Technical Document

Niagara$^{AX-3.x}$ Browser Access Guide

April 27, 2007

Niagara^{AX} User Guide

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Document Change Log

Updates (changes/additions) to this *NiagaraAX User Guide* document are listed below.

- Published: April 27, 2007

About This Document

Welcome to the *Browser Access Guide*. This manual is intended to help you use a standard web browser to access your NiagaraAX system. Included are example pictures that may (or may not) look similar to the real-time displays that have been prepared for your site.

Note: *Each NiagaraAX system looks somewhat different because most of the graphics and other web features are typically customized for each job. However, every effort was made in this guide to show mostly "typical" examples.*

This preface includes the following sections:

- "Intended Audience"
- "Document Summary"
- "Related Documentation"
- "Commonly Used Terms"

Intended Audience

The following people should use this document:

- NiagaraAX system owners and end users.

To get this most from this guide, you should already know how to use a computer and mouse. Previous experience using a web browser such as Microsoft Explorer or Mozilla Firefox is also helpful, but is not necessarily required.

Document Summary

This document contains the following chapters:

"Getting Started"—Topics include browser requirements, connection information needed, procedures to connect and sign on the system, using basic browser controls, mouse and cursor behavior, and signing off of the system.

"About Graphic (Px) views and commands"—Is about system graphics (Px Pages), including image and text elements, visual alarm indication, and issuing commands.

"About Schedules"—Provides information on using the graphical views for scheduling. Included are procedures to review and modify schedules, special events and holidays.

"About Alarms"—Covers standard browser access to alarms in the system, including procedures to acknowledge these alarms.

"About Histories"—Covers viewing history log data in the graphical History Chart views, and History maintenance views.

Related Documentation

The following documents are related to the content in this document and may provide addition information on the topics it covers:

- *NiagaraAX User Guide*
- *NiagaraAX Platform Guide*
- *NiagaraAX Provisioning Guide*

Commonly Used Terms

Throughout this guide, references are made to acronyms and terms that might be unfamiliar to you. This section provides definitions of some terms and is intended to ensure their consistent use.

browser Or web browser. This refers to an application like Microsoft Internet Explorer or Mozilla Firefox, widely used to locate and display web pages.

click, double-click, right-click To *click* is to tap a mouse button, pressing it down and then immediately releasing it. Clicking a mouse button is different from pressing (or dragging) a mouse button, which implies that you hold the button down without releasing it. When used as an instruction, click means to move the mouse pointer over that object and click the left mouse button (sometimes called button number one).

Some operations may require a *double-click,* which means that you click the (left) mouse button twice in rapid succession. Some operations require that you click the right mouse button. By convention, 'clicking' refers to the left mouse button. In this guide, the term *right-click* is used anywhere you need to use the right mouse button.

clipboard A special memory buffer that is used to temporarily store data that is being copied to another location. When you cut and paste data in a Windows application, you are removing the data from its source location and placing a copy of it in this buffer area, then pasting it from the clipboard to its final location (target).

dialog box or pop-up A graphical element (in the form of a box) used in Windows to display information or request input. Typically, dialog boxes request information and pop-ups convey information. They are both temporary - they disappear once you have entered the requested information and click OK.

folder Typically, this refers to a graphical representation of what used to be called a directory or subdirectory. Folders can contain other folders and files of various types.

Px Page Graphics page, referring to the NiagaraAX view that contains images and/or text that update (in real time) as a web page. A NiagaraAX system may have many Px Pages, with hyperlinks between each other (as well as their sub-elements, such as schedules, holiday calendars, history charts, and so forth).

HTML HyperText Markup Language - the authoring language used to create documents on the World Wide Web. HTML defines a set of codes that web browsers use to format web pages.

HTTP HyperText Transfer Protocol - the protocol used by the World Wide Web. HTTP defines how web servers and browsers transmit and format messages, including actions commands. HTTP is called a stateless protocol because each command is executed independently, without knowledge of the commands that came before it. The other main standard that controls how the World Wide Web works is HTML, which determines how web pages are formatted and displayed.

hyperlink An element contained on a web page that links the user to a different web page on the same site or an entirely different site. Hyperlinks are also used as user controls in electronic documents that take the user to another place on the current page or to a completely different document.

JACE controller Java Application Control Engine. (Rhymes with “space”.) The Tridium-manufactured controller that runs the core runtime NiagaraAX software in a Java Virtual Machine (JVM), providing a station with direct support for field device integration plus enterprise LAN connectivity. Among other duties, each JACE controller acts as a web server, with some models capable of directly serving their own web graphics (Px or Hx Pages).

objects NiagaraAX stations are engineered using “components,” which have known properties, including inputs and outputs used for sharing information and control. There are many types of components, including container components and child components.

station A NiagaraAX station is a combination of services and processes that run in the JVM (Java Virtual Machine) in a JACE controller or Web Supervisor PC. It is engineered and represented as a collection

of components. A Web Supervisor station can archive data from other networked JACE controller stations in a database, and may also serves graphics. A JACE controller station provides access to (and integration of) various networked control devices, and may also serve graphic views to remote browsers.

SQL Structured Query Language. A database language widely-used for querying, updating, and managing relational databases.

URL Uniform Resource Locator. The global address of a document or other resource. To access your system, you enter a URL in your browser's address bar (location bar), typically with the "http://" prefix and the IP address (or host name) of the target Web Supervisor or JACE controller. Various URLs used for routine access to NiagaraAX stations are provided throughout this document.

view A generic term that applies to what you see in your browser, for example, calendar view, history chart view, and so forth. Data can often be presented in several different views.

Web Supervisor Refers to a NiagaraAX station running on a PC, which is typically configured as the Supervisor station for any networked JACE controller(s). Typically, this PC is also running the full suite of NiagaraAX applications, including WorkplaceAX and the Alarm Console.

XML eXtensible Markup Language. A specification developed by the W3C (World Wide Web Consortium). XML is a subset of SGML, designed especially for web documents. Use of custom tags provides "extensibility", not available using HTML. The NiagaraAX Framework uses XML as one method of station database storage, also as an output option for text data (for example: logs, archives, and status queries).

Chapter 1

Getting Started

Special software is not necessary to access your NiagaraAX system. You can use the same web browser that you already use to browse the Internet.

This chapter provides information and procedures to help you start exploring your NiagaraAX system. The following main sections are included:

What You Need to Connect

You need the following before you can access your NiagaraAX system with a browser:

- A "Web Browser"
- "Your Connection Information"

Web Browser

You probably already have this. A "Java-enabled" browser is required—the typical configuration for most modern browsers. For two popular browsers (Internet Explorer and Mozilla Firefox), the following parameters have proven most essential:

Setting browser options (Microsoft Internet Explorer)

Note: *Browsers have different menus for creating a "favorite" or "bookmark" link. The following procedure is written using Internet Explorer 6.0 menus. Refer to your browser online help for more information about setting options for your particular browser type and version.*

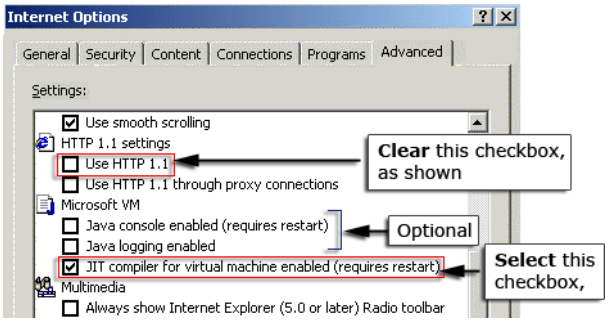
Step 1 From Internet Explorer's menu bar, select **`Tools > Internet Options > Advanced`**

The **`Internet Options`** dialog box displays.

Step 2 In the **`Internet Options`** dialog box, set the following options as shown in Figure 1-1.

- Under "HTTP 1.1 settings", clear the checkbox for "Use HTTP 1.1".
- Under "Microsoft VM", select the "JIT compiler for virtual machine enabled" option.

Figure 1-1 *Internet Explorer Internet Options settings*



Step 3 Click the **OK** button after setting the desired options.

The **`Internet Options`** dialog box closes.

Step 4 Close and re-open the browser to finalize the changes.

Refer to "Your Connection Information" for more information about connecting to your station.

Setting browser options (Mozilla Firefox)

Note: *Browsers have different menus for creating a "favorite" or "bookmark" link. The following procedure is written using Mozilla Firefox 2.0 menus. Refer to your browser online help for more information about setting options for your particular browser type and version.*

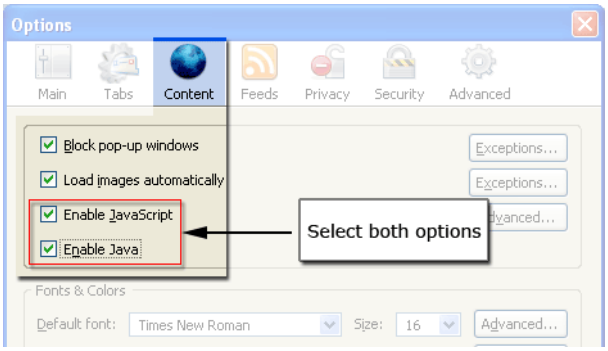
Step 1 From Mozilla Firefox menu bar, select: **`Tools > Options`**.

The **`Options`** dialog box displays.

Step 2 In the **`Options`** dialog box, set the following options as shown in Figure 1-2.

- Enable Java
- Enable JavaScript

Figure 1-2 *Mozilla Firefox Options settings*



Step 3 Click the **`OK`** button after setting the desired options.

The **`Options`** dialog box closes.

Step 4 Close and re-open the browser to finalize the changes.

Refer to "Your Connection Information" for more information about connecting to your station.

Your Connection Information

Note: *Your browser's successful display of a graphic (Px Page) after connection to the system is the basic test for NiagaraAX compatibility.*

If your LAN (local area network) is behind a "firewall," it may be configured to block Java applets. If so, Px Pages will not display in any browser (although other HTML items such as menus may appear). In this case, your IT system administrator will need to make the necessary firewall changes.

The administrator for your NiagaraAX system should provide you with the information necessary for your system access, along with any specific connection considerations. Typically, you will need the following three pieces of information:

- The *host name or IP address* for each NiagaraAX host you will access.
  Typically, you receive this as a complete "http" (web) link, for example:
  `http://10.10.8.64`
  This may even be delivered to you in the body of an e-mail, so you can just click it to start the connection. Refer to Appendix A, "My System," for a spot where you may wish to record this information.
- Your assigned *user name* for the NiagaraAX station running on this host.
  When connecting, a sign-on dialog box pops up. You enter this name.
- Your assigned *password* for the NiagaraAX station running on this host.
  You enter this password in the same popup sign-on box.
- If you are using a modem to directly dial into a modem-equipped NiagaraAX host, you also need to be supplied its phone number, as well its *host* user name and password. Refer to Appendix C, "Direct-Dial Access," for more details.

