A UTC Fire & Security Company

Software designed for safety systems and the people who use them

Safety System Software

User Guide

95-8560-6.0

CONTENTS

Section 1 - Introduction

Section 2 - S^3 Configuration

Section 3 - Ports

Section 4 - Start Monitoring

Section 5 - Printing

CONTENTS

CONTENTS

CONTENTS

Section 13 - EQP Logic Editor

DET-TRONICS®

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What is S³

Safety System Software (S³) is a complete, high performance Human Machine Interface software package that is designed to work seamlessly with a variety of Safety Systems including all three generations of the Detector Electronics “Eagle ” addressable systems. It allows data to be acquired from these systems for event and alarm tracking, display on custom graphics, and to be shared with other systems.

When used as an Operator Interface Station (OIS) it also allows commands to be sent to attached systems to perform a variety of functions. S³ also provides convenient and accurate device configuration, programming and diagnostic tools.

There are no cumbersome keyboard commands for the operator to learn. The entire interface is graphic in nature. On screen point and click icons allow convenient navigation through the application with easy access to the various features.

The S³ database contains all of the information needed to allow for easy and accurate configuration. All pertinent information for the device being configured including user selectable options is displayed on an easy to understand “point configuration screen”. From this screen the configuration can be viewed and changes can be made as desired.

Pre-configured “Point Display Screens” present data for complex networked devices as well as conventional ones in a consolidated and easy to understand format. With Eagle Quantum Premier devices, each node on the network provides detailed status information, recent alarms and calibration records.

S³ also provides password protection for up to 64 different user accounts to keep unauthorized personnel from modifying system configurations, and thousands of user levels for accessing command and control functions.

In short, S³ collects, tracks, displays and distributes your safety system information while allowing intuitive operator input for command and control functions of these safety systems.

User Guide

Depending on the application or system, it is very unlikely that all the features offered in S³ will be utilized, or some features may be used more than others. The S³ user guide has been developed to assist experienced operators in understanding the vast capabilities of this robust safety system software.

New users with no prior S³ knowledge will have difficulty following this guide. It is strongly recommended that a new user attend the EQP Systems Advanced Technical Training class (Course 102). Further information is available through our website or contact us by telephone.

Features

- User friendly point and click navigation, with no special keyboard commands to learn.
- Menu driven configuration ensures easy installation or modification.
- Configuration additions or changes can be made at any time with minimal interruption to system operation.
- Alarm and calibration data available online.
- Automatic diagnostics ensures reliable system operation.
- Up to 10 simultaneous active communication ports.
- Automatic serial port configuration; baud rate, data bits, stop bits, parity.
- OPC 2.03 Data Access Server option to share data with outside systems.
- Complete logic programming and simulation environment.
- SIL-2 compliant logics also available.
- Comprehensive “event tracking” for up to 250,000 unique tags.
- Event logging to screen, disk, and printer.
- Single window view of data from a variety of sources.
- Bilingual support for online operations.
- Multi-level security for up to 64 unique accounts.
- Project based development environment for managing multiple projects.
- Printing of comprehensive project documentation.
- Integral project backup and restore utility.
- Complete configuration logging for tracking changes to setpoints, device configurations, downloads, etc.

Requirements

The minimum S^3 workstation hardware requirements are:

Computer. The S^3 software suite is designed to run on an Intel® based computer with at least a 800 MHz Pentium III processor, running Windows Vista/XP Professional. Computers operating on a 64 bit platform are fully supported; as with many modern programs, the faster the machine, the better the performance.

A hard drive with at least 50 MB of available space and a CD-ROM drive is also required for installation.

Memory. S^3 Safety System Software is a high performance Operator Interface System (OIS) environment and requires a minimum of 256 MB of physical memory. When custom graphics are included in a project the memory footprint grows by 1MB per screen, based on XGA screen resolution, higher resolutions require more memory. Det-Tronics typically provides a minimum of 512MB of physical RAM in its OIS installations.

Display. S^3 requires thousands of colors (16 bit) and a minimum display resolution of 1024 pixels wide by 768 pixels high (XGA). Software support for touchscreens is included.

Serial Ports. S^3 is designed to utilize up to ten high speed serial ports, all running at up to 115.2 kbps simultaneously — typically this includes the two serial ports available on the motherboard of the computer, plus up to eight additional ports on an expansion card with a serial coprocessor. USB to serial converters are supported.

Ethernet. S^3 can communicate with some systems via a single or redundant Ethernet connection. Each network card must have a separate, fixed, TCP/IP address.

Printers. The system can utilize any properly installed printer for documentation purposes. For on-line alarm monitoring a serial printer port must be configured through the “Ports” screen, and the appropriate printer attached. S^3 is designed to work with a serial version of the Okidata ML490 four color, tractor feed, dot matrix printer.

Architecture

The S^3 software suite is divided into two distinct environments, Configuration and Online Monitoring.

The Configuration environment revolves around device/database configuration, graphics generation, project management and documentation.

The Online environment involves utilizing these configurations to collect distribute and display the information to operations personnel.

These two environments are summarized below.

Configuration Environment

This environment is utilized to configure the system for operation. The following primary functions are accessible:

- Configuration of communication ports which allow data to be collected from attached systems. This includes port type selection, protocol selection, and the manipulation of any adjustable parameters.
- Configuration of supported addressable field devices.
- Programming and simulation of supported logic solvers.
- Creation and editing of the second language database.
- Tag name development, alarm and event tracking configuration.
- Global operational parameter adjustments such as time & date format, touchscreen support, remote connection parameters, custom sound library management, etc.
- Project management tools to allow for multiple projects to be developed on one machine. This includes an integral project based backup and restore utility
- Security administration allowing for the creation and maintenance of user accounts.
- The ability to print selectable detailed project documentation.

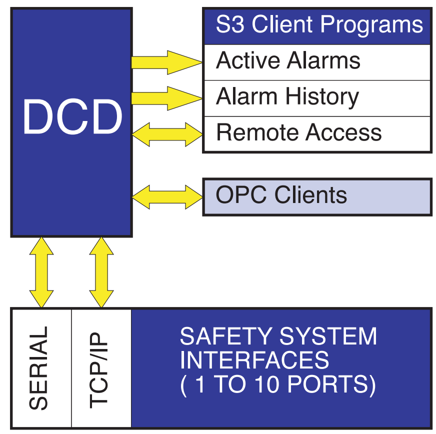
Online Environment

The S^3 software suite consists of a number of separate application programs that work together to collect, distribute and display data from a variety of sources.

At the center of the suite is an application program called the “Data Collector and Distributor” or “DCD” for short.

DCD

The DCD is the heart of all online operations. It handles all of the OIS communication processes including serial communications to attached systems, TCP/IP communication with attached systems, communication with OPC clients, and peer-to-peer communications with other S^3 application programs both local and remote.



The DCD can control up to ten communication ports, either individual serial ports or TCP/IP connections.

It collects data from these ports to update the tag database in accordance with the configurations of the individual attached systems.

Other S^3 application programs query the DCD to perform their individual functions such as, updating the active alarm list, generating the alarm history and daily log, and servicing remote access requests.

Installation Options

There are two installation options available depending on how the workstation is to be used. They are; Operations and Development.

Operations Installation Selection

This installation is designed for full time Operator Interface Station (OIS) operations where the system will be “online” around the clock and will be used by operations personnel as a window into the safety system.

If the “Operations” selection is used for installation, the system will be configured as a secure stand-alone OIS with tight security restrictions installed at the lowest levels of the operating system.

The user must be logged into Windows as the “Administrator” in order to install this option.

When the “Operations” installation is used S^3 takes complete control of the workstation and when “Online” access to the operating system will not be allowed. In addition, access to other application programs or Windows functions such as “CTL-ALT-DEL”, “ALT-TAB”, etc. will not be available.

The “Operations” installation also configures the system so that on a loss of power (or other event that causes a system restart) the OIS will automatically return to its previous state. S^3 will automatically restart and if online prior to the event will return online with the last valid user logged in as the current user. If not online the station will return to the S^3 Main Screen.

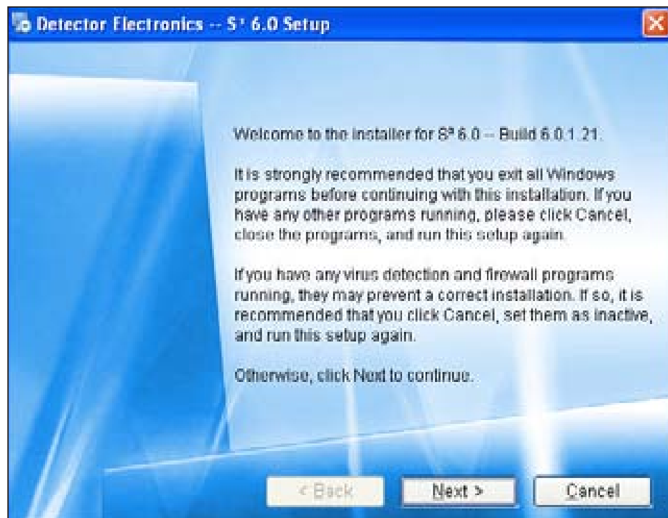
Development

The "Development" installation does not install the low level security features of the "Operations" version. User level security is still utilized but full access to the operating system is available in a manner consistent with the given operating system.

When S^3 software is ordered with the OIS computer, the software will come already loaded on the hard disk of the computer. If S^3 software is ordered separately, if re-installation of the original software becomes necessary, or if a software update is to be installed, use the following procedure.

NOTE
If S^3 software is currently running, return to the System Overview screen and quit S^3 before installing the software. It is highly recommended to uninstall any previous versions of S^3 before installation.

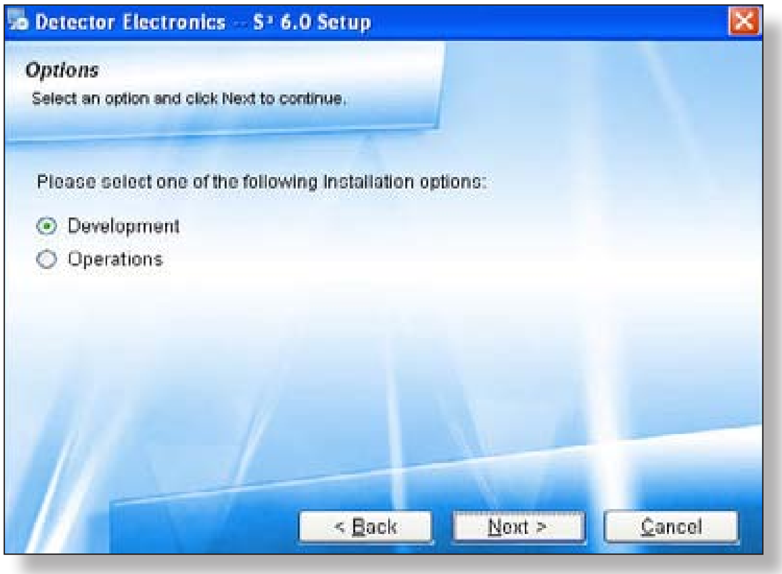
Installation Procedure



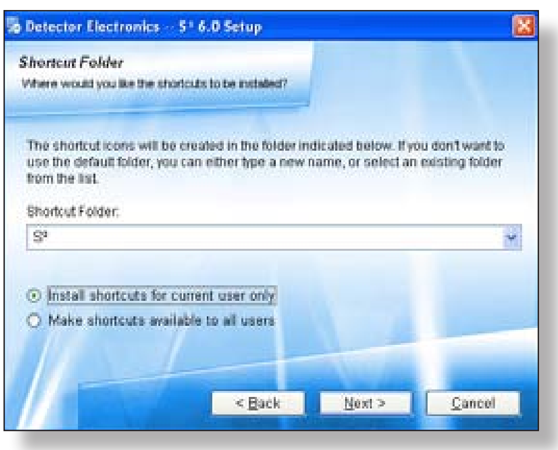
1. Insert the S^3 CD into the CD-ROM drive. Open the CD drive icon and double click on "Install." This will open the "Setup" dialog box with important instructions on how to continue. Clicking on the "Next" button will advance to the license screen.

2. This step presents Det-Tronics' software license agreement. Read the agreement and choose the appropriate radio button. Use the "Next" button to continue.

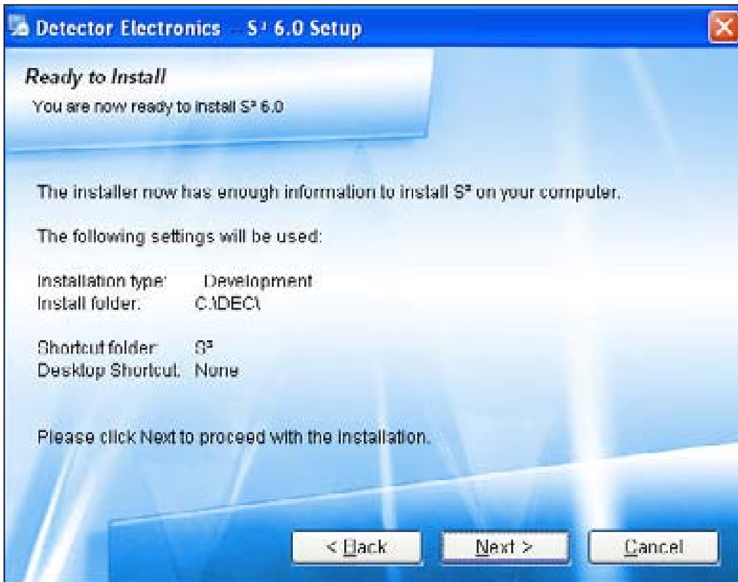
3. Choose one of the two types of installations and click the Next button. A “Develolpment” install is required when S^3 is being installed for the first time. An “Operations” install would be performed after all logics and settings have been created in the Development mode. In Operations mode, no changes can be made to logics or settings, only monitoring occurs in this mode.



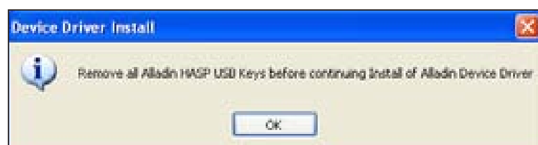
4. The next two windows are related to the S^3 desktop shortcut. Choose accordingly, then choose Next to continue.



5. Verify that all options selected in previous windows are correct, use the Back button to make corrections, choose Next to begin installation.

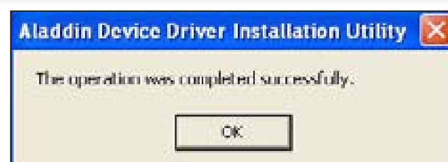


6. During installation there will be a prompt to remove all Alladin USB keys; do so at this time and choose OK to continue.



7. The installer will now install all the necessary drivers.

8. After the drivers are installed successfully, a confirmation window will appear, choose OK to continue.



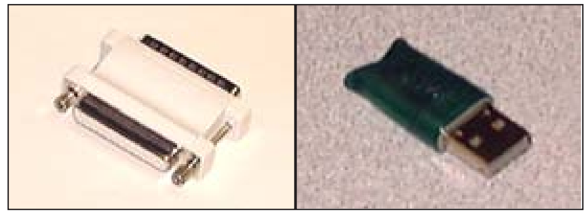
9. A successful installation window will appear, click Finish.

10. Plug the Aladdin key to a USB port on the computer.

11. The system will ask to be rebooted due to the newly installed drivers. Choose Yes, and OK.

Upon successful installation, S^3 automatically creates a desktop shortcut and a folder titled "DEC", where all necessary and related files are stored.

Hardware Keys



A hardware key which attaches to the workstation determines the options that will be enabled on the station.

The hardware keys are available in two versions; one for the standard DB-25 Parallel printer port and the other for a USB port.

This “Standard” hardware key is programmable to enable a variety of options.

The “Standard” Configuration/Runtime Key

This key will allow communication with and the configuration of Detector Electronics Corporations “Eagle” addressable Fire & Gas systems. (EAGLE2000 “E2K”, Eagle Quantum “EQ”, Eagle Quantum Premier “EQP”).

The Configuration/Runtime key enables the following features:

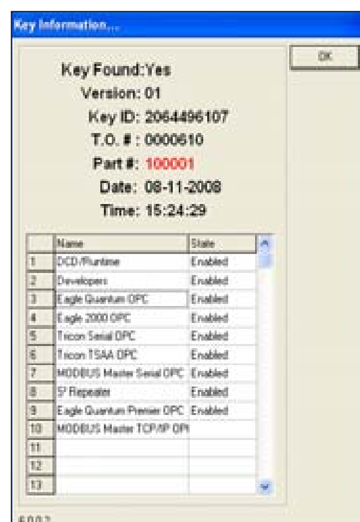
- The ability to utilize up to 10 serial ports to communicate with multiple Eagle systems.
- The ability to configure any of the field devices and download this configuration to them.
- The ability to program, simulate, monitor and document logic for the supported controllers.
- The ability to look at the “real time status” of any attached Eagle field device through pre-built “point-displays”.
- Enables the DCD program allowing it to run.
- The ability to utilize a configuration engineered with the developers key to communicate via up to 10 ports.
- The ability to log to screen, disk, and printer any configured events for any of the attached systems.

This key does not allow the development of custom graphics but does allow online operation with graphics created with a developers key.

A variety of options are available and when purchased will be enabled by the key. These include the following:

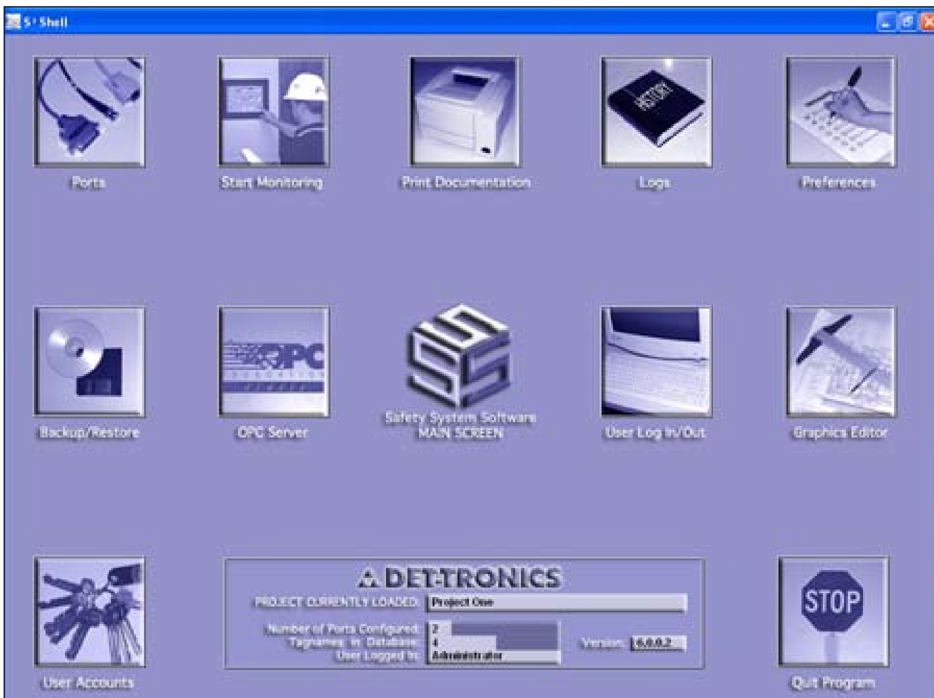
- Expansion of EQP network from 60 to 250 nodes.
- Enabling additional communication ports. Up to 10 total can be enabled.
- Enabling the EQP OPC Data Access Server feature imbedded in the DCD.
- Enabling Modbus RTU serial and/or Modbus TCP Ethernet ports.
- Enabling Triconex serial and/or TSAA Ethernet ports.

While on the main screen (see the next section) in S^3, the user is able to view a list of all enabled options available with a key by pressing “K” on the keyboard. The window should resemble the example to the right.



When the S³ application program is started it will display its "MAIN SCREEN". From this screen there is access to all the engineering, configuration and utility programs that make up the S³ application suite.

There are eleven buttons on this screen, each one provides access to a different area of the application suite.



Main Screen

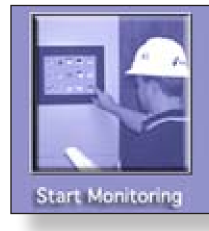
Before any work can be done the user must "log in" to the system with a valid password utilizing the "Log In/Out" button.

The access privileges for the users account will determine what features will be available for access and the buttons for these features will then be enabled.

Ports

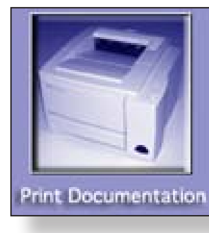
Provides access to the "Port Configuration" screen. From that screen up to ten (10) ports can be configured for access to attached systems via serial connection, or Ethernet.

Start Monitoring



Launches the main online monitoring application (DCD) which starts continuous polling of all enabled ports and begins event monitoring, logging and printing. If so configured, it also displays custom graphics with dynamic data overlay.

Print Documentation

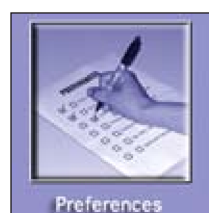


Provides access to the project configuration documentation features of the system. Complete documentation of port, point, and event configurations for all attached devices can be selected for printing on the Windows default printer.

Logs

Allows access to both the configuration logs and daily log files. The configuration logs track all configuration changes made to the system while the daily logs store events monitored online and are stored by day.

Preferences



Provides access to a wide range of global preferences including the ability to select the currently active project, second language support, sound library configuration, day/date/time options, screensaver options and more.

Backups

Provides access to the project backup and restore utility. This automated utility allows a selected project to archived to or restored from floppy. Built in compression routines allow even large projects to be backed up.

Log In/Out

Provides access to the user "Log In" screen. Up to 64 unique password protected user accounts can be configured, each having different rights and privileges.

Passwords

Provides the system administrator with the tools for setting up and managing the individual user accounts. Individual users with valid accounts may also change their password from this utility.

OPC Server

Allows the user to browse the tag name database and view the OPC properties of tags, to activate or deactivate either individual tags or groups of tags, and to document (print) the server configuration.

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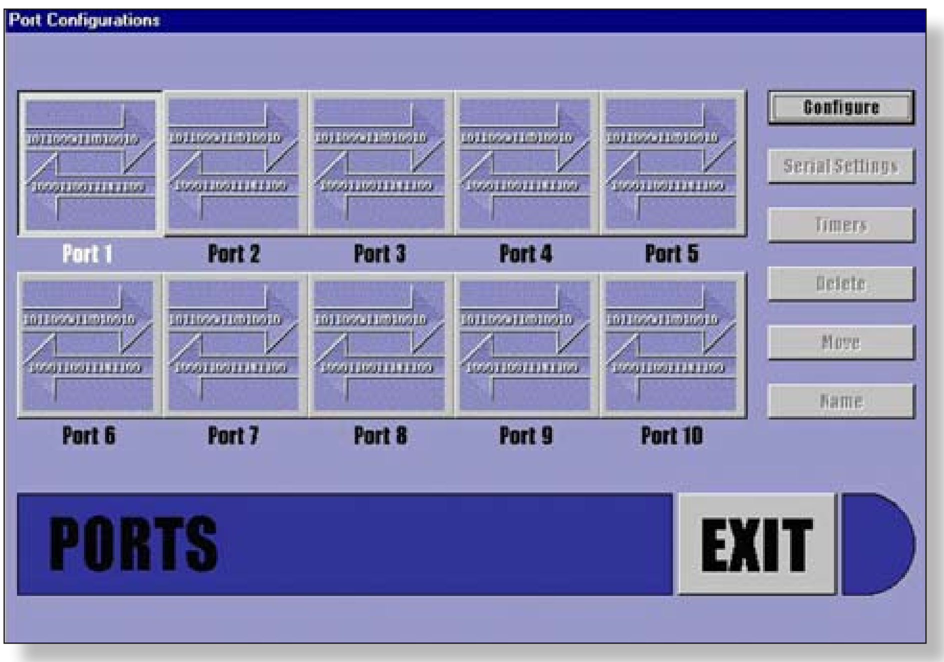
Basic Port Configuration

Clicking on the "Ports" button from the S³ Navigation screen of the S³ software brings up the Port Configurations dialog box:

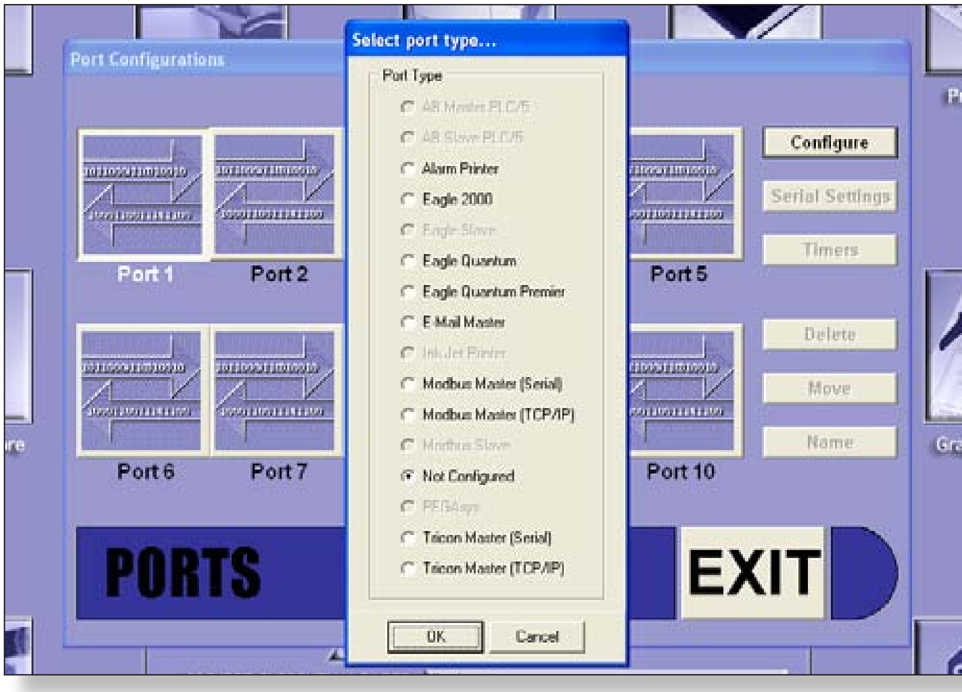
S³ offers ten ports, each of which can be configured to a specific type of system or device.



By default, when the Port Configurations dialog box first appears, Port 1 is selected.

Choosing the "Configure" button from the "Port Configurations" dialog box, the "Select port type" dialog box appears (this is true only when an unused port is selected).

The available choices are based on the S³ hardware key plugged into the computer, and only supported systems or devices are darkened.

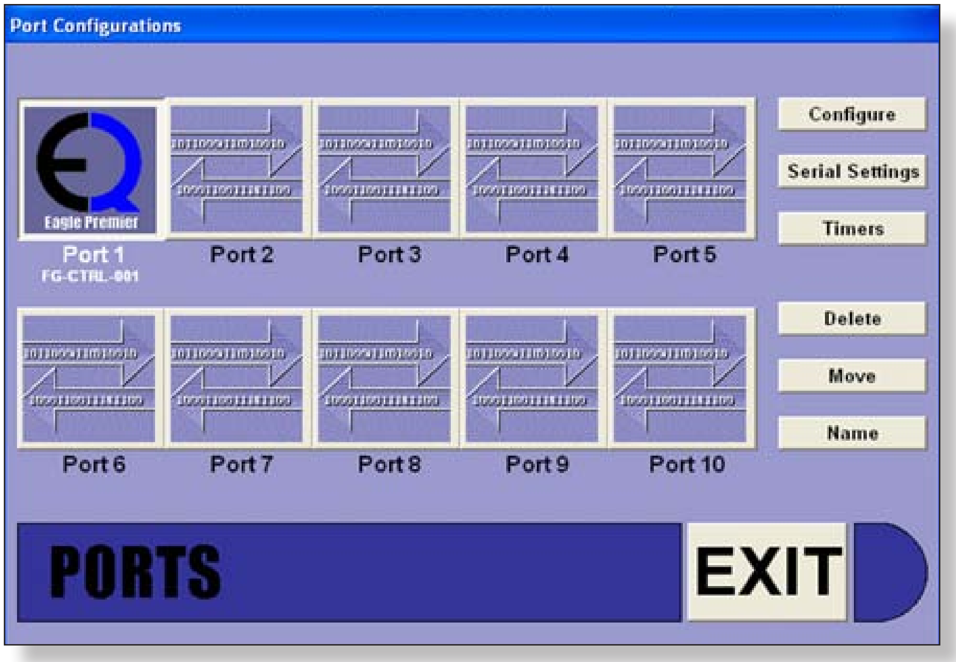


"Not Configured" is the default selection, simply select the radio button for the type of port to be created and click OK. This will open the main configuration screen for the selected port type. Clicking Cancel will return to the Port Configurations dialog box without any change.

NOTE
Refer to the appropriate section of this manual for details on specific port type configurations.

From the main configuration screen for the selected port type, choose "Exit" to return to the Port Configuration screen.

NOTE
New port types are constantly under development. Information on new port type support and the latest information on S³ updates can be obtained through the Detector Electronics website at www.det-tronics.com.



Serial Port Settings

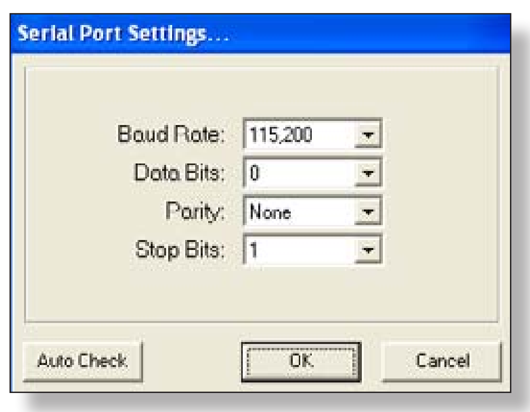
Once the port type has been selected, the button face will change to match the selection. In addition, six buttons on the right hand side of the window will be enabled. These buttons allow various parameters to be adjusted for any configured port.

Configuration of the device(s) attached to a port, data table reads, etc. are accessed by double-clicking on the port button, or selecting the “Configure” button.

Physical serial port configuration parameters like baud rate, the number of data bits, etc. can be accessed using the “Serial Settings” button. This will open a dialog box allowing the adjustment of the port parameters.

The port parameters can be set manually from the pull-down menus.

Selecting the “Auto Check” button will cause the software to cycle through all combinations until it can connect. It will then display the successful settings.



The “Timers” button will open a dialog box allowing the “Polling” and “Watchdog” timers for the port to be set. There are also checkboxes to enable each of these timers.

The Polling Timer determines how quickly the port will poll the attached slave.

The Watchdog Timer determines how long to wait for a response from the slave before logging a watchdog fault. A sound can be tied to this fault from a pulldown menu.

The “Delete” button allows the removal of a port from the system configuration. Port deletions are **final**, there is no “undo”, use with care.

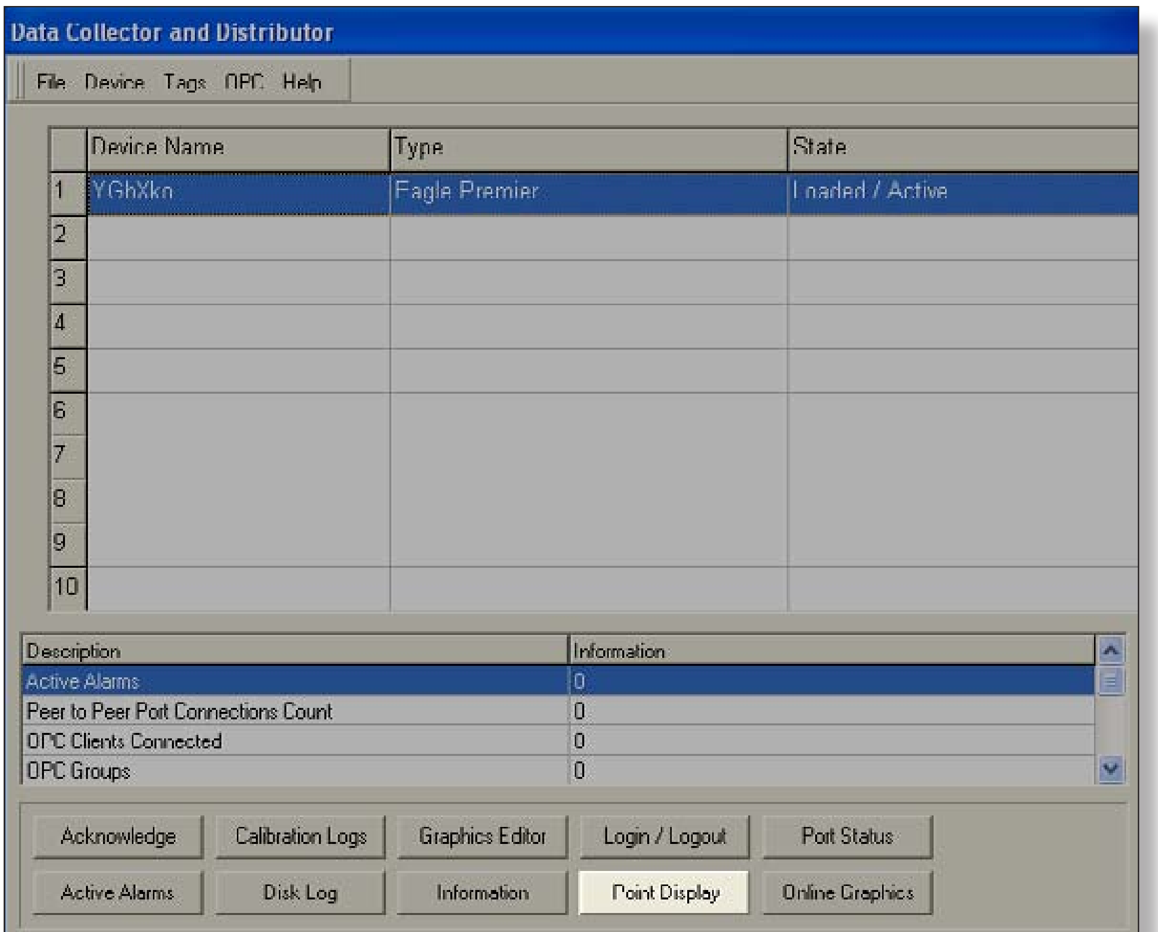
The “Move” button allows a fully configured port to be relocated to a different port while preserving its configuration.

NOTE
Moving a port will have no impact on the graphics since the dynamic and TAG objects are based on the tag name not the port.

The “Name” button allows a name to be associated with a port. This name will then show up in the printed documentation for the port. It has no other purpose except for the printed documentation.

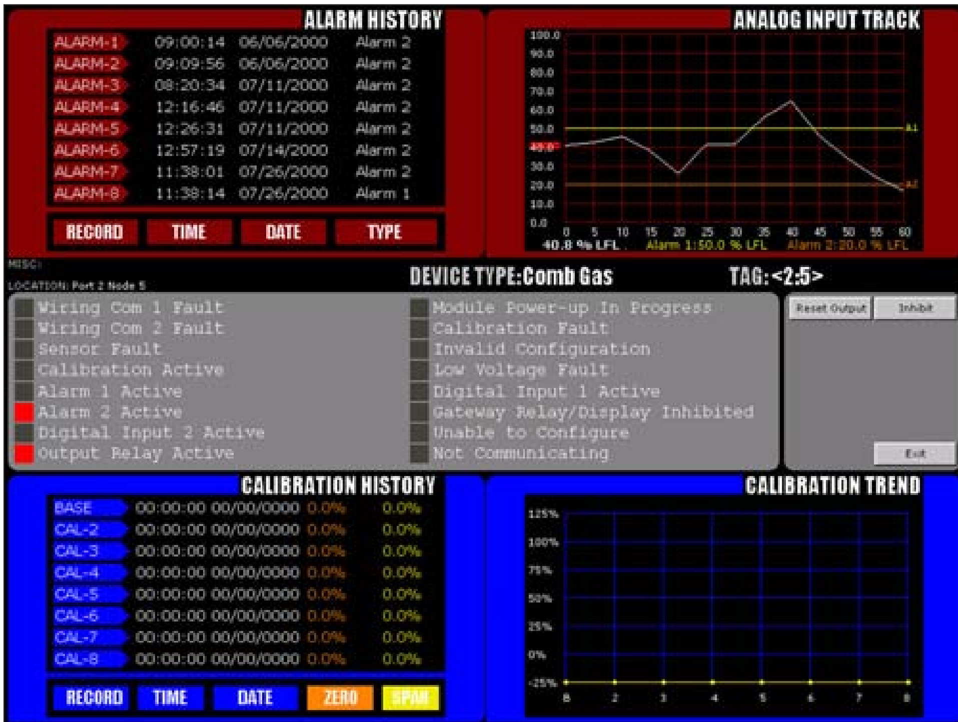
Online Operation

The “Start Monitoring” button launches the DCD, which allows the user to access “Online Mode”.



Online mode provides the operator with continuously updated information about the attached systems.

Shows the user detailed information about a selected TAG object. Each type of device, digital inputs, analog inputs, fire detectors, gas detectors etc. have a different type of point display, tailored to the amount and type of data available for that specific device.



The sample point display above is for an addressable combustible gas detector.

Displays a list of defined button groups so the user can select and display the group. Each button group has up to five buttons that can be used to change screens, send commands to attached systems, etc. The user can only select button groups that are “enabled” for the current graphic screen. Button groups are defined in the graphic editor.

Displays the “Function Key List” available online for faster execution of functions.

The program functions with assigned Fkeys include the Acknowledge, Alarm History, Log in/out, Port Diagnostics, Calibration Log Reporter, and Quit Online Operations.

Acknowledge (F3)

Silences audible alarms, causes all TAG objects in a "New Alarm" state on the graphics to go to their "Acknowledged Alarm" state, and can also be configured to activate a user programmed button.

Active Alarms (F5)

Opens the "Active Alarms" screen that shows any "out of tolerance" conditions. Using the buttons at the bottom of the screen, these conditions can be sorted by communication port or viewed all together.

In the example below there are two active ports, Port 1 configured for Triconex system and Port 3 configured for a Quantum system. On the right side of the screen are a number of self-explanatory buttons for navigating the list, none are shown highlighted due to the shortness of the list in the example.

There is a counter at the top right indicating the current number of active alarms. In the lower right there is a page indicator and buttons for Acknowledging alarms or exiting the display.

Alarm History (F6)

Opens the “Alarm History” screen and displays the current days log. This daily log shows date and time stamped events for a 24 hour period.

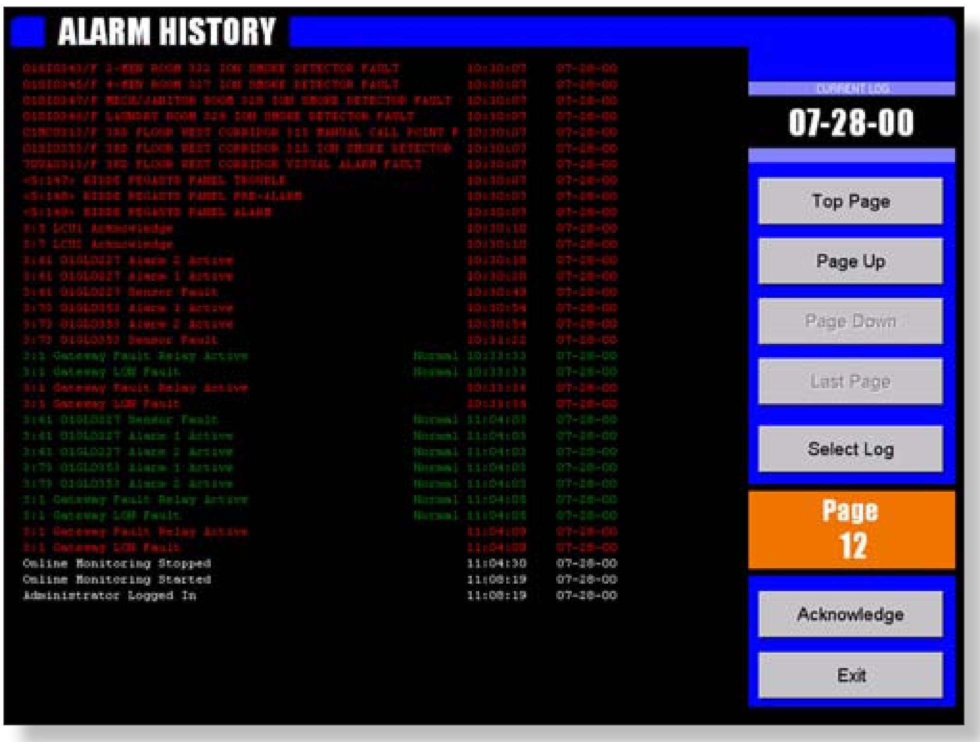
It has two main areas, the historical display in the center and the navigation buttons running down the right side of the screen. In addition to viewing the current days log, the user can use the “Select Log” button to choose a log from another day.

The date of the log being displayed is shown at the top right of the display.

An acknowledge button is provided to acknowledge alarms without leaving the Alarm History screen.

Log in/out (F8)

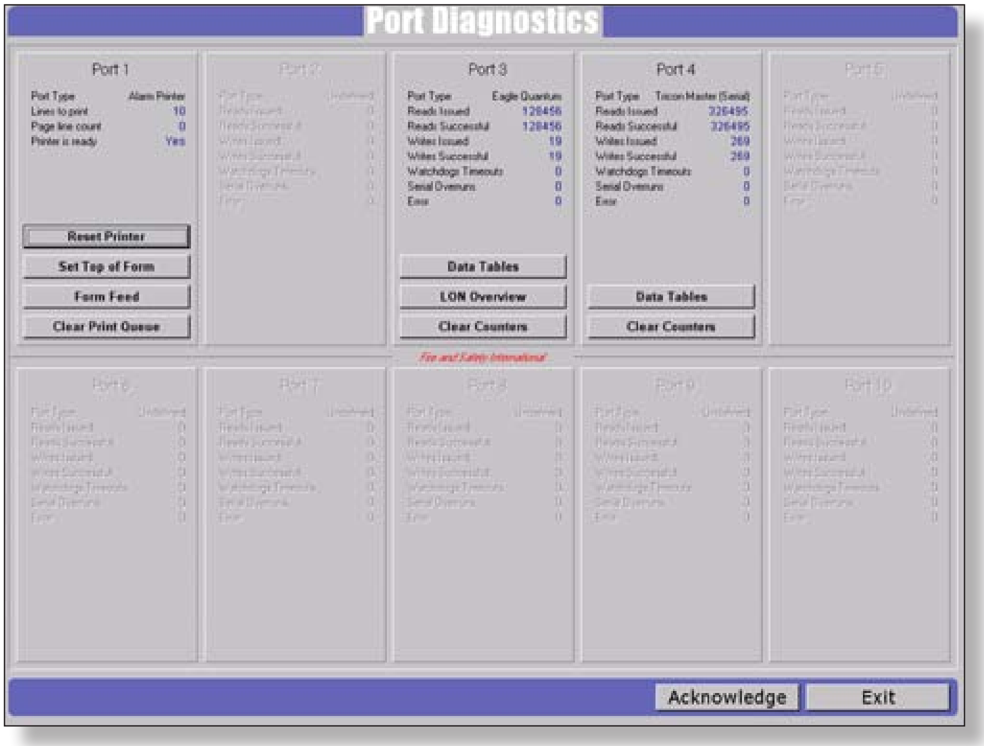
Up to 64 unique users can be configured, each having their own access privileges. This Fkey allows the current user to “log out”, or a new user to “log in” to the system. This action will be recorded in the Alarm History.



Port Diagnostics (F11)

Opens the "Port Diagnostics" screen which displays the status of all ten communication ports.

Dynamic counters display information on data reads issued and successful, writes issued and successful, and failures in communication between S^3 and the attached systems.



Each port type has buttons for accessing applicable features. These include a way to display the ports data tables, a LON Overview for Eagle type ports and a way to clear the counters.

The "Printer" port type allows for printer control and maintenance. A "soft reset" of the printer can be performed as well as setting the top of form and initiating form feeds. In addition the printer event queue can be cleared.

Data Tables

The data tables show users the current information about addresses and bits being read from attached systems stored in specific serial tables of a port.

This feature is typically used by maintenance personnel to determine if the selected port is reading the correct addresses and to do detailed troubleshooting.

Some port types allow for the configuration and polling of multiple data tables. All configured data tables are available for viewing by pressing the appropriate button at the lower left of the screen.

An "Acknowledge" button is provided to allow alarms and events to be acknowledged without leaving the data table screen.

LON Overview

This is a specialized diagnostic screen which displays a schematic representation of the addressable Eagle Quantum Premier, Eagle Quantum or EAGLE2000 loop.

Each device on the loop is represented by a rectangle containing the device tag and other information. The color of the rectangle represents the current status of the device. There are five possible conditions/status, Normal, Fault, Alarm, New Fault, or New Alarm.

Additional viewing options that can display more information are accessed through a group of buttons in the lower right of the display.

Acknowledge

Either silences an activated alarm while being in the LON overview screen or silences an activated alarm from the Port Diagnostics screen.

Display Type

It displays devices by device name.

Point Display

Clicking on this button or double clicking on the rectangle representing a particular point will display the "Point Display" for that unit. From the "Point Display" all of the available status and diagnostic details on a nodes can be viewed. (Read more about the point display in Section 11-10).

Exit

Takes the user out of the LON overview screen.

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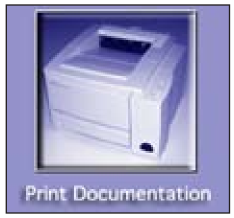
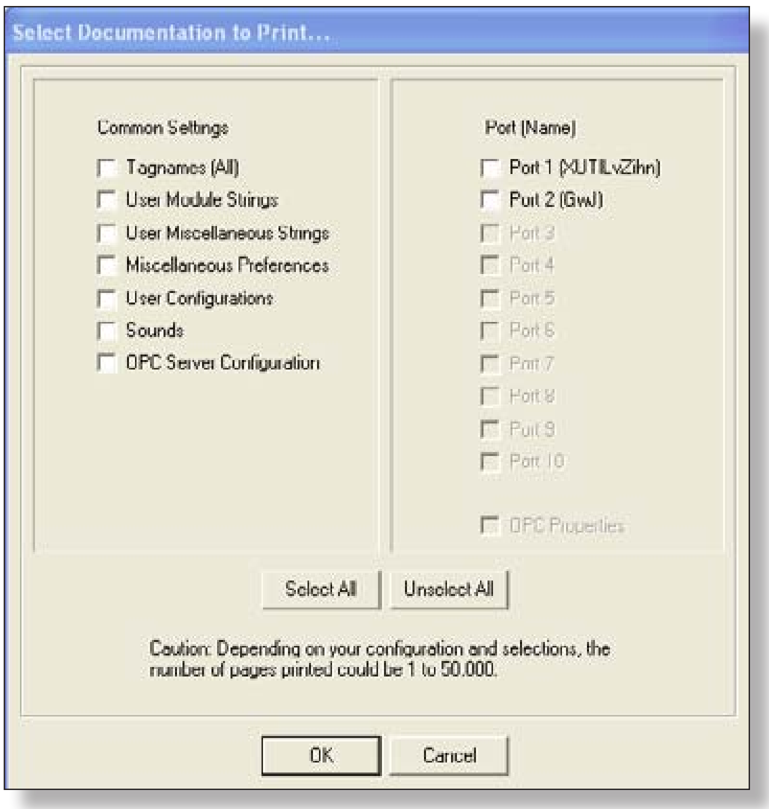


Overview of features

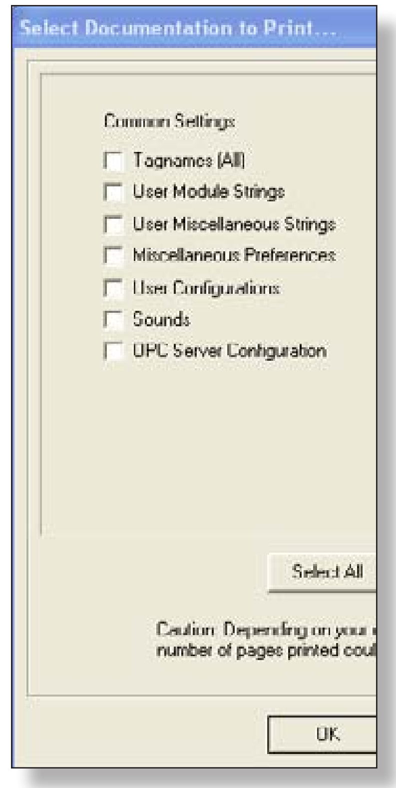
Using the Windows default local or network printer, S³ can be print comprehensive documentation of port, point, and event configurations for all attached devices.

Selecting the “Print Documentation” button from the main screen will open a dialog box which allows the user to configure which portions of the documentation to print.



Choices are made using check boxes for both the type of documentation and the ports to be included. Using the select all button will provide total documentation of the system configuration. This could easily reach into hundreds of pages of printed documentation depending on the number of ports configured and their point configurations.

Filtering data to be printed



Tagnames (All)

This selection prints a list of all tagnames used in the system.

User Module Strings

This selection prints the factory default and user configured "event descriptions" associated with the individual points.

User Miscellaneous Strings

This selection prints the factory default and user configured substitutes for the descriptions of buttons and text used by the system in the "Online" mode. Examples of miscellaneous strings include the navigation button descriptions, function key list and user configured buttons.

Miscellaneous Preferences

This selection prints certain configuration parameters in the graphic editor and online applications. In the graphic editor this includes the graphic grid spacing and polygon tool settings. In the online application it includes whether or not the acknowledge button silences custom sounds first, how may days alarm logs will be kept, whether the alternate language dictionary is configured to be used or not and whether to use a twelve or twenty four hour clock.

User Configuration

S^3 supports up to sixty four (64) unique user accounts, this selection prints all user account information except passwords. This includes whether or not the user can access the configuration programs, initiate send commands to attached devices, access port diagnostics and quit online operations.

Sounds

This selection prints a list of the custom sound library. Up to 64 custom sounds can be recorded and used by the system.

OPC Server Configuration

Prints a list of "Active" tags available to OPC Clients.

Selecting ports to document

Port 1 - 10

S^3 supports up to ten ports. Each port can be physical serial port or an Ethernet connection.

NOTE
A single Ethernet card can support multiple ports!

In the example to the right, ports one and three are configured and therefore selectable. The ports not configured are grayed out.

Each selected port will have its documentation printed.

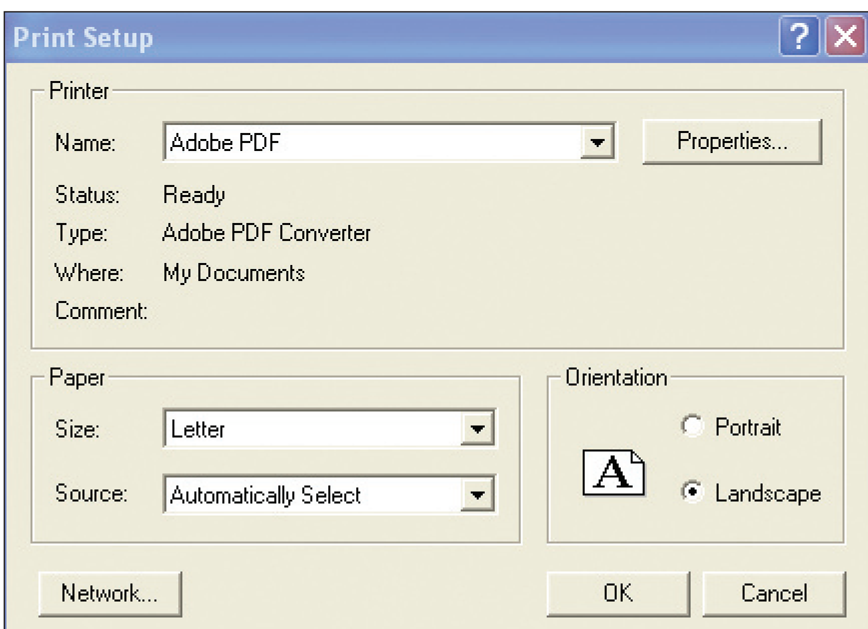
Port documentation includes all aspects of the configuration including the communication parameters and any configured points, events, alarms, setpoints, custom event names, etc. Each configured point has one page of printed configuration data.

Once all of the selections for the documentation and ports to print have been made, select the “OK” button to access the “Print Setup” dialog box for the Windows-NT/2000/XP/Vista default printer and continue the printing process.

Once the print configuration is set, selecting OK will display the “Print Setup” dialog box for the Windows-NT/2000/XP/Vista default printer.

In the example below an HP LaserJet 5000 network printer is the Windows-NT/2000/XP/Vista default.

Depending on the default printer installed the dialog box and choices available will vary.



NOTE
The Okidata event and alarm printer specified for use with S^3 can be configured as the Windows-NT/2000/XP/Vista default printer and used for documentation. However, due to the volume of paper and printer speed, it is not recommended.

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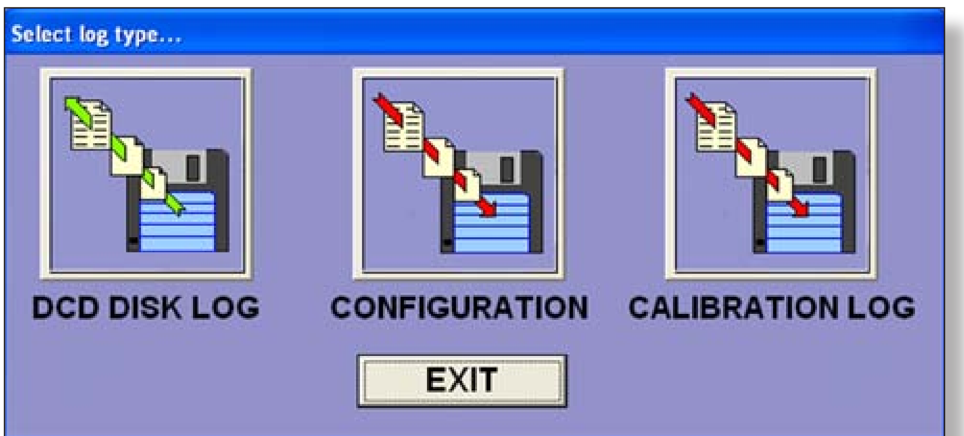
Overview of features

S^3 maintains three different types of logs; disk, configuration and calibration. All can be viewed and printed from this utility.

Selecting the "Logs" button will display the "Select Log Type" window to choose which type of logs are to be accessed.



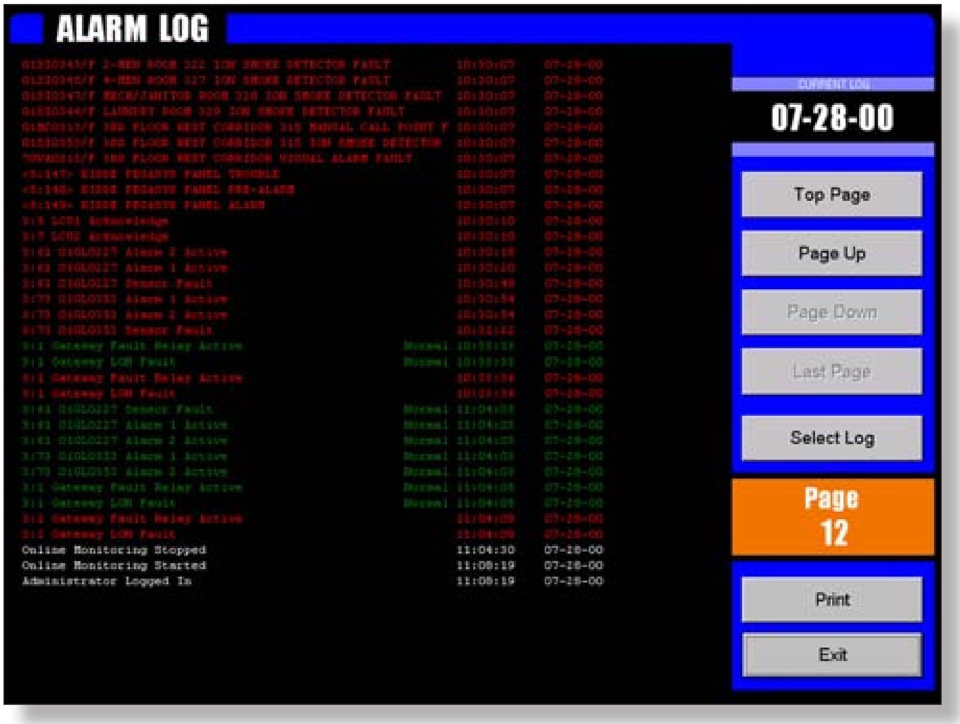
DCD Disk Log's are a chronological list of alarms and events that have occurred during a 24 hour period while the DCD was online. Each log runs from midnight to midnight and each days log is stored by date.

Configuration logs track all configuration changes made to the system including point creation and deletion, setpoint changes, etc.

Calibration logs are the collation of data from queries of the distributed calibration histories of field devices on the network. The user determines what port, what type of device, a time frame and S^3 will retrieve the data from the field devices and put it into a report. The daily disk, configuration log and any previous logs from this utility can be viewed or printed.

Alarm Logs (DCD Disk Log)

Below is a sample alarm log. Running down the right hand side is the log name (which is the date), navigation buttons, a button to select a different log for viewing, the page indicator for the currently viewed log, a print button and an exit button.



The purpose for the alarm log is to provide a chronological history of events related to the system. These recorded "events" can indicate alarms, diagnostic information, or just out of tolerance conditions as defined by the user.

During the detailed port configuration process events are configured and their destinations determined. One of these destinations is the daily alarm or disk log.

Events can appear in any of four colors:

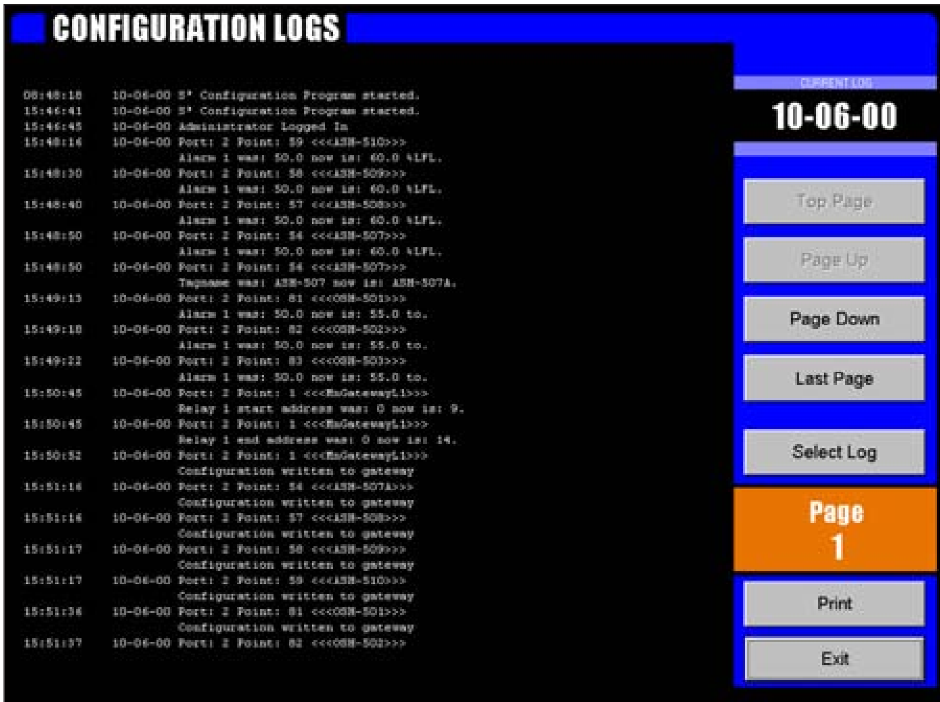
Red = Alarm
Yellow = Fault
Green = Alarm/Fault; Return to normal
White = Non-critical event

NOTE
Events configured as "white" that also go to the alarm printer will print in "black".

The log is formatted in three columns, the first contains the event name, the second indicates the time, and date is displayed in column three.

Configuration Logs

Below is a sample configuration log. Running down the right hand side is the log name (which is the date), navigation buttons, a button to select a different log for viewing, the page indicator for the currently viewed log, a print button and an exit button.



The purpose for the configuration log is to provide an audit trail for safety related changes to the system. By examining the configuration log it can be determined if tagnames were changed, if alarm setpoints were changed in the detector configurations, and if these changes were downloaded to the system or not.

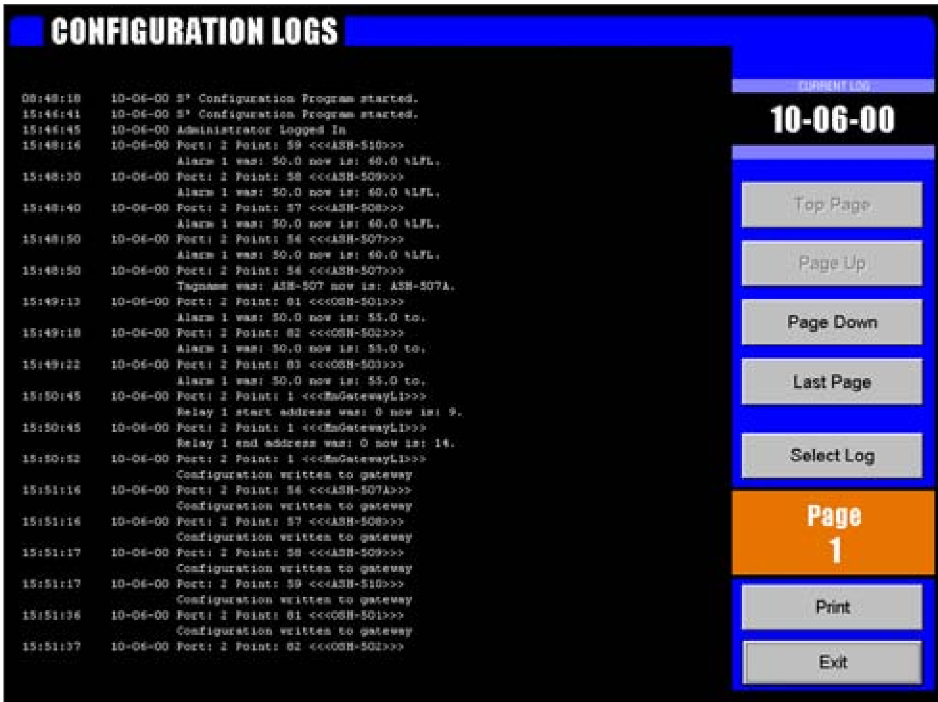
The log is formatted in three columns, the first contains the time, the second the date and the third a description of the change.

The change column may use two lines to log the change. In these cases the first line contains the port number, point number, and tag name. The second line contains the description of the change.

NOTE

The configuration log tracks changes related to operation and safety only. Changes to graphics are not logged.

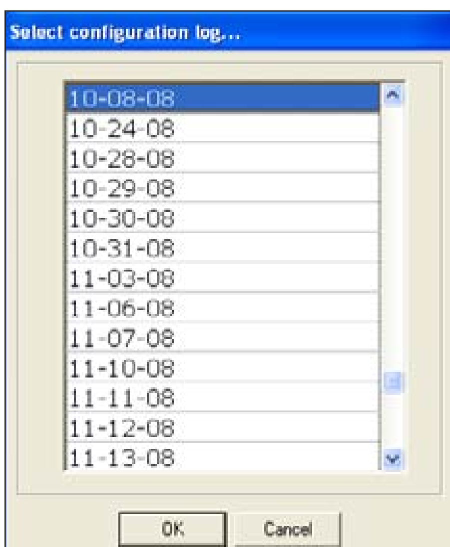
The Configuration and Alarm logs can be opened or viewed, and previous logs can be printed by using the "Select Log" button.



This will display a standard Windows-NT/2000/XP file navigation dialog box showing the content of the configuration or alarm log sub-directory, which ever is applicable.

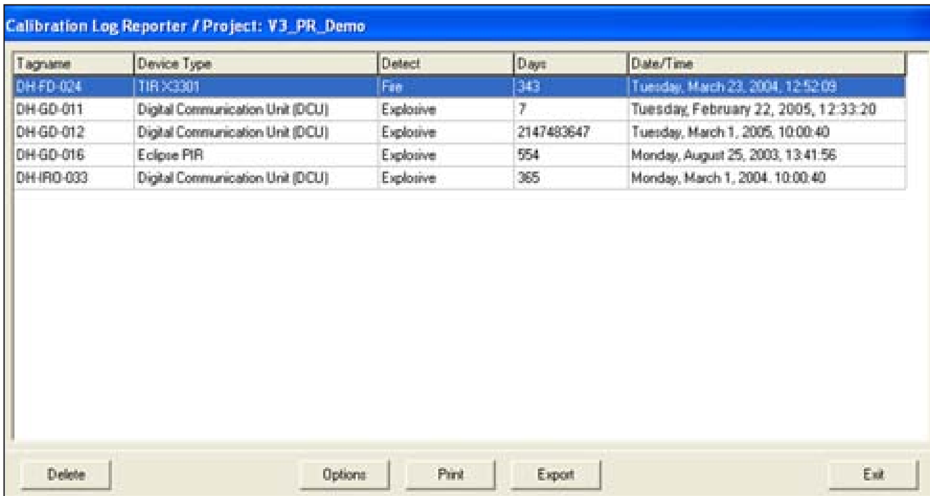
The logs are listed using the month, the day and year, with the date as their name. Select the date of interest and OK to open the log for viewing and / or printing.

The "Print" button will display the standard Windows-NT/2000/XP printer dialog box for the default printer.



Calibration Logs

Below is a sample calibration log. The calibration log reporter is a configurable database query tool designed to allow a user to quickly determine if periodic calibration of field devices is being conducted.


Calibration Log Reporter / Project: V3_PR_Demo

Tagname	Device Type	Detect	Days	Date/Time
DH-FD-024	TIR X3301	Fire	343	Tuesday, March 23, 2004, 12:52:09
DH-GD-011	Digital Communication Unit (DCU)	Explosive	7	Tuesday, February 22, 2005, 12:33:20
DH-GD-012	Digital Communication Unit (DCU)	Explosive	2147483647	Tuesday, March 1, 2005, 10:00:40
DH-GD-016	Eclipse PIR	Explosive	554	Monday, August 25, 2003, 13:41:56
DH-IRO-033	Digital Communication Unit (DCU)	Explosive	365	Monday, March 1, 2004, 10:00:40

Delete Options Print Export Exit

The log displays the Tagname, Device Type, Detector type, Days since the last calibration and the Date/Time of the last calibration. If the device has never been calibrated, the Date/Time will show the time the calibration log reporter was accessed and the “Days” field will have the maximum integer value of 2147483647.

Whenever a calibration log is collected from a field device, online or in configuration, it is stored in a database. This database is currently viewable only on the computer where the database file is located. It is viewable from the “Logs” button on the main screen, and the DCD.

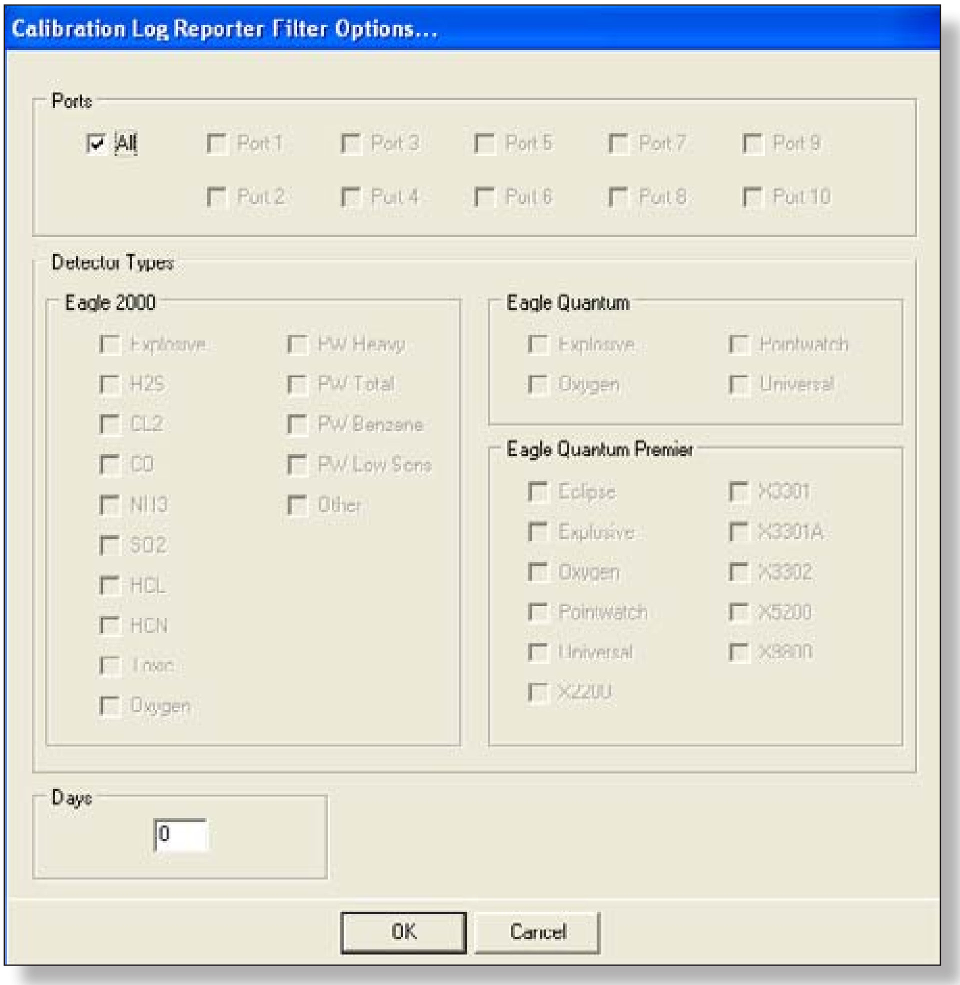
If viewed from the “Logs” button a choice of project/database is available. If via the DCD it is the current active project.

Printing is supported to any “windows” configured printer. If preferred, the logs can be exported as a text document and opened with a text editing software such as Notepad.

Calibration Log Reporter Filter Options

The options button opens the “Filter Options..” dialog box allowing for the S^3 database query to be configured. This allows the user to configure a report that provides just the specific information required.

The top section, labeled “Ports” provides check boxes for the ten potential ports. “All” is the default, deselecting it will highlight all available ports for which logs exist.

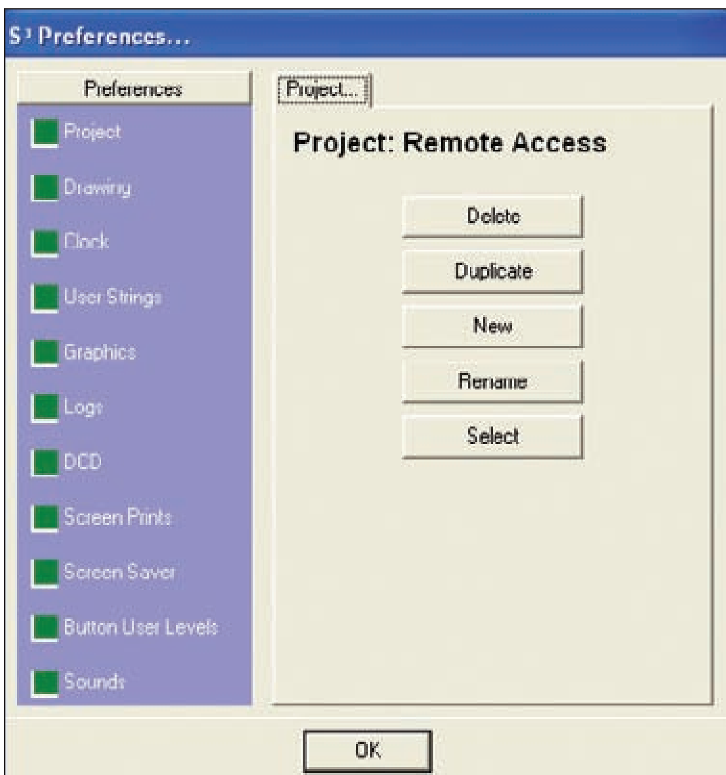


Eagle devices (2000, Quantum, Premier) store their calibration histories in local non-volatile memory. Whenever S^3 accesses this data it stores it in a database thus creating a “Log” linked to the port of origin. This happens whenever a point display is accessed, from the configuration environment, or by the DCD when running.

The preferences button provides access to a variety of project management and global attributes and settings. They are accessed from a dialog box called "S³ Preferences". Arranged down the left side are eleven categories, starting with "Project". Once the project is selected, the other ten categories apply only to that project.

Project

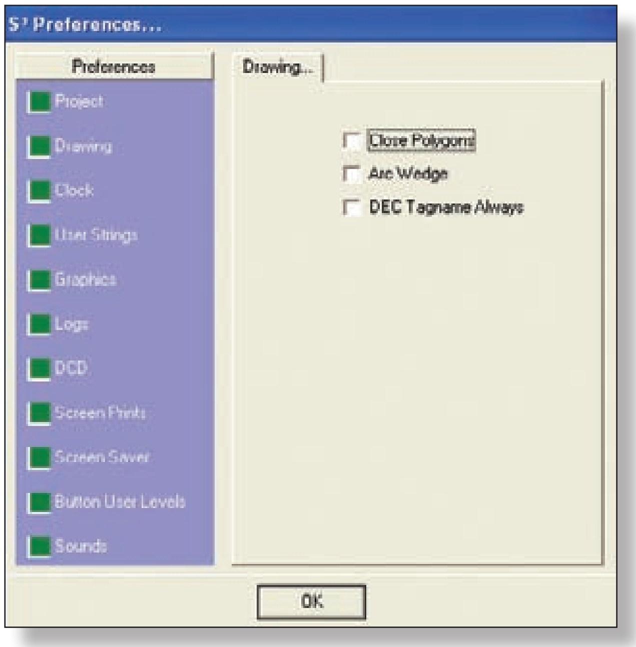
Shown below, the project category allows for the top level selection and manipulation of the project to be worked on. The currently active project is displayed at the top right, in this example "Remote Access".



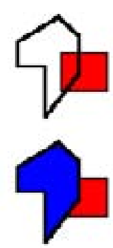
Multiple projects can be in development on the same machine and this tab provides resources for deleting projects, duplicating projects, creating new projects, renaming existing projects, and selecting an existing project.

Drawing (Unsupported Feature)

The drawing tab allows for the setting of the default operation of two drawing tools in the graphic editor. The "Polygon" and "Arc" tools.



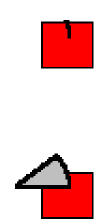
Close Polygons



By default, this check box is de-selected. This means that when a polygon is drawn in the graphic editor, when finished it has no fill color or pattern. If selected, the finished polygon will become a solid object with adjustable fill color and pattern attributes.

Within the graphic editor, any polygons drawn will be "open" or "closed" based on the settings of this check box. However, once drawn individual polygons can be changed as required.

Arc Wedge



By default, this check box is de-selected. This means that when an arc is drawn in the graphic editor, when finished it has no fill color or pattern. If selected, the finished arc will become a solid object (wedge) with adjustable fill color and pattern attributes.

Within the graphic editor, any arc drawn will be "open" or "closed" based on the settings of this check box. However, once drawn individual arcs can be changed as required.

DEC Tagnames Always

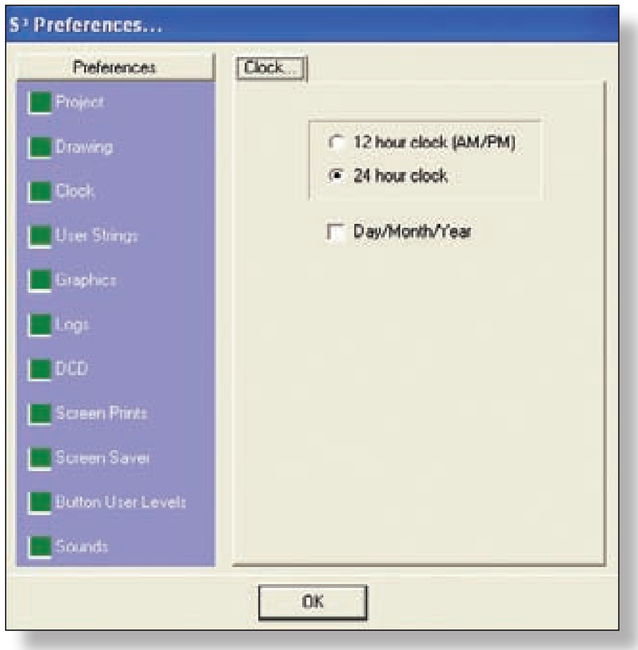
By default, this check box is de-selected. This means that when a project with graphics is opened in the graphic editor, all devices represented will not have a Det-Tronics tagname associated with them. When selected, a series of Det-Tronics tagnames will appear beside the various devices represented in a graphic project.

Clock

The purpose of the clock tab is to accommodate the two different methods for displaying the time and date around the world.

Time

A radio button is provided to choose between a twelve hour clock with AM and PM suffix or a 24 hour clock.

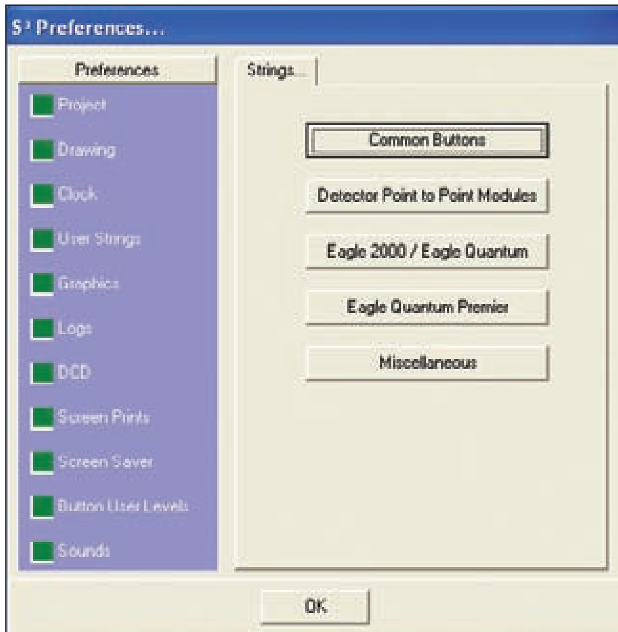


Date

A check box is provided to format the date using the “Day/Month/Year” method. The default is “Month/Day/Year”.
These time and date settings apply to all logs and printouts created by S^3.

User Strings

The “User Strings” tab provides access to a very powerful feature, the Second Language Dictionary (SLD). The SLD is used to provide second language support to the “Online” aspects of the systems operation.



The four databases in the SLD are accessed through the buttons on the preferences dialog box. Each database provides the factory default, in English, with a field to substitute a second language equivalent.

Common Buttons

Substitutes for all operator interface buttons found in the online application of S^3.

Detector Point to Point Modules

Supports a variety of commonly used Detector Electronics Corporation conventional gas detectors and optical flame detectors.

Eagle 2000 / Eagle Quantum

The default device event descriptions can be substituted by the user in various languages.

Eagle Quantum Premier

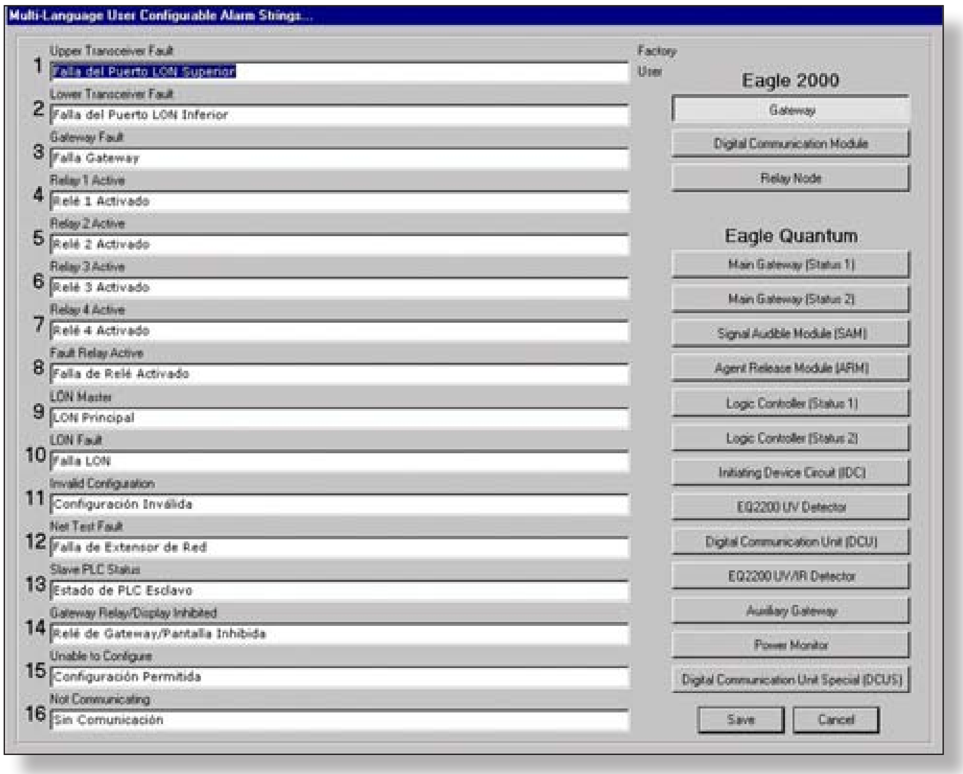
Factory names for each item may be configured by creating or importing a replacement name.

Miscellaneous

Substitutes for a variety of text descriptions found throughout the S^3 online application.

Examples

Below is an example of EAGLE2000/Eagle Quantum SLD configuration.
On the right hand side of the dialog box are a series of buttons for the different products.



In this example, the EAGLE2000 Gateway is selected. That causes a list of the available events for that device that can be configured for tracking. The English factory default description is displayed above a field where a substitute description can be entered. In this example it is a Spanish description but it could be any Roman character language.

NOTE
Cyrillic font support is included for Russian speaking countries.

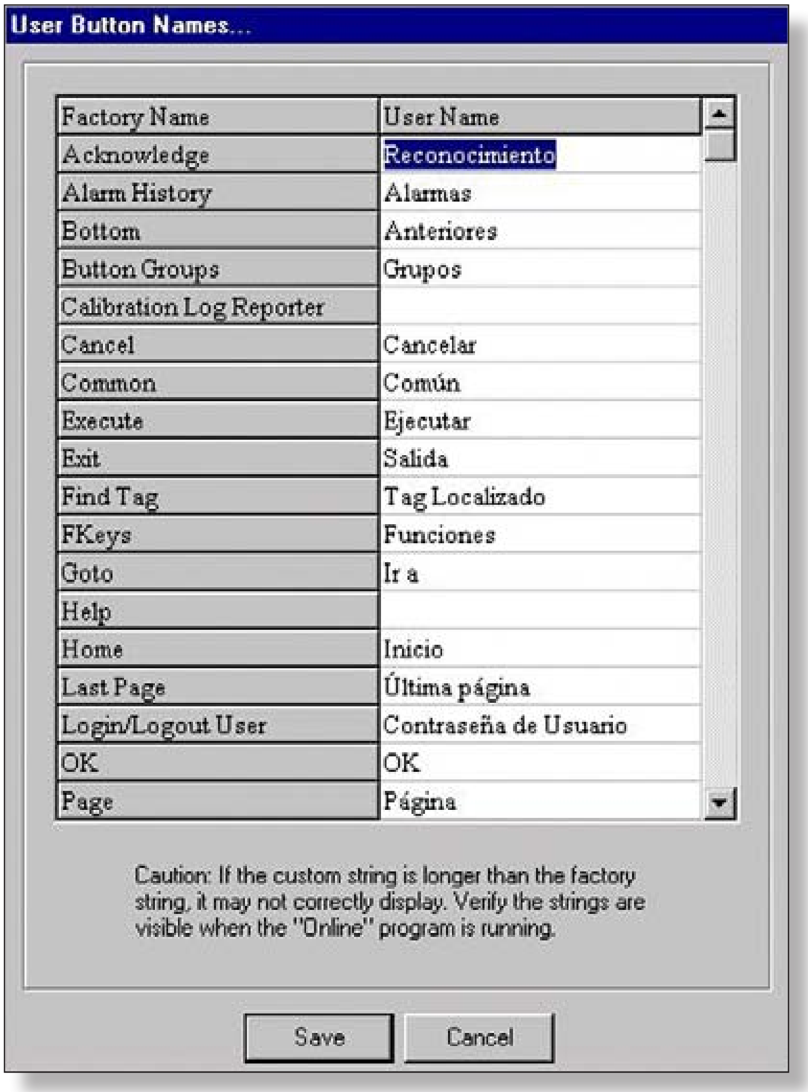
Once the appropriate substitute descriptions have been entered, selecting the "Save" button will record the new descriptions.

The descriptions entered in the SLD's will be made available for use when points are configured in the "Ports" configuration area.

SLD descriptions for the user interface buttons used by the online application are presented in the "Factory Name" column of the "User Button Names..." dialog box.

Substitutes are entered in the "User Name" column. In the example below the configuration is incomplete, some buttons do not yet have a substitute string.

If left blank, these buttons will have no name when online.



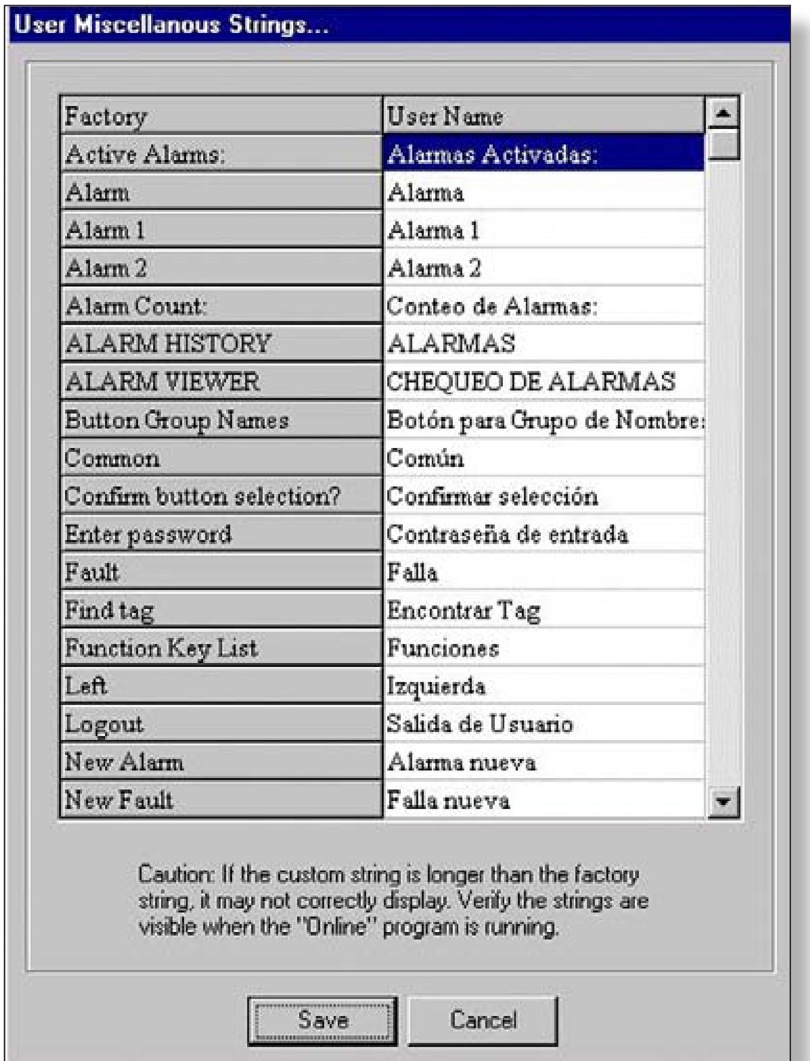
“Miscellaneous Strings” are pieces of descriptive text used in a variety of online locations like dialog boxes, window names and data entry fields.

Substitutes are entered in the “User Name” column.

Like the user buttons, all fields must be filled out or “blank spaces” will appear at these locations when online.

When translating button names or miscellaneous strings into other languages the text may be too long for the button or space causing problems.

Take care to test thoroughly to ensure a “proper fit” for substitute strings.



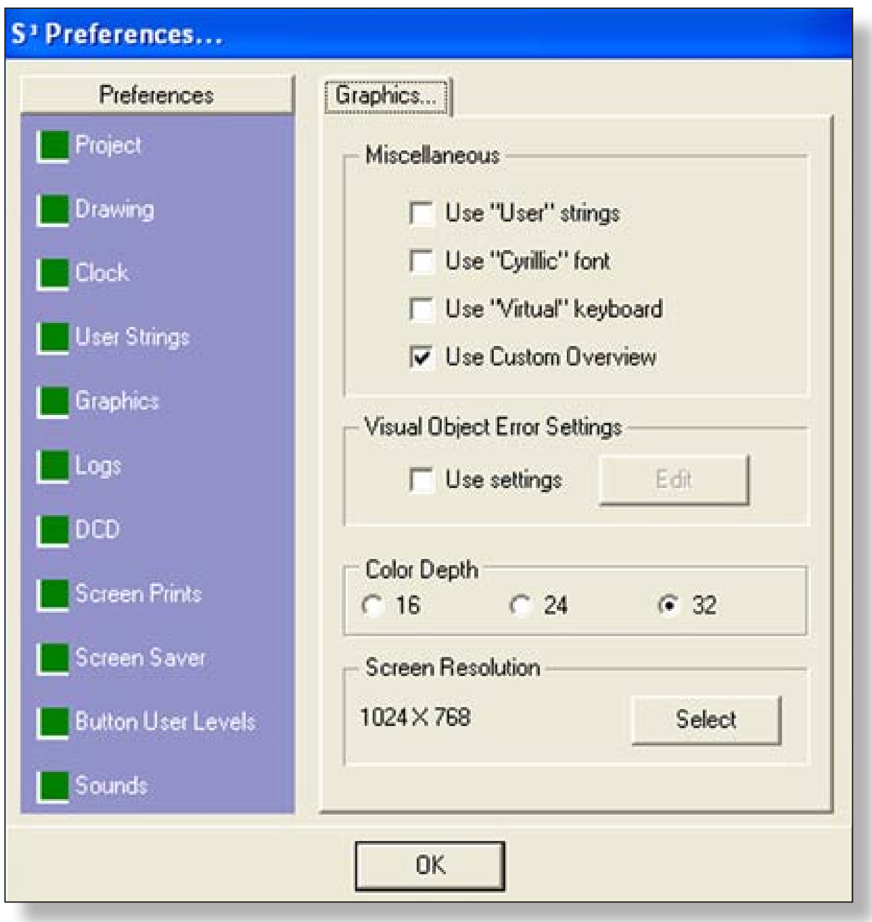
Graphics (Unsupported Feature)

This category pertains to the operation of the "Online" application. This application displays custom graphics with an overlay of dynamic information from various attached systems. This is the main operational mode used by plant operators and other personnel monitoring the safety systems.

There are four global attributes that are configured by check box selections in the Miscellaneous portion of the dialog box and two other settings pertaining to the online color selections.

User Strings

When this check box is selected, the Online application will substitute the factory defaults for button descriptions, miscellaneous text, and device alarm and event data with user configured Second Language Dictionary (SLD) data.



To revert back to the English factory default values, stop the online application and de-select this checkbox. This provides an easy means of switching back and forth between the defaults and SLD.

Cyrillic Font

S^3 supports the use of Cyrillic in the SLD for both display and printing purposes when used with the recommended alarm printer.

Virtual Keyboard

When this option is selected S^3 provides an onscreen keyboard whenever data entry is required, such as for user login, password entry, etc.

This is primarily to provide user input on systems equipped with a touch-screen as the operators primary interface.

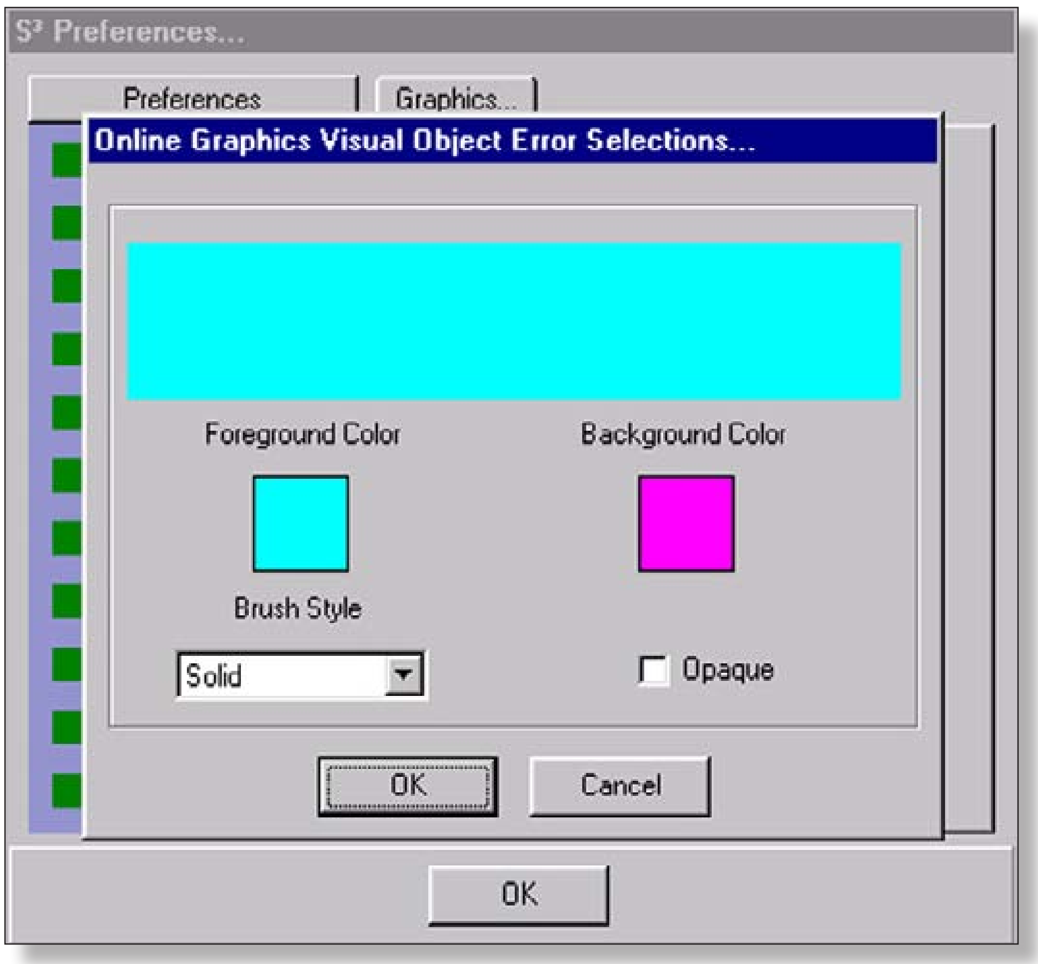
Custom Overview (Unsupported Feature)

When this option is selected a custom full-screen overview is substituted for the automatically generated scaled composite of custom screens. This custom overview must be created in the graphic editor and can be generated using the editors tools, from imported graphics, or a combination of the two.