User Account permissions

Note: *It would be helpful if your NiagaraAX system administrator explained what "rights" have been assigned to you (in your user account). These rights determine not only what you can access (view), but also whether or not you can perform the following:*

- Issue control commands—for example, to change a setpoint, turn On or Off lights or equipment, or issue timed overrides. Generally, such commands are classified as “standard” (manual) or “emergency,” with separate command rights for each class. They are presented as “right-click” commands.
- Modify weekly schedule events, add or delete special events, and add or delete calendar dates (holidays). These are considered “Admin-level” write actions.
- Perform various system-administration commands, such as clearing or archiving logged data (histories), backing up a station database, and various others. Requiring “Admin command” rights, these commands are also presented as “right-click” commands.

Information about performing the commands and actions listed above are described in other topics. However, you may not have the necessary security rights to perform these operations, at least for all of these things. In either case, the system is aware of your rights when you sign on, and provides you with the necessary menus or controls based on these rights.

Connecting to the System (Signing On)

You connect to your system by entering the address of the system host, either a Web Supervisor or a JACE controller. The system host runs a NiagaraAX station, which prompts you to sign on. After you enter your user name and password, you are connected to the system.

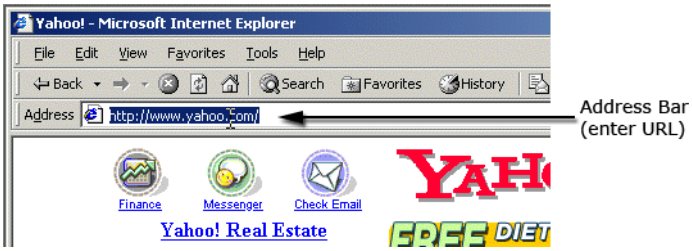
Connecting to and logging into the system

To connect to your system:

Step 1 Open your browser, if not already started.

Step 2 Click once in the address bar (location field) of your browser, to completely highlight the current URL, as shown in Figure 1-3.

Figure 1-3 *Deleting the current URL*



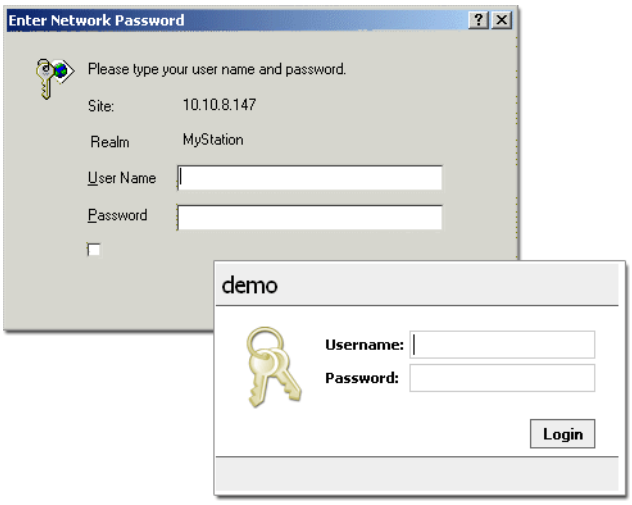
Step 3 Type the host name (or host IP address) supplied by your NiagaraAX system administrator into the *address bar* (location bar) in your browser, as shown in Figure 1-4.

You can include the leading `http://` portion (or omit it if desired).
(Do not include “www” characters.)

Figure 1-4 *Typing in the host address*

Step 4 Press the Enter key.
A connection is made to the station. This typically produces a popup dialog box or a station login page that prompts for your user name and password.

Figure 1-5 *Login screens*

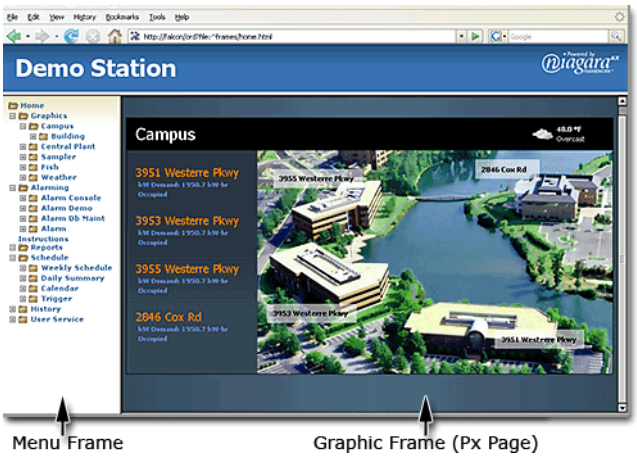


Step 5 Type your supplied user name.

Step 6 Press the Tab key to move to the password field, and type your supplied password. (Each password character you type displays as an (*) asterisk.)

Step 7 Press the Enter key to send your logon information to the station.
If accepted (information is correct), you will see your assigned home page. This may be a top-level graphic of your system, a graphic plus a menu frame, such as the example in Figure 1-6, or something completely different, depending on how your system was built.

Figure 1-6 *Graphic Home page*



If you user name and password is not accepted, you are re-prompted (the popup dialog box remains with the entered user name, but the password is cleared). Check your information, correct any errors, and try again.

Note: *Within any browser window, three logon tries are permitted before you receive a "401 Error: Access Denied."*

Note: *It is possible that your system has been engineered to allow some "public access."*
If so, you may not be prompted for your user name and password, at least when first connecting. In this scenario, however, it is likely that later you will be prompted (at some point while navigating your way through the system). In this case, just enter your assigned user name and password and proceed as normal.

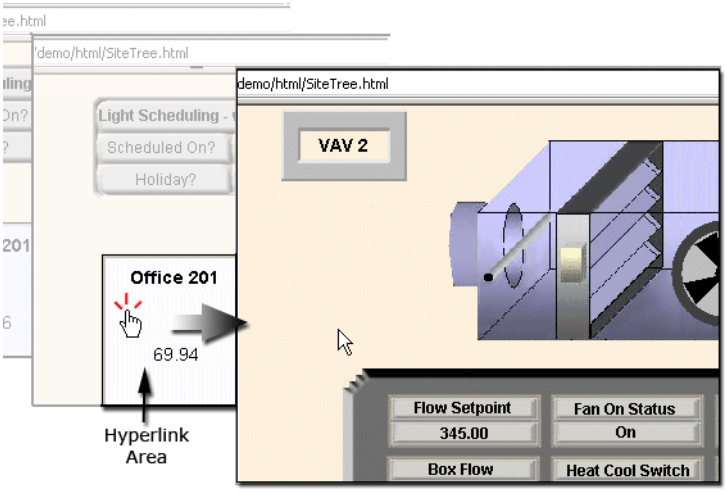
Using Browser Controls

While connected to your system, you will find hyperlinks that you can follow to navigate to see various graphics displays or other pages. When you mouse over an element in a graphic that contains a hyperlink, the cursor changes to a pointing-hand.

Cursor icons:  change to:  (also see Figure 1-7).

Simply click to follow the link. This updates the browser window with the new contents, or (in some cases) may launch a new browser window.

Figure 1-7 *Click to follow any hyperlink indicated by a pointing hand.*



These type of links have been engineered as part of the station database, meaning that your access was "anticipated" (even more precisely, facilitated).

In addition to these links, you also use standard browser and windows controls, including the following:

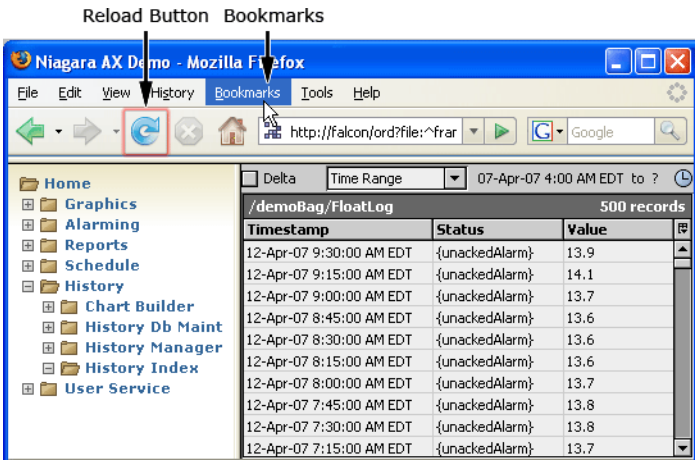
- "Back and Forward Buttons"
  Click on your browser's **`Back`** button to return to the previously viewed browser display. After using the Back button, you can click on the **`Forward`** button to return again to the previous display.
  In most browsers, **`Back`** and **`Forward`** buttons are in the *upper left* of the toolbar.
  - **`Back`**—Click to back up one display.
  - **`Forward`**—Click to return forward.

  You can continue to click back or forward, as needed.
  Note: *Even if you click back to before your original (pre-sign-on) display, you should not have to sign on again.*

Figure 1-8 *Browser "Back", "Forward", and "Reload" buttons*

- "Refresh (Reload) Button"
  You do not need to use the Refresh (Reload) button when viewing most of the graphics that are served by your NiagaraAX system. Values in graphics continuously update in real-time and you only need to observe. The browser maintains an open connection to the station.
  However, text-only views (typically tables) and some generated charts provide "snapshots" of current values. Examples are the Status page, log data tables, and the Alarm Display page

Figure 1-9 *Example of a static table view that may require a periodic Refresh (Reload).*



While viewing these displays, you may wish to periodically click on your browser's **`Reload`** button to update the display—particularly if you have displayed the page using the **`Back`** or **`Forward`** button. Otherwise, you will be viewing values "cached" (stored) by the browser, instead of the latest values.

- "Bookmarks"
  You can set and save browser bookmarks (Favorites) for any point during your access of your NiagaraAX system. This allows you to return to a favorite display in your system directly whenever you are using your browser.

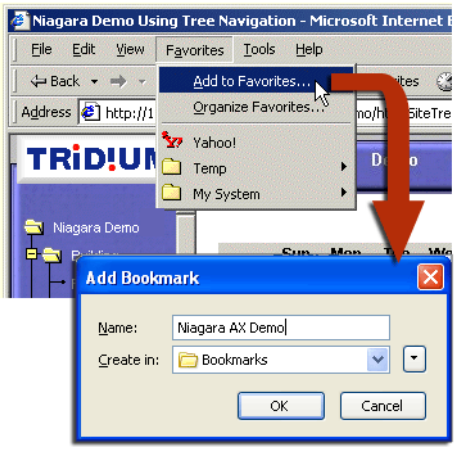
Creating a new Favorite (Bookmark) in the browser.

Note: *Browsers have different menus for creating a "favorite" or "bookmark" link. The following procedure is written using Internet Explorer 6.0 and Mozilla Firefox 2.0 menus. Refer to your browser online help for more information about creating bookmarks for your particular browser type and version. In the following steps, Internet Explorer menu items and terminology is given first, followed by the Firefox equivalent in parentheses.*

Step 1 In Internet Explorer, under the **`Favorites`** (**`Bookmark`**) menu, select **`Add to Favorites...`** (**`Bookmark This Page...`**).

The **`Add Favorite`** (**`Add Bookmark`**) dialog box appears.

Figure 1-10 *Adding a Favorites (Bookmark)*



Step 2 In the **`Add a Favorite`** (**`Add Bookmark`**) dialog box, name the bookmark a descriptive name by typing in the Name field. You can also organize your Favorites (Bookmarks) in existing folders or create new folders from this same dialog box.