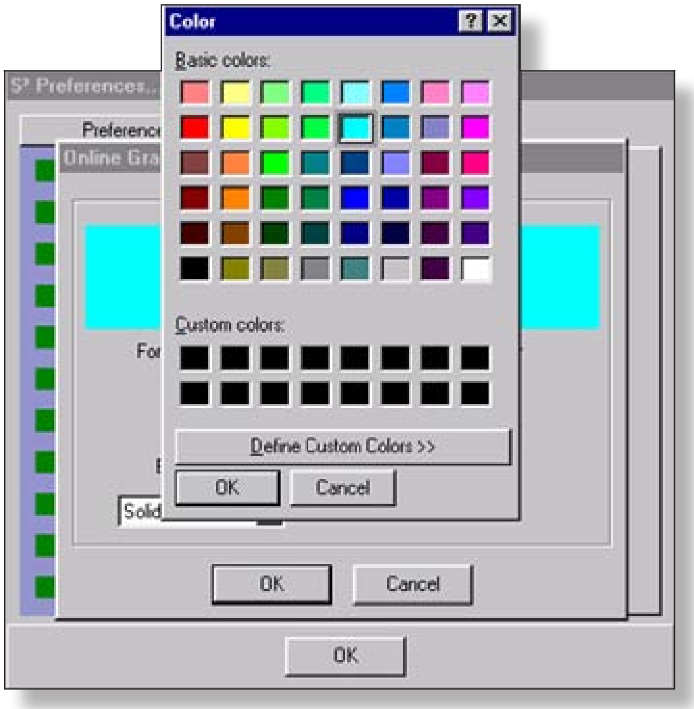
Visual Object Error Settings (Unsupported Feature)

This checkbox selection enables an online feature that changes the color of any dynamic object that is tied to data that has been flagged as invalid by S³.

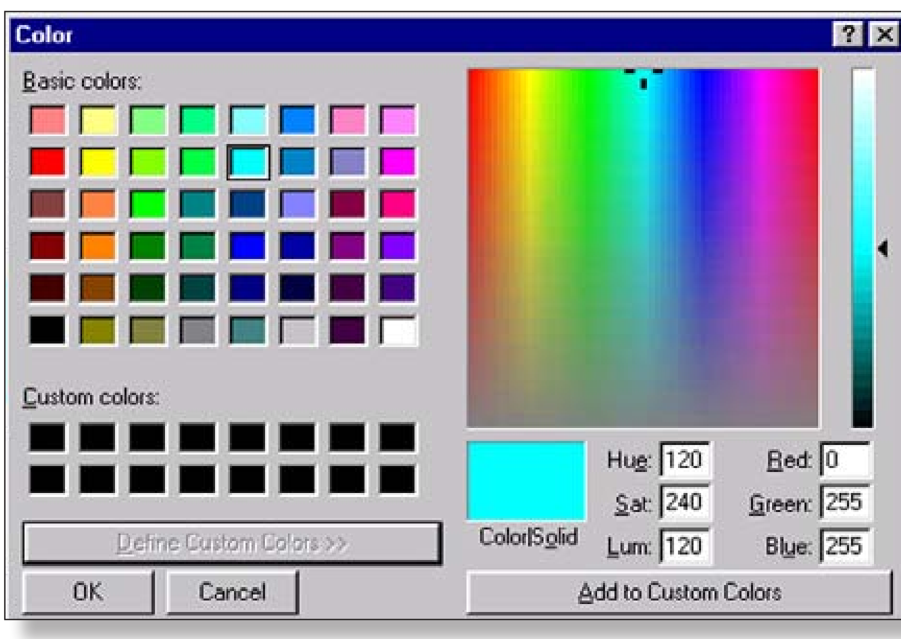
To change the "error" color select the "Edit" button and S³ will display the color selection dialog box. The default error colors will initially be selected with Aqua for the foreground, Magenta for the background, and a solid brush. To change these selections click on the sample block for the color to be changed and a color picker will be displayed.



Choose from any of the 48 standard color definitions displayed, or from the 16 custom colors.



Select the “Define Custom Colors” button to display an expanded color picker dialog box that allows any desired color to be added to the “Custom Colors” selections. Up to 16 can be configured.



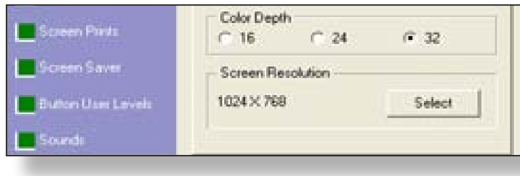
NOTE
Custom colors will not be saved.

Color Depth Settings

There are three choices for the displayed color depth, 16, 24 and 32. This corresponds to the maximum number of colors used by the operating system and the computers video card to display graphics.

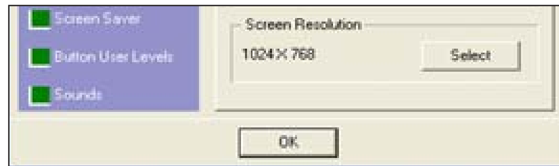
16 bit = 65,636 colors
24 bit = 16, 777, 216 colors
32 bit = True color

16 bit is the default and minimum requirement.



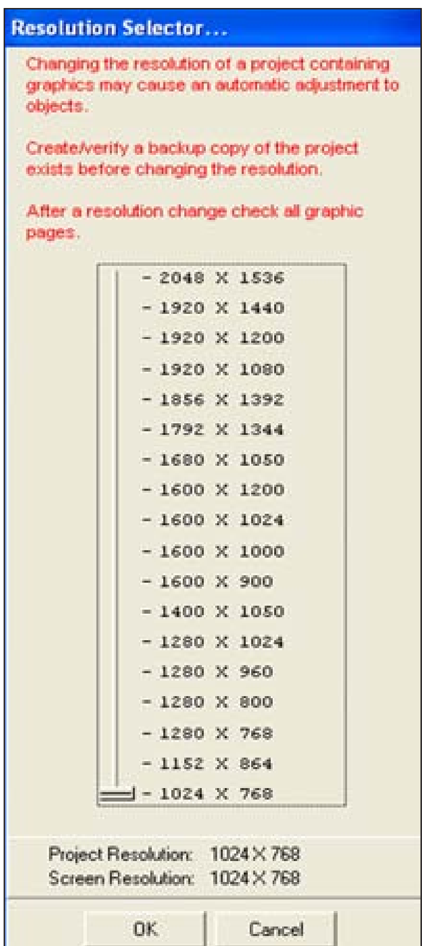
Screen Resolution

The selected screen resolution for the custom graphics on the active project is displayed and a “Select” button to open the “Resolution Selector” dialog box where the screen resolution can be set.



Resolution Selector

This dialog box has an adjustable slider where the screen resolution for the online custom graphics can be set for the project.



At the bottom of the dialog box the project resolution is displayed along with the screen resolution of the computer S^3 is currently running on.

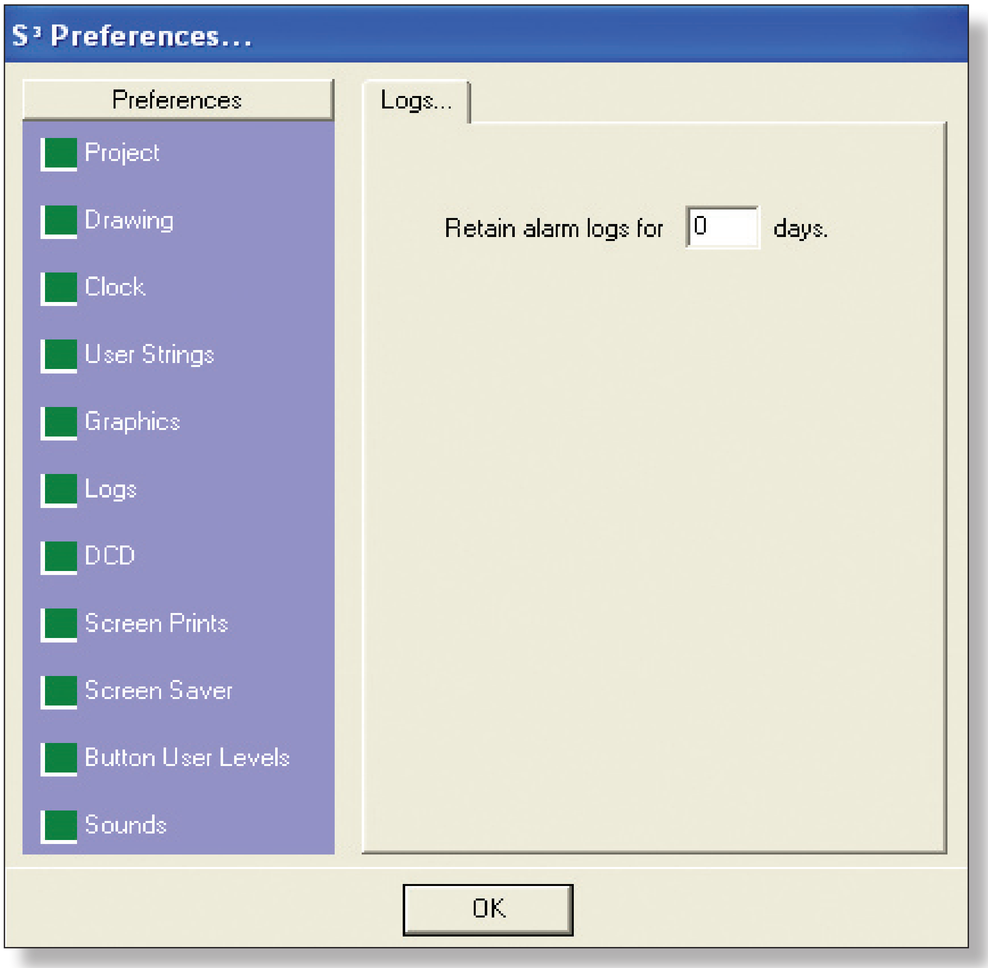
In some cases, the graphic development may be done on a computer with a different resolution than the “target” machine for the project.

The minimum resolution is XGA or 1024 X 768 pixels. At XGA resolution the task bar must be configured to “Auto Hide” otherwise buttons in certain areas of the configuration environment will be hidden.

NOTE
The list of supported resolutions to the left may have grown since this issue of the manual as PC vendors are constantly adding support for additional screen sizes.

Logs

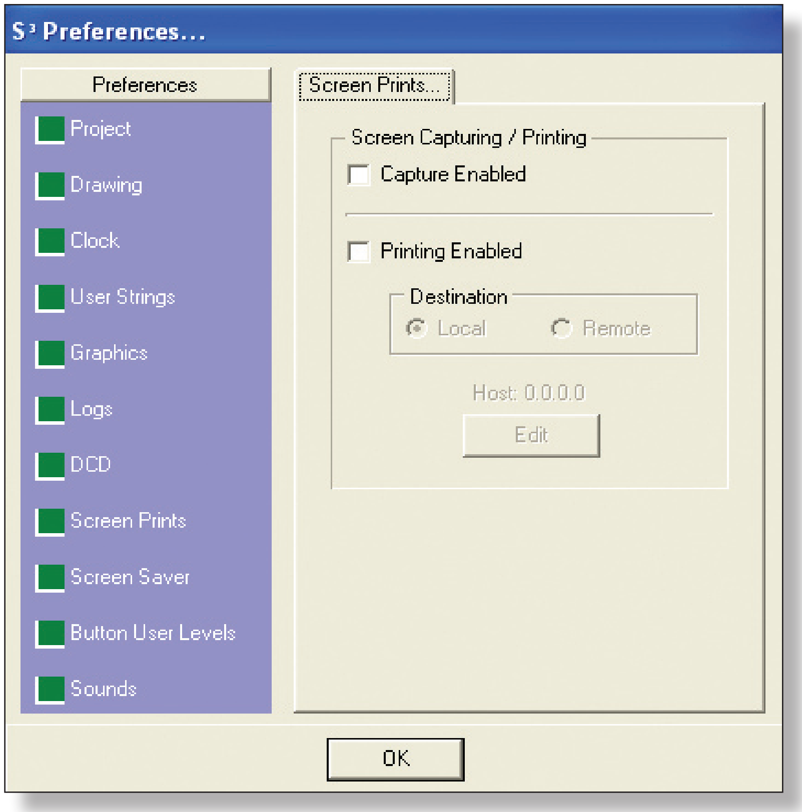
This tab allows the setting of the log retention time. This adjustment determines how long the system will keep daily log files.



When set to zero (the default) all files will be kept and the user must ensure the hard disk does not fill up. If a number is entered in the field, the system will save that number of log files and then delete the oldest when that number is exceeded.

DCD

The Data Collector and Distributor application program has five configurable parameters that can be used to modify its behavior.



Settings

There are two settings relating to how sounds are handled.

The first one, "Track sounds for clients only" is used in configurations where the local machines DCD is unattended and is used primarily to send data to other S^3 client machines. In this situation the configured sounds play and are acknowledged by the remote clients and the local machine does not play sounds.

The second setting, "Silence Sound First" configures the DCD to silence the active sound(s) prior to any additional functions that may be configured to be executed when the "Acknowledge" button is activated.

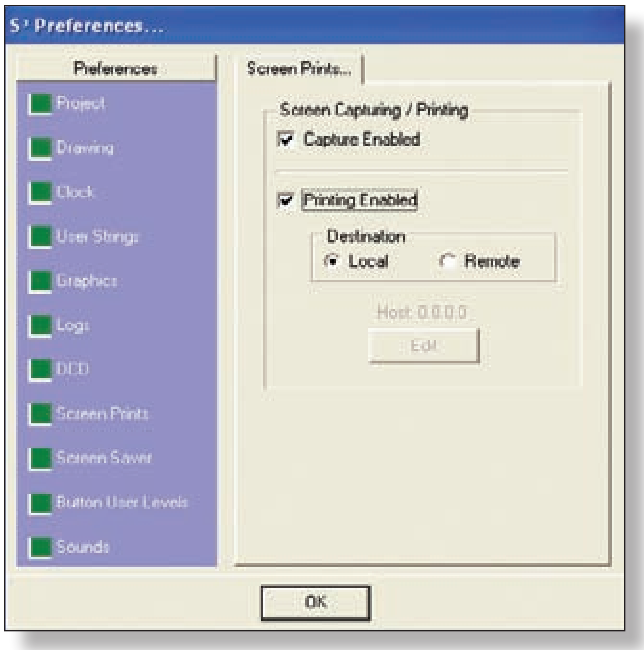
Both settings can be used concurrently.

Screen Prints

In addition to capturing screens in S³, the captured screens can be sent to either a local or remote printer for output.

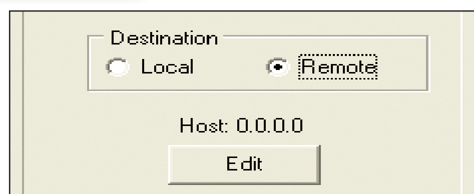
Local Printing

With “Local” selected as the destination, the screen will print on the default Windows printer.



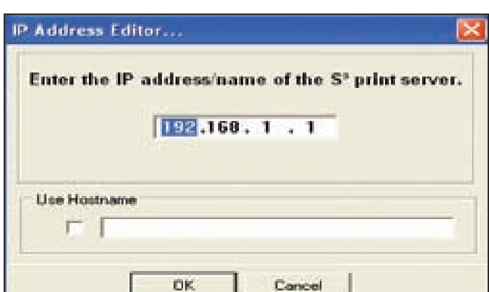
Remote Printing

If “Remote” is selected as the destination, a “Host Address” for another S³ workstation that is running the DCD must be specified by its TCP/IP address.



Specifying a Printer

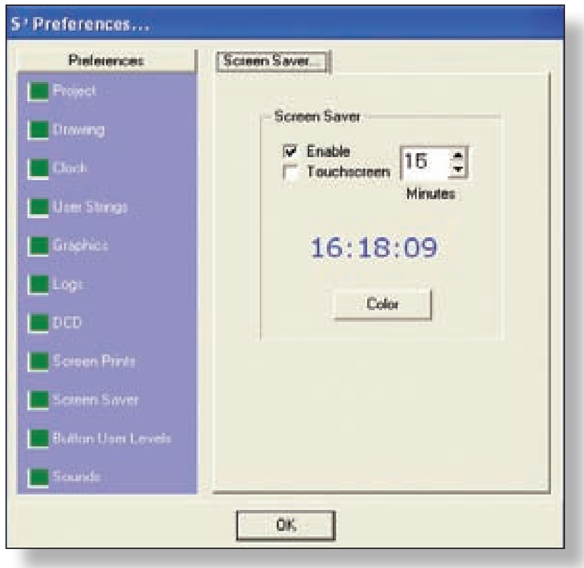
Clicking the “Edit” button will allow the TCP/IP address to be entered.



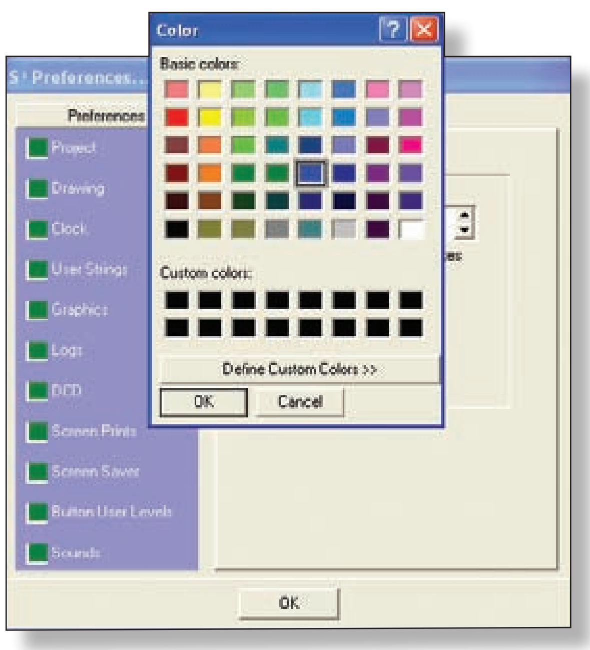
NOTE
Local and remote computers must all be on the same side of firewalls.

Screen Saver

S³ provides a screen saver feature that will display the current time on a black background after a user configurable time period has elapsed without any activity.



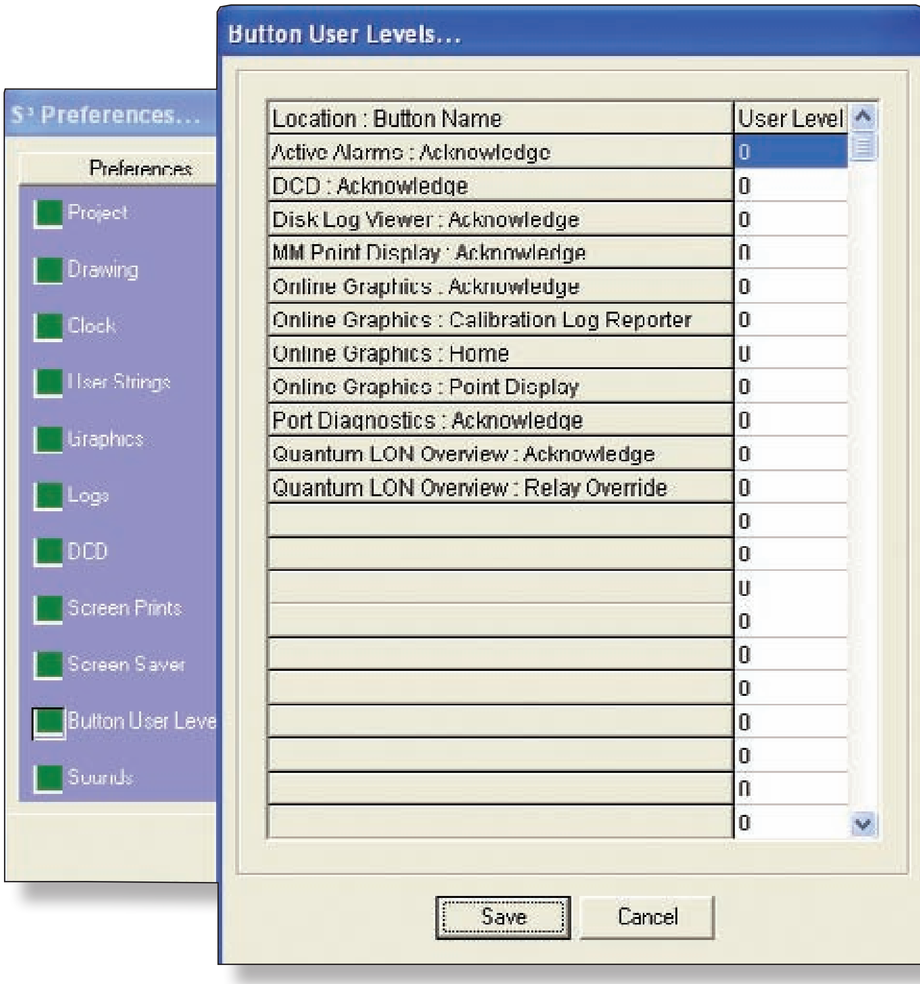
There is also a “Touchscreen” check-box to allow the user to exit the screen saver by touching anywhere on the screen, without causing any screen navigation response.



The color of the displayed time can be changed by clicking on the “Color” button. This will open the standard “color picker” dialog box that allows the selection of any of the 48 pre-set colors.

Button User Levels

This feature allows the DCD application program's user interface buttons to be assigned a "User Level" for security or operational control purposes.



The default value is "0" and has a range of 0-65535. The user level is set in the "Passwords" configuration section of S³.

If the user logged in has a user level greater than or equal to the setting of the button, the button will be available. Otherwise, it will be grayed out.

Sounds

The sounds tab allows access to the custom sounds database and integrated sound editor.

Selecting the “Edit” button will open the “Sound Editor” dialog box.

S^3 supports up to sixty four sounds that can be attached to events in the system. One sound, “Warning,” is included with S^3 the other sixty three slots can be used to build a project specific sound library.

To access the editor, select a sound database slot, numbered 1 through 64 on the left side of the “Sound Names” scrolling list, and then select the “Edit” button.

This will launch the “Sound Editor”.

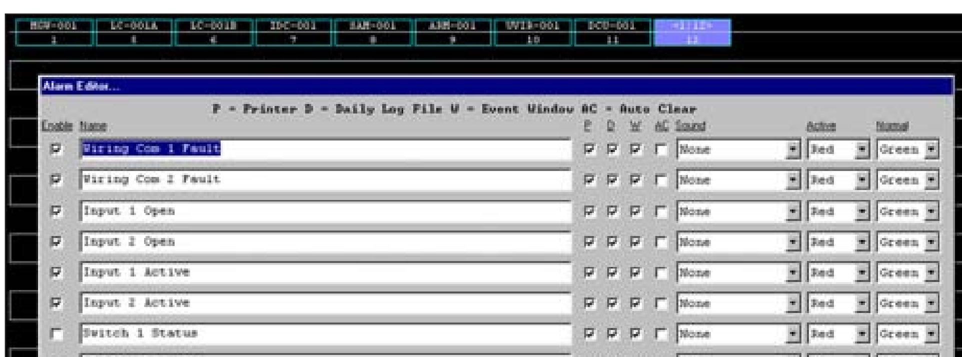
The sound editor makes use of the standard Windows based sound card and microphone to allow for the recording and playback of custom sounds.

Custom sounds are limited to a maximum recording time of five seconds. This is to accommodate the fact that more than one sound may be in the queue at any given time.

The recording time is displayed in the horizontal bar graph at the top of the dialog box.

Use the “Record” button to begin recording. The horizontal bar graph will display the elapsed time. Press the “Stop” button to end the recording. Use the “Play” button to play back the recorded sound.

Sounds from this library are then attached to events in the system during point configuration in the “Ports” area of the system.



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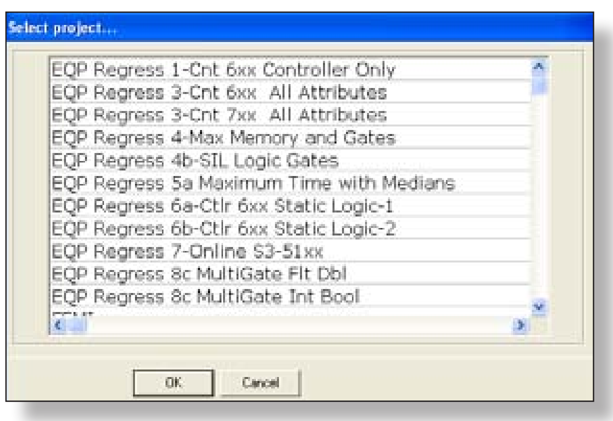
Overview of features

This button provides access to S^3's built in project Backup and Restore utilities. These utilities allow whole projects to be archived or restored for backup purposes or to be moved to another workstation.

Selecting the “BACKUP” button will open the “Select Project” dialog box prompting for a selection.



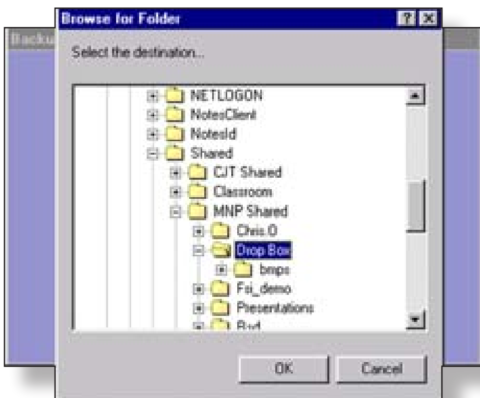
Select the appropriate project from the scrolling list and the select “OK” to begin the process.

Backup

Once the project is selected a dialog box will be displayed allowing for browsing of the file system in order to select a destination for the backup.

This can be on local hard drives, a network drive, or the local floppy disk drive.

NOTE
We suggest storing the backup elsewhere rather than on the S³ computer

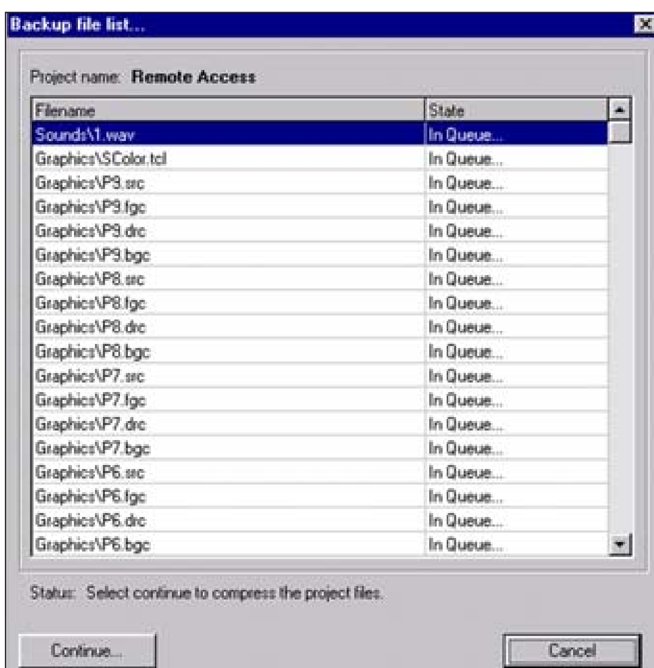


Procedure for backing up to a Network Drive

Once the destination is chosen for backup, the system will display the "Backup File List" dialog box which displays the files to backup and the status of the procedure.

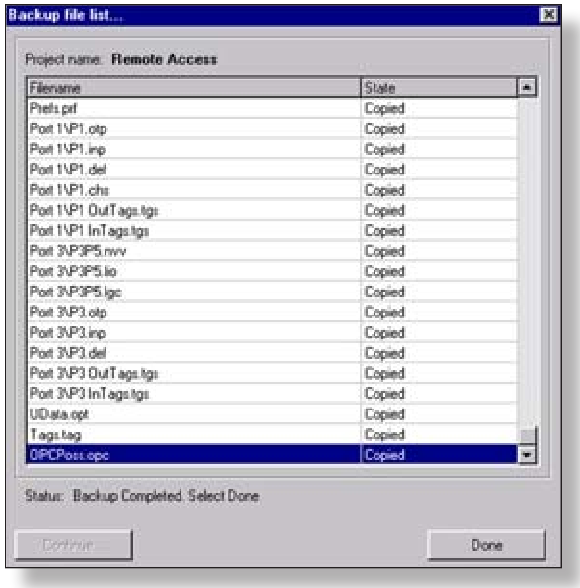
The dialog box is formatted with two columns, the left one containing the file name, the right one displaying the status of the file.

S³ will begin the backup process automatically by compressing all of the files to reduce disk space requirements. This highly efficient compression algorithm allows even large projects with dozens of custom graphic pages to be backed up to a floppy disk, or flash drive.



After the files have been compressed they will be copied to the destination volume, the status will indicate “Backup Completed Select Done”.

Click on the “Done” button to return to the Backup/Restore main dialog box.

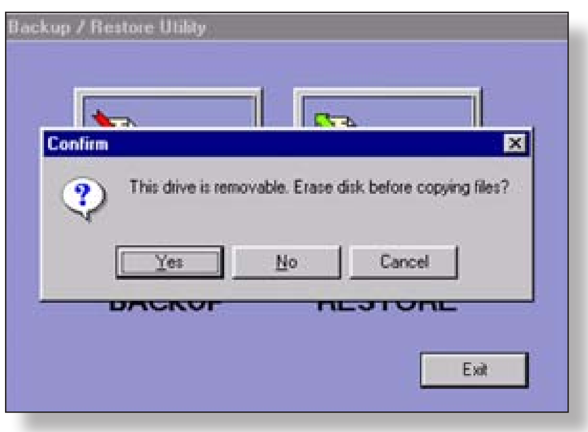


Backing up to Floppy Disk

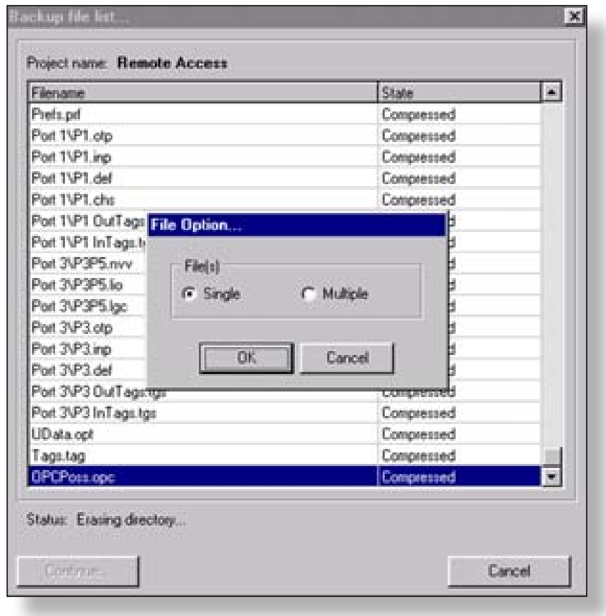
If the “A” drive was selected as the destination, there may be a prompt to confirm that the drive is removable and whether it should be erased before copying the project onto it.

In some cases, it may be desirable to backup more than one project to the floppy disk(s) in which case select “No” to the prompt.

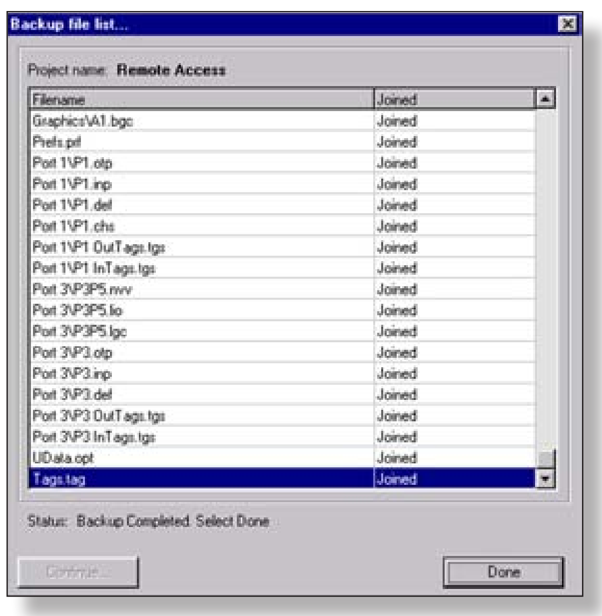
In most cases, a floppy disk should be erased and this is the default choice. Select “Yes” and the program will open a prompt asking for a formatted disk to be inserted into the “A” drive. If a flash drive is selected, choose “No”.



Once the disk is in place, choose the desired file option, either "Single" or "Multiple". The default is "Single" and will combine all of the compressed project files into a single project backup file and copy it to the selected destination. This option is significantly faster when backing up to a floppy disk. The "Multiple Files" option is available when access to the individual files might be preferred.



Once the file option selection is made, select the "Continue" button and the utility will copy the files to the floppy. If the project is too large to be backed up to a single floppy, the program will prompt for additional disks as required.



When all files have been successfully backed up, the "Cancel" button will change to a "Done" button which when selected will exit the backup utility.

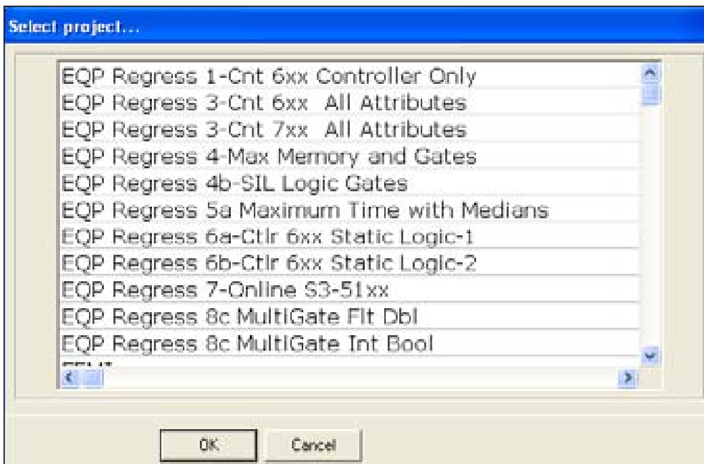
Restore

To restore an archived project from either a floppy disk or network, select the "Restore" button from the Backup/Restore Utility dialog box.

Once the "Restore" button is selected the "Restore Selection" dialog box is displayed.

Select either "Existing" or "New" to begin the process.

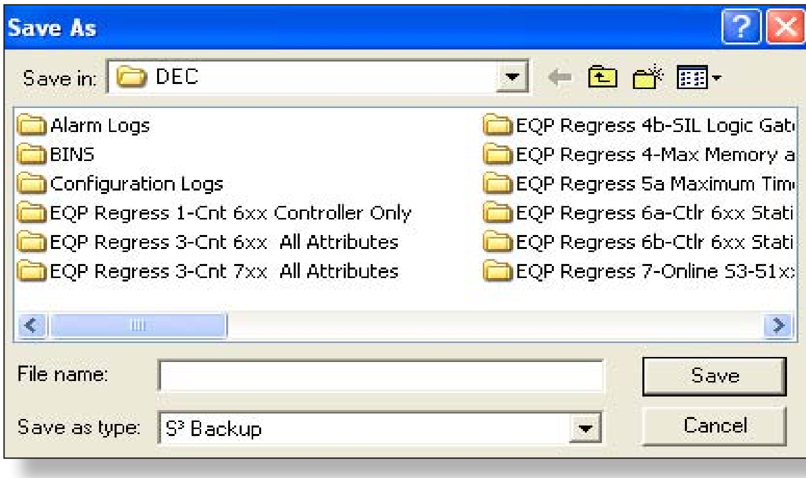
NOTE
If "Existing" is selected the restore function will overwrite the existing project with the "Restored" information. The existing project info will be deleted.



If "Existing" is chosen the "Select Project" dialog box is displayed. Select the appropriate project from the scrolling list and the select "OK" to begin the process.

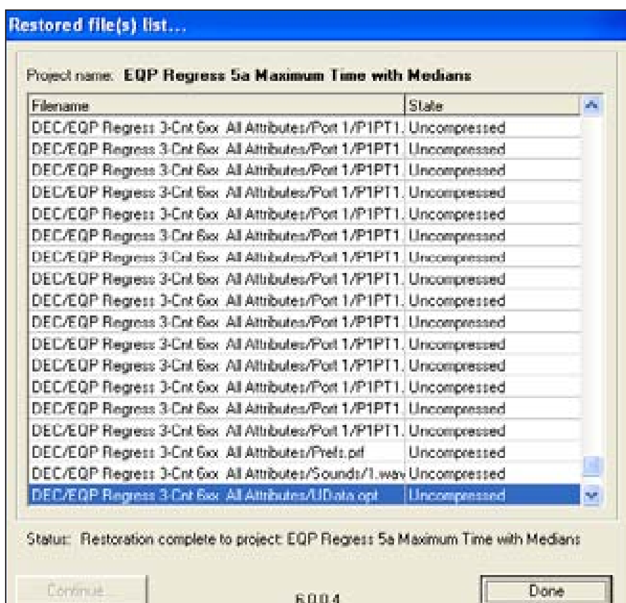
If "New" is selected a dialog box prompting the entry of the project name is displayed.

Once the project to be restored has been chosen and the “OK” button selected, the file system browser dialog box is displayed prompting for the selection of the project source.



When the source has been chosen select the “Save” button to begin the restoration procedure. As files are restored they will show up in the “Filename” column of the dialog box with their state displayed to the right.

When the process is complete, the “Done” button will highlight. Select “Done” to exit the restoration utility.



NOTE
Use the “Restore” feature for situations where a S^3 project created on one workstation needs to be opened on a secondary workstation.

S^3 is designed to simply and efficiently "integrate" data from a variety of multi-vendor safety solutions into a common Operator Interface Station (OIS) where it can be viewed, tracked, and presented to the operator.

We have chosen "OPC" as the mechanism for sharing this concentrated safety system data with other systems throughout the facility.

Traditionally, each software or application developer was required to write a custom interface, or server/driver, to exchange data with hardware field devices. OPC eliminates this requirement by defining a common, high performance interface that permits this work to be done once, and then easily reused by HMI, SCADA, Control and custom applications.

What is OPC? OPC (OLE for Process Control) is an industry standard created with the collaboration of a number a leading worldwide automation and hardware software suppliers working in cooperation with Microsoft.

The organization that manages this standard is the OPC Foundation. The Foundation has over 220 members from around the world, including nearly all of the world's major providers of control systems, instrumentation, and process control systems.

OPC Defined: OPC is based on Microsoft's OLE (now Active X), COM (Component Object Model) and DCOM (Distributed Component Object Model) technologies. It consists of a standard set of interfaces, properties, and methods for use in process-control and manufacturing-automation applications.

The Active X/COM technologies define how individual software components can interact and share data. OPC provides a common interface for communicating with diverse process-control devices, regardless of the controlling software or devices in the process.

OPC in S^3

The OPC option for S^3 is one of the easiest ways to provide safety system data from many sources to the distributed control system or other OPC compliant system.

With the OPC option S^3 becomes a "Version 2.03 Data Access Server" to make available, under user configuration, any information being tracked by the S^3 event handling database.

The S^3 server setup is a model of simplicity. The user is presented with a tag list showing all of the points being tracked by the system and the user can then choose what to "activate" for OPC clients to access. Using this simple tag based method it is possible to share complex data knowing little more that the tag name. OPC clients don't need to know anything about the port type, serial or Ethernet settings, memory register locations, addresses, or any of a number of technical details, just the tag name.

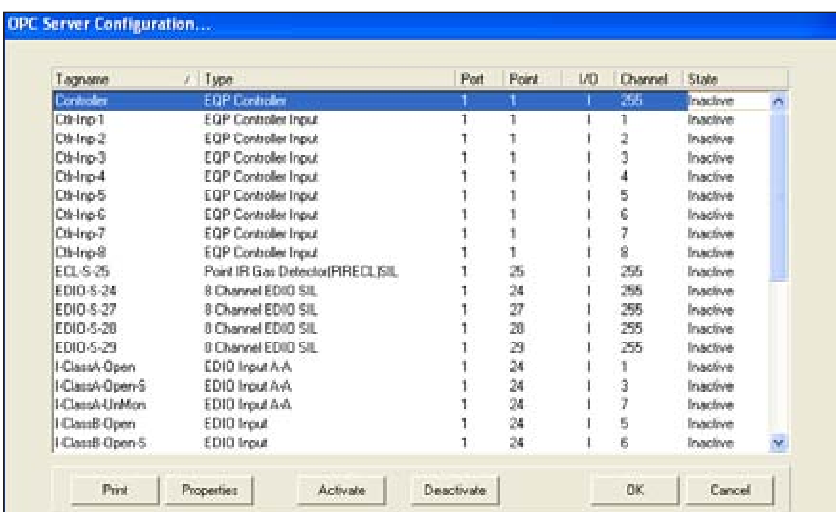
OPC Server Configuration

To configure OPC data points, select the OPC Server button from the S³ Main Screen. This will display the OPC Server Configuration dialog box which lists all of the tags available for activation by the server.

NOTE
For the S³ server to function, the S³ hardware key must have the OPC server function enabled.

The available tags shown, were created during the port configuration process. When a Modbus, Triconex, Eagle or other device is configured it is added to the S³ tag name database. All of the points in this tag name database are automatically set up by S³ for use by the OPC server. This greatly simplifies OPC tag management.

The OPC Server Configuration dialog box displays the tagname, type and origin information along with its OPC status, either Active or Inactive. To make a tagname available to OPC Clients, select the tagname and click on the "Activate" button.



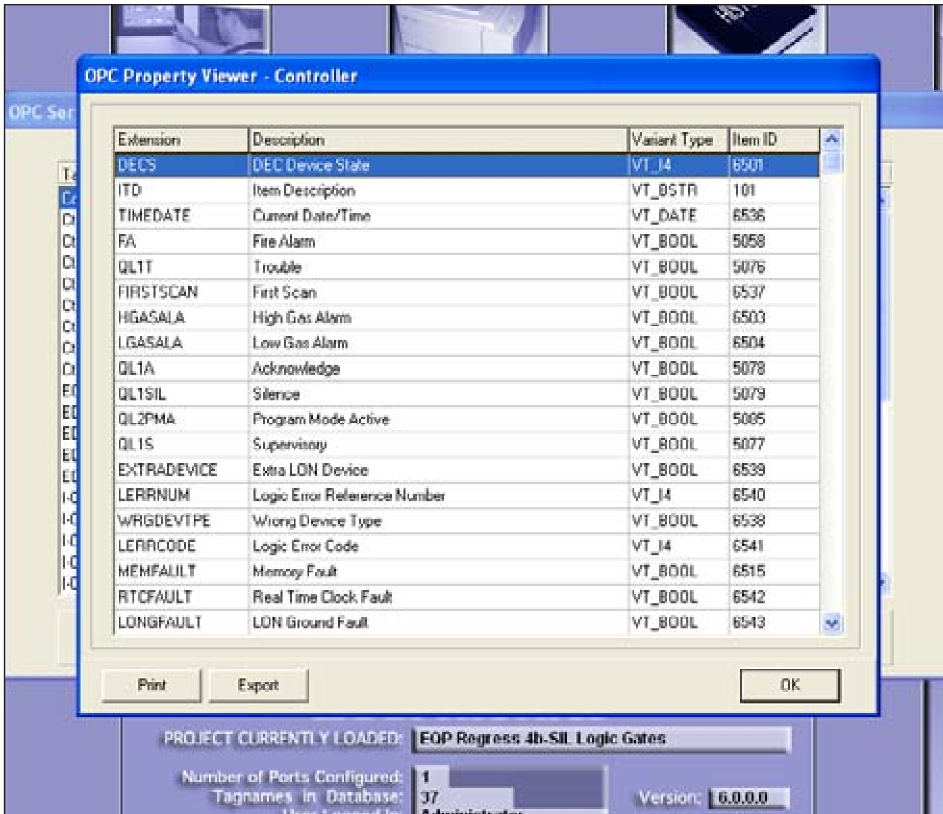
In the example to the left, the EQP Controller is selected. Its tagname is "Controller", it originates at S³ port 1 point 1, is an "I" (input), and has an OPC State of "Inactive".

This is a "top level" view of the devices and their status. In the above example this single point "Controller" actually is a compound point with a variety of subordinate data available to the OPC client.

To view this data, select the "Properties" button.

OPC Property Viewer

The properties button at the bottom of the OPC Server Configuration dialog box will open the “OPC Property Viewer” and display the properties for the selected point.



The individual property extension, description and variant type are displayed.

These properties were configured automatically by S^3 for inclusion by the OPC server when the point was created within the Port Configuration process.

In the above example, because it was an intelligent addressable device, it has a great deal of data indexed to it.

Simple analog or discrete devices will have far less available data.

NOTE
Individual properties of an “Active” device cannot be made inactive.

NOTE
OPC Clients: *In order for OPC clients to be able to connect to the S^3 OPC Server, S^3 must be installed on the client machine, but not running and no hardware key is necessary.*

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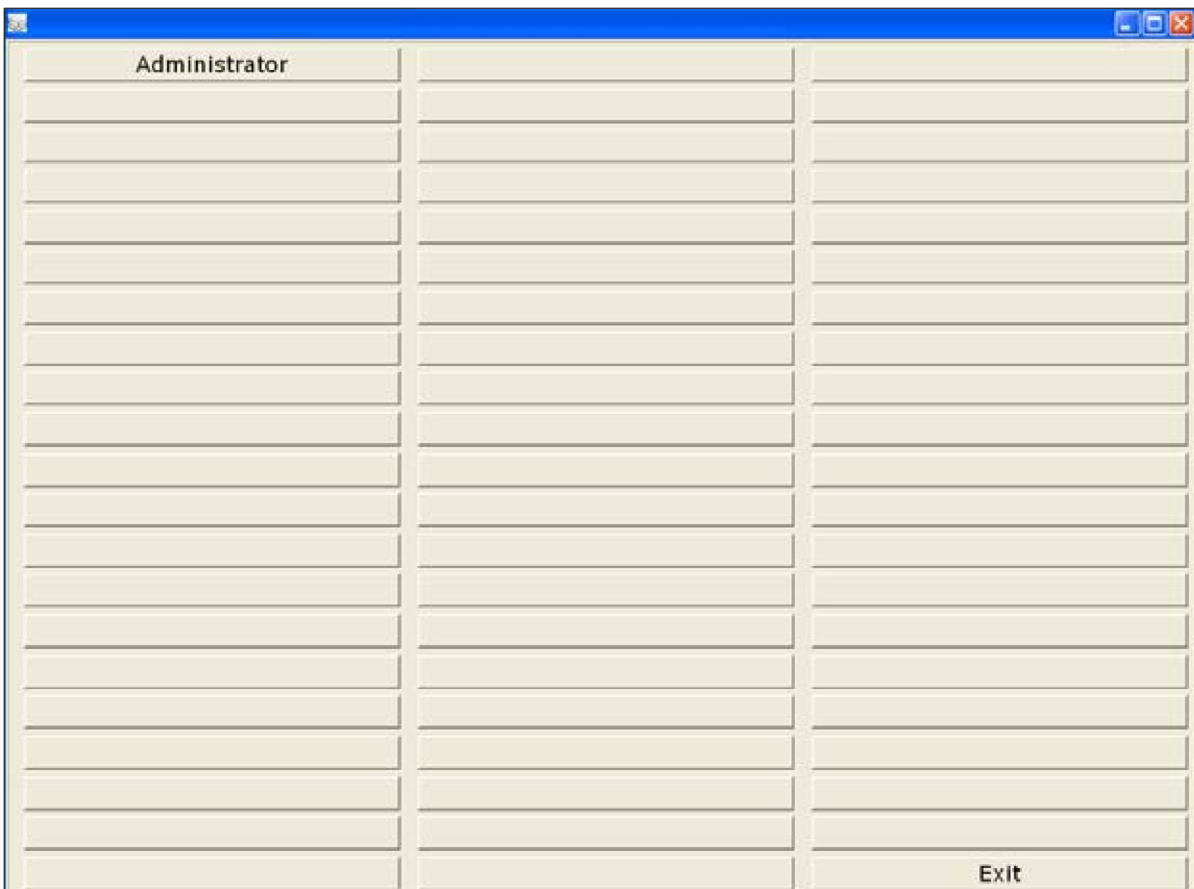
Security

These buttons are part of the S³ security system. The "Log In/Out" button is used to log in or change users, the "User Accounts" button allows the system administrator to create or modify user accounts. User accounts are specific to each project and multiple users can have access to one project.

S³ supports up to sixty three unique user accounts, each capable of having a different password and access privileges. These user accounts are controlled by the S³ system administrator.



Selecting the "User Log In/Out" button will display the user selection screen. The administrator account is automatically created by the system and cannot be deleted.

Administrator Privileges

The person logged in as the Administrator is the only one who can create, modify or delete user accounts. In addition, the Administrator may also change the password for his/her own account.

NOTE
The default password for the Administrator is "DEC".

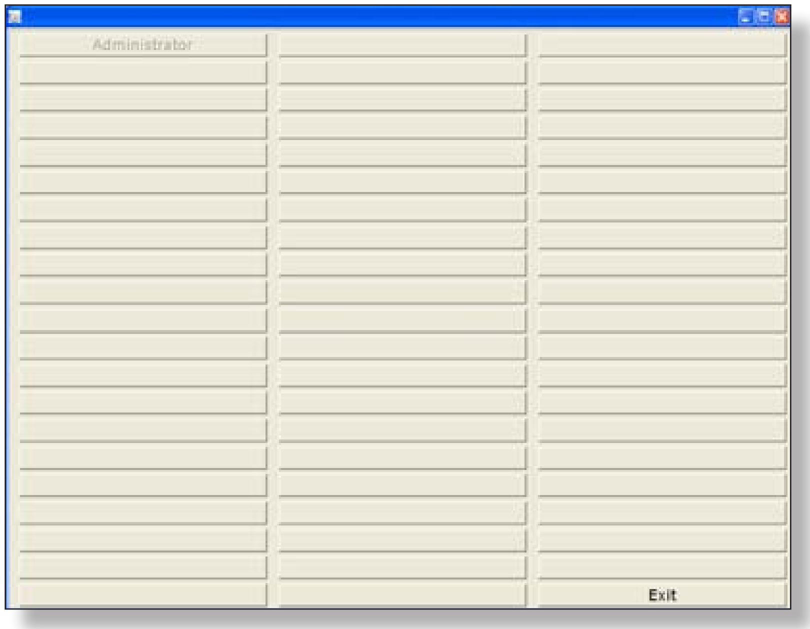
CAUTION
If the Administrator changes his/her password and loses it, there is no way to restore the account.

To set up or modify user account parameters, click on the "User Accounts" button on the main screen. This will open the "User settings..." dialog box. Five buttons allow for selecting, creating, renaming and deleting user accounts, one button is for entering or changing an accounts password.

Above the buttons are four check boxes and a "User Level" field that determine the rights the user is allocated. These rights include the user level and whether or not he/she is able to access diagnostics or configuration utilities and a "restricted access" mode for viewing but not changing configuration data.

Creating User Accounts

To create a new user, select the "New" button from the "User Settings" dialog box (see previous page). The user selection screen will appear, then select any blank button to be configured as a new user



This will display a dialog box for entering the new users name. Enter the name of the new user, in the example below "Operator" was chosen.

After entering the new users name, select “OK” to accept the name and display the “User settings...” dialog box.

There are four check boxes and one field that are used to configure the users account.

User Level

A user level between 0 and 65535 is used to determine what a user can do. Each command or button which a user can interact with in S^3 has a user level assigned to it. The higher the number, the higher the “privileges” for that user. A user level of “0” would allow “browsing” only with no command capability.

Configure system enabled

When selected, this option allows the user access to the engineering and configuration aspects of the S^3 software suite. This includes the ability to make, move, configure and delete ports. The ability to create or modify points like fire detectors, gas detectors, analog transmitters, digital inputs, etc. attached to one or more of the available ports.

Quit “Online” operations enabled

When selected, the user is able to quit online operations and return to the S^3 main screen for access to the various engineering and maintenance utilities.

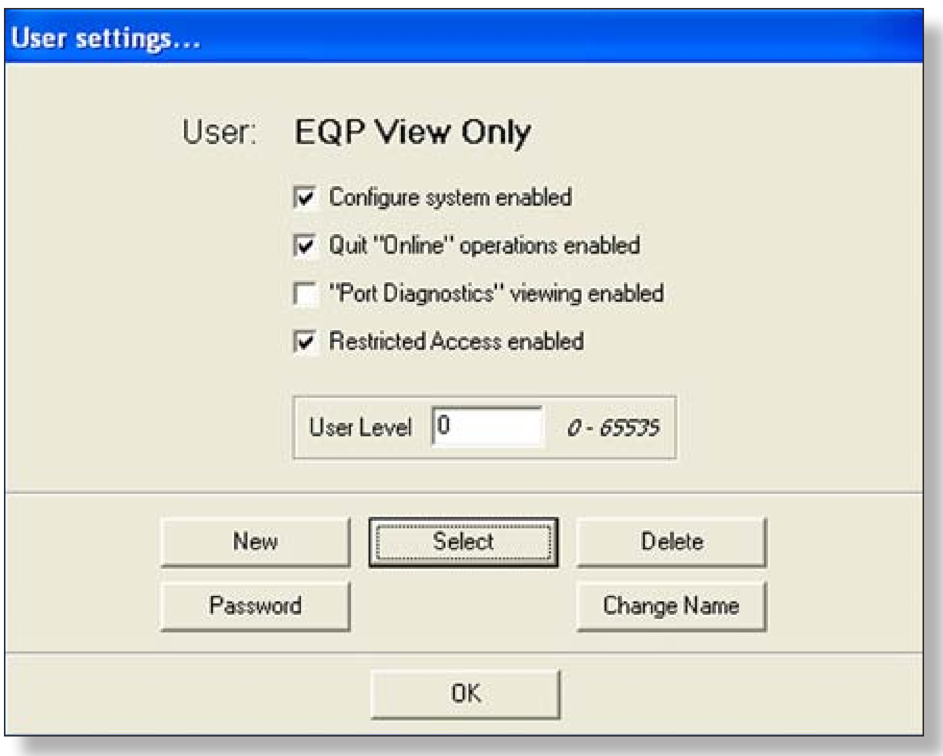
Port Diagnostics viewing enabled

When selected, when online the user can access the port diagnostics screen (F11). This screen allows the user to view details about the operation of all active communication ports, whether serial or Ethernet. This would typically be used by a technician responsible for troubleshooting connectivity between the S^3 station and any attached systems.

Restricted Access enabled

This feature applies only to Det-Tronics Eagle Quantum Premier systems and is intended to give limited access of the EQP port configurations for viewing and documentation purposes.

User accounts can be created with only the “restricted access” checkbox selected, or combined with the other checkboxes; configure system, quit online, port diagnostics.



When a user account is created using only the restricted access checkbox, the user can log in and view the configuration and calibration logs as well as configure and initiate the print-out of system documentation but cannot access any other S^3 features.

If “restricted access” is combined with “configure system” the user can also create project backups using the “Backup/Restore” utility and view the LON configuration of an EQP port but cannot edit or view the LON devices details.

If combined with “Quit Online operations” a restricted access user could log in while the graphics environment was online, be able to navigate the graphics and be able to quit the graphics environment returning to the configuration environment and the view and document the project as described above but not be able to make changes or return online.

Passwords

After the selection of the options assigned to the user, a user password must be created. This password is used to log on to the system at startup or when online during shift changes etc.

Select the “Password” pushbutton to access the “Password” dialog box. The password must first be entered into the “Enter password:” field and then again into the “Verify password:” field to validate the entry.

NOTE
Only the Administrator may change passwords.

If a password is lost it cannot be retrieved and the user account must be deleted and then recreated as a new user.

Change Name

This button allows a users login name to be changed without effecting the account configuration. For instance “Operator” could be changed to “John Doe” while retaining the password and privileges previously configured.

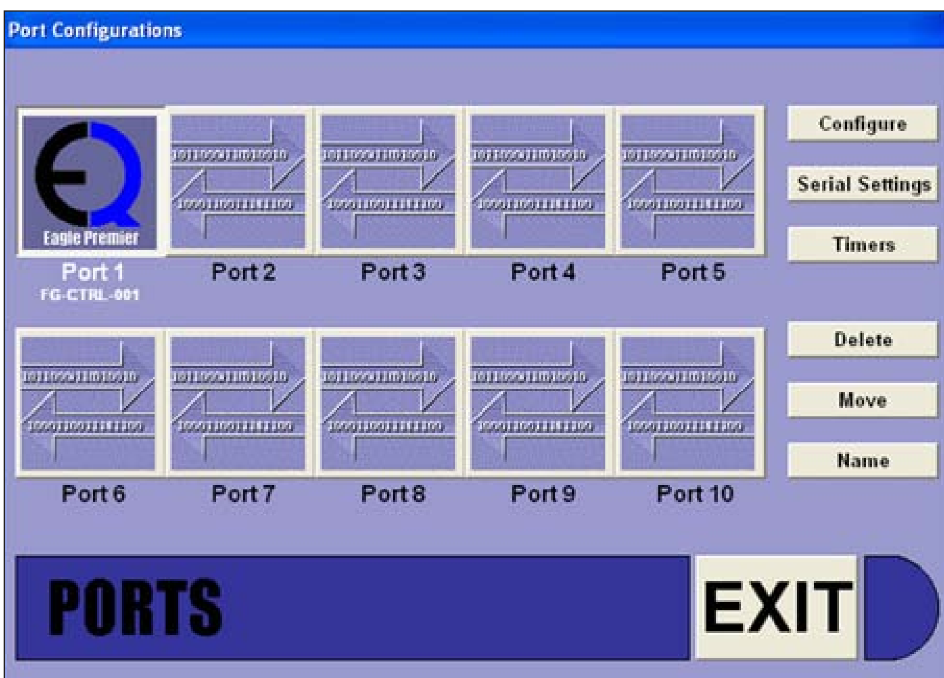
EQP Configuration

One of the supported communication port types is for the Detector Electronics Corporation "Eagle Quantum Premier" fire & gas system.

System configuration consists of three major phases.

- Identifying all of the devices on the network.
- Configuring the operating parameters of each of these devices.
- Downloading the configuration data over the network to the devices.

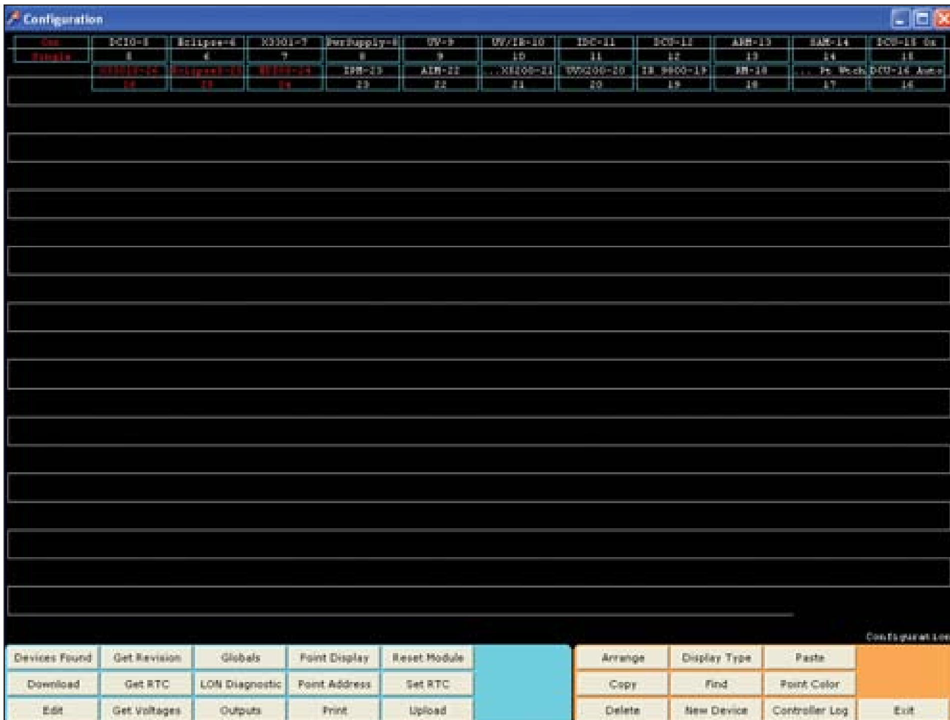
NOTE
Prior to configuration, ensure communication with the Eagle Quantum Premier controller is established. Reference the "Ports" (Section 3) area of this users guide on establishing serial communications.



Enter the Eagle Quantum Premier configuration screen by either double-clicking on the port button or by selecting the port and then choosing "Configure" from the buttons on the right of the Ports screen.

Configuration Screen

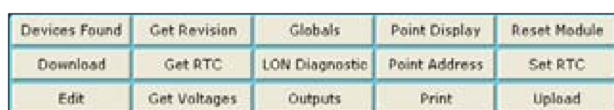
The main configuration screen is divided into two functional areas. The top area, which has a schematic representation of the Local Operating Network (LON™) on which all of the field devices reside and the lower area which contains context sensitive buttons for accessing features and performing functions.



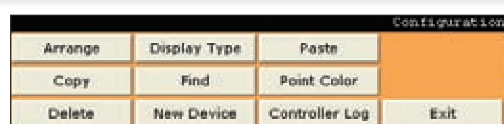
On a new loop, as represented in the sample above (in blue), the LON schematic has a single device, the controller, shown at the upper left corner and addressed as "Node 1". This node is automatically placed on the LON because without it no further configuration or monitoring can take place.

Button Bar Overview

There are two button bars located at the bottom of the screen, the "Command Bar" and the "Configuration Bar". The Command Bar is used to create, query or directly manipulate LON devices.



The Configuration Bar is used to create, duplicate or delete devices and to reconcile their physical and logical LON addresses.



The functionality of each button is described on the following pages.

Command Bar Overview

The command bar has fifteen buttons, most of which initiate a command to a field device to perform a certain function, return a value, or feed “real-time” information to S^3 to be displayed.

The command issued is specific to the node selected in the upper section. In some cases, multiple nodes may be selected using either the shift-click or drag methods and the command can be sent to all applicable nodes in the selected set.

To initiate a command using the command bar, select either a single node or a group of nodes, then click on the desired command button. In most cases a progress monitor will appear and display text messages tracking the execution of the command.

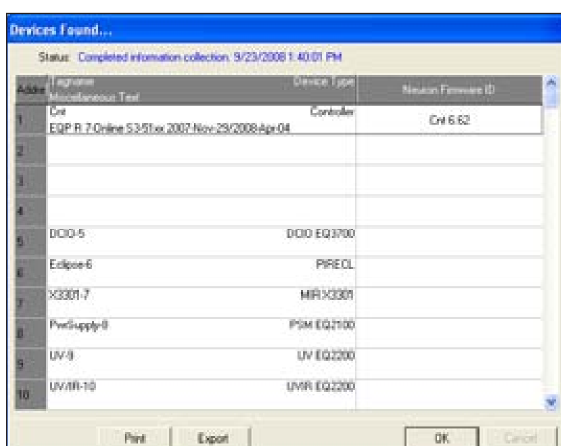
Command Definitions

Devices Found

This command actively queries the controller for information on any devices it is in communication with.

The controller returns this information to S^3 which displays a table listing the devices, by node number (address on the LON) along with the device type and the firmware revision number of each device.

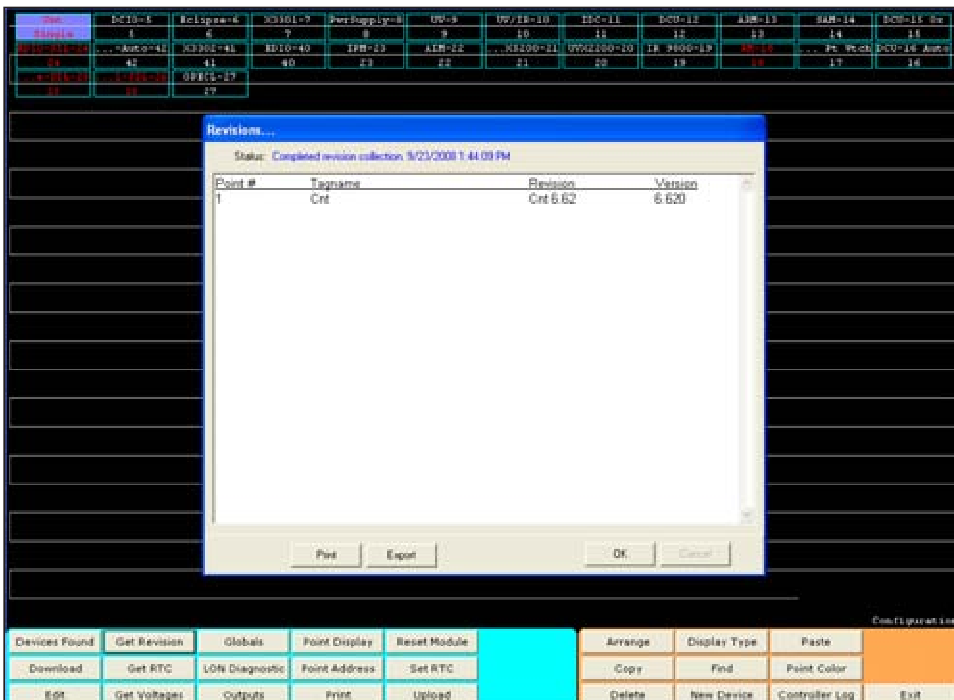
The “Devices Found” dialog box also provides a “Print” button which can be used to output a hardcopy of the current LON configuration, both hardware and firmware.



Get Revision

Returns the selected devices revision and firmware version information.

Over time features and fixes are added to various products. The "Get Revision" feature provides a convenient way of determining if the devices in the system have these features and/or fixes or if they need to be updated.



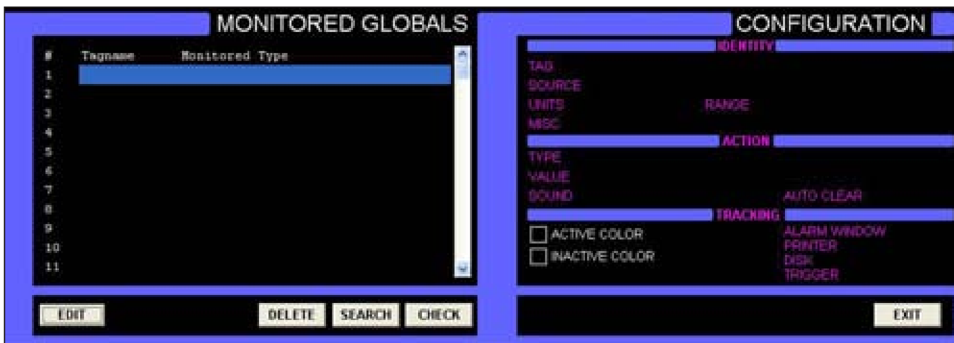
In the example above, the controller was selected prior to initiating the "Get Revision" command and the "Revisions..." dialog box displays the controllers information.

NOTE
All devices have revision values, but not all devices will have version values

Globals

Provides access to configuration services allowing defined global memory values to be set up for tracking by the DCD.

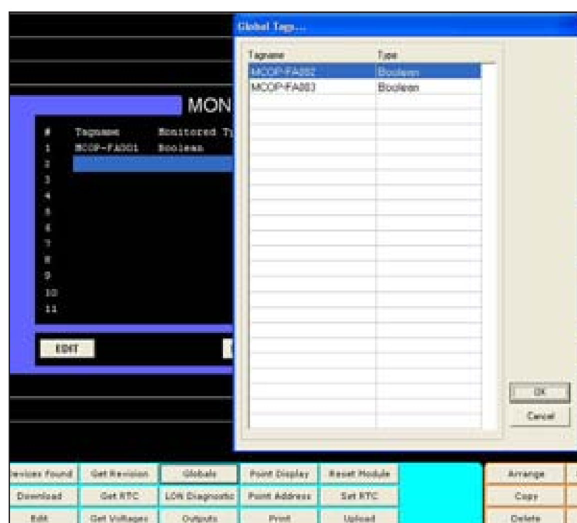
Once configured, these globals can be logged and/or printed by the event monitor.



NOTE

*Global memory points **cannot** be configured from this location. Global memory point creation and configuration is done within the controllers logic editor.*

To configure a global memory point for monitoring, select a "slot" from the "Monitored Globals" pane on the left side of the dialog box and then select the "Edit" button.

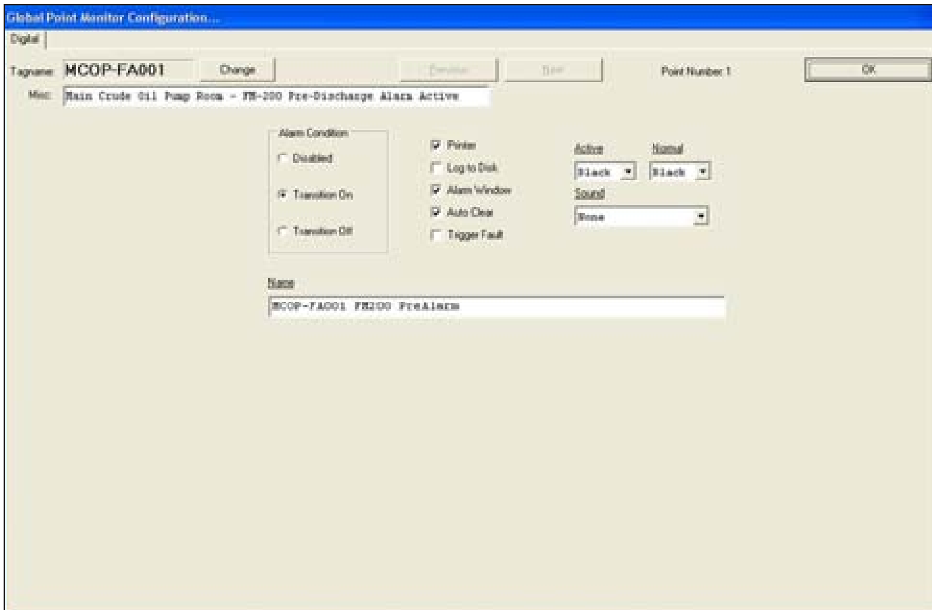


This will open a dialog box displaying all configured global memory points that are available for monitoring.

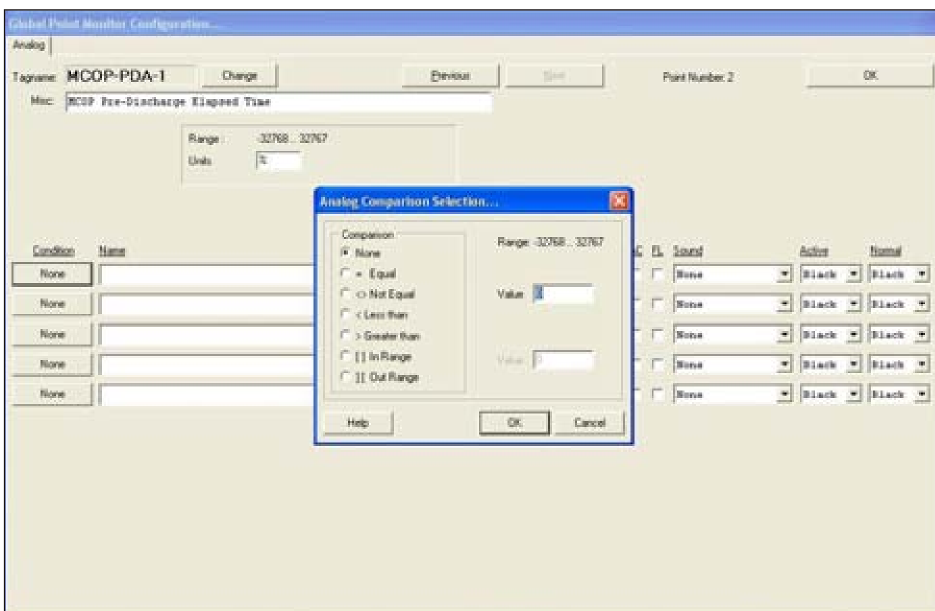
In the example to the right, two points are available.

Choose the desired point and select "OK" to access the configuration dialog box for the point.

A dialog box labeled "Global Point Monitor Configuration..." that is specific to the type (digital, analog, etc.) will be displayed allowing the monitoring of the point to be configured.

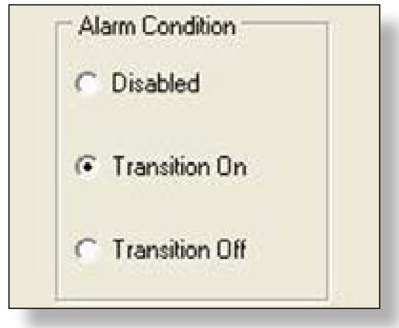


The selected example point above is a "Digital" ON/OFF point type that can be configured to log to the printer, disk, alarm window. In the example below, an "Analog" point type is selected and can be configured for multiple conditional events to be tracked.



Discrete Points

Globals tied to "discrete" ON/OFF type events can be set to alarm when the event transitions either High (ON) or Low (OFF) with the "Alarm Condition" radio button. They can also be disabled which removes them from tracking but leaves the event configured in case it is desired to activate it later without the need for knowing the configuration details.



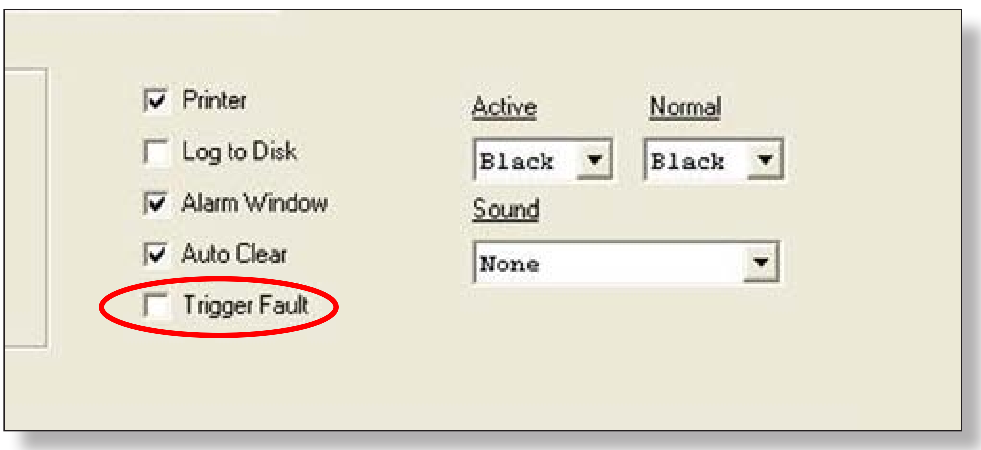
Transition On

When the tracked event transitions from the off state to the on state the alarm will be activated as configured.

Transition Off

When the tracked event transitions from the on state to the off state the alarm will be activated as configured.

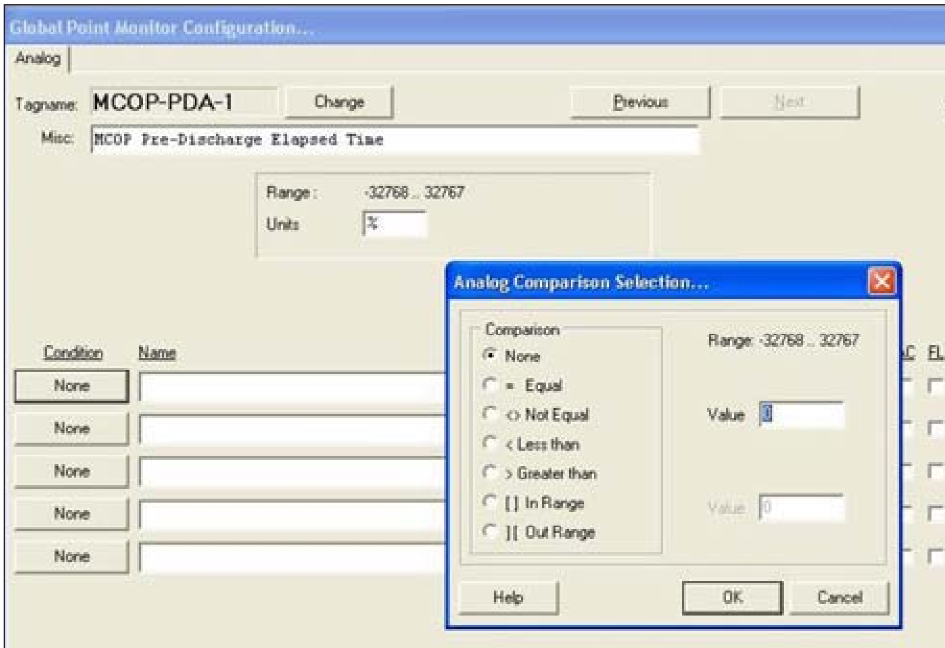
The event configuration consists of selecting where the event is to be tracked (Printer, Disk, Alarm Window), whether it will automatically clear when the event returns to its normal condition, what colors will be used for the events normal and active states, and whether a recorded sound will be triggered when the event occurs.



There is also an option to allow the event to "trigger a fault".

Analog Points

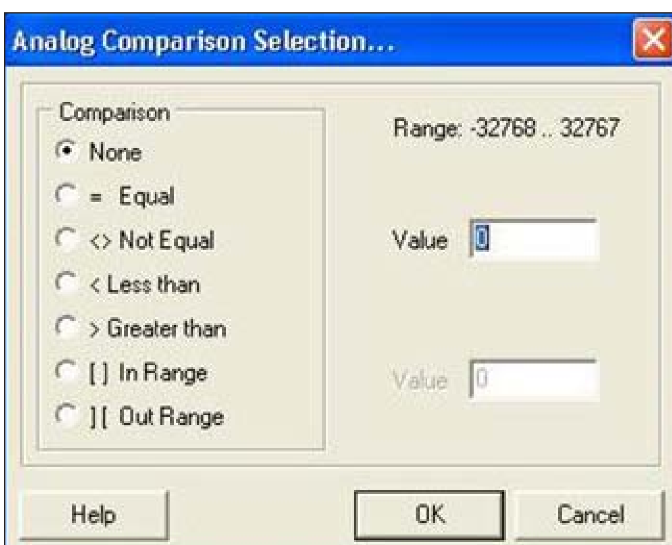
Globals tied to “analog” type events can be set to alarm in accordance with “conditional arguments” chosen from the “Analog Comparison Selection...” dialog box.



Up to five conditions can be named and configured with each one using one of the available comparisons. The analog signal is compared using the selected logical operator against the values entered. When the condition is true the event will be activated and tracked as configured.

The logical operators for comparison are self explanatory and selected by radio button. Most have a single value entry field.

The “In Range” and “Out Range” operators have two value entry fields to define the desired range.



Once the event name is entered and the comparison configured, the event tracking configuration is set up using the check boxes and menus to the right of the event name.

The five checkbox selections are defined below:

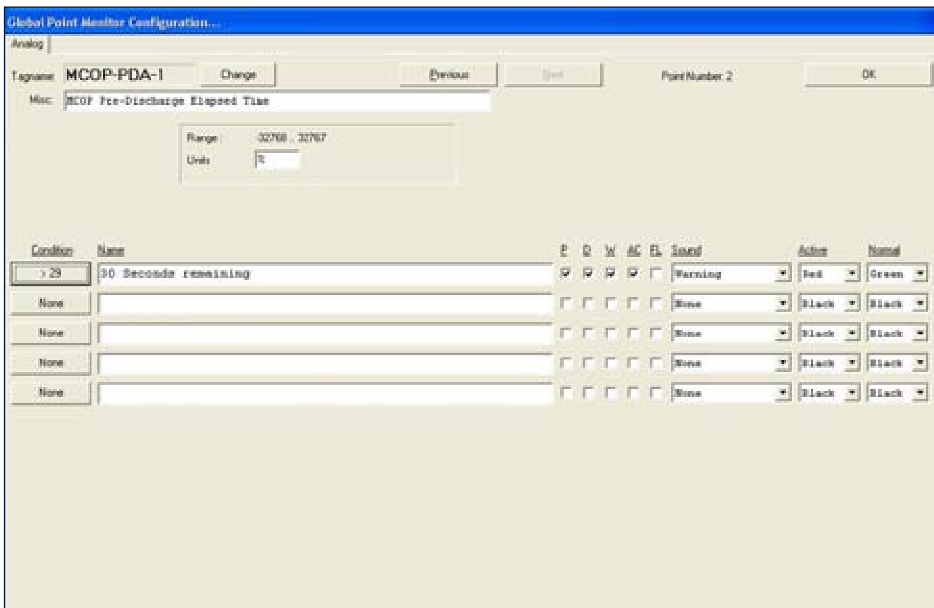
P: Printer (Tractor feed event printer)

D: Disk (Daily log file)

W: Window (One line FIFO display)

AC: Auto Clear (Event directly tracks the "raw" data state and doesn't require operator acknowledgement)

FL: Fault (Designates the event to be considered a fault instead of an alarm).



In the completed sample above, when the analog value exceeds 29 the event "30 Seconds Remaining" will be logged to the printer (in red), daily log file, event window and the OIS will play the "Warning" sound.

When the value drops below 29 the event will automatically clear.

Selecting a "Monitored Global" display its associated configuration data in the "Configuration" pane to the right of the globals list.

This provides "at a glance" a complete configuration overview of the selected global.

Since hundreds of monitored global points can be created, a “Search” button is provided to quickly locate a specific point entering all or part of the text from the points tagname.

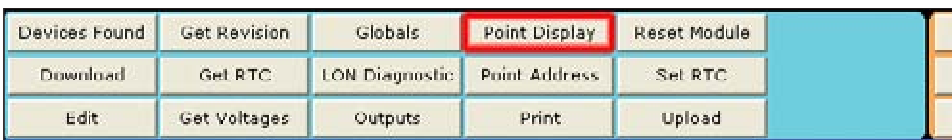
A “Check” button ensures that the monitored global is indexed to a valid tag in the controller. If the tag has been deleted after the creation of the monitored global, an error will be generated.

A “Delete” button is used to remove one or more monitored globals from the database.

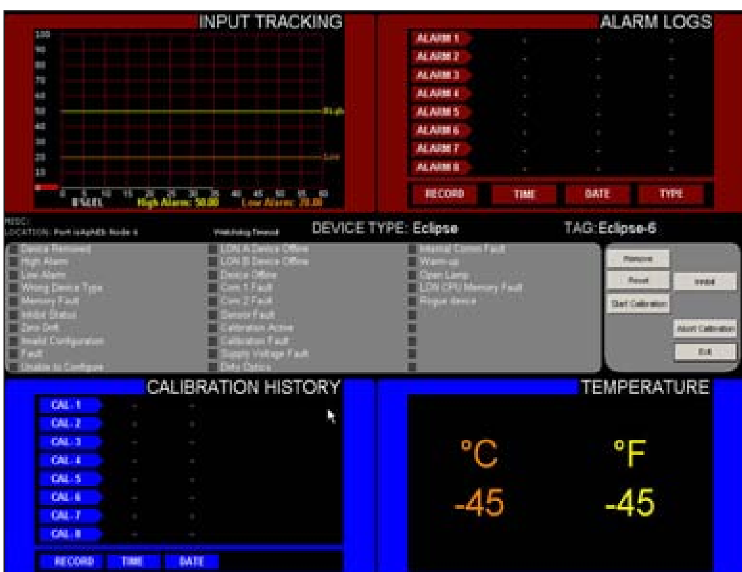
Point Display

Shows detailed information about a selected node including status and diagnostics, alarm history, calibration history and trend, and if applicable the current analog value. To access a device point display, select the device from the LON schematic by single clicking on it. It will highlight as shown below.

Select the “Point Display” button and the appropriate display will open.



Each device type has a point display that is specific to the information available for its type of field device. In the following example, a Point IR Gas Detector (PIRECL) is selected.

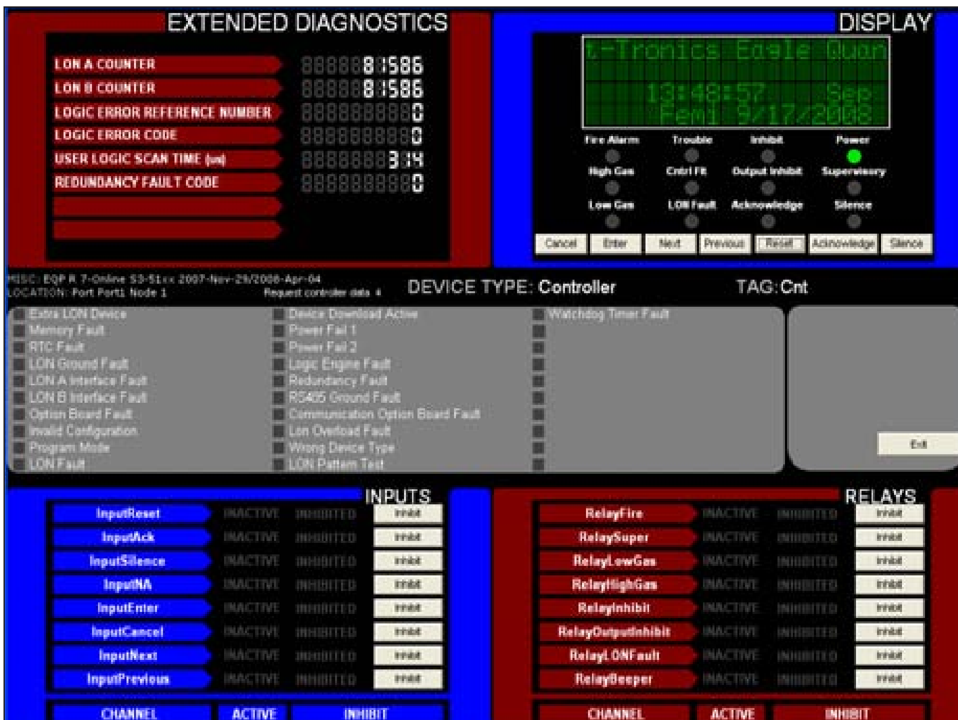


Both configuration and dynamic information for the device are arranged in a logical manner and presented on a full screen template. If the controller is not currently connected and communicating with the S³ station then no “watchdog timeout” will be displayed for the selected point. Simulated data is only displayed if no hardware key is installed.

In the example below Node 1, the Controller (EQ3001) is selected.

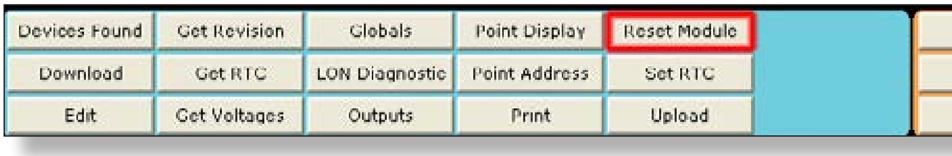
When the "Point Display" button in the command bar is selected a point display template specific to the controller is brought up.

Point displays are very useful in determining the status of the device, for resetting faults, inhibiting functions, checking calibration and alarm histories, and in the case of the controller, the faceplates' scrolling text display is simulated.



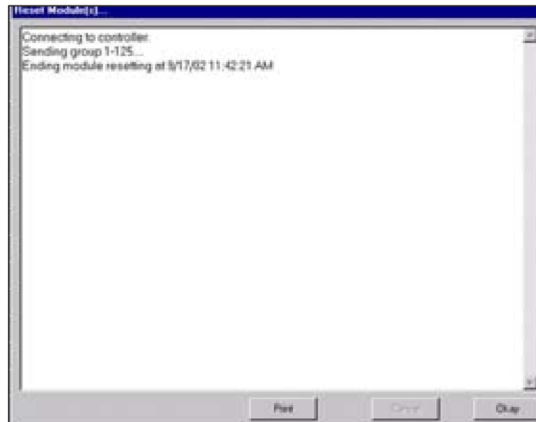
Reset Module

This command forces a selected field device to perform a "soft restart" effectively "rebooting" the field device. This will also reset any latched alarms, faults, outputs, etc.



The reset command can be sent to a single selected device or a group of devices. In the example to the right a group of nodes 1-125 was selected from the LON schematic and the reset command issued.

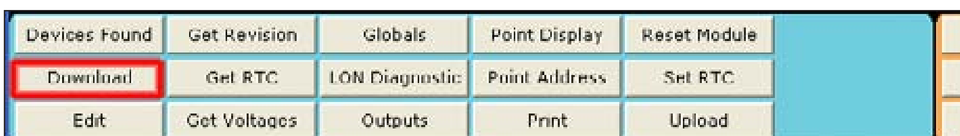
The controller then sent the reset command to the appropriate devices and logged the activity to the "Reset Module(s)" dialog box to provide feedback to the user.



Download

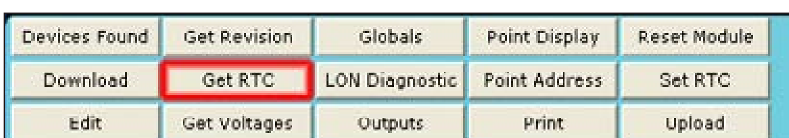
Sends all configuration data from S^3's LON configuration database to the controller. This command must be used after changing the configuration of a node, group of nodes, or controller logic.

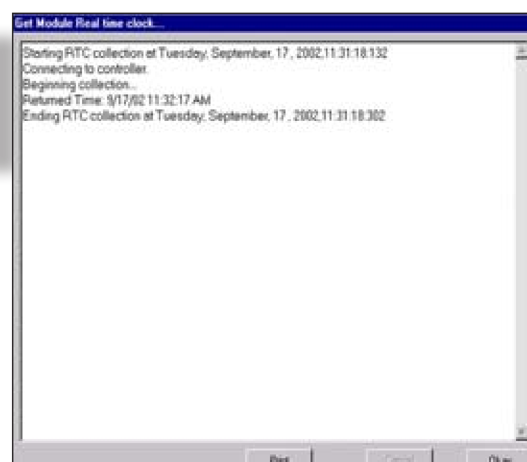
To send configuration data to the devices on the LON, choose "Download". This will cause S^3 to sequentially download the configuration of all nodes, starting with LON address 1 and ending with the last configured node.



Get RTC

Requests the "Real Time Clock" data from the controller.





The gateway will return the current date and time, according to its internal clock. Verify this date and time against that of the S^3 station for accuracy. If it is not the same as the S^3 station, use the Set RTC command described later to correct the discrepancy.

LON Diagnostic

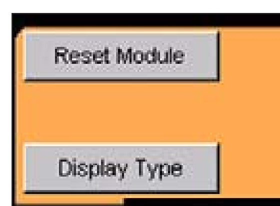
Displays a graphic “LON Schematic” displaying dynamic information about the LON and the devices residing on it.

The schematic begins with Node 1, the controller, in the upper left corner and a line representing the communication network (LON) running back and forth across and down the screen.

The LON is typically wired as a loop starting and ending at the controller although the schematic does not show this for aesthetic reasons. The end of the LON at the lower right is assumed to connect back to the controller at the top left of the screen.

Each configured device is represented by a rectangle bisected longitudinally with the tag name displayed in the upper section and the node number (LON address) displayed in the lower section.

Using the “Display Type” button the node number in the lower section can be replaced with the device type.

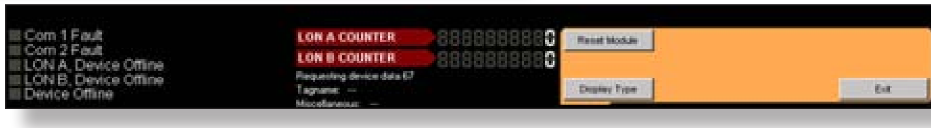


NOTE
Use of this display requires proper setup of the “LON ORDER” screen prior to the use of this display.

This button is a “toggle” and will change name following activation to indicate what its function will be on its next activation.

Diagnostic data is displayed to two ways on the display, through the color of the rectangle defining each node, and through indicators and counters at the bottom of the screen.

The LON is typically wired as a loop starting and ending at the controller which has two physical interfaces (transceivers) labeled “A” and “B”.



On an intact LON each of these transceivers receives information from all of the field devices at roughly the same time. A nodes proximity to one or the other transceiver along with the propagation delay of long wiring distances and/or network extenders will induce a small time differential. This differential will cause an individual nodes message to be read by either the A or B transceiver first and processed by the controller.

If the last message processed by the controller for a node comes through the “A” transceiver the rectangle representing that node will have a green outline on the diagnostic LON schematic. If it comes through the “B” transceiver its rectangle will be outlined in yellow.

Normal LON

On a healthy LON with good network integrity, message traffic will appear random and each nodes outline color will constantly change without any pattern.

Faulted LON

On a faulty LON with a break in the wiring or other abnormal condition, message traffic may have only one path to the controller. This would be indicated graphically by all of the nodes before the problem changing to one color (green or yellow) and the nodes after the problem changing to the other color. The area where the color transition occurs is most likely the problem area.

In this way the LON diagnostic display can be used to localize LON wiring problems. In addition to the graphic representation of message traffic on the display, quantitative data is available for diagnostics through indicators and counters.

If a node on the schematic is selected (by single-clicking on its rectangle) the five indicators in the lower left of the screen will show the diagnostic data from the selected node.

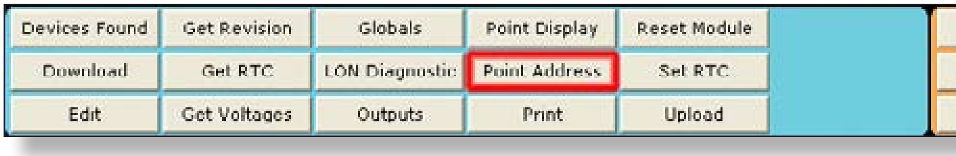
To the right of these indicators are LON counters that show message processing by the controller. On a healthy system the counters should be close to equal. On a system with a degraded network, there may be a significant offset showing either the “A” or “B” transceiver getting the majority of traffic.

Reset Module

To the right of the LON counters is the “Reset Module” button. This command forces a selected field device to perform a “soft restart” effectively “rebooting” the field device. This will also reset any latched alarms, faults, outputs, etc.

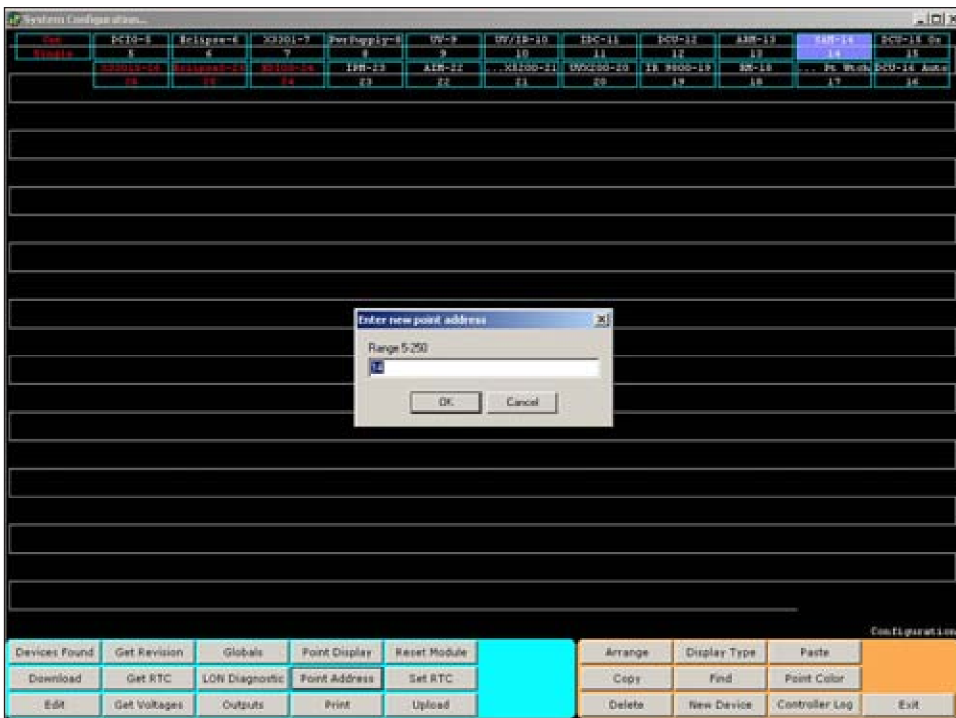
Point Address

Allows a node on the LON schematic to be given a different address.



This is typically used when similar nodes are copied & pasted to preserve a particular set of configuration parameters. After the paste function, the "new" node may have an incorrect address and it must then be changed.

To use this function, select a node by single-clicking on its rectangle. Once the node is highlighted, click on the "Point Address" button and the "Enter new point address" dialog box will appear. Enter the desired new node number and the click on the "OK" button.



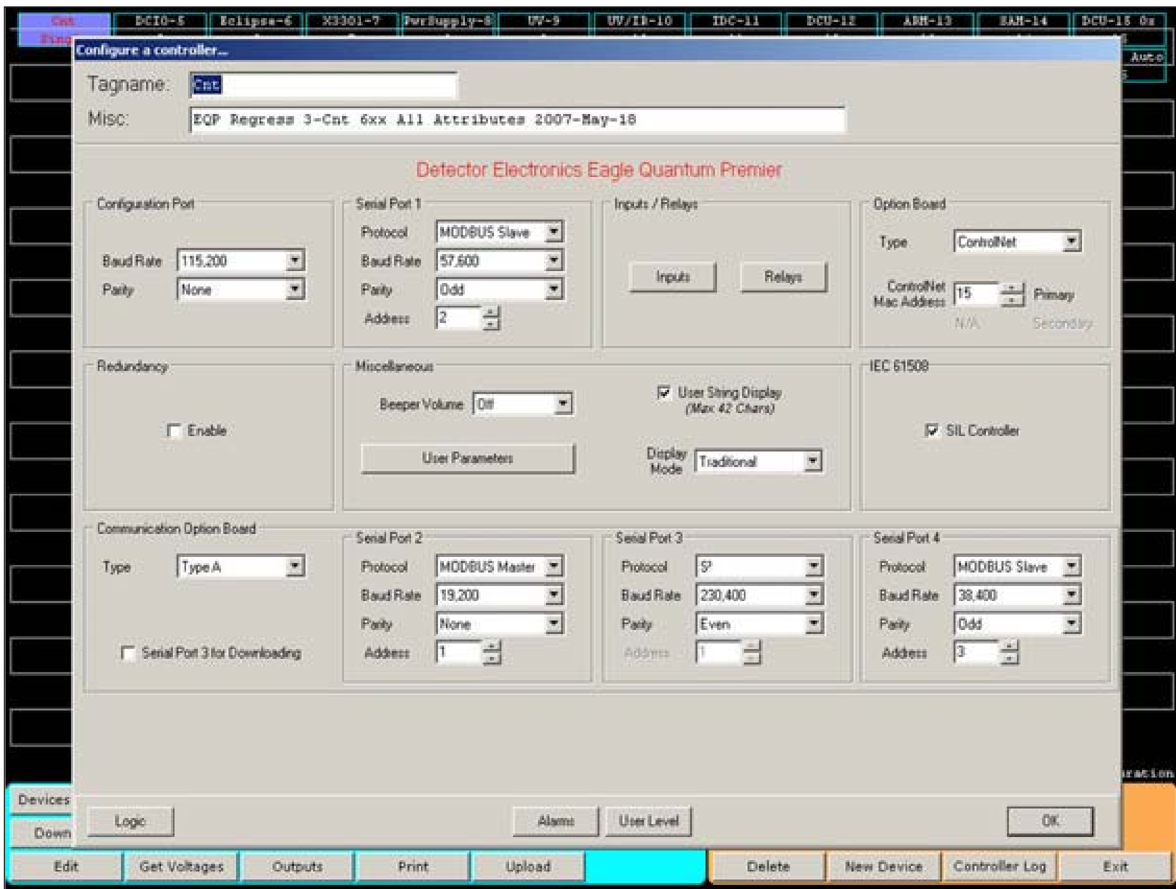
Set RTC

Sends the current date and time of the S³ station to the controller synchronizing them. Since the field devices all use the controllers date and time pulse when storing their own alarm and calibration data, it is important to verify the proper time on the PC and then match the clock used by S³ station for event monitoring and tracking.

Edit

Selecting the "Edit" button displays the detailed configuration data for a single selected node. To enter the edit mode for a particular node double-click on the rectangle representing the node on the LON schematic.

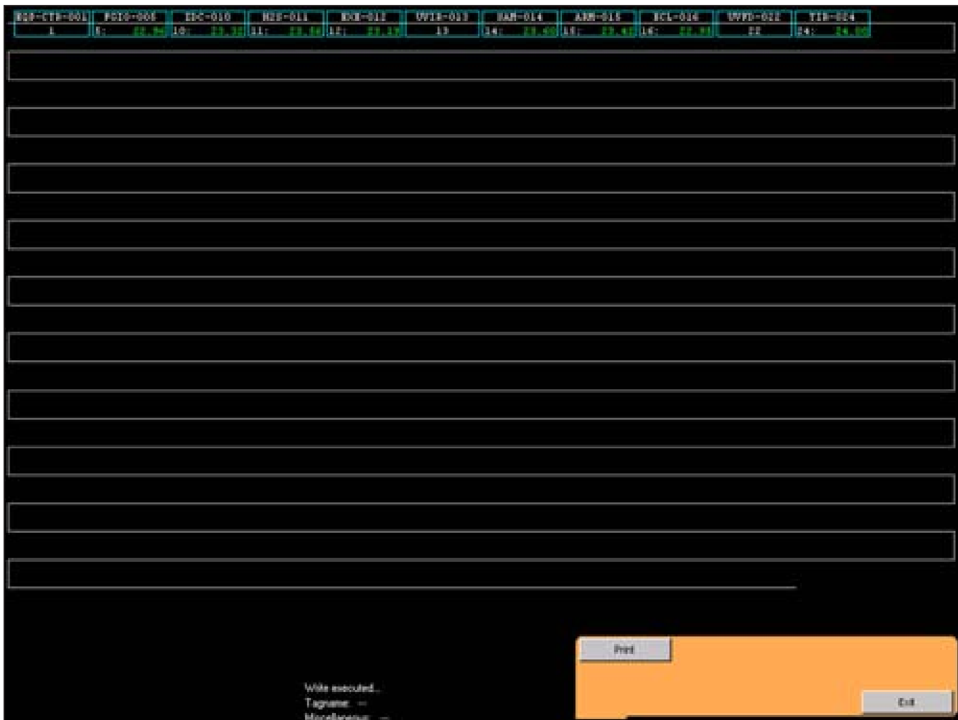
Below is an example of the controller configuration screen. Detailed examples of node editing, for each device, will be shown in the Premier Device Configuration section of this document.



Get Voltages

Displays 24 Vdc supply voltage information for uses such as troubleshooting power distribution problems.

Selecting the “Get Voltages” button will display a graphic LON Schematic upon which S^3 will overlay dynamic 24 Vdc power supply data from each compatible field device.



Certain previous generation Eagle Quantum field devices may not be compatible with this command.

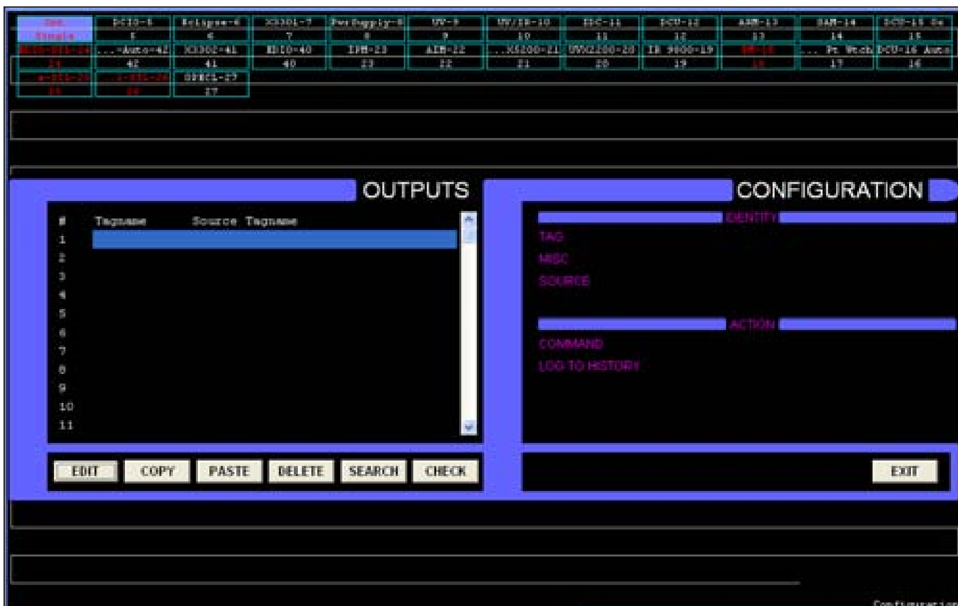
In the example above nodes 12, 14, 15 and 16 are compatible and display the node address in the lower left with the supply voltage in the lower right. Nodes 13 and 22 are older styles, therefore a UVIR and UV optical flame detector cannot support this feature and only display their node number.

Outputs

Tags linked to commands to be sent to the controller or field devices on the LON are configured here.

Each “output” is a tag in the DCD database that references a command or controls a memory location within the Premier controller.

Select the “Outputs” button from the command bar to access the configuration screen.

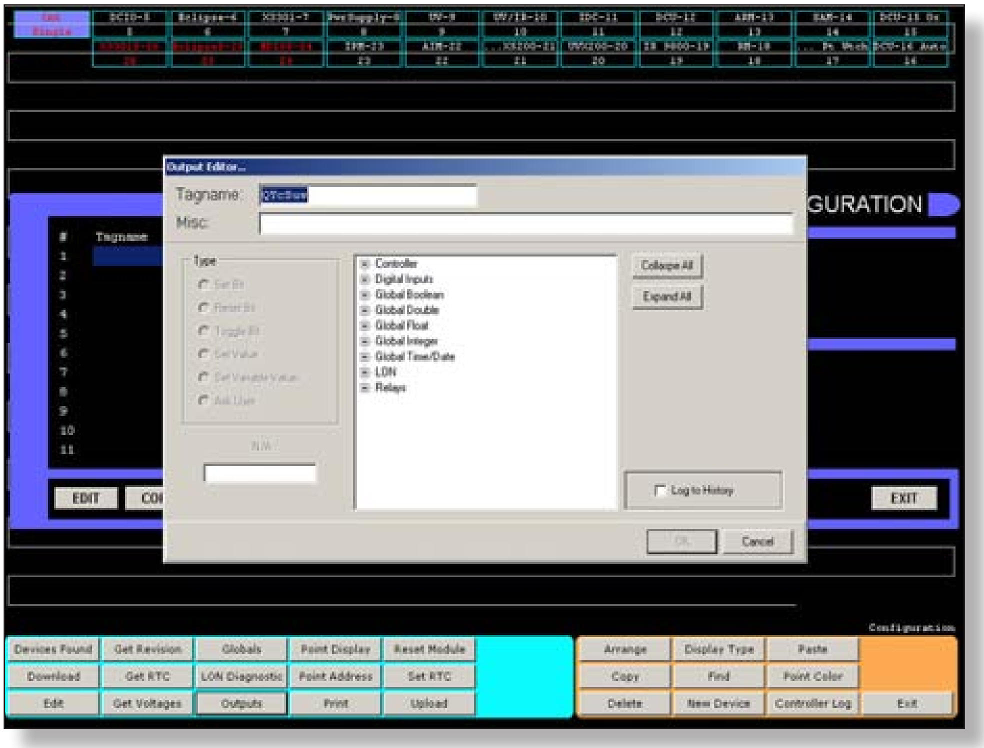


The screen is divided into two sections, Outputs & Configuration. On the left side the outputs pane consists of a scrolling list showing all configured output tags in the database. Below the list are buttons for creating and maintaining the tag list.

On the right side is the configuration pane which will show the details of any selected output from the list.

To create an output, double click on one of the “slots” in the scrolling list or select a slot and click on the “Edit” button below the list.

This will display the “Output Editor” dialog box.



The Output Editor provides two data entry fields, the first for entering the tagname desired for the configured output, the second provides for a “long description” of the tagname function.

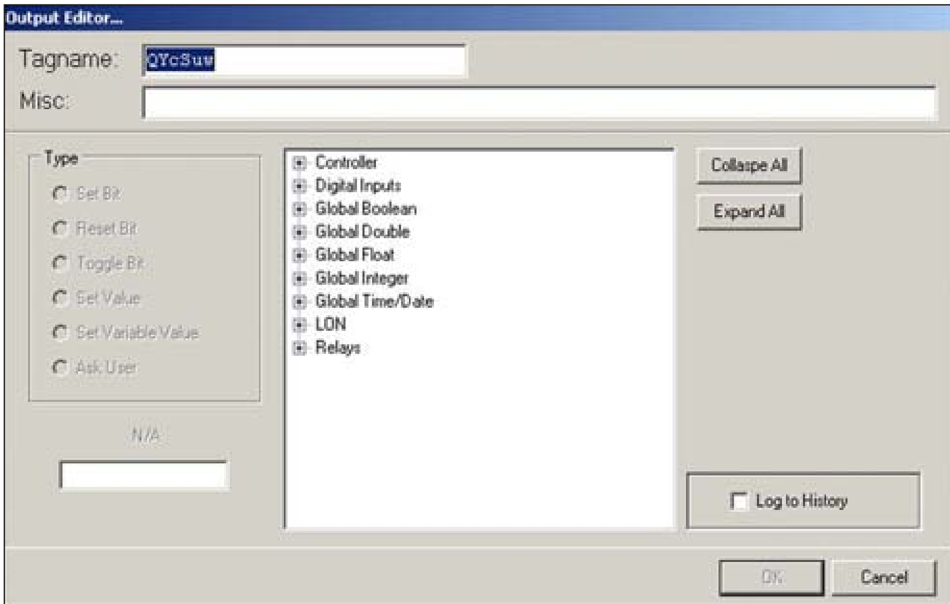
Below these two fields is a hierarchal list of “destinations” to tie the output to the database.

Any item on the list that has a “+” before it has subordinate items and clicking on the “+” will expand the list showing all items that make up that category.

To the right of the list are two buttons that can “Expand” or “Collapse” all subordinate items in the list for easy viewing.

A checkbox in the lower left of the Output Editor dialog box determines whether the configured output will be logged to the history file upon execution.

Below is the Output Editor dialog box just after opening. A random, unique tagname is generated by default by S^3.

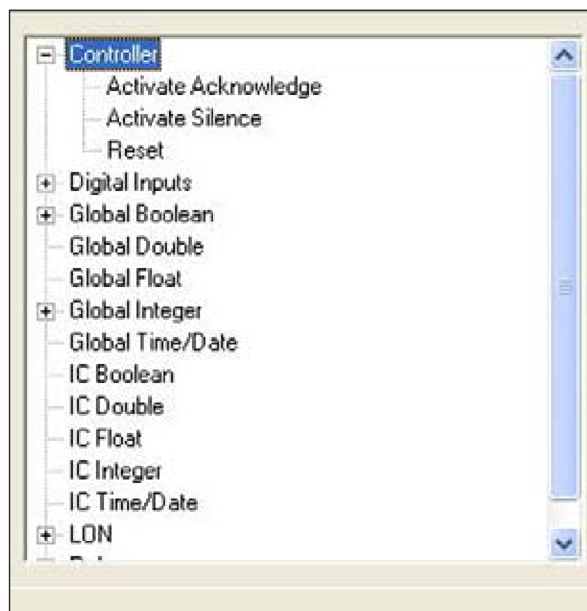


The firsts twelve items on the list provide access to controller commands and the global database. The "LON" item will allow access to all field device command functions, the "Relays" item is for accessing the controllers onboard relays.

In the example to the right, the "Controller" item has been expanded by clicking on the "+" sign and now shows three subordinate items, Activate Acknowledge, Activate Silence and Reset.

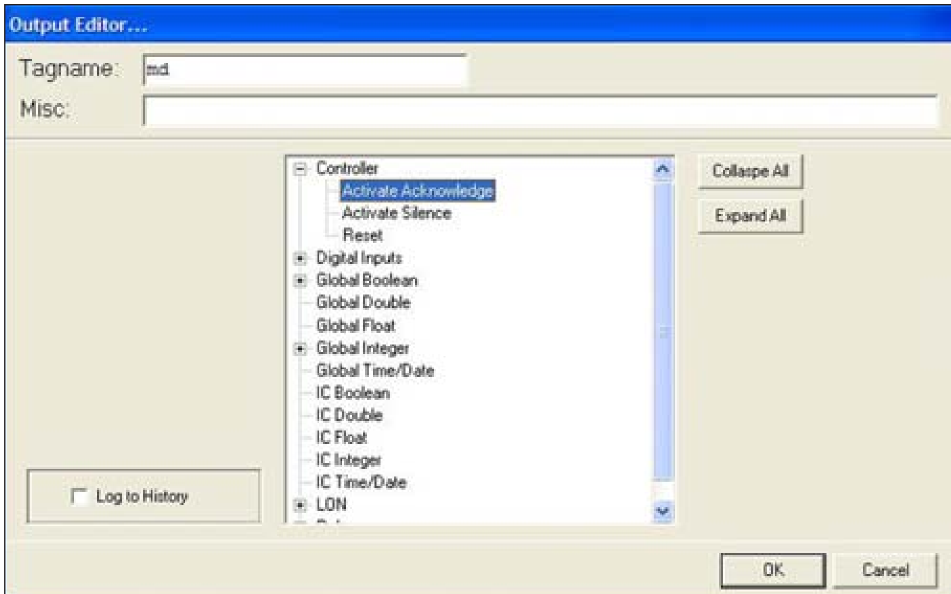
As these additional items are revealed, the list extends beyond the bottom and becomes scrolling.

The hierarchal arrangement of items provides an easy and logical method of accessing the thousands of potential items that could be configured as outputs on a large premier system.

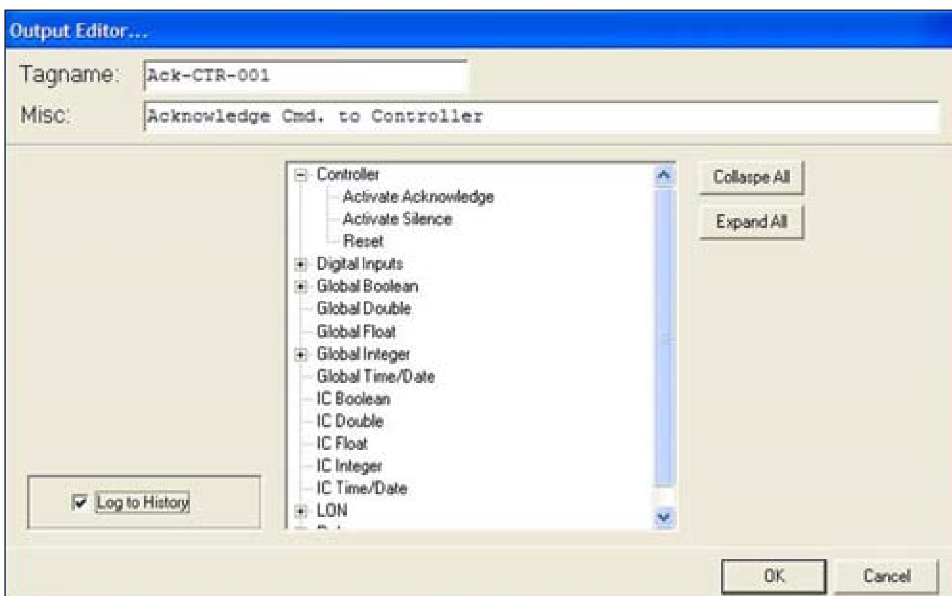


Sample output configurations

Example 1 involves an output to acknowledge an alarm on the controller. With the controller selected and its item list expanded select the "Activate Acknowledge" item.

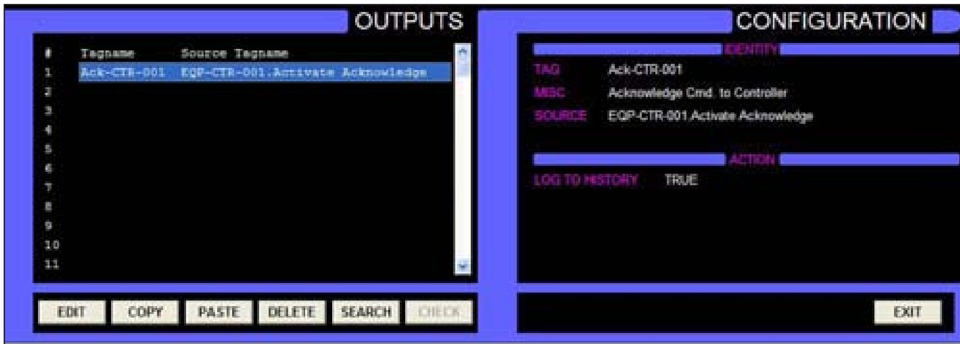


Next, create the tagname and miscellaneous comments and select "Log to History" to complete the configuration.



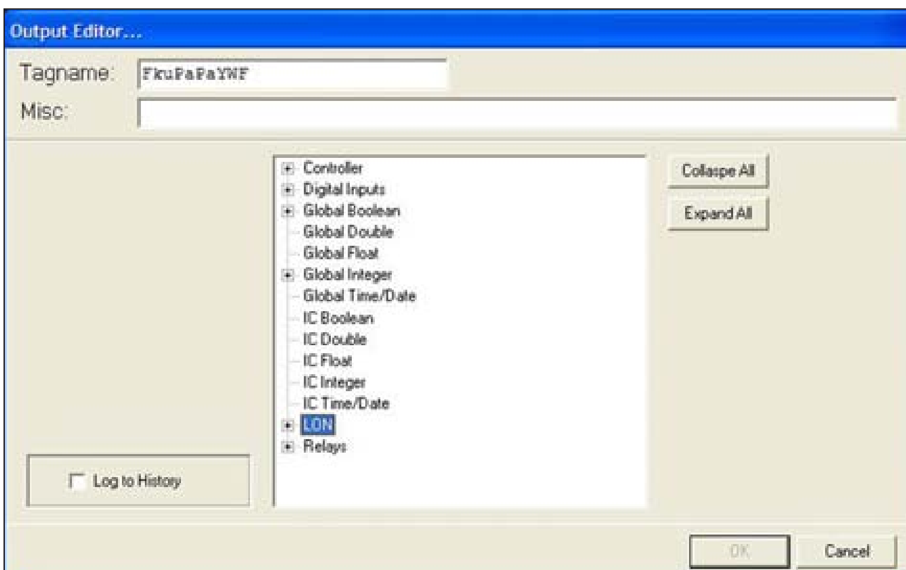
When the configuration is complete, select the "OK" button in the lower right of the dialog box.

The configured output #1 is now displayed both in the output list on the left along with its details displayed in the configuration pane on the right.



Example 2 involves creating an output to reset an Agent Release Module (ARM) on the LON. This output will be configured in output slot #2.

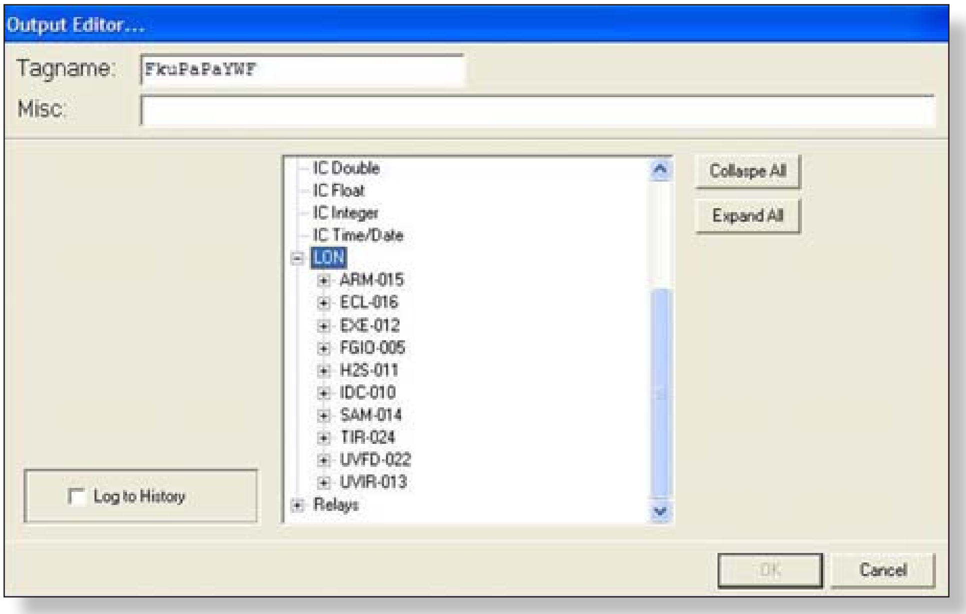
Double click on the second slot, or single click the slot and select the “Edit” button in the bottom left of the output pane to open the “Output Editor” dialog box.



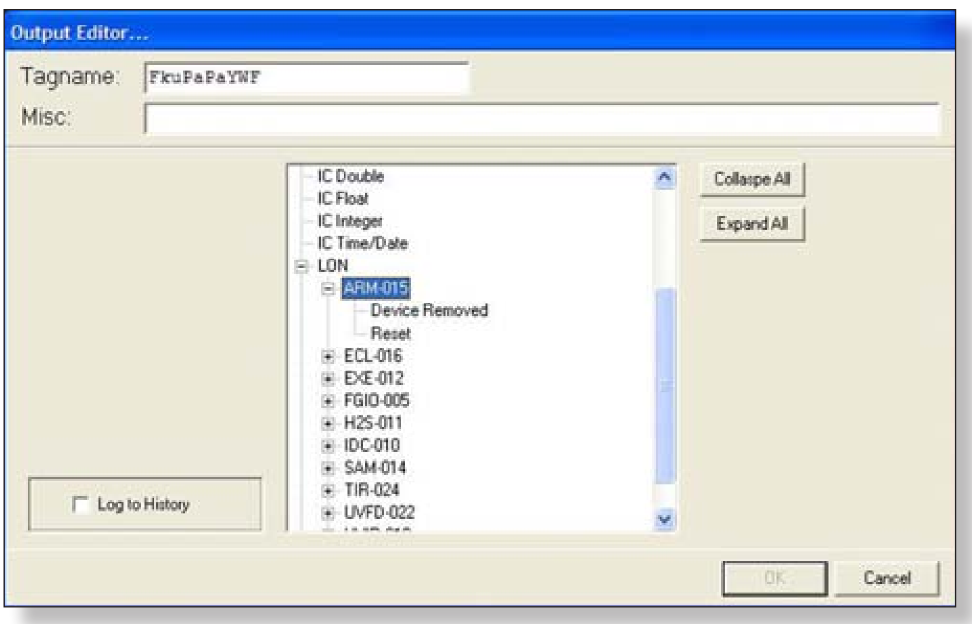
Notice that a random tagname has been entered automatically, next select the “LON” item. All field devices will be listed under this item.

Clicking on the “+” sign left of the “LON” item will expand it revealing the devices on the LON. In this sample program there are only 10 field devices but in typical systems their could be dozens.

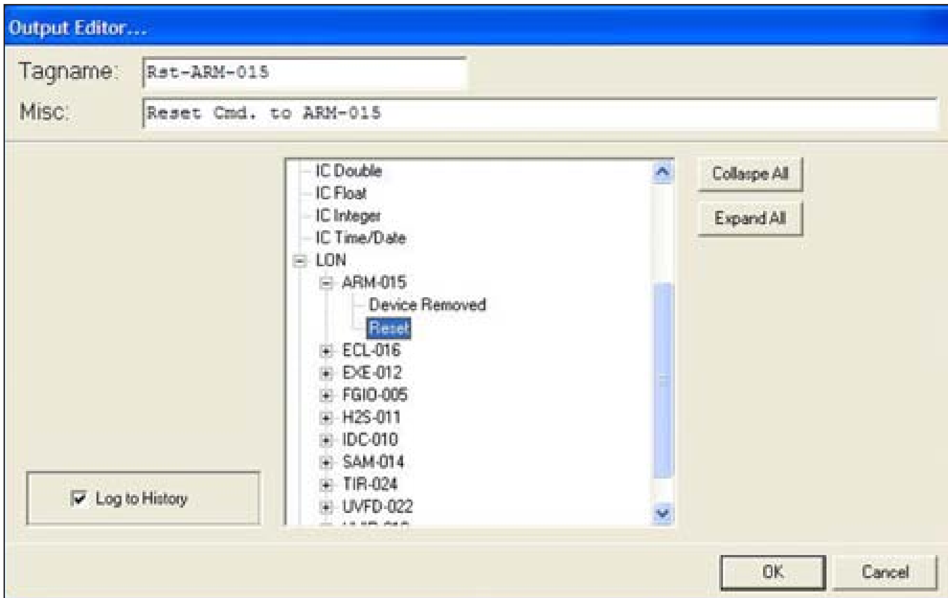
Notice that each LON field device has the “+” sign to its left signifying that there are subordinate items associated with them. The number of subordinate items will vary by device type.



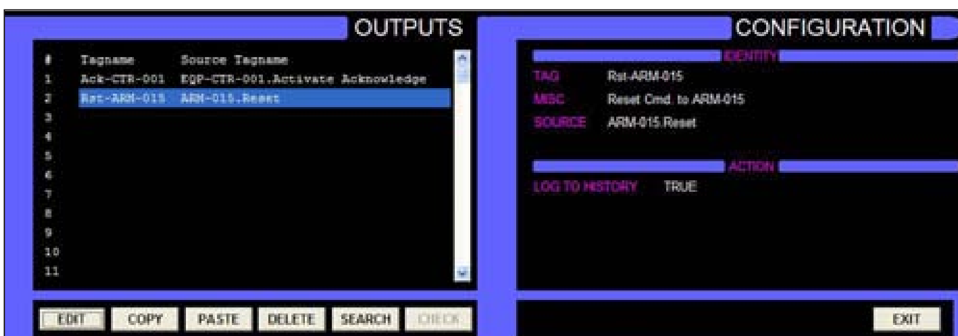
Expand the “ARM-015” item to display its subordinate items. An ARM has only two selections; “Device Removed” and “Reset”.



Select the "Reset" item from the ARM-015 list, fill in the tagname and miscellaneous fields and then select "Log to History" to complete the configuration.

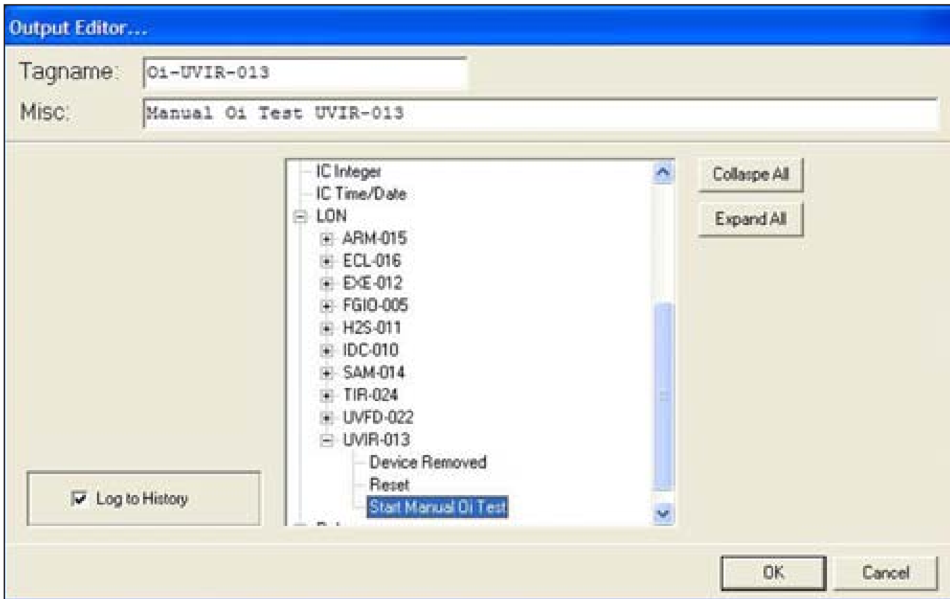


Then select the "OK" button in the lower right of the dialog box to complete the configurations entry into the database.



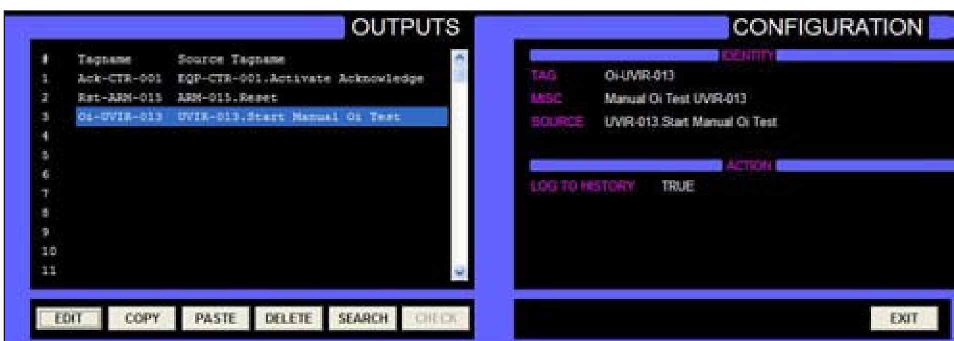
This completes the configuration of the first two output "slots".

Example 3 involves creating an output to initiate a manual Optical Integrity (Oi) test on a UVIR optical fire detector. This output will be configured in output slot #3.



Above is the output editor dialog box with “UVIR-013” expanded, “Start Manual Oi Test” selected, and the tagname and miscellaneous fields filled out.

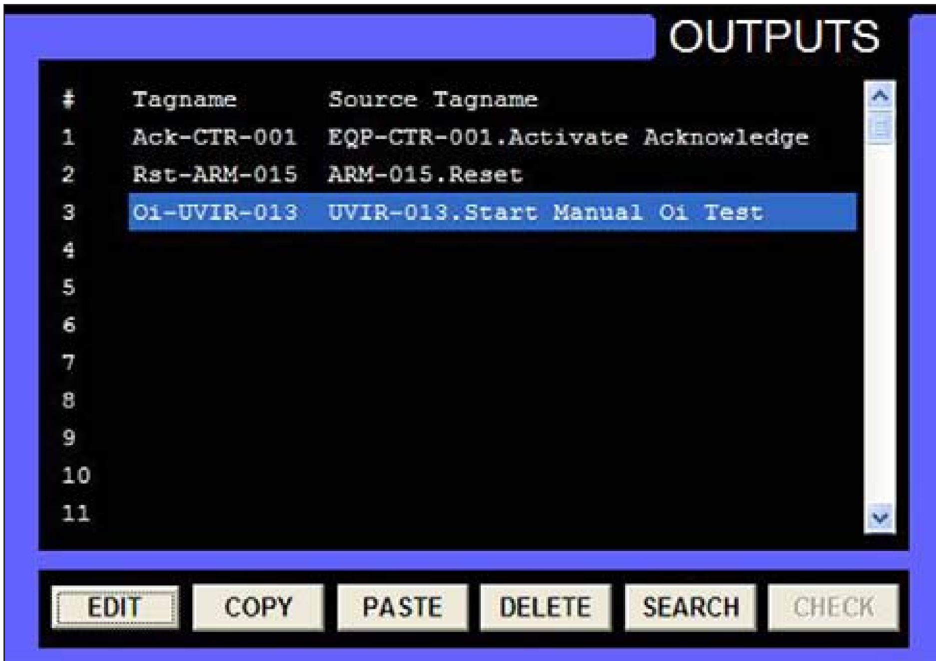
Notice that the UVIR detector has three subordinate items instead of two as in example 2 with the ARM module.



The three examples for output tags are now complete and the configuration information is displayed on the “Outputs Configuration” screen.

Output Configuration Screen Details

The left hand pane uses a scrolling list with three columns to display the configured outputs and allow for their editing.



The first column "#" contains the slot number for the outputs in the database. In the example above, the first three slots are configured.

The second column contains the "Tagname" that is used within the database to identify the item. This tagname will be used throughout the S^3 environment, and specifically within the graphic editor when assigning these outputs to user configured buttons.

The third column "Source Tagname" displays the tagname of the device that the output is associated with followed by the command function. In the highlighted example of slot 3 above, the source is UVIR-013 and the command function is "Start Manual Oi Test". This is then represented in the output list as;

UVIR-013.Start Manual Oi Test

The six buttons at the bottom of the Outputs pane perform the following functions:

Edit opens the "Output Editor" dialog box to allow an output to be configured for slot selected.

Copy allows a selected slots' configuration to be copied for pasting into another slot to speed up the configuration of similar outputs.

Paste used with "Copy" above, allows a copied slots configuration to be pasted into the selected slot to speed up the configuration of similar outputs.

Delete immediately and permanently erases a slots configuration. This function is not "reversible" so use with caution.

Search allows for locating matching text strings to quickly find a desired slot for viewing or editing, since thousands of outputs can be configured.

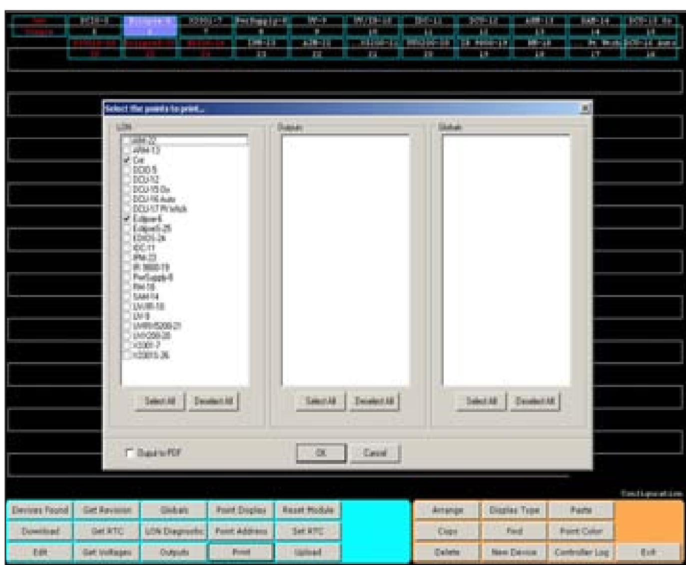
Check is primarily used following editing of the LON configuration to verify that all configured outputs are still linked to valid items in the database.

Print

Allows for the select printing of configuration information for the controller, field devices and database for documentation purposes.

NOTE
This command will send the selected configuration data to the default Windows printer, not the alarm & event printer.

Once the "Print" button on the command bar is selected the print selection dialog box will open.



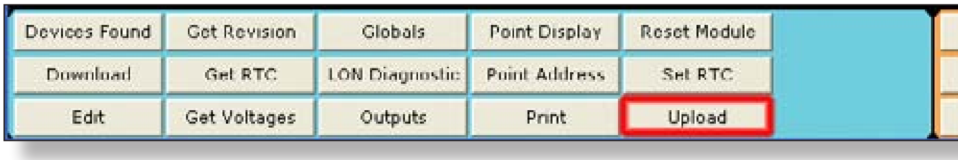
The dialog box is divided into three main selection areas, LON, Outputs, and Globals. All configured items for each category are displayed along with a checkbox to select the items data for printing.

At the bottom of each column are "Select All" and "Deselect All" buttons to aid in the rapid selection of data to print.

Optionally, the data can be output to "PDF" format by using the checkbox in the lower left of the dialog box.

Upload

Queries the controller for its configuration and if a complete configuration was properly stored, it will be uploaded and saved to a newly created project (refer to section 8-5 in regards to creating a new project). The current project will not be changed.



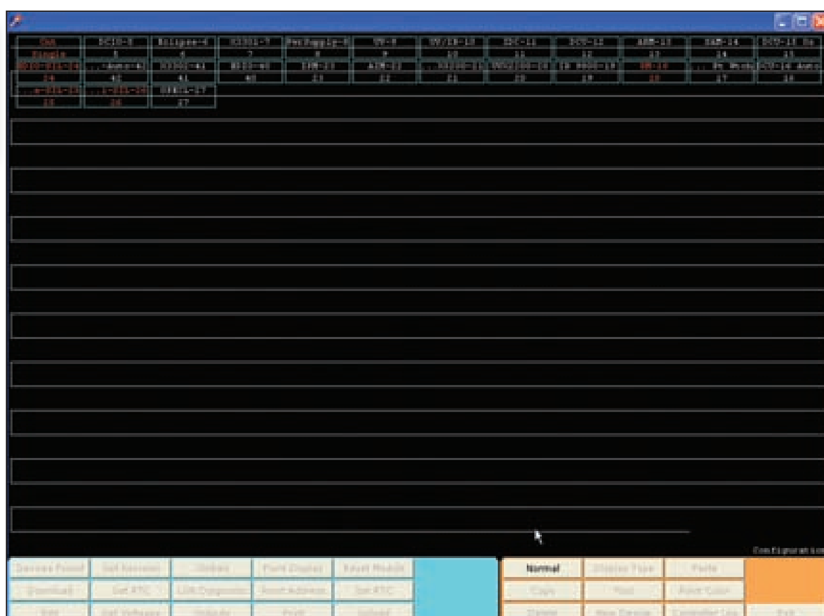
The "Upload" command is typically used when attaching an S^3 station to an existing system for which there is no existing database on the S^3 station.

Configuration Bar

The configuration bar has eight buttons, each of which is used in the configuration of the LON and creation of LON devices.

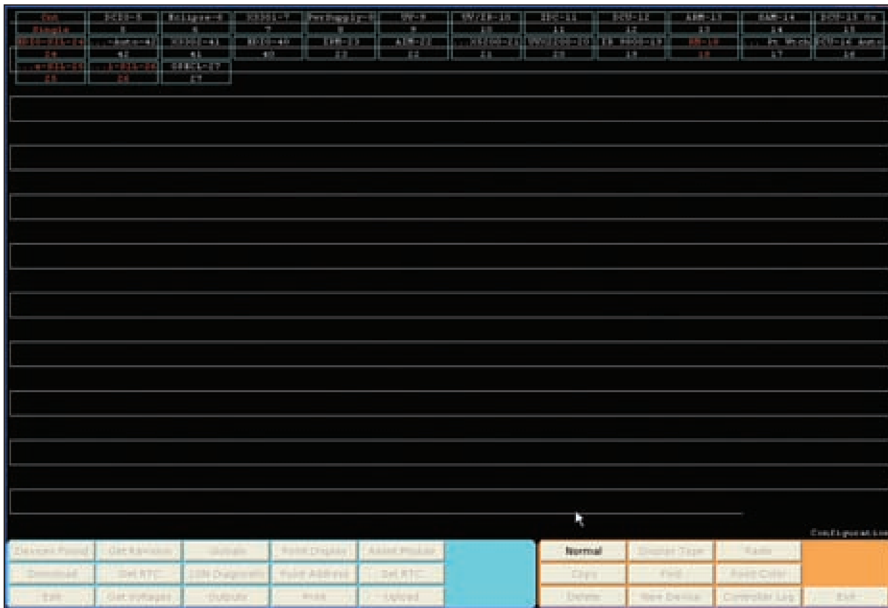
Arrange

This button allows the re-arrangement of the nodes on the LON schematic for the purpose of matching the physical and logical order of the network.



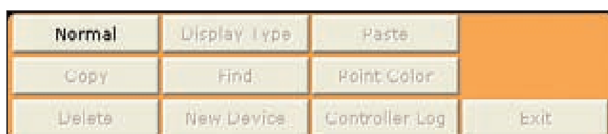
This must be done to optimize the functionality of the LON diagnostic screen. On the example network schematic shown on the right the node order is shown numerically. Node 1 being the controller, followed sequentially by nodes 5, 10, 11, 12 ....etc. In the plant, it's entirely possible that "Node 5" may wire to "Node 20" and the overall order could be 1, 5, 20, 21, 23 ... etc.

The "Arrange" button allows movement of the location of the nodes on the schematic representing the LON to match the actual way the LON is wired in the field. This is an important step for ease of future LON troubleshooting.



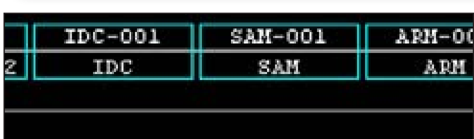
To use the "Arrange" function, click on the "Arrange" button and drag the nodes into their desired locations. To move a node, click and drag it over the area between the two nodes at the new location, then release the mouse button. The node will then be moved to this location but retain its original address.

When the physical and logical addresses have been reconciled, select the "Normal" button to return to the standard LON configuration screen.



Display Type

A "toggle button" that allows either the default Node Number to be displayed on the LON schematic, as shown in the example below, or the device type.



When the "Display Type" button is selected, the LON schematic will substitute the device type for the node number, as shown below. When the device type is being displayed, the button on the configuration bar will toggle to say "Display Number", and when selected shifts the LON schematic display back to the default Node Number view.

Copy/Paste

Used in conjunction with the "Paste" command, "Copy" allows a nodes configuration to be duplicated elsewhere on the LON while retaining the configuration data.

This is very useful when there are to be many nodes of the same type and configuration on a LON. The detailed configuration only needs to be done once, then copy and paste as many as needed with only the new nodes tag name and address needing to be manually entered.

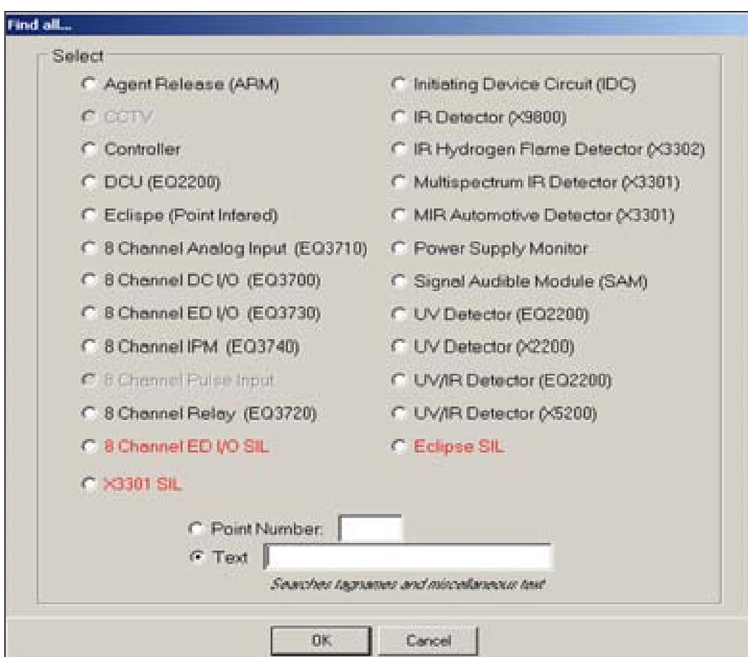
To copy a node select it by single clicking on the device then choose the "Copy" button. The "Paste" button will produce a new device with all of the configuration from the copied node, just enter the new tag name and miscellaneous text.

Find

Displays a dialog box that allows the configuration database to be searched for specific types of field devices, a specific node address, or specific text.

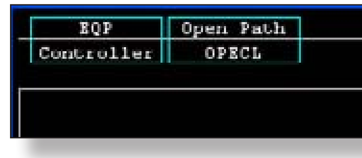
The "Find" button will open the "Find all..." dialog box which provides radio buttons to select a device type, and fields for either a LON address or text from either the tagname or miscellaneous text.

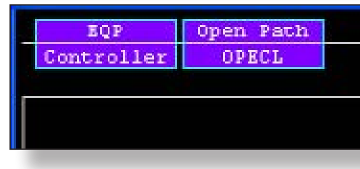
Items found matching the search criteria are highlighted in blue on the LON schematic. This is particularly useful when trying to find a specific tag name on very large systems with hundreds of points.



Point Color

If at anytime a field device becomes difficult to view above the black background, the “Point Color” button enables the user to choose a new background color to help the device stand out for better viewing.

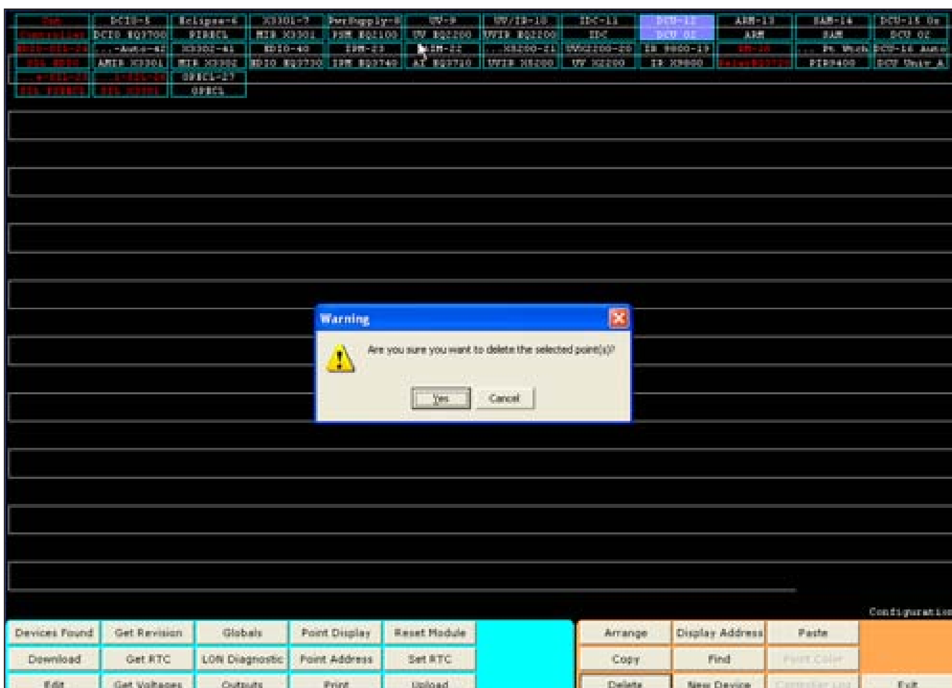




Delete

Removes a selected node from the LON configuration.

Select a node or multiple nodes on the LON Schematic and then select the “Delete” button to remove them from the database.

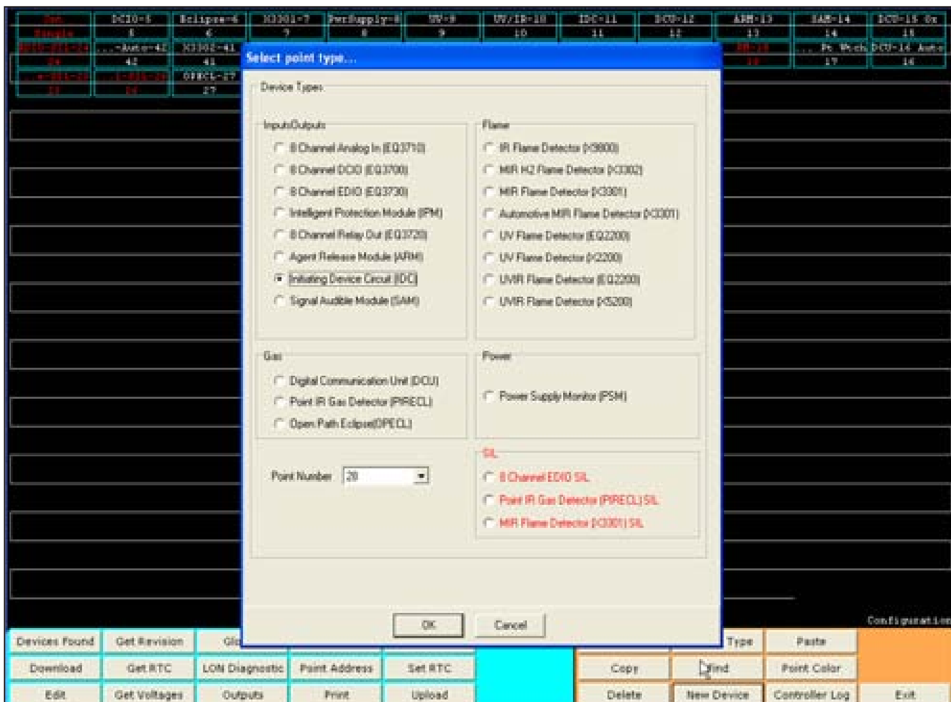


Use this function with caution as it does not have an “undo”.

New Device

Opens the "Select Point Type" dialog box from which a new device can be added to the LON.

In the example below, "Initiating Device Circuit (IDC)" has been selected.



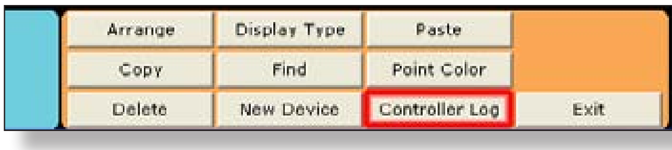
At this point, selecting the "OK" button would add an IDC to the LON, just after the last configured device.

At this point, the configuration dialog box for the selected point type is displayed. This dialog box provides access to all of the programmable parameters for the selected device type. The detailed configuration instructions for each device type is covered in svection 12.

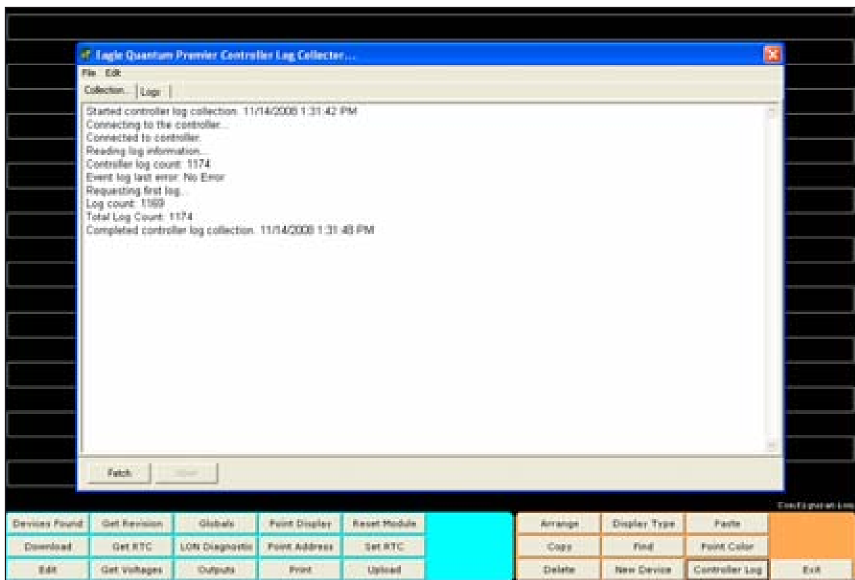
NOTE
Verify the proper LON address for the new device is shown in the "point number" window; correct if not.

Controller Log

S^3 keeps a log of every event ever excecuted by the controller, logs which cannot be edited or deleted.



Once the "Controller Log" button is selected a new window will appear requiring the "Fetch" button to be selected in order for the logs to populate the screen.



Clicking the "Logs" tab displays the controller logs with more detailed infomation, and the user is able to export the info to Excel or PDF formats. This is done by going to the File menu and choosing "Export".

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Controller

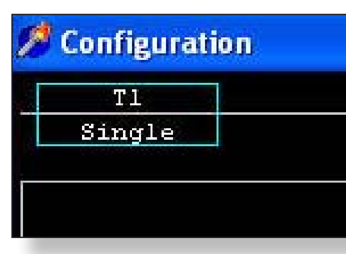
NOTE
This Section is dedicated to the EQP controller and key field devices it supports. Please be aware that the controller will encounter compatibility issues with some field devices if it's firmware is not up to date and does not match the correct version of the S³ software. Refer to marketing bulletin 78-1006 for more information.

The "Controller" is the first device on any Eagle Quantum Premier Local Operating Network (LON). This device is used to perform the user logic, it provides the NFPA-72 required operator interface elements and provides a communication interface to the S³ Operator Interface Station (OIS) and/or other intelligent systems for monitoring purposes.

Both the user logic and the configuration for all of the LON devices is first created and stored in the S³ configuration database, then downloaded to the Controller, which in turn downloads this information to the field devices where it is stored in their non-volatile memory. A copy of the configuration data is also stored in the Controllers own non-volatile memory.

When an Eagle Quantum Premier port is first created, the LON schematic is empty except for a "node rectangle" representing the Controller, as shown in the example to the right.

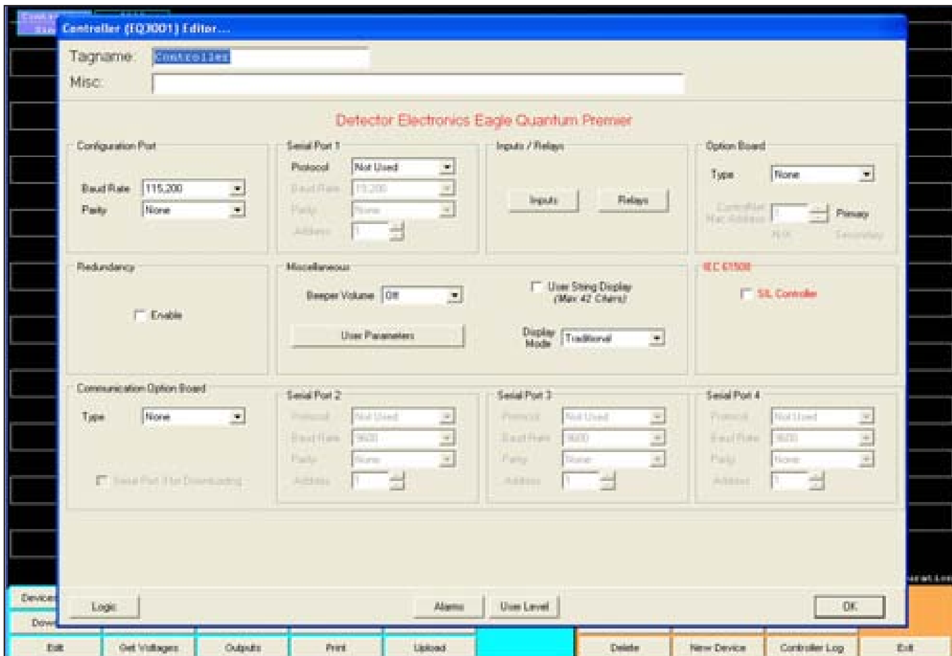
The node rectangle is divided in half horizontally with the tag name in the top and controller configuration in the bottom. In the example to the right, S³ has assigned "T1" as a temporary tag name. This tagname is randomly generated and can be replaced by the user assigned tag name. The bottom half will contain the controller configuration default of "Single" signifying a single "non-redundant" arrangement.



Configure a Controller

To begin controller configuration, double-click on its selection rectangle or single-click on the selection rectangle and choose the “Edit” button in the lower left position of the command bar. This opens the “Configure a controller...” dialog box which provides access to all of the user configurable features of the controller, including access to the logic editor.

NOTE
This section of the user guide deals with the hardware configuration of the controller only.



Tagname

This field provides room for a 24 character tagname which will be used to reference the controller throughout the S^3 global database. This tagname is used in the logic editor, OPC server, and all printed documentation. Upon device creation in the database S^3 assigns a randomly generated tagname.

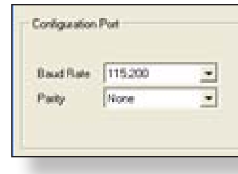
Misc

The “Miscellaneous” field provides room for an optional 42 character description to be used as desired.

Configuration Port

This motherboard port is used to connect to an S^3 workstation to perform configuration, diagnostics and troubleshooting. It utilizes a proprietary protocol unique to the EQP controller and S^3 software package and cannot be used by other devices. The configuration port uses the RS-232 standard and it has two configurable parameters; baud rate and parity.

Port Baud Rate



The port speed can be adjusted in standard intervals between a high speed of 115,200 baud which is both the default setting and the recommended setting, and, a low speed of 2,400 baud. Lower speeds are not recommended but sometimes required if the controllers location is too far from the S^3 workstation to support the recommended speed.

Parity

The parity setting for the controllers configuration port defaults to "None" but it can also be adjusted to either "Even" or "Odd". There are no other adjustable parameters for the configuration port.

Redundancy

The EQP system supports either a simplex (Single) or redundant (Dual) configuration. This selection is displayed in the lower half of the rectangle representing the controller.

If a redundant arrangement is to be used, two identical controllers are hooked up in parallel. On a failure of the primary the "Hot-Standby" unit would take over without interruption.

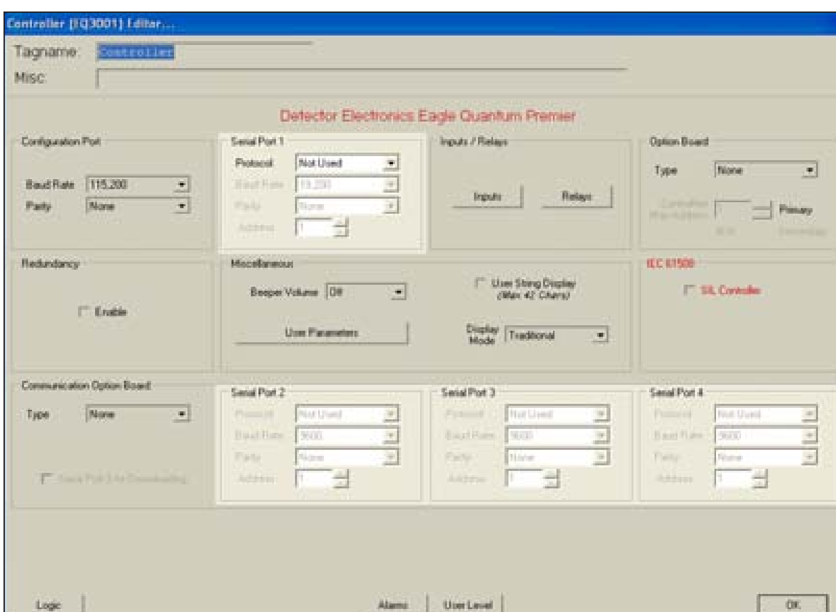
Redundancy Configuration

If redundancy is to be used, "Enable" this feature with the redundancy checkbox, and then select "Type-A" from the pull down menu for "Communication Option Board". The "Type-A" option board is required to support redundancy and also provides three additional serial ports for user configuration.

Serial Ports

The Eagle Quantum Premier Controller supports up to six serial ports. Two on the motherboard; one for configuration and a second for Modbus communications. Four on the option board; one for redundancy and three for Modbus.

NOTE
Port 3 can be used for configuration.



Serial Ports 1-4

These ports can be used for communication with a host device such as a users Distributed Control System (DCS), Programmable Logic Controller (PLC) or Human Machine Interface (HMI).

Ports 1 and 2 use the RS-485 standard, 3 and 4 use the RS-232 standard. Each have four configurable parameters; protocol, baud rate, parity and address.

Protocol

This serial port currently supports the Modbus RTU slave protocol and the drop down menu allows the selection of either "Not Used", "MODBUS Slave" and "MODBUS Master". Port 3 can also be set as a configuration port, or a second S^3 monitoring port.

Option Board Baud Rate

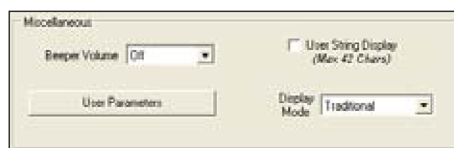
The motherboard ports speed can be adjusted in standard intervals between a high speed of 115,200 baud and a low speed of 2,400 baud. 19,200 baud is both the default setting and the most commonly used setting for connection to Modbus compliant devices. Ports 2-4 on the Type-A expansion board have a speed range of 9,600 to 230,400 bps.

Address

The address field is for entering the desired Modbus station address. The default value is "1" and it can be changed by using the "up/down" arrows or direct entry of a value. The Modbus station address must be in a range from 1 to 247. Addresses above 1 are typically used in multidrop systems.

Miscellaneous

This section of the "Configure a controller..." dialog box has three adjustable parameters; setting of the controller's built in "beeper" volume, LON point disabling and access to the user parameter editor.



Beeper Volume

The Eagle Quantum Premier controller has an integral "Beeper" to annunciate a variety of conditions and to meet regulatory requirements.

To accommodate the controller being mounted in areas with different amounts of ambient noise the beeper can be adjusted to any of three settings; Low, Medium and High, via a pop-up menu. The default value is "Low" which is suitable for installations where the controller is not in a separate enclosure and is in a control room/office type environment.

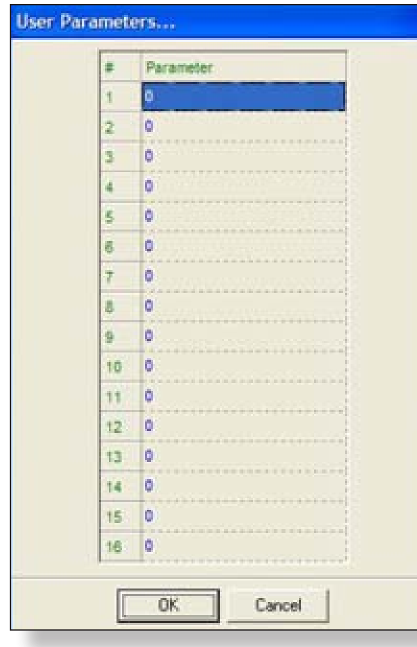
User String Display

Check the "User String Display" to allow the descriptor entered in the "Misc" field to be displayed on the controller.

User Parameters

This button opens the “User Parameters...” dialog box allowing for their values to be set. These parameters are intended for use in special applications utilizing the Allen-Bradley ControlNet interface option.

The use of these parameters is described in the users guide for the ControlNet option module. In general applications, these parameters should be “0”.



CAUTION
Do not make adjustments to the settings of these parameters without having detailed knowledge of their operation.

WARNING
Inappropriate use of these parameters could cause unintended results in controller operation.

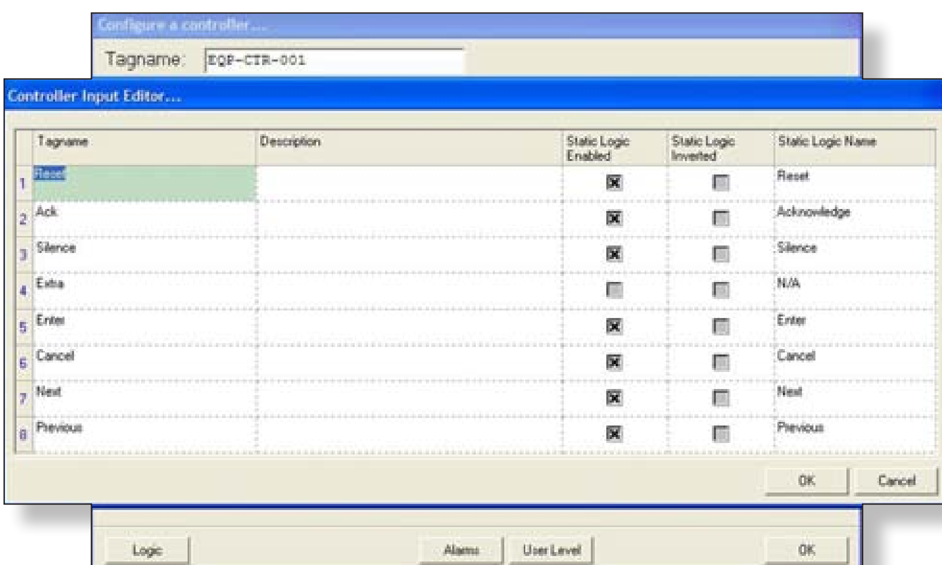
Inputs/Relays

The Eagle Quantum Premier controller provides eight unsupervised digital inputs and eight unsupervised relay outputs. This I/O can be configured to perform pre-assigned “Static Logic” functions or they can be configured at the users discretion for any desired purpose. All sixteen of these I/O points are accessible by the controller’s user programmable logic.

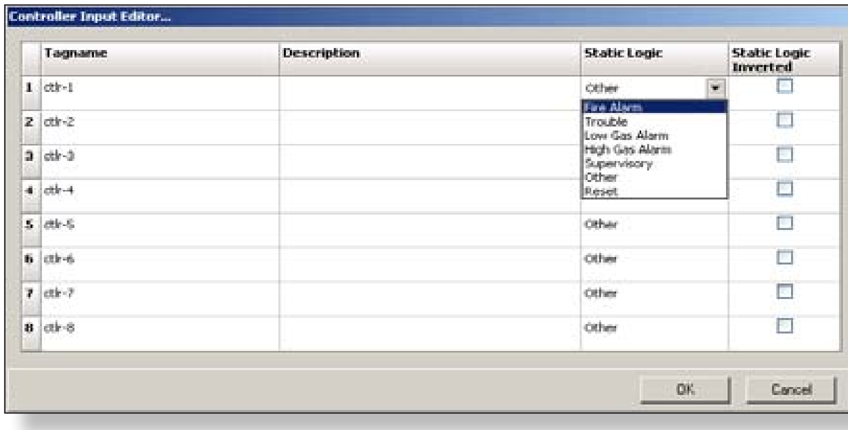
Inputs

Selecting the “Inputs” button will open the “Controller Input Editor...” dialog box. By default the “Static Logic” functions for each point is disabled and each point is unnamed.

The functions of the static logic functions are self explanatory and mirror the functionality of the controller’s faceplate buttons.



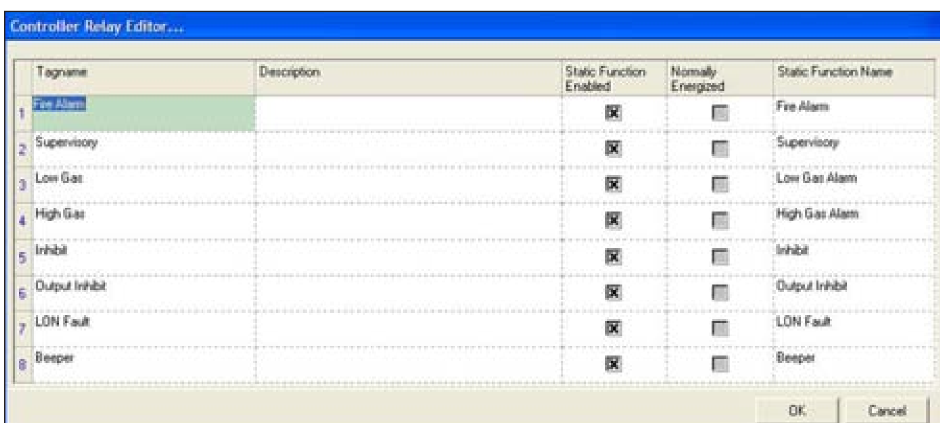
The primary reason for this feature is to accommodate instances where the controller must be mounted inside another enclosure and the faceplate buttons are brought through the door to allow operation while inside. Typically a window allows viewing of the controller's faceplate.



Each point can be logically "inverted" by using the checkbox in the "Static Logic Inverted" column. If the use of "Static Logic" is required, use the appropriate checkbox to enable this feature on a point-by-point basis and enter a tagname and description appropriate to the desired function(s).

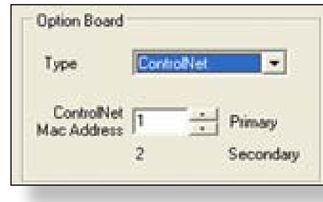
Relays

Selecting the "Relays" button will open the "Controller Relay Editor..." dialog box. By default the "Static Logic" functions for each point is disabled and each point is unnamed.



The functions of the static logic functions are self explanatory and mirror the functionality of the controller's faceplate LEDs and beeper. If the use of "Static Logic" is not required, use the appropriate checkbox to enable this feature on a point-by-point basis and rename the function(s).

Option Board



The Eagle Quantum Premier controller is designed to be expandable and is provided with a slot for an add on circuit board.

Selecting the “Type” drop down menu will display the available options.

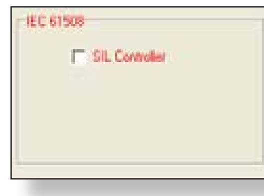
If no expansion board is installed select “None”.

If the “ControlNet” expansion board is selected the “ControlNet Mac Address” field will activate allowing data entry.

The ControlNet option provides redundant communications with Allen-Bradley (or compatible) products that support this ControlNet.

The ControlNet Mac address can be set in a range from 1 to 99.

IEC 61508



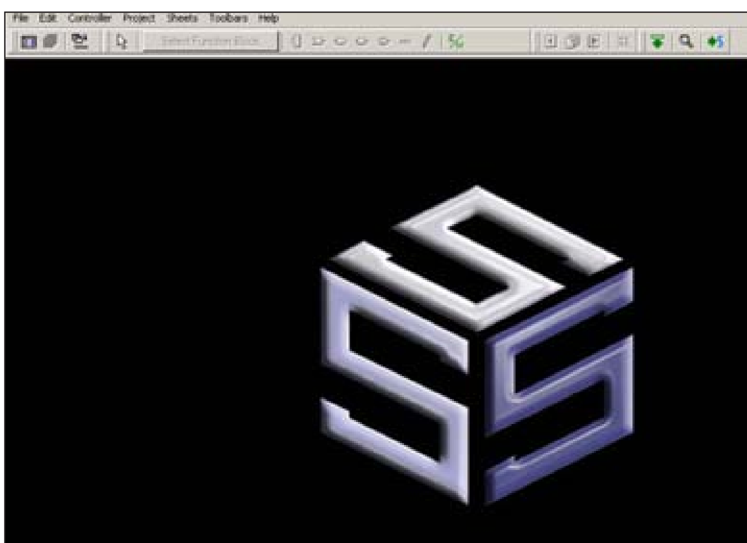
The Eagle Quantum Premier Controller fully supports IEC 61508 SIL 2. Do not check unless the EQP has SIL 2 firmware.

Configure a controller continued...

Across the bottom of the “Configure a controller...” dialog box there are four buttons; Logic, Alarms, User Level and OK.

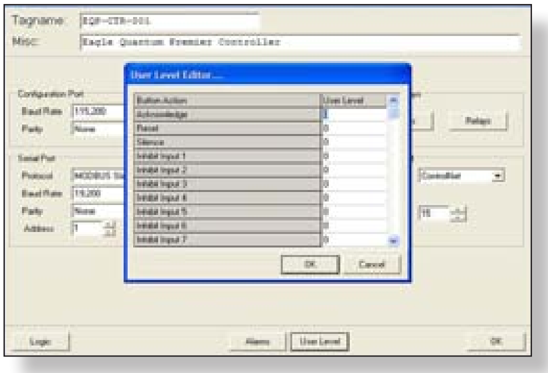
Logic

This button launches the S³ Logic Editor for the Eagle Quantum Premier controller. See section 13 for more details.



Alarms

Selecting this button opens the "Alarms to Monitor..." dialog box. This scrolling list displays the alarms and events related to the controller that can be configured to be monitored by S³. The controller has 75 alarms and events that can be monitored, some of which are disabled by default. Alarm and event monitoring is covered on the next page.



User Level

Allows user levels to be set on a variety of controller features for security. Assign an appropriate user level to each item in the list. Refer to section 10 of this User's guide for details on user level settings.

OK

Closes the "Configure a controller..." dialog box when finished.

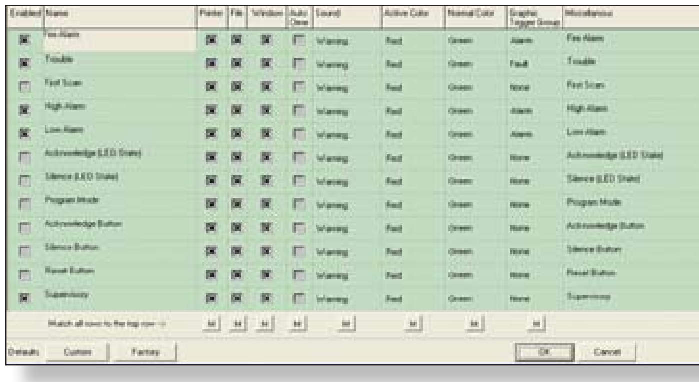
Every field device on the LON as well as the controller has a device specific set of alarms and events that can be configured for the S³ DCD to track. This data is made available by the DCD to the OPC Server.

Although the number and type of events vary from device to device, the methodology for the configuration of these items is the same and will be covered in detail only once.

In the descriptions for configuring each type of field device, any unique attributes pertaining to that devices event tracking will be presented.

Alarms

Allows for the configuration of the alarm and event monitoring for the device. These alarms and events are used by the S^3 OPC Server. Clicking on the “Alarms” button will open the “Alarms to Monitor...” dialog box. Below is an example of the controller’s event configuration.



The dialog box is a scrolling list with eleven attribute columns. There are four buttons running horizontally across the bottom of the window; Custom, Factory, OK and Cancel.

Custom

Selecting this button will replace all of the names with those in the second language database. Refer to “ User Strings” in the preferences section (Section 7) of this users guide.

Factory

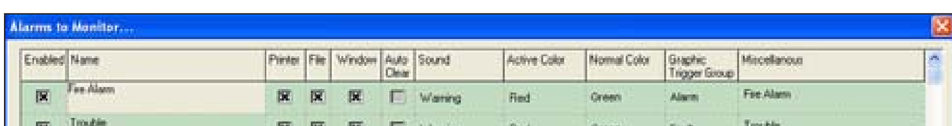
Restores the factory default values to **all** fields and settings.

OK

Closes the dialog box and stores changes in the configuration to the database.

Cancel

Closes the dialog box without storing changes. In addition to these buttons, eight columns have a “M” button at the bottom of the column. This will “Match” every row in that column to the value or setting in the top row.



The definitions of the eleven columns in the “Alarms to Monitor...” dialog box are as follows:

Enabled

Turns an event on or off. If disabled, no other settings do anything.

Name

This 48 character field is used to describe the event or alarm. This is the text that will be used and recorded throughout the S^3 applications suite when the event occurs.

Printer

When selected, sends the event to the S^3 event printer.

File

When selected, sends the event to the “Alarm History” module of S^3 for storage in the daily log.

Window

When selected, sends the event to the “Active Alarms” module of S^3. This module is accessed via the F6 key when online. It will also be displayed in the single line FIFO display at the bottom of the screen when in the Online mode. Refer to Section 4.

Auto Clear

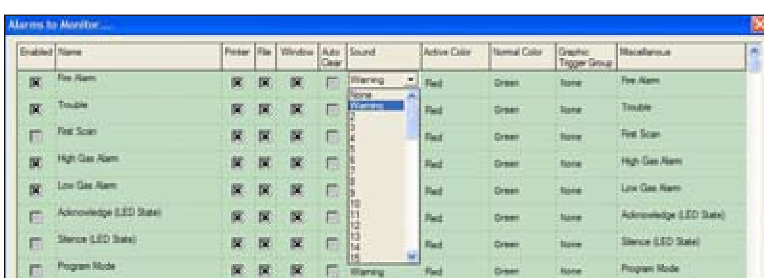
This selection determines whether the logged event will track the real time occurrence of the event or when the operator acknowledgement is factored in.

If the AC checkbox is not selected, which is the default, when an event occurs it will be logged to the appropriate locations, as configured by the Printer, File, Window selections, with the date and time of occurrence. When the event returns to its normal state, nothing will happen until the operator activates the “Acknowledge” button. The system will then log the date and time of the event returning to “Normal”. In reality it’s logging the first time the operator activates the Acknowledge button after the event has returned to normal.

If the AC checkbox is selected, when an event occurs it will be logged to the appropriate locations, as configured by the Printer, File, Window selections, with the date and time of occurrence. When the event returns to its normal state, the system will then log the date and time of the event returning to “Normal”.

Sound

Each event may have a sound attached to it which plays when the event occurs, until the Acknowledge button is actuated.



The sound can be the default “Warning” or any of sixty three custom sounds. Use the pull down menu to select the desired sound.

Active Color/Normal Color

Select one of four different colors for recording when events become “Active” or return to “Normal”.

These color selections are made from the pull down menu located to the right of the event name. The color selections apply to both printed and screen presentations of the event. In the example above, the event will be shown in Red when active and Green when it returns to normal.

Miscellaneous

This field always shows the factory default description for the event. This is helpful in checking custom settings to ensure translation or assignment accuracy.

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X3301

Multi-Spectrum Infrared Flame Detector

The MIR X3301 is located on the LON/SLC and provides Multi-Spectrum Infrared Optical Flame detection capability for the Eagle Quantum Premier system.

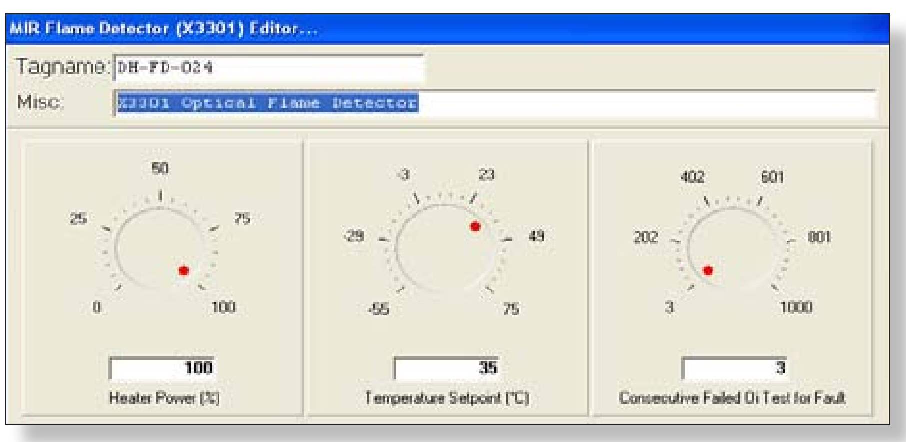
It provides unsurpassed detection of fires from light to heavy hydrocarbon fuels combined with the highest degree of false alarm rejection.

The detector has Division and Zone explosion-proof ratings and is suitable for use in indoor and outdoor applications.

The MIR X3301 contains three IR sensors with their associated signal processing circuitry. A multi-color LED on the detector faceplate indicates detector status condition. Microprocessor controlled heated optics increase resistance to moisture and ice.

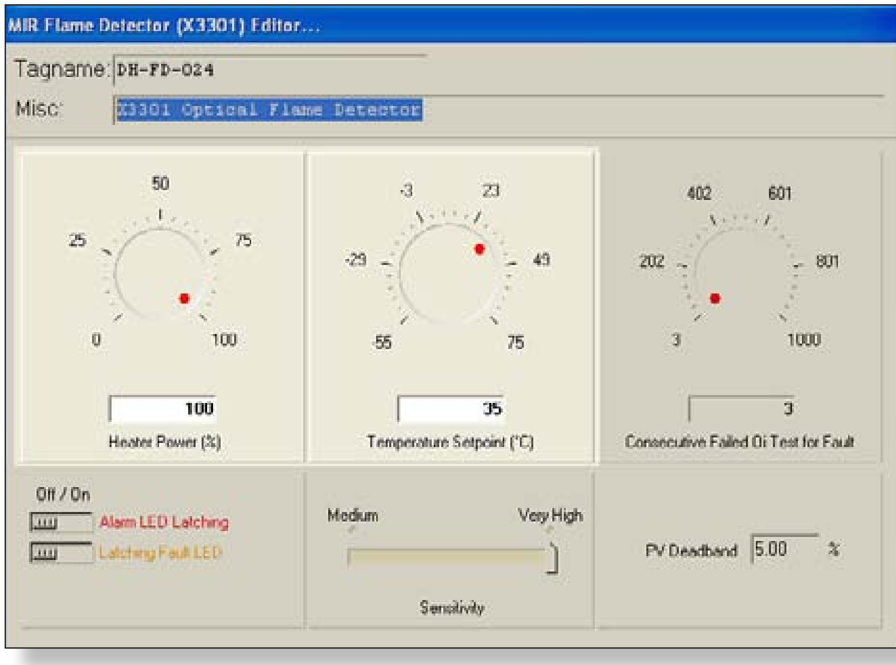
Tagname

The tagname at the top of the dialog box refers to the flame detector. Until a tagname is entered the detector is not available in the S^3 database for programming, monitoring or dynamic graphic purposes.



Heater Optics

Up to 8 watts of power can be utilized to provide heat to the optical sensing elements. The "Heater Power" adjustment allows the user to determine the maximum amount of power to use in trying to achieve the temperature setpoint. This can be an important adjustment in situations where the power budget is limited or in installations with large quantities of detectors.



Temperature Setpoint

The default temperature setpoint for the heated optics is 35°C but can be adjusted utilizing the rotary dial or by entering a value in the setpoint field.

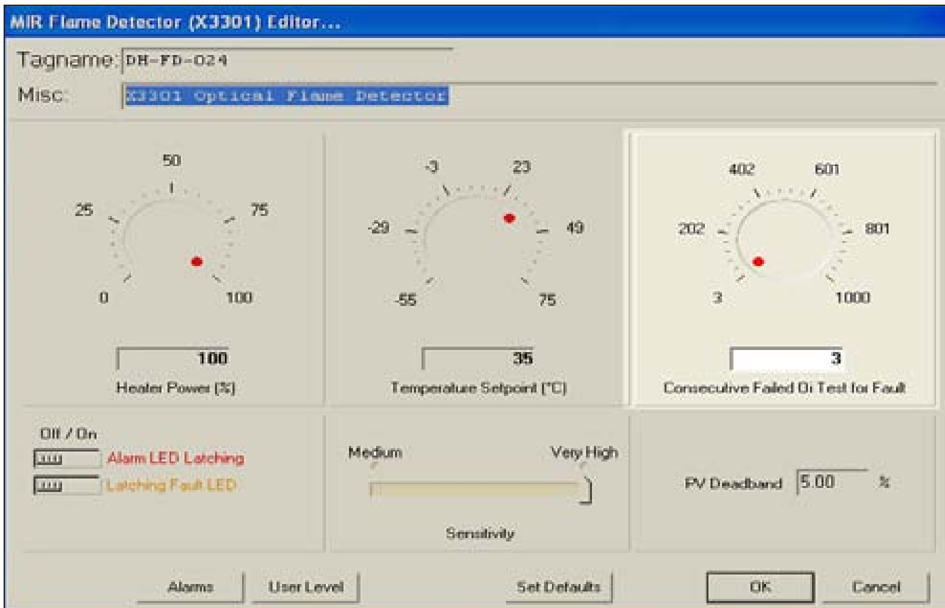
Automatic Oi

The MIR X3301 includes the Automatic Optical Integrity (Oi) feature — a calibrated performance test that is automatically performed once per minute to verify complete detector operation capabilities. No testing with an external test lamp is required.

The detector automatically performs the same test that a maintenance person with a test lamp would perform — once every minute, 60 times per hour. However, a successful automatic Oi test does not produce an alarm condition. The Protect•IR signals a fault condition when less than half of the detection range remains. This is indicated remotely on the S^3 Point Display and is evident locally by the yellow color of the LED on the face of the detector.

Oi Test Fault

The detector automatically conducts Oi tests to check the integrity of the optical sensing systems. Three consecutive failed Oi tests will generate a fault condition, which will be indicated by the LED on the face of the detector turning yellow. The EQP Controller and S^3 software will also annunciate this fault.



In certain environmental conditions like very heavy rain, Oi test failures can occur even though the hardware is not faulty. To compensate for this the number of failed Oi tests required to generate the fault can be adjusted upward to a maximum of 30.

Magnetic Oi / Manual Oi

The detector also incorporates both magnetic Oi and manual Oi features that provide the same calibrated test as the automatic Oi, and in addition actuates the Alarm to verify output operation for preventive maintenance requirements. These features can be performed at any time and eliminate the need for testing with a non-calibrated external test lamp.

The magnetic Oi test is performed by placing a magnet by the marked location (mag Oi) on the outside of the detector. The manual Oi test is accomplished by selecting the Oi Test button on the Point Display in the S^3 software. The magnet must be held in place for a minimum of 6 seconds to complete the test.

Either of these test methods activates the calibrated IR emitters. If the resulting signal meets the test criteria, indicating that greater than half of the detection range remains, the alarm status message to the EQP controller changes state. The indicating LED will change to red, and the analog signal displayed in the tracking area of the S^3 point display goes to maximum.

This condition remains until the magnet is removed or the software test is complete. If the alarm LED is configured for non-latching operation, it will change states and the red LED will turn to green. If the unit has latching LED's, the detector's operating software will automatically reset the relays with no operator action required.

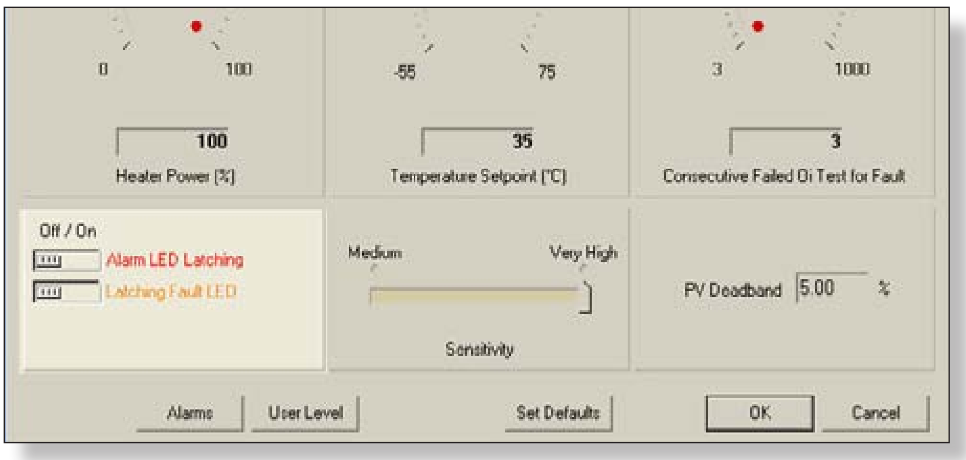
If less than half of the detection range remains, no alarm is produced and a fault is generated. The fault indication can be reset by momentarily applying the magnet or via S^3 software command.

Alarm LED Latch

The tri-color LED on the face of the detector turns red when in alarm and can be configured to be either latching or non-latching. If latching is selected, following a fire detection, the LED will stay on until the detector is reset from the point display for the detector in the S^3 software. The default is non-latching.

Fault LED Latch

The tri-color LED on the face of the detector turns yellow when a fault is present (fire over-rides fault) and can be configured to be either latching or non-latching. If latching is selected, following a fire detection, the LED will stay on until the detector is reset from the point display for the detector in the S^3 software. The default is non-latching.