Step 3 Complete the Favorite (Bookmark) creation by clicking the **`OK`** button.

The dialog box disappears and the new Favorite (Bookmark) appears under the Favorites menu in the appropriate folder.

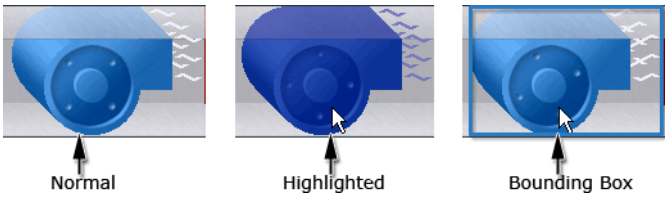
Note: *During a browser session in which you have not already signed into your system, and you select a saved bookmark (into the system), you will be prompted first for your user name and password—just like when you first accessed the system.*

- "Windows Controls"
  When accessing your system, you should typically *maximize* your main browser window to ensure you can see all parts of graphics and menus. Do this by simply *double-clicking* anywhere on the *Title Bar* (the top of the browser window)—this acts as a toggle you can use to set the browser window back to a re-sizeable window.
  In some cases, especially if your display is less than XGA resolution (1024 x 768 pixels), even a maximized browser window might not be able to display the complete contents of a system-graphic or menu. In this case, your browser window automatically provides scroll bars: either vertical, horizontal, or both. Just click and drag on the scroll bar sliders, as needed, to view the complete area.

Right-click (popup) menus

As you move the mouse cursor over elements in a graphic (Px Page), you may notice that some graphic elements change colors, or show a colored boundary, as shown in (Figure 1-11). This is the default behavior for an element that represents a commandable object.

Figure 1-11 *Highlighting or a bounding-box with a commandable element*



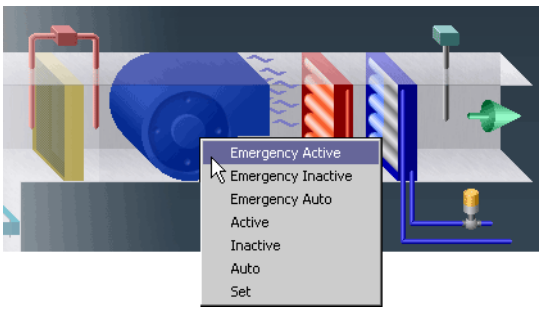
A highlighted element or bounding-box is the visual signal that a right-click, command menu may be available for that object. (The menu appears only if you have the necessary command rights).

Note: *Systems may be engineered so as not to show bounding-boxes or highlighting. In this case, you simply need to "know" that a right-click command menu exists.*

Command menus

You can *right-click* on any object that is "commandable" to see the associated popup menu, as shown in Figure 1-12. If the menu appears, you have command rights. If you do not have rights to commands in the popup menu, nothing will happen.

Figure 1-12 *Right-click to see the available command menu.*



Caution *Do not issue commands "just because you can." You should understand how the commands affect your system (and even more importantly) discuss this topic with your NiagaraAX system administrator, before you issue commands.*

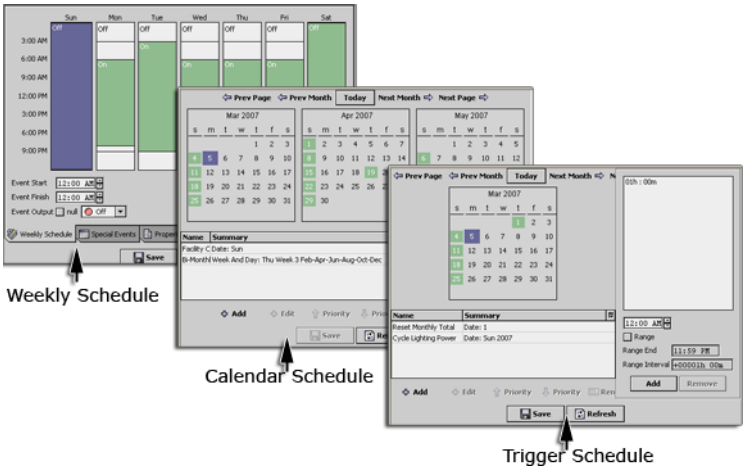
Types of special views

Some hyperlinks from graphics produce special views. These include graphical editors for reviewing and modifying things like schedules, viewing, and editing history logs.

Note: *Before using the graphical editors to modify schedules and holidays (calendar), please refer to the topics that provide procedures and detailed explanations.*

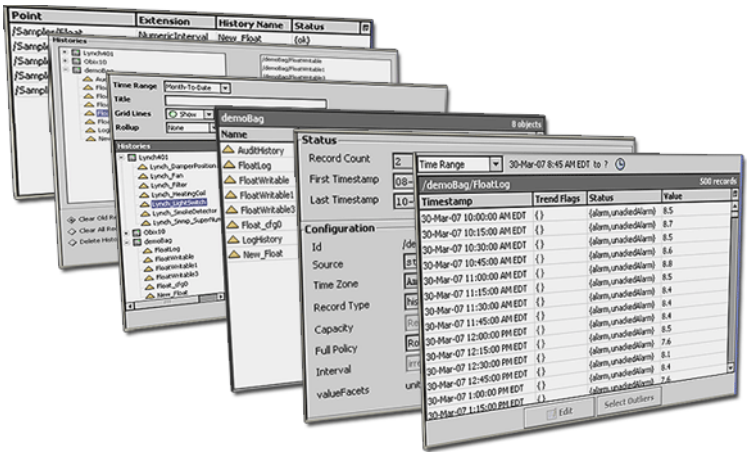
- **Schedule**
  These are views that lets you review event times in a schedule, see special events (exceptions) if defined, and access other parameters. If you have permissions for the schedule, you can also modify these items. A Calendar view lets you review defined holidays, and add and delete them if you have proper permissions. See the example views in Figure 1-13.

Figure 1-13 *Example Schedule and Calendar views*



- **History**
  These views present historical data in several different ways, including: graphical charts, tabular, and data-management views where you can build charts using multiple history files.

Figure 1-14 *Example history views*



- **Property sheet**
  For any selected component in the station, its property sheet view lists its available properties, where some properties may be "child" containers-each "expandable" listing their own properties (and so on).
  Depending on your permissions, you may see not see all available properties. In addition, some properties may be writable by some users, but read-only by other users.
- **Wire sheet**
  A wire sheet view is available only if you have the "Default Wb Web Profile" and you have "admin write" permissions on a component (typically, a folder). This advanced view lets you graphically add and wire components together, to create control logic.
- **Category sheet**
  Category sheet views are available only if you have the "Default Wb Web Profile" and you have "admin write" permissions on components. This advanced view lists all categories in the station, and shows a check mark beside any that are assigned to this component.
- **Slot sheet**
  Slot sheet views are available only if you have the "Default Wb Web Profile" and you have "admin write" permissions on components. This advanced view lists all slots (properties, actions, topics) for

a component, and allows you to set config flags, change display names, and even add new slots.

- **Link sheet**
  Link sheet views are available only if you have the "Default Wb Web Profile" and you have "admin write" permissions on components. This advanced view provides a tabular list of links out of (and into) the selected component, and allows editing or deletion of links.
- **Manager views**
  Various table-based manager views are available only if you have the "Default Wb Web Profile" and you have "admin write" permissions on certain container components. These advanced views provide a tabular list of child components, and typically allow editing, creation, and deletion of sub-components, and often other "job-based" operations.

Types of Web profiles

Note: *In NiagaraAX, the concept of **Profiles** pertains to the different ways that Workbench is displayed while using either the Java plugin or using Hx technology. In this context, it does not refer directly to security settings or personal preferences.*

Profiles provide NiagaraAX software engineers with the ability to customize both the desktop Workbench and the Web Workbench interface. Using NiagaraAX, the software engineer can create customized Workbench applications that provide different functionality. Refer to *NiagaraAX Developer Guide* for more information about custom user interface development.

Custom user interface design, at the browser level, allows for different views that may include or exclude features such as sidebars, navigation trees and other tools that are provided through the interface. **Web profiles** are used to identify these different web (browser) interfaces. A systems engineer, or anyone with proper administrative credentials can assign a single Web profile to each user that is listed in the User Manager.

The following standard Web profile options are provided:

- Default Wb Web Profile
  Includes all Workbench functions (refer to "Default Wb Web Profile" on page 1-9)
- Basic Wb Web Profile
  Reduced feature set in Workbench interface (refer to "Basic Wb Web Profile" on page 1-10)
- Default Hx Profile
  No Java plugin (refer to "Default Hx Profile" on page 1-10)
- Basic Hx Profile
  No Java plugin with reduced feature set interface (refer to "Basic Hx Profile" on page 1-11)

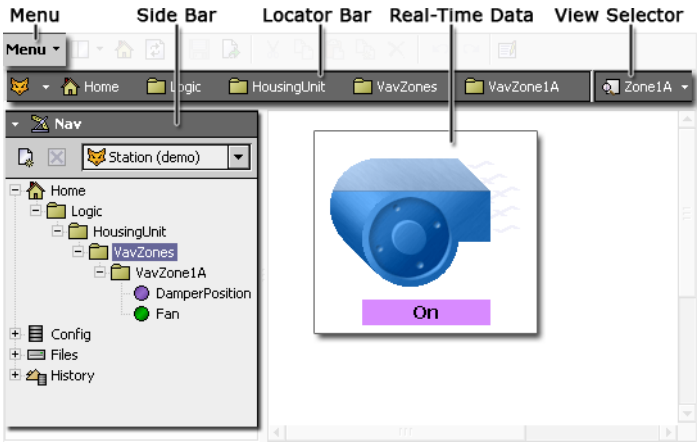
Most systems provide special navigation features which vary according to the system configuration and the user profile that is activated when you log in to the system. Following is a list and brief description of the possible types of navigation features.

- Default Wb Web Profile
  Includes all Workbench functions (refer to "Default Wb Web Profile" on page 1-9)
- Basic Wb Web Profile
  Reduced feature set in Workbench interface (refer to "Basic Wb Web Profile" on page 1-10)
- Default Hx Profile
  No Java plugin (refer to "Default Hx Profile" on page 1-10)
- Basic Hx Profile
  No Java plugin with reduced feature set interface (refer to "Basic Hx Profile" on page 1-11)

Default Wb Web Profile

This profile provides all the features of the Web Workbench, using the full Java plugin download.An example of the Default Wb Web Profile is show in Figure 1-15.

Figure 1-15 *Default Wb Web Profile example*



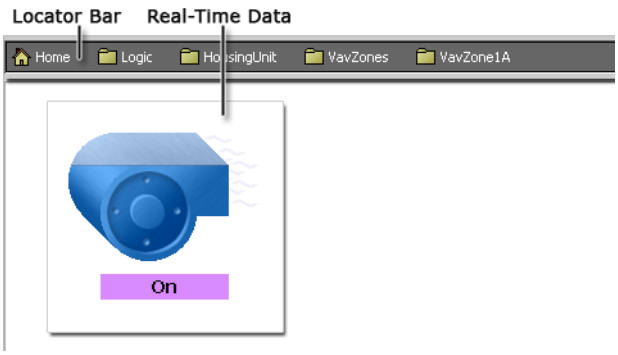
Major features of the Default Wb Web Profile include:

- **Dropdown menu list**
  This menu includes the following submenus: File, Edit, Search, Tools, SideBars, PxEditor.
- **Side Bar**
  You may show or hide this pane. It may include the nav side bar and the palette side bar. The nav side bar displays the navigation hierarchy that is defined by the nav file.
- **Locator Bar**
  This interactive graphic bar appears across the top of the view area.
- **Real-Time Data**
  Data is displayed in real-time using the Java plugin.
- **View selector**
  Provides the same view selection options that are available in the desktop Workbench views.

Basic Wb Web Profile

This profile uses a reduced set of features but provides a rich user interface using the Java plugin download. An example of the Basic Wb Web Profile is show in Figure 1-16.

Figure 1-16 *Basic Wb Web Profile example*



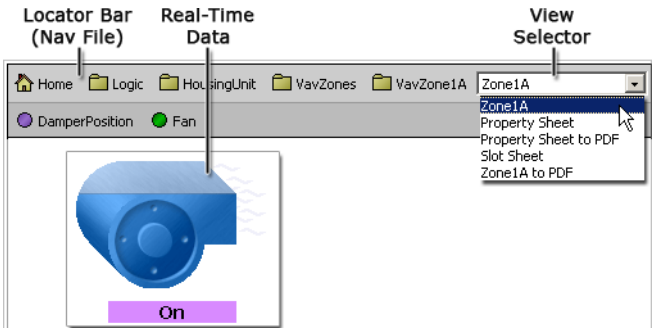
Major features of the Basic Wb Web Profile include:

- **Locator Bar**
  This graphic bar appears across the top of the view area.
- **Real-Time Data**
  Data supplied in real time using the Java plugin.

Default Hx Profile

This profile uses a special "Hx" technology and provides a real-time user interface without the Java plugin download. An example of the Default Hx Web Profile is shown in Figure 1-17.

Figure 1-17 *Default Hx Profile example*



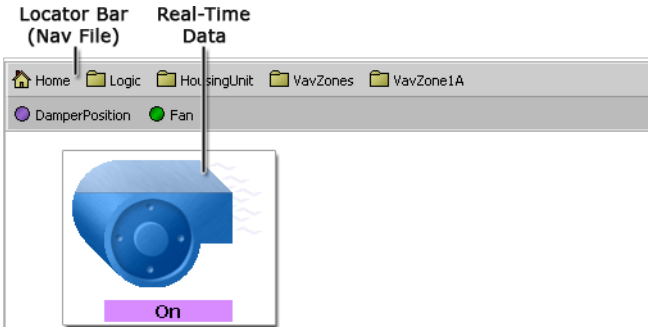
Major features of the Default Hx Profile include:

- **Locator Bar**
  This graphic bar appears across the top of the view area and displays links that are defined by the nav file.
- **Real-Time Data**
  Data is displayed in real time using Hx technology instead of the Java plugin.
- **View Selector**
  This dropdown option list provides a set of alternative views for the active object.

Basic Hx Profile

This profile uses a special "Hx" technology. It provides a reduced set of features but includes real-time user interface without the Java plugin download. An example of the Basic Hx Profile is shown in Figure 1-18.

Figure 1-18 *Basic Hx Profile example*



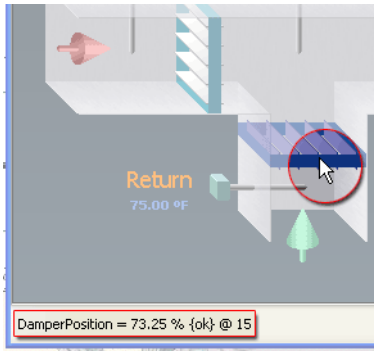
Major features of the Basic Hx Profile include:

- **Locator Bar**
  This graphic navigation bar appears across the top of the view area and displays links that are defined by the nav file.
- **Real-Time Data**
  Data supplied in real time without using Hx technology instead of the Java plugin.

Status bar information

In the lower left corner of the browser window is an area called the status bar. The status bar shows information when you rollover elements such as graphics, buttons, or controls. As you move your mouse cursor over a hyperlink or certain types of system graphics, the status bar displays the link destination or output data, as shown in Figure 1-19. A hyperlink destination is typically defined using an "Object Resolution Descriptor" (Ord) in the station database.

Figure 1-19 *Status bar shows link destinations and other details related to cursor position.*



Logging off (signing off) the system

You can simply close (not minimize) your browser window to sign off your browser connection to the station. Or, your system may be configured with a "logout" link that you can click to log off of the system. Alternately, you can manually type in the following logout URL in your browser's address bar and press the Enter key:

```
http://<hostNameOrIPaddress>/logout
```

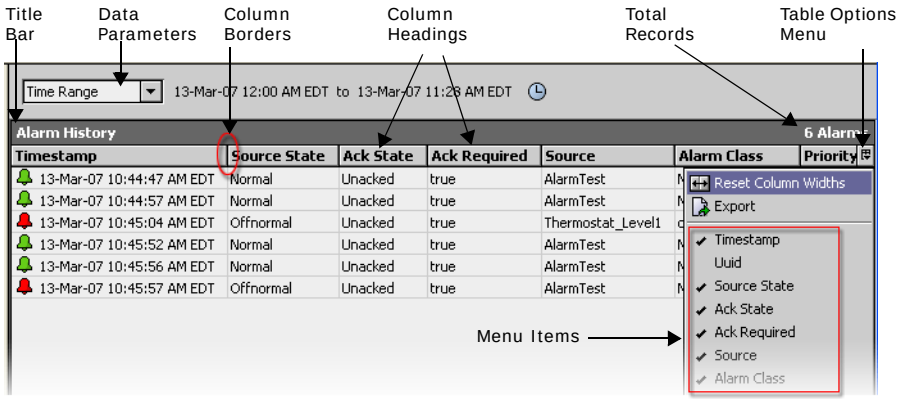
By default, this type of logout brings up the "login" screen again.

Figure 1-20 *Logging off the system*

Common table view controls and display options

Many views that present information in tables have one or more of the following display features and use one or more of the controls and options described in the following list:

Figure 1-21 *Table controls and options*



- **Data parameters**
  This control allows you to choose from a list of time options that filter the data that is displayed in the table. These controls include `Delta` (for history logging) and `Time Range` settings.
  - Delta reporting option
    This option is useful for history logging, when you want to display value changes (delta) in your report.
  - Time range option list

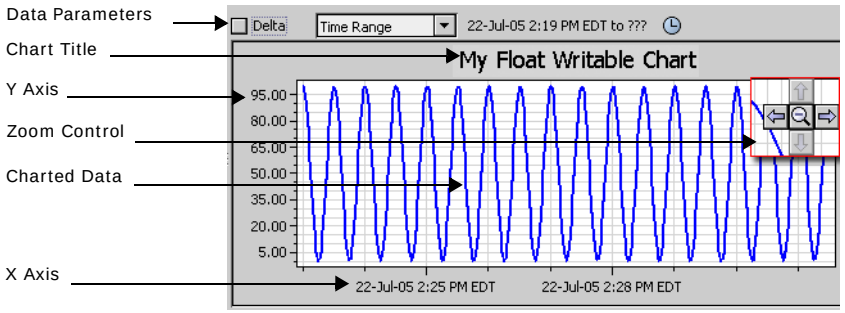
This list has a variety of predefined time range options, including an option that allows you to restrict your data presentation to a particular date and time range that you specify.

- **Title bar**
  This area of the table displays the name of the data collection on the left side of the title bar and in some tables (collection table, history table, alarm extension manager, and others) displays the total number of records in the table on the right side of the title bar.
- **Column headings**
  Each column of data has a title that indicates the data type.
- **Column boundaries**
  Each column has a movable column boundary that can be used to re-size the column using the mouse control. Stretch or shrink column width by dragging the column boundary, as desired. Use the `Reset column widths` menu item to reset all column widths to their default size.
- **`Table Options`** menu
  This menu is located in the top right corner of the table and provides one or more of the following controls and options. The standard **`table options`** menu includes the following items:
  - **`Reset column widths`**
    This menu item sets all columns in the table to their default widths. This is useful if you manually changed widths of columns, and now some contents are hidden (even after scrolling).
  - **`Export`**
    This menu item opens the **`Export`** dialog box where you can choose to export the table to PDF, text, HTML, or CSV (comma separated variable).
  - **`Context-sensitive menu items`**
    Additional context-sensitive menu items appear in the **`table options`** menu, depending on the type of table that you are viewing. These additional menu items allow you to select or deselect the item in order to display or hide the column data in the table.

Chart controls and options

Many views that present information in charts have one or more of the following display features and use one or more of the controls and options described in the following list:

Figure 1-22 *Chart controls and options*



- **Data parameters**
  These controls include `Delta` (for history logging) and `Time Range` settings.
  - Delta reporting option
    This option is useful for history logging, when you want to display value changes (delta) in your report. Checking the delta box causes the chart or table to be recalculated and replotted using delta values. Instead of plotting the recorded values for each sample, the difference (delta) between the recorded values is plotted. This is useful when electrical consumption has been recorded as a totalized (summed) log and you want to display the amount of consumption that was used during each sample interval.
  - Time range option list
    This list has a variety of predefined time range options, including an option that allows you to restrict your data presentation to a particular date and time range that you specify.
- **Chart Title**
  This area of the chart displays the name of the chart. This title is editable in the chart builder view.
- **y Axis**
  Displays units for the y axis.
- **x Axis**
  Displays units for the x axis.

- **Charted Data**
  The color of the line and type of line is editable in the chart builder view:
- **Zoom Control**
  The zoom control appears when you drag the mouse cursor across the chart display area. The direction that you drag the mouse determines which axis gets "zoomed" in on. If you drag horizontally, the zoom effect is in the horizontal axis only. If you drag the mouse vertically, the zoom effect is in the vertical only. You can zoom mulitple times if you want to, until you reach the maximum enlargement. You can also use the zoom controls to reduce the magnification amount, or to move the chart left, right, up, or down.

Beginner's FAQs (Frequently Asked Questions)

The following questions and answers may be helpful after first using your browser to access your NiagaraAX system.

Q: Why does my co-worker connect to the same system I do, but see a completely different graphic?

A: Each user in the system may be assigned to a different "Home Page." Moreover, users may be given different security rights. This means that you each may be able to access different parts of the system, or have different abilities to issue commands and overrides, modify setpoints, and so forth.

Q: Q: Why do I have to sign on to the system more than once? For example, I sign on when I first connect in the browser, and then I'm prompted to sign on again later, usually when I select a certain log chart or schedule.

A: This can occur if your system contains multiple stations (NiagaraAX hosts). After your initial sign on to the first station (typically the Web Supervisor), you will prompted again whenever a hyperlink requires connection to a different station (typically a JACE controller). However, you are asked to sign on only once to any particular station during your browser session--and only then if required.