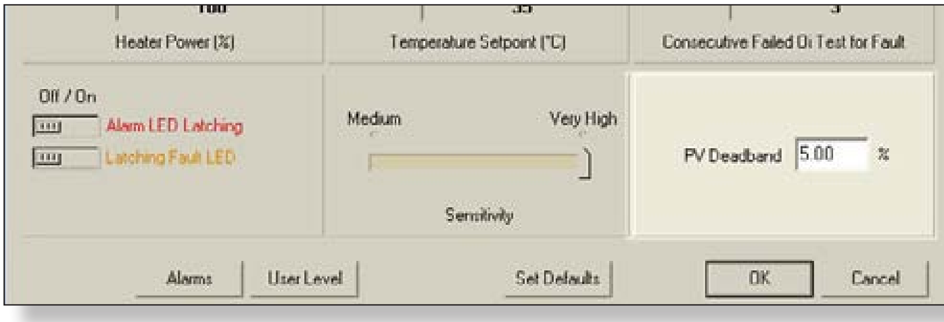
Detector Sensitivity

The sensitivity of the detector can be adjusted between medium and very high using the sensitivity slider control in the center bottom area of the configuration dialog box.

PV Deadband

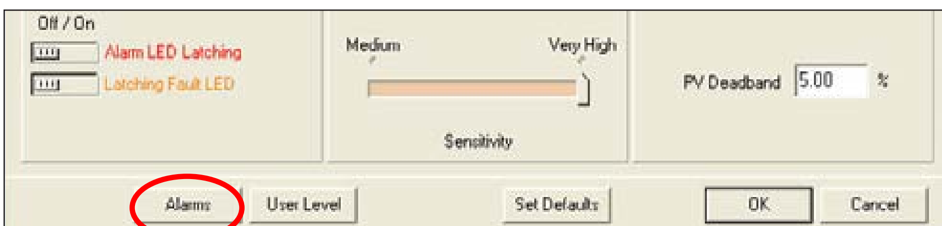
A field is provided to enter the desired PV (Process Variable) Deadband.

Normally all values are transmitted to the controller every five seconds; If the PV changes more than the entered percentage before the five second report time arrives, an immediate message is sent with the current values.

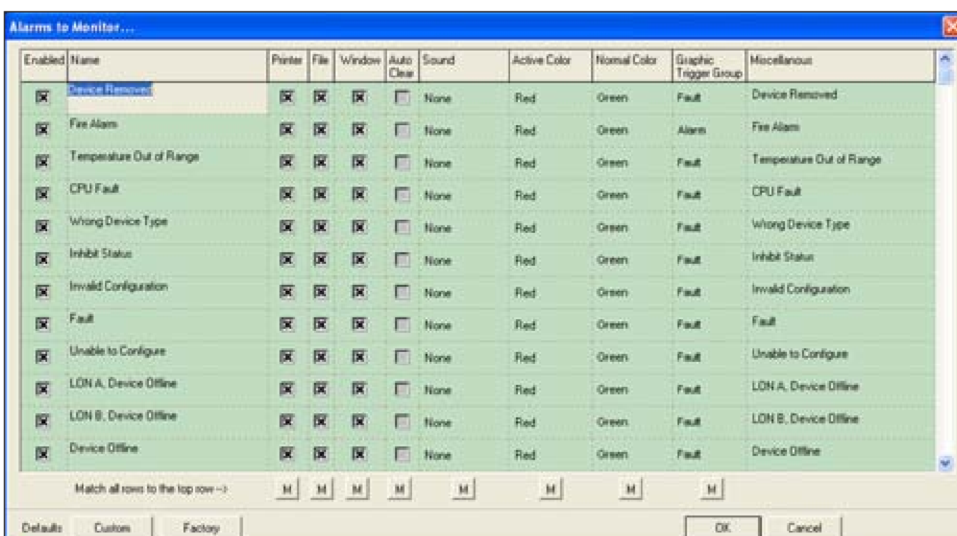


Alarms

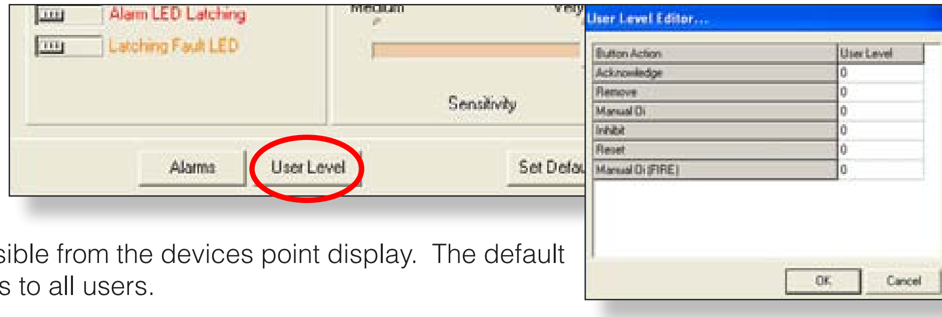
Selecting this button opens the "Alarms to Monitor..." dialog box. This scrolling list displays the alarms and events related to the device that can be configured to be monitored by S^3.



There are 31 alarms and events that pertain to the status and diagnostics for the MIR X3301.

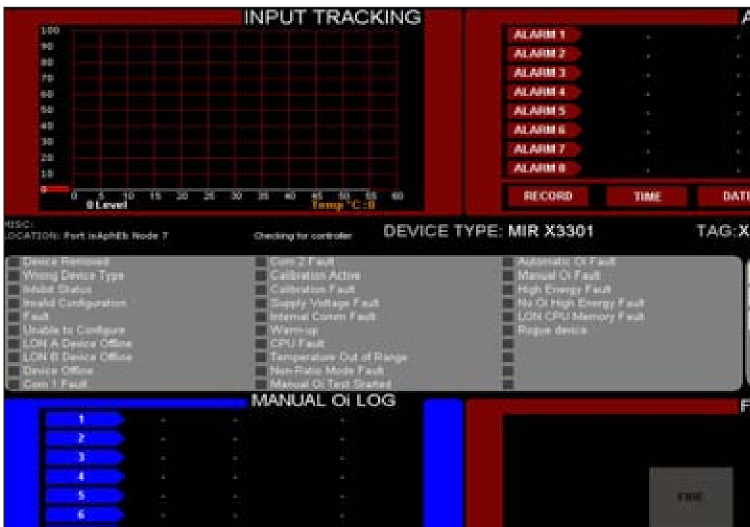


User Levels



The "User Level Editor..." provides a means for limiting access to the "Acknowledge", "Remove", "Manual Oi", "Inhibit", "IR Calibration", "Manual Oi (FIRE)" and "Reset" buttons for the module which are accessible from the devices point display. The default value is "0" and provides access to all users.

Change these values to match a user account configuration and security needs.



Point Display

The MIR X3301 has a custom "Point Display" that can be accessed from either the Point Display button on the Command Bar or from the Online Mode.

The point display provides a single window view of all available real-time data for the device.

Alarm Logs

The top right quadrant of the display shows the last eight alarms with their date and time data.

Analog Input Track

The top left quadrant shows a dynamic 60 second history of the measured variable (IR counts) for the detector. The input track scrolls from left to right with the most current data at the "pen" on the left margin. The display updates once every five seconds.

Manual Oi Log

The bottom left quadrant of the point display shows the detectors manual Optical Integrity (Oi) log. The last eight manual tests are shown with the date, time and a PASS/FAIL indicator.

Status & Diagnostics

The middle portion of the point display shows the discrete status and health indicators for the detector.

Buttons

There are six buttons that can send commands to the detector including; remove, inhibit, reset, Manual Oi, Manual Oi (FIRE) and IR Calibration.

X3302

Multi-Spectrum Infrared Flame Detector

The MIR H2 X3302 is located on the LON/SLC and provides Multi-Spectrum Infrared Optical Flame detection capability for the Eagle Quantum Premier system.

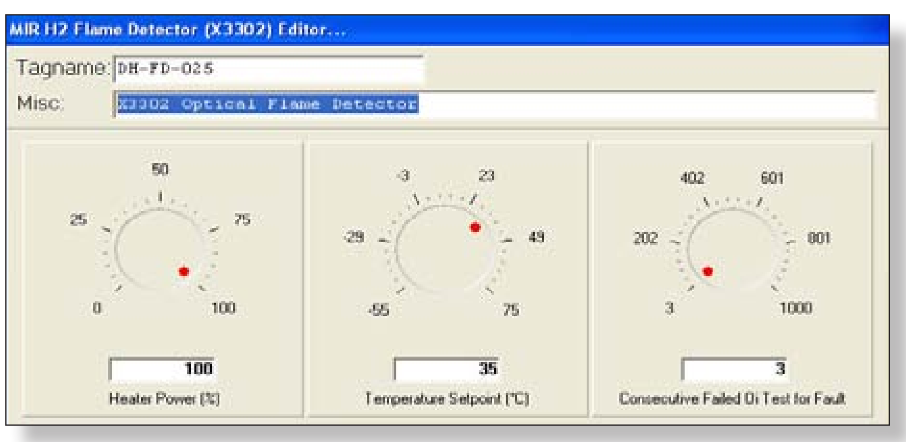
It provides unsurpassed detection of invisible hydrogen flames and hazardous materials that produce mostly water vapor, and little or no CO_2 in the combustion process. The detection capability of the X3302 is double that of traditional UV and UVIR detectors. At the same time, it attains complete solar resistance and insensitivity to artificial lights, lightning, and "blackbody" radiation, which still plague other detection technologies.

The X3302 contains three IR sensors with their associated signal processing circuitry. A multi-color LED on the detector faceplate indicates detector status condition. Microprocessor controlled heated optics increase resistance to moisture and ice.

The detector has Division and Zone explosion-proof ratings and is suitable for use in indoor and outdoor applications.

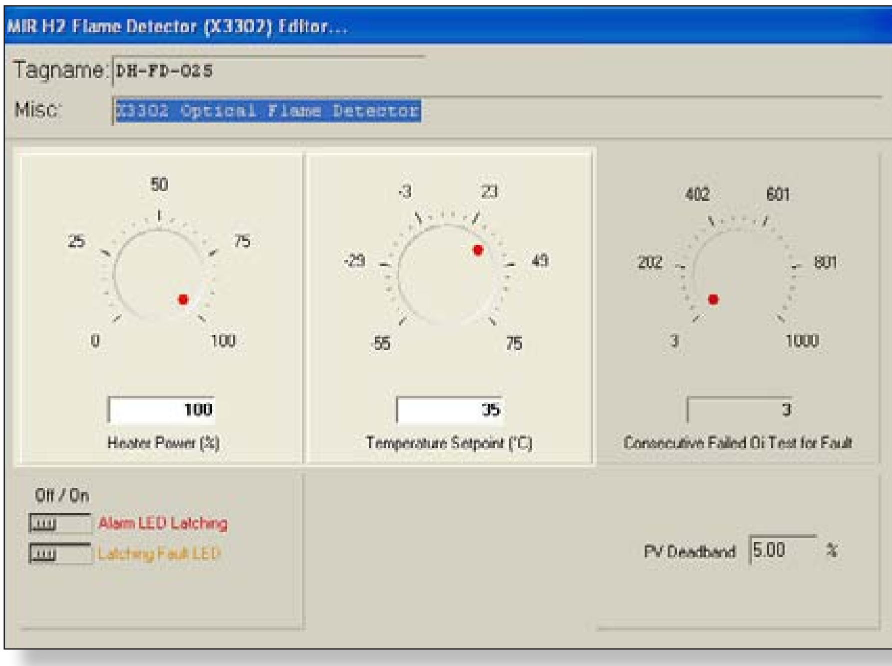
Tagname

The tagname at the top of the dialog box refers to the flame detector. Until a tagname is entered the detector is not available in the S^3 database for programming, monitoring or dynamic graphic purposes.



Heater Optics

Up to 8 watts of power can be utilized to provide heat to the optical sensing elements. The "Heater Power" adjustment allows the user to determine the maximum amount of power to use in trying to achieve the temperature setpoint. This can be an important adjustment in situations where the power budget is limited or in installations with large quantities of detectors.



Temperature Setpoint

The default temperature setpoint for the heated optics is 35°C but can be adjusted utilizing the rotary dial or by entering a value in the setpoint field.

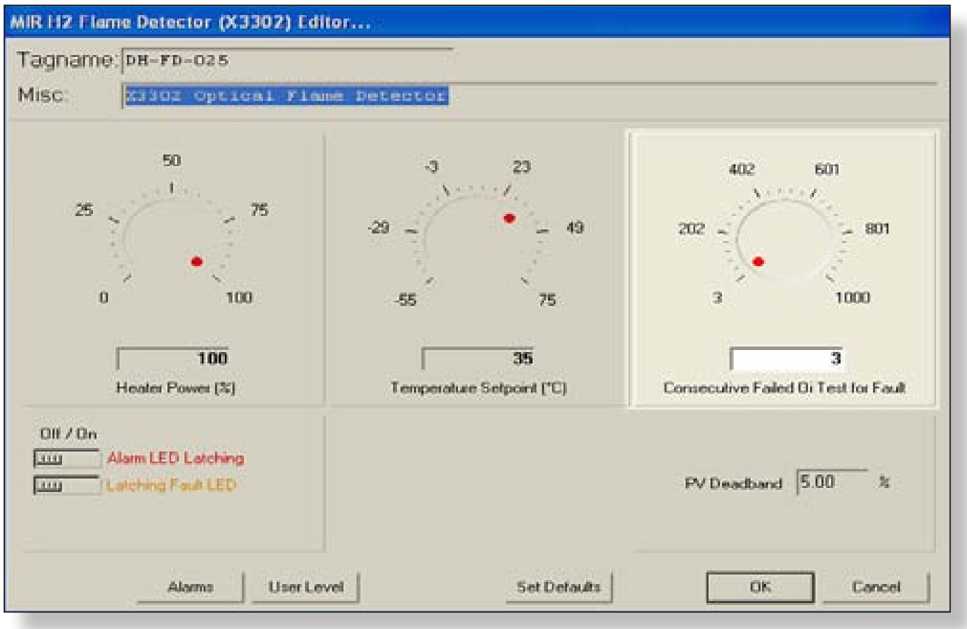
Automatic Oi

The MIR X3302 includes the Automatic Optical Integrity (Oi) feature — a calibrated performance test that is automatically performed once per minute to verify complete detector operation capabilities. No testing with an external test lamp is required.

The detector automatically performs the same test that a maintenance person with a test lamp would perform — once every minute, 60 times per hour. However, a successful automatic Oi test does not produce an alarm condition. The Protect•IR signals a fault condition when less than half of the detection range remains. This is indicated remotely on the S³ Point Display and is evident locally by the yellow color of the LED on the face of the detector.

Oi Test Fault

The detector automatically conducts Oi tests to check the integrity of the optical sensing systems. Three consecutive failed Oi tests will generate a fault condition, which will be indicated by the LED on the face of the detector turning yellow. The EQP Controller and S^3 software will also annunciate this fault.



In certain environmental conditions like very heavy rain, Oi test failures can occur even though the hardware is not faulty. To compensate for this the number of failed Oi tests required to generate the fault can be adjusted upward to a maximum of 30.

Magnetic Oi / Manual Oi

The detector also incorporates both magnetic Oi and manual Oi features that provide the same calibrated test as the automatic Oi, and in addition actuates the Alarm to verify output operation for preventive maintenance requirements. These features can be performed at any time and eliminate the need for testing with a non-calibrated external test lamp.

The magnetic Oi test is performed by placing a magnet by the marked location (mag Oi) on the outside of the detector. The manual Oi test is accomplished by selecting the Oi Test button on the Point Display in the S^3 software. The magnet must be held in place for a minimum of 6 seconds to complete the test.

Either of these test methods activates the calibrated IR emitters. If the resulting signal meets the test criteria, indicating that greater than half of the detection range remains, the alarm status message to the EQP controller changes state. The indicating LED will change to red, and the analog signal displayed in the tracking area of the S^3 point display goes to maximum.

This condition remains until the magnet is removed or the software test is complete. If the alarm LED is configured for non-latching operation, it will change states and the red LED will turn to green. If the unit has latching LED's, the detector's operating software will automatically reset the relays with no operator action required.

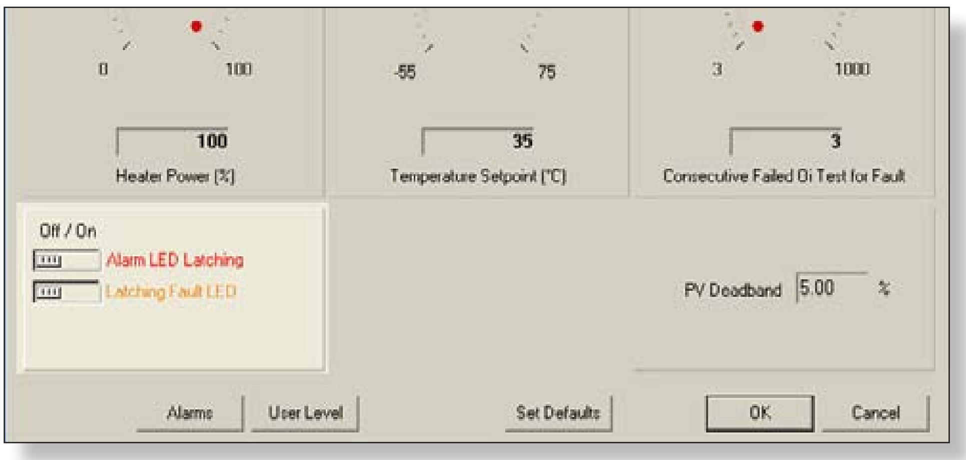
If less than half of the detection range remains, no alarm is produced and a fault is generated. The fault indication can be reset by momentarily applying the magnet or via S^3 software command.

Alarm LED Latch

The tri-color LED on the face of the detector turns red when in alarm and can be configured to be either latching or non-latching. If latching is selected, following a fire detection, the LED will stay on until the detector is reset from the point display for the detector in the S³ software. The default is non-latching.

Fault LED Latch

The tri-color LED on the face of the detector turns yellow when a fault is present (fire over-rides fault) and can be configured to be either latching or non-latching. If latching is selected, following a fire detection, the LED will stay on until the detector is reset from the point display for the detector in the S³ software. The default is non-latching.



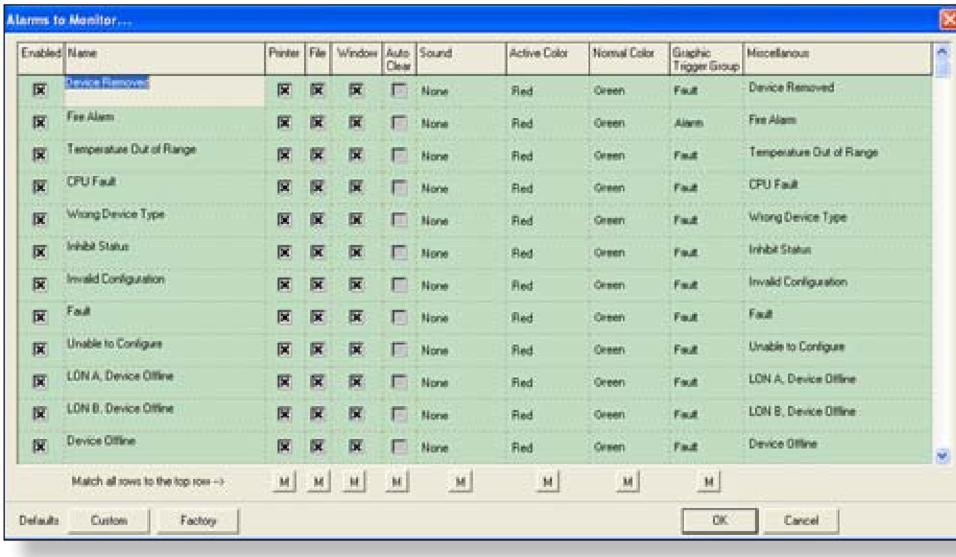
PV Deadband

A field is provided to enter the desired PV (Process Variable) Deadband.

Normally all values are transmitted to the controller every five seconds; If the PV changes more than the entered percentage before the five second report time arrives, an immediate message is sent with the current values.

Alarms

Selecting this button opens the “Alarms to Monitor...” dialog box. This scrolling list displays the alarms and events related to the device that can be configured to be monitored by S^3.

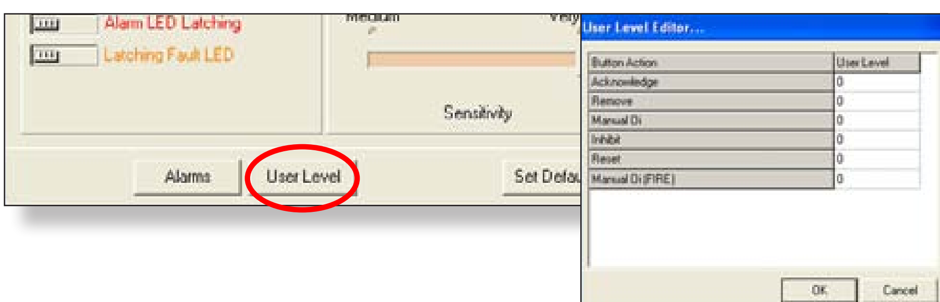


There are 31 alarms and events that pertain to the status and diagnostics for the MIR X3302.

User Levels

The “User Level Editor...” provides a means for limiting access to the “Acknowledge”, “Remove”, “Manual Oi”, “Inhibit”, “IR Calibration”, “Manual Oi (FIRE)” and “Reset” buttons for the module which are accessible from the devices point display. The default value is “0” and provides access to all users.

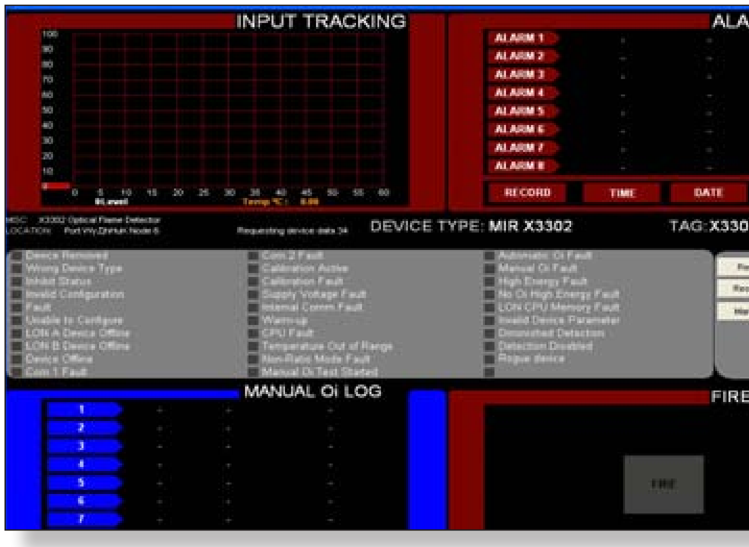
Change these values to match a user account configuration and security needs.



Point Display

The MIR X3302 has a custom “Point Display” that can be accessed from either the Point Display button on the Command Bar or from the Online Mode.

The point display provides a single window view of all available real-time data for the device.



Alarm Logs

The top right quadrant of the display shows the last eight alarms with their date and time data.

Analog Input Track

The top left quadrant shows a dynamic 60 second history of the measured variable (IR counts) for the detector. The input track scrolls from left to right with the most current data at the “pen” on the left margin. The display updates once every five seconds.

Manual Oi Log

The bottom left quadrant of the point display shows the detectors manual Optical Integrity (Oi) log. The last eight manual tests are shown with the date, time and a PASS/FAIL indicator.

Status & Diagnostics

The middle portion of the point display shows the discrete status and health indicators for the detector.

Buttons

There are six buttons that can send commands to the detector including; remove, inhibit, reset, Manual Oi, Manual Oi (FIRE) and IR Calibration.

X9800

Infrared Flame Detector

The IR X9800 is located on the LON/SLC and provides Infrared Optical Flame detection capability for the Eagle Quantum Premier system.

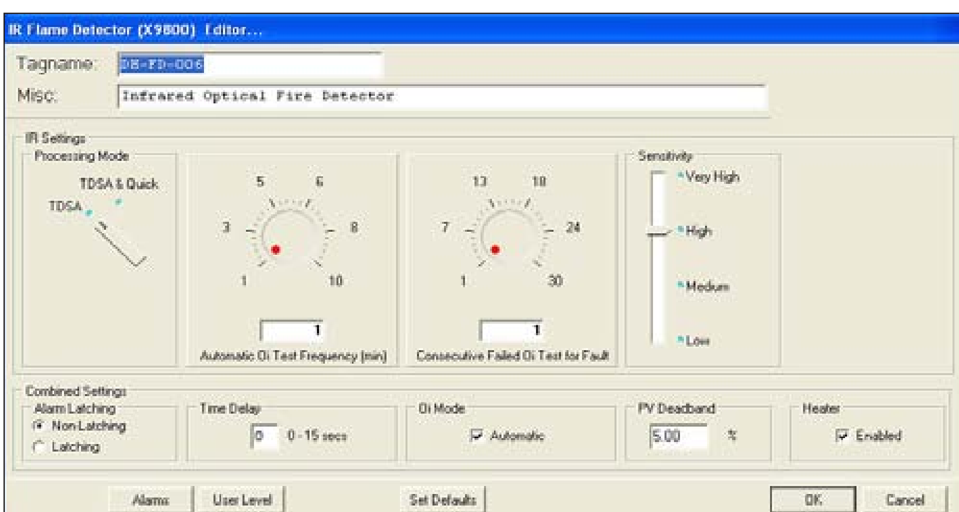
The IR X9800 meets the most stringent requirements worldwide with advanced detection capabilities and immunity to extraneous sources, combined with a superior mechanical design.

The detector is equipped with both automatic and manual Oi test capability. The detector has Division and Zone explosion-proof ratings and is suitable for use in indoor and outdoor applications.

Tagname

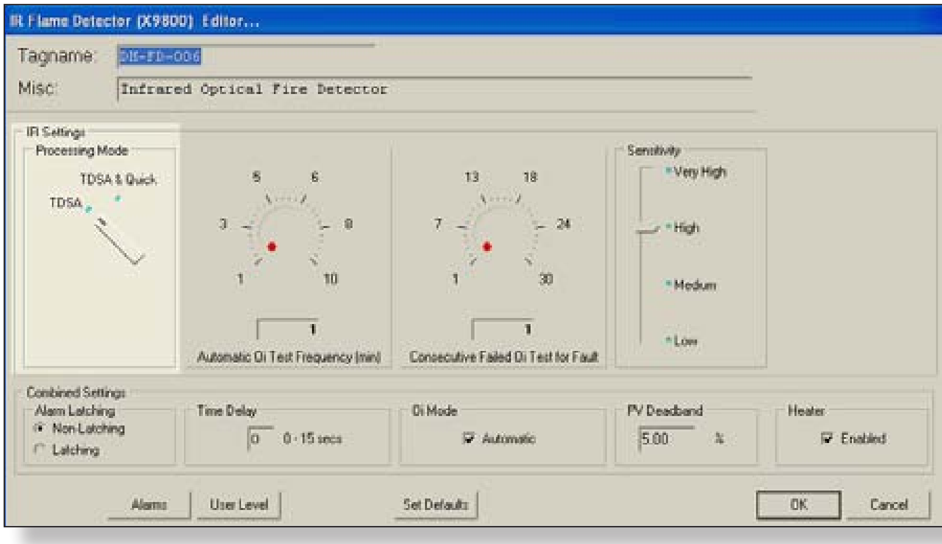
The tagname at the top of the dialog box refers to the flame detector.

Until a tagname is entered the detector is not available in the S^3 database for programming, monitoring or dynamic graphic purposes.



Configuration

Enter the tagname for the detector, a miscellaneous description and then adjust the IR Settings.



Processing Mode

The IR X9800 features signal processing options.

These options determine the type of logic that the detector will use for processing fire signals to customize the IR X9800 to the application.

Two signal processing options are available for the IR X9800: "TDSA" and "TDSA & Quickfire".

TDSA enabled
The TDSA signal processing technique analyzes the input signal in real time, requiring the IR signal to flicker randomly in order to recognize it as a fire condition.

Using TDSA signal processing, the X9800 ignores regularly chopped blackbody sources (occurring in areas where moving conveyors and hot objects in proximity to one another result in a regularly chopped IR signal), because it looks for a less uniform signal.

However, in the presence of a regularly chopped signal, the unit is more susceptible to false alarms due to sporadic IR that functions as a trigger when occurring in conjunction with the regularly chopped signal.

TDSA & Quick Fire enabled
Either initiates fire alarm.

The Quick Fire (High Speed) feature can be used in conjunction with the TDSA signal processing method.

This method overrides TDSA requirements in the event of an intense signal. When Quick Fire is activated, the detector is capable of responding to an intense fire signal in less than 30 milliseconds (0.030 seconds).

Using the Quick Fire feature in conjunction with TDSA signal processing allows the detector to provide a high speed response to a large, non-flickering fire (such as in high pressure gas applications) while maintaining an ability to respond to smaller fires.

Automatic Oi

The IR X9800 includes the Automatic Optical Integrity (Oi) feature — a calibrated performance test that is automatically performed once per minute to verify complete detector operation capabilities. No testing with an external test lamp is required.

The detector automatically performs the same test that a maintenance person with a test lamp would perform — once every minute, 60 times per hour. However, a successful automatic Oi test does not produce an alarm condition.

The IR X9800 signals a fault condition when less than half of the detection range remains. This is indicated by the yellow color of the LED on the face of the detector.

Magnetic Oi / Manual Oi

The detector also incorporates both magnetic Oi and manual Oi features that provide the same calibrated test as the automatic Oi, and in addition actuates the message to verify output operation for preventive maintenance requirements.

These features can be performed at any time and eliminate the need for testing with a non-calibrated external test lamp.

CAUTION

These tests require disabling of all extinguishing devices to avoid release resulting from a successful test.

The magnetic Oi test is performed by placing a magnet by the marked location (mag Oi) on the outside of the detector.

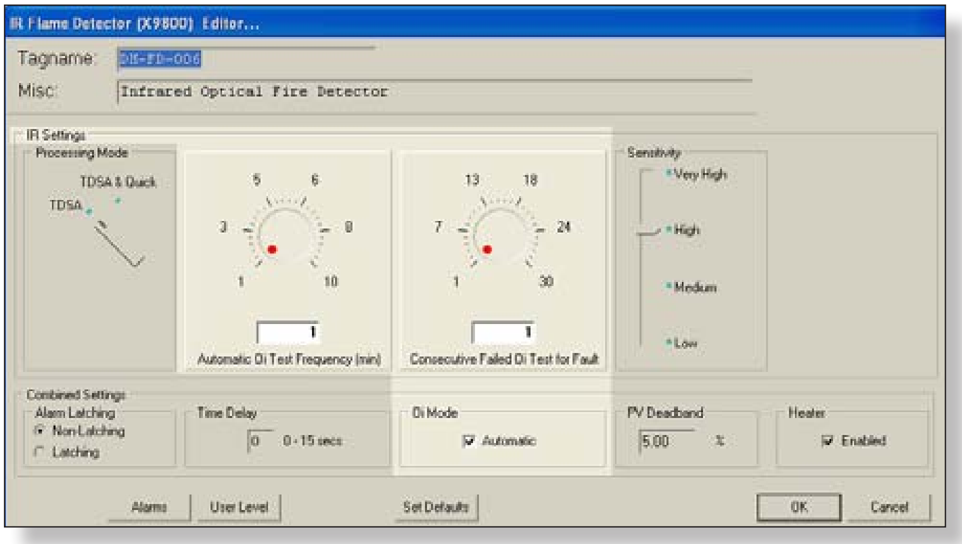
The manual Oi test is accomplished by selecting the button on the devices Point Display. The magnet must be held in place for a minimum of 6 seconds to complete the test. These test methods activate the calibrated IR emitter.

If the resulting signal meets the test criteria, indicating that greater than half of the detection range remains, the Alarm message changes state, the indicating LED changes to red, and a full scale reading is displayed in the analog readout on the S^3 Point Display.

This condition remains until the magnet is removed or the S^3 software test command is released. If less than half of the detection range remains, no alarm is produced and a fault is generated. The fault indication can be reset by momentarily applying the magnet or the S^3 Software Point Display reset button.

Oi Configuration

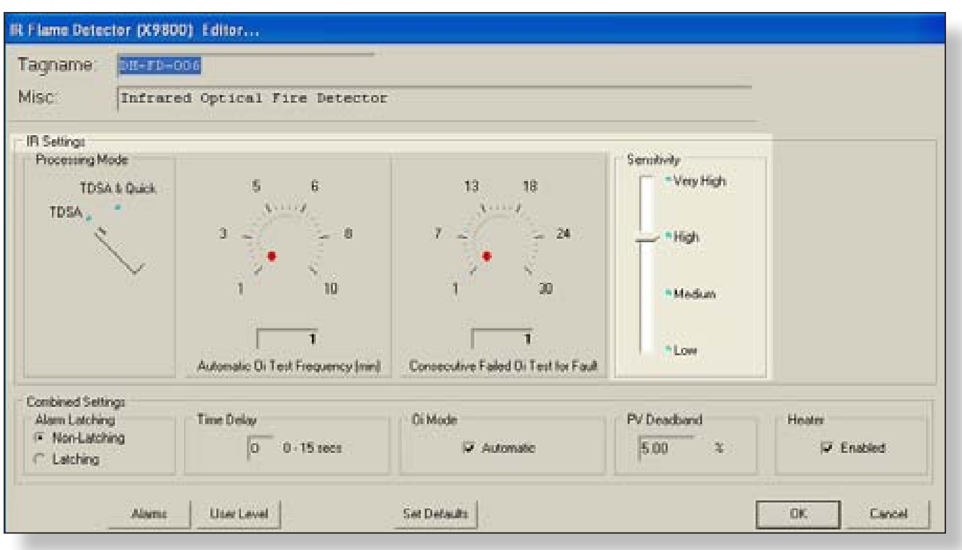
The frequency of Oi testing can be adjusted between once a minute as maximum and up to once every ten minutes as a minimum. There is also a checkbox for automatic operation.



The number of failed Oi tests needed to generate a fault can also be adjusted within a range of 1 to 30. Test failures can sometimes be generated during heavy rain or other environmental conditions thus requiring this parameter to be flexible.

Sensitivity

Dense fog, rain as well as certain gases and vapors can absorb IR radiation and reduce the sensitivity of the detector.



The sensitivity of the detector can be adjusted to any one of four settings using the slider control as shown above.

Alarm Latching

This refers to the fire alarm "message" being sent from the detector to the EQP controller and then used in both the embedded and user programmed logic. Non-latching is the default and most common setting.

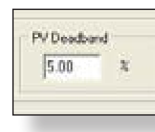
Using the Radio Buttons select either latching or non-latching for the alarm operation. If set to latching, the user will have to reset the detector from its S^3 Point Display following an alarm.

Time Delay

An input time delay can be programmed by entering a value from 1 to 15 seconds in the provided field.

This will delay sending the fire alarm message to the EQP controller until the fire alarm has been generated **uninterrupted** for the specified time. This programmable delay can be used to filter out spurious events.

PV Deadband



A field is provided to enter the desired PV (Process Variable) Deadband.

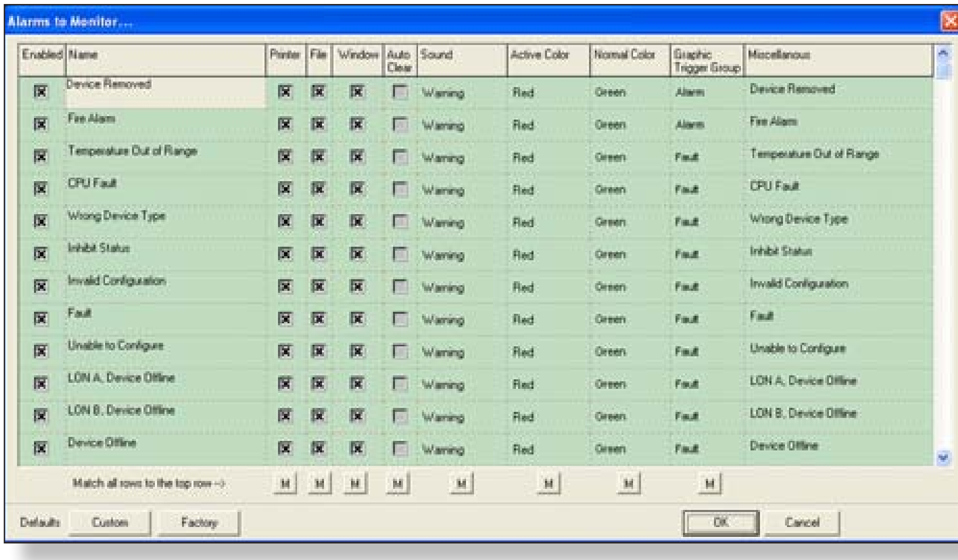
Normally all values are transmitted to the controller every five seconds; If the PV changes more than the entered percentage before the five second report time arrives, an immediate message is sent with the current values.

Heater

A checkbox is provided to enable the Microprocessor controlled heated optics for increased resistance to moisture and ice. In climates where this is not an issue, deselecting this option will save up to 8 watts per detector.

Alarms

Selecting this button opens the “Alarms to Monitor...” dialog box.

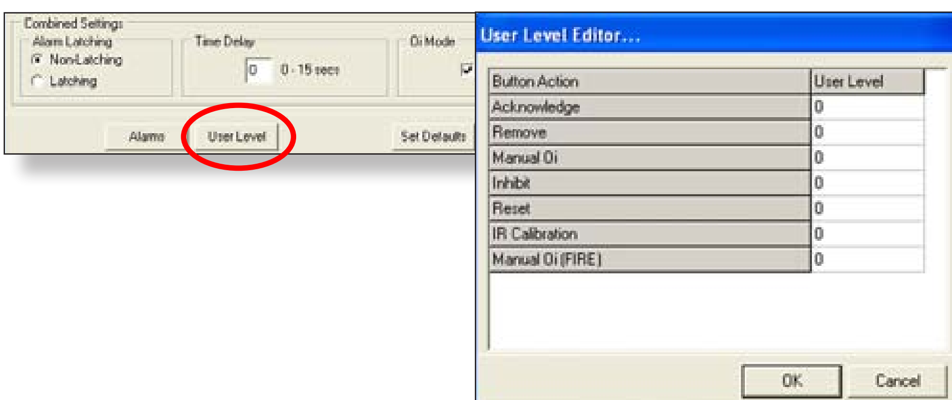


This scrolling list displays the alarms and events related to the device that can be configured to be monitored by S³. There are 28 alarms and events that pertain to the status and diagnostics for the IR X9800.

User Levels

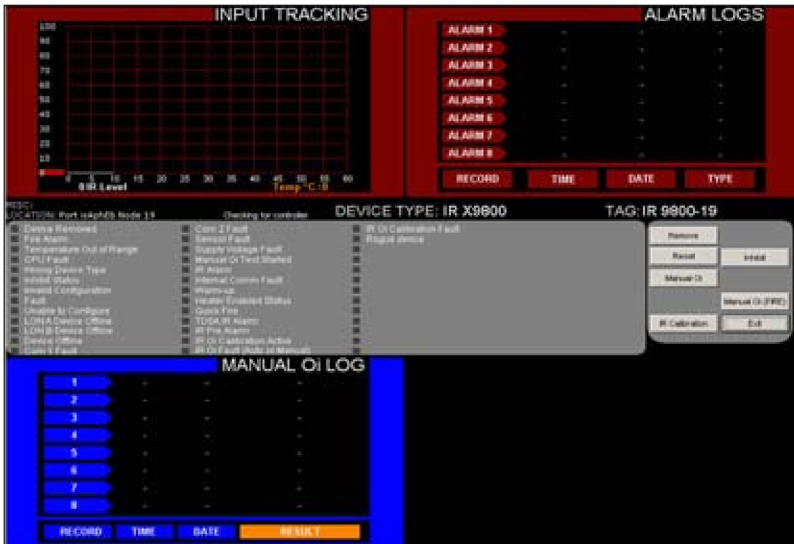
The “User Level Editor...” provides a means for limiting access to the “Acknowledge”, “Remove”, “Manual Oi”, “Inhibit”, “IR Calibration”, “Manual Oi (FIRE)” and “Reset” buttons for the module which are accessible from the devices point display. The default value is “0” and provides access to all users.

Change these values to match a user account configuration and security needs.



Point Display

The IR X9800 has a custom "Point Display" that can be accessed from either the Point Display button on the Command Bar or from the Online Mode. The point display provides a single window view of all available real-time data for the device.



Alarm Logs

The top right quadrant of the display shows the last eight alarms with their date and time data.

Analog Input Track

The top left quadrant shows a dynamic 60 second history of the measured variable (IR counts) for the detector. The input track scrolls from left to right with the most current data at the "pen" on the left margin. The display updates once every five seconds.

Manual Oi Log

The bottom left quadrant of the point display shows the detectors manual Optical Integrity (Oi) log. The last eight manual tests are shown with the date, time and a PASS/FAIL indicator.

Status & Diagnostics

The middle portion of the point display shows the discrete status and health indicators for the detector.

Buttons

There are six buttons that can send commands to the detector including; remove, inhibit, reset, Manual Oi, Manual Oi (FIRE) and IR Calibration.

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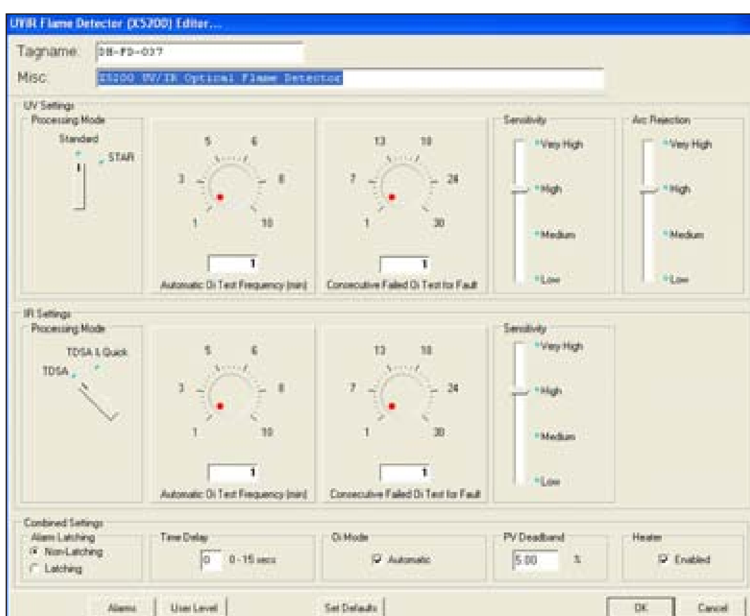
X5200

Ultraviolet (UV) / Infrared (IR) Flame Detector

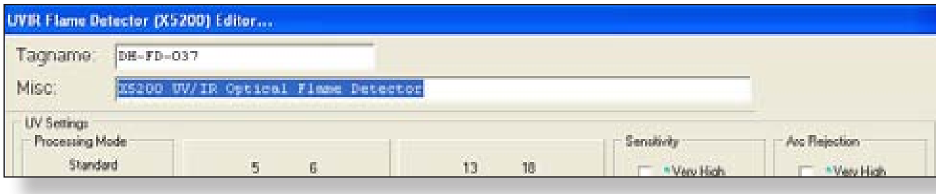
The UVIR X5200 is located on the LON/SLC and provides UVIR Optical Flame detection capability for the Eagle Quantum Premier system. The UVIR X5200 meets the most stringent requirements worldwide with advanced detection capabilities and immunity to extraneous sources, combined with a superior mechanical design. The detector is equipped with both automatic and manual Oi test capability. The detector has Division and Zone explosion-proof ratings and is suitable for use in indoor and outdoor applications.

Tagname

Configuration of the detector is through the “UVIR Flame Detector (X5200) Editor...” dialog box which contains controls for manipulating all of the adjustable parameters of the detector. This includes processing and sensitivity adjustments for both of the sensors along with some global settings for alarm action, Oi, time delays and deadband. The tagname at the top of the dialog box refers to the flame detector as a whole and is the identifier used for programming. Until a tagname is entered the detector is not available in the S^3 database for programming, monitoring or dynamic graphic purposes.



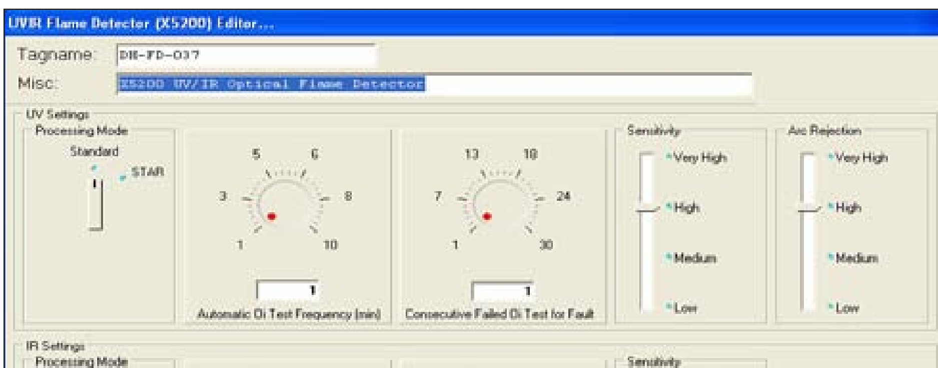
The optional description entered in the miscellaneous text field can be used for further describe where or how the detector is being used and can be helpful in troubleshooting.



The UVIR X5200 features signal processing options for both the UV and IR sensors. These options determine the type of logic that the detector will use for processing fire signals to customize the UVIR X5200 to the application.

UV Flame Detector Options

The UV flame detector output (measured in counts per second) is compared to the fire threshold (the “sensitivity” setting). If the radiant energy level from the fire exceeds the selected alarm threshold level, the fire alarm output is activated. In every application, it is crucial to ensure that the radiant ultraviolet energy level from the expected fire at the required distance from the detector will exceed the selected sensitivity level.



The UV flame detector in the X5200 can be programmed for “Standard” signal processing or “Arc Rejection”.

Arc Rejection (Recommended Factory Setting)

The Arc Rejection mode enables the detector to prevent nuisance fire alarms caused by UV from short-duration electrical arcs or electrostatic discharge, while maintaining the ability to reliably detect the UV given off by a flame.

Typical applications that benefit from arc rejection logic include electrostatic coating processes and uncontrolled environments where transient UV sources can be present, such as many typical outdoor applications. Most false alarm sources have short transient UV signatures, while fire creates a long UV signature over many seconds. Most fires are detected in a few seconds.

Standard Signal Processing

Standard signal processing is recommended for high speed suppression systems only. To allow for high speed operation, the standard processing mode does not incorporate the arc rejection programming. This mode should only be used in a controlled, indoor environment.

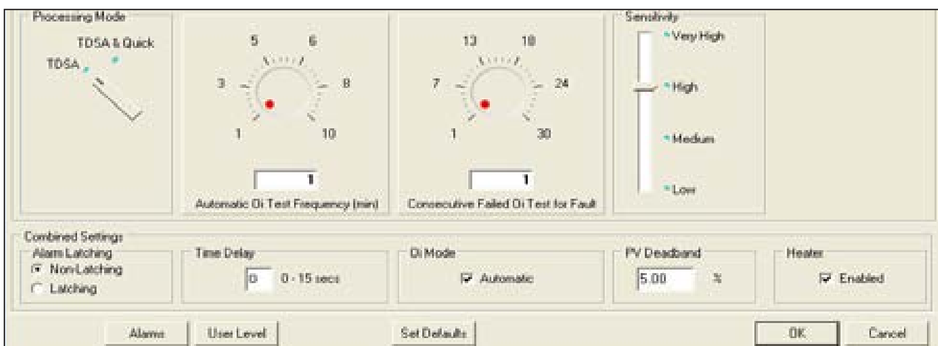
IR Detector Options

The IR detector in the UVIR X5200 can be programmed for; “TDSA enabled” or both “TDSA and Quick Fire enabled” (either initiates fire alarm).

Time Domain Signal Analysis (TDSA)

The TDSA signal processing technique analyzes the input signal in real time, requiring the IR signal to flicker randomly in order to recognize it as a fire condition.

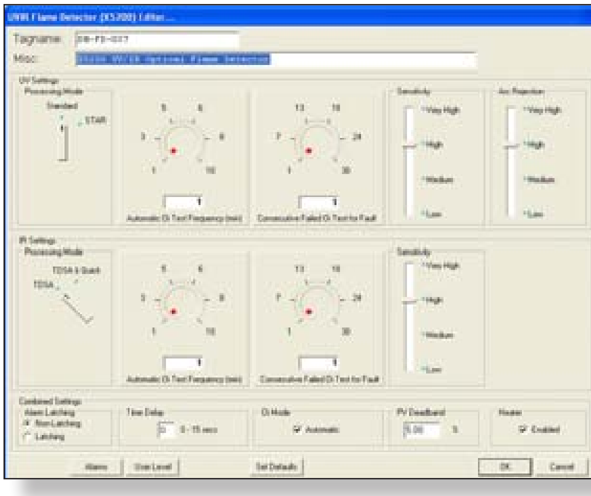
Using TDSA signal processing, the UVIR X5200 ignores regularly chopped blackbody sources (occurring in areas where moving conveyors and hot objects in proximity to one another result in a regularly chopped IR signal), because it looks for a less uniform signal.



However, in the presence of a regularly chopped signal, the unit is more susceptible to false alarms due to sporadic IR that functions as a trigger when occurring in conjunction with the regularly chopped signal.

Quick Fire (High Speed)

The Quick Fire (High Speed) feature can be used in conjunction with the TDSA signal processing method. This method overrides TDSA requirements in the event of an intense signal. When Quick Fire is activated, the detector is capable of responding to an intense fire signal in less than 30 milliseconds (0.030 seconds). Using the Quick Fire feature in conjunction with TDSA signal processing allows the detector to provide a high speed response to a large, non-flickering fire (such as in high pressure gas applications) while maintaining an ability to respond to smaller fires.



Sensor Sensitivity Adjustments

Both the UV and IR sensors have individually adjustable sensitivity selections. These settings combined with the signal processing and arc rejection selections will effect how the detector responds to different types of fires. For details on the impact of these settings on a variety of common fuels, refer to the UVIR X5200 instruction manual 95-8546.

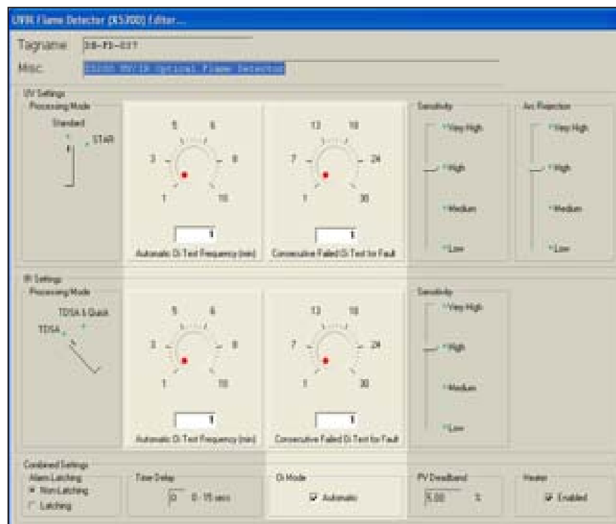
Automatic Optical Integrity (Oi)

The UVIR X5200 includes the Automatic Optical Integrity (Oi) feature — a calibrated performance test that is automatically performed once per minute to verify complete detector operation capabilities.

No testing with an external test lamp is required. The detector automatically performs the same test that a maintenance person with a test lamp would perform —once every minute, 60 times per hour. However, a successful automatic Oi test does not produce an alarm condition.

The UVIR X5200 signals a fault condition when less than half of the detection range remains. This is indicated by the Fault relay and is evident by the yellow color of the LED on the face of the detector.

The Oi feature is set to automatic as a factory default but can be deselected for “manual only” operation. Manual Oi tests can be initiated via the detectors point display in the S^3 software.



Oi Test Frequency

The default Oi test frequency is once a minute but can be adjusted to any whole minute increment up to a maximum of ten minutes.

Oi Test Fault

The detector automatically conducts Oi tests to check the integrity of the optical sensing systems. Three consecutive failed Oi tests will generate a fault condition, which will be indicated by the LED on the face of the detector turning yellow. The EQP Controller and S^3 software will also annunciate this fault.

In certain environmental conditions like very heavy rain, Oi test failures can occur even though the hardware is not faulty. To compensate for this the number of failed Oi tests required to generate the fault can be adjusted upward to a maximum of 30.

Oi Mode

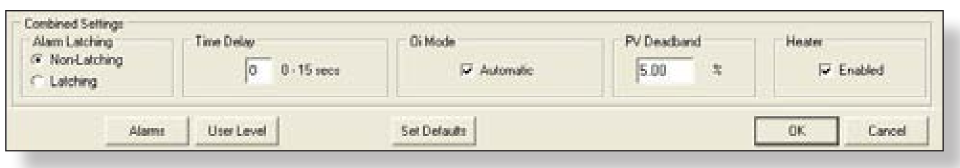
The UVIR X5200 includes the Automatic Optical Integrity (Oi) feature — a performance test that is automatically performed to verify complete detector operation capabilities.

Combined Settings

The bottom portion of the dialog box contains settings for the alarm latching, Optical Integrity (Oi), input time delay and PV deadband adjustments that apply to the whole detector as opposed to a specific sensor.

Alarm Latching Mode

The red LED on the face of the detector comes on when in alarm and can be configured to be either latching or non-latching. If latching is selected, following a fire detection, the LED will stay on until the detector is reset from the point display for the detector in the S³ software. The default is non-latching.

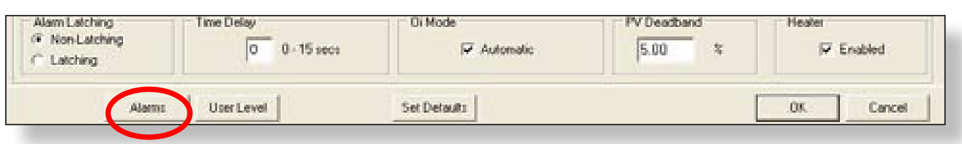


Time Delay

An input time delay can be programmed by entering a value from 1 to 15 seconds in the provided field. This will delay sending the fire alarm message to the EQP controller until the fire alarm has been generated **uninterrupted** for the specified time. This programmable delay can be used to filter out spurious events.

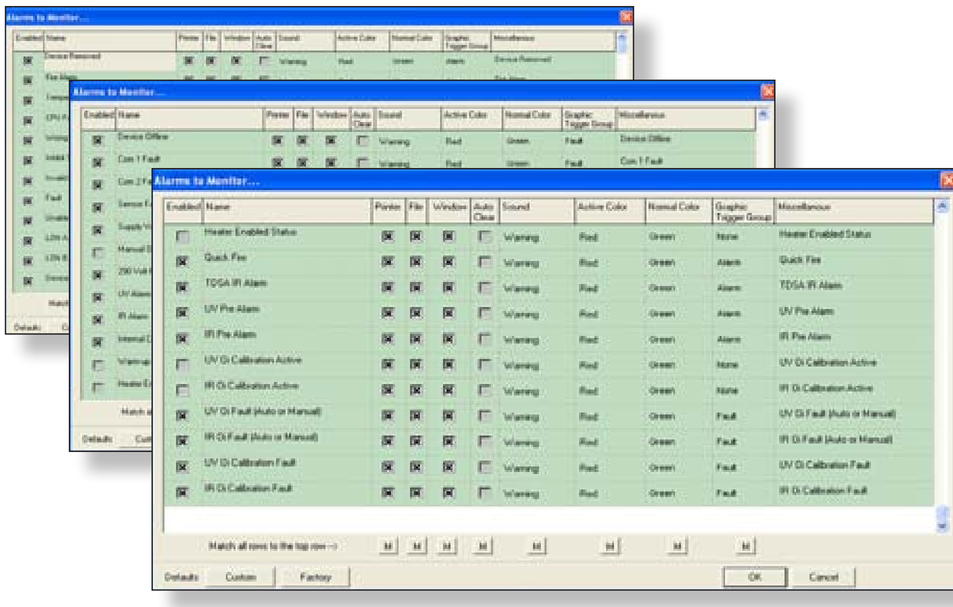
PV Deadband

A field is provided to enter the desired PV (Process Variable) Deadband. Normally all values are transmitted to the controller every five seconds; If the PV changes more than the entered percentage before the five second report time arrives, an immediate message is sent with the current values.



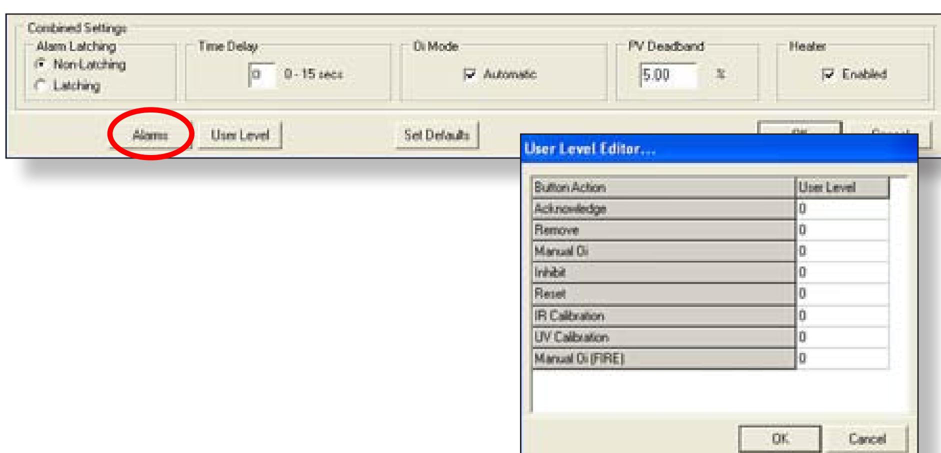
Alarms

Selecting this button opens the "Alarms to Monitor..." dialog box. This scrolling list displays the alarms and events related to the device that can be configured to be monitored by S³. There are 33 alarms and events that pertain to the status and diagnostics of the UVIR X5200.



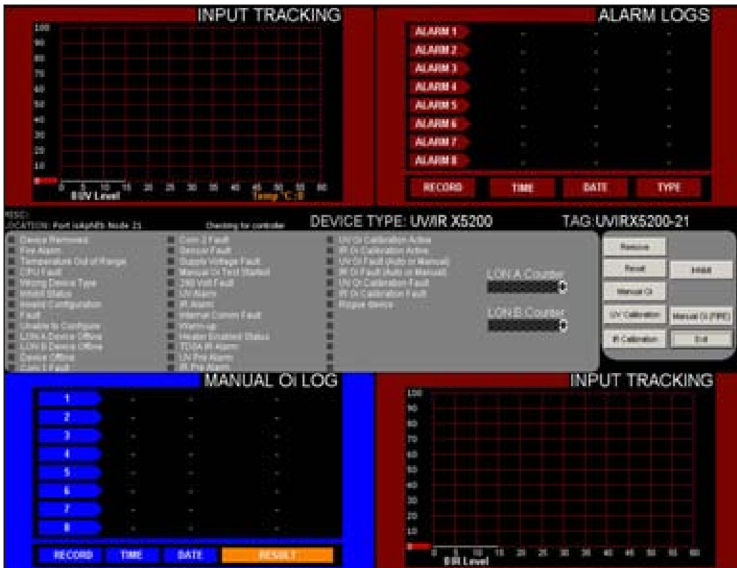
User Levels

The "User Level Editor..." provides a means for limiting access to the "Acknowledge", "Remove", "Manual Oi", "Inhibit", Manual Oi (FIRE)", "IR Calibration", "UV Calibration" and "Reset" buttons for the module which are accessible from the devices point display. The default value is "0" and provides access to all users. Change these values to match a user account configuration and security needs.



Point Display

The UVIR X5200 detector has a custom "Point Display" that can be accessed from either the Point Display button on the Command Bar or from the Online Mode. The point display provides a single window view of all available real-time data for the device.



Alarm Logs

The top right quadrant of the display shows the last eight alarms with their date and time data.

Analog Input Tracks

The top left and bottom right quadrants show a dynamic 60 second history of the detectors measured variables, UV and IR levels. The input track scrolls from left to right with the most current data at the "pen" on the left margin. The display updates once every five seconds.

Oi Log

The bottom left quadrant of the point display shows the detectors manual Optical Integrity (Oi) log. The last eight manual tests are shown with the date, time and a PASS/FAIL indicator.

Status & Diagnostics

The middle portion of the point display shows the discrete status and health indicators for the detector.

Buttons

There are eight buttons that can send commands to the detector including; remove, inhibit, reset, Manual Oi, Manual Oi (FIRE), IR Calibration and UV Calibration.

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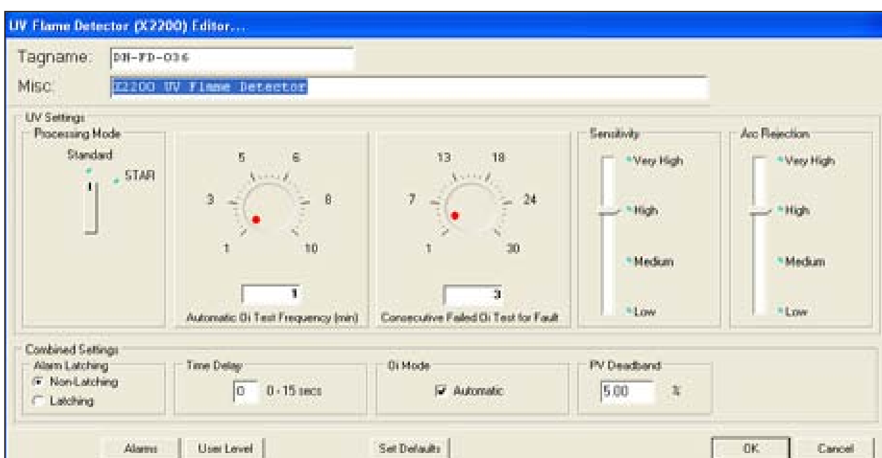
X2200

Ultraviolet (UV) Flame Detector

The UV X2200 is located on the LON/SLC and provides Multi-Spectrum Infrared Optical Flame detection capability for the Eagle Quantum Premier system. The UV X2200 meets the most stringent requirements worldwide with advanced detection capabilities and immunity to extraneous sources, combined with a superior mechanical design. The detector is equipped with both automatic and manual Oi test capability. The detector has Division and Zone explosion-proof ratings and is suitable for use in indoor and outdoor applications.

Tagname

The tagname at the top of the dialog box refers to the flame detector. Until a tagname is entered the detector is not available in the S^3 database for programming, monitoring or dynamic graphic purposes.

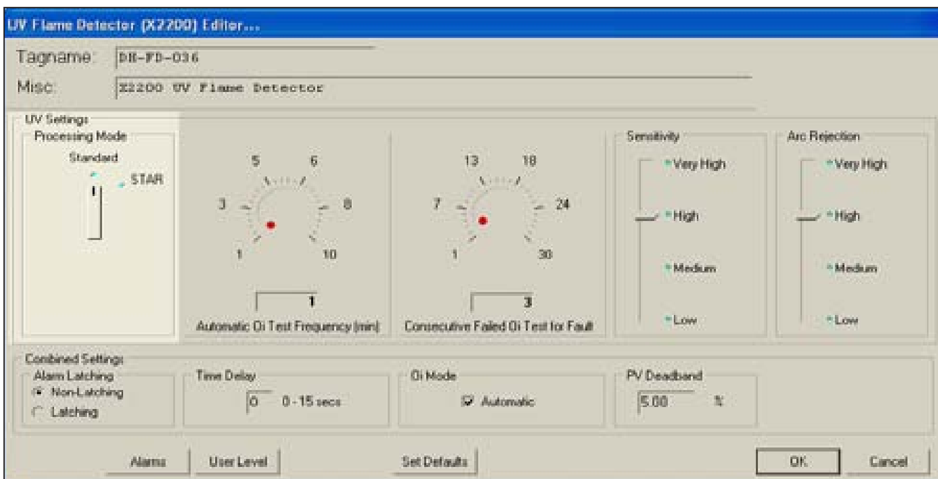


Signal Processing Options

The UV flame detector output (measured in counts per second) is compared to the fire threshold (the “sensitivity” setting). If the radiant energy level from the fire exceeds the selected alarm threshold level, the fire alarm output is activated. In every application, it is crucial to ensure that the radiant ultraviolet energy level from the expected fire at the required distance from the detector will exceed the selected sensitivity level. The UV detector in the UV X2200 can be programmed for “Arc Rejection” or “Standard Signal Processing”.

STAR (Arc Rejection)

The “STAR” mode (recommended factory setting) enables the detector to prevent nuisance fire alarms caused by UV from short-duration electrical arcs or electrostatic discharge, while maintaining the ability to reliably detect the UV given off by a flame.



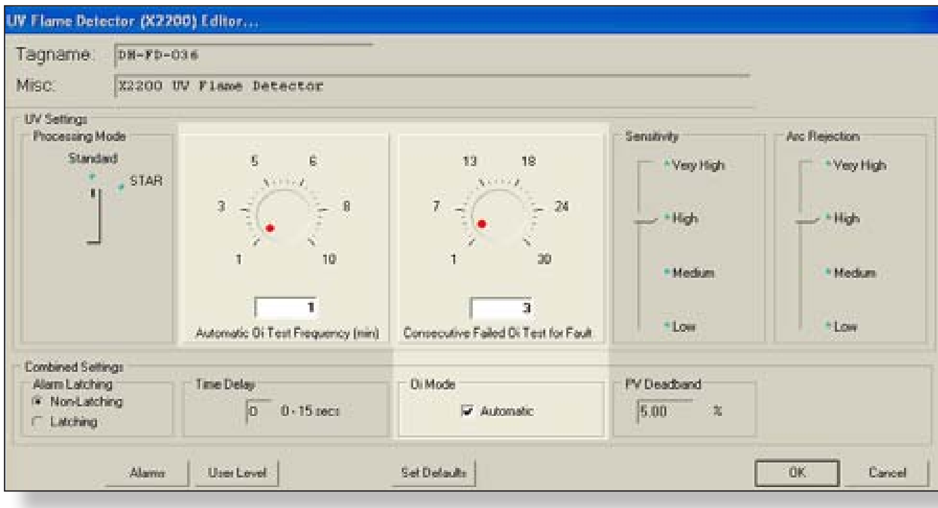
Typical applications that benefit from arc rejection logic include electrostatic coating processes and uncontrolled environments where transient UV sources can be present, such as many typical outdoor applications. Most false alarm sources have short transient UV signatures, while fire creates a long UV signature over many seconds. Most fires are detected in a few seconds.

Standard Signal Processing

Standard signal processing is recommended for high speed suppression systems only. To allow for high speed operation, the standard processing mode does not incorporate the arc rejection programming. This mode should only be used in a controlled, indoor environment.

Automatic Oi

The UV X2200 includes the Automatic Optical Integrity (Oi) feature — a calibrated performance test that is automatically performed once per minute to verify complete detector operation capabilities. No testing with an external test lamp is required. The detector automatically performs the same test that a maintenance person with a test lamp would perform —once every minute, 60 times per hour. However, a successful automatic Oi test does not produce an alarm condition.



The UV X2200 signals a fault condition when less than half of the detection range remains. This is indicated by the fault message on the EQP controller and is evident by the yellow color of the LED on the face of the detector. The Oi feature is set to automatic as a factory default but can be deselected for “manual only” operation. Manual Oi tests can be initiated via the detectors point display in the S^3 software.

Oi Test Frequency

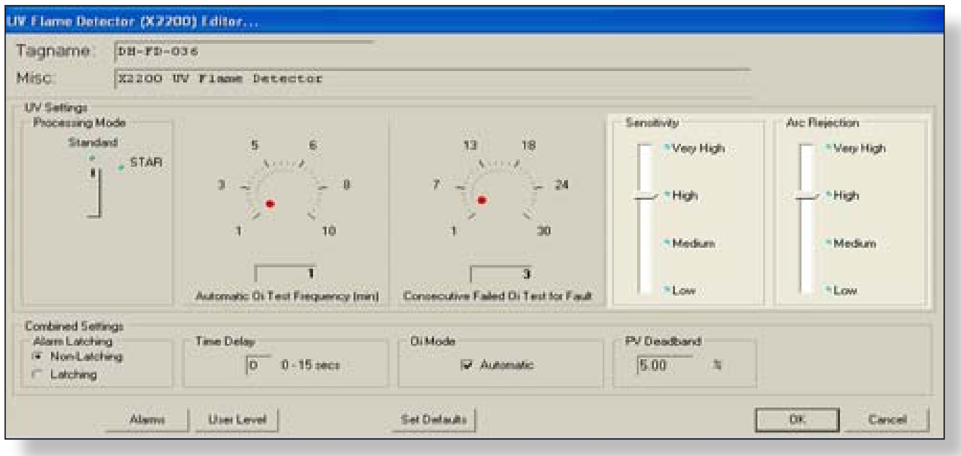
The default Oi test frequency is once a minute but can be adjusted to any whole minute increment up to a maximum of ten minutes.

Oi Test Fault

The detector automatically conducts Oi tests to check the integrity of the optical sensing systems. Three consecutive failed Oi tests will generate a fault condition, which will be indicated by the LED on the face of the detector turning yellow. The EQP Controller and S^3 software will also annunciate this fault. In certain environmental conditions like very heavy rain, Oi test failures can occur even though the hardware is not faulty. To compensate for this the number of failed Oi tests required to generate the fault can be adjusted upward to a maximum of 30.

Sensitivity and Arc Rejection

The detector sensitivity and arc rejection settings are adjusted using the four position sliders provided in the configuration dialog box.



The factory default for both is “High” which responds to a 1 x 1 foot n-Heptane fire at 60 feet in 1 second with standard processing. For other fuels, distances, etc. Refer to the Appendix in the UV X2200 instruction manual 95-8549.

Combined settings

Alarm LED Latch: The tri-color LED on the face of the detector turns red when in alarm and can be configured to be either latching or non-latching.

If latching is selected, following a fire detection, the LED will stay on until the detector is reset from the point display for the detector in the S^3 software. The default is non-latching.

PV Deadband

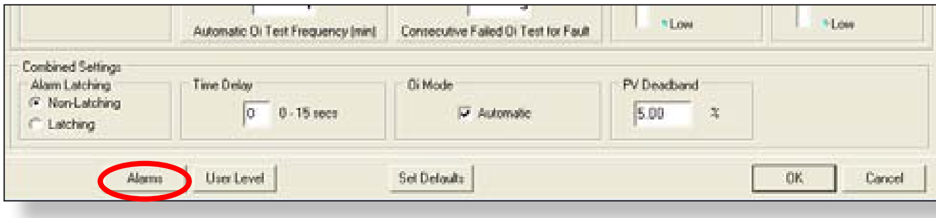
Normally all values are transmitted to the controller every five seconds; If the PV changes more than the entered percentage before the five second report time arrives, an immediate message is sent with the current values.

Time Delay

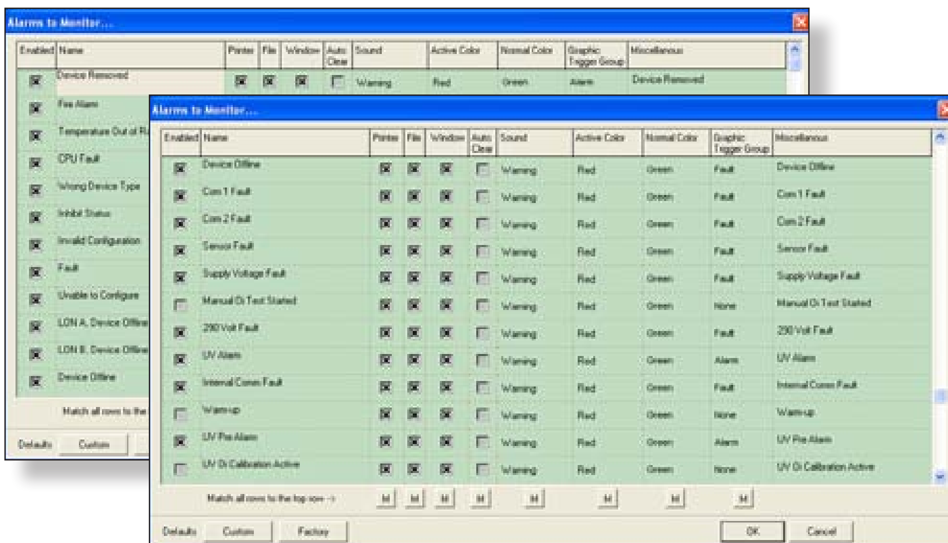
An input time delay can be programmed by entering a value from 1 to 15 seconds in the provided field. This will delay sending the fire alarm message to the EQP controller until the fire alarm has been generated **uninterrupted** for the specified time. This programmable delay can be used to filter out spurious events.

Alarms

Selecting this button opens the “Alarms to Monitor...” dialog box.

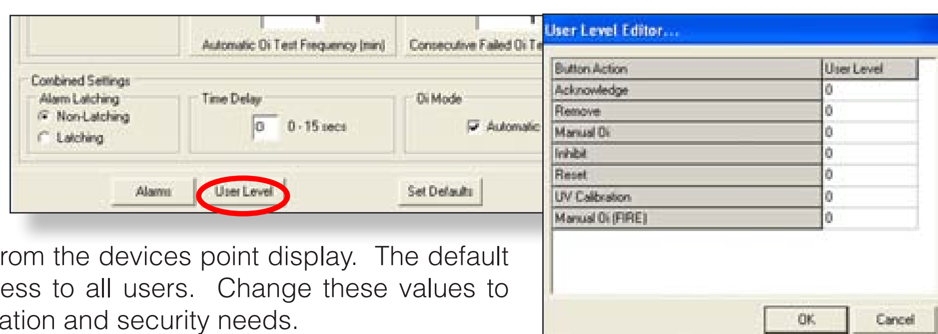


This scrolling list displays the alarms and events related to the device that can be configured to be monitored by S^3.



There are 25 alarms and events that pertain to the status and diagnostics of the UV X2200 detector.

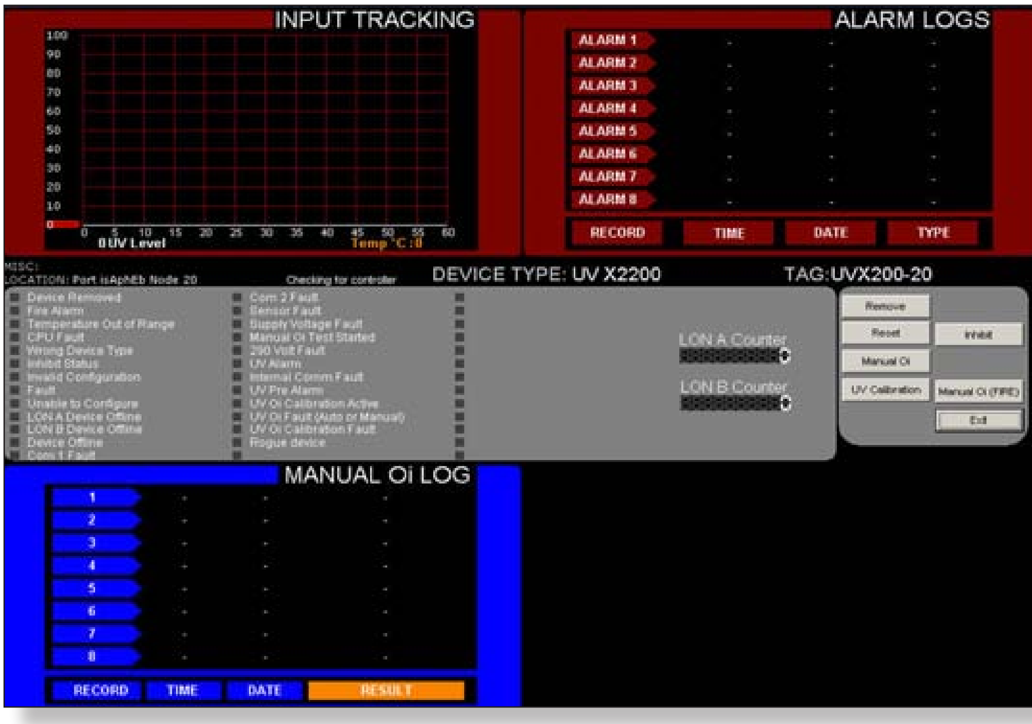
User Levels



The “User Level Editor...” provides a means for limiting access to the “Acknowledge”, “Remove”, “Manual Oi”, “Inhibit”, Manual Oi (FIRE)” and “Reset” buttons for the module which are accessible from the devices point display. The default value is “0” and provides access to all users. Change these values to match a user account configuration and security needs.

Point Display

The UV Flame Detector (X2200) has a custom “Point Display” that can be accessed from either the Point Display button on the Command Bar or from the Online Mode.



The point display provides a single window view of all available real-time data for the device.

Alarm Logs

The top right quadrant of the display shows the last eight alarms with their date and time data.

Analog Input Track

The top left quadrant shows a dynamic 60 second history of the measured variable (UV Level) for the detector. The input track scrolls from left to right with the most current data at the “pen” on the left margin. The display updates once every five seconds.

Oi Log

The bottom left quadrant of the point display shows the detectors manual Optical Integrity (Oi) log. The last eight manual tests are shown with the date, time and a PASS/FAIL indicator.

Status & Diagnostics

The middle portion of the point display shows the discrete status and health indicators for the detector.

Buttons

There are six buttons that can send commands to the detector including; remove, inhibit, reset, Manual Oi, Manual Oi (FIRE) and UV Calibration.

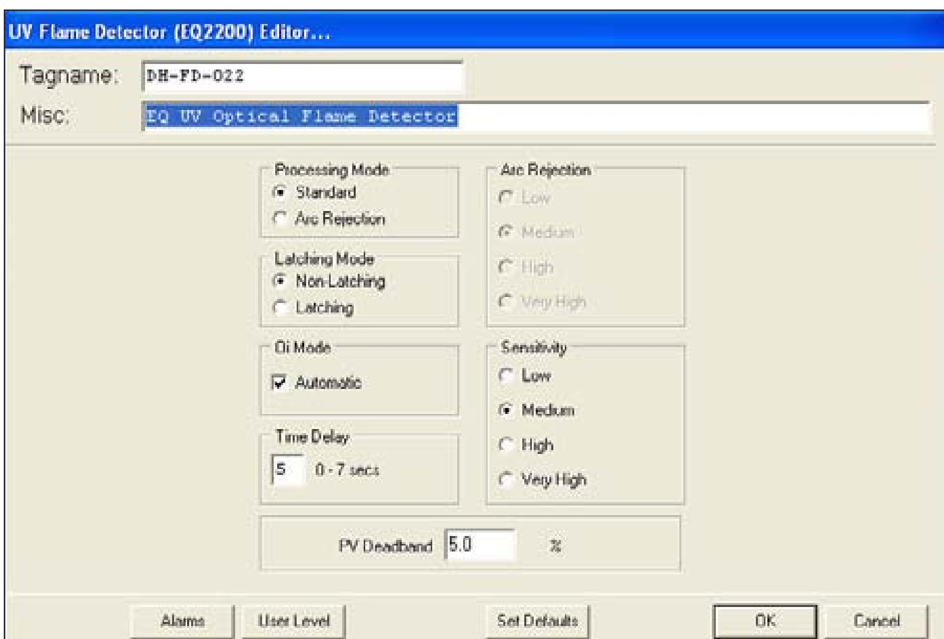
EQ2200UV

Ultraviolet (UV) Flame Detector

The UV EQ2200 is located on the LON/SLC and provides UV Optical Flame detection capability for the Eagle Quantum Premier system. The detector has Division and Zone explosion-proof ratings and is suitable for use in indoor and outdoor applications.

Tagname

The tagname at the top of the dialog box refers to the flame detector. Until a tagname is entered the detector is not available in the S^3 database for programming, monitoring or dynamic graphic purposes.



The UV flame detector output (measured in counts per second) is compared to the fire threshold (the"sensitivity" setting). If the radiant energy level from the fire exceeds the selected alarm threshold level, the fire alarm output is activated. In every application, it is crucial to ensure that the radiant ultraviolet energy level from the expected fire at the required distance from the detector will exceed the selected sensitivity level. The UV flame detector can be programmed for "Arc Rejection" or "Standard Signal Processing".

Arc Rejection (Recommended Factory Setting)

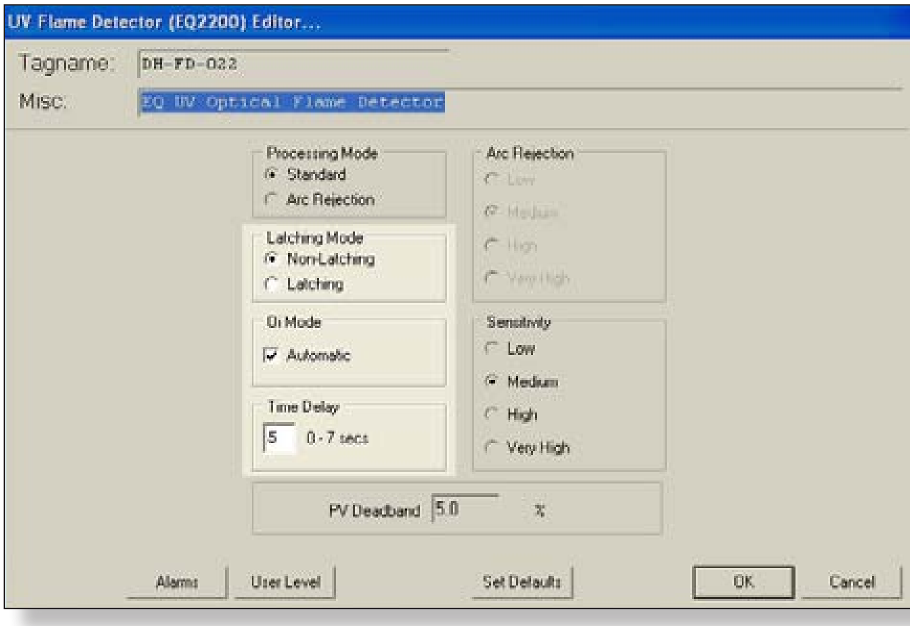
The Arc Rejection mode enables the detector to prevent nuisance fire alarms caused by UV from short-duration electrical arcs or electrostatic discharge, while maintaining the ability to reliably detect the UV given off by a flame. Typical applications that benefit from arc rejection logic include electrostatic coating processes and uncontrolled environments where transient UV sources can be present, such as many typical outdoor applications. Most false alarm sources have short transient UV signatures, while fire creates a long UV signature over many seconds. Most fires are detected in a few seconds.

Standard Signal Processing

Standard signal processing is recommended for high speed suppression systems only. To allow for high speed operation, the standard processing mode does not incorporate the arc rejection programming. This mode should only be used in a controlled, indoor environment.

Alarm Latching Mode

The red LED on the face of the detector comes on when in alarm and can be configured to be either latching or non-latching. If latching is selected, following a fire detection, the LED will stay on until the detector is reset from the point display for the detector in the S^3 software. The default is non-latching.



Oi Mode

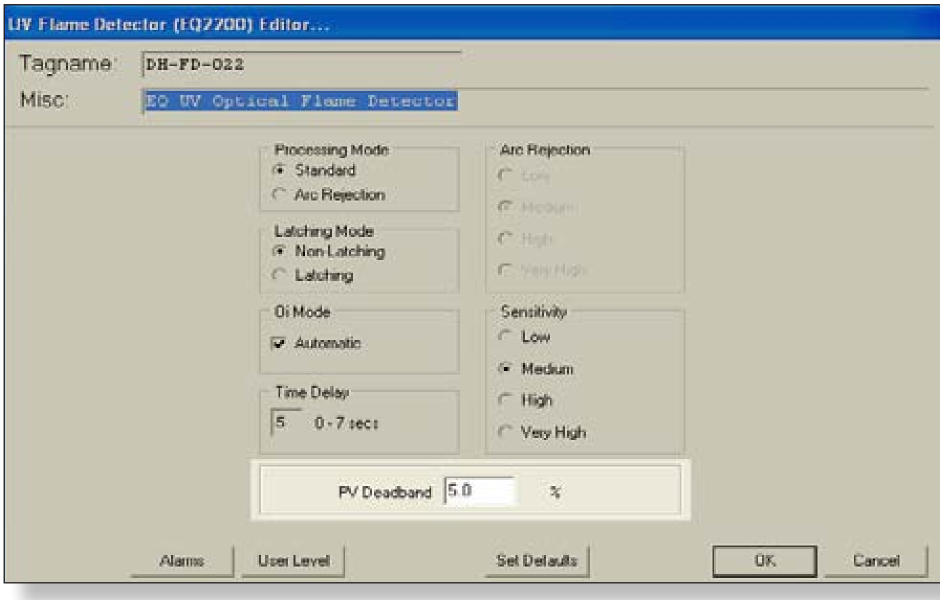
The UV EQ2200 includes the Automatic Optical Integrity (Oi) feature — a performance test that is automatically performed once per minute to verify complete detector operation capabilities. No testing with an external test lamp is required. The detector automatically performs the same test that a maintenance person with a test lamp would perform —once every minute, 60 times per hour. However, a successful automatic Oi test does not produce an alarm condition. The UV EQ2200 signals a fault condition when less than half of the detection range remains. This is indicated by the Oi fault message on the EQP Controller and via the S^3 software. The default mode is Automatic. Manual Oi tests can be initiated from the point display in the S^3 software.

Time Delay

An input time delay can be programmed by entering a value from 1 to 7 seconds in the provided field. This will delay sending the fire alarm message to the EQP controller until the fire alarm has been generated **uninterrupted** for the specified time. This programmable delay can be used to filter out spurious events.

PV Deadband

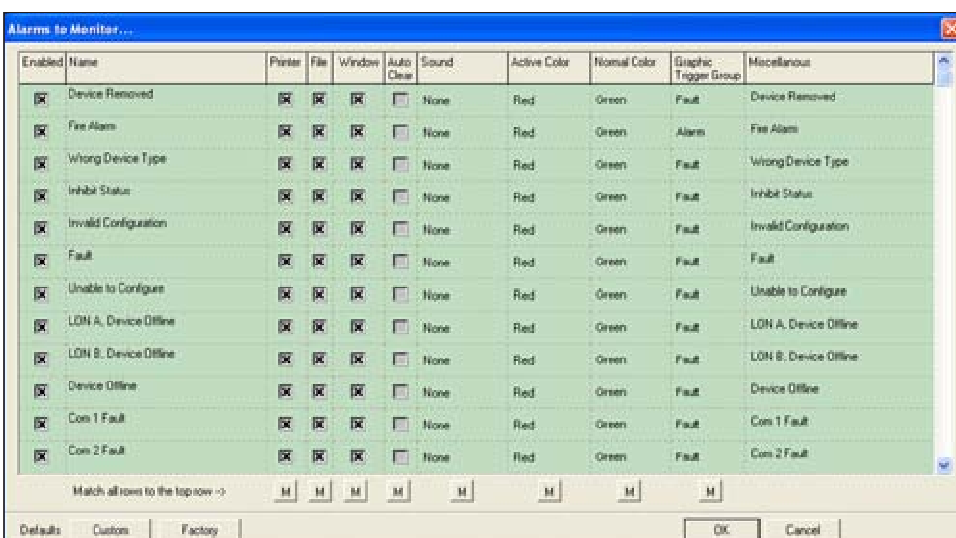
A field is provided to enter the desired PV (Process Variable) Deadband.



Normally all values are transmitted to the controller every five seconds; If the PV changes more than the entered percentage before the five second report time arrives, an immediate message is sent with the current values.

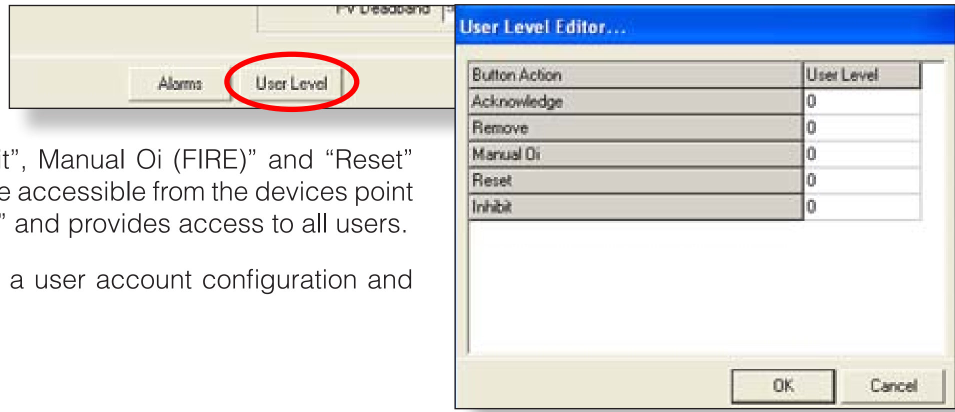
Alarms

Selecting this button opens the “Alarms to Monitor...” dialog box. This scrolling list displays the alarms and events related to the device that can be configured to be monitored by S^3.



There are 21 alarms and events that pertain to the status and diagnostics for the UV EQ2200.

User Levels

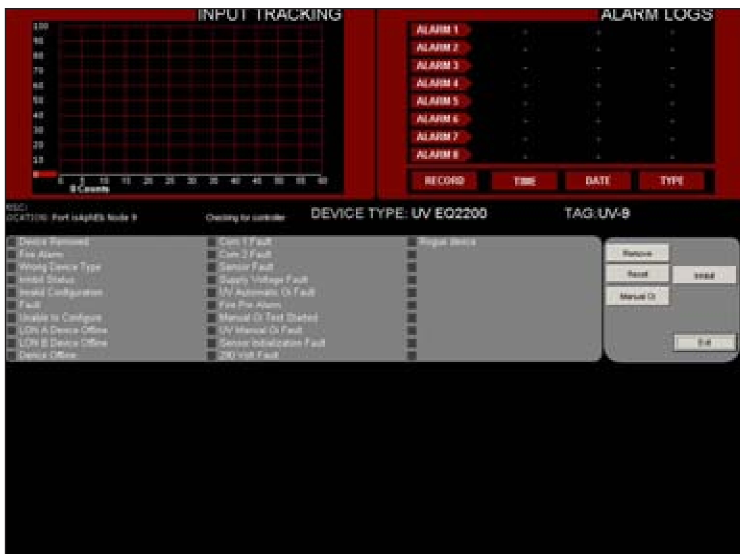


The "User Level Editor..." provides a means for limiting access to the "Acknowledge", "Remove", "Manual Oi", "Inhibit", Manual Oi (FIRE)" and "Reset" buttons for the module which are accessible from the devices point display. The default value is "0" and provides access to all users.

Change these values to match a user account configuration and security needs.

Point Display

The UV EQ2200 has a custom "Point Display" that can be accessed from either the Point Display button on the Command Bar or from the Online Mode. The point display provides a single window view of all available real-time data for the device.



Alarm Logs

The top right quadrant of the display shows the last eight alarms with their date and time data.

Analog Input Track

The top left quadrant shows a dynamic 60 second history of the measured variable (UV counts) for the detector. The input track scrolls from left to right with the most current data at the "pen" on the left margin. The display updates once every five seconds.

Status & Diagnostics

The middle portion of the point display shows the discrete status and health indicators for the detector.

Buttons

There are four buttons that can send commands to the detector including; Remove, Inhibit, Reset and Manual Oi.

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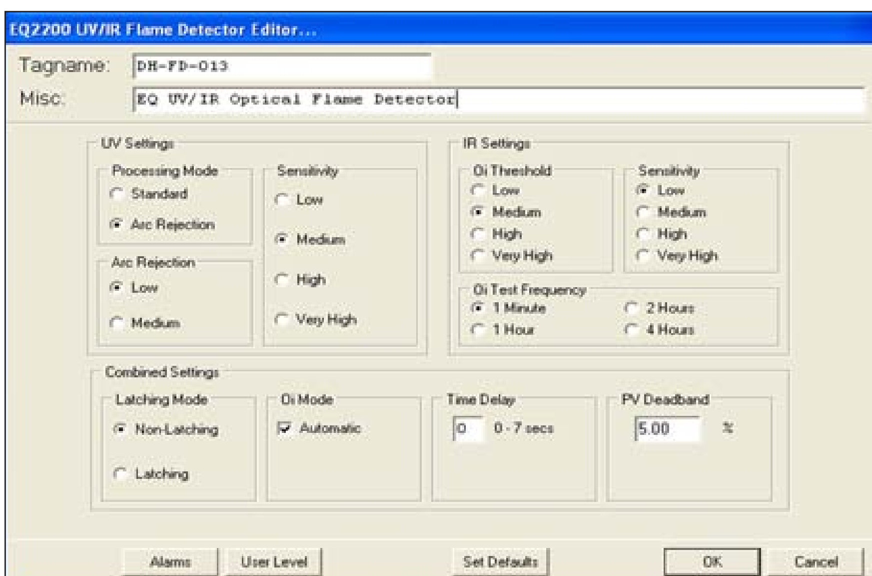
EQ2200UVIR

Ultraviolet (UV)/Infrared (IR) Optical Flame Detector

The UVIR EQ2200 is located on the LON/SLC and provides a combination UV & IR Optical Flame detection capability for the Eagle Quantum Premier system. The detector has Division and Zone explosion-proof ratings and is suitable for use in indoor and outdoor applications.

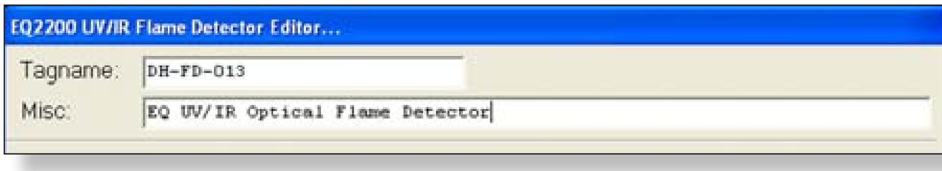
Configuration

Configuration of the detector is through the "UVIR EQ2200 Flame Detector Editor..." dialog box which contains controls for manipulating all of the adjustable parameters of the detector. This includes processing and sensitivity adjustments for both of the sensors along with some global settings for alarm action, Oi, time delays and deadband.



Tagname

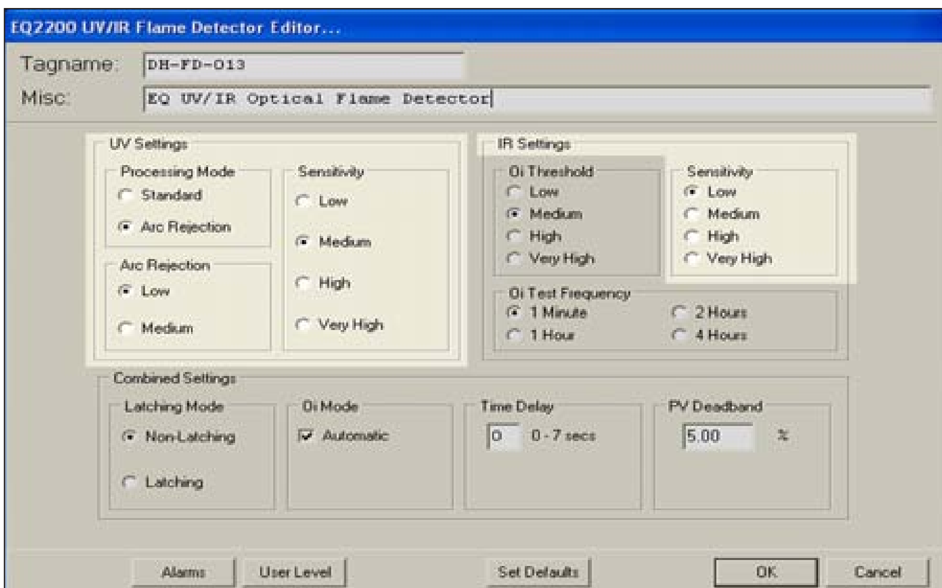
The tagname at the top of the dialog box refers to the flame detector as a whole and is the identifier used for programming.



Until a tagname is entered the detector is not available in the S^3 database for programming, monitoring or dynamic graphic purposes. The optional description entered in the miscellaneous text field can be used for further describe where or how the detector is being used and can be helpful in troubleshooting.

Sensor Settings & Sensitivity

Both the UV and IR sensors have independently adjustable settings for a variety of processing and sensitivity variables that can be used to fine tune the detectors operation to fit the application.



UV Specific Settings

The UV flame detector can be programmed for either “Standard Signal Processing” or “Arc Rejection”.

Arc Rejection (Recommended Factory Setting)

The Arc Rejection mode enables the detector to prevent nuisance fire alarms caused by UV from short-duration electrical arcs or electrostatic discharge, while maintaining the ability to reliably detect the UV given off by a flame. Most false alarm sources have short transient UV signatures, while fire creates a long UV signature over many seconds. Most fires are detected in a few seconds.

Standard Signal Processing

Standard signal processing is recommended for high speed suppression systems only. To allow for high speed operation, the standard processing mode does not incorporate the arc rejection programming.

This mode should only be used in a controlled, indoor environment.

UV and IR Sensor Sensitivity Settings

Both the UV and IR detectors can be individually programmed to operate in one of four sensitivity settings; Low, Medium, High or Very High.

The sensitivity level determines the maximum response distance and the response for the UVIR flame detector as a whole will be the lesser of the two.

Examples of sensitivity settings are shown in the table below:

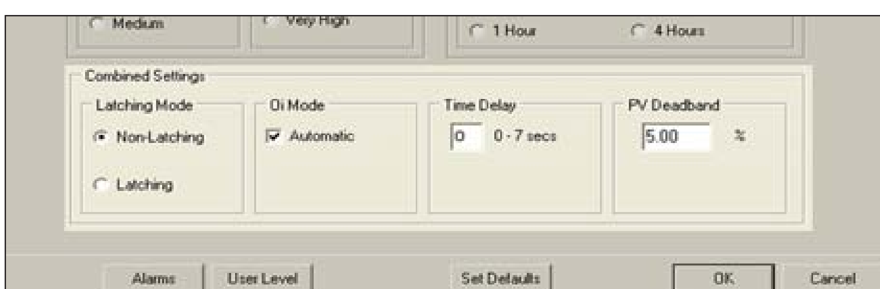
	Sensitivity	Arc Rejection	30 Inch Methane	1 Sq. Ft. Gasoline	1 Sq. Ft. Methanol
UV Standard	Low		40	30	15
	Medium		60	45	20
	High		80	65	35
	Very High		100	100	55
UV Arc Rejection	Low	Medium	35	30	10
	Low	High	35	30	10
	Medium	Medium	55	40	15
	Medium	High	55	40	15
	High	Medium	60	50	25
	High	High	65	50	25
	Very High	Medium	85	65	50
	Very High	High	85	65	50
IR	Low		40	65	40
	Medium		55	75	45
	High		65	90	55
	Very High		90	100	60

Combined Settings

The bottom portion of the dialog box contains settings for the alarm latching, Optical Integrity (Oi), input time delay and PV deadband adjustments that apply to the whole detector as opposed to a specific sensor.

Alarm Latching Mode

The red LED on the face of the detector comes on when in alarm and can be configured to be either latching or non-latching. If latching is selected, following a fire detection, the LED will stay on until the detector is reset from the point display for the detector in the S³ software. The default is non-latching.



Automatic Oi

The UVIR EQ2200 includes the Automatic Optical Integrity (Oi) feature — a performance test that is automatically performed to verify complete detector operation capabilities.

No testing with an external test lamp is required. The detector automatically performs the same test that a maintenance person with a test lamp would perform —once every minute, 60 times per hour. However, a successful automatic Oi test does not produce an alarm condition. While the default Oi test frequency is once a minute, it can be changed to once an hour, every two hours, or once every four hours. The default mode is Automatic. Manual Oi tests can be initiated from the point display in the S^3 software.

Time Delay

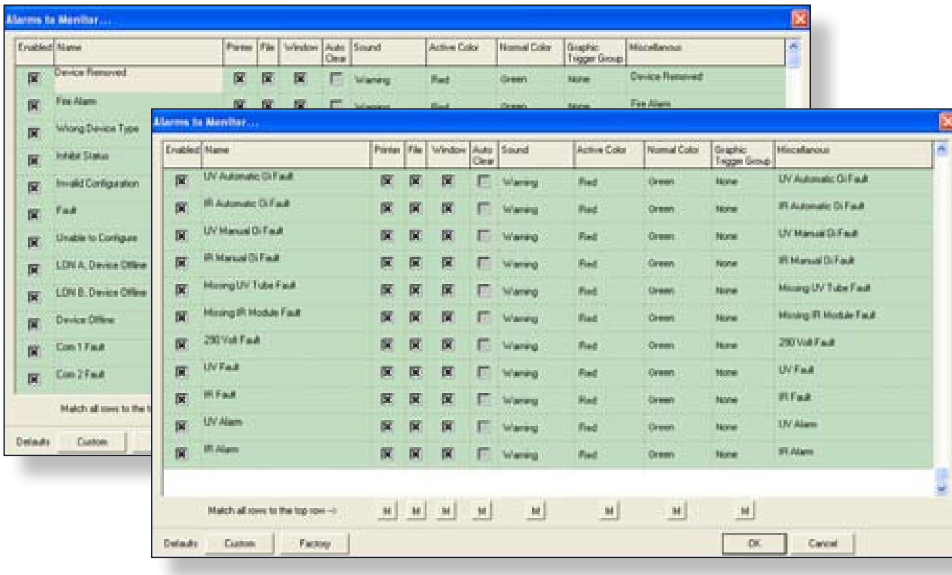
An input time delay can be programmed by entering a value from 1 to 7 seconds in the provided field. This will delay sending the fire alarm message to the EQP controller until the fire alarm has been generated **uninterrupted** for the specified time. This programmable delay can be used to filter out spurious events.

PV Deadband

A field is provided to enter the desired PV (Process Variable) Deadband. Normally all values are transmitted to the controller every five seconds; If the PV changes more than the entered percentage before the five second report time arrives, an immediate message is sent with the current values.

Alarms

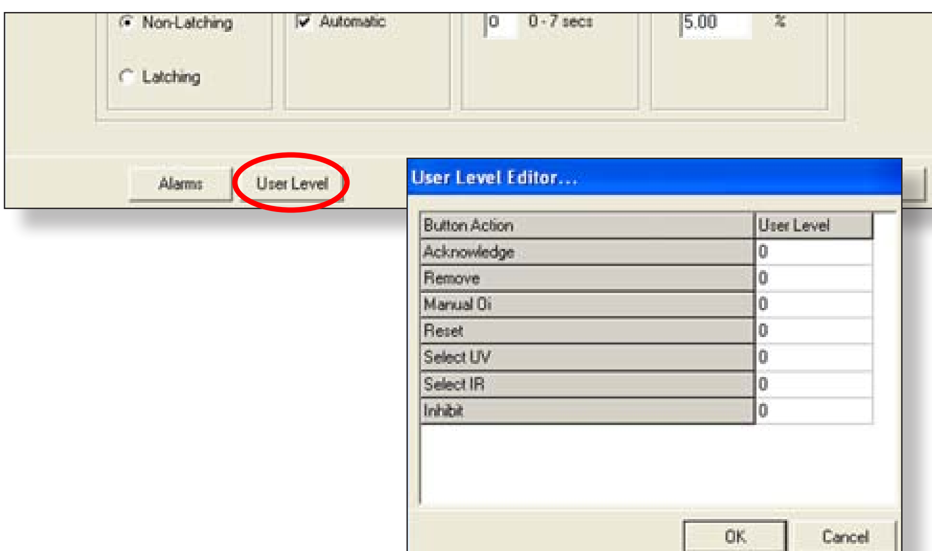
Selecting this button opens the "Alarms to Monitor..." dialog box. This scrolling list displays the alarms and events related to the device that can be configured to be monitored by S^3.



There are 27 alarms and events that relate to the status and diagnostics of the UVIR EQ2200.

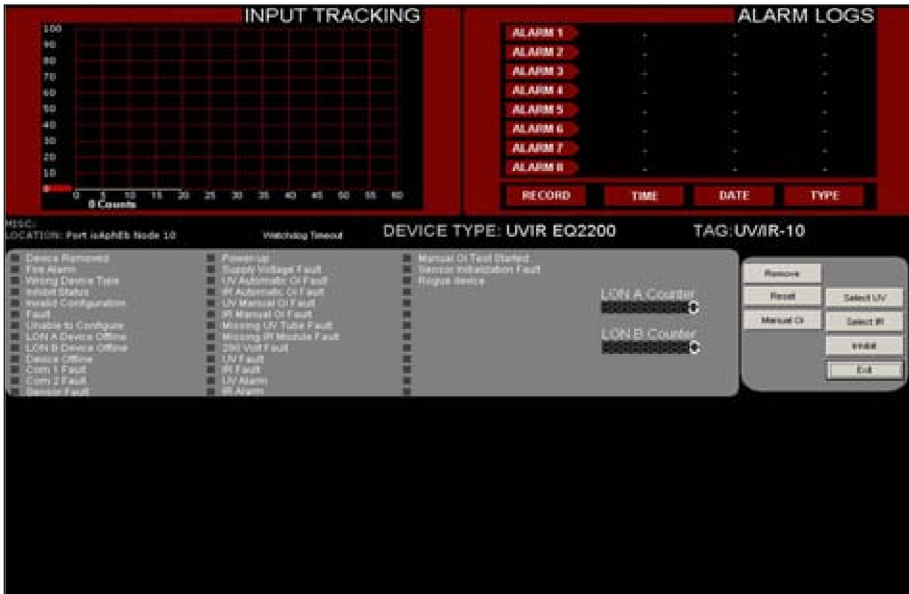
User Levels

The "User Level Editor..." provides a means for limiting access to the "Acknowledge", "Remove", "Manual Oi", "Inhibit", Manual Oi (FIRE)" and "Reset" buttons for the module which are accessible from the devices point display. The default value is "0" and provides access to all users. Change these values to match a user account configuration and security needs.



Point Display

The UVIR EQ2200 has a custom "Point Display" that can be accessed from either the Point Display button on the Command Bar or from the Online Mode. The point display provides a single window view of all available real-time data for the device.



Alarm Logs

The top right quadrant of the display shows the last eight alarms with their date and time data.

Analog Input Track

The top left quadrant shows a dynamic 60 second history of the measured variable (UV counts or IR level) for the detector. The input track scrolls from left to right with the most current data at the "pen" on the left margin. The display updates once every five seconds. Only one of the two PV's (UV or IR) can be displayed at a time, used the "Select UVIR" buttons on the center right side of the display to toggle between displaying UV Counts as shown in the example above, or, the IR sensors level.

Status & Diagnostics

The middle portion of the point display shows the discrete status and health indicators for the detector.

Buttons

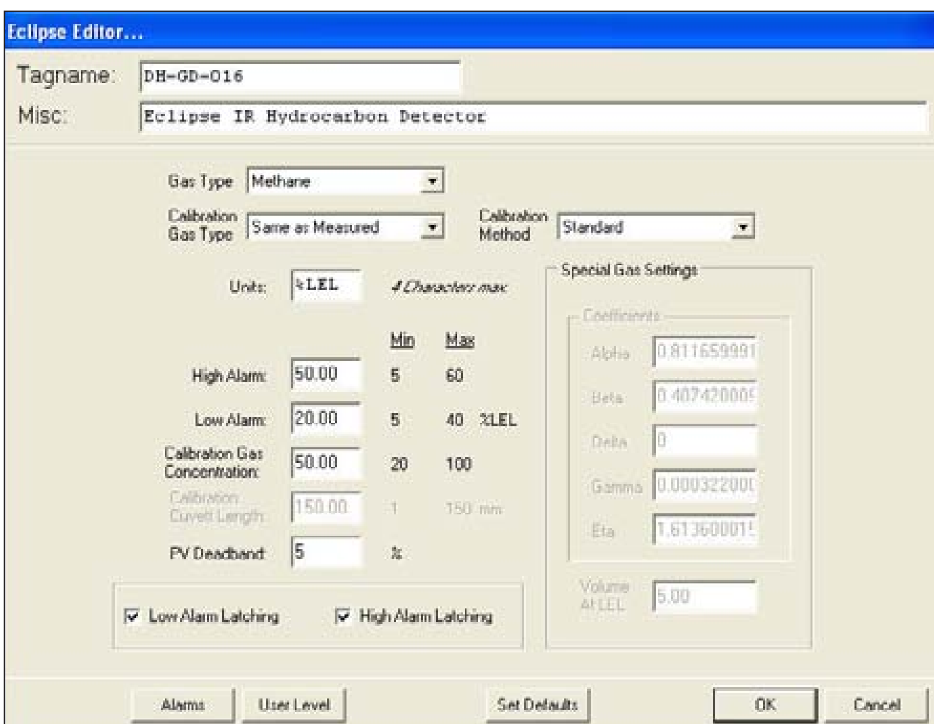
There are six buttons that can send commands to the detector including; Remove, Inhibit, Reset, Select UV, Select IR and Manual Oi.

PIRECL

Point IR Gas Detector

The PIRECL is a diffusion based, point-type infrared gas detector that provides continuous monitoring of combustible hydrocarbon gas concentrations in the range of 0 to 100% LFL.

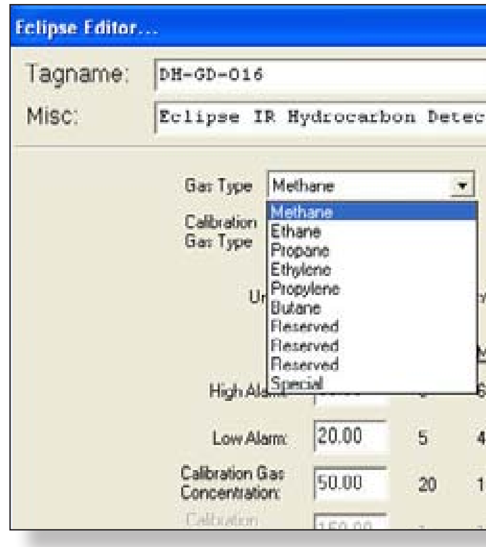
The Point IR Gas Detector has integral communication hardware and resides on the EQP communication network without the need for external interface modules.



The first step in configuring the PIRECL detector is to enter the tagname and any miscellaneous text in the appropriate fields at the top of the dialog box.

Gas Type

After entering the desired tagname and miscellaneous information, select the gas type the detector is being installed to primarily monitor from the pull-down list.

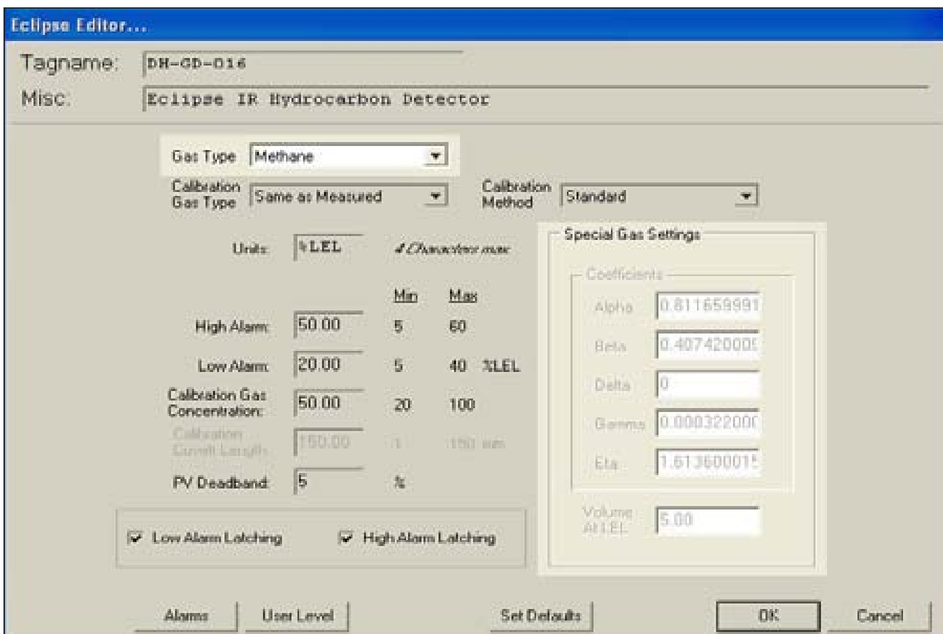


There are six common hydrocarbon gases that are available in the detectors memory.

There are three "Reserved" fields for future standard characterizations and one selection called "Special" which if selected allows a unique hydrocarbon gas to be defined and downloaded to the detector.

Special Gases

If "Special" is selected as the gas type, the "Special Gas Settings" area of the editor becomes active and allows for the entry of the gas coefficients necessary to define the gas.



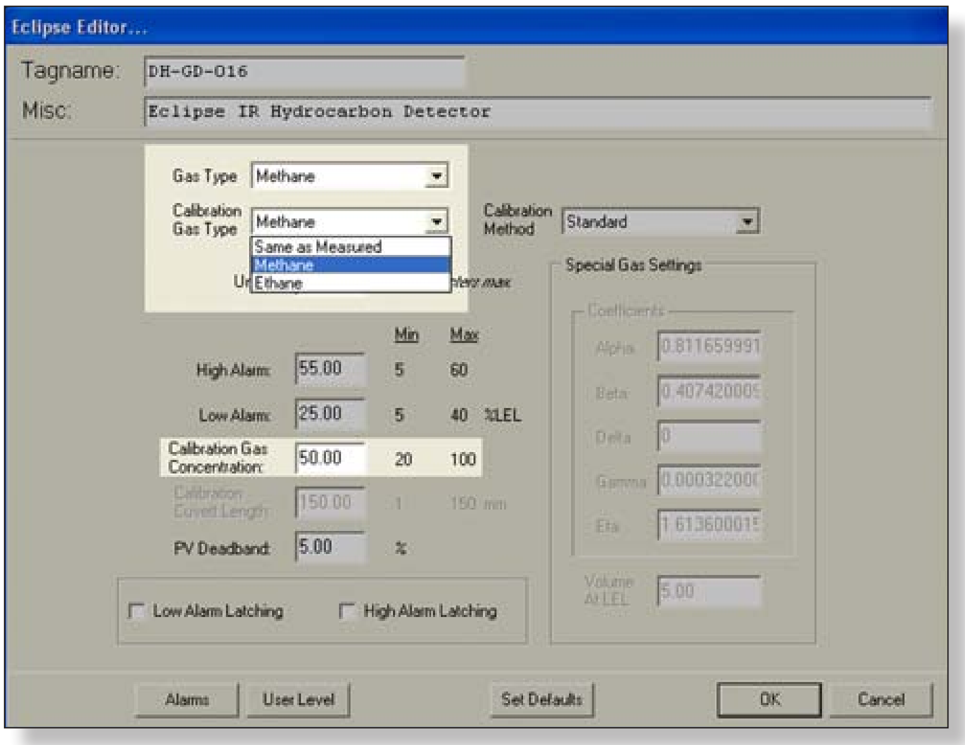
Once the gas type has been selected, a calibration gas type and method must be chosen.

Calibration Gas: Type and Concentration

PIRECL supports three selections for calibration gas type; Ethane, Methane and "same as measured".

Typically the calibration gas type is the same as the measured gas, however, in some installations it may be preferred to use a single type of calibration gas to calibrate a number of hydrocarbon detectors even though they are not all characterized to monitor the same gas in normal operation.

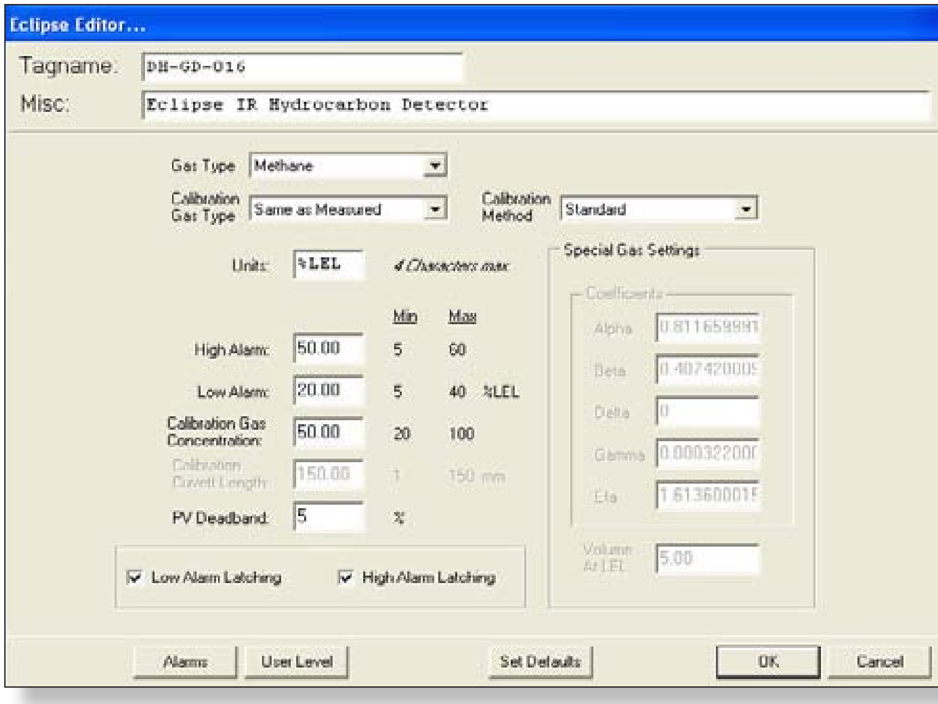
PIRECL supports the use of either Methane or Ethane as a calibration gas regardless of the "Gas Type" selected for the detector. Of course, the "measured gas" can also be selected as the calibration gas type.



Once the calibration gas type is set, the concentration must be set. The default value of 50% LFL can be changed between 20% LFL and 100% LFL to match the gas being used.

Alarm Setpoints

The High and Low gas alarm setpoints can be changed by entering new values in the fields provided on the dialog box.



The default values are 50% LFL for the High Alarm and 20% LFL for the Low Alarm.

The High alarm can be adjusted within a range of 5% LFL and 60% LFL.

The Low alarm can be adjusted within a range of 5% LFL and 40% LFL.

NOTE
The Low Alarm setpoint cannot be set to a higher value than the High Alarm setpoint.

PV Deadband

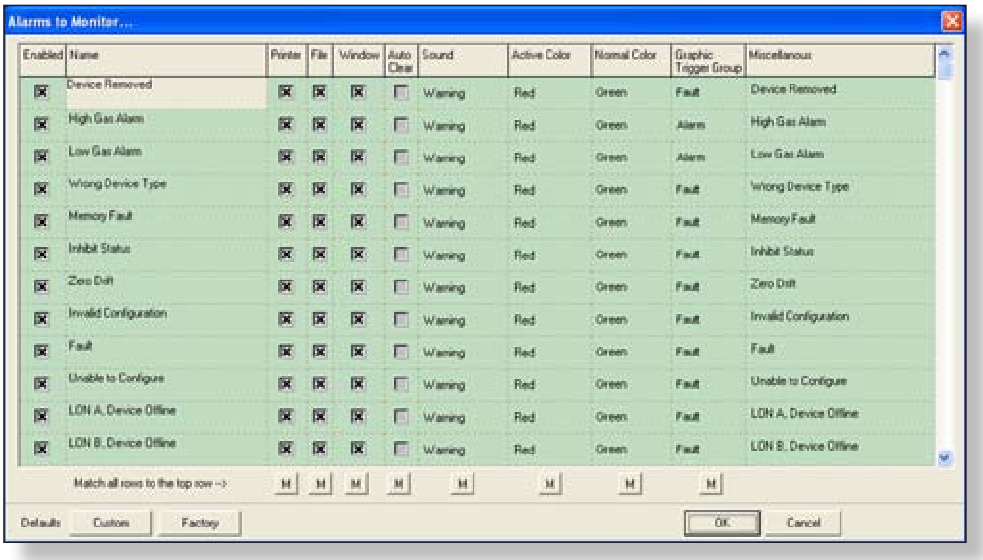
The "PV Deadband" field determines what percentage change in the Process Variable (PV) will prompt the unit to send an immediate update to the controller instead of waiting for its regularly scheduled message time. The default is 5%.

Common Settings

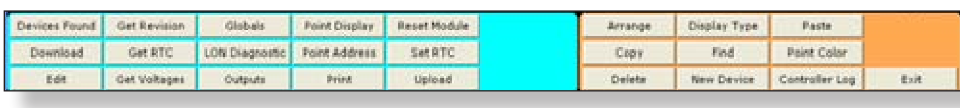
The bottom of the "PIRECL Editor..." dialog box contains buttons for setting all of the common settings on the device.

Alarms

Selecting this button opens the "Alarms to Monitor..." dialog box. This scrolling list displays the alarms and events related to the device that can be configured to be monitored by S³.



There are 25 alarms and events that relate to the status and diagnostics of the PIRECL.



Completing Configuration

When all parameters have been set, select the OK button to return to the LON configuration screen.

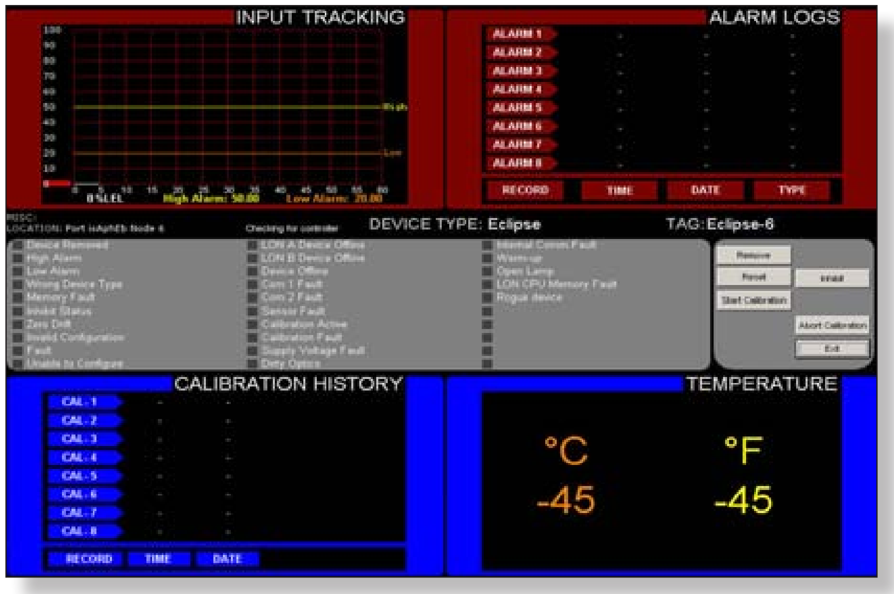
From the Command Bar download the new configuration to the controller, or configure other devices.

NOTE

*The Download command will send **all** configurations. Individual nodes cannot be downloaded as is the case with earlier generations of Eagle products (i.e. EAGLE2000 & Eagle Quantum).*

Point Display

The Eclipse has a custom “Point Display” that can be accessed from either the Point Display button on the Command Bar or from the Online Mode.



The point display provides a single window view of all available real-time data for the device.

Input Tracking

The upper left quadrant contains a 60 second analog track running from left to right, the newest data on the left margin. This area graphically displays the low and high alarm setpoints as horizontal lines crossing the graph area, yellow for high and orange for low. Digital readouts at the lower margin also display the PV and alarm setpoints.

Alarm History

The upper right quadrant displays the alarm history for the device. The last eight alarms with date and time are shown. This data is stored in the field device and retrieved over the LON for display.

Calibration History

The lower left quadrant displays the calibration history for the device. The last eight calibrations with date and time are shown. This data is stored in the field device and retrieved over the LON for display.

Temperature

The lower right quadrant displays the sensor package temperature.

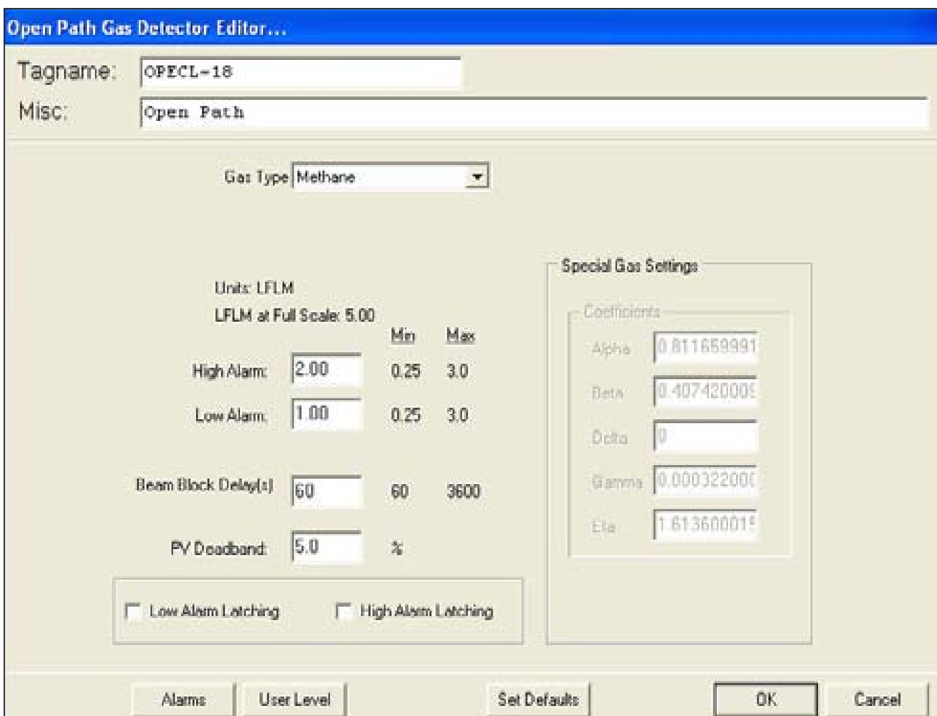
Status & Diagnostics

Crossing the whole point display in the center is an area displaying 24 discrete pieces of status and diagnostic information on the detector.

OPECL

Open Path Eclipse Gas Detector

NOTE
Controller Firmware 7 is required in order for the OPECL to function with the EQP controller.



The OPECL is an open path infrared gas detection system that provides continuous monitoring of combustible hydrocarbon gas concentrations in the range of 0 to 5 LFL-meters, over a distance of 5 to 120 meters.

The Open Path Eclipse Gas Detector has integral communication hardware and resides on the EQP communication network without the need for external interface modules.

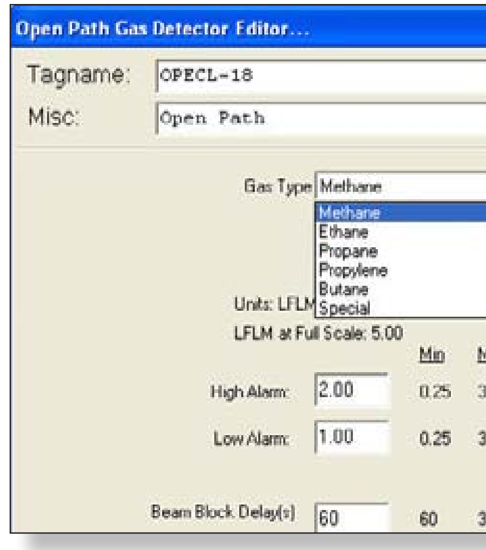
The first step in configuring the OPECL detector is to enter the tagname and any miscellaneous text in the appropriate fields at the top of the dialog box.

Gas Type

After entering the desired tagname and miscellaneous information, select the gas type the detector is being installed to primarily monitor from the pull-down list.

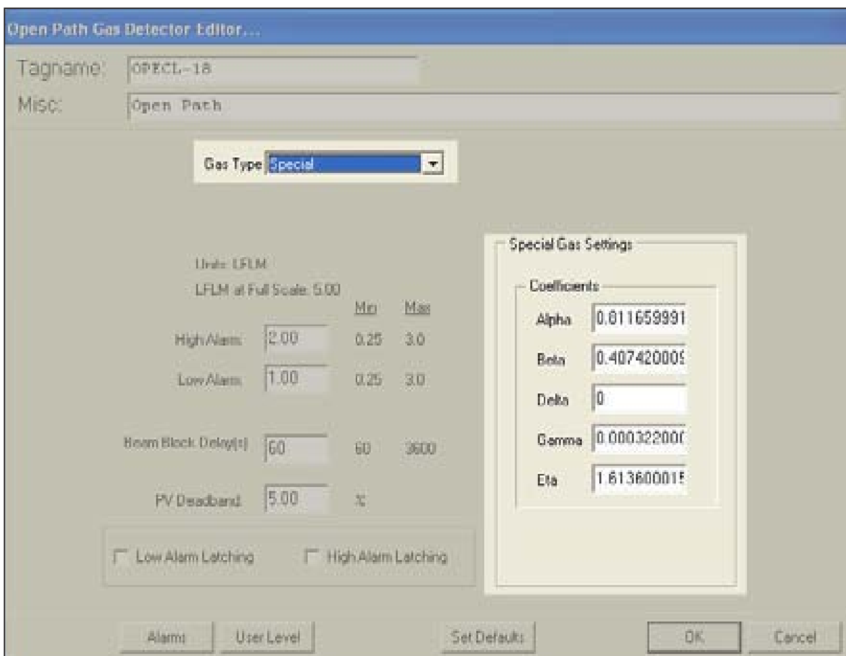
There are 5 common hydrocarbon gases that are available in the detectors memory.

There is one "Special" field which if selected allows a unique hydrocarbon gas to be defined and downloaded to the detector.



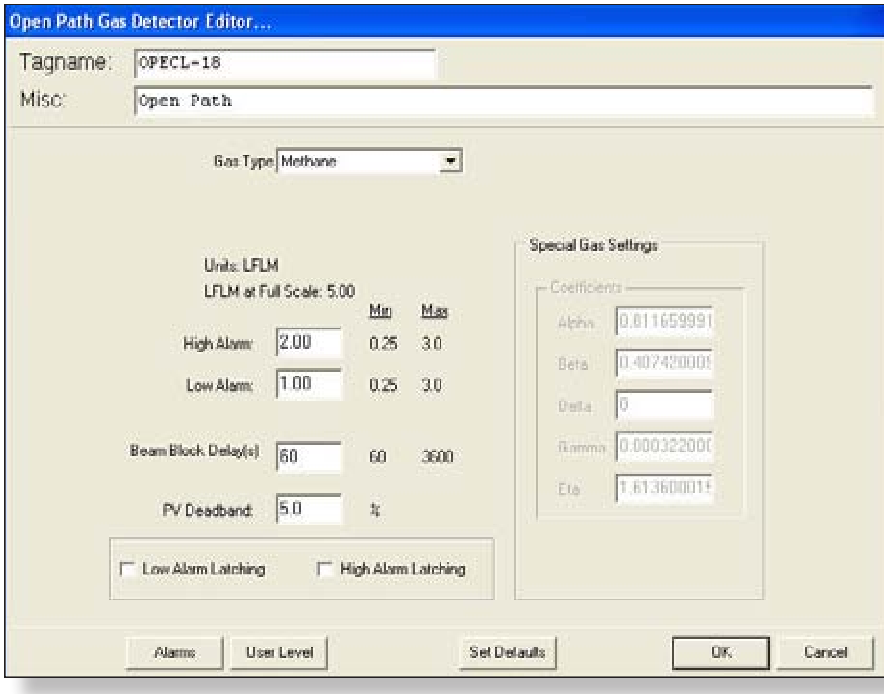
Special Gases

If "Special" is selected as the gas type, the "Special Gas Settings" area of the editor becomes active and allows for the entry of the gas coefficients necessary to define the gas.



Alarm Setpoints

The High and Low gas alarm setpoints can be changed by entering new values in the fields provided on the dialog box.



The default values are 2% LFLM for the High Alarm and 1% LFLM for the Low Alarm at a full scale of 5.00 LFLM. The High and Low alarms can be adjusted within a range of 0.25% LFL and 3% LFLM.

NOTE

The Low Alarm setpoint cannot be set to a higher value than the High Alarm setpoint.

PV Deadband

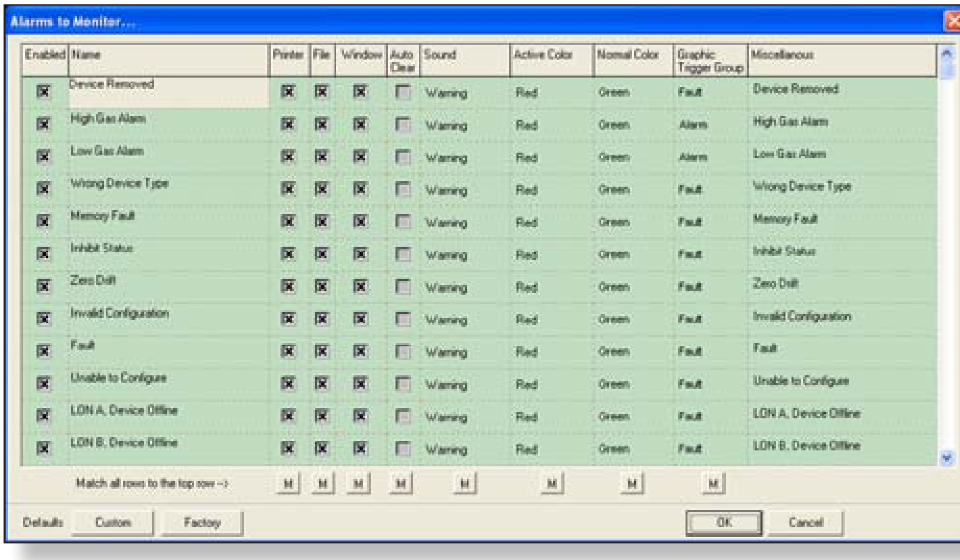
The "PV Deadband" field determines what percentage change in the Process Variable (PV) will prompt the unit to send an immediate update to the controller instead of waiting for its regularly scheduled message time. The default is 5%.

Common Settings

The bottom of the "OPECL Editor..." dialog box contains buttons for setting all of the common settings on the device.

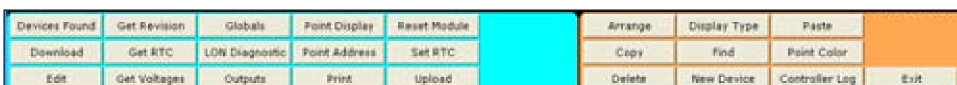
Alarms

Selecting this button opens the "Alarms to Monitor..." dialog box. This scrolling list displays the alarms and events related to the device that can be configured to be monitored by S^3.



Completing Configuration

When all parameters have been set, select the OK button to return to the LON configuration screen.

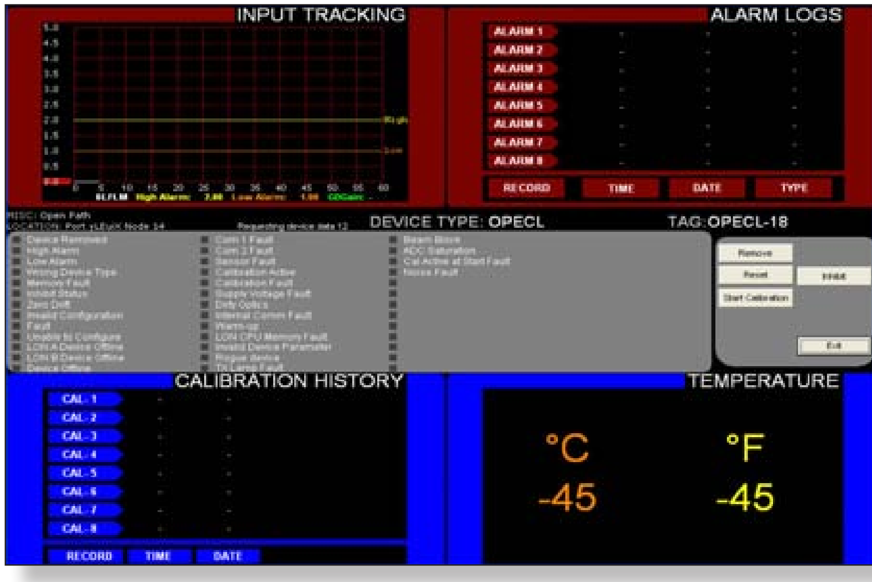


From the Command Bar Download the new configuration to the controller, or configure other devices.

NOTE
*The Download command will send **all** configurations. Individual nodes cannot be downloaded as is the case with earlier generations of Eagle products (i.e. EAGLE2000 & Eagle Quantum).*

Point Display

The Open Path Eclipse has a custom "Point Display" that can be accessed from either the Point Display button on the Command Bar or from the Online Mode.



The point display provides a single window view of all available real-time data for the device.

Input Tracking

The upper left quadrant contains a 60 second analog track running from left to right, the newest data on the left margin. This area graphically displays the low and high alarm setpoints as horizontal lines crossing the graph area, Yellow for High and Orange for Low. Digital readouts at the lower margin also display the PV and alarm setpoints.

Alarm History

The upper right quadrant displays the alarm history for the device. The last eight alarms with date and time are shown. This data is stored in the field device and retrieved over the LON for display.

Calibration History

The lower left quadrant displays the calibration history for the device. The last eight calibrations with date and time are shown. This data is stored in the field device and retrieved over the LON for display.

Temperature

The lower right quadrant displays the sensor package temperature.

Status & Diagnostics

Crossing the whole point display in the center is an area displaying 24 discrete pieces of status and diagnostic information on the detector.

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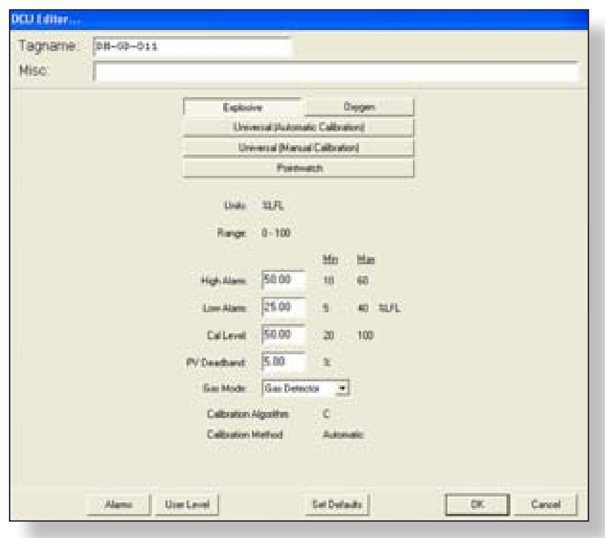
Digital Communication Unit (DCU)

For gas detectors and other analog inputs

DCU's are single channel analog input modules for the Eagle Quantum Premier LON. S³ provides four variations of software support for DCU's, as follows:



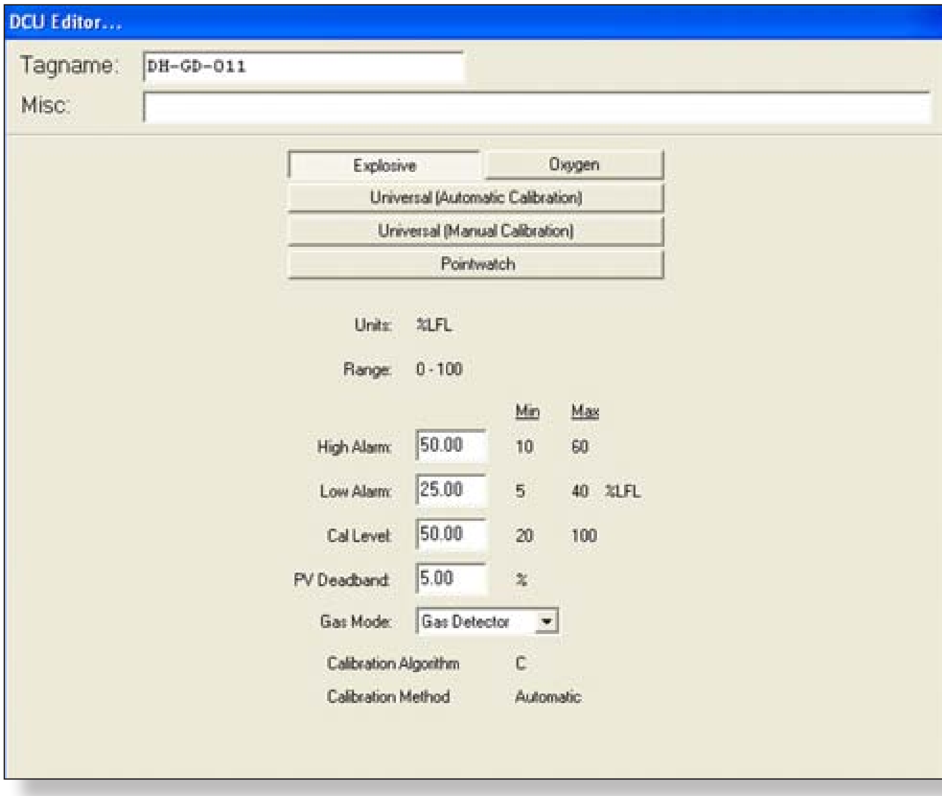
- **Explosive**
  For use with Det-Tronics catalytic bead combustible gas detectors.
- **Oxygen**
  For use with Det-Tronics electrochemical oxygen depletion cells.
- **Universal**
  Used with Det-Tronics line of electrochemical cells measuring a variety of toxic gasses.

  The "Universal" DCU can also be used with any standard 4-20ma* analog input and it for allows for the entry of user assigned units and ranges.
- **DCU PointWatch**
  Used with Detector Electronics "PointWatch" PIR9400 series infrared point hydrocarbon detectors.

NOTE

**The actual range digitized by the DCU is between 0 and 24 mA because some field devices utilize the over-range & under-range areas for diagnostic or other data.*

From a configuration standpoint, all DCU's have the same basic adjustable parameters; Alarm 1, Alarm 2, and Calibration gas concentration (Cal Level).



The DCU Universal also has a fields for entering the engineering units and unit range for the attached sensor.

The "PV Deadband" field determines what percentage change in the Process Variable (PV) will prompt the DCU to send an immediate update to the controller instead of waiting for its regularly scheduled message time. The default is 5%.

The "Gas Mode" selection has two choices; "Gas Detector" or "Other". The default is "Gas Detector" which limits the adjustable range of the low and high alarm setpoints to be consistent with regulatory requirements.

Common Settings

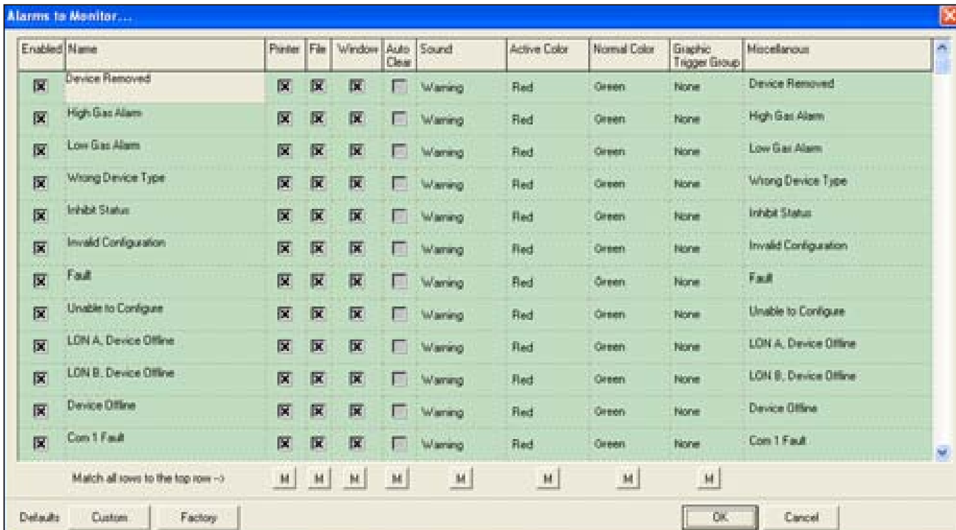
The bottom of the "DCU Editor..." dialog box contains buttons for setting all of the common settings on the device.

Alarms

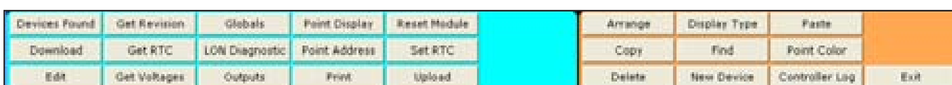
Selecting this button opens the “Alarms to Monitor...” dialog box. This scrolling list displays the alarms and events related to the device that can be configured to be monitored by S[3].

Completing Configuration

When all parameters have been set, select the OK button to return to the LON configuration screen.



From the Command Bar Download the new configuration to the controller, or configure other devices.

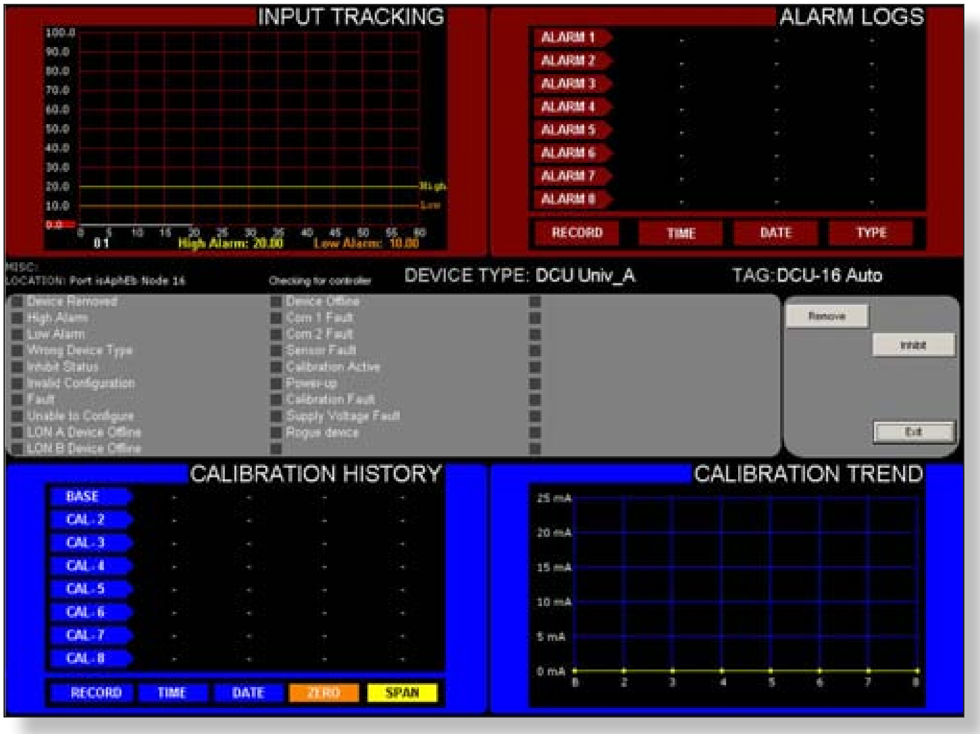


NOTE

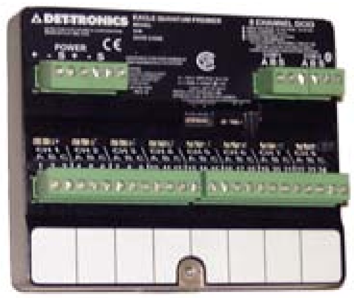
*The Download command will send **all** configurations. Individual nodes cannot be downloaded as is the case with earlier generations of Eagle products (i.e. EAGLE2000 & Eagle Quantum)*

Point Display

The DCU has a custom "Point Display" that can be accessed from either the Point Display button on the Command Bar or from the Online Mode. The point display provides a single window view of all available real-time data for the device.



NOTE
The above point display is accessed from the configuration area. The point display in the online monitoring mode does not include the LON A & B Counters.




Discrete IO (DCIO)/ Enhanced Discrete IO SIL (EDIO)

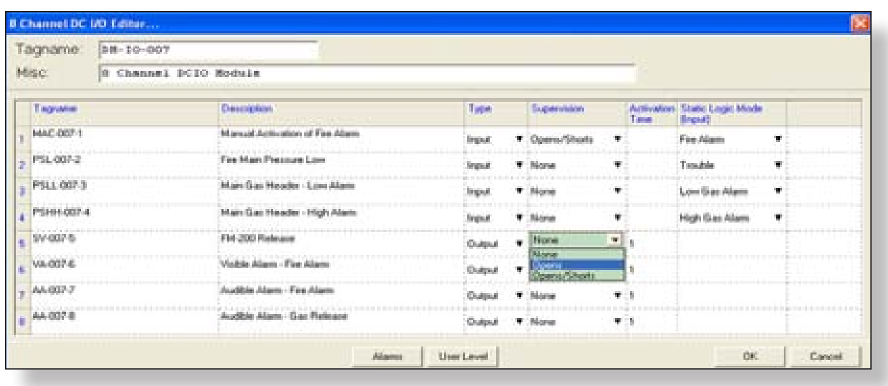
Flexible 8 channel input/output modules for 24 Vdc discrete field devices

DCIO's and the newer EDIO's are flexible 8 channel discrete (ON/OFF) input/output modules for the Eagle Quantum Premier LON.

From a configuration standpoint, each channel can be configured to be either an input or an output, supervised or unsupervised.

The DCIO or EDIO is configured by double-clicking on its selection rectangle on the LON schematic.

This opens the "8 Channel DC or ED I/O Editor..." which provides fields for the entry of any user changeable parameters.



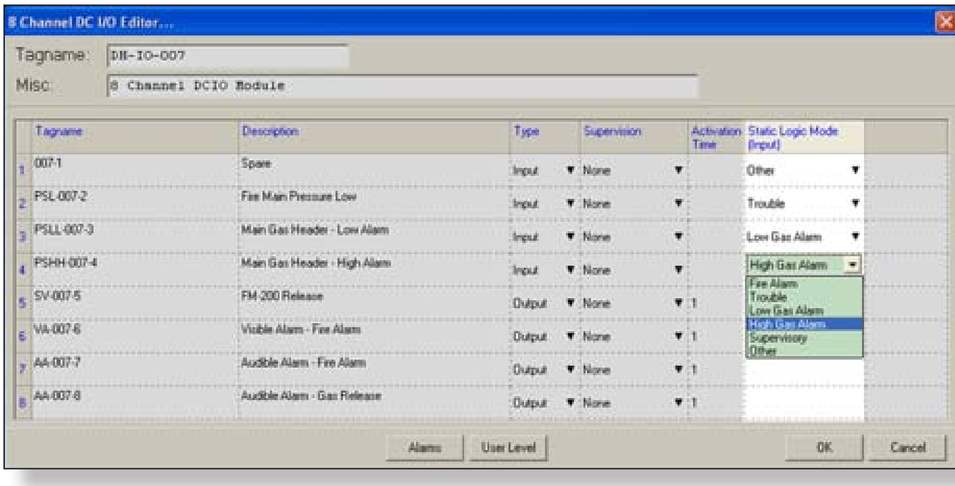
Being a multi-channel device there are multiple tagnames. At the top of the dialog box there is a device tagname that refers to the DCIO or EDIO module and is used with its global status and diagnostic events. Below this are channel tagnames for the status and diagnostics relating to the eight individual channels.

The example above is for a DCIO. Note that the configuration of the DCIO and EDIO are the same, however the EDIO also supports 2-wire smoke detectors and "Class-A" inputs and outputs so it has additional choices in the "Type" pull down menu.

It also provides buttons for accessing other configurable items such as alarm and event tracking for the unit and user levels settings.

Tagname

The tagname at the top of the dialog box refers to the entire module. Each of the eight channels also require a tagname and until one is entered, that channel is not available in the S^3 database for programming, monitoring or dynamic graphic purposes.



Type

Using a pull down menu each channel can be configured to be either an input or an output. When configured as an input the channels will work with “dry” contact closure type devices. When configured as an output the channels will power a 24 Vdc load.

Supervision

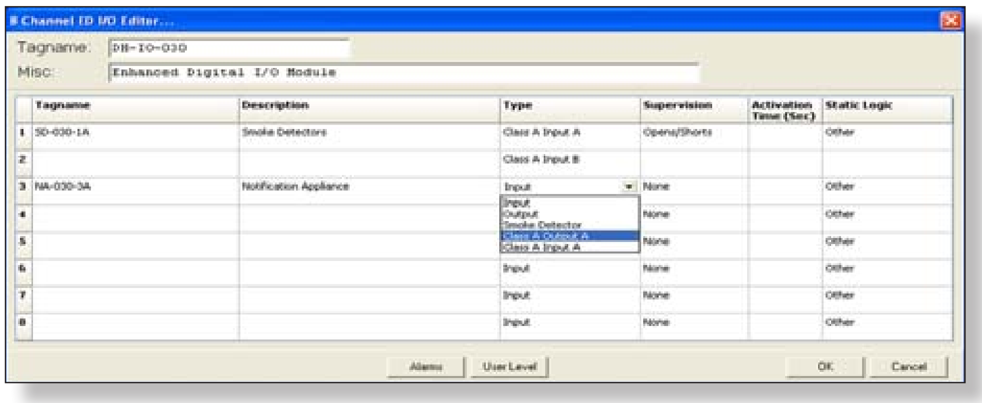
Via a pull down menu, the inputs and outputs may be software configured to supervise their attached device. Available supervision options include “None”, “Open Circuit” detection, “Open and Short” circuit detection.

Activation Time

If a channel is configured as an output, an “Activation Time” (in seconds) can be entered. This feature works in conjunction with the user program to simplify the logic and protect the field device. When being programmed in the controller, if this channel is selected as a “Timed” output then the value entered in the “Activation Time” field determines how long the output remains energized, even if the user logic keeps the output energized.

Static Logic Mode (Input)

If the channel is configured as an input, a pull down menu will allow any of five different "static logic" functions to be assigned, or, to select "Other" which is the default and has no automatic function.



The five static logic functions are:

Fire Alarm
Sets off the "Fire Alarm" LED and relay* on the EQP controller.

Trouble
Sets off the "Trouble" LED and relay* on the EQP controller.

Low Gas Alarm
Sets off the "Low Gas" LED and relay* on the EQP controller.

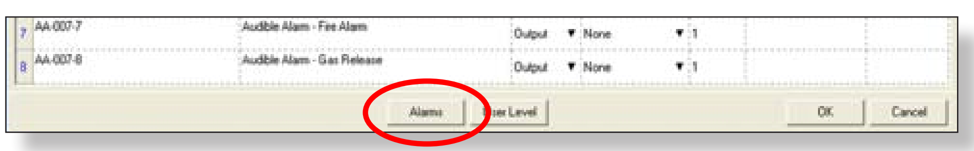
High Gas Alarm
Sets off the "High Gas" LED and relay* on the EQP controller.

Supervisory
Sets off the "Supr" LED and relay* on the EQP controller.

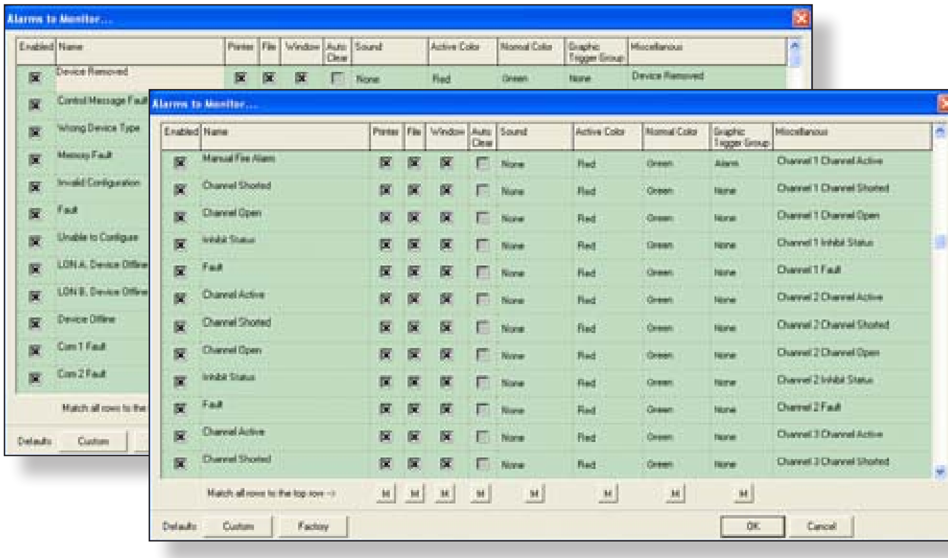
If a static logic function has been selected for an input, when the input is active that action will occur automatically without the need for any user programmed logic. If the input is to be used with user programmed logic only, select "Other".

Alarms

Selecting this button opens the "Alarms to Monitor..." dialog box. This scrolling list displays the alarms and events related to the device that can be configured to be monitored by S[3].

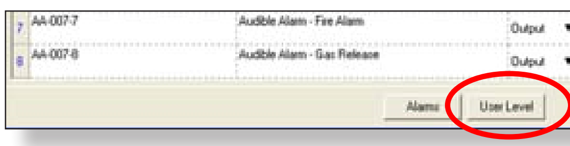


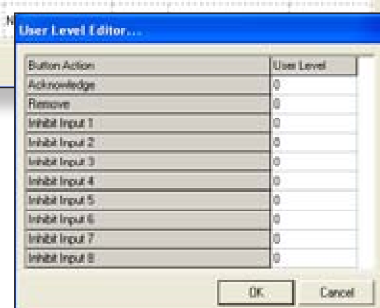
The first 13 alarms pertain to the status and diagnostic for the overall module.



After this come 5 alarms for each of the eight channels. This gives a total of 53 alarms and events that can be enabled and monitored by S^3 for this module type.

User Levels





The "User Level Editor..." provides a means for limiting access to the "Acknowledge", "Remove", and "Inhibit" buttons for the module which are accessible from the devices point display.

The default value is "0" and provides access to all users. Change these values to match a user account configuration and security needs.

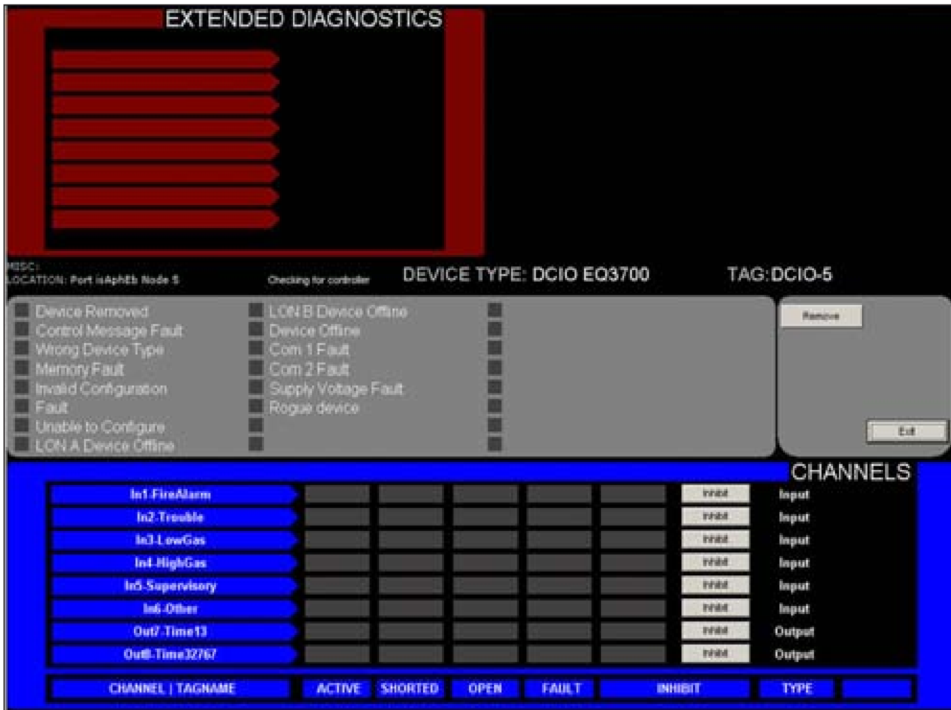
Completing Configuration

When all parameters have been set, select the OK button to return to the LON configuration screen.

From the Command Bar Download the new configuration to the controller, or configure other devices.

Point Display

The DCIO has a custom “Point Display” that can be accessed from either the Point Display button on the Command Bar or from the Online Mode.



The point display provides a single window view of all available real-time data for the device.

The bottom half of the point display provides a data display area and annunciator for all 8 inputs. It also provides for “Inhibiting” the channels.

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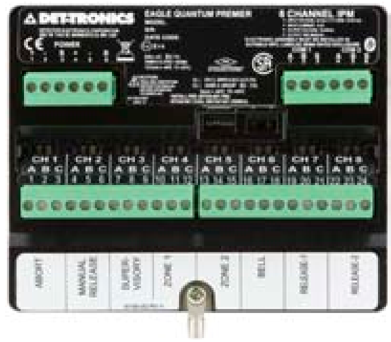


Intelligent Protection Module (IPM)

8 channel input/output module for 24 Vdc discrete field devices

The Intelligent Protection Module (IPM) is a part of the Det-Tronics Eagle Quantum Premier (EQP) System that is specially designed to monitor, supervise and control one fire suppression hazard.

The IPM is designed to provide continuous and automated local area fire protection, while monitoring system operation through continuous supervision of its Inputs/Outputs and Local Operating Network/Signalling Line Circuit (LON/SLC) connection to the EQP controller.

In addition the module contains a unique “embedded logic program” that if enabled during configuration allows the IPM to perform local area protection in a “back-up mode” without controller interaction. The IPM utilizes eight pre-configured Input/Output (I/O) channels to perform its monitoring, supervision and mitigation functions.

Inputs

On the input side, three supervised channels provide the following connections:

- Channel 1 for an Abort station
- Channel 2 for a Manual Release station
- Channel 3 for a Supervisory device.

Two additional input channels (zones) provide connections for “two-wire” conventional (non-relay based) smoke and heat detectors.

- Channel 4: Zone 1 detection circuit
- Channel 5: Zone 2 detection circuit

Outputs

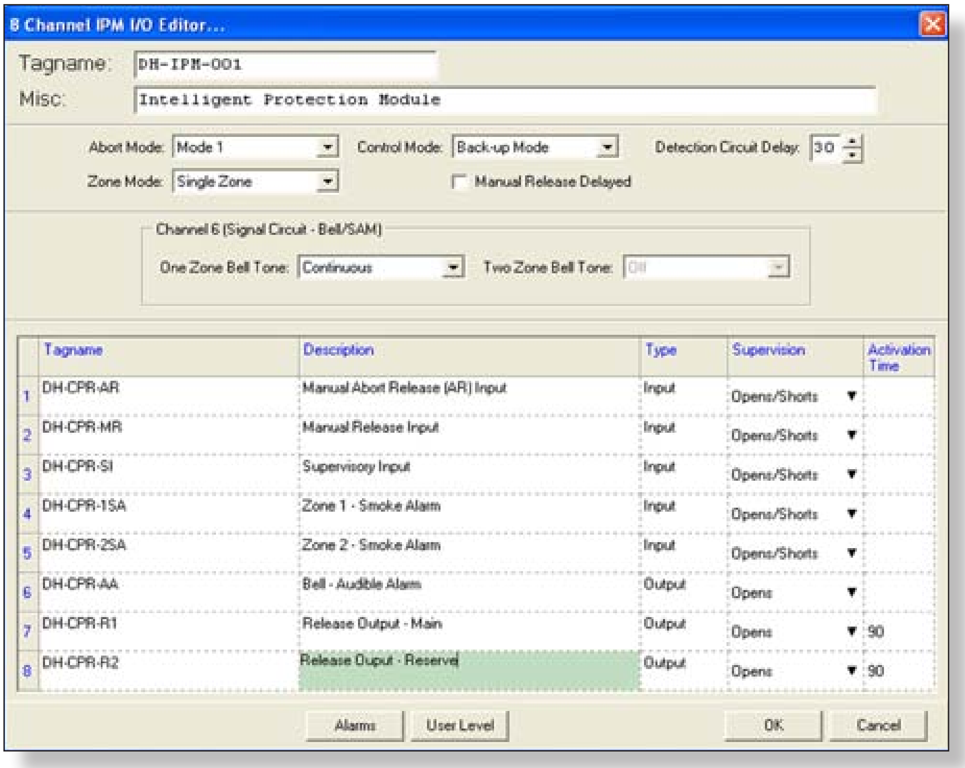
On the output side, three supervised outputs (1 signaling, 2 releasing) provide the following connections:

- Channel 6 for a notification appliance such as a bell, horn or lamp.
- Channels 7 & 8 for a main and reserve or secondary agent release.

Tagname

The tagname at the top of the dialog box refers to the entire module.

Each of the eight channels also require a tagname and until one is entered, that channel is not available in the S^3 database for programming, monitoring or dynamic graphic purposes.



Type

The channel type on the IPM is preset and not user changeable.

Supervision

Via a pull down menu, the inputs and outputs may be software configured to supervise their attached device. Available supervision options include “None”, “Open Circuit” detection, “Open and Short” circuit detection.

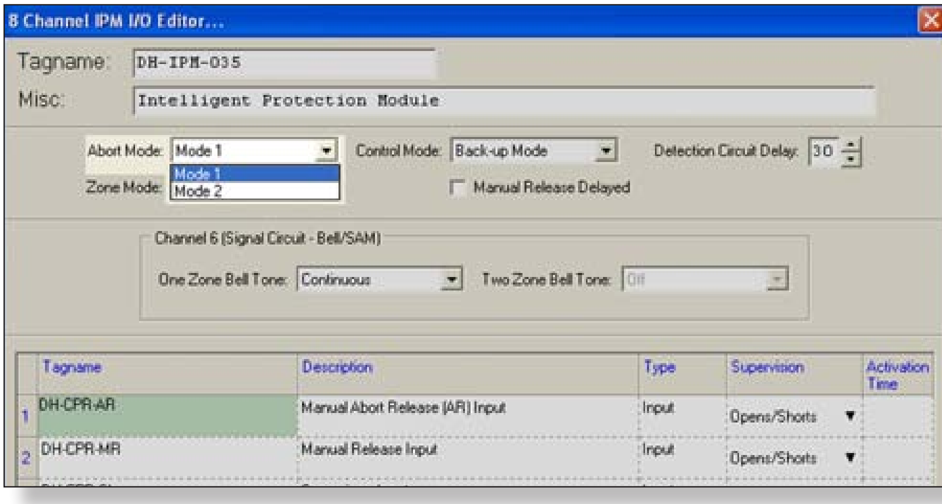
Activation Time

If a channel is configured as an output, an “Activation Time” (in seconds) can be entered. The value is in seconds. This feature works in conjunction with the user program to simplify the logic and protect the field device.

When being programmed in the controller, if this channel is selected as a “Timed” output then the value entered in the “Activation Time” field determines how long the output remains energized, even if the user logic keeps the output energized.

Abort Mode

The IPM abort input, Channel 1, is software configurable to use any one of three modes of operation. These three modes operate as follows:



Mode 1
Upon activation, the delay timer will count down to and hold at 10 seconds; upon release, timer will continue to count down to zero.

NOTE
Only this mode complies with UL 864.

Mode 2
Upon activation the delay timer will reset to its initial value and on release will continue counting down to zero.

IRI Mode

Functions similar to "Mode 1" except the abort will only function if activated prior to a second alarm.

Zone Modes

The IPM has two "zone modes"; Single or Cross Zoned. The backup logic will execute differently depending on the zone mode selected.

Alarm Condition

Single Zone Mode
Upon receipt of an alarm from an activated detector on IPM channel 4 or 5 OR activation of the manual station, channel 2:

Signal circuit devices are activated per the software selected signaling circuit configuration described earlier – Bell Circuit (SAM) Channel 6.

Programmed release time delay activated.

Release output(s) activated.

Operation of Abort: Discharge is aborted ONLY when alarm is from a detector, and abort is activated during programmed release time delay. Abort sequence is dependent on the abort mode selection as described earlier.

Cross Zoned Mode
Upon receipt of an alarm from one activated detector in one zone.

Signal circuit devices are activated per the software selected signaling circuit configuration, two zone mode, one zone in alarm, as described earlier – Bell Circuit (SAM) Channel 6.

Second Alarm Condition
Upon receipt of an alarm from a second activated detector in the other zone.

Signal circuit devices are activated per the software selected signaling circuit configuration, two zone mode, two zones in alarm.

Programmed release time delay activated.

Release output(s) activated.

Manual Alarm Condition – Cross Zoned Mode

Upon receipt of a manual alarm from Channel 2 the signal circuit devices are activated per the software selected signaling circuit configuration, two zone mode, two zones in alarm.

Programmed release time delay activated.

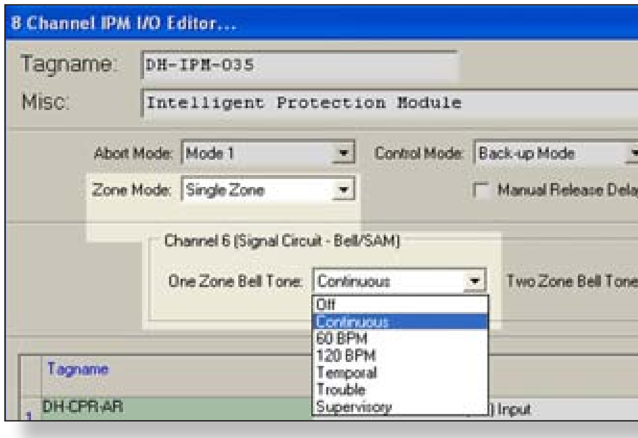
Release output(s) activated.

Signaling Circuit Operation – Bell Circuit (SAM), Channel 6

This output channel can be software selected to any standard EQP Signal Audible Module (SAM) configuration. In a cross-zoned mode, selections re limited as follows:

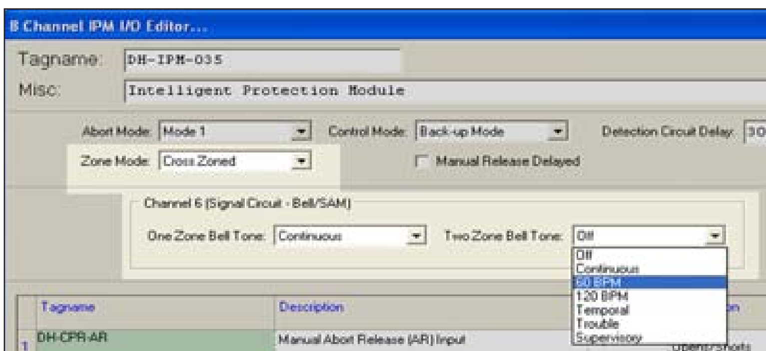
Single Zone Mode

The signaling circuit can be configured to any standard SAM selection.



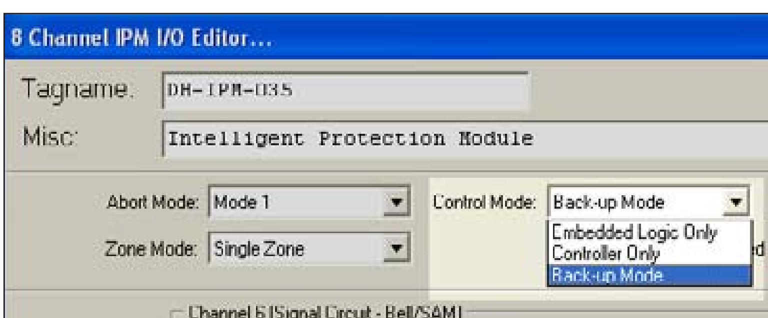
Signal Circuit in Cross Zoned Mode

In this mode the user must make two selections.
A standard SAM selection for when a single detection circuit is in alarm and another selection for when both detection circuits are in alarm.



Control Mode

The IPM has 3 operation modes, Controller Only, Back-up Mode, Embedded Only.



Controller Only
In this mode the I/O of the IPM will be controlled from the EQP Controller only and embedded logic is inactive.

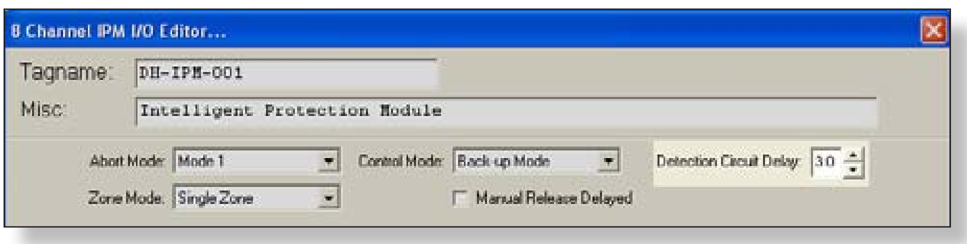
Back-up Mode
The default selection) the IPM I/O is normally controlled by the EQP Controller but utilizes embedded logic in accordance with the “Control Transfer Sequence Description” to control its I/O under certain circumstances.

Embedded Only
In this mode the IPM continuously operates from its embedded logic. The status of all IPM I/O is available to the EQP Controller but control of the outputs are not; however, controller and S^3 reset commands are accepted.

Detection Circuit Delay Selection

This selection provides a time delay that will apply to the two detector circuits, (Channels 4 and 5) as well as to the manual release signal (Channel 2).

There are seven time delay selections running between 0 and 60 seconds in ten second increments as shown below:

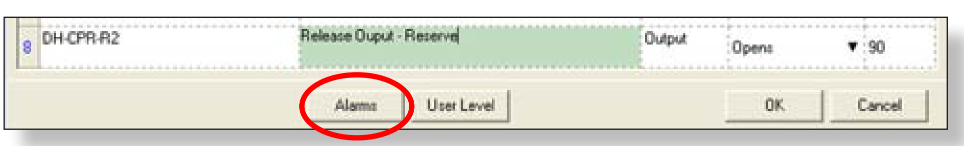


0	Second
10	Seconds
20	Seconds
30	Seconds
40	Seconds
50	Seconds
60	Seconds

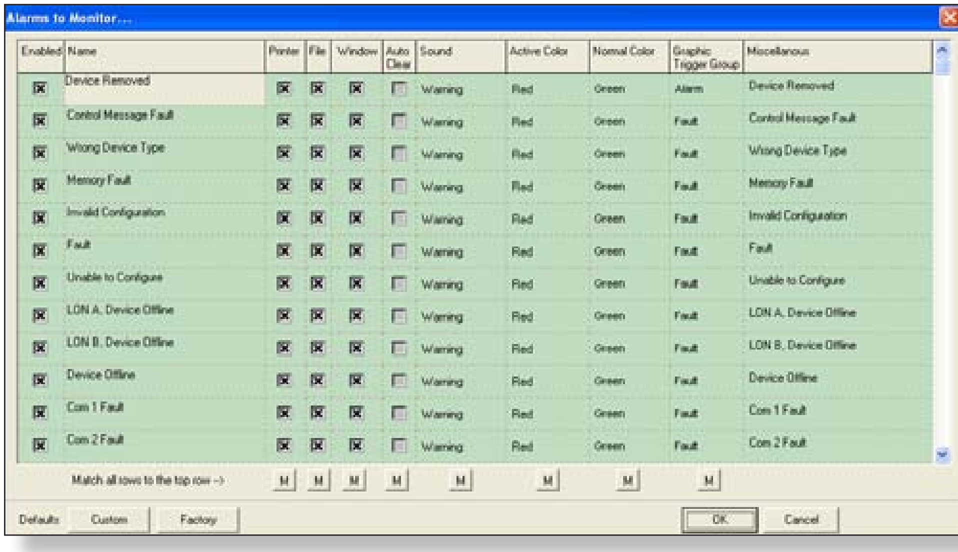
If the time delay selected is greater than 30 seconds, this time will apply only to the two detection circuits. The manual release time delay will be clamped at 30 seconds.

Alarms

Selecting this button opens the “Alarms to Monitor...” dialog box. This scrolling list displays the alarms and events related to the device that can be configured to be monitored by S^3.

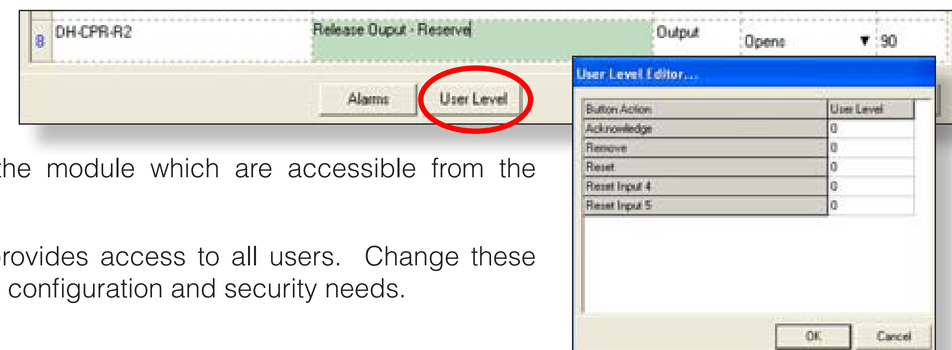


The first 14 alarms pertain to the status and diagnostic for the overall module.



After this come 4 alarms for each of the eight channels. This gives a total of 46 alarms and events that can be enabled and monitored by S^3 for this module type.

User Levels



The "User Level Editor..." provides a means for limiting access to the "Acknowledge", "Remove", Module and Channel "Reset" buttons for the module which are accessible from the devices point display.

The default value is "0" and provides access to all users. Change these values to match a user account configuration and security needs.

Point Display

The IPM has a custom "Point Display" that can be accessed from either the Point Display button on the Command Bar or from the Online Mode.

The point display provides a single window view of all available real-time data for the device. The bottom half of the point display provides a data display area and annunciator for all 8 inputs and outputs.

Reset Button

The reset button on the IPM point display will reset the module. Part of this reset includes automatically cycling power to the two smoke detector zones (channels 4 & 5) to reset these latching devices.

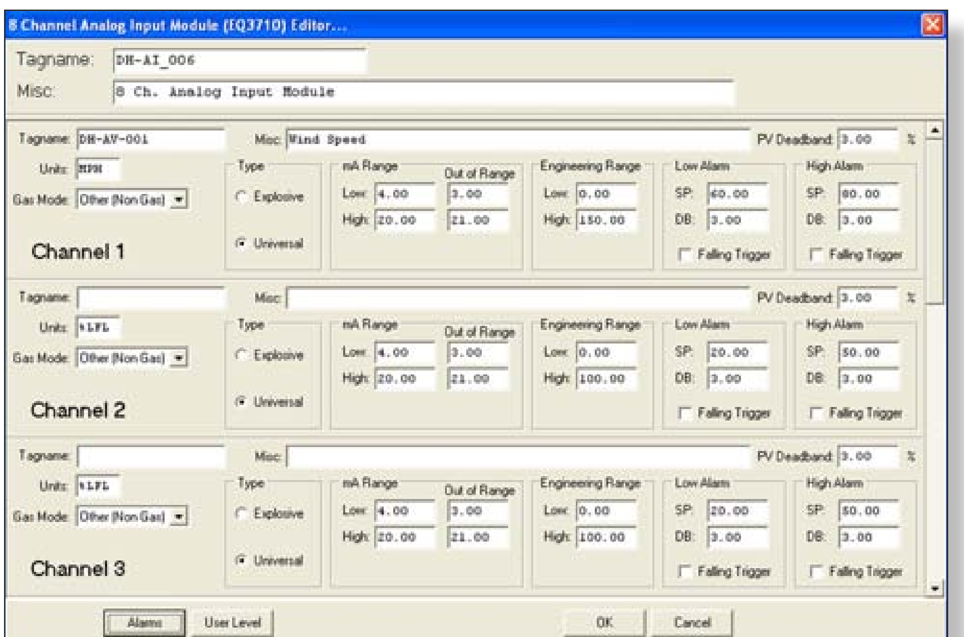
Analog Input Module (AIM)

8 channel input module for 0-24 ma signals

AIM's are multi-channel analog modules for the Eagle Quantum Premier LON. From a configuration standpoint, each channel can be configured to be either a gas detector or a generic analog input.

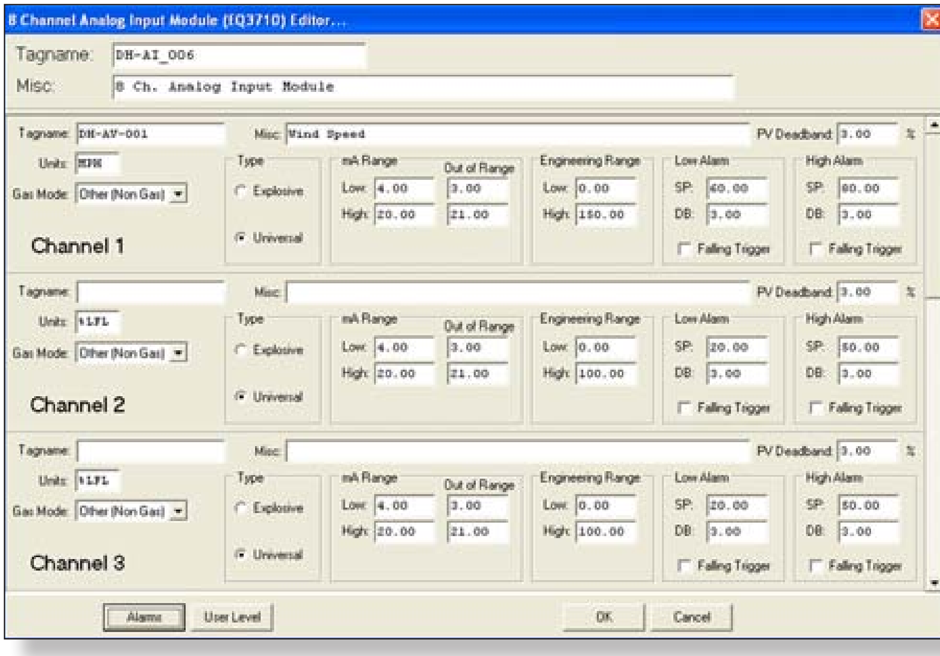
The AIM is configured by double-clicking on its selection rectangle on the LON schematic. This opens the "8 Channel AIM Editor..." which provides fields for the entry of any user changeable parameters.

Each of the eight inputs have their configuration information grouped by channel and a scroll bar is used to see them all.



Channel Configuration

Adjustable parameters include the engineering units and range, the analog signal (ma) range, alarm setpoints, deadband adjustments for both the module and the eight individual channels, and an alarm trigger direction selection per channel.



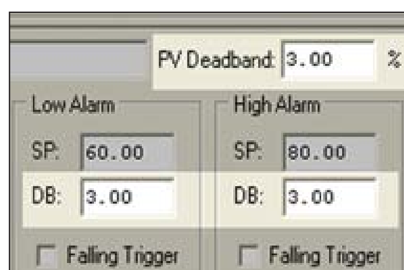
Being a multi-channel device there are multiple tagnames. At the top of the dialog box there is a device tagname that refers to the module as a whole and is used with its global status and diagnostic events.

Ranges

Below this are channel tagnames and configuration fields relating to the eight individual channels. Fields are provided to enter the engineering units and ranges for both the milliamp input and engineering range.

Deadband

A field is provided to enter the desired PV (Process Variable) Deadband. Normally all values are transmitted to the controller every five seconds; If the PV changes more than the entered percentage before the five second report time arrives, an immediate message is sent with the current values.



The Alarm Setpoint areas also provide a deadband (DB) field allowing the individual alarm hysteresis to be configured.

Alarm Trigger Direction

In addition, each alarm has a checkbox to choose a “Falling Trigger” alarm type.

When selected, the alarm will activate when the analog value drops below the setpoint as its value is falling.

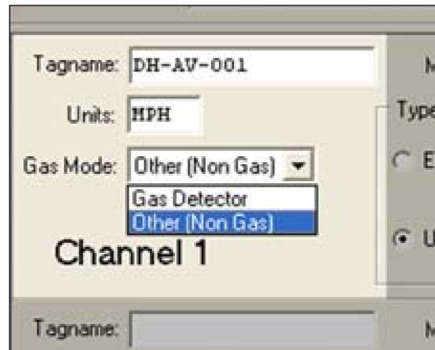
In the default configuration, a rising value activates the alarm as it passes through the setpoint.

Gas Mode

Each channel can be configured to be used with a “Gas Detector” or “Other (Non Gas)” instrument.

When a channel is configured as “Other” it can be used to monitor virtually any linear analog value from a wide range of temperature, pressure, level and other transmitter types.

When configured as a gas detector, regulatory requirements will preset alarm setpoint ranges and certain alarm characteristics.



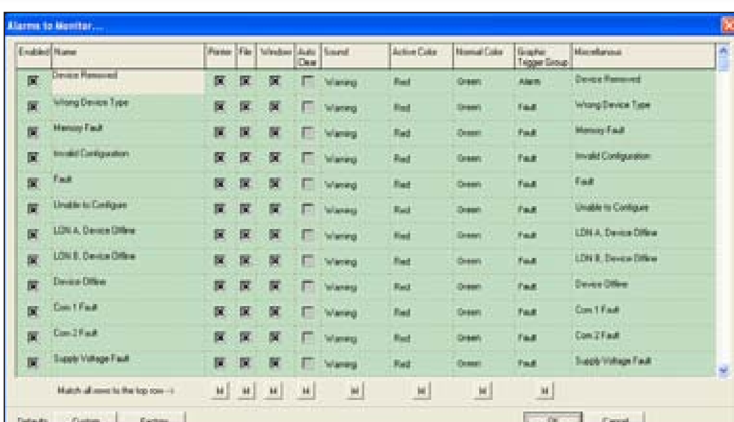
Common Settings

The bottom of the “AIM Editor...” dialog box contains buttons for setting all of the common settings on the device.

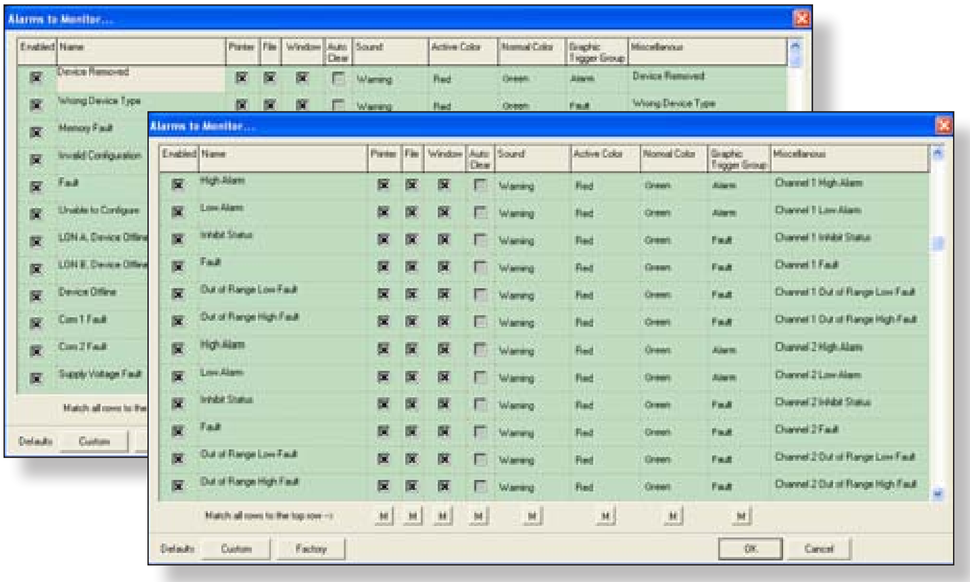
Alarms

Selecting this button opens the “Alarms to Monitor...” dialog box.

This scrolling list displays the alarms and events related to the device that can be configured to be monitored by S³.



The first 12 alarms pertain to the status and diagnostic for the overall module.