Q: Q: Does the system "know" when I'm connected?

A: Yes, in that each station in the system records changes made by all users in an "audit log." This applies whether a user is signed on using a web browser or the native tool (JDE). Recorded changes include most commands plus schedule and holiday edits, along with the time and date of occurrence. The audit log for each station is typically archived, and may be reviewed by the system administrator.

Note: *This underscores the importance of keeping your user name and password private, and being sure to close your browser windows when finished.*

Q: Q: When I click on a hyperlink, I get an error. What does it mean?

A: Reasons can vary, but typically the following applies:

- If "Page cannot be displayed," the station may not be running, or the network connection (or Internet connection) may be down.
- If "401 Access Denied," this means insufficient user rights. If seen upon station signon, it means your entered user name or password are not valid.

Q: Q: If I acknowledge an alarm or alert, does the system administrator know?

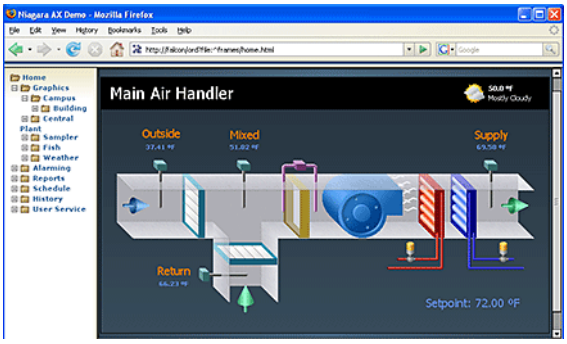
A: Yes. Each alarm or alert acknowledgement is recorded in the application database of the Web Supervisor (or possibly a JACE-NP), and includes the user that acknowledged it and the time and date. Refer to "Notifications (Alerts and Events)," page 7-4, for more information.

Chapter 2

About Graphic (Px) views and commands

System graphic views (technically called "Px views") provide real-time data using both images and text. Usually these views are the main interface to your system, and provide links to other graphics and special views-and possibly access to commandable "actions" via image and text elements. Each Px view can display a screen with animated graphics that contain system information, as shown in Figure 2-1.

Figure 2-1 *Graphic (Px) view in a browser*



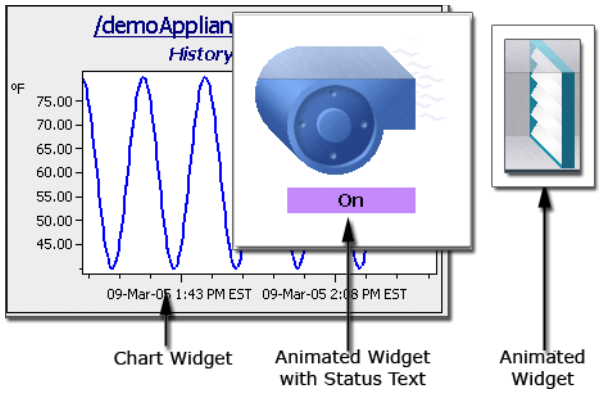
Animated graphics are graphics that change, or “update”, based on data values that come from object sources that are connected (or “bound”) to them. A “graphic” can be as simple as a single word of text (“ON”) or a number (“72”), or it can be an animated image (rotating fan). Most Px views are assembled using a variety of elements, known as "widgets," that include graphic layout elements plus images and text that are linked to real-time data. Widgets provide the graphic visualization of data in NiagaraAX, so animated graphics are comprised of one or more widgets assembled in a Px file, available for display in the browser.

About Widgets

“Widget” is the name given to special components that provide visualization in a NiagaraAX system. System engineers use the NiagaraAX Px Editor to work with the widget properties in defining user interface functions for control and information display. User-interface widgets can process input in the form of mouse, keyboard, and focus events or they can be read-only displays of real-time data. These features provide the tools for building rich user interfaces. Widgets include things such as charts and graphs, tables of data, animated graphics, and even simple lines of animated, or continuously updating text.

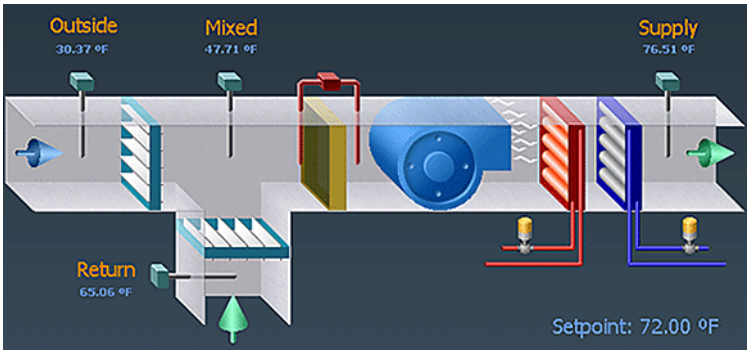
Widgets are animated by binding any widget property to a legitimate data source. This means that system engineers can connect numeric values to widget properties that use numeric values and connect binary values to objects that can use binary values. By animating the properties of a widget, the engineer can control text and image appearance as well as change a widget’s location on the page and even its visibility. Widgets in Px views typically include one or more "background" images, plus other images that may represent various devices, buildings, or data presentations. Figure 2-2, shows a few examples of different types of widgets.

Figure 2-2 *Example widgets*



Some images graphically represent different types of values. For example, in the Figure 2-3, the fan is "animated" (appears moving when on and not moving when off). This display is a graphic representation of a boolean (“on” or “off”) value. The outside-air damper is also proportionally displayed (currently at a 87% open position). This is a graphic display of a numeric-type value (87%).

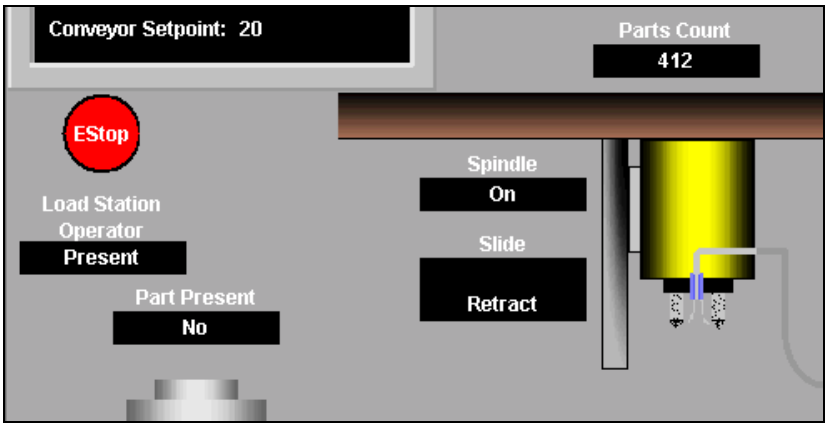
Figure 2-3 *Example text and graphic widgets*



Typically, text-only widgets are used for both “labels” and for directly displaying values. Values appearing in text may be formatted in different fonts and colors, as designed by the system designer. In Figure 2-3, text widgets show temperature values, and are used for other values and labels too.

Besides showing analog values, text values may be binary (two-state) or multi-state (three-or-more states). For example, a value may display as On or Off Slow, or Fast, Yes or No, or any needed state, as shown in Figure 2-4.

Figure 2-4 *Portion of a graphic that is mostly text-based.*



Types of graphic status indicators

Graphic displays may use certain standard colors and behaviors to indicate a point's current status or condition. Various elements in graphics may be capable of visual indications of certain conditions, including alarm or fault conditions. Coloring and blinking are options for indicating status and are used with some elements only if the "color" or "color and blink" option is selected. Typically, such elements turn a different color as long as the off-normal condition exists. In addition, a system can be engineered to provide almost any custom representation of an off-normal condition.

Types of status indicators

- **Alarm icon**
  Alarm icons are used only in the Alarm Console or Alarm Portal views to display alarm status. More details about the alarm icons are provided in "Alarm views" on page 4-4.
- **Blinking**
  Blinking (like coloring) is an optional effect that may be used to alert the user to an important status, such as an alarm or fault. The "blink" option is used only in conjuction with a "color" option.
- **Color**
  Color is optional effect to alert the user to an important condition or status. Color may be used with or without the blinking option—or it may be disabled for some display situations.
  The following list provides a description of each of the typical statuses and the colors that are associated with them in the NiagaraAX system.

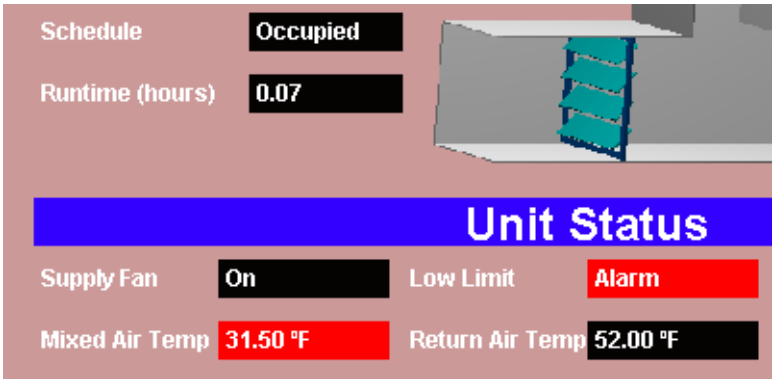
Status colors (common)

- **Alarm (red)**
  `Alarm` status is indicated by white text and red background 65.0 °F.
  An alarm status indicator displays when a point currently has a value in an alarm range (as defined by the point's properties).

Example Red (alarm): When a graphic element turns red, it means the object represented is currently in a known alarm condition. For example, the analog value received from a temperature or humidity sensor may be above (or below) a configured alarm limit, or an "alarm switch" (filter status, for instance) may be in the "off-normal" state (closed or opened).

During this period, an associated graphic element remains red. Color returns to "normal" only when the alarm status condition ends.

Figure 2-5 *Graphic portion with two text elements currently displaying red (alarm)*



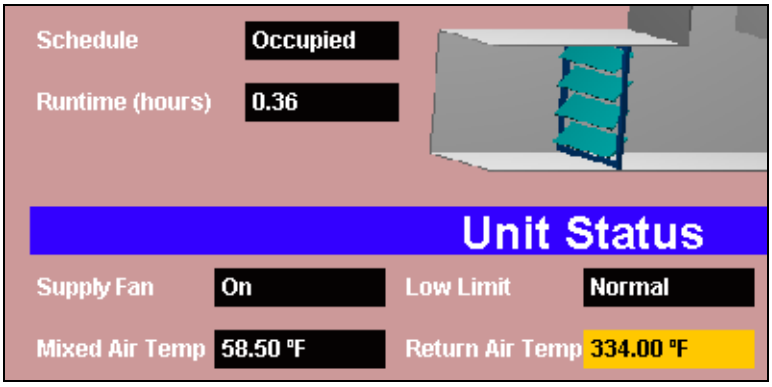
If you (as a system user) are given alarm acknowledgment privileges and a link to the alarm display, you may be able to find and acknowledge the associated fault alarm—this will record the time, date, and user (you) that acknowledged it. However, the element will remain red until the fault condition is over.