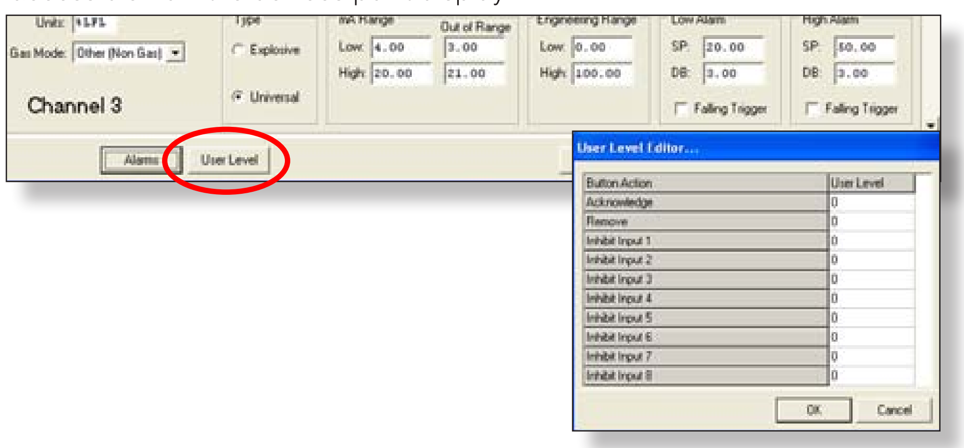


After this come 6 alarms for each of the eight channels. This gives a total of 60 alarms and events that can be enabled and monitored by S³ for this module type.

User Levels

The “User Level Editor...” provides a means for limiting access to the “Acknowledge”, “Remove”, and “Inhibit” buttons for the module which are accessible from the devices point display.

The default value is “0” and provides access to all users. Change these values to match a user account configuration and security needs.

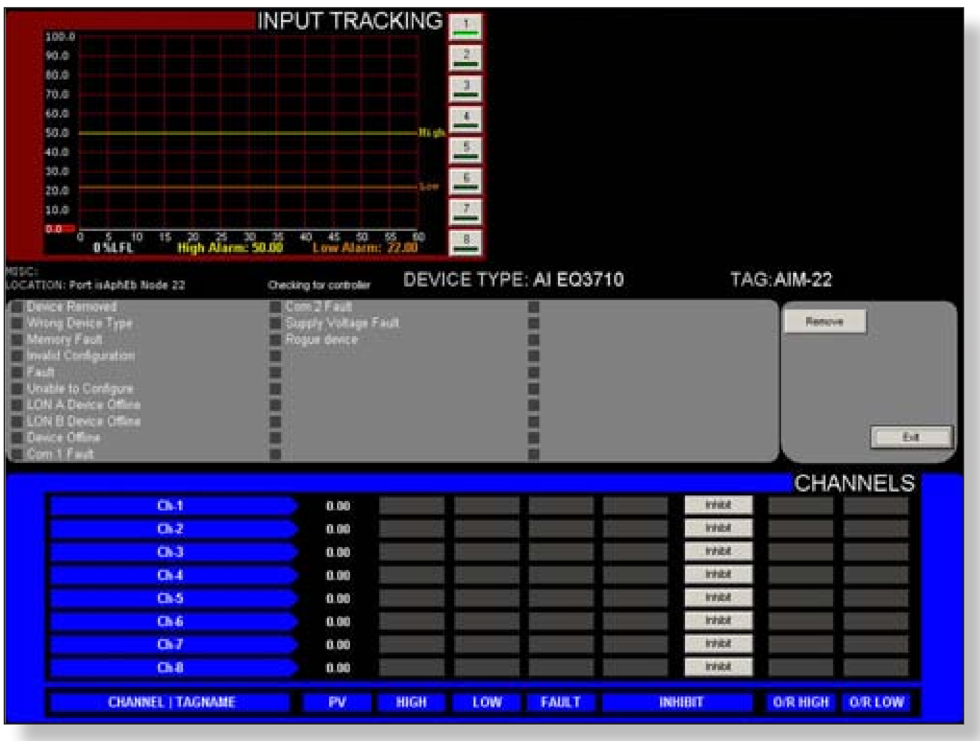


Completing Configuration

When all parameters have been set, select the OK button to return to the LON configuration screen. From the Command Bar Download the new configuration to the controller, or configure other devices.

Point Display

The AIM has a custom "Point Display" that can be accessed from either the Point Display button on the Command Bar or from the Online Mode. The point display provides a single window view of all available real-time data for the device.



Being a multichannel device, the AIM point display allows any of the 8 inputs to be connected to the analog input track in the top left quadrant by clicking on the desired channel button on the right of the graph.

The bottom half of the point display provides a data display area and annunciator for all 8 inputs. It also provides for "Inhibiting" the channels.

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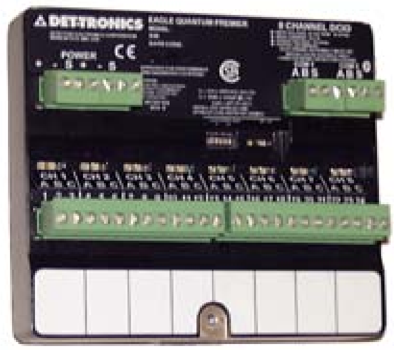


Relay Module

8 channel relay module

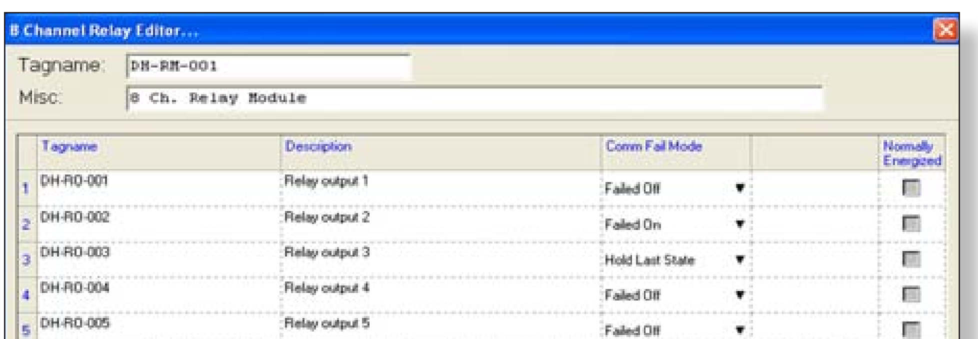
The 8 Channel Relay Module consists of eight individually configured output channels. Each output channel drives a Form-C relay.

NOTE
The relay module only supports equipment that operates on 24 Vdc/Vac (not to exceed 2amperes) at each output channel.

The relay module has two LEDs for the device and two LEDs for each channel.

On the device level, one green LED indicates power, while the other yellow LED indicates a LON communication fault.

For each channel, one red LED indicates channel activation and the other yellow LED indicates a fault condition.



Tagname

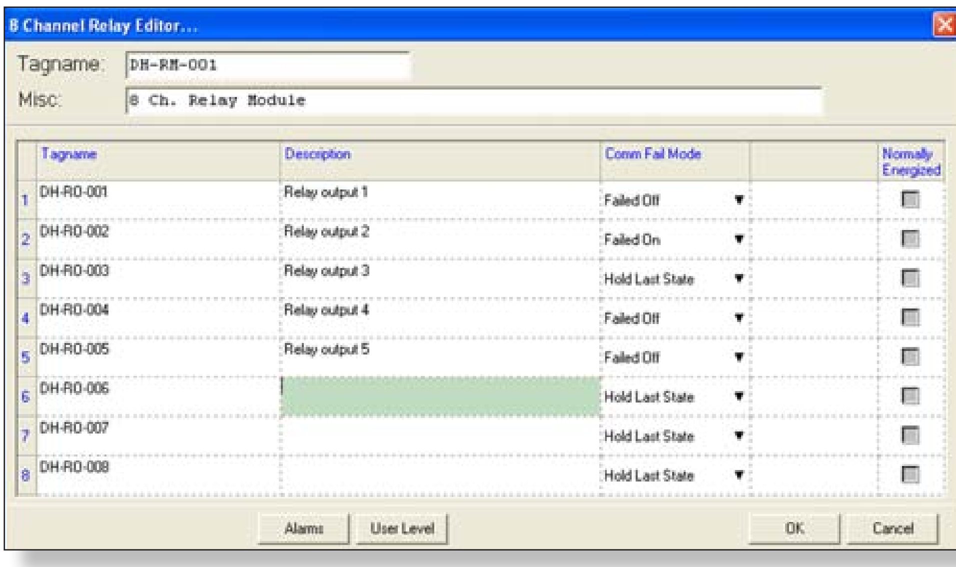
The tagname at the top of the dialog box refers to the entire module. Each of the eight channels also require a tagname and until one is entered, that channel is not available in the S^3 database for programming, monitoring or dynamic graphic purposes.

Description

This field provides an area to describe the function of each relay. Adding this optional information can make troubleshooting and startup easier.

Com Fail Mode

Each of the 8 relays can be individually configured to respond in one of three ways in the unlikely event of a complete loss of communications with the EQP controller.



The three selections are as follows:

Failed Off: Relay coil de-energizes

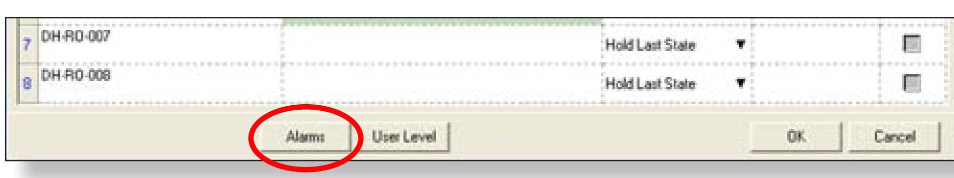
Failed On: Relay coil energizes

Hold Last State: Relay coil stays energized or de-energized as per its last valid command from the EQP controller.

Alarms

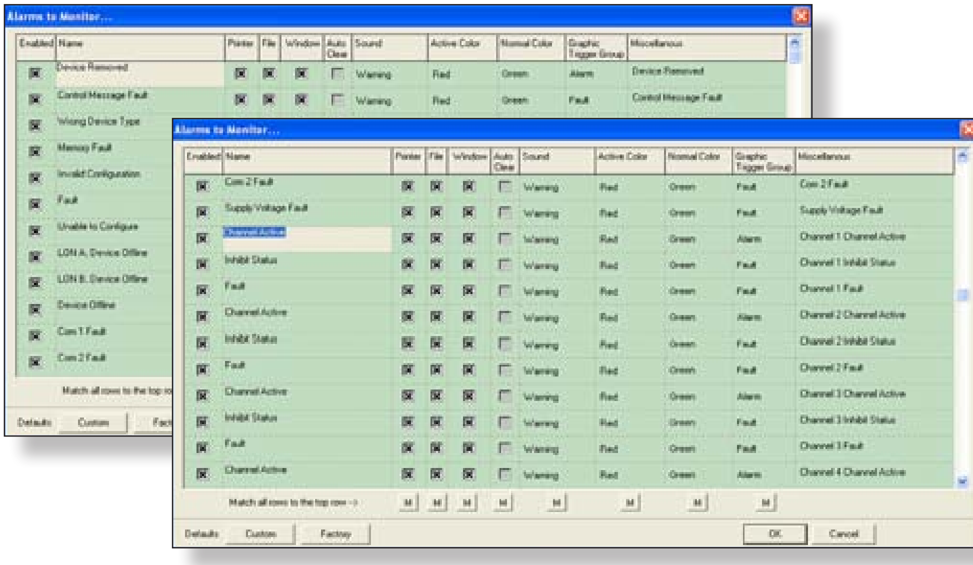
Selecting this button opens the “Alarms to Monitor...” dialog box.

This scrolling list displays the alarms and events related to the device that can be configured to be monitored by S^3.



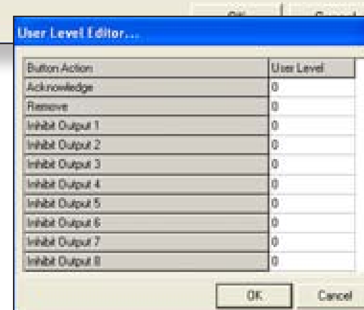
The first 13 alarms pertain to the status and diagnostic for the overall module.

After this come 3 alarms for each of the eight channels. This gives a total of 37 alarms and events that can be enabled and monitored by S^3 for this module type.



User Levels

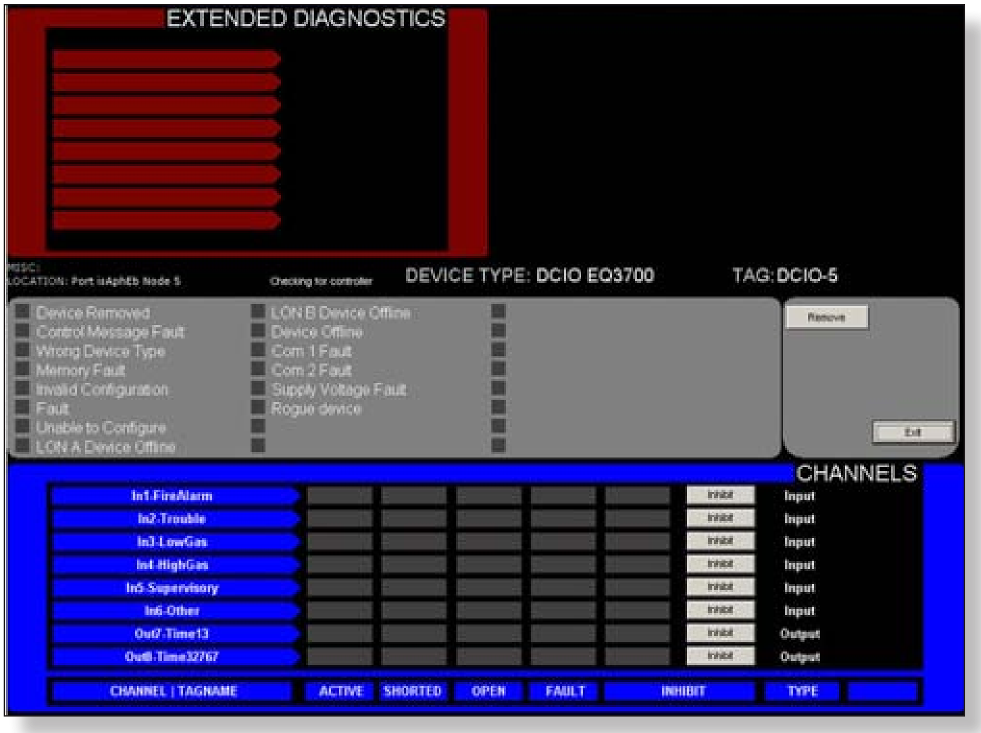
The “User Level Editor...” provides a means for limiting access to the “Acknowledge”, “Remove”, and “Inhibit” buttons for the module which are accessible from the devices point display.



The default value is “0” and provides access to all users. Change these values to match a user account configuration and security needs.

Point Display

The IPM has a custom “Point Display” that can be accessed from either the Point Display button on the Command Bar or from the Online Mode.



The point display provides a single window view of all available real-time data for the device. The bottom half of the point display provides a data display area and annunciator for all 8 relay outputs.

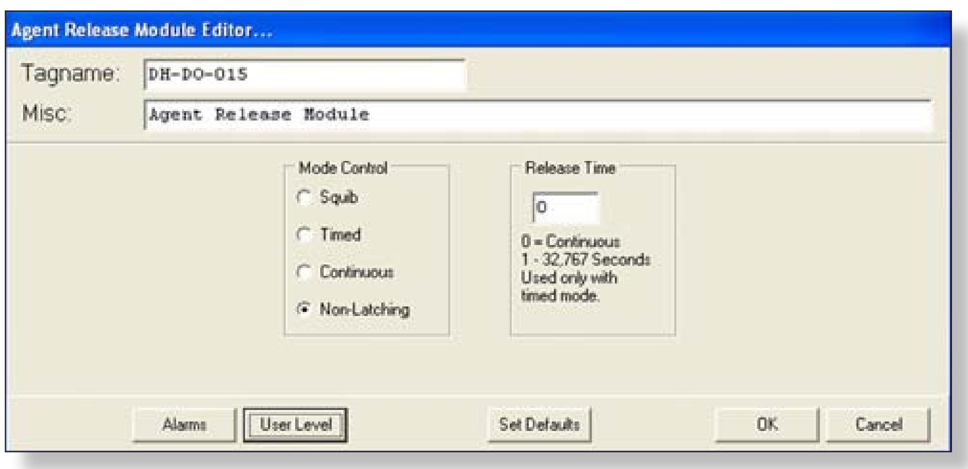
Inhibit Buttons

Each relay output has an inhibit button that can be used to disable that channel from responding to commands from the user logic program in the EQP controller.

Agent Release Module (ARM)

The EQ2500ARM Series Agent Release Module (ARM) is located on the LON/SLC and provides agent release capability for the Eagle Quantum Premier system. The device is controlled by programmable logic in the Controller and can be used for “Single,” “Cross” or “Counting” Zone Style initiation.

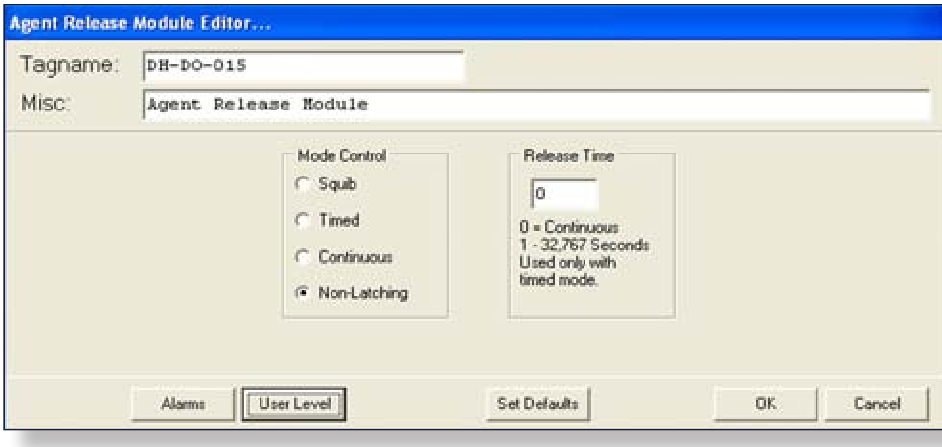
Optional time delay, abort and manual release sequences allow the output to be programmed for use in unique applications. The Agent Release Module can monitor and control two output devices (rated for 24 Vdc), which are energized together.



The release circuits are compatible with a variety of solenoid or initiator (squib) based suppression systems. The release circuit is supervised for open circuit conditions. If a trouble condition occurs (open circuit or solenoid supply voltage less than 19 volts), it will be indicated at the controller.

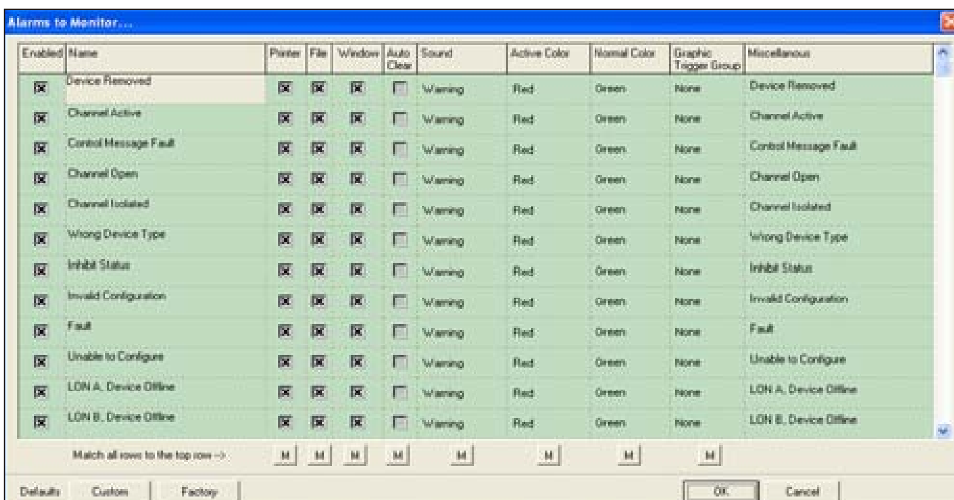
Mode Control

ARM outputs can be latching or non-latching. Non-latching follows the condition of the user programmed logic. Latching requires a reset of the controller.



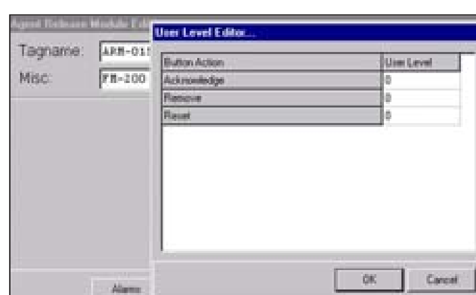
Alarms

Selecting this button opens the “Alarms to Monitor...” dialog box. This scrolling list displays the alarms and events related to the device that can be configured to be monitored by S^3.



User Level

Allows user levels to be set on a variety of device features for security. Assign an appropriate user level to each item in the list. For details in user level settings refer to Section 10.

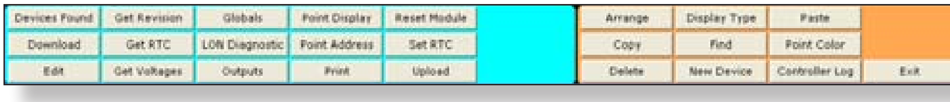


OK

Closes the “Agent Release Module Editor...” dialog box when finished.

Point Display

The ARM has a custom “Point Display” that can be accessed from either the Point Display button on the Command Bar or from the Online Mode.



The point display provides a single window view of all available real-time data for the device.

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IDC

2 channel Initiating Device Circuit (IDC) module

The EQ22xxIDC Series Initiating Device Circuit (IDC) module is located on the LON/SLC and provides supervised input capability for the Eagle Quantum Premier system. There are three 2 Channel EQ22xxIDC Series Initiating Device Circuit (IDC) modules available: The EQ22xxIDC allows discrete inputs from smoke/heat detectors, manual call stations or other contact devices.

It accepts two dry contact inputs for use with devices such as relays, pushbuttons, key switches, etc. The IDC supports ANSI/NFPA 72 Class B, Style B supervised input circuits. Each circuit requires its own end of line (EOL) resistor for monitoring circuit continuity.

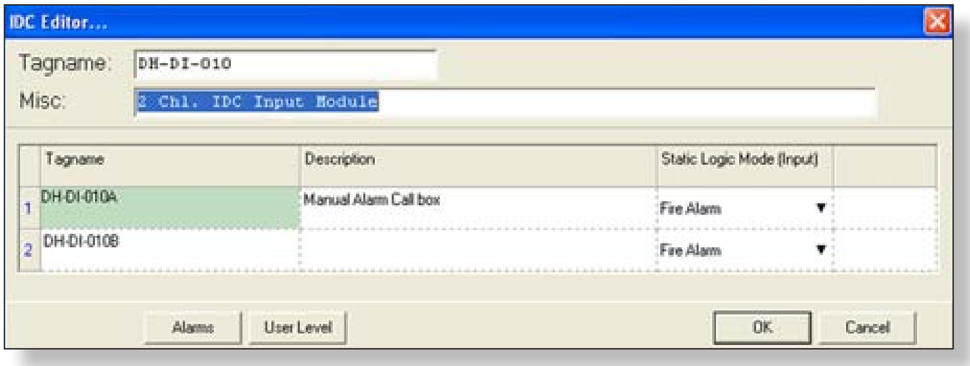
The EQ22xxIDCGF Initiating Device Circuit Ground Fault Monitor (IDCGF) responds to the presence of a ground fault within the power circuitry of the system. It provides an unsupervised dry contact input and ground fault monitoring circuitry for indicating a power supply trouble condition. It is intended for use with a third party power supply.

The EQ22xxIDCSC Initiating Device Circuit Short Circuit (IDCSC) is similar to the IDC, but supports ANSI/NFPA 72 Class B Style C supervised input circuits. (Not FM Approved).

Tagname

The tagname at the top of the dialog box refers to the entire module.

Each of the two input channels also require a tagname and until one is entered, that channel is not available in the S^3 database for programming, monitoring or dynamic graphic purposes.



Configuration

Enter the Tagname for the module, a miscellaneous description and then the tagnames and descriptions for the two input channels.

Until tagnames are assigned to the two input channels they are not available in the S^3 database for programming in the user logic.

Static Logic Mode (Input)

Each of the two inputs has a pull down menu that allows one of five different "static logic" functions to be assigned, or, to select "Other" which is the default and has no automatic function.

The five static logic functions are:

Fire Alarm
Sets off the "Fire Alarm" LED and relay* on the EQP controller.

Trouble
Sets off the "Trouble" LED and relay* on the EQP controller.

Low Gas Alarm
Sets off the "Low Gas" LED and relay* on the EQP controller.

High Gas Alarm
Sets off the "High Gas" LED and relay* on the EQP controller.

Supervisory
Sets off the "Supr" LED and relay* on the EQP controller.

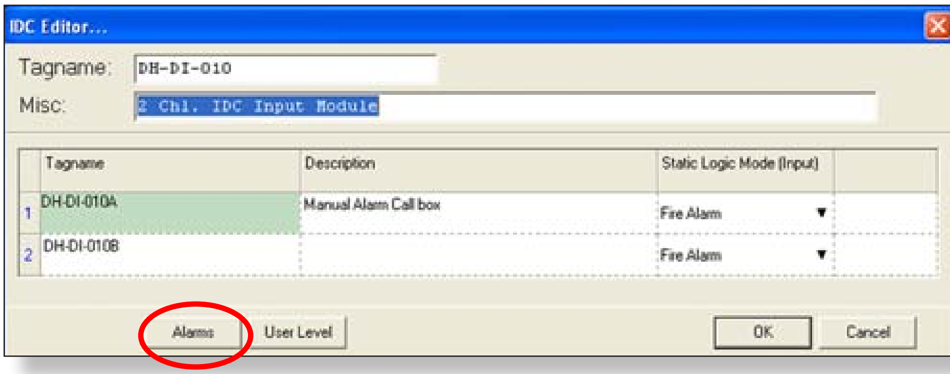
If a static logic function has been selected for an input, when the input is active that action will occur automatically without the need for any user programmed logic.

If the input is to be used with user programmed logic only, select "Other".

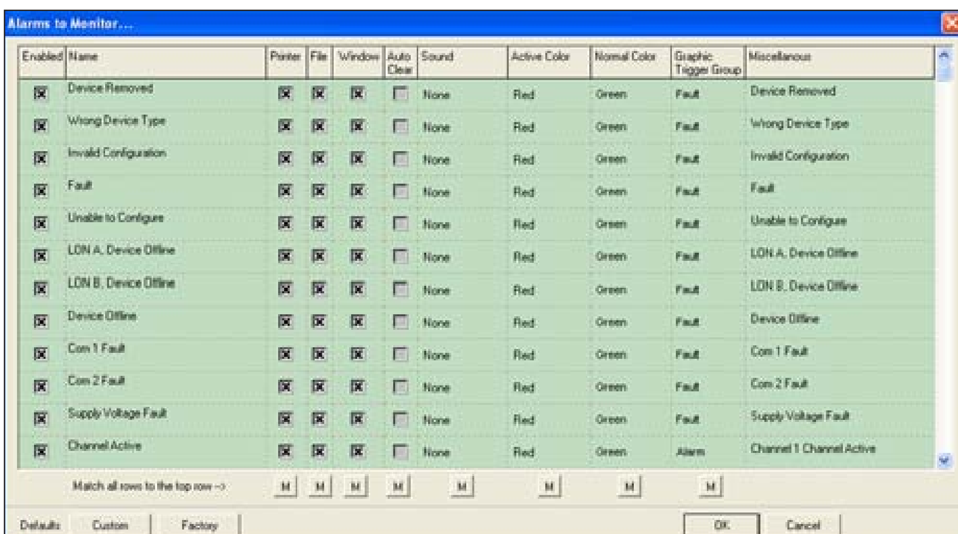
Alarms

Selecting this button opens the "Alarms to Monitor..." dialog box.

This scrolling list displays the alarms and events related to the device that can be configured to be monitored by S^3.

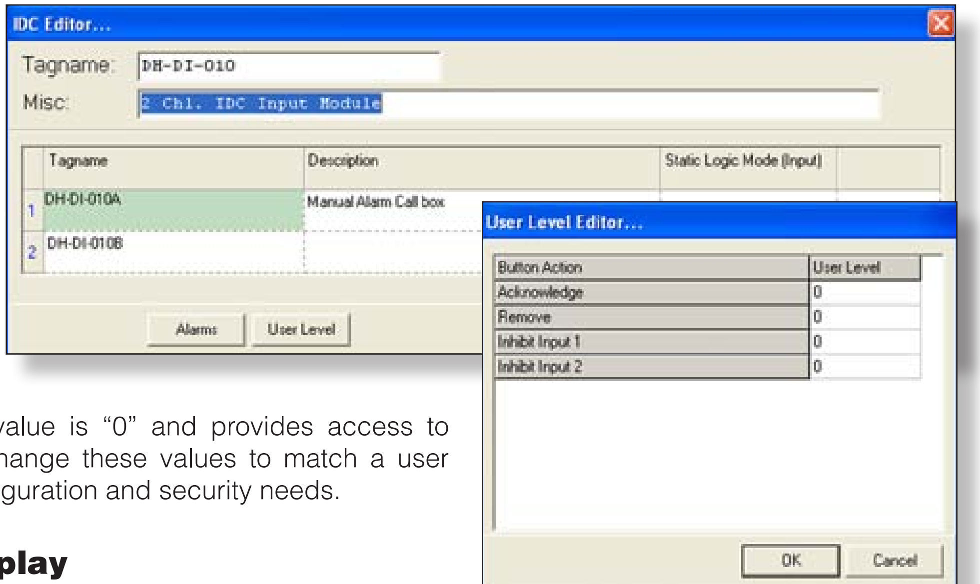


The first 11 alarms pertain to the status and diagnostic for the overall module. After this come 3 alarms for each of the eight channels, resulting in a total of 17 alarms and events that can be enabled and monitored by S^3 for this module type.



User Levels

The "User Level Editor..." provides a means for limiting access to the "Acknowledge", "Remove", and "Inhibit" buttons for the module which are accessible from the devices point display.

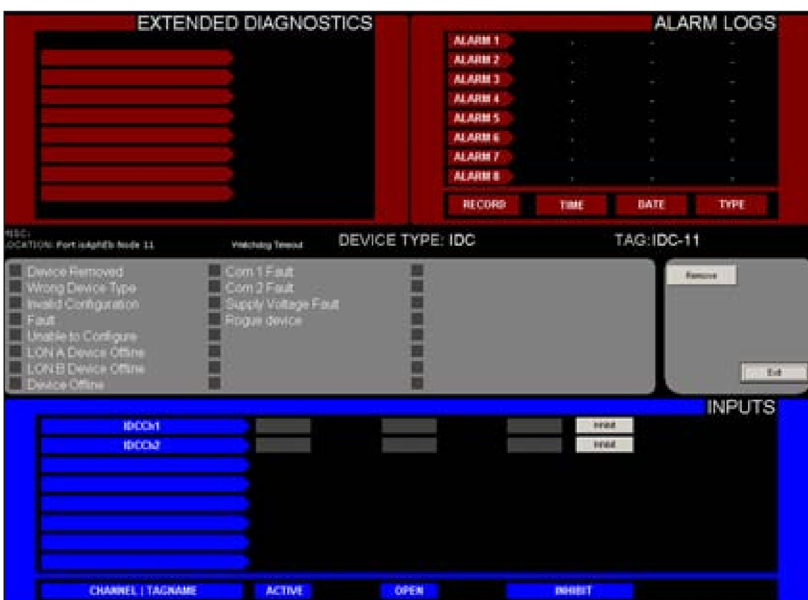


The default value is "0" and provides access to all users. Change these values to match a user account configuration and security needs.

Point Display

The IDC has a custom "Point Display" that can be accessed from either the Point Display button on the Command Bar or from the Online Mode.

The point display provides a single window view of all available real-time data for the device. The top right quadrant of the display shows the last eight alarms (channel activation) with their date and time data.



The bottom half of the point display provides a data display area and annunciator for the two input channels.

Inhibit Buttons

Each input has an inhibit button that can be used to disable that channels status from reaching the user logic program in the EQP controller.

Signal Audible Module (SAM)

The EQ2500SAM Signal Audible Module is located on the LON/SLC and provides NFPA-72 compliant Notification Appliance Circuit (NAC) control capability to the Eagle Quantum Premier system.

The Signal Audible Module provides two indicating circuits for controlling UL Listed 24 Vdc polarized audible/visual indicating appliances.

The device is located on the LON and is controlled by programmable logic in the Controller.

Each output circuit is independently programmable to allow notification of separate events.

Each output can be individually activated for any one of the following pre-defined outputs:

1. Continuous
2. 60 beats per minute
3. 120 beats per minute
4. Temporal pattern.

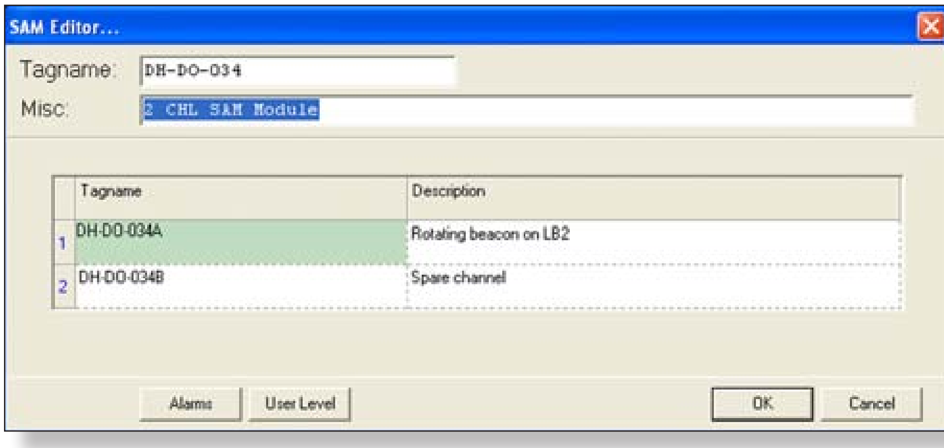
Device outputs operate in the reverse polarity manner when activated. Each output is rated at 2 amperes.

The output circuits are supervised for open and short circuit conditions.

If a wiring fault occurs, a trouble condition will be indicated at the Controller and on the S^3 Point Display.

Tagname

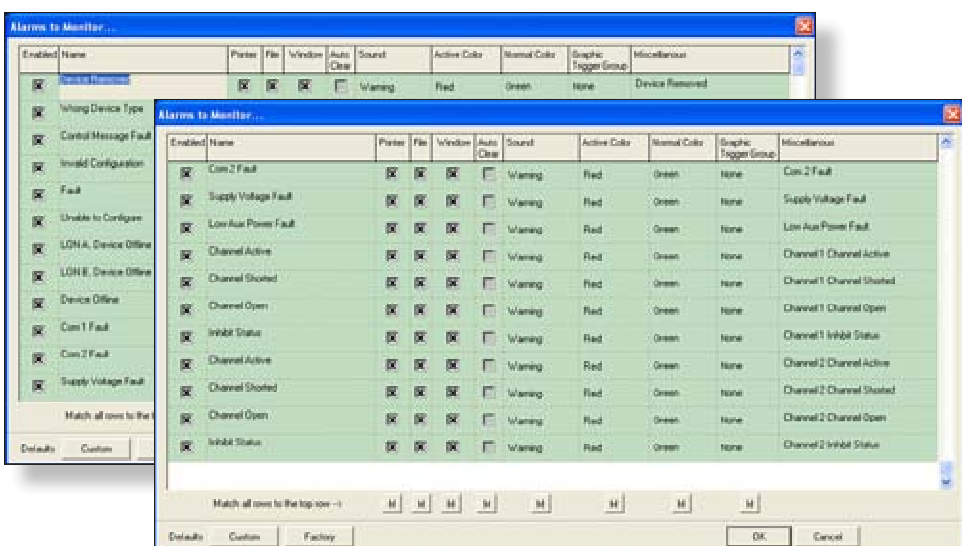
The tagname at the top of the dialog box refers to the module. Each of the two output channels also require a tagname. Until the tagnames are entered the module is not available in the S³ database for programming, monitoring or dynamic graphic purposes.



Below the tagname is a “Misc” text field to enter descriptive information to better identify the location or purpose of the module. Data in this field is optional.

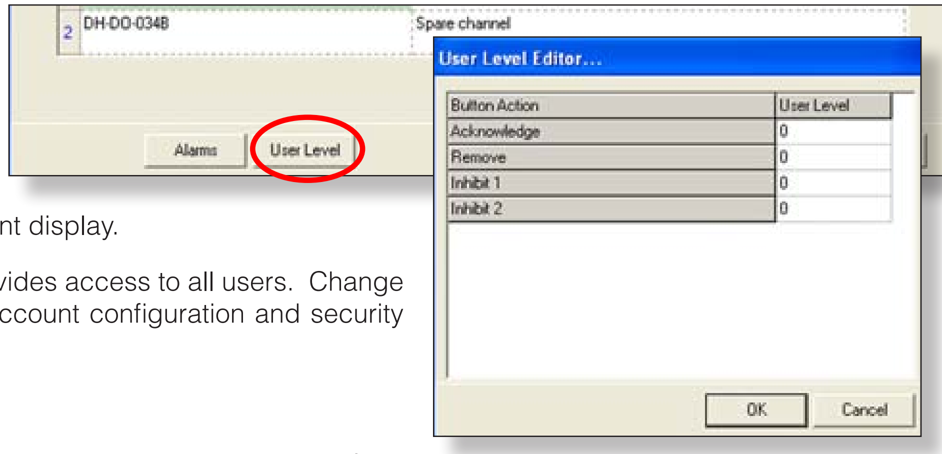
Alarms

Selecting this button opens the “Alarms to Monitor...” dialog box. This scrolling list displays the alarms and events related to the device that can be configured to be monitored by S³.



There are 13 alarms and events that pertain to the status and diagnostics for the module plus 4 per output channel.

User Levels

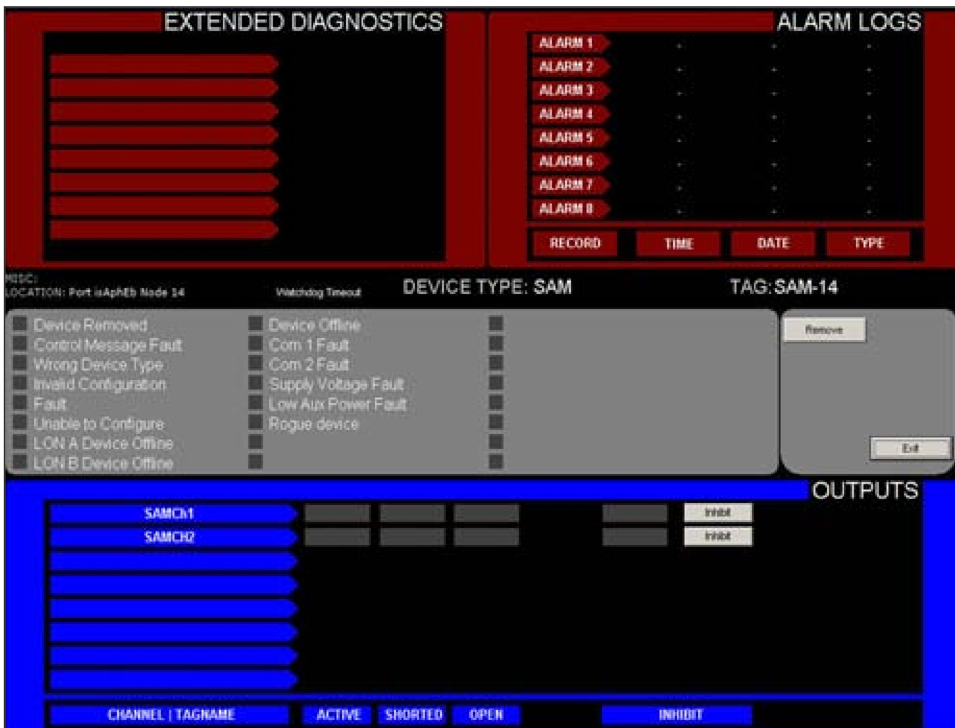


The "User Level Editor..." provides a means for limiting access to the "Acknowledge", "Remove" and "Inhibit" buttons for the module which are accessible from the devices point display.

The default value is "0" and provides access to all users. Change these values to match a user account configuration and security needs.

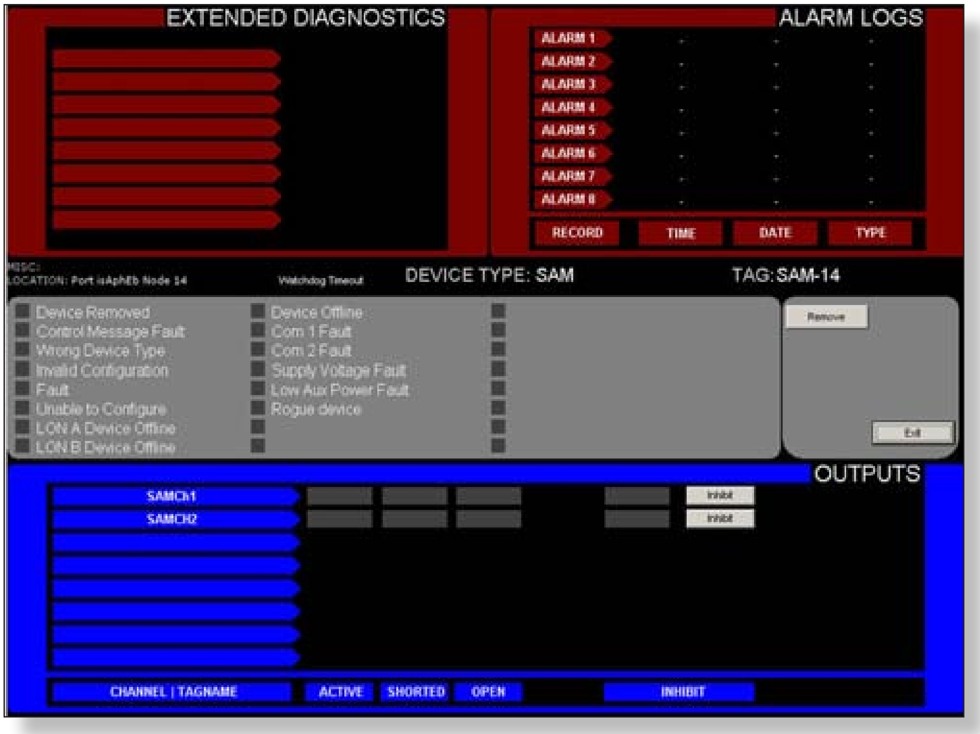
Point Display

The SAM has a custom "Point Display" that can be accessed from either the Point Display button on the Command Bar or from the Online Mode. The point display provides a single window view of all available real-time data for the device.



Alarm Logs

The upper right quadrant of the point display shows the last eight alarms that have occurred along with their date & time. This information is stored in the module and is retrieved over the LON for display in this area.



Status & Diagnostics

The middle area of the point display shows the discrete status of 13 pieces of tracked status and diagnostic data.

Channel Status

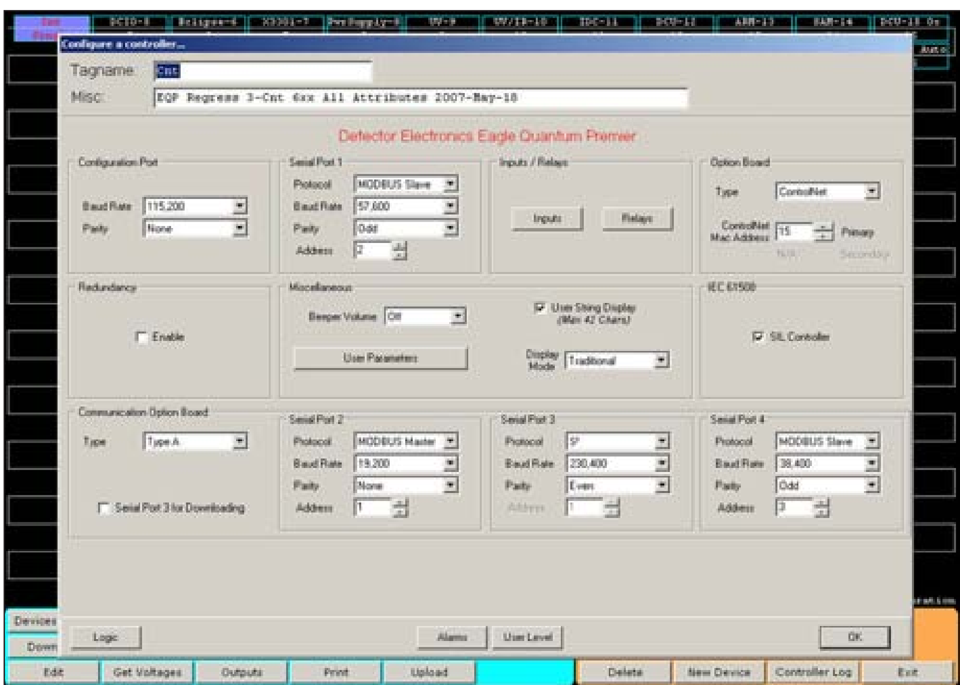
The bottom half of the point display provides an annunciator style display depicting the status and health of the two output channels. Next to the channel tagname are indicators for Active, Shorted, Open and the Inhibit status. Buttons are also provided to inhibit either of the output channels. (If the user has sufficient access privileges).

Logic Editor

The Eagle Quantum Premier controller is a programmable device that requires a “user program” to be written to customize the system for the hazard(s) being monitored.

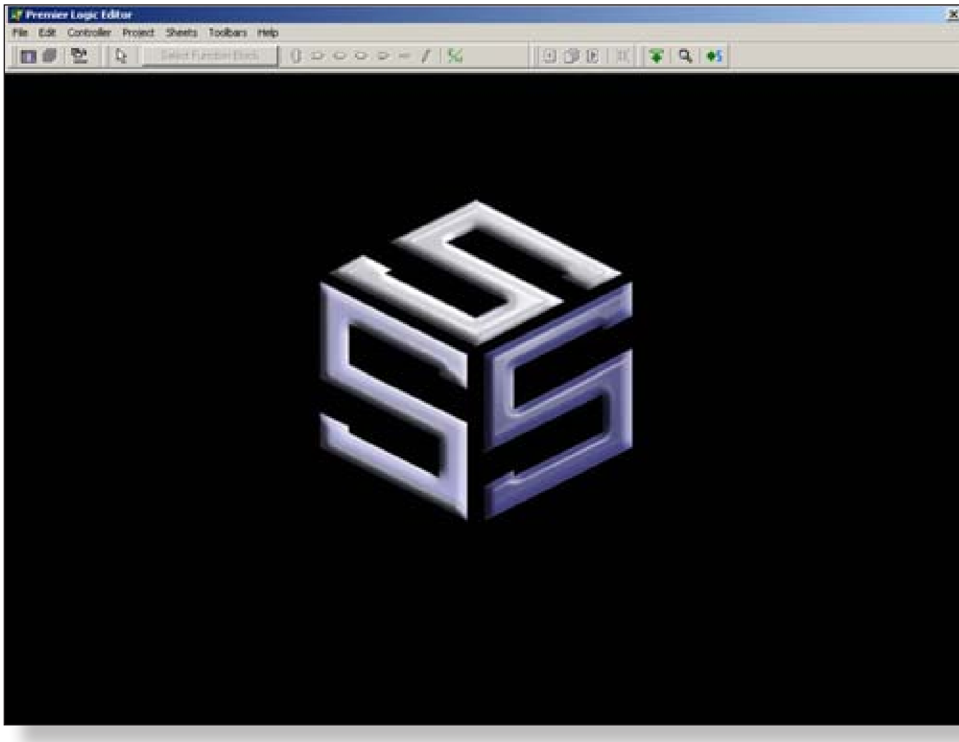
This “user program” is developed utilizing a “Logic Editor” within the S[3] software environment that provides the following facilities:

- An IEC-61131-3 style logic editor for developing logic.
- A logic simulator for testing and debugging the logic.
- The ability to download the program to the controller.
- The ability to monitor the operation of the logic “online”.
- The ability to create printed documentation of the user program.



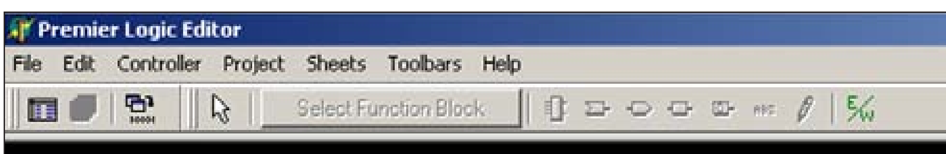
The logic editor is accessed through the controllers configuration dialog box. In the lower left of the “Configure a controller ...” dialog box there is a “Logic” button. Selecting this button will launch the “Logic Editor”.

Once the "Logic" button is selected from the "Configure a controller ..." dialog box, the "Logic Editor" program is launched.

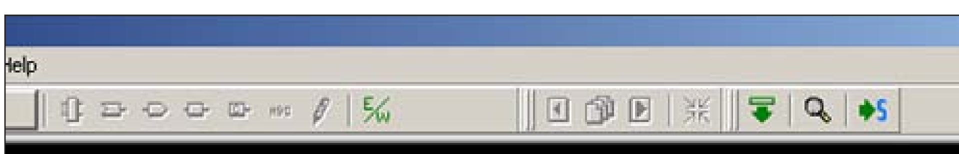


The "Premier Logic Editor" is a full screen application, and when launched looks like the example above.

The upper area of the screen contains the applicable menus at the top and a button bar below that provides access to a variety of editing and display tools. Below the button bar, is an empty area with the S^3 logo, this is the main work area where logic pages are displayed and edited.

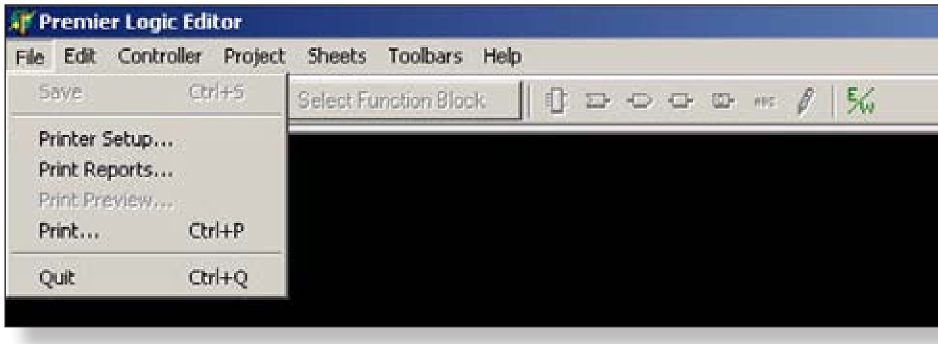


There are seven standard Windows pull down menus; File, Edit, Controller, Project, Sheets, Toolbars and Help. Each menu will be described in detail later. The button bar can be customized, but in the examples above and below it is shown in its default configuration.



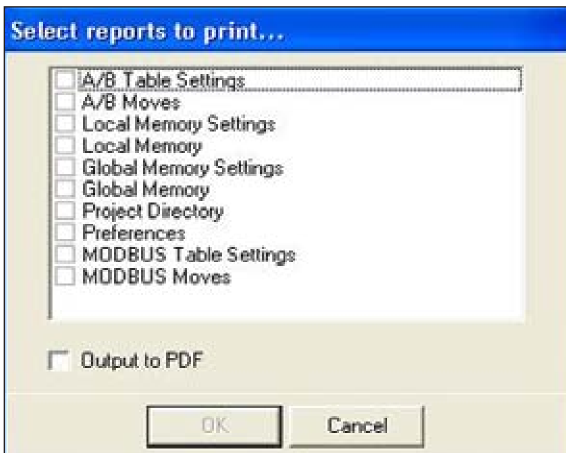
File Menu

This menu contains the standard "Windows" routines for setting up to print to a network printer and then printing selected reports.



Print Reports

Calls up the "Select reports to print..." dialog box which presents ten check boxes to select what portions of the controllers configuration are to be assembled into a report for printing.



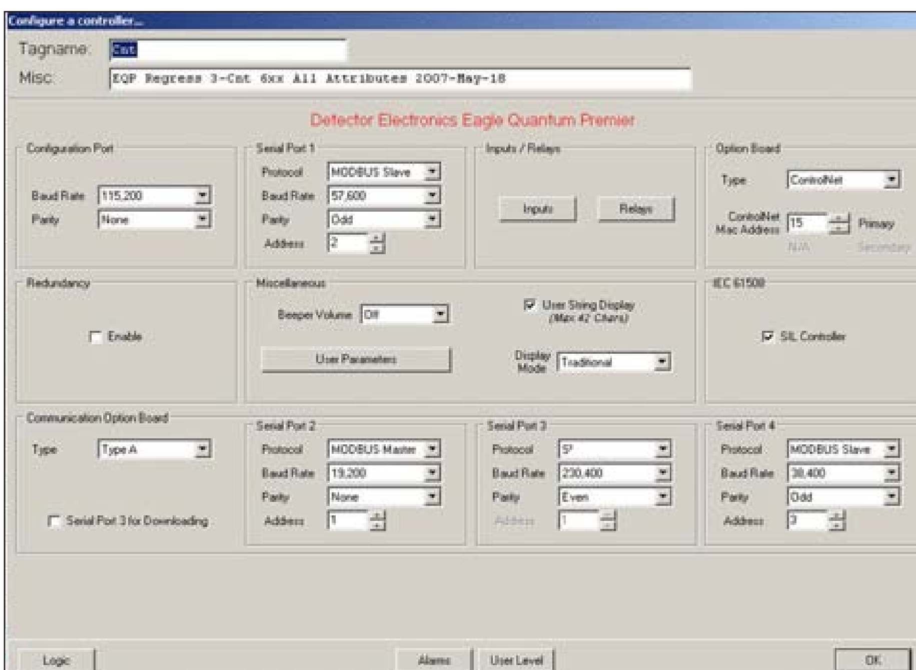
In the lower left of the dialog box, there is an "Output to PDF" checkbox that will send the reports to a PDF file instead of to the selected network printer.

These reports can be read and printed by Adobe Acrobat™ and other PDF compliant programs.

Quit

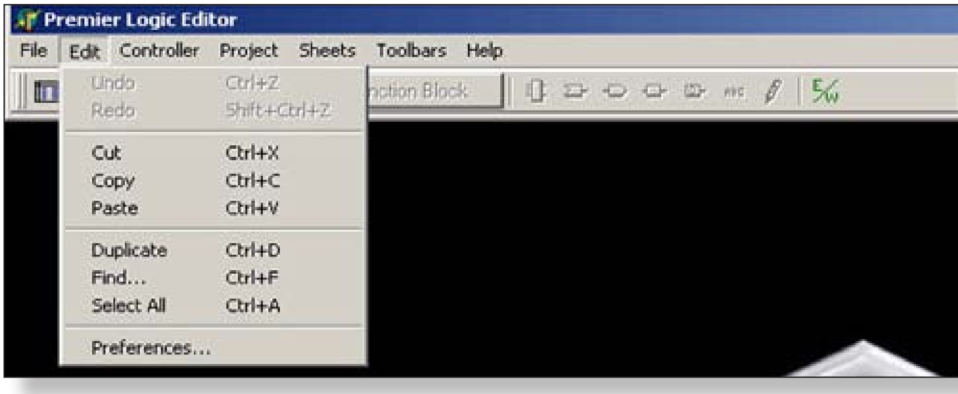
The "Quit" selection will shut down the logic editor program and return to the controllers configuration dialog box.

If there are unsaved changes to the configuration, a prompt will ask to save changes prior to exiting the logic editor.

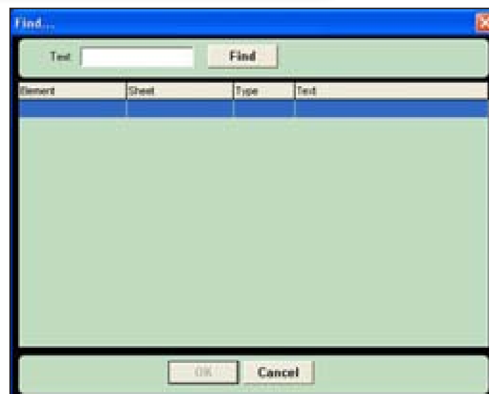


Edit Menu

This menu contains the standard "Windows" routines for Cut, Copy and Paste that will be used throughout the program. In addition there is a "Find" command, "Select All" and "Preferences".



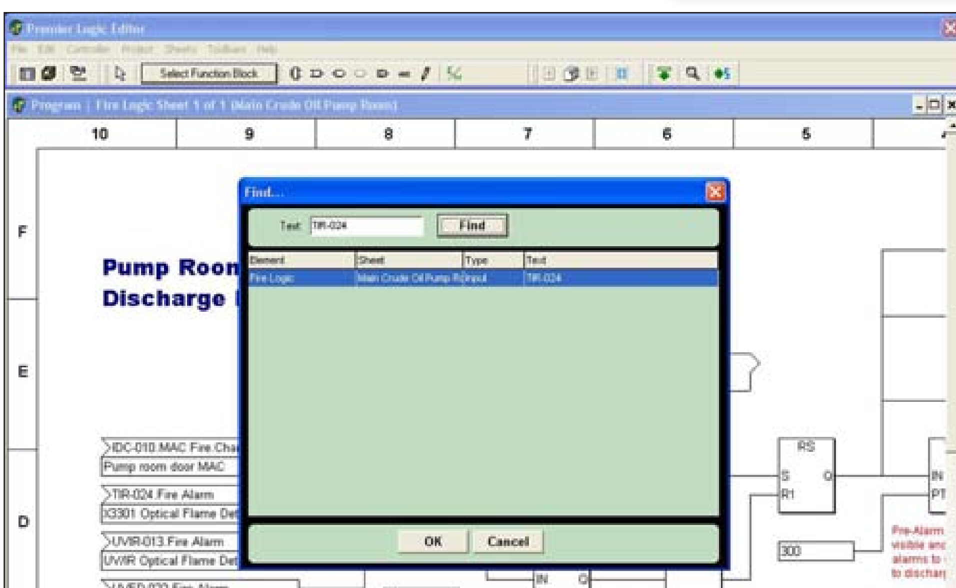
Find



This command will open the "Find" dialog box which provides a Text entry field and a Find button.

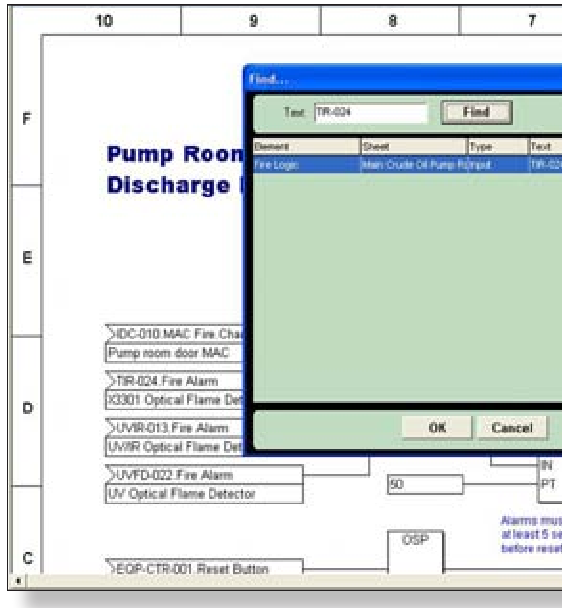
When a "Find" is initiated S^3 will search the logic drawings and list the matching elements along with their originating drawing sheet, element type and the full text associated with the search.

In the sample below, a logic page was opened and a search for the text string "TIR-024" was entered and the results are shown.



In this sample find, the listed **Element** is “Fire Logic” which is a program, the **Sheet Name** in the logic program is “Main Crude Oil Pump Room”, the **Type** is “Input” and finally the located “**Text**” is “TIR-024”.

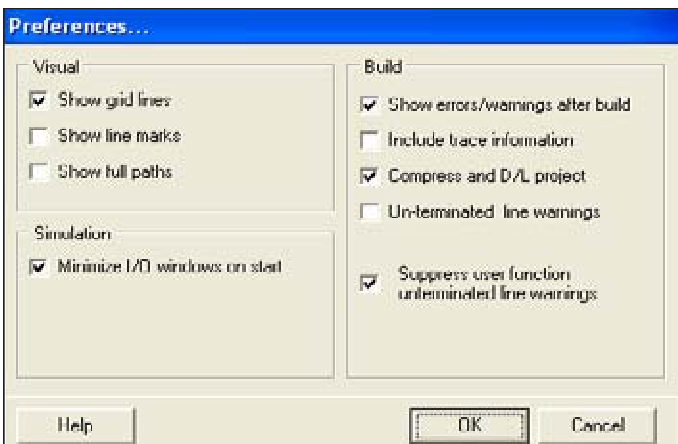
In the example to the right, the input block “TIR-024 Fire Alarm” is on the left side of the logic page partially behind the “Find...” dialog box.



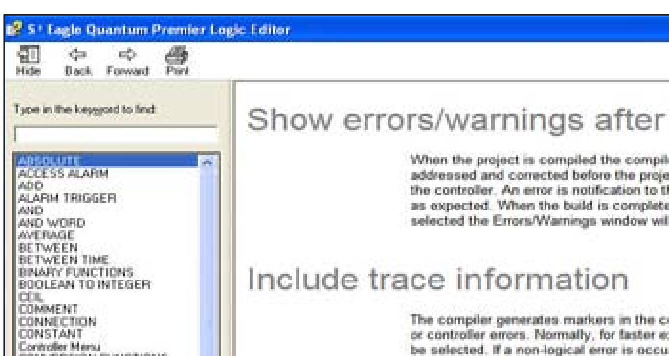
Preferences

This selection opens the “Preferences...” dialog box which contains a number of checkbox selections pertaining to the visual display of the logic editor, compiling (Build) options and a Simulator selection.

The example below shows the logic editors default configuration. Each of these selectable options are described in detail below.



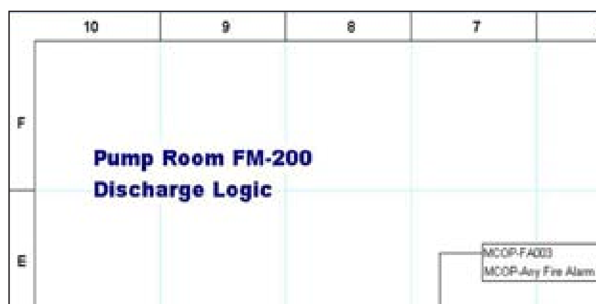
Use the “Help” function for additional information on how each checkbox affects the look and feel of a project.



Show grid lines

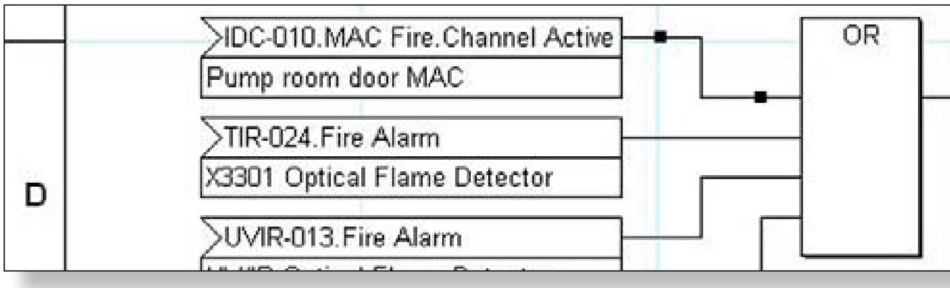
When selected this will display a faint cyan reference lines on the drawing pages that correspond to the horizontal and vertical references on the drawing title block.

The grid lines are drawn “behind” the graphic logic elements.

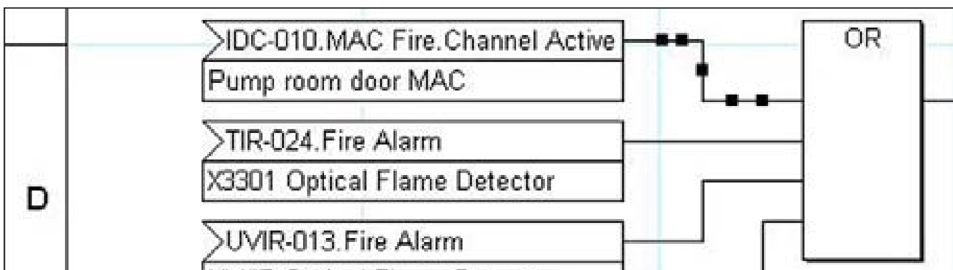


Show Line Marks

In the logic editor when a line is selected by clicking on it, or, when the “Connection Tool” has been selected, a small black rectangle marks the beginning and end of each line as shown in the first example below.

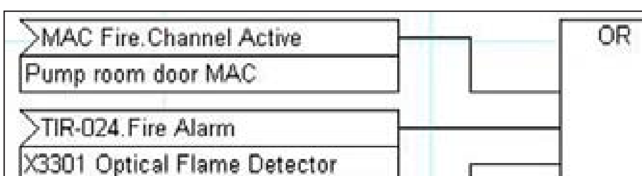


Selecting “Show Line Marks” as in the example below, will display an additional three visual indicators spaced between the beginning and end of the line to provide better visual cues on lines that are long or close to many others.



This is only a visual cue and has no effect on the ability to select or edit the line.

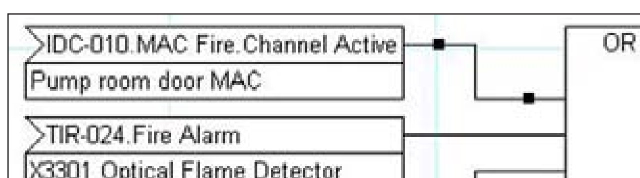
Show Full Paths



A tagname might be a channel on an IDC or HDIO or it could be the complete device. This option allows for the complete path to be shown.

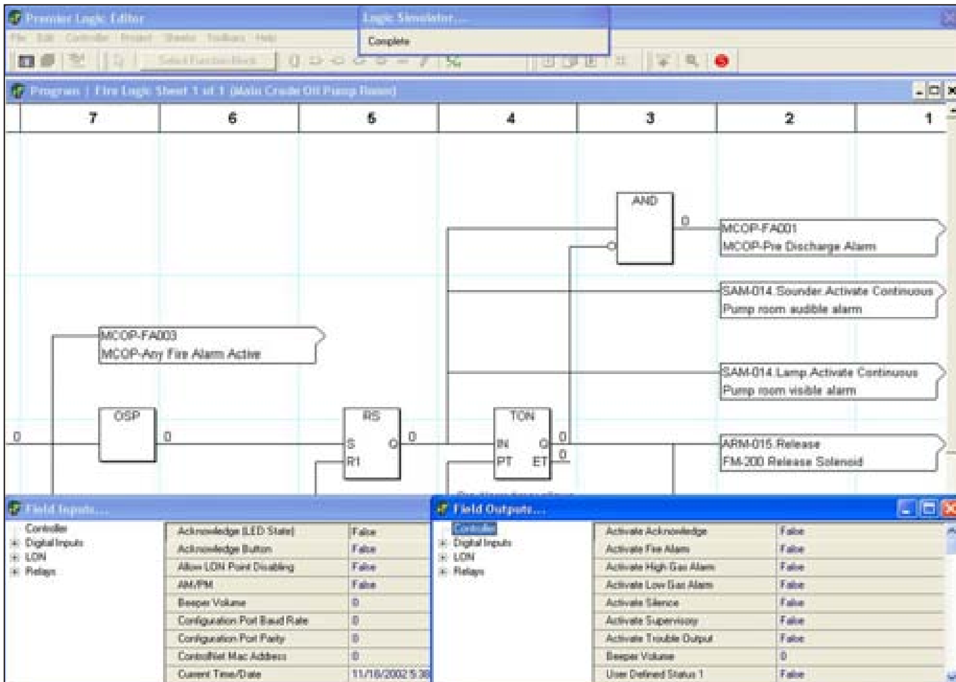
In the example to the left, an IDC which is tagged IDC-010 has two channels. One channel is “MAC Fire”.

When “Show Full Paths” is enabled the channel tagname is to be shown to the left of the tagname, as shown in the example to the right. It now reads; “IDC-010.MAC Fire”.



Minimize I/O windows on start

This option is used to control the look and feel of the logic simulator on startup. The simulator has two I/O windows. One is inputs and the other is outputs.



When the simulator starts these windows will normally open full size. If the checkbox is enabled they will open in the minimized state.

Show errors/warnings after build

When enabled, the logic editor will automatically display the "ERROR / WARNINGS VIEWER" at the completion of a project compile (build) listing any problems. This can also be done manually by using the "Show Errors/Warnings" menu item under the "Project" menu or by using the "E/W" button on the toolbar. Selecting one of the errors will close the viewer and display the section of logic containing the problem.

The list can be printed using the "Print" button in the lower left of the dialog box.

Include trace information

The compiler generates markers in the code for the troubleshooting of compiler or controller errors. Normally, for faster execution of the program, this would not be selected. If a non-logical error is occurring this could be used to aid in troubleshooting.

Compress and D/L project

When enabled the complete project is compressed and downloaded to the controller whenever the download command is executed. This powerful feature backs up all aspects of the project including any non-Premier ports and custom graphics. It is very similar to the routine of the “Backup/Restore” utility described in section 8 except the compressed file is stored in non-volatile memory in the controller instead of on the OIS hard disk or network. This option allows any S^3 station to later “upload” the complete project for editing or display without needing an original copy. If this option is not selected it will be **impossible** for an S^3 station without the original project file to view, edit or troubleshoot the program in the controller. An attached S^3 station will be able to determine the LON makeup and provide LON and device diagnostics, but access to the controller program will not be available.

NOTE
This option adds time to the build and download and is not required for proper operation of the program.

In practice this option is usually disabled until the user program and entire project are complete, tested and ready for service.

Un-terminated line warnings

With this checked a warning will be generated when a missing pin is present on a function block. The warning is placed in the “Error/Warnings Viewer”. If unchecked, the warning will not be visible in the “Error/Warnings Viewer”.

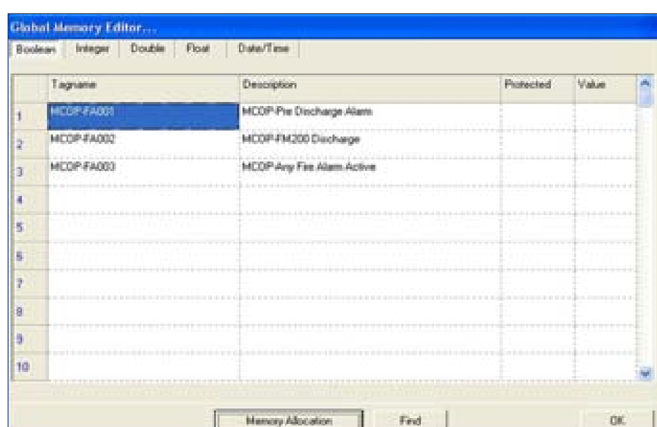
Controller Menu

This menu provides access to a variety of memory management functions for internal program variables and for the configuration of the Allen Bradley and Modbus tables used by outside systems to access the controllers data.

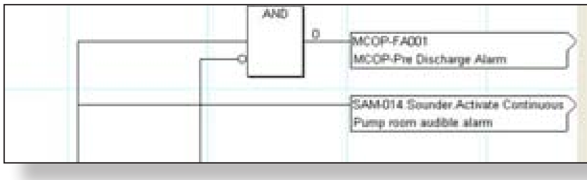
Global Memory

Global memory is typically used to exchange data with external devices such as Modbus or Allen-Bradley PLC’s. This menu item opens the “Global Memory Editor...” which allows for the creation of and displays information on the five types of global memory. It also allows for the adjustment of memory allocations.

The dialog box is “tabbed” allowing for the selection of the memory type to be displayed/edited. In the example to the right, “Boolean” is selected and there are three points created.



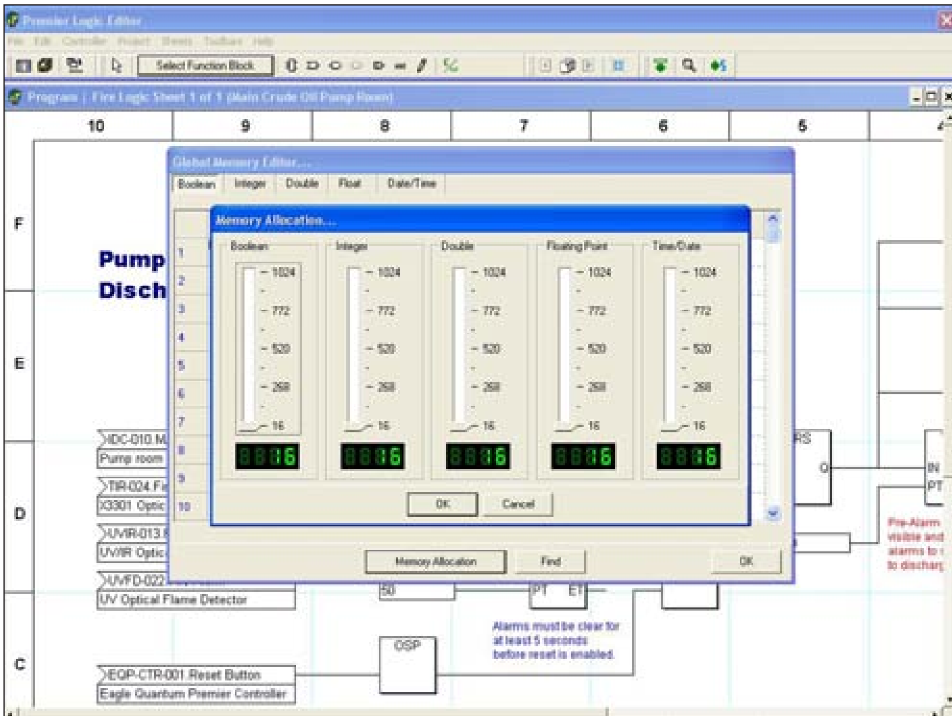
To create a global memory point, put the editing cursor in the “Tagname” field and enter a tagname, then if desired enter a long name in the “Description” field.



Once created, this global memory point will be available in the logic editor for use as an input to or output from logic elements.

Memory Allocation

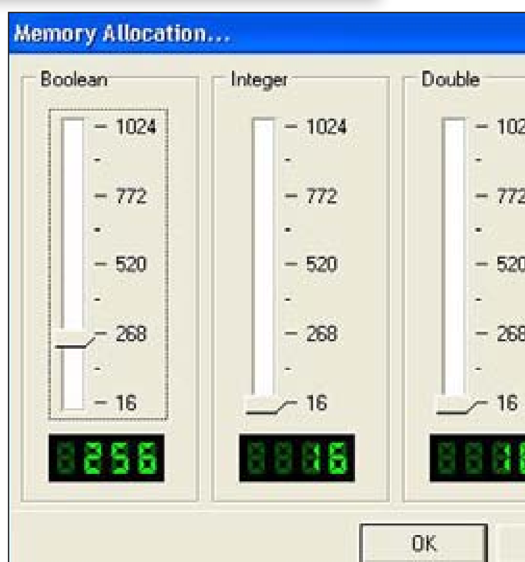
The amount of memory set aside for each of the five types is adjustable. Clicking the "Memory Allocation" button at the bottom of the local memory editor dialog box will open the Memory Allocation dialog box.



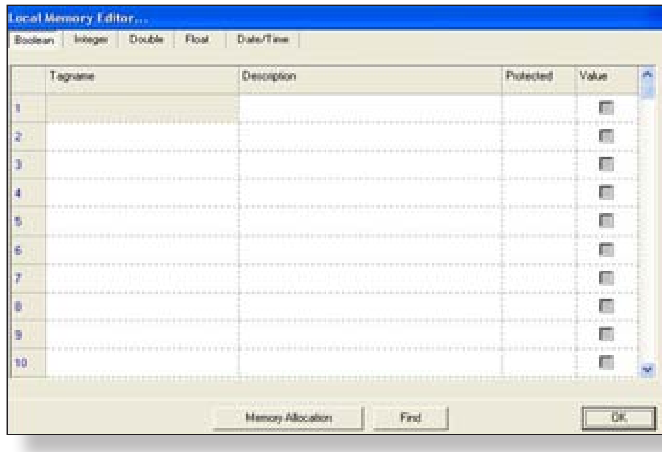
This dialog box provides five "slider" type adjustments to change the memory allocation for each type. The default setting is 16 and is adjusted by clicking on the slider and dragging it up or down until the desired quantity is reached.

Up to 1K (1024) can be allocated for each type of memory. The minimum like the default value is 16.

To set the memory allocation, move the slider to the approximate value desired. To set the exact value, observe the digital display and use the Up/Down arrow keys to change the value one number at a time.



Local Memory



This menu item opens the "Local Memory Editor..." which allows for the creation of and displays information on the five types of local memory. It also allows for the adjustment of memory allocations.

The dialog box is "tabbed" allowing for the selection of the memory type to be displayed/edited. In the example to the right, "Boolean" is selected and there are no points created yet.

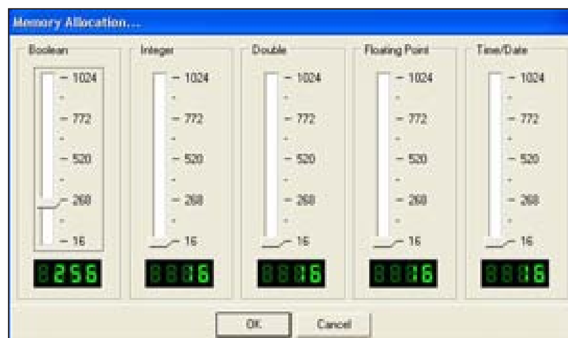
To create a local memory point, put the editing cursor in the "Tagname" field and enter a tagname, then if desired enter a long name in the "Description" field.

Once created, this local memory point will be available in the logic editor for use as an input to or output from logic elements.

Value

The value column is available in each of the six local memory types and allows the setting of an initial value. This value will be used when the program begins execution and if the variable is not written to it will remain unchanged.

Memory Allocation



Local Memory is allocated in the same manner as described earlier for Global Memory. A "Memory Allocation..." dialog box provides a slider to adjust the amount of memory for each type.

Memory Export/Import

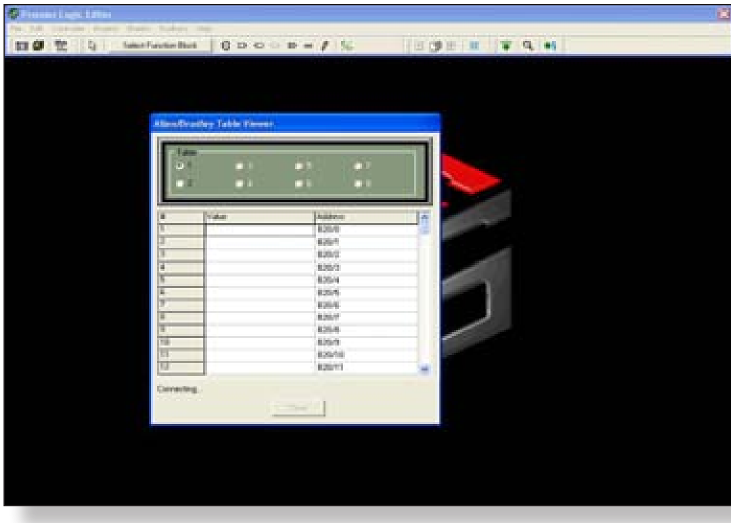
Global and local memories can be exported as an excel spreadsheet (CSV), or a text file which can be opened in a text editing program. Nothing will be exported if the memory editor is not populated.

AB Export/Import

This selection allows the AB (Alan Bradley) settings created to be exported or imported to and from MS Excel or a text editing program.

AB Monitor

This dialog box is a tool for checking the value of data in any of the eight configurable data tables used for exchanging data between the Premier controller and Allen Bradley systems.



The desired table is selected with a radio button in the top portion of the dialog box and a scrolling list displays the data. In the example above the viewer has just been activated and is attempting to establish communication with the Premier controller.

AB Moves

This dialog box allows for the configuration of data moving between an Allen Bradley system and the Eagle Quantum Premier controllers memory. The dialog box uses a tabbed interface with two tabs on the left side representing the two directions data can flow.

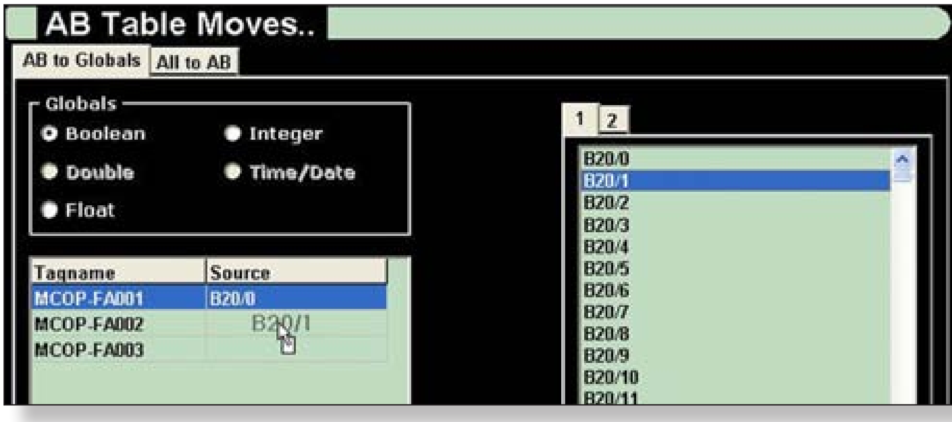
Data to be moved from the AB system into the Premier controllers memory is configured under the "AB to Globals" tab.

Data that will move from the Premier controller to the AB system is configured under the "All to AB" tab.

On the right side of the dialog box is a tabbed scrolling list representing configured data tables. In the example above, there are two tabs, one for each configured AB table (see previous page). There can be up to eight tabs representing the maximum number of configured data tables.

To configure data for movement, select and drag an address from the right hand side and drop it into the "Source" cell next to the desired "Tagname" in the left hand side.

In the example below the AB address “B20/0” is configured to be moved to a Premier controller global variable “MCOP-FA001” and AB address “B20/1” in the process of being “dropped” onto a Premier controller global memory point “MCOP-FA002”.



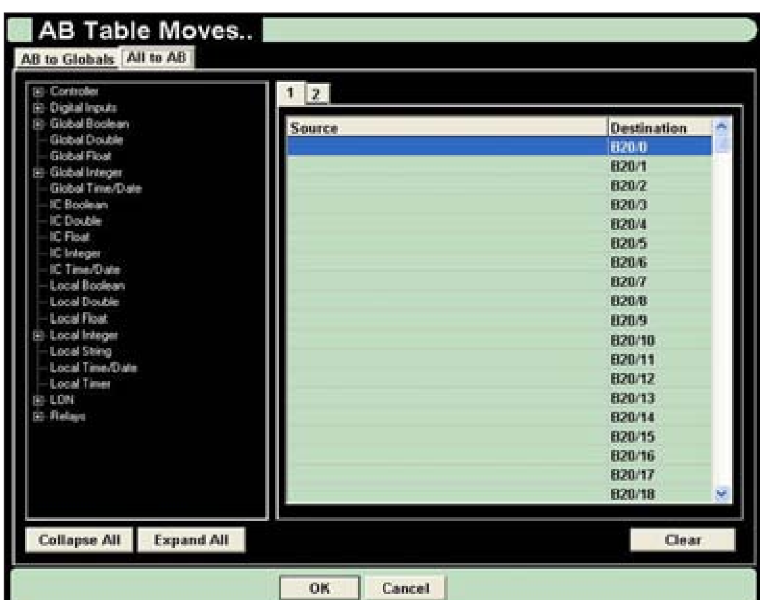
The radio buttons on the left hand side of the dialog box will determine which configured global variables are displayed.

In the example to the right the “Boolean” radio button is selected and the three configured boolean globals are displayed as potential targets for data input.

NOTE

Data coming from an AB system into the Premier controller can only be moved into global memory locations that have been configured using the Global Memory Editor as described on preceding pages of this manual.

When the “All to AB” tab is selected, a hierarchical list of “sources” is shown on the left hand side of the dialog box which can be selected for “movement” to “destinations” in the AB system.



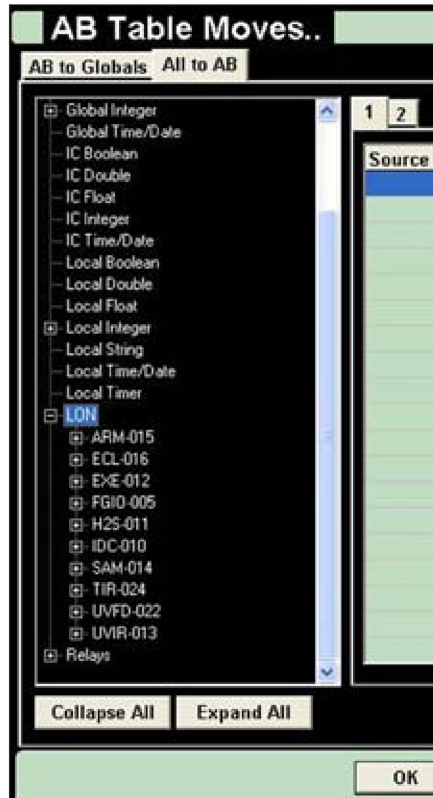
Any item on the list that has a “+” before it has subordinate items and clicking on the “+” will expand the list showing all items that make up that category. Below the list are two buttons that can “Expand” or “Collapse” all subordinate items in the list for easy viewing. The first twelve items on the list provide access to controller status information and the globals database. The “LON” item will allow access to all field device information, the “Relays” item is for accessing the controllers onboard relay status.

In the example to the right, the "LON" item has been expanded by clicking on the "+" sign and now shows ten subordinate items, each of which is a field device.

As these additional items are revealed, the list extends beyond the bottom and becomes scrolling.

The hierarchical arrangement of items provides an easy and logical method of accessing the thousands of potential items that could be configured as outputs on a large premier system.

In the example below, a field device on the LON, an Agent Release Module with the tagname "ARM-015" has been selected and "opened" to display its subordinate data. Any of the displayed items can be selected and configured for "movement" to the AB system utilizing the "drag and drop" method.



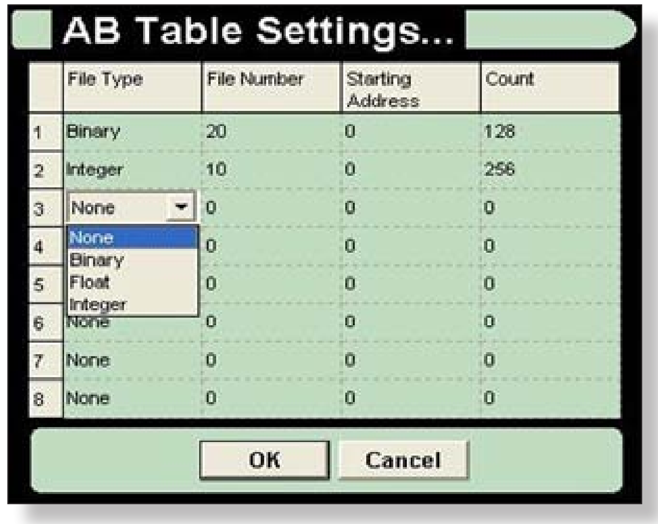
To configure a data point for "movement" click and "drag" the selected point to the right side of the dialog box and "drop" it on the desired Allen Bradley destination address.

In the example below, the "Channel Active" point is in the process of being moved to the selected destination address "B20/0" in the AB table.

Once "dropped" in the desired cell in the "Source" column on the right side of the dialog box, the "Channel Active" status for "ARM-015" will now map to the Allen Bradley destination address of "B20/0". This process must be repeated for all data to be shared with the AB host device.

AB Table Settings

This menu selection opens a dialog box which allows up to eight communication interface "tables" to be configured to allow for data to be "moved" between the Eagle Quantum Premier controller and an Allen-Bradley PLC or other system utilizing Allen Bradley communication protocols. Clicking on any cell in the "File Type" column will activate a pop-up menu allowing the selection of the proper table type for the data to be exchanged.



	File Type	File Number	Starting Address	Count
1	Binary	20	0	128
2	Integer	10	0	256
3	None	0	0	0
4	None	0	0	0
5	Float	0	0	0
6	None	0	0	0
7	None	0	0	0
8	None	0	0	0

The three file types are binary, floating point (Float) and Integer. To configure a table, select the appropriate file type, file number, starting address and the number of words to read (count). Once the tables are configured, click the "OK" button to allocate memory to support the new table configuration.

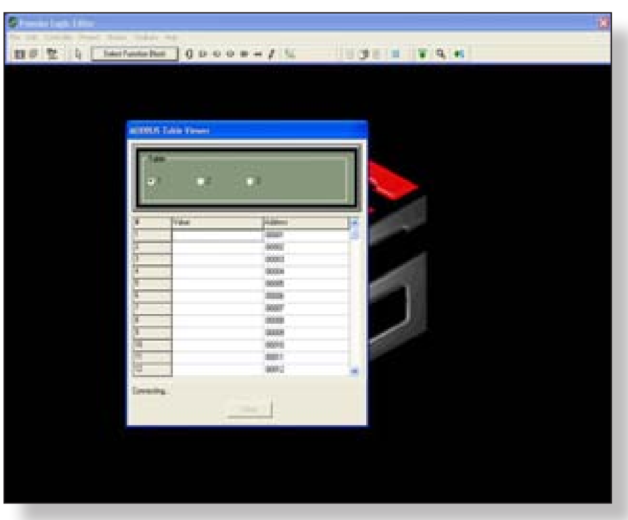
In the example above, table 1 is configured for binary data which will be stored in file 20. The table will be 128 words (16 bit registers) long and therefore support 2048 discrete "bits" of information.

MODBUS Export/Import

This selection allows the MODBUS settings created to be exported or imported to and from MS Excel or a text editing program.

MODBUS Monitor

This dialog box is a tool for checking the value of data in any of the three configurable data tables used for exchanging data between the Premier controller and Modbus RTU systems.



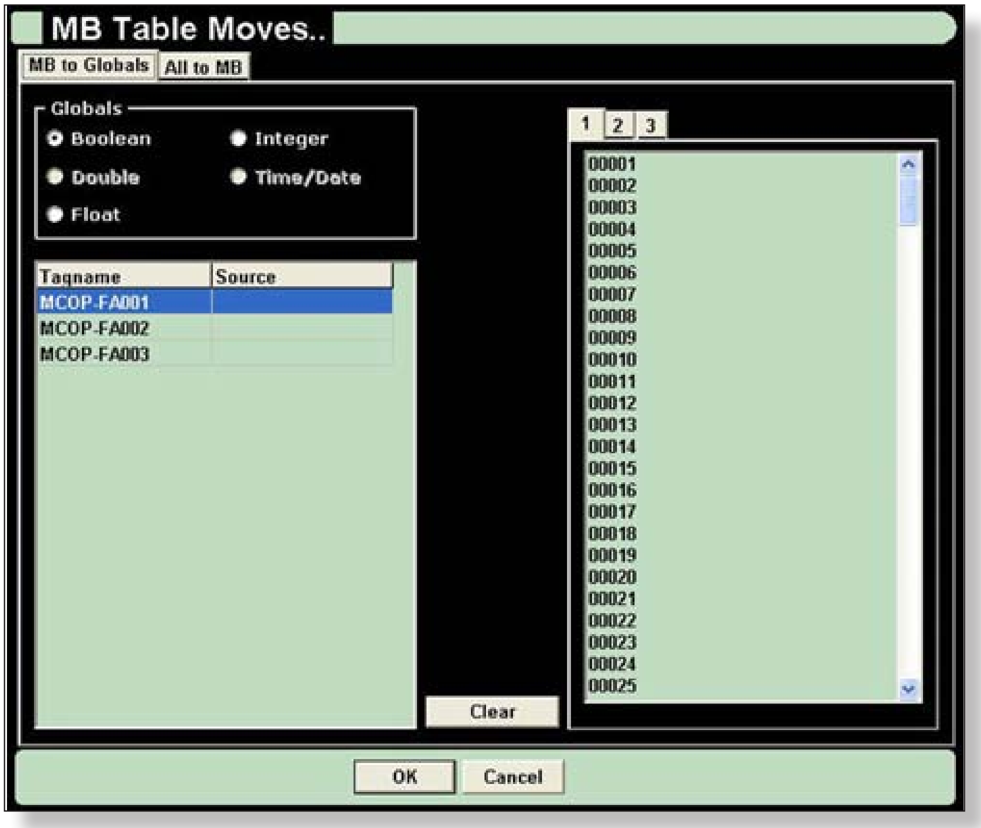
The desired table is selected with a radio button in the top portion of the dialog box and a scrolling list displays the data.

In the example to the right, the viewer has just been activated and is attempting to establish communication with the Premier controller.

MODBUS Moves

This dialog box allows for the configuration of data moving between a "Modbus RTU Master" system and the Eagle Quantum Premier controllers memory.

The dialog box uses a tabbed interface with two tabs on the left side representing the two directions data can flow.

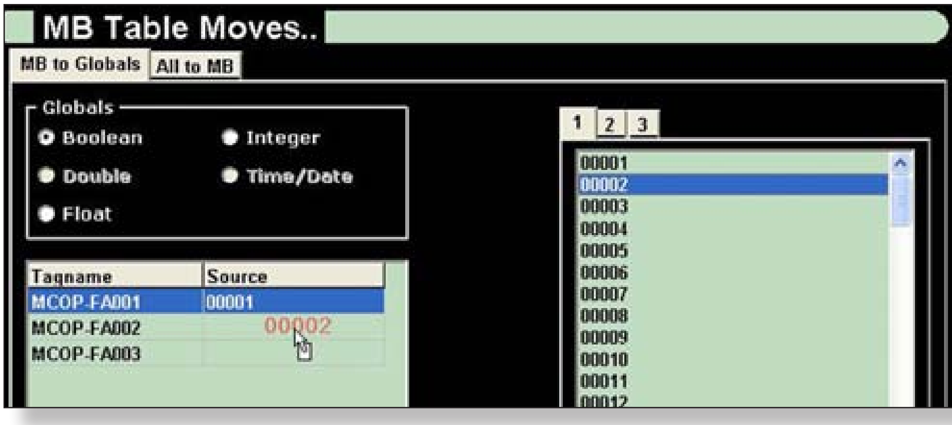


- Data to be moved from the MB system into the Premier controllers memory is configured under the "MB to Globals" tab.
- Data that will move from the Premier controller to the MB system is configured under the "All to MB" tab.

On the right side of the dialog box is a tabbed scrolling list representing configured data tables. In the example above, there are three tabs, one for each available MB table.

To configure data for movement, select and drag an address from the right hand side and drop it into the "Source" cell next to the desired "Tagname" in the left hand side.

In the example below the MB address “00001” is configured to be moved to a Premier controller global variable “MCOP-FA001” and MB address “00002” in the process of being “dropped” onto a Premier controller global memory point “MCOP-FA002”.

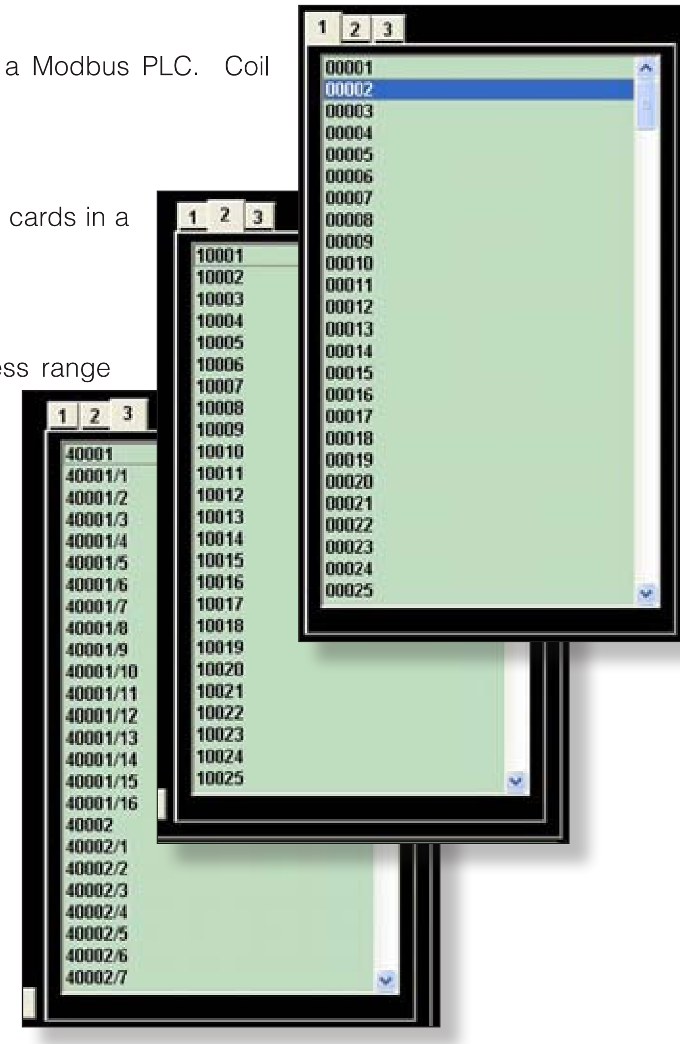


The radio buttons on the left hand side of the dialog box will determine which configured global variables are displayed.

In the example to the right the “Boolean” radio button is selected and the three configured boolean globals are displayed as potential targets for data input.

NOTE
Data coming from a Modbus system into the Premier controller can only be moved into global memory locations that have been configured using the Global Memory Editor as described on preceding pages of this manual.

The three available Modbus data tables are accessed by the three tabs at the top of the right hand side of the dialog box. Select the table desired by clicking on the appropriate tab.



Tab 1

Is for “Coils” which typically represent “Outputs” in a Modbus PLC. Coil addresses start with “0”.

Tab 2

Is for “Inputs” which typically represent discrete input cards in a Modbus PLC. Input addresses start with “1”.

Tab 3

Is for registers (16 bit words) that occupy an address range beginning with 40,001.

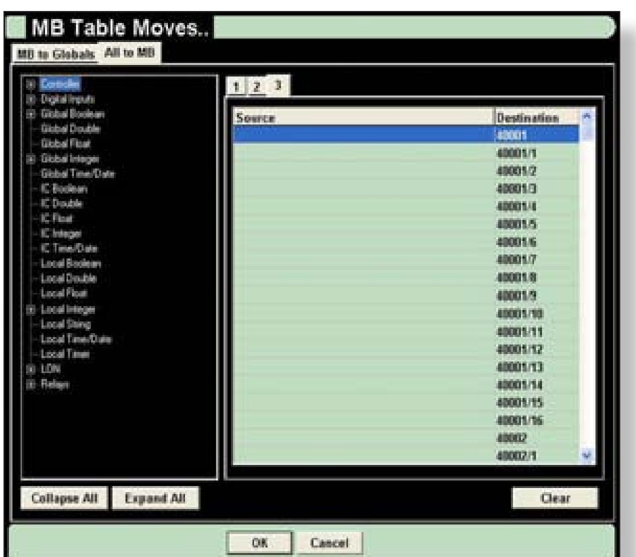
Registers can be used either as a whole “16 bit” word to move an integer value, or as sixteen individual “bits”, into which boolean “ON/OFF” data can be moved.

When the “All to MB” tab is selected, a hierarchical list of “sources” is shown on the left hand side of the dialog box which can be selected for “movement” to “destinations” in the AB system.

Any item on the list that has a “+” before it has subordinate items and clicking on the “+” will expand the list showing all items that make up that category.

Below the list are two buttons that can “Expand” or “Collapse” all subordinate items in the list for easy viewing.

The firsts twelve items on the list provide access to controller status information and the globals database.



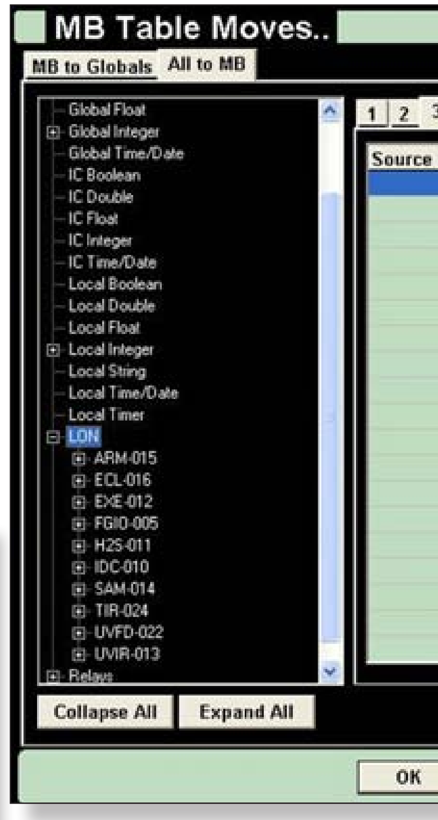
The “LON” item will allow access to all field device information, the “Relays” item is for accessing the controllers onboard relay status.

In the example to the right, the “LON” item has been expanded by clicking on the “+” sign and now shows ten subordinate items, each of which is a field device.

As these additional items are revealed, the list extends beyond the bottom and becomes scrolling.

The hierarchical arrangement of items provides an easy and logical method of accessing the thousands of potential items that could be configured as outputs on a large premier system.

In the example below, a field device on the LON, an UVIR Fire Detector with the tagname “UVIR-013” has been selected and “opened” to display its subordinate data. Any of the displayed items can be selected and configured for “movement” to the MB system utilizing the “drag and drop” method.



To configure a data point for “movement” click and “drag” the selected point to the right side of the dialog box and “drop” it on the desired Modbus destination address.

In the above example, the “Fire Alarm” point is in the process of being moved to the selected destination address “40001/1” in the MB table.

Once “dropped” in the desired cell in the “Source” column on the right side of the dialog box, the “Fire Alarm” status for “UVIR-013” will now map to the first “bit” of register 40000, Modbus destination address of “40001/1”.

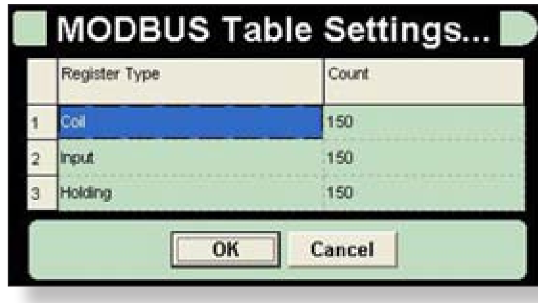
This process must be repeated for all data to be shared with the MB host device.

MODBUS Table Settings

This menu selection opens a dialog box which shows the three communication interface "tables" to be configured to allow for data to be "moved" between the Eagle Quantum Premier controller and a Modbus based system utilizing the industry standard Modbus RTU communication protocol.

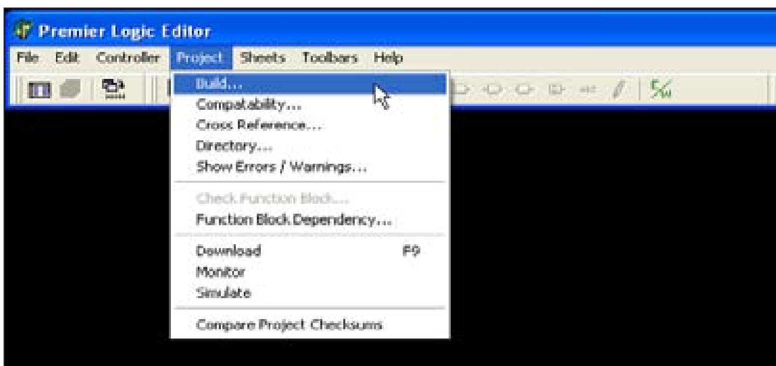
There are three register types, Coil, Input and Holding each of which are for the exchange of a different type of data. The default "Count" for each register type is 0.

Adjust the "Count" to match the number of registers required for each type. Once the tables are configured, click the "OK" button to allocate memory to support the new table configurations.



Project Menu

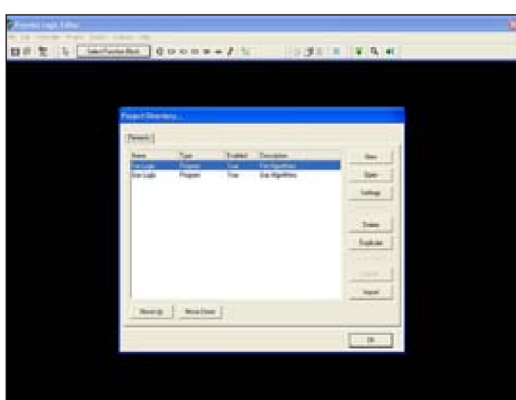
This menu allows access to the project directory as well as several functions related to logic creation, debugging, simulation and downloading to the controller.



S³ uses the international standard "IEC-1131" for the structure and style of the logic programming environment.

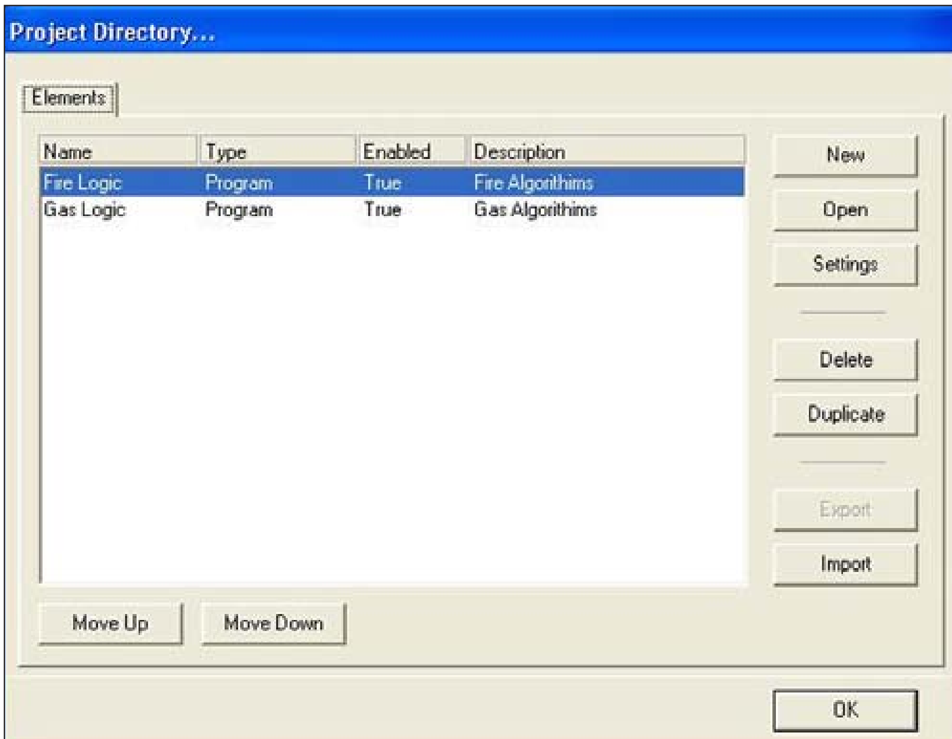
Selecting "Directory" will open the "Project Directory..." dialog box which lists the existing project "Elements" and provides tools for the creation, editing, deletion, duplication and arrangement of these elements.

In the S³ programming environment an "Element" can be either a user program or a function block. In the example above, there are two existing elements, both of which are programs.



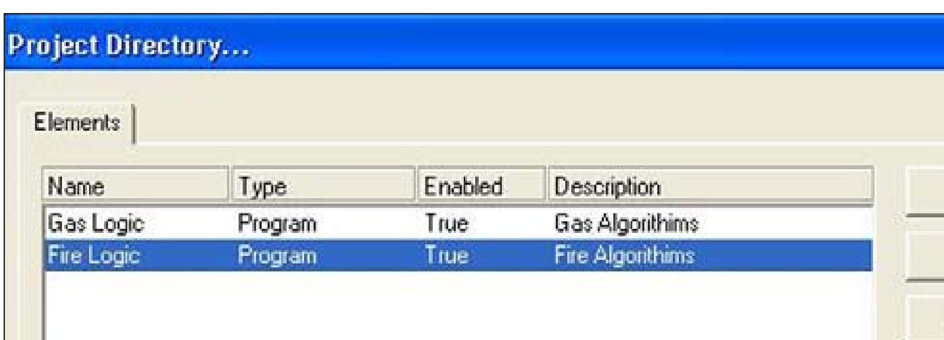
Move Up/Move Down

The Premier Controller executes its logic programs in the order that they appear in the "Elements tab" of the "Project Directory..." dialog box. In the example below, the controller will execute the program "Fire Logic" first and then process the "Gas Logic" program.



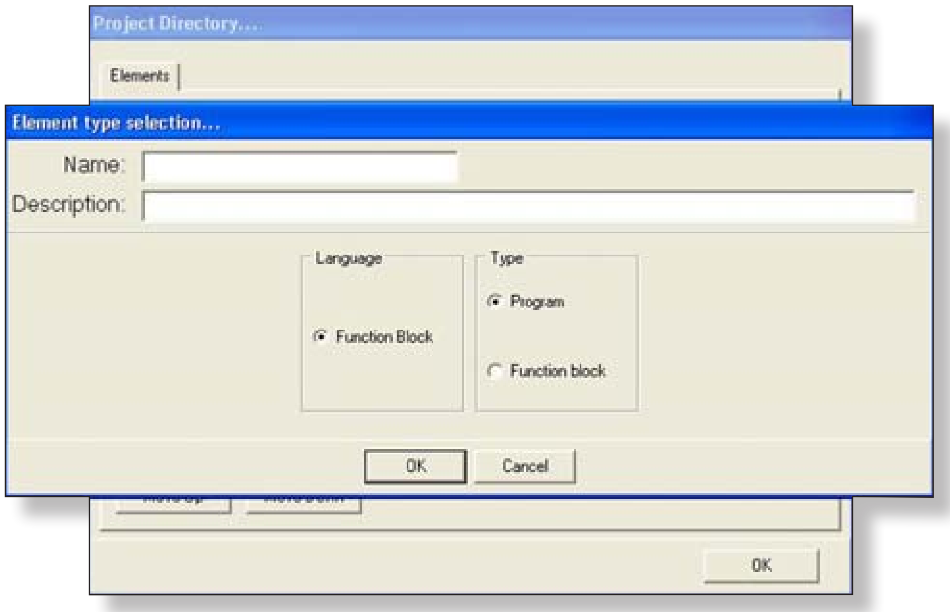
The "Move Up" and "Move Down" buttons located in the lower left of the "Project Directory..." dialog box are used to change the execution order of the programs. In the example above, the "Fire Logic" program is highlighted.

Selecting the "Move Down" button moves it down one position, in this case to the bottom of the two element list as shown in the example below.

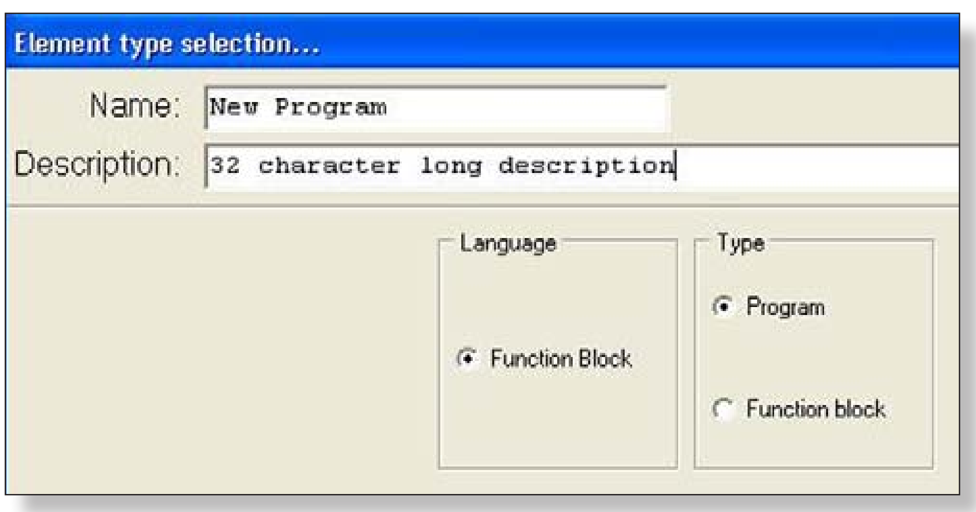


New

This button opens the "Element type selection" dialog box used to configure a newly created element. Fields are provided for an element name and description along with radio buttons to select the "Type" of element to be created, "Program" or "Function block".

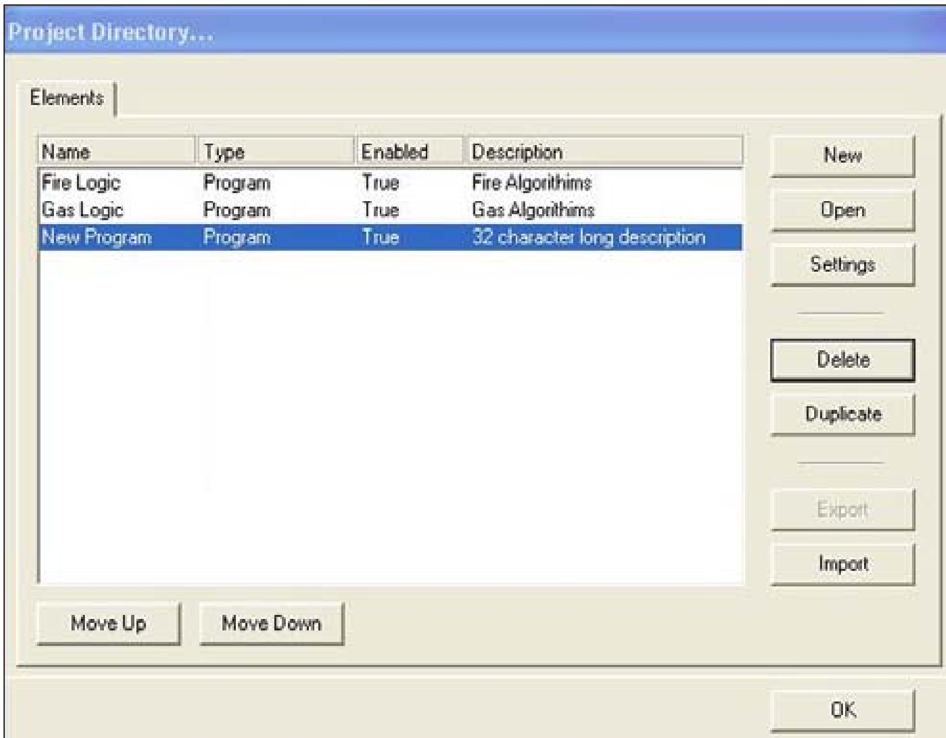


The default selection is for the creation of a new "Program". The "Language" selection is fixed at "Function Block" as S^3 does not currently support any other languages.



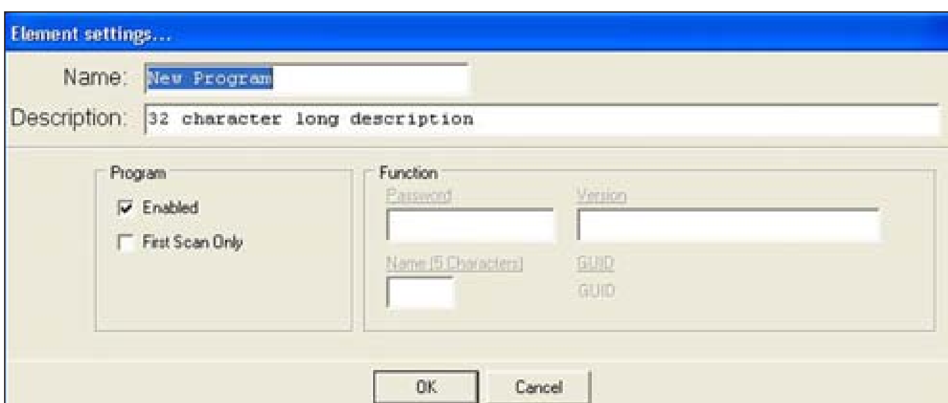
Enter a "Name" up to 20 characters long and an optional "Description" of up to 32 characters. Both the name and description show up in the directory window and help to identify the program or function block.

Select the “OK” button to return to the “Project Directory...” dialog box and the information on the newly created third element named “New Program” is now highlighted.



Settings

Select the “Settings” button to open the “Element settings...” dialog box which has two program control check boxes and some additional fields that pertain to “Functions” and will be covered later.



The “Program” check boxes are “Enabled” and “First Scan Only”.

Enabled

The enabled checkbox determines whether the program will be executed by the controller or not. When checked the program will run.

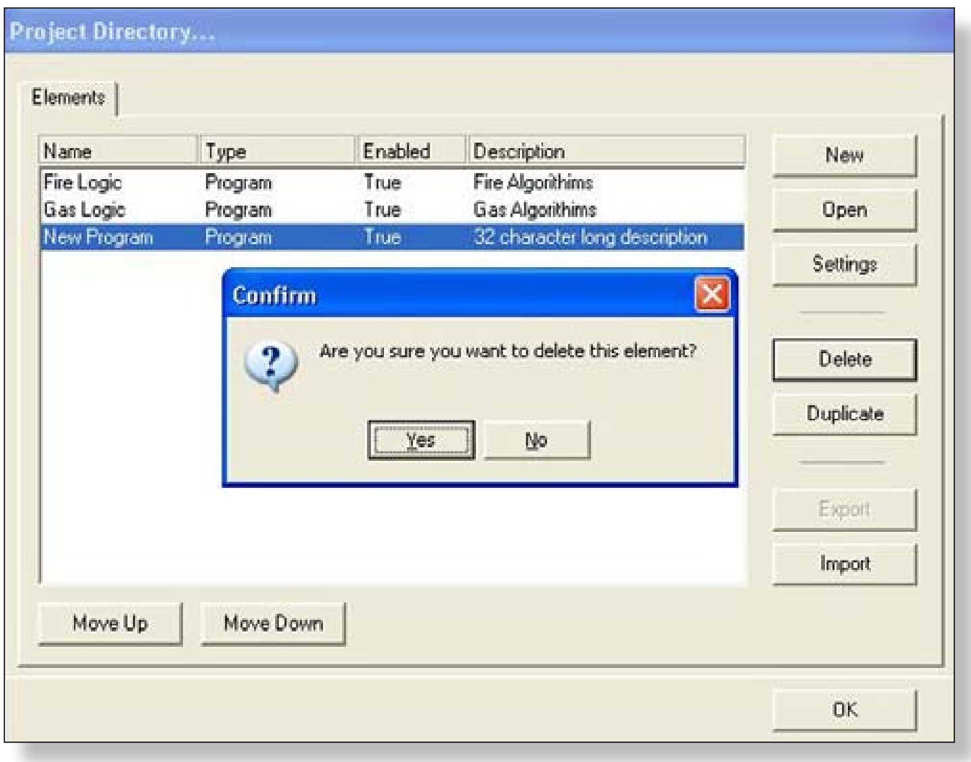
First Scan Only

When checked the program will run once when the controller executes its first logic scan and will not run again until the controller is stopped and restarted. This is typically used for a "setup" routine.

Delete

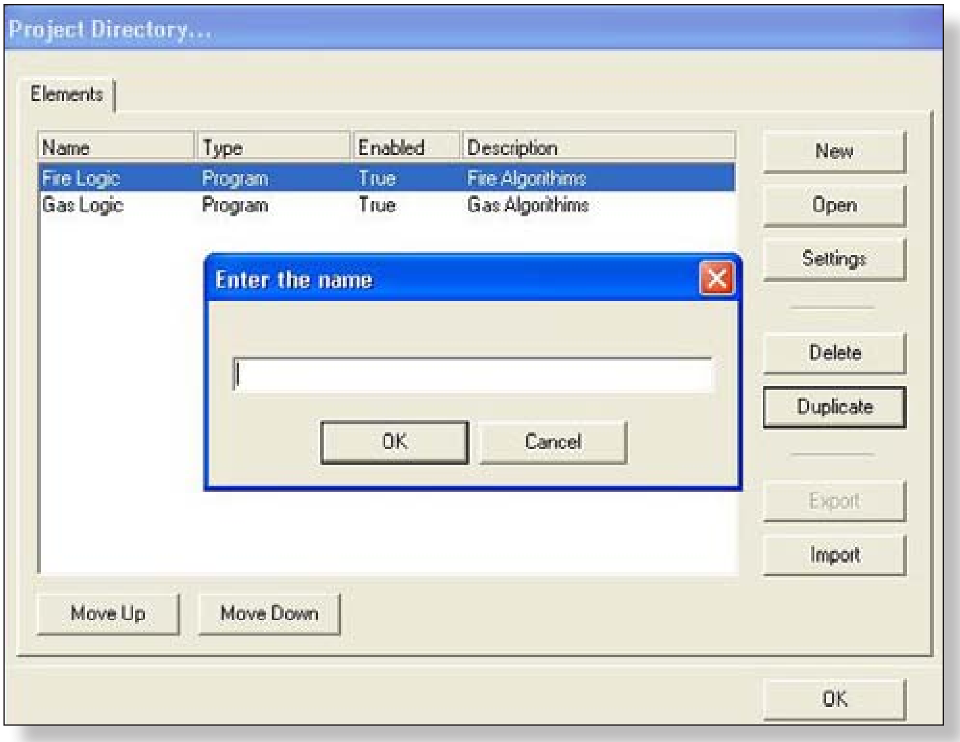
This button will remove the selected program or function block from the directory, project and hard drive. This function cannot be "undone".

In the example below the element "New Program" is selected, choosing the Delete button will display a dialog box asking to confirm the deletion of the element. Selecting "Yes" will permanently remove it.



Duplicate

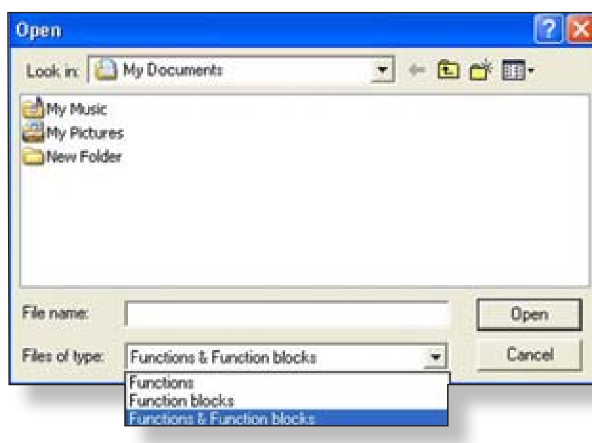
This button will make a copy of a selected element and add it to the project directory. When the Duplicate button is selected a dialog box will open allowing a new name to be entered for the duplicated element. Enter a name and then select "OK" to complete the duplication. Selecting "Cancel" will abort the duplication.



Import

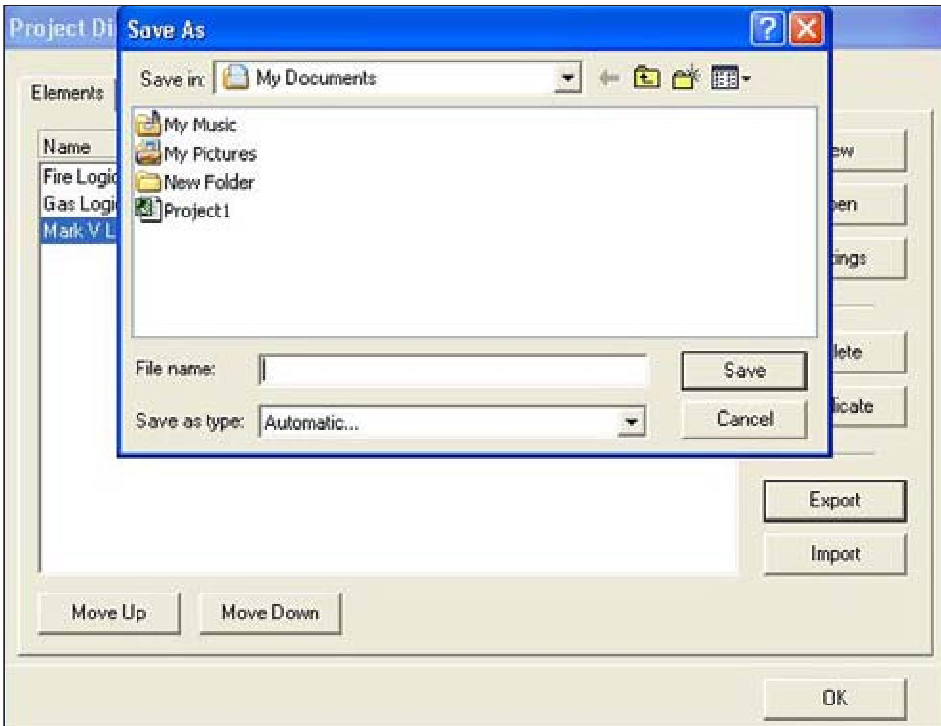
The import function facilitates bringing certain elements created in another project into the current one. These elements can be functions or function blocks.

When the "Import" button is selected, the standard Windows "Open" dialog box appears to allow navigation to the location of the source files to be "imported". A pull down menu allows filtering by type making it easier to locate the desired function or function block.



Export

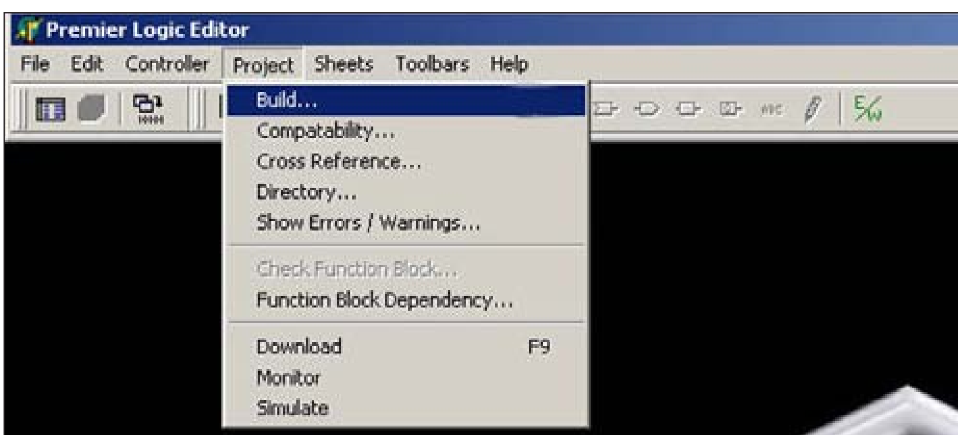
If a function block or function is highlighted in the project directory window, the "Export" button will become active allowing the element to be exported.



The standard Windows "Save As" dialog box allows for naming the file and choosing a destination to save to.

Build

The build option "compiles" the project. The project is a program that must be compiled to download to the controller.



The build process allocates memory, validates tagnames, validates data types, etc.

View the “Errors/Warnings” viewer if the build window indicates any errors or warnings. A preference selection will automatically open the “Errors/Warnings” viewer if selected.

Compatibility

Checks to see compatibility between S³ and controller firmware.

Cross Reference

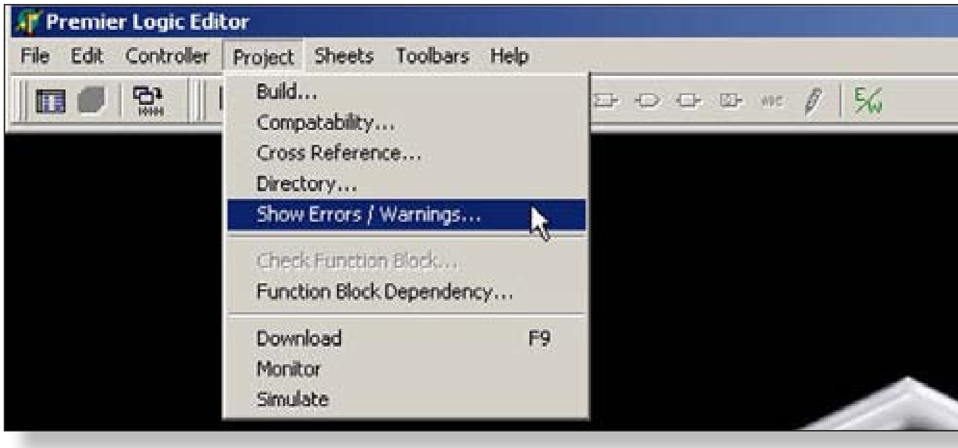
A list is generated to show every instance of tags and where they are used.

Directory

This menu selection opens the viewer and displays any problems found in the project during the last build (compile).

Show Errors/Warnings

This menu selection opens the viewer and displays any problems found in the project during the last build (compile).

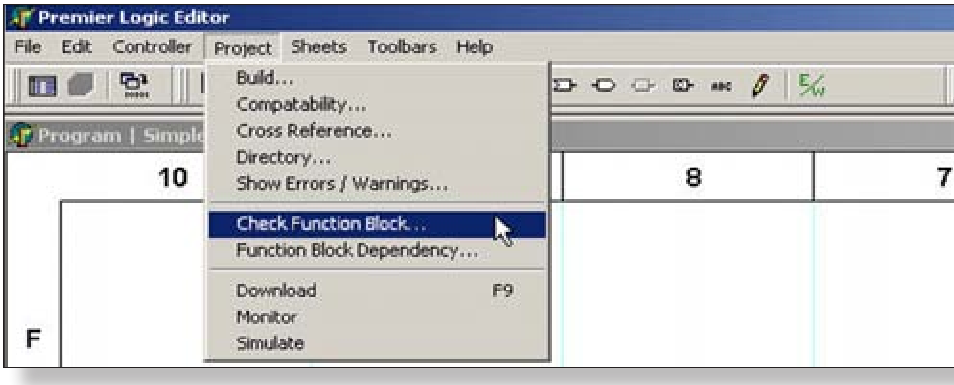


When enabled, the logic editor will display the "ERROR / WARNINGS VIEWER" at the completion of a project build listing any problems.

Selecting one of the errors will close the viewer and display the section of logic containing the problem. The list can be printed using the "Print" button in the lower left of the dialog box.

Check Function Block

When a function block is open for editing, this menu item becomes available. When selected S³ will check the validity of the program and list any found errors or warnings.

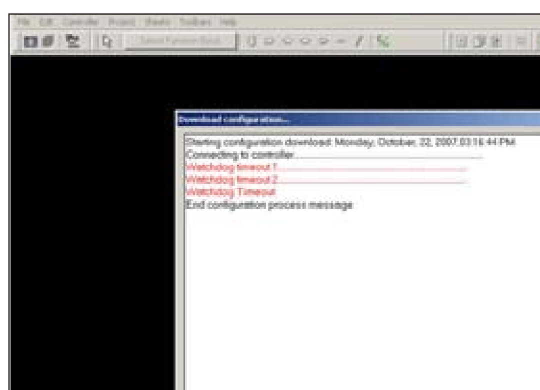


If a function block is not open for editing this feature is not available.

Download

Once the project has been "built" and no errors or warnings were discovered, selecting this menu item will transfer the project to the controller.

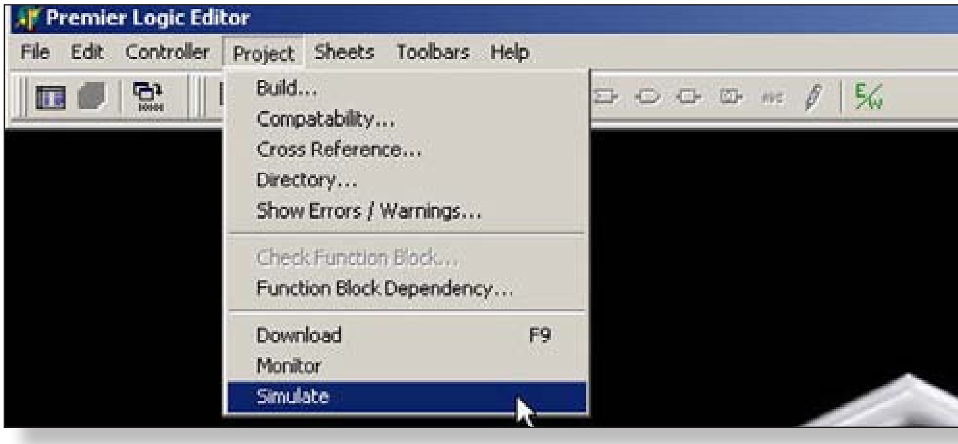
If a valid build is not found when the menu item is selected, S³ will automatically initiate a build and if no errors or warnings are discovered, the program is downloaded to the controller.



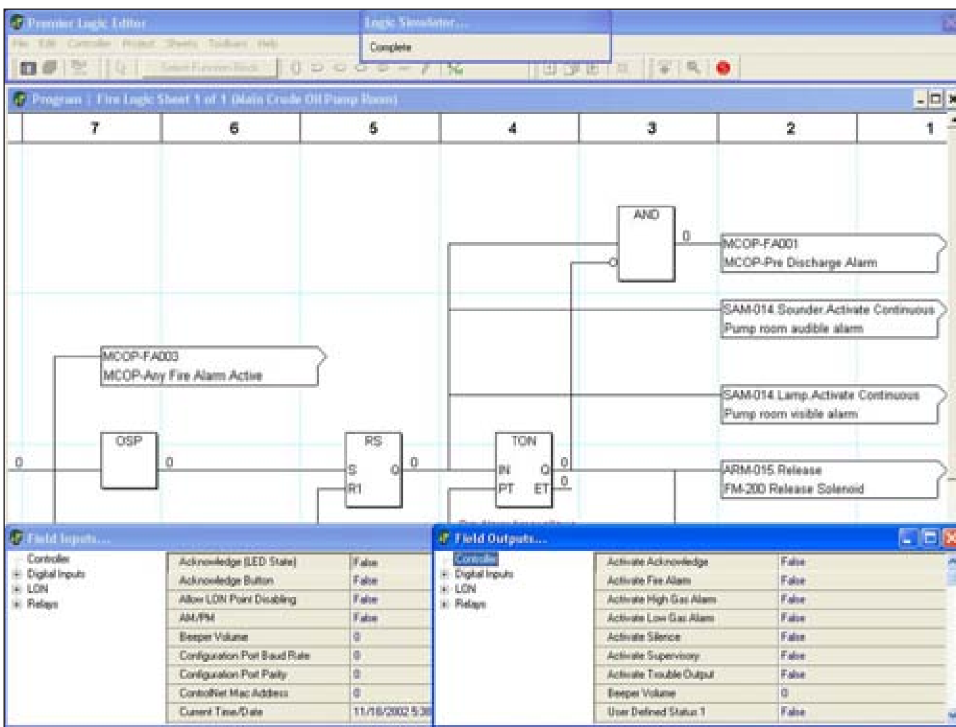
During the download process, a dialog box will open displaying the establishing of the communication connection with the controller, the download progress and listing any errors or warnings that may occur.

Simulate

If the project has been "built" and no errors were discovered then the program can be simulated within the S³ environment. Simulation allows for program testing and debugging without the need for an actual Eagle Quantum Premier controller being attached to the S³ workstation.



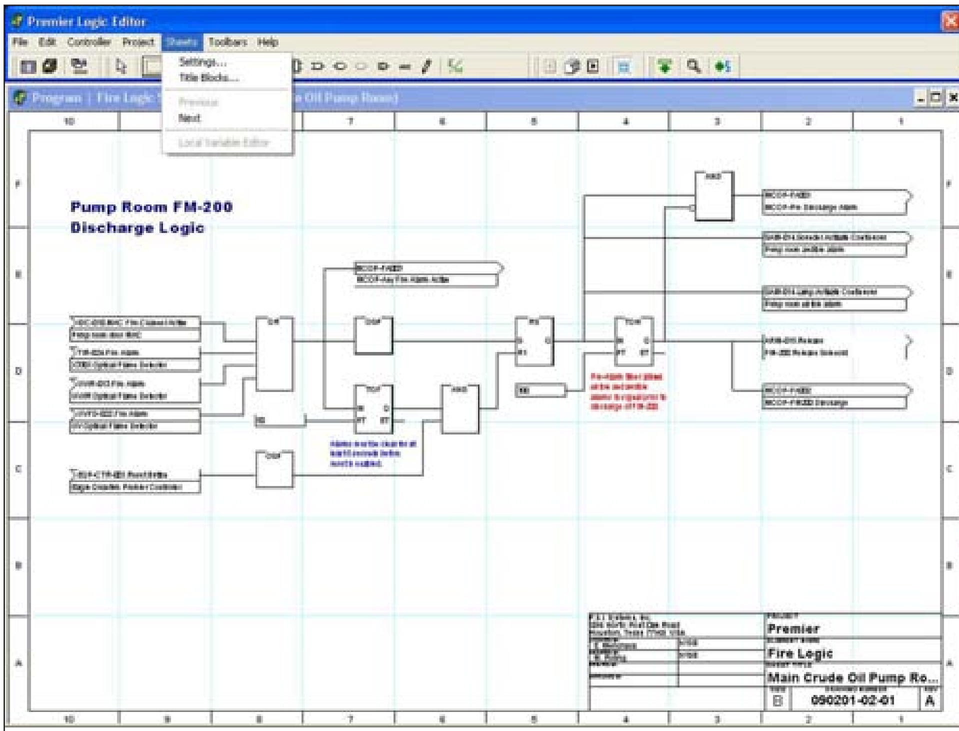
Below is an example of a program in the "simulation" mode.



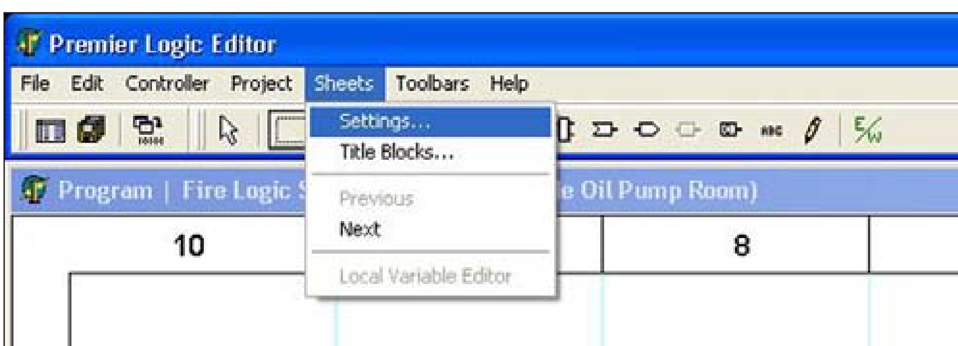
When the simulator is running, the value for each logic element is displayed on the screen to the right of the element. Inputs can be directly manipulated and variables can be modified as well.

Sheets Menu

The S3 logic editor utilizes a Computer Aided Design (CAD) style of program to create logic in much the same way that a draftsperson would have created drawings depicting logic in the past. Drawing “sheets” are used to create the logic and also serve as documentation of this logic.



The “Sheets” menu provides access to features determining the layout of the logic pages along with the information in the title block.

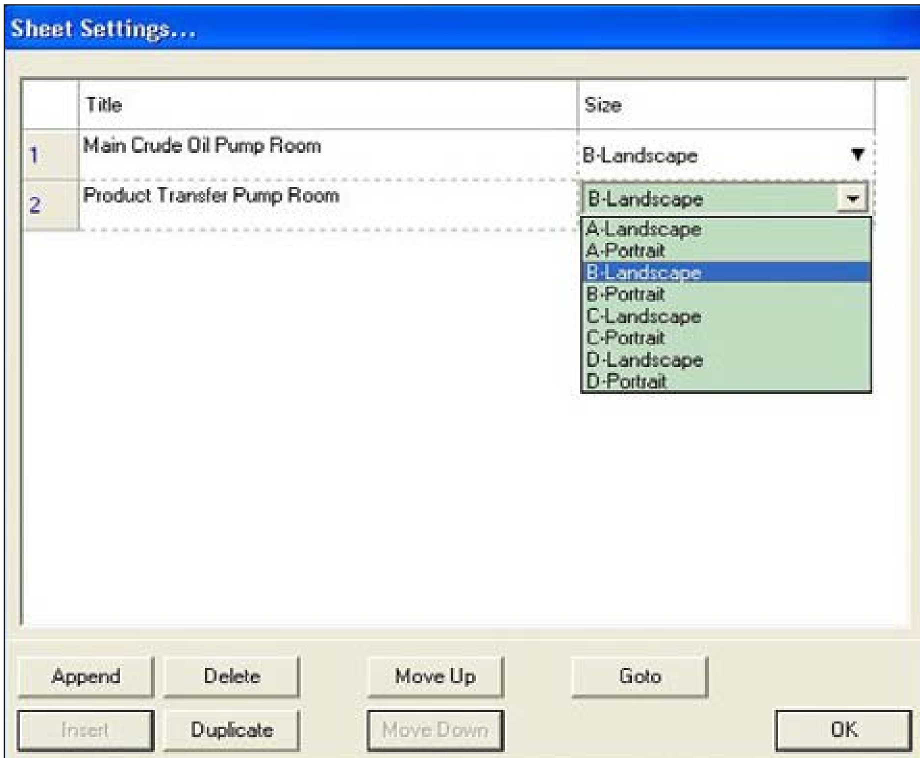


NOTE

None of these menu items will “do” anything unless an element (program or function block) has been opened from the project directory window.

Settings

This menu item opens a dialog box where logic pages are given a "title" that appears in the title bar of the window for the drawing sheet, and a size and orientation for the drawing sheet can be selected. The "Sheet Settings..." dialog box will list all existing sheets that have been created for an element (program or function block) along with seven buttons for "sheet management" purposes.



Size

A pull down menu to the right of the sheets title allows for the selection of the logic sheets size and orientation. Engineering drawing sizes ranging from "A" to "D" can be selected in either a Landscape (Horizontal) or Portrait (Vertical) orientation. In the example below, "B-Landscape" is selected which creates a sheet 17" wide by 11.5" high.

Append

This button will create a new sheet at the end of the list of existing sheets. On selection, a dialog box will open allowing the new sheet to be named upon creation.

Delete

This button will remove a selected sheet from the element. This cannot be "undone" and should be used with caution!

Insert

This button will create a new sheet after the sheet currently highlighted in the list of existing sheets. On selection, a dialog box will open allowing the new sheet to be named upon creation.

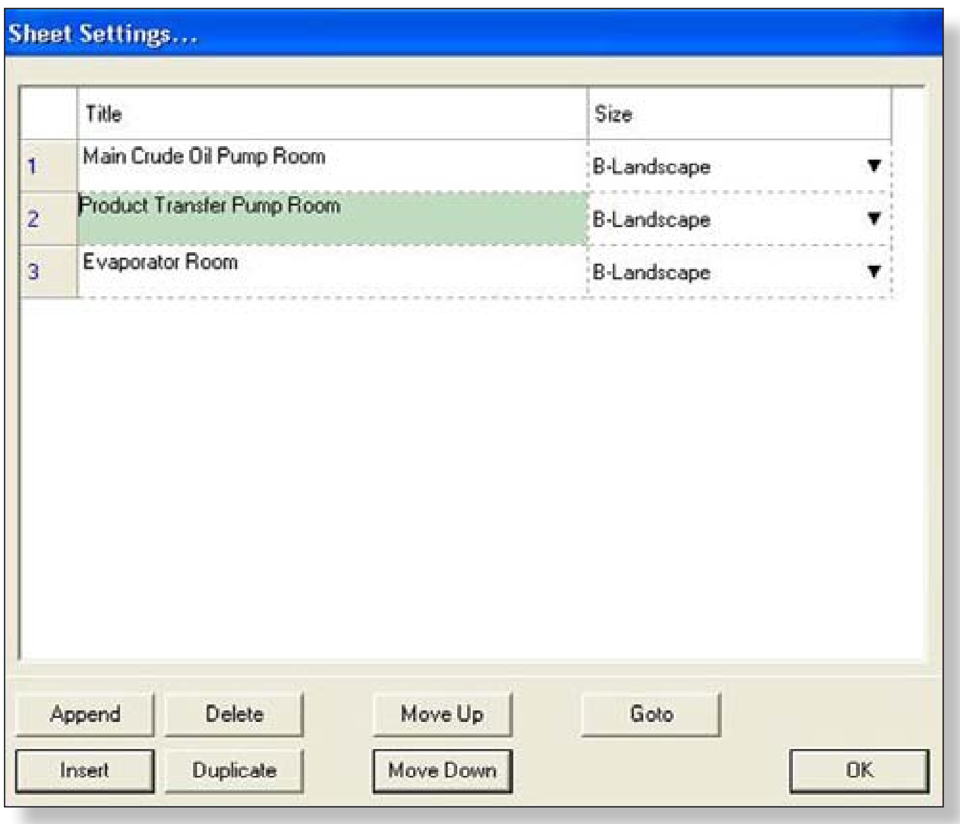
Duplicate

This button will create a new sheet at the end of the list of existing sheets. This "duplicate" will have a copy of all logic and settings on the original sheet. A dialog box will open allowing the new sheet to be named upon creation.

Move Up/Down

These two buttons are used to change a sheets position within the elements execution list. This is an extremely important feature in that the Eagle Quantum Premier controller executes logic in the order the sheets appear in the "Sheet Settings..." list.

In the example below, Item 2, the "Product Transfer Pump Room" sheet is selected. In its current position its logic will execute after the "Main Crude Oil Pump Room" and before the logic for the "Evaporator Room".



The "Move Down" button will place it after the "Evaporator Room" in both visible location in the list as well as logic execution order. The inverse would be true if the "Move Up" button were selected.

Goto

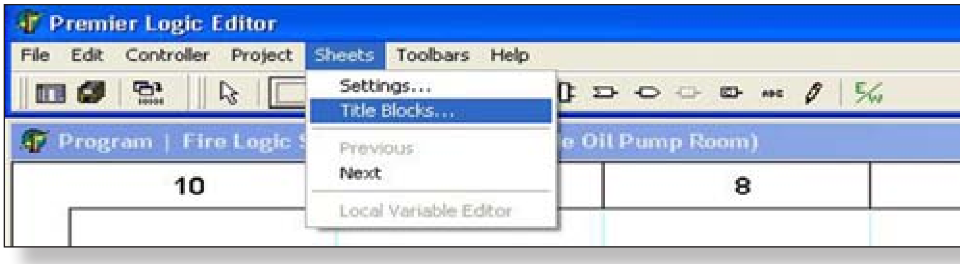
This button will open the sheet currently selected. In the example above, the Goto button will open the "Product Transfer Pump Room" sheet.

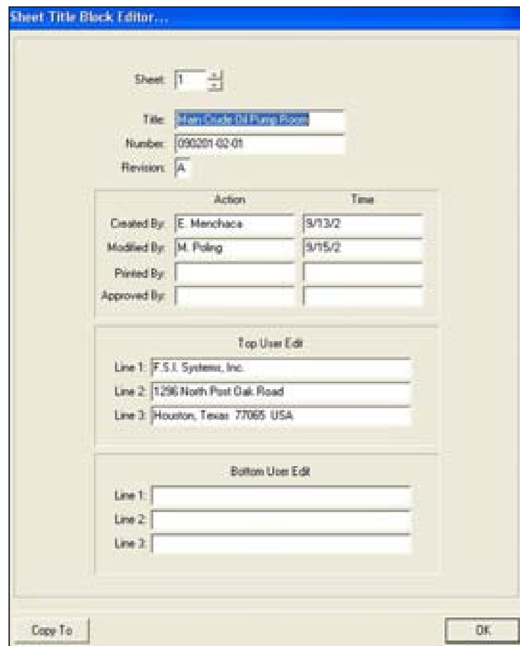
OK

The OK button will accept any changes and close the "Sheet Settings..." dialog box.

Title Blocks

In the lower right area of each drawing sheet is a "Title Block" area which contains fields typically used to describe the project and functionality of the logic on the sheet.





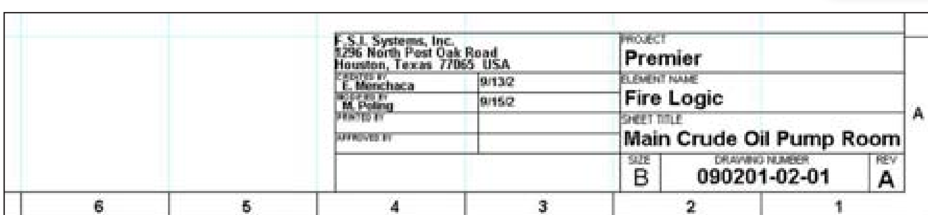
Selecting this menu item opens the "Sheet Title Block Editor..." dialog box. This dialog box provides 18 fields for data entry to describe the project and logic functionality.

The first field "Sheet" shows the current sheet number within the element (program or function block). Below that are fields for the sheet "Title", drawing "Number" and drawing "Revision".

Below this are fields for tracking the creation of the logic and modifications.

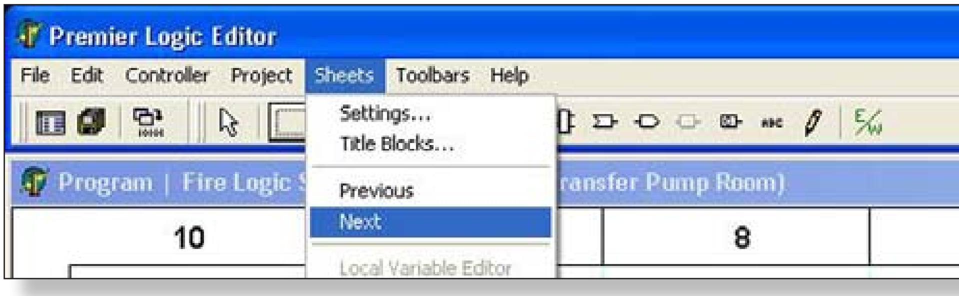
Below this are three field each for a "Top" and "Bottom" user edit. The top area is three lines to the left of the project name, the bottom area is three lines to the left of the drawing size.

In the lower left of the dialog box a "Copy To" button allows the entered information to be copied to any other selected sheets within the same element (program or function block).

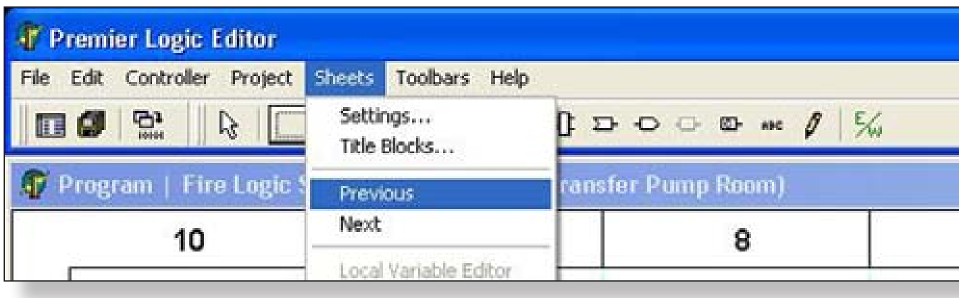


Next/Previous

These menu items become active whenever an element has more than one logic sheet.

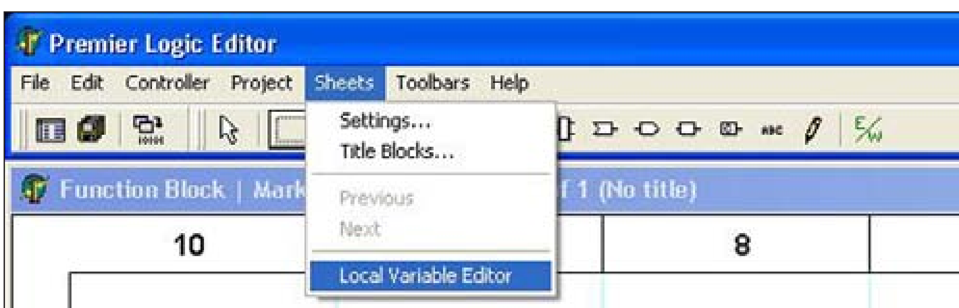


They change the displayed logic sheet to the next or previous one as is appropriate.



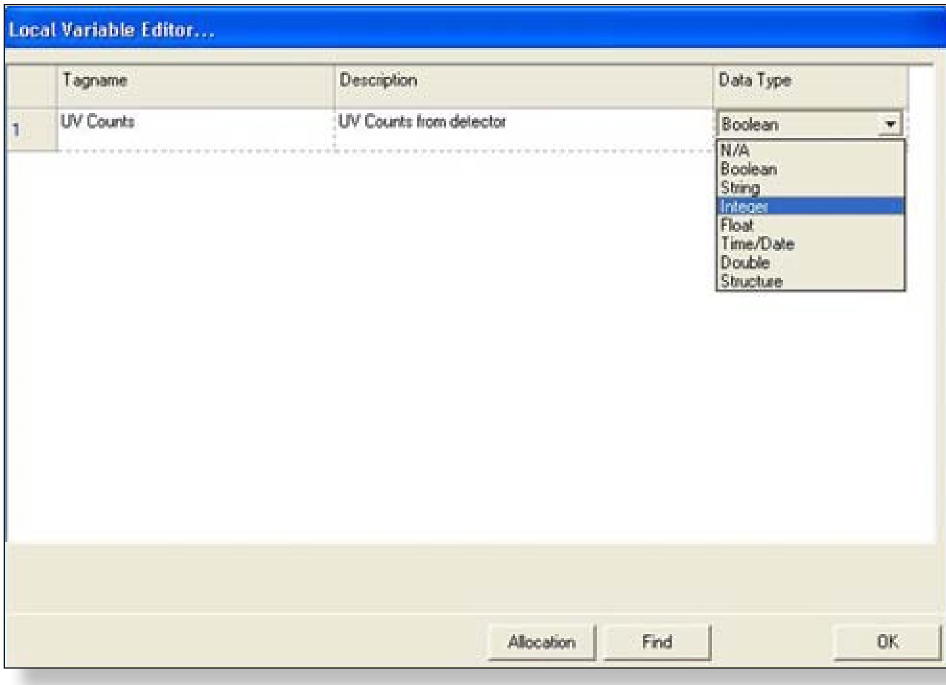
Local Variable Editor

Variables are used to store intermediate values within a logic program or function block. "Local Variables" are only used within a function block and their values are not accessible outside of that specific function block. Before local variables can be used, they must first be created. This is done with the "Local Variable Editor..." accessible through the menu selection.



This menu selection is only available when a function block sheet is currently active.

In the example below, a single variable is being created, the tagname "UV Counts" has been entered, the description has been entered, and the pull down menu is active in order to choose the appropriate "Data Type" for the variable. The default quantity of local variables allocated by S^3 is "1" and must be changed to meet the needs of the function block being created.

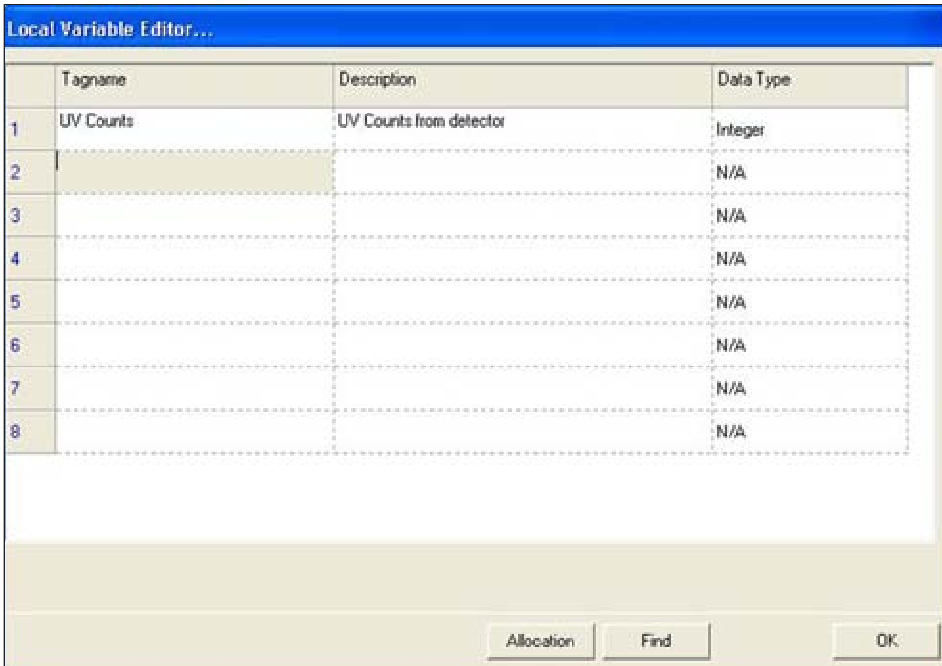


The "Allocation" button at the bottom center of the "Local Variable Editor..." dialog box will open the "Local Variable Allocation..." dialog box.

From here up to 1K (1024) local variables can be allocated. In the example to the right, "8" has been entered into the field and will be created.

Once the "OK" button is selected, the allocation dialog box will close and 8 "slots" are now allocated for variable creation within the Local Variable Editor.

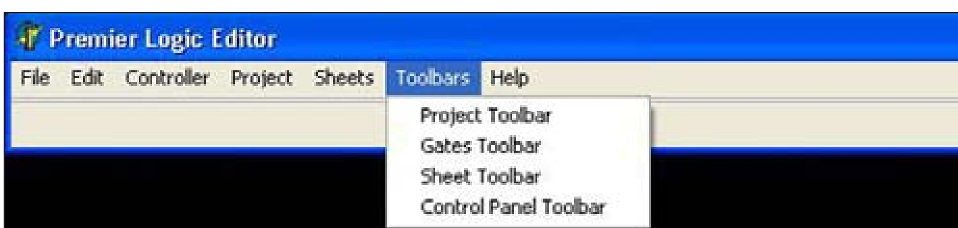
In the example below the creation of local variable #1 “UV Counts” has been completed and there are now additional slots to create up to eight local variables.



NOTE
The number of local variables available (1-1024) is not dependent on the data type, i.e. more variables do not become available by simply choosing only boolean types instead of integer or floating point types.

Toolbars Menu

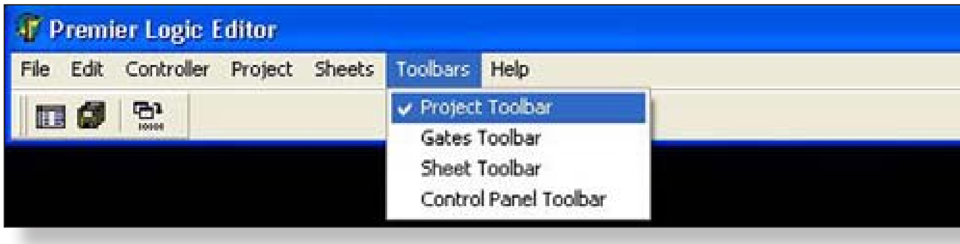
Toolbars provide “shortcuts” to many menu items described earlier. The “Toolbars” menu provides a mechanism for enabling or disabling any or all of the four “Toolbars” used in the logic editor. By default all are enabled.

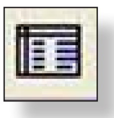


For the example above all have been disabled and the toolbar area of the logic editor (horizontal area just below the menu names) is empty.

Project Toolbar

This toolbar provides three shortcuts; Project Directory, Save Project and Build Project.





Project Directory

The project is divided into elements. These elements are made up of programs and function blocks. Selecting this icon provides access to the tools for the creation, opening, ordering, duplication, deleting and configuration of these project elements. It also allows for the importing and exporting of function blocks.

Save Project

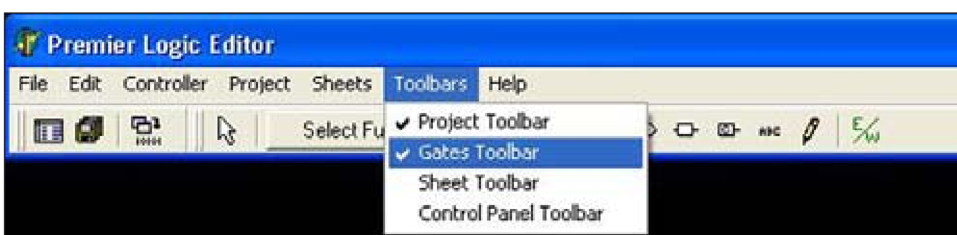
Selecting this icon saves the project. Note that the project is automatically saved whenever the "Build" command is initiated.

Build Project

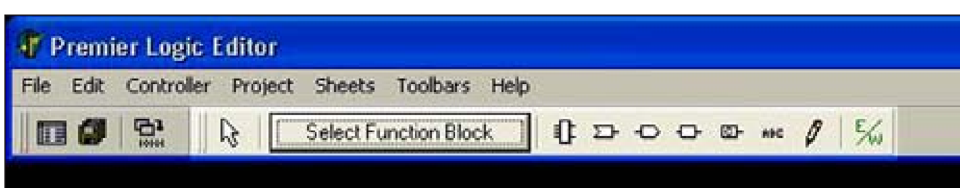
Selecting this icon builds (compiles) the project. The project is a program that must be compiled before it can be downloaded to the controller. The build process allocates memory, validates tagnames, validates data types, etc.

Gates Toolbar

This toolbar provides access to all of the tools used in the creation of the logic programs and function blocks.



The "Gates Toolbar" provides access to ten logic creation, editing and verification tools.

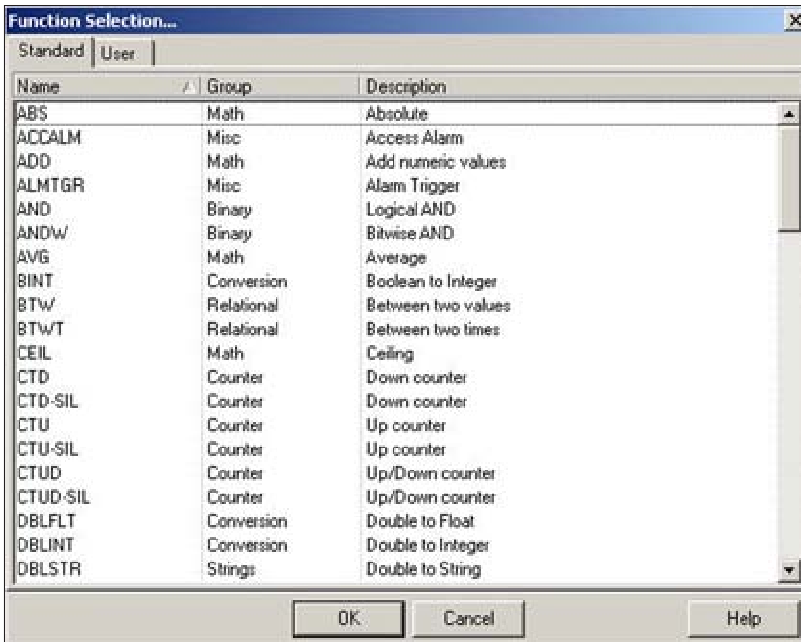


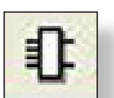
Pointer Tool

This arrow shaped tool is used to select and manipulate the position and or size of any logic function on a sheet.

Select Function Block

This button opens the “Function Selection” window which contains a scrolling list of all standard and user created functions available for selection.

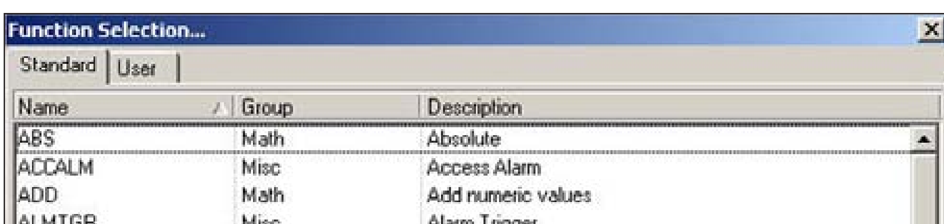




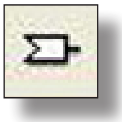
Function Block Icon

When the user selects a standard or a user created function block from the “Function Selection...” window, the selection is saved. The “Function Block” icon then becomes a shortcut to this last selected function block.

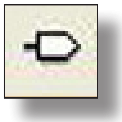
In the example below the “ABS” function is selected via the “Function Selection...” window. When the window is closed the “ABS” function will be assigned to the “Function Block” icon.



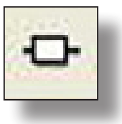
Subsequent selections of this icon will allow repeated selection and placement of this gate type without having to reopen the “Function Selection...” window.



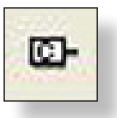
Input Variable
All input variables to a program or function are via this symbol. Once placed on a logic sheet, the input variable must be “linked” to a compatible parameter on the controller, a field device, or a location in controller memory.



Output Variable
All output variables from a program or function are via this symbol. Once placed on a logic sheet, the output variable must be “linked” to a compatible parameter on the controller, a field device, or a location in controller memory.

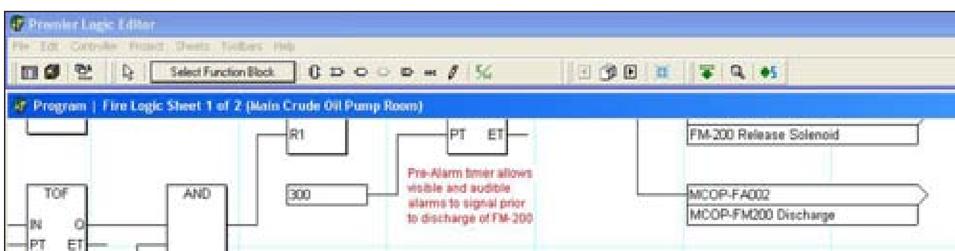


Local Variable
Local variables are available in function blocks only. If a sheet for a standard “Program element” is opened, this function will be grayed out. These variables provide for the transfer of values between sheets of a multi-sheet block and private local storage (local variables).

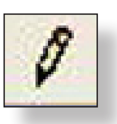


Constant Value
Constants allow for user set values to be input to a function or output variable that do not change during the execution of the program or function.

Comment
The user may want to place comments on the sheets to communicate what task a section of logic performs or any other annotation.



In the example above, there is a comment indicating “Pre-Alarm timer allows visible and audible alarms to signal prior to discharge of FM-200” below the timer that delays discharge while annunciation is in progress.

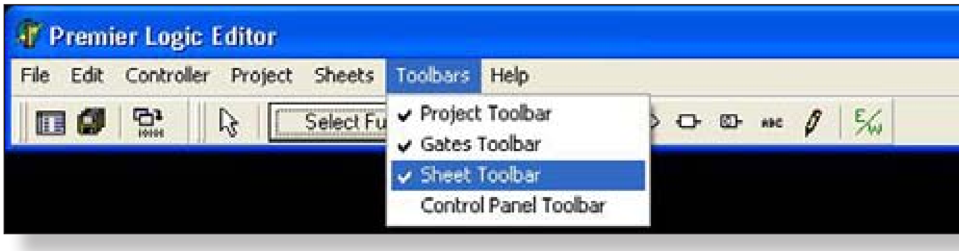


Connection Tool
The function block inputs and outputs are connected via the “Connection Tool”. This tool is also referred to as the “Line Tool” and the “Wire Tool”.

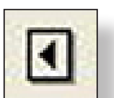
Errors/Warnings
When a build is performed any and all errors are reported via a window. This icon opens the “Error/ Warning Viewer” described earlier in this section.

Sheet Toolbar

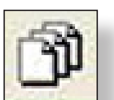
There are four icons which provide shortcuts to menu items having to do with logic sheets.



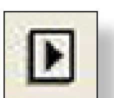
These four icons from left to right are; Previous Sheet, Sheet Settings, Next Sheet and Fit to Window.



Previous Sheet
When a multi-sheet logic or function block element is open and a "previous sheet" exists, this button will highlight and its selection will open the previous sheet.



Sheet Settings
Sheets have a name, size and position. Via this icon the "Sheet Settings..." window is opened from which sheets can be created, deleted and have their name changed. In addition a sheets logic execution order can be changed.



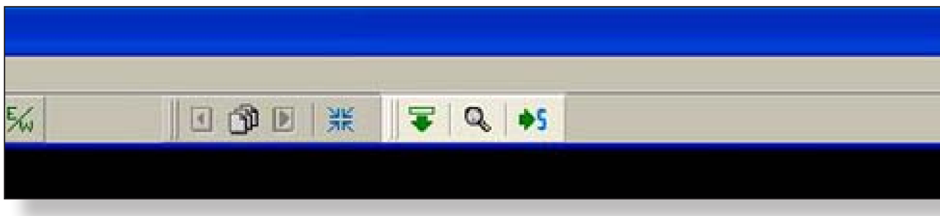
Next Sheet
When a multi-sheet logic or function block element is open and a "next sheet" exists, this button will highlight and its selection will open the next sheet.

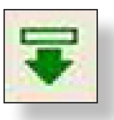
Fit to Window
This icon scales the drawing sheet so that the entire sheet can be viewed in one window. Editing is not allowed when the "Fit to Window" feature is active.

Control Panel Toolbar

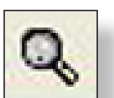
There are three icons which provide shortcuts to menu items having to do with logic and the controller.

These three icons from left to right are; Download, Monitor and Simulate.





Download
When this icon is selected and the project has been "built" and no errors were discovered then the program is transferred to the controller. If a valid build is not found then a "build" is performed and if no errors are discovered the program will be downloaded to the controller.

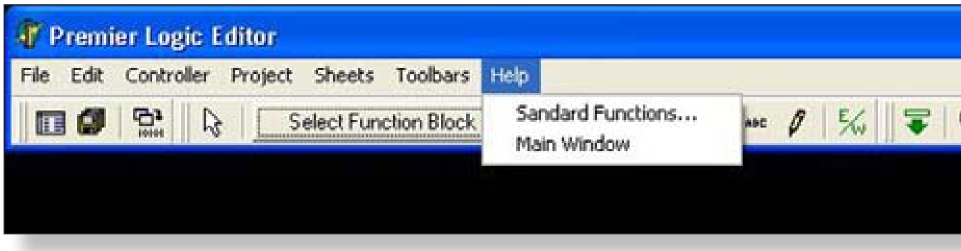


Monitor
When connected to a controller and the project matches the program in the controller, the logic of the program can be monitored. In the monitor mode, the logic sheet is displayed on screen and the results of all function block bins can be viewed.

Simulate
If the project has been "built" and no errors were discovered then the program can be simulated on the S^3 workstation. If a valid build is not found, the build is automatically performed and if no errors are found the simulation is started.

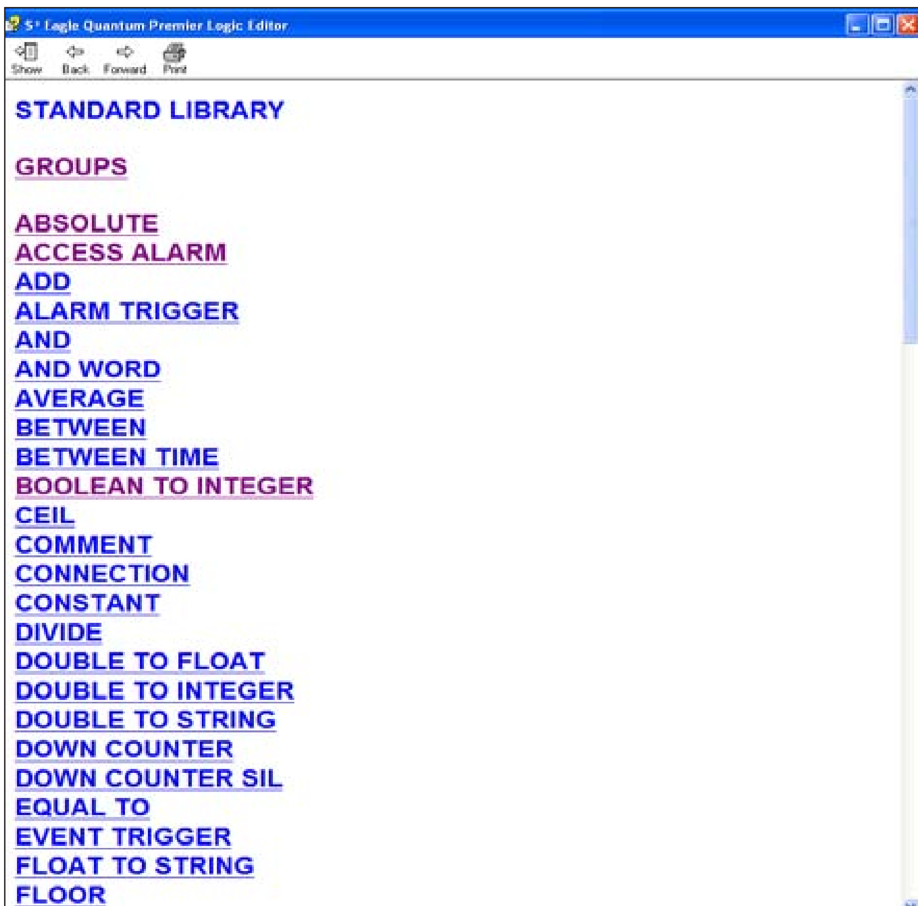
Help Menu

The help menu provides access to the online help system and has two areas; "Standard Functions" and "Main Window".



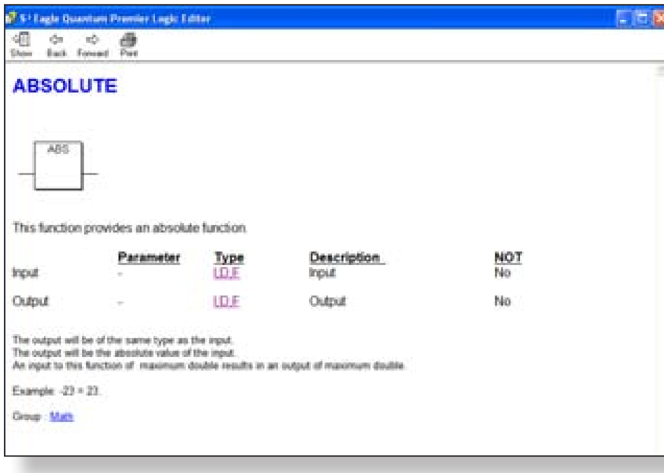
Standard Functions

This portion of the help system covers all of the available logic operators available for use in the logic editor. Selecting this menu item will open a hypertext linked help window featuring all available logical operators.



To access detailed information on a subject, click on a library function and the information will be displayed.

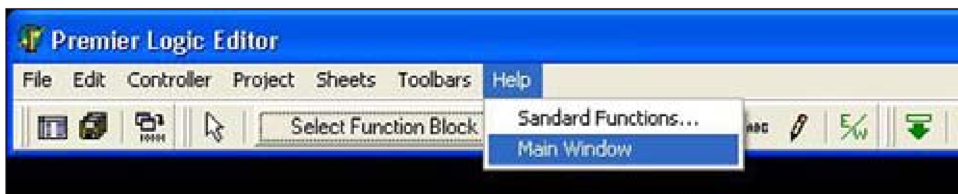
In the example below, the "Absolute" function was selected and the details of how to use this function are shown.



Use the Contents, Index, Back and Print buttons below the help windows menu bar to navigate the help system and print hard copies as required.

Main Window

This portion of the help system covers the description and operation of the icons in the logic editors tool bar.



Pictures of the tool bar icons are shown along with a description of their functions.

Use the Contents, Index, Back and Print buttons below the help windows menu bar to navigate the help system and print hard copies as required.

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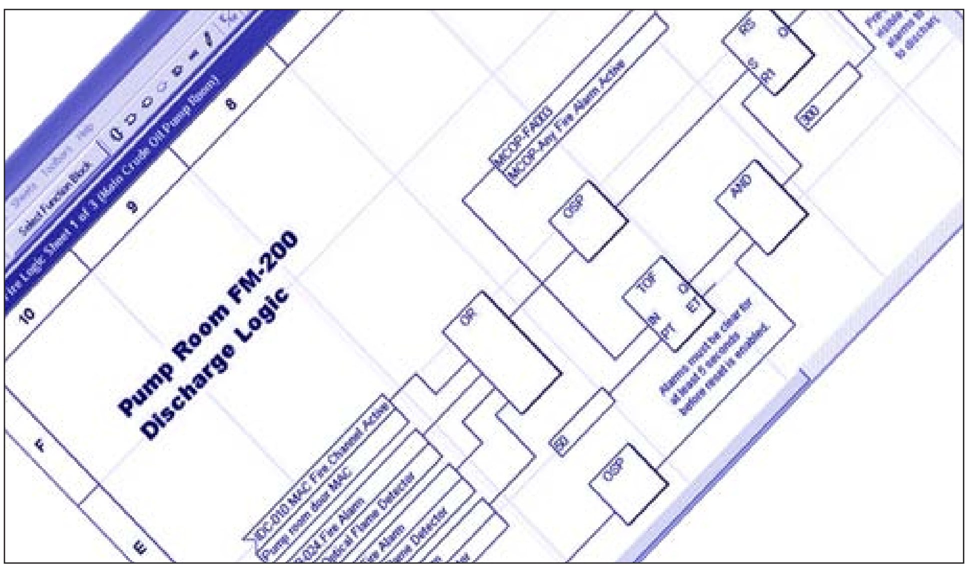
Logic Creation

The S³ Logic Editor provides a modern full featured IEC-61131-3 style environment to generate, test and document user programmable logic for Eagle Quantum Premier controller.

S³ utilizes the “Function Block Diagram (FBD) Language”.

FBD is a graphically oriented language that corresponds to block logic diagrams. The elements used in this language appear as blocks wired together to form logic circuits. The wires can communicate binary and other types of data between FBD elements. In FBD programming, a group of elements visibly interconnected by wires is known as a network. An FBD diagram may contain one or more networks. In the S³ programming environment these networks can span multiple sheets within a program or function block element.

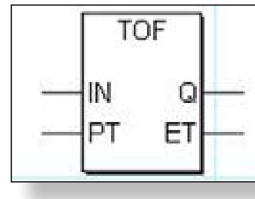


Definitions

Programs

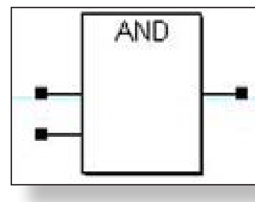
Programs are the highest-level executable elements within an S^3 project. Programs can invoke functions or function blocks, but cannot invoke other programs. Projects are typically partitioned into multiple programs based on the operational requirements of an installation.

Function Blocks



In S^3 a function block is an executable element that yields one or more values and is generally used to perform repetitive operations. Variables within a function block persist from one evaluation of the function block to the next, so that the values calculated for one evaluation can be used in the next. Therefore, invocation of the same function block with the same input values may not yield the same output values. Examples of such function blocks are timers and counters like the Timer OFF delay (TOF).

Functions



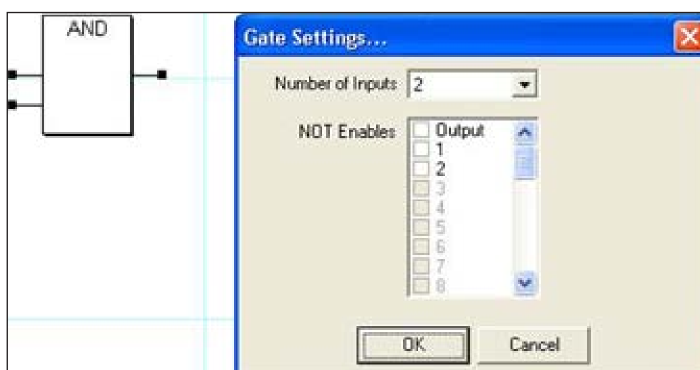
A function is an executable element that yields exactly one result. Unlike function blocks, variables in a function do not persist from one evaluation to the next. An example of a typical function is the boolean “AND” gate. Two or more inputs are evaluated and result in a single output.

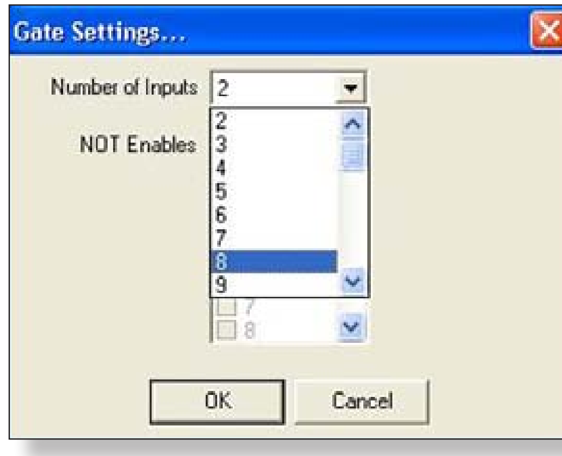
Extensible Functions

These functions have a minimum of two (2) inputs and can have a maximum of thirty two (32). The number of inputs into the function can be adjusted by double clicking on it.

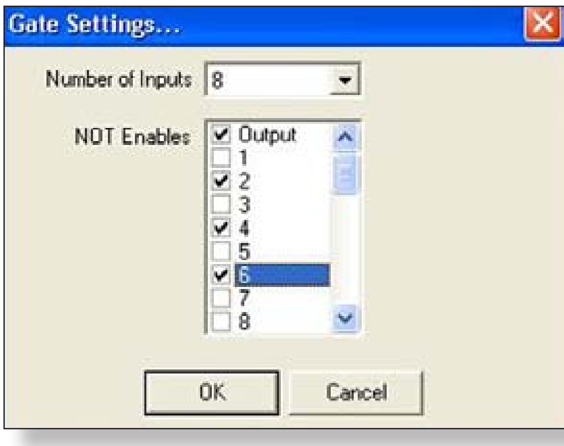
This will open a dialog box allowing the input number to be set and also may allow inverting any or all of the inputs as well as the output.

In the AND gate example to the right, the default of two non inverted inputs and a non inverted output are shown. To change the extensible number of inputs, click on the arrow to the right of the “Number of Inputs” field.

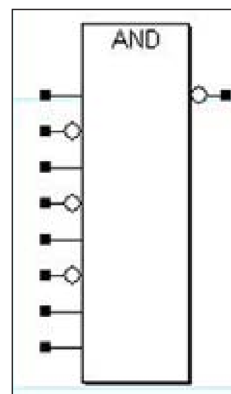




The "Gate Settings..." dialog box provides a scrolling pull-down menu from which the number of inputs can be adjusted anywhere between Two (2) and Thirty Two (32).



In the examples above and to the left, eight inputs were selected and then inputs Two (2), Four (4) and Six (6) were inverted by clicking on the "NOT Enable" checkbox corresponding to those inputs. In addition, the output was inverted in the same manner.

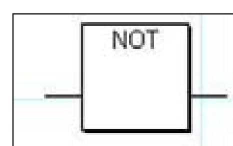


Once these selections were made, clicking on the "OK" button closes the "Gate Settings..." window and the re-configured function appears as in the example to the left.

Note the small circles on the output and input "pins" indicate that these signals are "Inverted" from their normal state.

Non-Extensible Functions

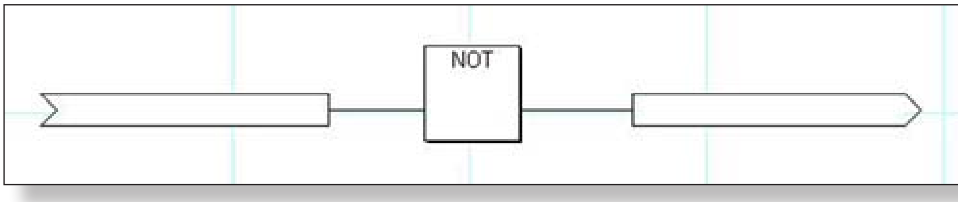
These functions have a single non expandable input. One example of a non-extensible function is the boolean "NOT" gate, as shown in the example to the right. A single input with a single output.



Placing Logic Operators on a Sheet

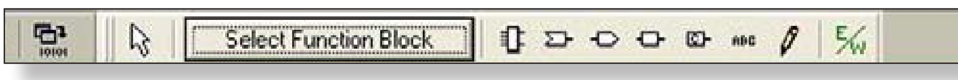
To develop a program the user must be able to use the Logic Editor to place functions, function blocks, variables, inputs and outputs on a sheet within an element and then connect them together into viable networks.

Below is an example of one of the simplest networks possible, a non-extensible function with a single input and a single output.



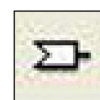
To create this network open a sheet within a created element and place the three logic operators on the sheet and connect them together.

1. All logic operators are selected via the icons on the “Gates Toolbar” shown above and described earlier in this section.



2. Click on the “Input Variable” icon on the Gates Toolbar.

   The cursor will change to a miniature input variable symbol when positioned within the drawing area of the current sheet.



3. Place the Input Variable on the sheet by positioning the mouse cursor over the sheet and clicking the left mouse button.

   The cursor will return to the “Arrow” symbol and this tool can be used to move the placed Input Variable to the desired location on the sheet. It may also be moved using the arrow keys.

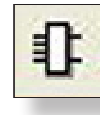
4. Activate the  button on the “Gates Toolbar” to open the “Function Selection...” dialog box.

5. Scroll down the list of available logical operators (function blocks or functions) and locate the binary “NOT” operator.

NOTE

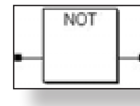
If the name of the desired operator is known, it can be located quickly by typing its name. Once typing has begun, S³ will automatically reposition the scrolling list.

6. Select **NOT** and click "OK".

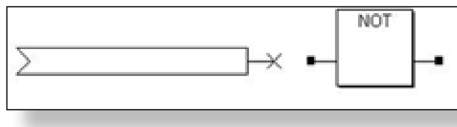


The cursor will change to a miniature function block symbol when positioned within the drawing area of the current sheet.

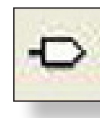
7. Place the "NOT" function on the sheet by positioning the mouse cursor over the sheet and clicking the left mouse button.



The cursor will return to the "Arrow" symbol and this tool can be used to move the placed function to the desired location on the sheet. It may also be moved using the arrow keys.

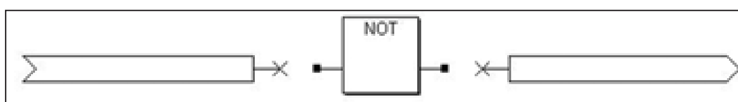


8. Click on the "Output Variable" icon on the Gates Toolbar.



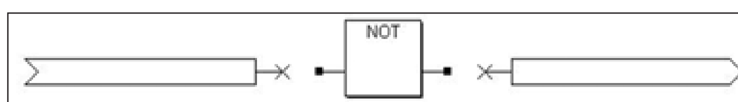
The cursor will change to a miniature output variable symbol when positioned within the drawing area of the current sheet.

9. Place the Output Variable on the sheet by positioning the mouse cursor over the sheet and clicking the left mouse button.



Once all three logic operators are placed on the sheet, they must be connected together before the program can be considered finished and ready to be compiled.

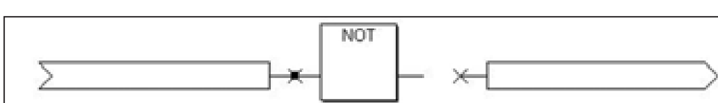
Connecting Logic Operators



Inputs, outputs, constants, functions, function blocks, etc. can be connected to each other either directly or by using "wires". In the example to the right, connections must be made between the input, output and NOT gate.

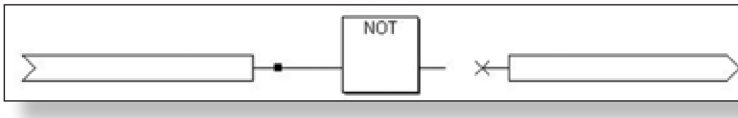
Direct Connection

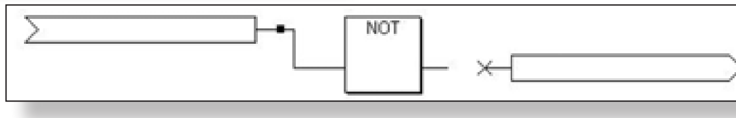
To use the "direct connect" method, use the mouse to select the Input Variable and drag it to the right until its output connector mates with the NOT gates input connector as shown below.