- **Fault (orange)**
  `Fault` status is indicated by black text on orange background 208.8 °F.
  Typically, this indicates an NiagaraAX configuration error or license error. If a fault occurs following normal (ok) status, it could be a "native fault" condition detected within the device, or perhaps some other fault criteria that was met.

Example Orange (fault) When a graphic element turns orange, it means the object represented currently has a fault status. Less common than alarm status, a fault usually means the value received from a sensor or device is outside any reasonable (measurable) limits. This condition may occur from an open

or shorted-connection in a sensor cable, for example. During this fault period, the element will remain orange. The color may return to "normal" only when the fault condition no longer applies—in some cases, an alarm status (red) color may be seen first.

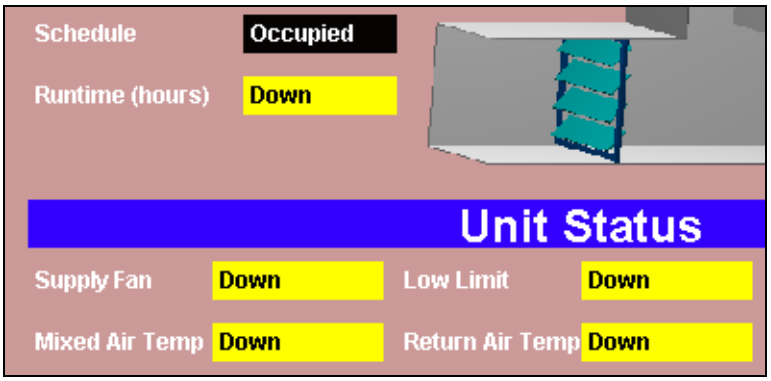
Figure 2-6 *Graphic portion with one text element currently displaying orange (fault).*



- **Down (yellow)**
  `Down` status is indicated by black text on yellow background 68.4 °F.
  This status usually means that communications to the parent device are currently lost, based upon the device status (Monitor) configuration for that network.

Example Yellow (down) When a graphic element turns yellow, it means that communications are down between the station and the device with the originating data. Although not typical, when this occurs usually multiple elements in a display will be yellow.

Figure 2-7 *Graphic portion with text elements currently displaying yellow (down)*



If you (as a system user) are given alarm acknowledgment privileges and a link to the alarm display, you may be able to find and acknowledge an associated device down alarm—this will record the time, date, and user (you) that acknowledged it. However, elements will remain yellow until device communications are re-established.

Status colors (other)

- **Overridden (magenta)**
  `Override` status is indicated by black text on magenta background 72.0 °F.
  An override means that the current point control is from a user-invoked command.
- **Disabled (gray)**
  `Disabled` status is indicated by black text on light gray background 79.0 °F.
  This status means that the point (or its parent device or network) has been manually disabled.
- **Stale (tan)**
  `Stale` status is indicated by black text on tan background 73.4 °F
  This status means that the associated point has not received the requested response for this data item within an expected (preconfigured) amount of time.
- **null (no color indication)**
  `Null` status is indicated by the word "null".
  This status means that the point control has entered a state without a value (null) as opposed to having a specific value and priority level. This status is typically used for a "fallback" setting for a point.
- **Unacked alarm (no color indication)**

`Unacked alarm` status is indicated by a blinking graphic display element and also by the text "Unacked" in an alarm view. Blinking occurs continuously until the associated alarm is acknowledged—regardless of the current alarm state.

This status means that this type of alarm requires an acknowledgment. The alarm goes into an "acked" state once the alarm is acknowledged—even if the point is still in an alarm condition.

Note: *Status types "unackedAlarm" and "null" do not affect the indicated status color.*

Priority of status indication

Since status flags for a point or object can get set in combinations, status color indication uses a priority method. Among those six status flags with associated colors, priorities (and default colors) are, in order:

1. disabled (dark gray)

   The point may also have other status flags set. Typically, you manually set and clear this status (unlike others). After disabled is set for a point, it is no longer polled, so further status changes do not occur until disabled is cleared.
2. fault (orange)
3. down (yellow)
4. alarm (red)

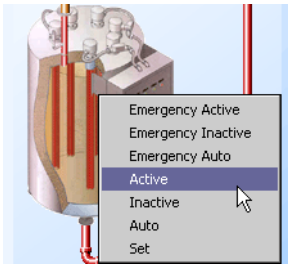
   Point may have other status flags set.
5. stale (tan)
6. overridden (magenta)

   The point may also have other status flags set.

Using actions (commands)

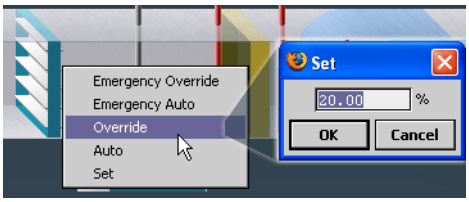
The graphics in your system interface may include elements that are linked to control objects that have action commands associated with them. Depending on your user profile and the associated security permissions, these actions may be available from the popup (right-click) menu that is associated with the objects. Figure 2-8 shows an example of an action menu associated with a boiler.

Figure 2-8 *Example popup menu with actions*



Actions that are available on the popup menu include different types of actions that have different priority levels. For example, an **`Emergency Active`** action and an **`Active`** action are both "override" type actions but **`Emergency Active`** has a higher priority that **`Active`**.

Figure 2-9 *Example popup menu with actions and secondary dialog box*



To issue an action (command) using the graphic popup menu

To issue an action using the graphic popup menu, do the following:

Step 1 Right-click on the object that you want to affect.

The popup menu displays.

Step 2 From the popup menu, select the desired action.

Note: *For some actions, another dialog box appears to allow you to type in the desired value.*

Step 3 If a secondary popup or dialog box appears, type in the desired value and click the **OK** button.
The dialog box and popup menu disappear and the action is applied to the object.

Types of Actions

Actions include the following types:

- **Override actions**
  Override actions involve the concept of "priority". When you use an override action, you are changing an action setting at a certain priority level. If your new override setting has a higher priority than the current setting priority level, then the new override takes effect. Override actions may be set at Emergency or Normal priority levels and include the following types of override options:
  - Permanent override
    If an override is set as "permanent" it remains in effect until this override is removed using the "Auto" option.
  - Timed override
    This is a temporary override that is effective for a defined length of time. You can select from an option list of preset times or you can type in a custom time for the timed override.
  - Auto
    The Auto option removes any permanent or temporary override of equal or lower priority level and allows the default value or any other input value to control the point.
- **Set actions**
  Set actions are simply actions that allow you to define ("set") a specific value at a point. When you type in or choose a value for a "set" action, the value that you use is only in effect when the "auto" option is in effect for that point. You can change a point value using the **Set** dialog box associated with the **Set** menu option at the point.

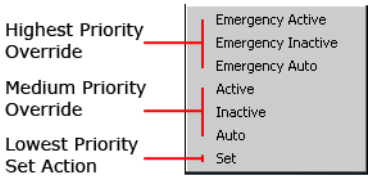
Types of override actions

The following types of override actions are available, depending on the type of point you are controlling.

Note: *For Boolean and for Enum (multi-state) type overrides, you should set (or at least review) the override value or state first, and then issue the override action. During an active override, any changes that you make to the override value are ignored until the next override.*

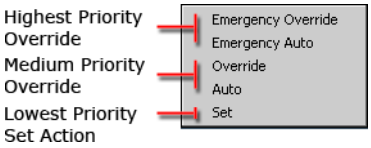
- **Boolean override**
  Figure 2-10 shows an example of the popup menu associated with a boolean control point.

Figure 2-10 *Boolean action menu*



The Boolean override is used to control a binary-type point, such as might be used to turn lights and equipment on or off. The following override options are available at a boolean control point and are listed, in order of priority, from lowest to highest priority level:
  - **Active**—On or Start, this action sets a "true" value at the boolean control point.
  - **Inactive**—Off or Stop, this action sets a "false" value at the boolean control point.
  - **Auto**—Clears any values set previously using the **Active** or **Inactive** menu items. **Auto** does not clear values set using the **Emergency Active** or **Emergency Inactive** menu items.
  - **Emergency Active**—On or Start, this action sets a "true" value at the boolean control point at the highest priority level.
  - **Emergency Inactive**—Off or Stop, this action sets a "false" value at the boolean control point at the highest priority level.
  - **Emergency Auto**—This action clears any previously issued command at the highest priority (Emergency) level and returns control to the next-highest priority action (active or inactive).
- **Numeric override**
  Figure 2-11 shows an example of the popup menu associated with a numeric control point.

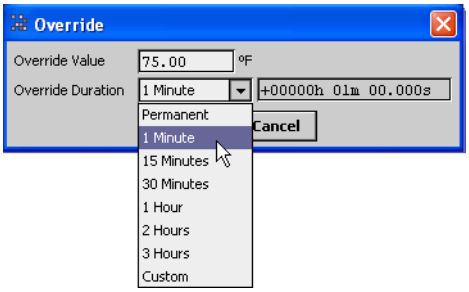
Figure 2-11 *Numeric action menu*



The numeric override is used to control an analog-type point, such as might be used to manually set or modify temperature setpoints, for example. The following override options are available at a numeric control point and are listed, in order of priority, from lowest to highest priority level:

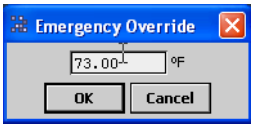
- **Override**—The override action sets a numeric value that you specify. Selecting this menu item opens an **Override** dialog box, as shown in Figure 2-12. Choose a preset time option or select Custom to set a specific time in the associated time field and click the **OK** button.

Figure 2-12 *Numeric Override dialog box*



- **Auto**—Clears any values set previously using the **Override** action. **Auto** does not clear values set using the **Emergency Override** action.
- **Emergency Override**—This action sets a value at the numeric point at the highest priority level. Selecting this menu item opens an **Emergency Override** dialog box, as shown in Figure 2-13. Type in a numeric setting in the field, as desired and click the **OK** button.

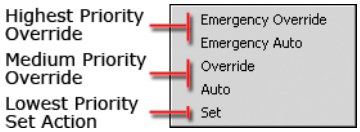
Figure 2-13 *Emergency Override dialog box (numeric value)*



- **Emergency Auto**—This action clears any previously issued action at the highest priority (Emergency) level and returns control to the next-highest priority action.

- **Enum writable (multi-state) override**
  Figure 2-14 shows an example of the popup menu associated with an enum (multi-state) control point.

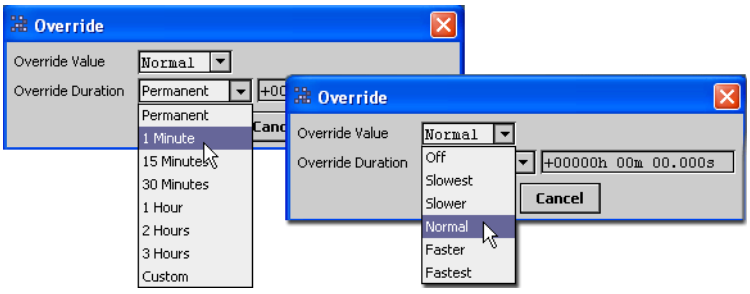
Figure 2-14 *Enum action menu*



This type of override action might be used to control a multi-state device, such as a multiple-speed fan or any other device that has an enumerated set of modes. The following override options are available at an enum control point and are listed, in order of priority, from lowest to highest priority level:

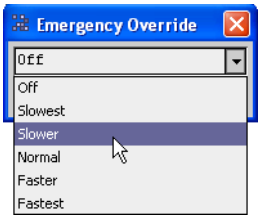
- **Override**— The override action sets a value that you choose from an option list. Selecting this menu item opens an **Override** dialog box, as shown in Figure 2-15. Use a preset time option or select Custom to set a specific time in the associated time field and click the **OK** button.

Figure 2-15 *Enum override dialog box (showing duration and value options)*



- **`Auto`**—Clears any values set previously using the **`Override`** action. **`Auto`** does not clear values set using the **`Emergency Override`** action.
- **`Emergency Override`**—This action sets a value at the enum point at the highest priority level. Selecting this menu item opens an **`Emergency Override`** dialog box, as shown in Figure 2-13. Type a numeric setting in the field, as desired and click the **OK** button.

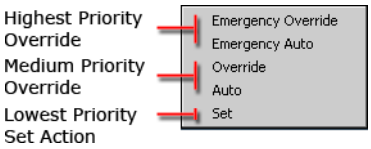
Figure 2-16 *Emergency Override dialog box (enum value)*



- **`Emergency Auto`**—This action clears any previously issued action at the highest priority (Emergency) level and returns control to the next-highest priority action.

- **String override**
  This type of override might be used to set a string value at a control point where custom text labeling is allowed to be set from the browser user interface, for example.

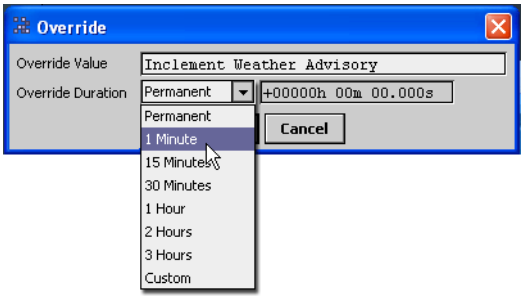
Figure 2-17 *String action menu*



The override is used to control string data at the point. The following override options are available at a string control point and are listed, in order of priority, from lowest to highest priority level:

- **`Override`**— The override action sets a numeric value that you specify. Selecting this menu item opens an **`Override`** dialog box, as shown in Figure 2-18. Use a preset time option or select Custom to set a specific time in the associated time field and click the **OK** button.

Figure 2-18 *String Override dialog box*



- **`Auto`**—Clears any values set previously using the **`Override`** action. **`Auto`** does not clear values set using the **`Emergency Override`** action.
- **`Emergency Override`**—This action sets a value at the numeric point at the highest priority level. Selecting this menu item opens an **`Emergency Override`** dialog box, as shown in Figure 2-13. Type in a numeric setting in the field, as desired and click the **OK** button.

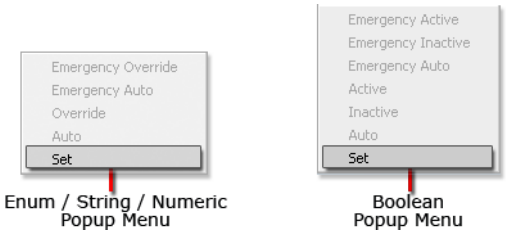
Figure 2-19 *Emergency Override dialog box (string value)*

- **`Emergency Auto`**—This action clears any previously issued action at the highest priority (Emergency) level and returns control to the next-highest priority action.

Set actions

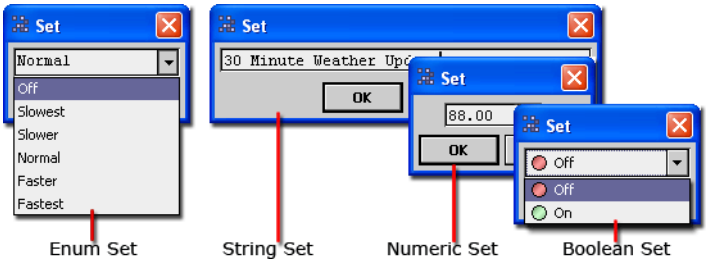
Set actions are used to "set" a value at a control point using a graphic element in your browser display. Set actions are permanent unless they are overridden by an override action or an input from a different source at a higher priority level. The value at a control point returns to the "set" value (or "fallback" value) when a temporary override action (timed) expires or if the override is removed (set to "auto"). Figure 2-20 shows an example of the popup menus associated with the various types of control points.

Figure 2-20 *Set menus*



When you select **`Set`** from the popup menu, the associated dialog box displays, as shown in Figure 2-21. Each dialog box is specific for the type of control point (and associated data).

Figure 2-21 *Set dialog boxes*



Each control point type has an associated **`Set`** action which is described in the following list.

- **`Numeric Set`**—Set a value for a control point associated with numeric data. A secondary popup dialog box displays the current value, which you may override by typing a different value or selecting a different option and clicking the **`OK`** button.
- **`Boolean Set`**—Set a value for a control point associated with boolean data. A secondary popup dialog box displays the current value, which you may override by selecting a different value option (On/Off, True/False, or similar) and clicking the **`OK`** button.
- **`Enum (multi-state) Set`**—Set a value for a control point associated with enumerated data. A secondary popup dialog box displays the current value, which you may override by selecting a different value option (Slow, Medium, Fast, or similar options) and clicking the **`OK`** button.
- **`String Set`**—Set a value for a control point associated with string data. A secondary popup dialog box displays the current value, which you may override by typing in a different string value and clicking the **`OK`** button.

Other control actions

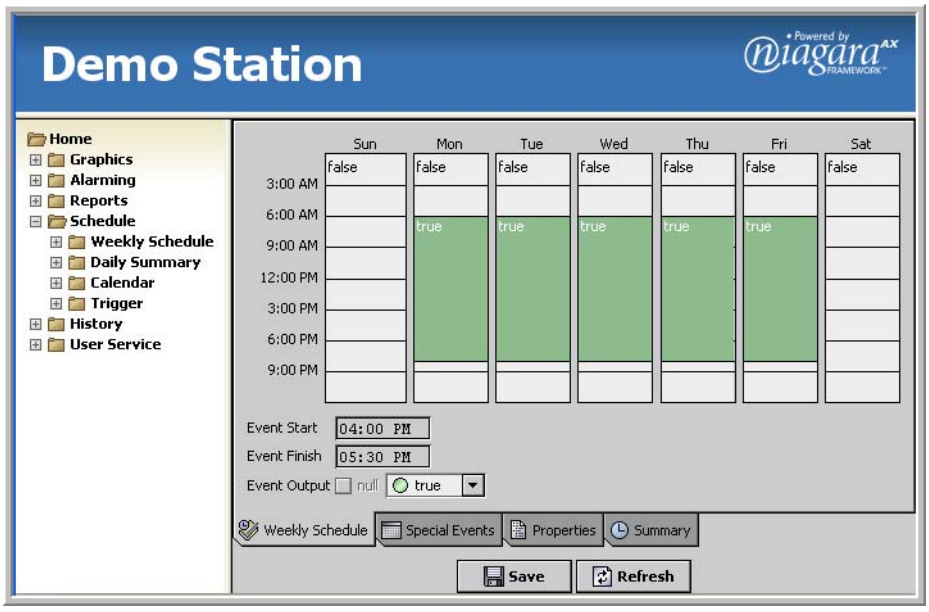
Depending on the type of object a Px widget is bound to, other types of control actions may be available. Typically, such actions have been given a descriptive right-click menu command.

Chapter 3

About Schedules

Schedules provide regular time-of-day, day-of-week control for controlling equipment such as lights, fans, and pumps. Schedules may reside in either a Web Supervisor station or in a JACE controller station. A station may contain many different schedules, or relatively few (one schedule can control many devices or systems).

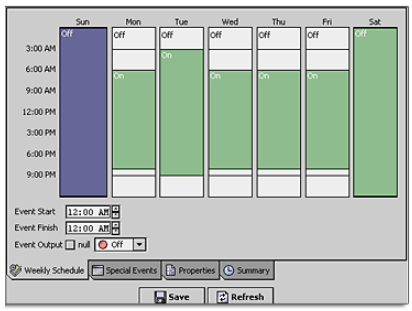
Figure 3-1 *Example browser schedule view*



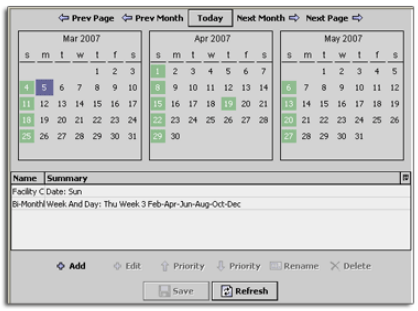
Types of schedules

There are three types of schedules; one or all of them may be used and available in your particular interface. Figure 3-2 shows an example of each of the following schedule types:

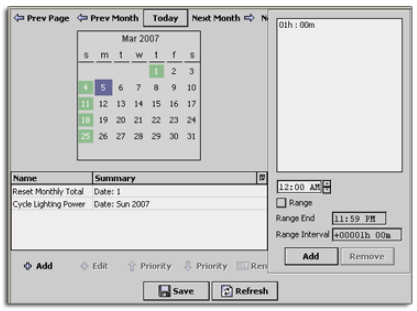
Figure 3-2 *Types of schedules*



Weekly Schedule



Calendar Schedule

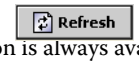


Trigger Schedule

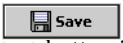
- **Weekly Schedule**
  The Weekly Schedule defines regular, repeating, events by "time-of-day" and "day-of-week." Also, you can configure any number of "special events" within a Weekly Schedule. The Weekly Schedule is typically the *most commonly used* type of schedule. For more information about the Weekly Schedule, refer to "Weekly Schedule tabs" on page 3-4.
- **Calendar Schedule**
  The Calendar Schedule is available to define specific *days*. Typically, you use them to define particular days that have scheduling exceptions (for example, *holidays*) so that you can *reference* them in the "Special Events" tab setup of Weekly Schedules. For more information about the Calendar Schedule, refer to "Weekly Schedule tabs" on page 3-4.
- **Trigger Schedule**
  You can use a Trigger Schedule to schedule the firing of topics, such as resetting a run time accumulator to zero at the beginning of each month. Unlike using a Weekly Schedule, which has specific on and off event times, the Trigger Schedule sends a command to execute at the event time. For more information about the Trigger Schedule, refer to "About Trigger Schedules" on page 3-17.
  TriggerSchedule provides a two-part view combining a "day picker" and an event "time picker" for specifying when topics are fired on those days.

Common schedule characteristics and properties

All three types of schedules have some common characteristics and properties that are described below.