At this point, the S[3] has linked the Input Variable to the input of the NOT gate and moving the Input Variable away with the mouse will automatically create a "wire" to keep the connection, as shown to the left.

Once this connection is established, the input variable can be repositioned anywhere left of its connection point and the connection wire will change size and shape to keep the connection.

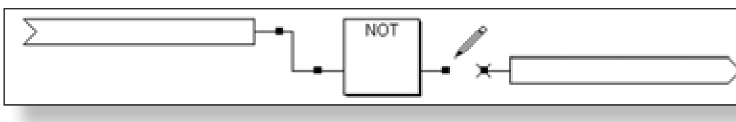




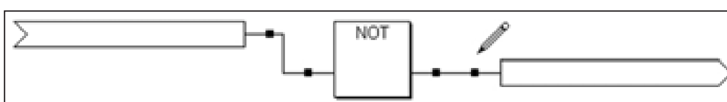
Using Wires

Click on the "Wire Tool" to activate it. The cursor changes to a miniature wire tool or pencil when it is positioned anywhere within the drawing area of the sheet. This means that wires can be drawn from one logic operator to another to connect them.

When active, the wire tool appears as in the example below. Using the wire tool, connect the output of the NOT gate to the input of the Output Variable. This will complete the drawing of this three logic operator network.

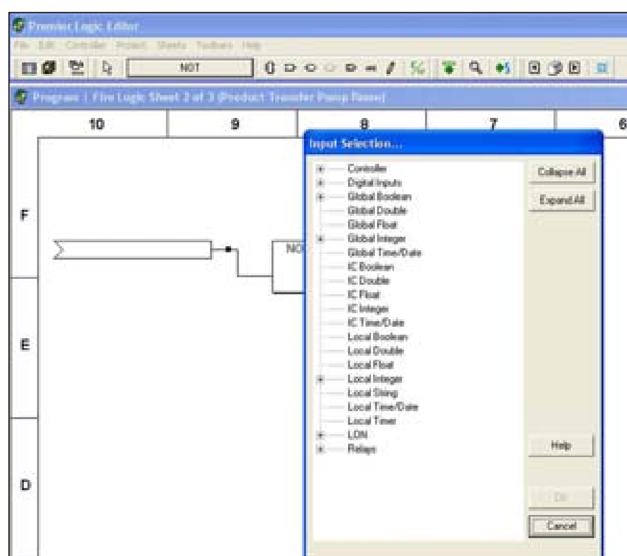


Next, the Input Variable and Output Variable must be "linked" to an appropriate I/O point or memory location in the controller.



Linking Variables

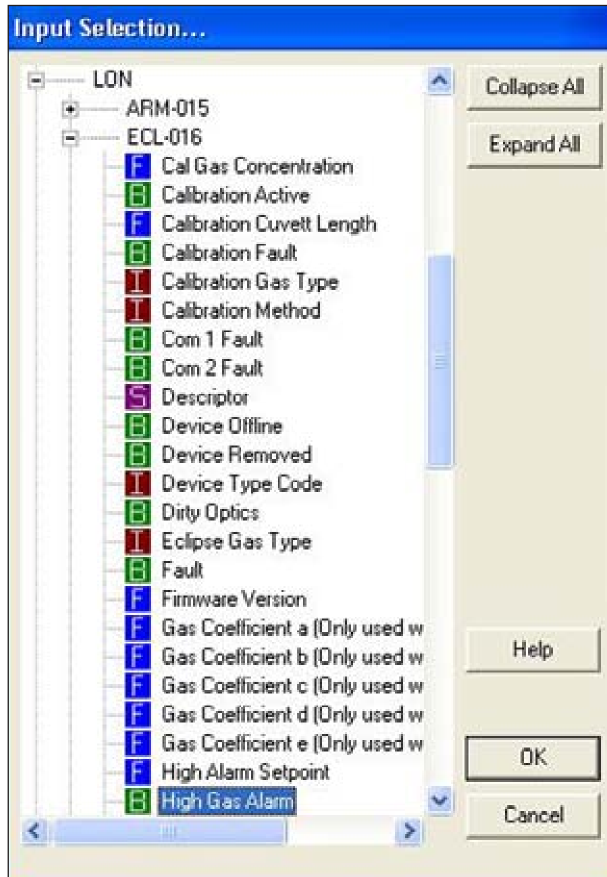
Input and output variables must be linked to compatible field device or controller memory data. Using the three logic operator "example network" created on the previous page, double-clicking on the "Input Variable" will open the "Input Selection..." dialog box which provides access to the Eagle Quantum Premier's database.



The "Input Selection..." dialog box presents the database as a hierarchical list of sources. Any item on the list that has a "+" before it has subordinate items and clicking on the "+" will expand the list showing all items that make up that category.

To the right of the list are two buttons that can "Collapse All" or "Expand All" subordinate items in the list for easy viewing. The first nineteen items on the list provide access to controller status information and the globals database. The "LON" item will allow access to all field device information, the "Relays" item is for accessing the controllers onboard relay status.

In the example to the right, the "LON" category has been expanded to reveal the field devices and then a Point IR Gas Detector (PIRECL) tagged "ECL-015" has been expanded. The data available for this device exceeds the window length and the list has become "scrolling" to accommodate the expanded data.

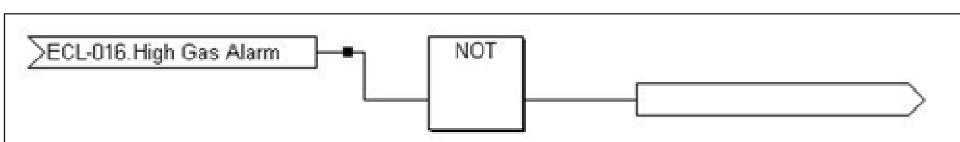


In this example, a "Boolean*" or "Binary" data element named "High Gas Alarm" has been selected by clicking on it with the mouse. Its selection is noted by its text description being highlighted.

The "block" with a letter preceding the data points name indicates the "Data Type" for that point.

The NOT gate in our example network requires a "Binary" data type for both inputs and outputs. The "High Gas Alarm" selected meets this criteria.

Selecting the "OK" button closes the "Input Selection..." dialog box and "links" the "ECL-015 High Gas Alarm" to the "Input Variable" of the example network, as shown below.

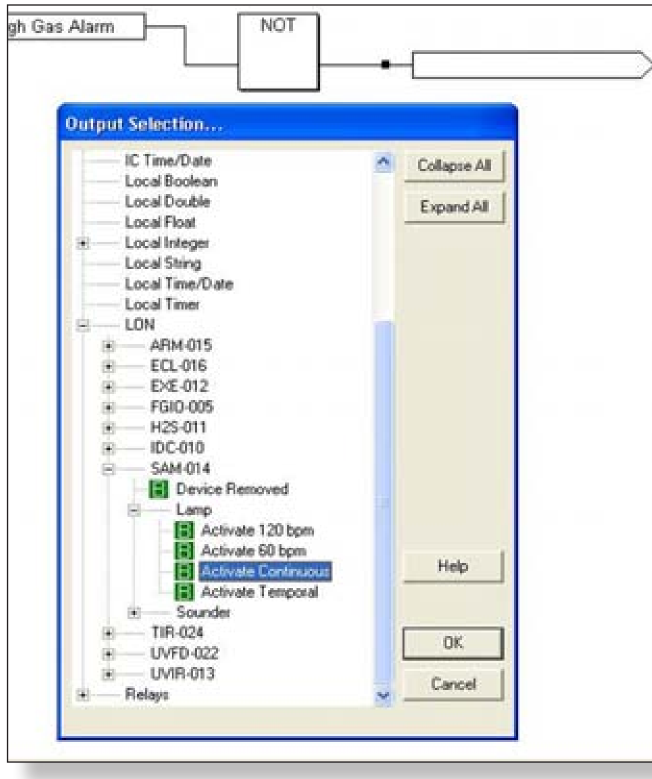


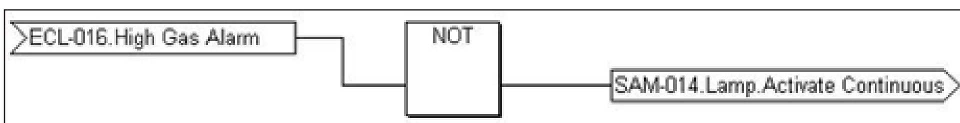
**NOTE*
For detailed "Data Type" definitions, structures and ranges, refer to section 13-67.

The final step in completing the example network is to link the NOT gates output variable to an appropriate point. Double clicking on the "Output Variable" opens the "Output Selection..." dialog box.

This dialog box presents the database in the same manner as described on the previous page for the input selection process.

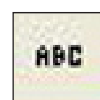
For this example, the LON data structure has been expanded, a Signal Audible Module (SAM) with the tagname "SAM-014" has been expanded and the Binary data point "Activate Continuous" for the Lamp output has been selected. Selecting the "OK" button will close the "Output Selection..." dialog box and link this output to the output variable as shown below.

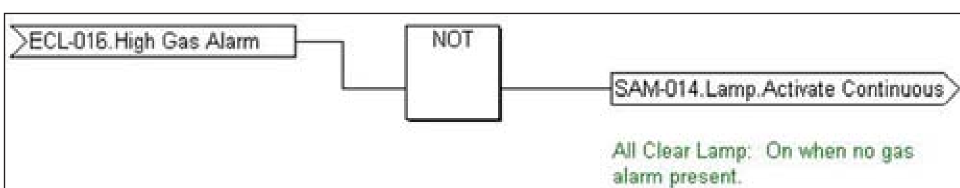




The network is now complete, when the High Gas Alarm for ECL-016 goes "ON" the lamp controlled by SAM-014 goes "OFF".

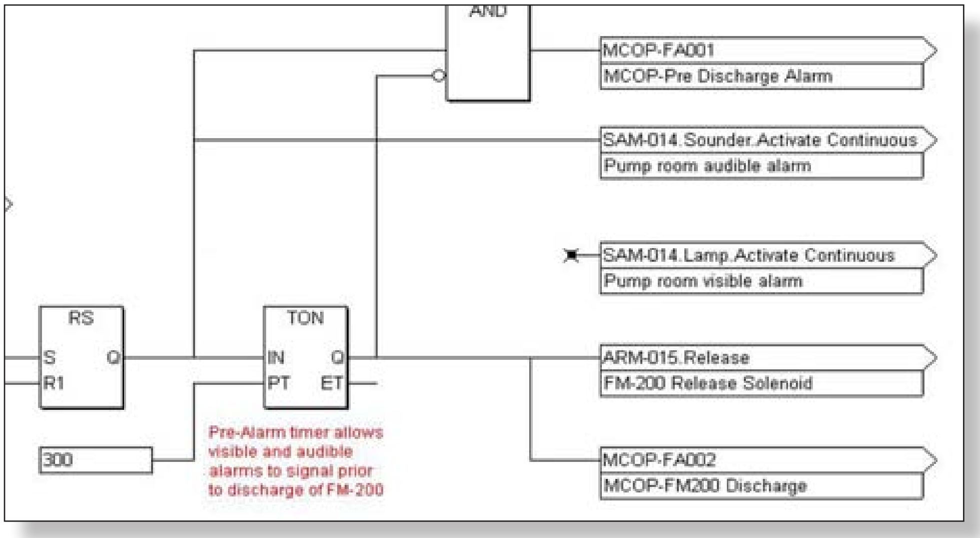
Using the "Comment Tool" a description can be added to explain the purpose of the output.



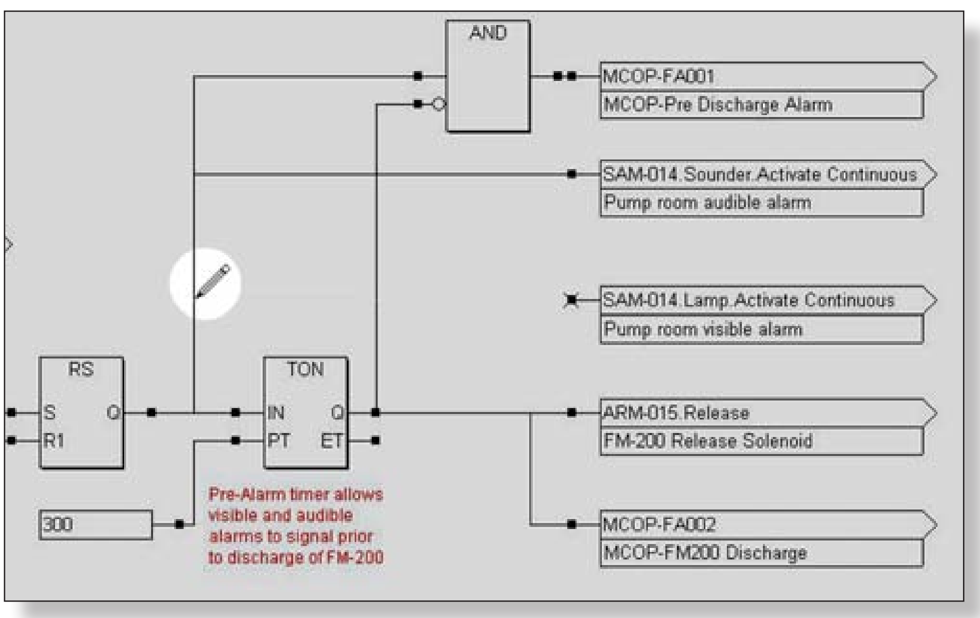


Wire-on-Wire

This type of connection is used when a single signal needs to be routed to multiple destinations as in the example below.

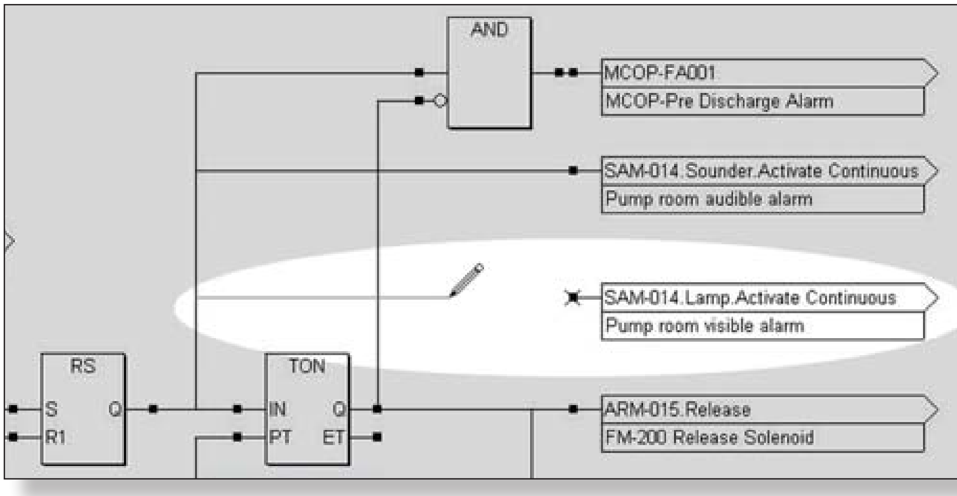


In this example the output “Q” of a “Reset-Set (RS)” block needs to be routed to the input of an “AND” gate, to the input of a timer (TON) and to two output locations on SAM-014. The first connection to SAM-014’s audible alarm is complete, the second connection to SAM-014’s visible alarm output needs to be created.

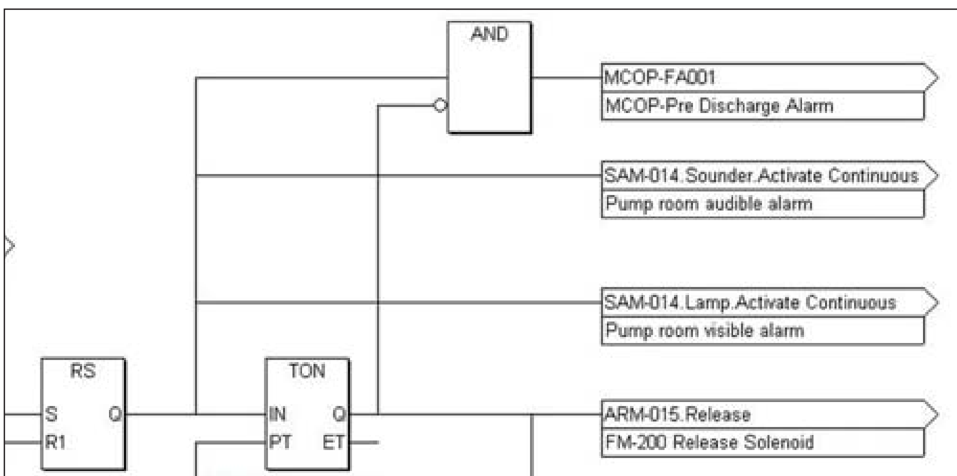


To accomplish this type of connection the “Wire Tool” is used. Select the “Wire Tool” and place it on an existing “wire” where a connection is desired.

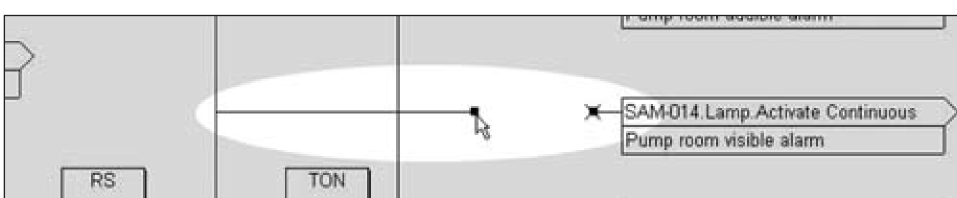
Click to and drag to make the connection and create a wire. Draw the wire from the initial wire-to-wire connection point to the input of the desired variable.



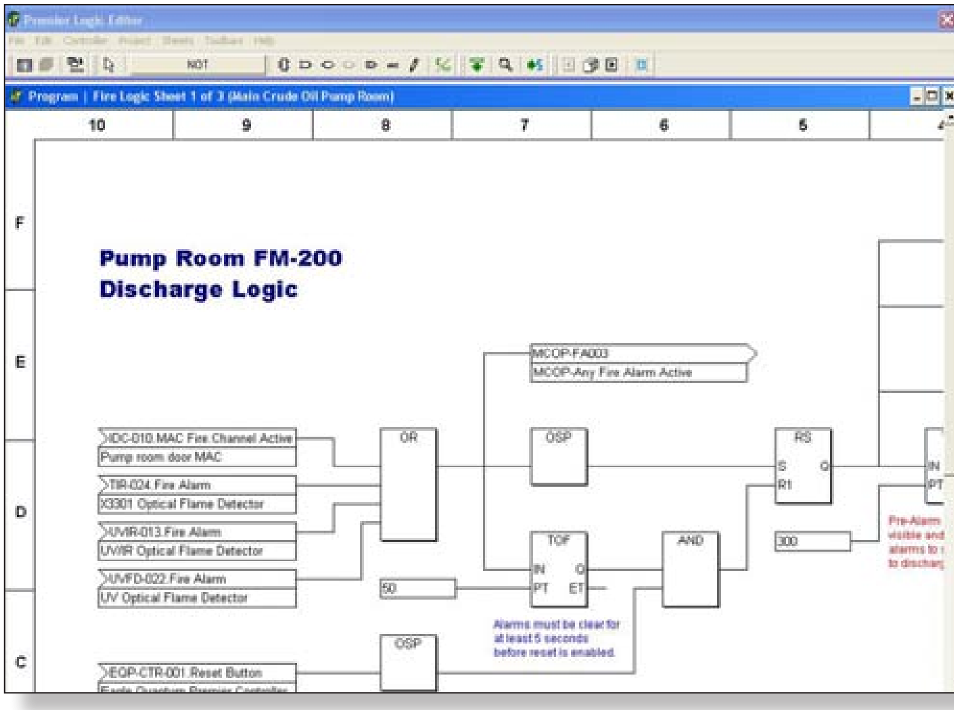
The completed circuit will look like the example below.



If the mouse button is released while "drawing" the wire, before completing the connection, an incomplete line segment will be created. To complete this segment, use the arrow tool to click and drag the incomplete end of the wire to its desired destination.



Combining the techniques described in the last few pages with the comprehensive standard set of S[3] functions and function blocks, virtually any kind or complexity of logic can be created quickly and easily.

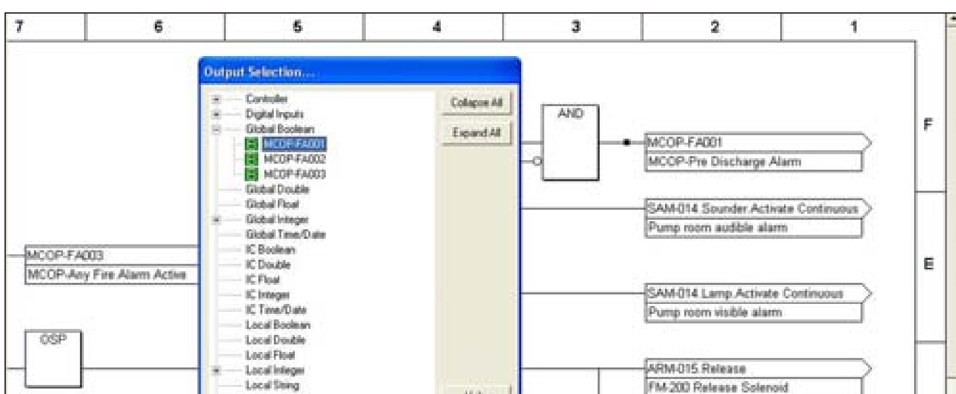


The example above utilizes a binary OR, a One Shot Pulse (OSP), a binary AND, a Reset/Set (RS) and text comments to create a portion of the protection logic for a pump room. In some cases, the complexity of the logic being designed or just the number of logic operators required may use more room than is available on the selected sheet size.

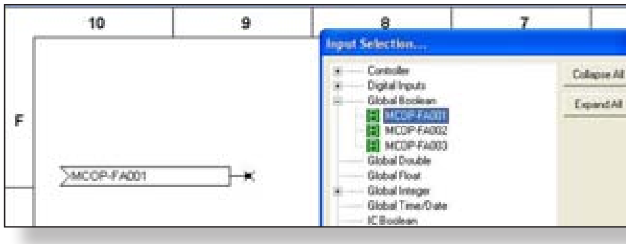
In these cases, the sheet can be made larger by selecting the “Settings” item of the “Sheets” menu. Sheet size can be increased from the minimum “A” size up to a maximum “D” size. If once the desired sheet size has been selected more room for logic is still required, information can be sent “between” the sheets in an element.

Sheet-to-Sheet Network Linking

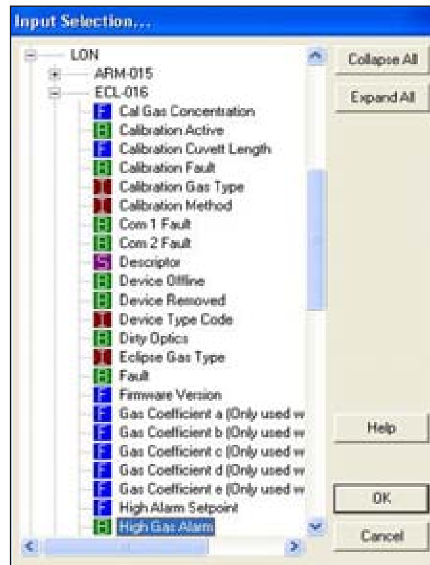
For very complex logic situations, it may be necessary for a logic network to span more than one sheet. This is fully supported and easy to implement. By assigning an “Output Variable” to a compatible “Global Variable” memory location in the controller, the value can then be accessed on another sheet.



In the example to the below, an Input Variable was placed and linked to a global memory point “MCOP-FA001”.



The value for this point was generated on the preceding sheet where it was assigned to the global database. Once placed in the global database, the value of “MCOP-FA001” can be used as an “Input Variable” on any other sheet in the project.



Data Types

Functions and Function blocks typically require a specific data type to be attached to their input and output pins. The S^3 online help file provides detailed information on both the data type compatibility requirements as well as how each logic operator functions. Below is a definition of the available data types, within the S^3 database these types are represented as follows:

B = Boolean
I = Integer
D = Double
F = Float
S = String
T = Time/Date

Detector	**IEC 1131-3**	**Range**
Boolean	Boolean	8 bit value, 1 = True, 0 = False
Integer	Integer	2 bytes, 16 bit value, -32,768..32,767
Double	Double Integer	4 bytes, 32 bit value,2,147,483,648..2,147,483,647
Float	Real	4 bytes, 32 bit value (IEEE 754 single precision) Most positive number 3.4028E+38 Least positive number 1.1754E-38 Least negative number -1.1754E-38 Most negative number -3.4028E+38

NOTE
When floats are used in a comparison for Equal (=), the comparison will be true if the values are within 0.01 of each other.

String String 80 bytes (Not supported as an I/O variable)

Time/Date Undefined

Item ID	Description	Data Type
1	Seconds (0-59)	Integer
2	Minutes (0-59)	Integer
3	Hours (0-23)	Integer
4	Day (1-31)	Integer
5	Month (1-12)	Integer
6	Year	Integer

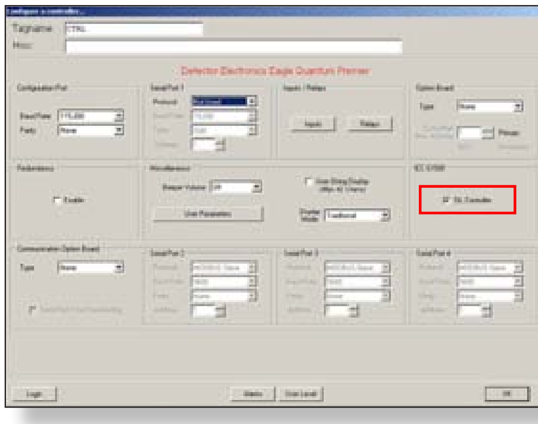
When displayed as a string the format is mm/dd/yyyy hh:mm:ss

Structure Structure A structure that does not have a fixed length.

Creating a SIL 2 project

As specified by IEC 61508 there are 4 levels of safety performance necessary for a safe functioning system. Det-Tronics supports a SIL 2 program when using S^3 6.x.x.x+ to build a project and downloading to controller version 6.xx+. Creating a SIL 2 project is similar to any other project in S^3, with a few extra steps. Follow these steps to create a SIL 2 project.

1. From the “Configure a controller…” screen, check “SIL Controller” as seen below .



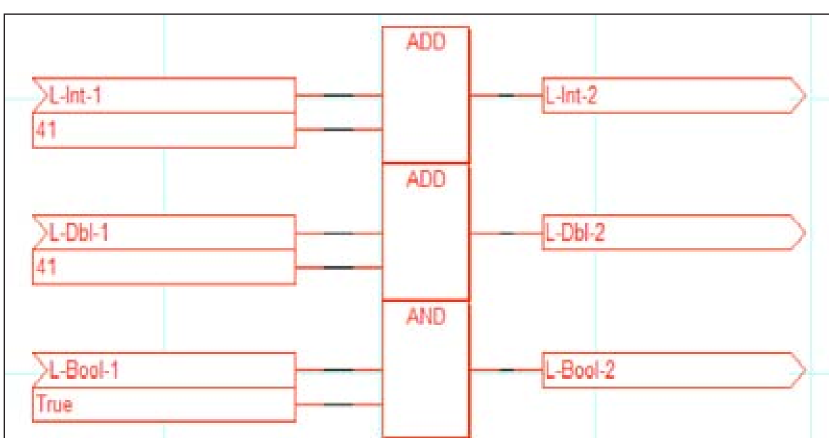
2. From the “Select point type…” screen, select the desired devices for a project. Note that the SIL devices are in red.

3. Once the controller is set as a “SIL Controller” and a SIL device is chosen, the screen should look similar to that of the figure below. If a devices’ name is not in red text, then the project is not SIL 2 compliant, this is also true for the controller.

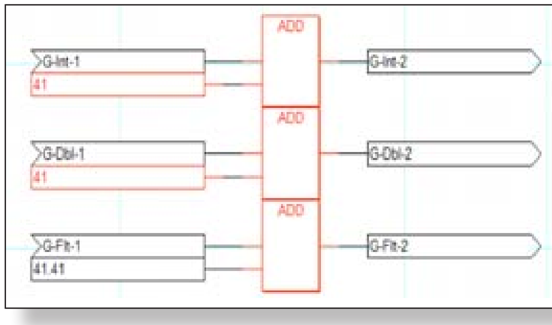
If there is difficulty reading red text on a black background, it is possible to change the background color by clicking the “Point Color” button as seen on the example screen above.

SIL Logic

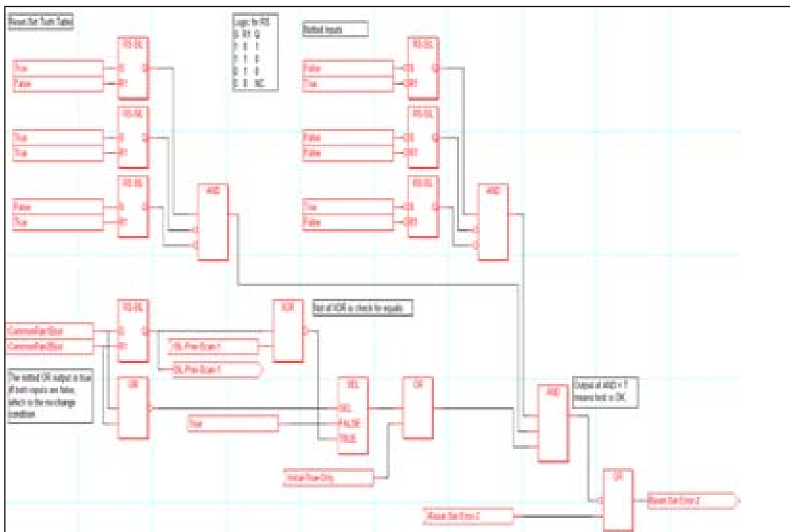
The “Premier Logic Editor” within S³ is designed to make life easy for the user to create and determine if a logic program complies with SIL 2. The program or custom function block will comply with SIL 2 if all the logics in the program are red, with the exception of the connecting paths, comments and user defined functions. Custom user defined functions are always in black regardless whether the function is SIL 2 compliant or not. If the plan is to include a user defined function block in a SIL 2 program, it must be manually verified as SIL 2 compliant. The figure to the left, and on the following page display some examples of SIL 2 and non-SIL 2 logic.



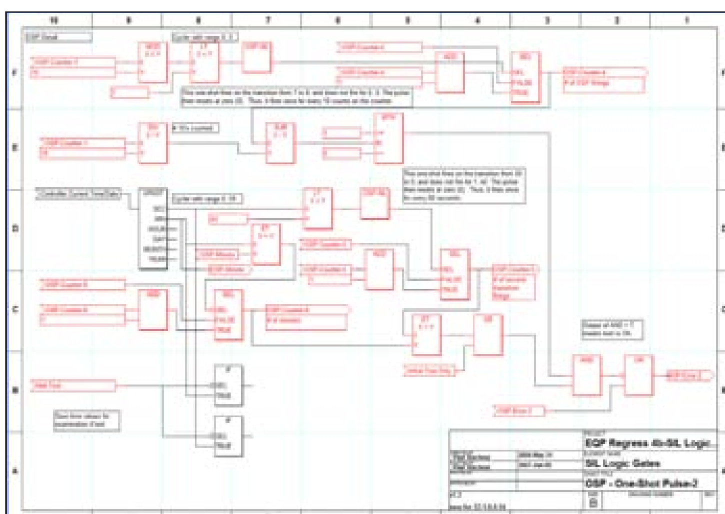
SIL 2 compliant. Everything is red.



Not SIL 2 compliant. There are non-red colored inputs and outputs.



SIL 2 compliant, everything is red except comments.



Not SIL 2 compliant, mixed usage of black logic gates with red logic gates.

Categories

The categories have the following meanings:

SIL
This item is SIL by specific design. Always RED

False
This item is not SIL due to a known condition that makes it non-SIL. There is a SIL equivalent. Always BLACK

No
This item is not SIL. It may have characteristics that would require a specific design to be SIL, but it was not designed/built that way. There is no SIL equivalent. Always BLACK

Yes
This item is SIL by characteristics. For example, there is no internal storage associated with this item and it only uses OK datatypes. RED if SIL controller, BLACK otherwise

Mutable
This item may or may not be SIL, based on the type of inputs and whether or not the inputs/outputs are themselves SIL-certified. RED if SIL controller, BLACK otherwise

Not Applicable
A SIL characteristic is not applicable, often because there is no active logic associated with this item.
Always BLACK

Functions

Gate/Function Name	Logic Function	Category	Notes
ABS	ABSOLUTE	Mutable	
ACCLAIM	ACCESS ALARM	No	Strings
ADD	ADD	Mutable	
ALMTGR	ALARM TRIGGER	No	
AND	AND	Yes	
ANDW	AND WORD	Yes	
AVE	AVERAGE	Mutable	
BTW	BETWEEN	Mutable	
BTWT	BETWEEN TIME	No	
BINT	BOOLEAN TO INTEGER	Yes	
CEIL	CEIL	No	
	COMMENT	Not Applicable	
	CONNECTION	Not Applicable	
	CONSTANT	Mutable	
DIV	DIVIDE	Mutable	
DBLFLT	DOUBLE TO FLOAT	No	
DBLINT	DOUBLE TO INTEGER	Yes	
DBLSTR	DOUBLE STRING	No	
CTD	DOWN COUNTER	False	
CTD-SIL	DOWN COUNTER SIL	SIL	
ET	EQUAL TO	Mutable	
EVTTGR	EVENT TRIGGER	No	
FLTSTR	FLOAT TO STRING	No	
FLR	FLOOR	No	
FRAC	FRAC	No	
GT	GREATER THAN	Mutable	
GE	GREATER THAN EQUAL TO	Mutable	
IF	IF	No	
	INPUT	Mutable	
INTBOL	INTEGER TO BOOLEAN	Yes	
INTDBL	INTEGER TO DOUBLE	Yes	
INTFLT	INTEGER TO FLOAT	No	
INTSTR	INTEGER TO STRING	No	
LT	LESS THAN	Mutable	
LE	LESS THAN EQUAL TO	Mutable	
LMT	LIMIT	Mutable	
MAX	MAXIMUM	Mutable	
MEDIAN	MEDIAN	Mutable	
MIN	MINIMUM	Mutable	
MBREAD	MODBUS READ	No	
MBWRT	MODBUS WRITE	No	
MOD	MODULO	Yes	
MOFN	M OF N	Yes	
MOSP	MOSP	No	
MUL	MULTIPLY	Mutable	
MUX	MULTIPLEX	Mutable	
NOT	NOT	Yes	

Gate/Function Name	Logic Function	Category	Notes
	NUMBER OF BITS	Yes	
ODD	ODD	Yes	Strings
TOF	OFF TIMER	False	
TON	ON TIMER	False	
TOF-SIL	ON TIMER SIL	SIL	
TON-SIL	ON TIMER SIL	SIL	
OSP	ONE-SHOT	No	
OSP-SIL	ONE-SHOT SIL	SIL	
OR	OR	Yes	
ORW	OR WORD	Yes	
OUT	OUTPUT	Mutable	
PACK16	PACK 16	Mutable	
PKDT	PACK DATE/TIME	No	Integers to Date-Time
PULSER	PULSER	No	
RS	RESET/SET	False	
RS-SIL	RESET/SET SIL	SIL	
RTM	RETENTIVE TIMER	False	
RTM-SIL	RETENTIVE TIMER SIL	SIL	
RND	ROUND	No	
SCALE	SCALE	No	
SEL	SELECTOR	Mutable	
SR	SET/RESET	False	
SR-SIL	SET/RESET SIL	SIL	
SQR	SQUARE	No	
SQRT	SQUARE ROOT	No	
STRAPD	STRING APPEND	No	
STRCPY	STRING COPY	No	
STNCPY	STRING N COPY	No	
SUB	SUBTRACT	Mutable	
S^3 MON	S^3 MON	No	
TDSTR	TIME/DATE TO STRING	No	
TRUNC	TRUNCATE	No	
UNPK16	UNPACK16	Mutable	
UPKDT	UNPACK DATE/TIME	No	
CTU	UP COUNTER	False	
CTU-SIL	UP COUNTER SIL	SIL	
CTUD	UP/DOWN COUNTER	False	
CTSU-SIL	UP/DOWN COUNTER SIL	SIL	
XOR	XOR	Yes	

Colorings

- Always RED
- Always BLACK
- Always BLACK
- RED if SIL controller, BLACK otherwise
- RED if SIL controller, BLACK otherwise
- Always BLACK

Color for the inherently SIL as opposed to the designed SIL

Logic Function	Category	Notes
ABSOLUTE	Mutable	
ACCESS ALARM	No	Strings
ADD	Mutable	
ALARM TRIGGER	No	
AND	Yes	
AND WORD	Yes	
AVERAGE	Mutable	
BETWEEN	Mutable	
BETWEEN TIME	No	
BOOLEAN TO INTEGER	Yes	
CEIL	No	
COMMENT	Not Applicable	
CONNECTION	Not Applicable	Very difficult, run-time data dependencies if try to do. Effectively impossible.
CONSTANT	Mutable	
DIVIDED	Mutable	
DOUBLE TO FLOAT	No	
DOUBLE TO INTEGER	Yes	
DOUBLE TO STRING	No	
DOWN COUNTER	False	
DOWN COUNTER SIL	SIL	
EQUAL TO	Mutable	
EVENT TRIGGER	No	
FLOAT TO STRING	No	
FLOOR	No	
FRAC	No	
GREATER THAN	Mutable	
GREATER THAN EQUAL TO	Mutable	
IF	No	Has storage, perhaps needs SIL equivalent.
IN	Mutable	Datatype, device
INTEGER TO BOOLEAN	Yes	
INTEGER TO DATETIME	No	
INTEGER TO DOUBLE	Yes	
INTEGER TO FLOAT	No	
INTEGER TO STRING	No	
LESS THAN	Mutable	
LESS THAN EQUAL TO	Mutable	
LIMIT	Mutable	
MAXIMUM	Mutable	
MEDIAN	Mutable	

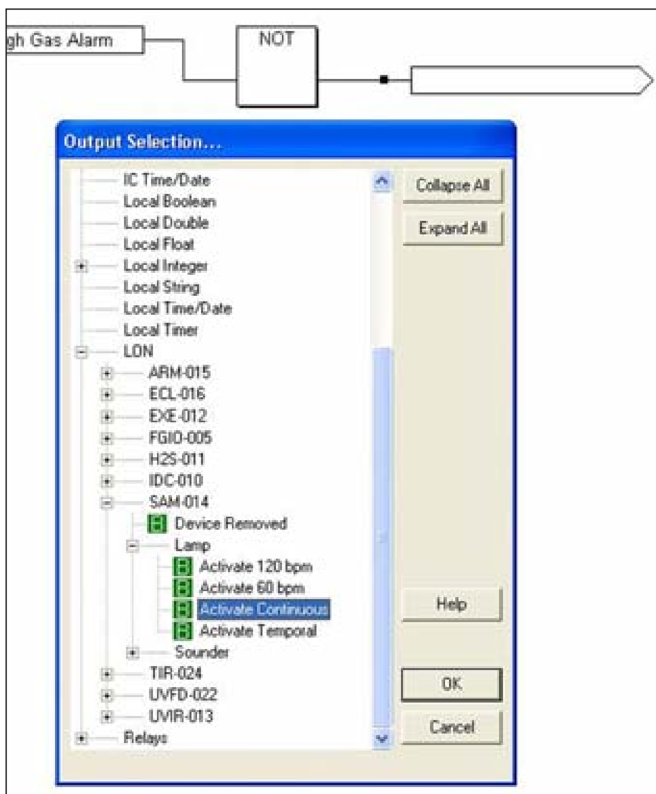
Logic Function	Category	Notes
MINIMUM	Mutable	
MODBUS READ	No	
MODBUS WRITE	No	
MODULO	Yes	See div, not clear.
M OF N	Yes	Why not?
MOSP	No	Complies to multiple one-shots followed by a multiple-input OR.
MULTIPLY	Mutable	
MULTIPLEX	Mutable	
NOT	Yes	Why not?
NUMBER OF BITS	Yes	Complies to a multiple-input boolean add.
ODD	Yes	
OFF TIMER	False	
ON TIMER	False	
OFF TIMER SIL	SIL	Not in S^3 help-file
ON TIMER SIL	SIL	Not in S^3 help-file
ONE-SHOT	No	See TT#548, 549
ONE-SHOT SIL	SIL, In process	See TT#548, 549
OR	Yes	
OR WORD	Yes	
OUT	Mutable	Datatype, device
PACK 16	Mutable	
PACK DATE/TIME	No	Integers to Date-Time
PULSER	No	S^3-only item, complies to 2 TON gates & others.
RESET/SET	False	
RESET/ SET SIL	SIL	
RETENTIVE TIMER	False	
RETENTIVE TIMER SIL	SIL	
ROUND	No	
SCALE	No	
SELECTOR	Mutable	
SET/RESET	False	
SET/RESET SIL	SIL	
SQUARE	No	
SQUARE ROOT	No	
STRING APPEND	No	
STRING COPY	No	
STRING N COPY	No	
SUBTRACT	Mutable	
S^3 MON	No	Used to monitor S^3 application-onine mode
TIME/DATE TO STRING	No	
TRUNCATE	No	
UNPACK16	Mutable	
UNPACK DATE/TIME	No	Ctr calls it date-time-to-integers.
UP COUNTER	False	
UP COUNTER SIL	SIL	
UP/DOWN COUNTER	False	
UP/DOWN COUNTER SIL	SIL	
XOR	Yes	

Device Items Reference

As described earlier, inputs and outputs to the logic must be "linked" to variables in the S^3 database for the controller in which the logic resides. When the database is "browsed" to locate the desired variable for a LON device, controller or memory location, a very large array of device "items" will be listed.

These items are listed in alphabetic order under each tagname in the database. Many of these items are familiar, like the standard "fire & gas" device types "Fire Alarm", "Lo Gas Alarm" etc. Others like "Neuron ID" and "Firmware Version" are not.

In addition to the standard F&G alarms, each LON device and the controller itself have a great deal of additional status and diagnostic information that can be utilized in logic. The following pages of this users guide provide a reference to over 300 of these "Device Items" so that the programmer can determine whether they could be used to enhance the user program being worked on.



Item Descriptions

Item 1 - Firmware ID String

The controller automatically polls LON devices for an ID string. The ID string contains an abbreviated device name and firmware version. As an example, "DCU 3.01" is the ID string for a DCU. The first three characters hold the device ID and the last 5 characters hold the firmware version. In multi processor units like the Eclipse and X3301 this represents the version of the software running on the neuron chip. For the controller, this variable holds the version of the main program, not the neuron firmware. Firmware version is used to determine device type and available functionality.

Item 2 - Neuron ID number

Each neuron holds a unique 48 bit "Neuron ID" number. Neuron ID numbers could be used as an alternative method to dip switch addressing in a future version.

Item 3 - Firmware Version

The firmware version is represented as a floating-point number. In multi processor units like the Eclipse and X3301 this represents the version of the software running on the main processor, not the neuron chip.

Item 4 - Serial Number

This location holds a unique serial number used for device identification.

Item 5 - Manufacture Date

Date of device manufacture.

Item 6 - OEM Device Code

This code is used to synchronize software features to a customer. This item can only be set at the factory by the controller final test fixture. It is not part of the user configuration.

Device Codes	
Value	**Description**
0	Detector Electronics
1	Solar Turbines

Item 7 - Device Code

Each device type has a unique code associated with it. Controller to PC configuration software use “Device Codes” to identify device types. The Controller to field device interface uses “LON Type Code” for backward compatibility with older devices.

Device Code	Device	LON Type Code
1	EQ2200DCU	95
2	EQ2200IDC	91
3	EQ2200UV	92
4	EQ2500SAM	93
5	EQ2500ARM	94
6	EQ2200UV/IR	96
7	EQ2100PSM	97
8	EQ3700DCIO	110
9	EQ3720RM	111
10	EQ3710AIM	112
11	8 Point Pulsed Input Module	113
12	PIRECL (Eclipse)	98
13	X3301	99
14	X2200 (UV)	114
15	X9800 (IR)	115
16	X5200 (UV/IR)	116
17	EQ3740IPM	117
18	EQ3730EDIO	118
19	X3302	119
20	EQ3750ASH	120
21	X3301A	121
22	EDIO-SIL	122
23	X3301-SIL	123
24	Eclipse-SIL	124
25	Open Path	125
100	EQ3000 (Premier Controller)	200
500	EQP Controller Relay	
501	EQP Controller Digital Inputs	
502	User Event	

Item 8 - Tag Name

User defined 20 character null terminated string.

Item 9 - Descriptor

User defined 42 character null terminated string.

Item 10 - Update Rate

The frequency of field device status transmission is adjusted with this variable. The allowable range is from 1,000 to 10,000 ms.

Item 11 - Time and Date of Configuration

The time and date of the configuration information is saved in this variable.

Item 12 - Unique Configuration Number

Each configuration will be assigned a unique number, which can be used to identify the configuration.

Item 13 - Configuration Port Baud Rate

Serial baud rate for the controller configuration port is set with this variable. A code is used to represent each rate.

Baud Rate Codes	
Code	**Speed**
1	2400
2	4800
3	9600*
4	19.2K
5	38.4K
6	57.6K
7	115.2K

* Default rate

Item 14 - Configuration Port Parity

Controller configuration port parity setting is set with this variable. A code is used to represent each type.

Parity	
Code	**Type**
1	None
2	Odd
3	Even

Item 15 - LON Address

Each device on the LON network must have a unique address. Valid controller addresses are in the range of 1 to 4. Field device addresses are in the range of 5 to 250.

Controller LON Address
Primary controllers will set this variable to 1 while secondary controllers will have a value of 2. User logic and external interfaces can use this variable to determine which controller is currently the master. Host configuration software need not write to this item.

Item 16 - Option Board Type

This variable defines the type of option board installed.

Option Board Types	
Value	**Description**
1	No Option Board Installed
2	ControlNet

Item 17 - Current Time and Date

The controller real time clock can be set or read with this variable.

Item 18 - User Name

Name of the user that was logged into S^3 when the project was built.

Item 19 - ControlNet MAC Address

The ControlNet MAC address is set with this variable. Allowable values range from 1 to 99.

Item 20 - Serial Port 1 Protocol

The second serial port protocol is set with this variable.

Serial Port Protocols	
Value	**Description**
1	Port not used
2	Modbus Slave
3	Modbus Master

Item 21 - Serial Port 1 Baud Rate

Serial baud rate for the controller RS485 serial port is set with this variable. The default baud rate is 9600.

Baud Rate Codes	
Code	**Speed**
1	2400
2	4800
3	9600
4	19.2K
5	38.4K
6	57.6K
7	115.2K

Item 22 - Serial Port 1 Parity

The controller second serial port parity setting is set with this variable. The default parity is “None”.

Item 23 - Serial Port 1 Address

The address field is only used for Modbus protocol. Valid Modbus addresses are in the range from 1 to 247. The default address is 1.

Item 24 - Allow LON Point Disabling

If this variable is set true, LON device disabling will be allowed. This feature has not been implemented, at this time disabling is always allowed.

Item 25 - Beeper Volume

The volume level of the internal beeper can be adjusted with this variable. Values from 1 (lowest) to 4 (highest) are allowed.

Beeper Volume	
Value	**Description**
1	Off
2	Low
3	Medium
4	High

Item 26 - Channel Type

This variable is used to configure device channels. See Section EQ37EDIO-SIL for more details.

Value	Definition
1	Input
2	Output
3	Smoke Detector
4	Class A Output A (First of the pair)
5	Class A Output B (Second of the pair)
6	Class A Input A (First of the pair)
7	Class A Input B (Second of the pair)
8	Solenoid Output
9	Class A Solenoid Output A (First of the pair)
10	Class A Solenoid Output B (Second of the pair)
11	Class A Smoke Input A (First of the pair)
12	Class A Smoke Input B (Second of the pair)

Item 27 - Low Alarm Latching

When this configuration variable is set low alarms are latched until the unit is power cycled or a reset command is issued.

Item 28 - High Alarm Latching

When this configuration variable is set high alarms are latched until the unit is power cycled or a reset command is issued.

Item 29 - DCU Type Code

See the DCU section for a description of this variable.

Item 30 - Gas Mode

Gas Mode is used to determine if static logic should activate high and low gas alarms. When mode 1 is selected static logic will activate the controller gas alarms. Mode 2 should be used for non-gas detector inputs.

Gas Mode	
Value	**Definition**
1	Gas Detector
2	Other (Non Gas)

Item 31 - Engineering Zero Value

Zero range corresponds to the 4 ma value on the sensor input. For example, if 4 ma equates to 10.0 MPH of air flow the engineering zero value should be set to 10.0.

Item 32 - Engineering Full Scale Value

Full scale range corresponds to the 20 ma value on the sensor input. For example, if 20 ma equates to 900.0 MPH of air flow the engineering zero value should be set to 900.0.

Item 33 - Calibration Level

This variable determines the calibration point for the 4 to 20 ma input. Valid values are in the range of 20 to 100% of full scale.

Item 34 - Low Alarm Setpoint

Alarm setpoints must be within the limits listed on the DCU type code table. Alarm determination is done at the DCU not the controller. However, user logic could be created within the controller to allow for many more alarm levels.

Item 35 - High Alarm Setpoint

Alarm setpoints must be within the limits listed on the DCU type code table. Alarm determination is done at the DCU not the controller. However, user logic could be created within the controller to allow for many more alarm levels.

Item 36 - Units Text

This field holds the engineering units as a text string. The text string shall be displayed with the process variable on the faceplate display. Future versions of DCUs with on board displays may also utilize this information for display.

Item 37 - PV Change Dead-band

The process variable dead-band can be adjusted with this variable. This is only used during “Online” operation and is expressed as a percentage of full scale. When the host computer instructs the controller to operate in online mode the controller sends exception messages to the host computer when device variables change. However, many analog values are constantly changing which many cause an abundance of unneeded messages. The “PV Change Dead-band” variable is provided to limit how often the value is sent. The value must change by the “PV Change Dead-band” amount or more fro the value to be sent.

Item 38 - Input Static Logic Mode

Input mode is used to determine if static logic should activate controller alarms on input activation. For example, if mode 1 is selected, static logic will activate the controller fire alarm when the input is activated.

Mode	Definition
0	Invalid
1	Fire Alarm
2	Trouble
3	Low Gas Alarm
4	High Gas Alarm
5	Supervisory
6	Other

Item 39 - UV Sensitivity

Sensitivity			
Value	Definition	Standard Mode	Star Mode
1	Low	96 cps	96 cups
2	Medium (Default)	48 cps	48 cps
3	High	24 cps	24 cps
4	Very High	8 cps	8/16 cps

Item 40 - Time Delay

Valid times are from 0 to 7 seconds with a default value of 5 seconds. This item is typically used to adjust the amount of time a fire must persist before it is deemed to be an actual fire.

Item 41 - UV Arc Rejection

UV Arc Rejection		
Value	Definition	Gate Length
1	Low	0.250
2	Medium (Default)	0.125
3	High	0.0625
4	Very High	0.0625

Item 42 - UV Processing Mode

UV processing mode can be selected with this variable.

UV Processing Mode	
Value	Definition
0	Standard
1	STAR

Item 43 - Oi Mode

Optical Integrity mode can be selected with this variable.

Oi Mode	
Value	**Definition**
0	Automatic
1	Manual

Item 44 - Latching

0 = non-latching output.
1 = latching output.

Item 45 - ARM Output Mode

See the ARM section for a description of this variable.

Item 46 - Activation Time

The output hold on time can be set with this variable.

Item 47 - IR Sensitivity

The IR for UVIR flame detectors always uses 0.125 second gate length for sampling the counter. The signal is compared to the threshold 0.5 second.

IR Sensitivity				
Value	**Definition**	**UV/IR**		**X3301**
		Counts per gate	Effective counts per second	
1	Low	8	64	Low (not used)
2	Medium (default)	6	48	Medium
3	High	4	32	High (not used)
4	Very High	2	16	Very High (Default)

Item 48 - IR Oi Threshold

The Oi test will run for a maximum of five seconds.

IR Oi Threshold		
Value	**Definition**	**Counts per Second**
1	Low	64
2	Medium (Default)	48
3	High	32
4	Very High	16

Item 49 - IR Oi Test Frequency

Three consecutive failures are required to fault, and three consecutive good tests are required to return to normal. While an IR oi fault is active the test frequency is reduced to once per minute.

IR Oi Test Frequency	
Value	**Definition**
1	1 minute (Default)
2	1 Hour
3	2 Hours
4	4 Hours

Item 50 - Full Scale Value

The Engineering unit full scale value can be configured and must match the current rating of power supply monitor. Only one model has been defined, 80 Amp, with a range of -16 Amps to +80 Amps.

Item 51 - AC Fault Threshold

The power supply monitor fault threshold can be set with this variable.

Item 52 - Supervision Option Select

An I/O channel can be configured with or without supervision.

Mode	Definition
1	No Supervision
2	Monitor for opens
3	Monitor for opens and shorts

Item 53 - Eclipse Gas Type

This field allows the PIRECL to be configured for different gas types.

Code	Description
1	Methane (Default)
2	Ethane
3	Propane
4	Ethylene
5	Propylene
6	Butane
7	Reserved
8	Reserved
9	Reserved
10	Special

Item 54 - Calibration Gas Type

Calibration gas type is selected with this code.

Description	Mode
Same as Measured (Default)	1
Methane	2
Propane	3

Item 55 - Calibration Method

Description	Code
Standard (Default)	1
Cuvett	2

Item 56 - Cuvett Length

1.0 to 150.0 mm, default 150mm

Item 57 - Calibration Gas Concentration

The allowable range is from 20 to 100% with 50% as the default.

Item 58 - Volume at LFL

Used for programming a special gas type, the default value is 5%.

Item 59 - Gas Coefficient a

Used for programming a special gas type.

Item 60 - Gas Coefficient b

Used for programming a special gas type.

Item 61 - Gas Coefficient c

Used for programming a special gas type.

Item 62 - Gas Coefficient d

Used for programming a special gas type.

Item 63 - Gas Coefficient e

Used for programming a special gas type.

Item 64 - Device Removed

The user sets this bit when the device has been removed from the system. Configuration information shall be retained in the controller to allow the device to be added at a later time. If the removed bit is set when program mode is exited, the status will be saved during a power cycle.
This item is used to tell the controller a device has been removed from the network. The controller will signal the "Extra LON Device" fault if the device is on-line with the removed item is set.

Item 65 - Static Logic Inverted

Setting this item tells the controller invert the signal when used with-in static logic. This can be used to have a normally energized controller relay or a normally active digital input.

Item 66 - Alternate Function

Each of the controller I/O points has a predefined alternate function. When the alternate function is enabled for a relay, it can not be used by user logic.

Item 67 - Fire Alarm

Fire alarm is indicated with this item. For the controller, this item represents the state of the fire alarm LED and relay.

Item 68 - Trouble

This item represents the state of the trouble LED and relay on the controller.

Item 69 - First Scan

This item is intended for use with-in user logic, it is true only during the first scan of user logic after program mode is exited.

Item 70 - High Alarm

High alarm is indicated with this item. For the controller this item represents the state of the high gas alarm LED and relay, if programmed for the alternate function.

Item 71 - Low Alarm

Low alarm is indicated with this item. For the controller this item represents the state of the low gas alarm LED and relay, if programmed for the alternate function.

Item 72 - Acknowledge

This bit tracks the state of the controller Acknowledge LED.

Item 73 - Silence

This bit tracks the state of the controller Silence LED.

Item 74 - Program Mode

This bit is set while the Controller is in program mode, else it is cleared.

Item 75 - Acknowledge Button

This item tracks the state of the acknowledge button on the controller faceplate and is intended for use by user logic.

Item 76 - Silence Button

This item tracks the state of the Silence button on the controller faceplate and is intended for use by user logic.

Item 77 - Temperature Out of Range Fault

This item is set for a temperature out of range fault

Item 78 - Reset Button

This item tracks the state of the Reset button on the controller faceplate and is intended for use by user logic. This item also goes TRUE when digital input 1 is configured for the reset function and is activated, or the activate reset item is set from S^3. This item is latched by the Controllers static logic until the current logic scan is complete. If the faceplate-reset button is still pressed at the end of the scan, the variable will be held TRUE for the next scan.

Item 79 - CPU Fault

The item indicates a problem with a processor or memory system, the cause of this fault is device dependent.

Item 80 - Supervisory

This item tracks the state of the controller Supervisory LED and relay, if programmed for the alternate function.

Item 81 - Channel Active

This item tracks the state of an I/O channel.

Item 82 - Control Message Fault

This item is set when a field device does not receive the output control message from the controller.

Item 83 - Channel Shorted

This item indicates when an I/O channel is shorted.

Item 84 - Channel Open

This item indicates when an I/O channel is open.

Item 85 - Channel Isolated

This item indicates when an I/O channel is isolated.

Item 86 - Normalized Process Variable

Normalized process variable holds the analog value read from the device as a floating point value. For devices with adjustable ranges, values are calculated by using the zero and full scale range values.

Item 87 - Raw Process Variable:

Raw process variable holds the analog value read from the device as an integer value. For devices with adjustable ranges, values are calculated by using the zero and full scale range values. When the raw integer format is used values are in the range of 0 to 4095. Values for an ideal 4 to 20 mA sensor are:

DCU Process Variable	
Input	**Output**
0 mA	0
4 mA	682
12 mA	2048
20 mA	3413
24 mA	4095

Item 88 - AC Voltage

The AC voltage can be read with this variable.

Item 89 - Temperature

The temperature in degrees C can be read with this variable.

Item 90 - Battery Current

This variable represents the battery charge or discharge current level. Positive values indicate battery charging while negative values represent battery discharge.

Item 91 - Flame Detector Counts per Second

This variable represents the counts per second from flame detectors.

Item 92 - Supply Voltage

Field device supply voltage as measured at the device can be read with this item.

Item 93 - Wrong Device Type

This item is reserved to signal that the controller has detected a wrong device type (Not supported in the first release).

Item 94 - Extra LON Device

This item is used to signal that the controller has detected an extra device on the LON.

Item 95 - Logic Error Reference Number

If the controller detects an error in user logic, the last trace number is stored in this item.

Item 96 - Logic Error Code

If the controller detects an error in user logic, an error number is stored in this item.

Logic Error Code	
0	No Error
1	Unknown Instruction Type
2	Unsupported Address Mode
3	Unsupported Data Type
4	Unsupported Instruction
5	A parameter error was detected
6	Too many items on the stack for this operation
7	User Program is too large
8	First Scan Program Too Large to Complete
9	Initial CRC was Incorrect
10	Failed Background CRC test
11	Instruction Pointer Error

Item 97 - Memory Fault

When this item is true, a fault has been detected in the memory system.

Item 98 - RTC Fault

When this item is true, the real time clock needs to be set, or the clock circuitry has malfunctioned.

Item 99 - LON Ground Fault

When this item is true, the controller has detected a ground fault.

Item 100 - Duplicate Address

Not supported.

Item 101 - LON A Interface Fault

This bit is set when a problem is detected with LON interface channel A.

Item 102 - LON B Interface Fault

The bit is set when a problem is detected with LON interface channel B.

Item 103 - Inhibit Status

This item is set when a device or channel has been inhibited.

Item 104 - Zero Drift

This item is set when a gas detector goes negative to point of a fault.

Item 105 - Option Board Fault

The controller sets this item true when a fault is detected in the controller option board.

Item 106 - Invalid Configuration

This item is set on new units, when the address is changed, or when invalid data is transferred to the device. A valid configuration must be downloaded to clear the item.

Item 107 - Fault

The controller performs a logical OR of all field device faults to control this item.

Item 108 - Unable to Configure

This item is set when the controller is unable to successfully transfer configuration information to the field device.

Item 109 - Last Direction

The controller has two LON channels A and B. In normal operation, both channels receive status messages from all devices. However, during network fault conditions messages will only be received from one side. This item indicates the last side status information was received from. This along with the offline bits can be used in determining the location of a network break. When the bit has a value of 0, channel A was the last side, a value of 1 indicates channel B was the last side.

Item 110 - Lon A Device Offline

This item is set when the controller has not recently received status messages from the device on the first Lon channel.

Item 111 - Lon B Device Offline

This item is set when the controller has not recently received status messages from the device on the second Lon channel.

Item 112 - Device Offline

Three offline item are provided for enhanced fault diagnostics. The controller maintains offline timers for every device on the network. The controller sets the LON x device offline item when it has not received messages from the device on that channel, A or B. The device offline fault item is set when both LON A and B offline bits are set (totally offline). The controller will not attempt to talk to devices that are offline. The item are automatically cleared when status messages are received.

Item 113 - Com 1 Fault

Each field device contains two network relays used to isolate network wiring faults. A status item is provided for each relay and is set when the fault isolation circuitry has detected and isolated a wiring fault.

Item 114 - Com 2 Fault

See com 1 fault.

Item 115 - Sensor Fault

Field devices set this bit to indicate a sensor related fault. Older field devices may also set this fault to signal invalid configuration data.

Item 116 - Calibration Active

Field devices set this bit to indicate that the sensor calibration process is active.

Item 117 - Power up

This bit is set during the power up time delay.

Item 118 - Calibration Fault

This bit is set when a fault is detected during the calibration process.

Item 119 - Supply Voltage Fault

This item is set when the field device input voltage is below 17.5 volts but still has enough voltage to operate. Many devices can read the input voltage.

Item 120 - UV Automatic Oi Fault

This item is set when the field device fails an automatic optical integrity test on the ultraviolet detector.

Item 121 - IR Automatic Oi Fault

This item is set when the field device fails an automatic optical integrity test on the IR detector.

Item 122 - Fire Pre Alarm

This item is set when the field device detects a pre fire alarm condition.

Item 123 - Manual Oi Test Started

The field device sets the item to indicate that a manual Oi test has started. The bit is self clearing when the test completes.

Item 124 - UV Manual Oi Fault

The field device sets the item to indicate that a manual Oi test failed.

Item 125 - IR Manual Oi Fault

The field device sets the item to indicate that a manual Oi test failed.

Item 126 - Missing UV Tube Module

The field device sets the item to indicate that the UV tube was not detected on start-up.

Item 127 - Missing IR Module

The field device sets the item to indicate that the IR module was not detected on start-up.

Item 128 - Sensor Initialization Fault

The field device sets the item to indicate that the sensor was bad at start-up. If the detector is set for Manual Oi the Sensor Initialization Test is conducted on start-up by turning on the test lamp. If less then 2 counts are received the Sensor Initialization fault is set. The Sensor Initialization fault bit is cleared any time 2 counts per second are received.

Item 129 - 290 Volt Fault

The field device sets this item to indicate low or high voltage. Some devices just check for low voltage while others monitor for low and high voltage conditions.

Item 130 - Low Aux Power Fault

The field device sets this item to indicate low voltage on the aux power input.

Item 131 - UV Fault

The field device sets this item to indicate a fault with the UV sensor. For the EQ2200 UVIR the UV fault bit is set when an auto UV Oi fault or missing UV tube or manual UV Oi fault or 290 volt fault is detected.

Item 132 - IR Fault

The field device sets this item to indicate a fault with the IR sensor. For the EQ2200 UVIR the IR fault bit is set when an auto IR Oi fault or missing IR module or manual IR Oi fault is detected.

Item 133 - UV Alarm

The field device sets this item to indicate a UV fire alarm.

Item 134 - IR Alarm

The field device sets this item to indicate a IR fire alarm.

Item 135 - UV/IR Counts

This item signals whether the process variable holds the UV or IR counts.

Value	PV Value
1	UV Signal
2	IR Signal

Item 136 - AC Failed

The field device sets this item to indicate missing AC power input.

Item 137 - Battery Fault

The field device sets this item to indicate a fault with the battery.

Item 138 - Ground Fault +

A device sets this item to indicate a ground fault on the plus side of the power supply.

Item 139 - Ground Fault -

A device sets this item to indicate a ground fault on the negative side of the power supply.

Item 140 - Power Supply Fault

A device sets this item to indicate a fault on the power supply.

Item 141 - Dirty Optics

A device sets this item to indicate that the optics need to be cleaned.

Item 142 - Internal Comm Fault

A device sets this item to indicate that a fault has occurred in the communications between the LON and host processors.

Item 143 - Warm-up

A device sets this item during the warm-up period.

Item 144 - Open Lamp

A device sets this item to indicate an open lamp fault.

Item 145 - Alarm Logs

Up to 8 alarm logs are held in this item.

Item 146 - Calibration Logs

Up to 8 calibration logs are held in this item.

Calibration Log Format	
Description	**Data Type**
Seconds	Int
Minutes	Int
Hours	Int
Day	Int
Month	Int
Year	Int
Zero Reading	Int
Span Reading	Int

Item 147 - Activate Output

Setting this control item will activate the output.

Item 148 - Reset Application

Setting this control item will reset the device application program.

Item 149 - Request Supply Voltage

Setting this control item instructs the controller to retrieve the input voltage from the field device.

Item 150 - Inhibit Control

Setting this control item instructs the controller to inhibit the device or channel associated with this item. Clearing the item will remove the inhibit.

Inhibit control and status resides in the controller, not the field devices. Only the primary alarm or input status is affected. Inhibits do not trigger a fault condition. When a device or a channel is inhibited, the controller will illuminate one of two LEDs. When inputs are inhibited the Inhibit led will be activated and when an output channel is inhibited the Out Inhibit led will be activated. Inhibits can be controlled from S^3, user logic or from the faceplate.

To change the inhibit state from the faceplate, navigate to the “Control Inhibit” property for the device or channel and press the enter button, inhibit control will toggle. Resetting the controller or field device will not change the inhibit state. Inhibits will persist through a download as long as the same device type remains at the address. Inhibits will be lost during a loss of power or after a watchdog reset.

There are no built in time-outs for inhibit. An “Actual State” variable was added to show the state of an inhibited input but S^3 does not currently display it. The “Actual State” variable is used by the controller when the inhibit is removed. This allows the alarm or active condition to reactivate before the next status message from the device arrives.

For SIL rated devices the master inhibit control must be enabled to allow inhibits to activate. See static logic function for controller digital input #4 for more information.

Device	What is Inhibited
DCU	Low and High Gas Alarm
IDC	Input Active
UV_Detector	Fire Alarm
SAM	Output
ARM	Output
UV/IR	Fire Alarm
PSM	
DCIO	Input Active or Output
Relay Module	Output
Eclipse	Low and High Gas Alarm
X3301/2/Automotive	Fire Alarm
X2200	Fire Alarm
X9800	Fire Alarm
X5200	Fire Alarm
Controller Relay	Output will not activate
Controller Digital Input	Input Active
AIM	Low and High Alarm
EDIO	Channel Active, Input or Output
EDIO_SIL	Channel Active, Input or Output
X3301_SIL	Fire Alarm
ECLIPSE_SIL	Low and High Gas Alarm

Item 151 - Request AC Voltage

Setting this control item instructs the controller to retrieve the AC voltage from the field device.

Item 152 - Activate Reset

Setting this control item instructs the controller to send a reset command to the field device.

Item 153 - Start Manual Oi Test

Setting this control item instructs the controller to send a start manual Oi test command to the field device.

Item 154 - Release

Setting this control item instructs the controller to sendrelease command to the ARM module. This will cause the output to activate.

Item 155 - Isolate

Setting this control item instructs the controller to send isolate command to the field device. This will cause the output to go to the isolate mode.

Item 156 - Select UV or IR

Changing this control item instructs the UVIR flame detector to send the UV or the IR signal.

Value	PV Value
1	UV Signal
2	IR Signal

Item 157 - Activate Continuous

Setting this control item instructs the field device output to turn on in the continuous mode.

Item 158 - Activate 60 bpm

Setting this control item instructs the field device output to turn on in the 60 bpm mode.

Item 159 - Activate 120 bpm

Setting this control item instructs the field device output to turn on in the 120 bpm mode.

Item 160 - Activate Temporal

Setting this control item instructs the field device output to turn on in the temporal mode.

Item 161 - Request Extended Status

Setting this control item instructs the controller to retrieve the extended status information from the fielded device.

Item 162 - Activate Timed

Setting this control item instructs the controller to activate an output in the timed mode.

Item 163 - Activate Fire Alarm

Setting this control item in the controller activates the fire alarm output. When this bit is set in a field device the output signals the temporal fire alarm pattern.

Item 164 - Activate Trouble Output

Setting this control item in the controller activates the trouble output. When this bit is set in a field device the output signals the trouble pattern.

Item 165 - Activate Low Gas Alarm

Setting this control item in the controller activates the low gas alarm output.

Item 166 - Activate High Gas Alarm

Setting this control item in the controller activates the high gas alarm output.

Item 167 - LON A Counter

Within the controller object, this status variable holds the number of heartbeat messages received. Resetting the controller will also reset this counter. When this variable is used with a field device it shows the number of received status messages. The counters are helpful for diagnosing wiring problem on the Lon network.

Item 168 - LON B Counter

Within the controller object, this status variable holds the number of heartbeat messages received. Resetting the controller will also reset this counter. When this variable is used with a field device it shows the number of received status messages. The counters are helpful for diagnosing wiring problem on the Lon network.

Item 169 - Display Text Line 1

This variable holds the ASCII test string on the controller faceplate.

Item 170 - Display Text Line 2

This variable holds the ASCII test string on the controller faceplate.

Item 171 - Display Text Line 3

This variable holds the ASCII test string on the controller faceplate.

Item 172 - Display Text Line 4

This variable holds the ASCII test string on the controller faceplate.

Item 173 - Heater Enable Status

This item is true when the Optics heaters are enabled. They may or may not actually be on at the time depending on the temperature.

Item 174 - LON Fault

The controller sets this item when a Lon fault is detected.

Item 175 - Signal to Noise Ratio

A detector's signal to ratio is held in this variable.

Item 176 - Activate Silence

Setting this control bit activates the controller silence status bit and LED. The LED and status bit will stay true until the controller is reset. The controller clears this control bit after the action is taken.

Item 177 - Activate Acknowledge

Setting this control bit activates the controller acknowledge status bit, LED, and silences the internal beeper. The LED and status bit will stay true until the controller is reset. However, the beeper will resound if new alarms are received. The controller clears this control bit after the action is taken.

Item 178 - Start IR Oi Calibration

Setting this control bit will cause the controller send a start IR Oi calibration message to the field device. The controller clears this control bit after the action is taken.

Item 179 - Activate Supervisory

Setting this control bit activates the controller supervisory output, status bit and LED. The output, LED and status bit will stay true until the controller is reset. The controller clears this control bit after the action is taken.

Item 180 - Latching Fault

Setting this configuration parameter causes the field device to latch the fault status until the device is reset.

Item 181 - Quick Fire Enable

Setting this configuration parameter enables quick fire detection method.

Item 182 - Bin Disabled Signaled by LED

Setting this configuration parameter enables “Bin Disabled Signaled by LED” feature in the X3301.

Item 183 - Heater Power

This configuration parameter determines what percent of power will be used for the optics heaters.

Item 184 - Temperature Setpoint

This configuration parameter determines the temperature at which the internal heaters are activated.

Item 185 - Consecutive Failed Oi Tests for Fault

This configuration parameter determines how many consecutive Oi tests must fail before a fault is generated.

Item 186 - User Logic Scan Time

This status variable holds the number microseconds needed to complete the user logic.

Item 187 - Power Fail 1

This controller sets this status variable when low voltage is detected on the power input #1.

Item 188 - Power Fail 2

This controller sets this status variable when low voltage is detected on the power input #2.

Item 189 - Output Inhibit

This controller sets this status variable when any outputs are inhibited, this includes the controller and field device outputs.

Item 190 - High Energy Detected

A field device sets this status bit to indicate that high energy was detected.

Item 191 - High Energy Fault

A field device sets this status bit to indicate that high energy was detected for a sustained period of time.

Item 192 - Non-Ratio Mode Fault

A field device sets this status bit to indicate that a non-ratio mode fault occurred.

Item 193 - Bin Disable

A field device sets this status bit to indicate that the bin fire detection mode is disabled.

Item 194 - Quick Energy Disabled

A field device sets this status bit to indicate that the quick energy detection mode is disabled.

Item 195 - No Oi High Energy Fault

A field device sets this status bit to indicate that the No Oi High Energy Fault is true.

Item 196 - Flash Fire

A field device sets this status bit to indicate that it has detected a flash type fire.

Item 197 - Bin Fire

A field device sets this status bit to indicate that it has detected a bin type fire.

Item 198 - Low Level Fire

A field device sets this status bit to indicate that it has detected a low level type fire.

Item 199 - Non-Ratio Mode Fire

A field device sets this status bit to indicate that it has detected a non-ratio mode type fire.

Item 200 - Quick Fire

A field device sets this status bit to indicate that it has detected a quick type fire.

Item 201 - AM/PM

This variable is intended for use by user logic to determine the time of day, 1 equals PM and 0 is AM.

Item 202 - Day of Week

This variable is intended for use by user logic to determine the day of week, the value is 1 for Sunday and 7 for Saturday.

Item 203 - Device Download Active

The controller sets this variable while it is downloading configuration information.

Item 204 to 215 - User Defined Status 1 to 12

User defined status is provided as a method to exchange information between the controller and the ControlNet interface. Information placed here is transmitted on ControlNet along with other scheduled data. See the ControlNet specifications for more details.

Item 216 - Logic Engine Fault

The controller sets this variable true when a fault is detected in the user program.

Item 217 - ControlNet Firmware Version

This variable hold the firmware version of the ControlNet board.

Item 218 - Activate Trouble Tone

Setting this control bit will cause the field device output to output the trouble pattern.

Item 219 - Activate Supervisory Tone

Setting this control bit will cause the field device output to output the supervisory pattern.

Item 220 - Request Alarm Logs

Setting this control bit will cause the controller to retrieve the alarm logs from a device.

Item 221 - Request Calibration Logs

Setting this control bit will cause the controller to retrieve the calibration logs from a device.

Item 222 - Request Temperature

Setting this control bit will cause the controller to retrieve the temperature from a device.

Item 223 - Heater Enable Control

This item is used to control the optics heater from user logic. This allows the user to disable the heater when AC power is lost.

Item 224 to 239 - User Parameters 1-16

User parameters can be used as part of a self configuration process. The values are saved in flash memory when program mode is exited.

Item 240 - Start Manual Oi Fire Test

Setting this control bit will instruct the flame detector to conduct an Oi test and activate the fire alarm output if the unit passes the test. This feature must be password protected.

Item 241 - Sustained Fire

A field device sets this status bit to indicate that it has detected a sustained type fire. In the X3301 this is the ORED status of Bin fire, low level fire, and non-ratio fire bits.

Item 242 - Lon CPU Memory Fault

A field device sets this status bit to indicate that it has detected a problem with the memory used with the LON CPU.

Item 243 to 247 - New Alarms

The bit is set for one scan of logic when new alarms occur. Intended for resounding silenced alarms in user logic.

Item 248 - Install Network Extender

Setting this control item instructs the controller to request the network extenders neuron Ids. The Ids are used to address the device when getting network diagnostic information. The neuron Ids will be retained in flash memory when program mode is exited.

Item 249 - Request Lon Diagnostic Info

Setting this control item instructs the controller to request the Lon Diagnostic Information from the device. Items 250 to 254 are updated.

Item 250 - Transmission Errors

The number of CRC errors detected during packet reception. These may be due to collisions or noise on the transceiver input.

Item 251 - Transaction timeouts

The number of times that the node failed to receive expected acknowledgements or responses after retrying the configured number of times. These may be due to the destination node being offline.

Item 252 - Rcv Transaction Full

The number of times that an incoming packet was discarded because there was no room in the transaction database.

Item 253 - Lost Messages

The number of times that an incoming packet was discarded because there was no application buffer available.

Item 254 - Missed Messages

The number of times that an incoming packet was discarded because there was no network buffer available.

Item 255 - IR Processing Mode

This item is used to select the processing mode for the IR detector.

Value	Description
1	TDSA
3	TDSA and Quick

Item 256 - UV Auto Oi Test Frequency

This item is used to select how often the automatic Oi test is conducted, see the device for the allowable range.

Item 257 - IR Auto Oi Test Frequency

This item is used to select how often the automatic Oi test is conducted, see the device for the allowable range.

Item 258 - Consecutive UV Failed Oi Tests for Fault

This item is used to select how many consecutive automatic Oi tests must fail before a fault is annunciated.

Item 259 - UV Counts per Second

This item will display the UV signal level.

Item 260 - IR Signal Level

This item will display the IR signal level.

Item 261 - TDSA IR Alarm

This item comes true when the IR detector generates a TDSA fire alarm.

Item 262 - UV Pre Alarm

For the new flame platform detectors, this item comes true when the number of UV counts per second exceeds ½ of that needed to signal an alarm.

Item 263 - IR Pre Alarm

For the new flame platform detectors, this item comes true when 18 or more valid turning points are found during a 10 second period.

Item 264 - UV Oi Calibration Active

This item comes true while the UV Oi calibration is active.

Item 265 - IR Oi Calibration Active

This item comes true while the IR Oi calibration is active.

Item 266 - UV Oi Fault

This item comes true when a manual or automatic UV Oi fault occurs.

Item 267 - IR Oi Fault

This item comes true when a manual or automatic IR Oi fault occurs.

Item 268 - UV Oi Calibration Fault

This item comes true when an UV Oi calibration fault occurs. The UV Oi lamp is activated and allowed to stabilize for 2 seconds. An average counts per second is determined. The average counts must be within a targeted window (150 to 250). Otherwise, an Oi calibration fault will occur.

Item 269 - IR Oi Calibration Fault

This item comes true when an IR Oi calibration fault occurs. The IR Oi lamp is activated and allowed to stabilize for 1 second. The Oi level is set to 1.55v. An average energy level is determined. If the energy level is outside of the targeted window (68 to 72), the Oi level is increased or decreased by 1 D/A step (20mv). This sequence is repeated every 320ms until the energy is inside the target window. The new Oi test energy threshold is ¼ of the found target. The threshold and the corresponding Oi level are saved in non-volatile memory. If the target is not found within 15 seconds, an IR Oi calibration fault will occur.

Item 270 - Start UV Oi Calibration

This command item is provided for starting the UV Oi calibration process. The controller will clear the item after the command is sent to the detector.

Item 271 - Comm Fail Mode

The item defines what state an output should go to on loss of communication with the controller.

Value	Mode
1	Hold Last State*
2	Failed Off
3	Failed On

* Default

Item 272 - Heater Enable Config

This item defines the initial state of the heater enable. The heater enable will assume this state on power-up.

Item 273 - Activate Cancel

Setting this control bit triggers the same action as pressing the cancel button on the controller faceplate. The controller clears this control bit after the action is taken.

Item 274 - Activate Enter

Setting this control bit triggers the same action as pressing the enter button on the controller faceplate. The controller clears this control bit after the action is taken.

Item 275 - Activate Next

Setting this control bit triggers the same action as pressing the next button on the controller faceplate. The controller clears this control bit after the action is taken.

Item 276 - Activate Previous

Setting this control bit triggers the same action as pressing the previous button on the controller faceplate. The controller clears this control bit after the action is taken.

Item 277 - Actual State

This variable holds the actual input state before inhibits are applied.

Item 278 - Device Config Step

This item holds the device configuration step. This item is only intended for system diagnostics.

Item 279 - mA Range Low

This value defines the low/zero point for a 4 to 20 mA input channel expressed in mAs. Typical values would be 0.0 or 4.0.

Item 280 - mA Range High

This value defines the full scale point for a 4 to 20 mA input channel. A typical value would be 20.0.

Item 281 - Out of Range Low Level (mA)

This value defines the low level current threshold for the out of range low fault.

Item 282 - Out of Range High Level (mA)

This value defines the high level current threshold for the out of range high fault.

Item 283 - Out of Range Low Fault

This item comes true when the analog input reading is below the “Out of Range Low Level”.

Item 284 - Out of Range High Fault

This item comes true when the analog input reading is above the “Out of Range High Level”.

Item 285 - Low Alarm Direction

This item determines if an alarm should be signaled as the signal level is increasing or decreasing. If this item is set to 1 the alarm will be active while the signal is above the threshold. If this item is set to 2 the alarm will be active while the signal is below the threshold.

Value	Mode
1	Alarm above threshold
2	Alarm below threshold

Item 286 - High Alarm Direction

See item 285.

Item 287 - Low Alarm Deadband

This item determines the amount of deadband that should be used for the low alarm.

Item 288 - High Alarm Deadband

This item determines the amount of deadband that should be used for the high alarm.

Item 289 - Redundancy Enable

This item determines if the controller is part of a redundancy pair. The system will fault if redundancy is selected and the controllers are not working together. This item should be set to 0 on non-redundant systems and 1 for a primary redundant controller.

Item 290 - Redundancy Fault

This item indicates a fault has been detected with redundancy. See the Redundancy Fault Code (item 291) for details on the cause of the fault.

Item 291 - Redundancy Fault Code

This item can be used to determine the cause of a Redundancy fault.

Code	Description
0	No Fault
1	Alarm below threshold
2	No Comm From other controller
3	Parse Error
4	Ack Comm Error
5	Standby Fault
6	Program Flow Error
7	LON A Interface Fault
8	LON B Interface Fault
10	Application Memory Error
11	User Logic Error
12	Invalid Configuration
13	No Lon communication between controllers
14	Error in Response

Item 292 - Request Manual Switch

This control item is only used with a redundant controller configuration. When this bit is set in a Master controller a switch to the standby controller is initiated. The switch will only occur if the standby controller is online and in a health state.

Item 293 - Beeper Status

The status of the internal audible beeper is reflected with this variable.

Beeper Status	
Value	**Description**
0	Off
1	Beeper Test (Active during lamp test)
2	Gas Alarm
3	Trouble
4	Supervisory
5	Fire

Item 294 - Communication Option Board Type

This configuration item determines what type of Communication Option Board is attached.

Communication Board Type	
Value	**Description**
0	None
1	Type A

Item 295 - Smoke Detector Type

This item selects a type of smoke detector.

Value	Detector Type
0	Invalid
1	Apollo
2	Fenwal

Item 296 - Abort Mode

This item selects the type of abort mode.

Value	Mode
0	Invalid
1	Mode 1
2	Mode 2
3	IRI Mode

Mode 1: Upon activation, timer will count down to and hold at 10 seconds; upon release, timer will continue to count down to zero.
Only this mode complies with UL 864.

Mode 2: Upon activation, timer will reset to initial value; upon release, timer will continue to count down to zero.

IRI Mode: This function is similar to “Mode 1” with the exception that the abort will only function if held prior to receiving the second alarm.

Item 297 - Detection Style

This item selects the Detection Style – Single or Cross Zoned. When single zone is selected, a release is activated if ether input is activated. Cross zone requires that both inputs be active before a release is activated.

Value	Mode
0	Invalid
1	Single Zone (1 zone release)
2	Cross Zoned (2 zone release)

Item 298 - Control Mode

This item selects the embedded logic control mode.

Value	Mode
0	Invalid
1	Embedded Logic Only
2	Controller Only
3	Back-up Mode

Embedded Logic Only: In this mode the device will always use the embedded logic and ignore control messages from the controller.

Controller Only: In this mode the device will accept control information from the controller and never use embedded logic. If communication with the controller is lost the outputs shall retain their last state.

Back-up Mode: In this mode the device will accept control information from the controller and only use embedded logic when communication with the controller is lost.

Item 299 - Detection Circuit Delay

This item allows the selection of a delay time that will apply to detector circuits, as well as a manual release (30 second max. for manual release, this will be handled by the field device). Time delay selection range from 0 to 60 seconds in 10-second increments. This could also be called an abort timer; it gives the user an opportunity to hold off a release during an investigation time.

Item 300 - Abort Active

This item is true while the release abort input is active. First used with the IPM (DCIO smoke) module.

Item 301 - Manual Release Active

This item is true while the Manual Release input is active. First used with the IPM (DCIO smoke) module.

Item 302 and 303 - Zone 1 and 2 Alarm

These items reflect the alarm status of smoke detector loops. First used with the IPM (DCIO smoke) module.

Item 304 - Signal Circuit Active

This item is true while the alarm signal circuit (SAM output) is active. First used with the IPM (DCIO smoke) module.

Item 305 and 306 - Release Circuit 1 and 2 Active

These items reflect the state of the release outputs. First used with the IPM (DCIO smoke) module.

Item 307 - Manual Reset Required

This item comes true when the IPM requires a manual reset.

Item 308 - Embedded Abort Timer

This item holds the amount of time remaining in the embedded abort timer.

Item 309 - One Zone Bell Tone

This item is used to select the bell tone when one zone of the IPM is in alarm and embedded logic mode is enabled.

Value	Tone
0	Off
1	Continuous
2	60 BPM
3	120 BPM
4	Temporal
5	Trouble
6	Supervisory

Item 310 - Two Zone Bell Tone

This item is used to select the bell tone when the second zone of the IPM is in alarm and embedded logic mode is enabled. See Item 309 for a list of available tones. The Marketing specification states that "The software will prevent both selections (309 and 310) from being the same".

Item 311 - Manual Release Delayed

First used with the IPM to select if the manual release input should be delayed or not. When set, the release output will be delayed by the selected time, if cleared the release is immediate.

Item 312 - Serial Port 2 Protocol

The second configurable serial port protocol is set with this variable.

Serial Port Protocols	
Value	**Description**
1	Port not used
2	Modbus Slave
3	Modbus Master

Item 313 - Serial Port 2 Baud Rate

The baud rate for the second configurable serial port is set with this variable. The default baud rate is 9600.

Baud Rate Codes	
Code	**Speed**
3	9600
4	19.5K
5	38.4K
6	57.6K
7	115.2K
8	230.4K

Item 314 - Serial Port 2 Parity

The parity setting for the second configurable serial port is set with this variable. The default parity is "None". Refer to the data type section of this document for the parity data values.

Item 315 - Serial Port 2 Address

This address field is used for Modbus protocol, valid Modbus addresses are in the range from 1 to 247 with a default value of 1.

Item 316 - Serial Port 3 Protocol

Serial Port Protocols	
Value	**Description**
1	Port not used
2	Modbus Slave
3	Modbus Master
4	S^3

Item 317 - Serial Port 3 Baud Rate

Serial baud rate for serial port 3 is set with this variable. . The allowed selections are listed below.

Baud Rate Codes	
Code	**Speed**
3	9600
4	19.2K
5	38.4K
6	57.6K
7	115.2K
8	230.4K

Item 318 - Serial Port 3 Parity

Serial port 3 parity is set with this variable. The default parity is "None". Refer to the data type section of this document for the parity data values.

Item 319 - Serial Port 3 Address

The address field is only used for Modbus protocol. Valid Modbus addresses are in the range from 1 to 247. The default address is 1.

Item 320 - Serial Port 4 Protocol

Serial Port Protocols	
Value	**Description**
1	Port not used (Debug Output)
2	Modbus Slave
3	Modbus Master

Item 321 - Serial Port 4 Baud Rate

Serial baud rate for serial port 3 is set with this variable. The allowed selections are listed below.

Baud Rate Codes	
Code	**Speed**
3	9600
4	19.2K
5	38.4K
6	57.6K
7	115.2K
8	230.4K

Item 322 - Serial Port 4 Parity

Serial port 3 parity is set with this variable. The default parity is "None". Refer to the data type section of this document for the parity data values.

Item 323 - Serial Port 4 Address

The address field is reserved for future use.

Item 324 - Master Controller

This item is set true when the controller controls the LON outputs, master mode. A controller in standby mode (hot back-up) will clear this item.

Item 325 - RS485 Ground Fault

This item is used to signal a ground fault on the RS485 port on the communications option board.

Item 326 - Communication Option Board Fault

This item is used to signal a fault with the communications option board. This fault is true when the communications option board is missing or the wrong board type is selected/installed.

Item 327 - Invalid Device Parameter

This item is used to signal that a device configuration is invalid. First used with the X3302 detector.

Item 328 - Diminished Detection

This item is used to signal that a detector has diminished detection ability. First used with the X3302 detector.

Item 329 - Detection Disabled

This item is used to indicate that a detectors ability to detect a fire is disabled. First used with the X3302 detector.

Item 330 - Start Calibration

This control item is used to initiate calibration of a device.

Item 331 - Abort Calibration

This control item is used to abort the calibration sequence.

Item 332 - Calibration Step

This item is used to indicate the calibration step. Each device type can define the meaning of each step.

Item 333 - Lon Overload Fault

This item is used to indicate that user logic is attempting to write more data to LON output devices then the LON can accommodate.

Item 334 - User String Display Enable

When this configuration item is true the controller descriptor text (item 9) will be displayed on the controller faceplate while in normal mode (scrolling marque).

Item 335 - Controller Display Mode

European approvals (EN54) and China approval bodies require specific information to be displayed by the controller. Approval requirements also specify specific modes of operation which differ from Premier's traditional operation. This item is used to select the proper mode of operation. This list may grow over time to fulfill requirements from different markets.

Controller Display Mode	
Value	**Mode**
1	Traditional
2	International

Item 336 - User Alarm

This item is only used internally by the AlarmTrigger logic function and is not associated with a particular device.

Item 337 - First Stage Alarm

First alarm output from a X3301A Automotive detector.

Item 338 - Second Stage Alarm

Second alarm output from a X3301A Automotive detector.

Item 339 - Config Port Relay Control

This status item is used to control a relay that switches the configuration port serial line from a primary controller to a secondary controller. The item goes true when the serial line should be connected to the secondary controller. The serial line is normally directed to the master controller except during the configuration process. In user logic this bit should be connected to one of the controller relays. The normally open contacts of the two relays (one from each controller) should be paralleled together to drive an external relay that switches the Rx and Tx comm lines.

Item 340 - Alarm Hold Timer

First used with the X3301A Automotive detector. Refer to the X3301 Automotive specification for details on this parameter.

Item 341 - Stage 2 Delay Timer

First used with the X3301 Automotive detector. Refer to the X3301 Automotive specification for details on this parameter.

Item 342 - Small Fire DelayTimer

First used with the X3301 Automotive detector. Refer to the X3301 Automotive specification for details on this parameter.

Item 343 - Suppression Timer

First used with the Automotive MIR Flame Detector (X3301). Refer to the AMIR X3301 specification for details on this parameter.

Item 344 - LON Diagnostic Fault

This is a new fault used by SIL field devices. The controller will issue this fault when the percent of missed status messages from a device is greater than 10% from both channels.

Item 345 - SIL Device

When this config bit is set it tells the Controller or field device that it should have compliance with IEC61508 (SIL2) operation. Controllers are configured with the factory test fixture for SIL operation. When the Controller is set for SIL operation extra diagnostics are performed on an ongoing basis. The controller will signal the “wrong device type” if the factory configuration does not match the configuration setting downloaded from S^3.

Item 346 - Internal Voltage Fault

This fault bit is set when hardware diagnostics detects a problem with one of the internal power supplies. First used with the EDIO-SIL device.

Item 347 - Hardware Fault

This fault bit is set when hardware diagnostics detects a hardware related problem. First used with the EDIO-SIL device.

Item 348 - PWM Fault

This fault bit is set when hardware diagnostics detects hardware problem with the PWM (Pulse Width Modulator). First used with the EDIO-SIL device.

Item 349 - Rogue Device

This fault bit is set when the controller detects two devices at the same address.

Item 350 - LON Pattern Test

This fault bit is set when the LON pattern message is incorrect or missing.

Item 351 - Watch Dog Timer Fault

This fault bit is set when the power-up test detects that the watchdog timer is not working properly.

Item 352 - Controller Inhibit Mode

In Alarms only mode, the inhibit feature inhibits only the alarms. The Alarms and Fault Mode inhibits all faults that trigger the Controller fault relay as well as alarms. The Alarms and Fault Mode also complies with EN54.

Control Inhibit Mode	
Value	**Mode**
1	Alarms Only
2	Alarms & Faults (EN54)

Item 353 - Controller Fault

This fault LED is set when the Controller is reset due to a Watch Dog Reset. It may only be cleared by a power cycle.

Item 354 - TX Lamp Fault

This Open path fault is set when the receiver has determined that the transmitter is flashing in the fault mode. This mode indicates that the transmitter lamp B is currently active.

Item 355 - Beam Block

This Open Path receiver has been blocked of all flash events.

Item 356 - ADC Saturation

This Open Path receiver and receiver are too close together.

Item 357 -Cal Active at Start

This fault is active when the switch input, which is pin 13 on the terminal board, is closed during power up. This fault is not active for a reed switch closure at startup.

Item 358 - Noise fault

This is an interference fault. It does not typically occur by itself.

Item 359 - Channel Fault Warning

This is a fault that is associated with each channel of a multi-channel field device. This is activated when there is any fault that affects the channel. The channel may or may not function. This only applies when the Controller Inhibit Mode is set to Fault Inhibit.

Item 360 - Gas Diode Gain

This is the current setting of the programmable amplifier used for the Open Path gas sensors. The setting may be a value from 1 through 7.

Item 361 - Beam Block Delay

The beam block delay is used with Open Path. This is the amount of time that must go by before a blocked beam fault is declared. The delay is configurable from 1 minute to 60 minutes.

Item 362 - Standby Power Fault 1

The standby controller sets this status variable when low voltage is detected on the power input #1.

Item 363 - Standby Power Fault 2

The standby controller sets this status variable when low voltage is detected on the power input #2.

Item 364 - Standby LON Fault

The standby controller sets this item when a Lon fault is detected.

Item 365 - Standby LON Gnd Fault

When this item is true, the standby controller has detected a ground fault.

Item 366 - Standby Controller Fault

This item is true when the standby controller has been reset by a Watch Dog Reset.

Item 367 - HSSL Communication Fault

This item is true when the master controller loses communication with the standby controller.

X3301 Multispectrum
IR Flame Detector

PointWatch Eclipse®
IR Combustible Gas Detector

Eagle Quantum Premier®
Safety System

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