- **Default view**
  The default view for any schedule is its "Schedule" view, where you define related days and events. Other views, such as a "Property Sheet" view are not usually available when using typical browser access profiles.
- **Refresh** 

  This button is always available at the bottom of *any Schedule view*:
  When you click Refresh, one of two things happens:
  - If the **Save** button is not available (no unsaved changes), clicking **Refresh** re-synchronizes the view with the current configuration.
  - If the **Save** button is available (unsaved changes), clicking **Refresh** reverts to the previously saved page state.; any unsaved changes are lost.

  Your refresh confirmation dialog box choices are as follows:
  - **Yes**
    Save all changes made in the view since last save. Equivalent to clicking **Save**.
  - **No**
    Clear all changes made in the view *since last save* (effective *reset*).
  - **Cancel**
    Cancels refresh, all unsaved changes remain as unsaved.
- **Save** 

  The **Save** button is available at the bottom of any Schedule view only if you have made unsaved changes to the schedule. Clicking **Save** downloads your changes to the schedule configuration. Immediately following, the **Save** button is unavailable again.

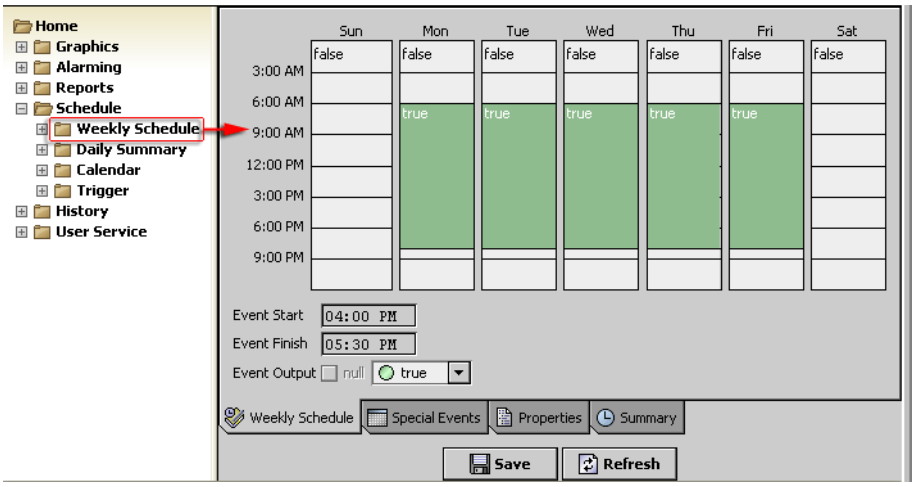
Caution *Always save the current schedule view before changing views (clicking another link) and before refreshing the current page (using either the schedule view Refresh button or the Browser refresh button). Any unsaved information is lost when the page is refreshed.*

Note: *For Weekly Schedules, you should usually save while working in each tab, even though any save applies to changes made on all tabs.*

About the Weekly Schedule

The Weekly Schedule is most often the default view for a scheduling screen in the browser. You can navigate to a Schedule view using the provided navigation, as shown in the examples in (Figure 3-3).

Figure 3-3 *Example Weekly Schedule*



Note: *The* **`Refresh`** *and* **`Save`** *buttons apply to all tabs in the Weekly Schedule view (not just the one displayed).*

Weekly schedule output processing

For any type of Weekly Schedule (Boolean, Enum, Numeric, String), output recalculation occurs upon any of the following:

- any saved change to its configuration
- any change at its input
- station startup
- any change to the system clock

Each calendar has a "Out" and "Out source" values as well as Next Time and Next Value data that are available. When any of these outputs change, all of these values are updated.

Out value

A schedule's *output value* is determined by the following, in highest-to-lowest priority:

1. To any "non-null" value at its input (if linked)
   This value is immediately passed to its output. Otherwise (if null), processing continues.
2. If the schedule is *not effective*, the output goes to the default output value.
   If the schedule *is effective*, the output goes to the (highest priority) active *special event* (if any).
3. To the active Weekly Schedule event (if any).
4. To the default output value.

For more details on effective schedules, see "Effective Period" on page 3-11.

Out Source value

Out source values provide a string "source description" of the current output, that can appear in the Summary Tab of a Weekly Schedule (for example) as one of the following:

- `Input`
- `Special Event: <SpecialEventName>`
- `Week: <day_of_week>`
- `Default Output`

Example out source values might appear as "`Week: monday`" or "`Special Event: Christmas Break`"

Next Time and Next Value

These values provide "look-ahead" data: the next known schedule output value, and its time of change.

- Next Time — Displays in a format such as: `03-Feb-05 5:00 PM`
- Next Value — Displays the next scheduled output value.

Typical application of these values is for informational display, however, these values can be linked into control logic.

Weekly Schedule tabs

The Weekly Schedule has the following four tabbed views available:

In addition, any Weekly Schedule provides a

- Weekly Schedule tab
  Specifies Sunday-through-Saturday (weekly) event times/values.
- Special Events tab
  All exceptions to the defined Weekly Schedule, as special events.
- Properties tab
  Important properties such as default output, schedule effective times, special event cleanup operation, and schedule facets.
- Summary tab
  For any selected day, provides a "Current Day Summary" view, providing a simple *linear* 24-hour graph of schedule event times and values for the current day.

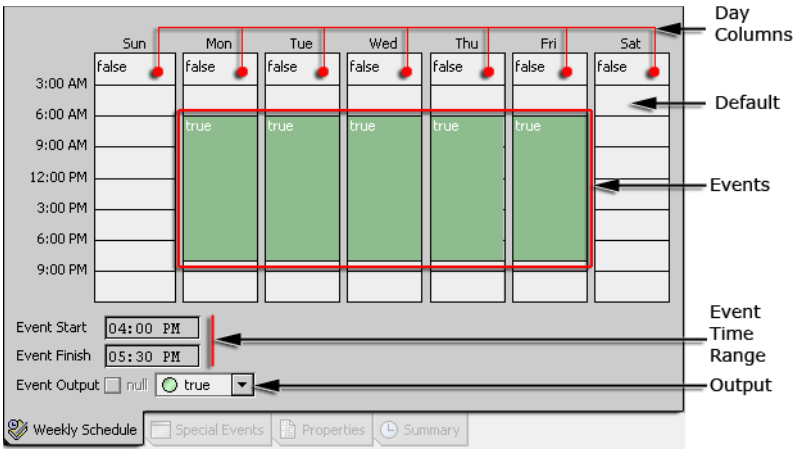
Weekly Schedule tab

Use the Weekly Schedule tab (shown in Figure 3-4) in the Weekly Schedule to enter regular schedule events, that is "normal schedule events" that repeat from week to week, based on the day of the week and the time of day. By default, any existing events appear as green blocks, while unscheduled (default output) time appears in white.

The Weekly Schedule tab includes the following areas, shown in Figure 3-4:

- **Day columns**
  The day columns are comprised of seven day-of-the-week column areas that display events with a green background and unscheduled (default) times with a white background.
- **Events**
  Green areas display in any column where you create an event. When you select an event the area displays as a dark shade of blue.
- **Event time range selector**
  These fields are active only when an event is selected. They provide a way for you to "fine-tune" any selected event time.
- **Output selector**
  This area allows you to choose a data value for output. Data options in this area are different for different types of data output, as described in Figure 3-4.

Figure 3-4 *Weekly Schedule tab areas*



The Weekly Schedule tab has the following features:

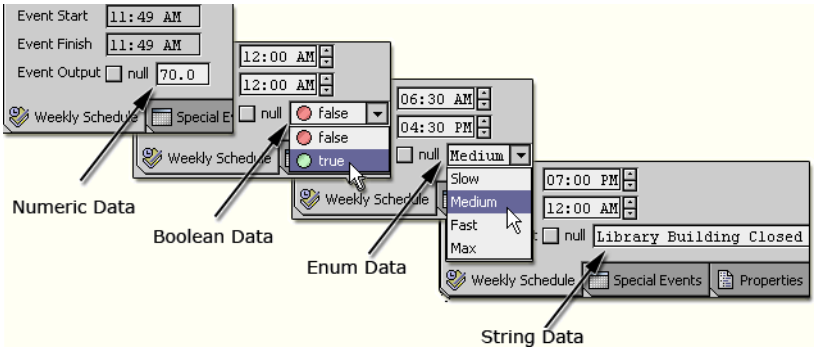
- "Tune" event times
- "Tune" event times
- Set output values
- Use the right-click (popup) menus

Types of Weekly Schedule data When working with a Weekly Schedule, you may be controlling events using different types of data. For example, you may simply be turning devices on or off at different times or on different days. However, you may be controlling devices by turning them to different settings, such

as low, medium, or high settings or even setting one or more devices, such as a thermostats, to specific numeric values for certain days and times. These different types of control applications affect what type of schedule properties you see in your Weekly Schedule tab, as shown in Figure 3-5.

The following list describes four types of Weekly Schedule data:

Figure 3-5 *Example Weekly Schedule data types*



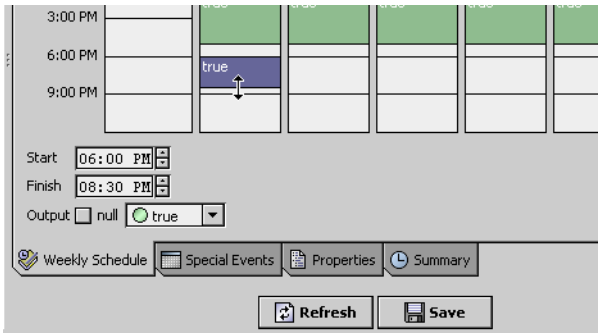
- **Boolean**
  This type of Weekly Schedule allows you to set a "True" or "False" state which usually relates to an "On" or "Off" condition. By editing the facets on the Properties tab, you can change the "True" value to display as "On", for example.
- **Enum**
  Note: *When using Enum schedules you must first have a defined range facet set up. If not already set, you can do this using the Schedule's Properties tab tab. See "Facets" on page 3-11 for more details.*
  This type of Weekly Schedule allows you to choose from a range of predefined values. By editing the facets on the Properties tab, you can change the value options that are displayed in the Weekly Schedule tab.
- **String**
  This type of Weekly Schedule allows you to type in a text string to use as an output.
- **Numeric**
  This type of Weekly Schedule allows you to type in a numeric value to use as an output.

Using the Weekly Schedule tab The following sections describe how to use the Weekly Schedule tab to:

- Schedule Events
- "Tune" event times
- Set output values
- Use the right-click (popup) menus

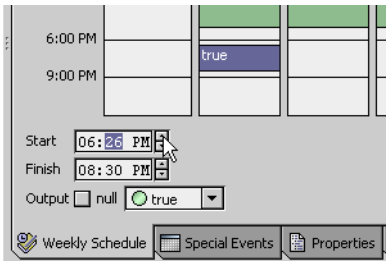
Schedule Events To add a new schedule event to the Weekly Schedule tab, simply click in a day at the approximate event start time, and drag downward to define the start and finish time (Figure 3-6). To edit an existing event, drag the event's top or bottom edge to change its start or finish time (in broad increments). Figure 3-6 shows an example of dragging in the day column to adjust the finish time of an event. The event displays dark blue when it is *selected* (as indicated by dark blue). The event remains selected until you refresh the display using the **Refresh** button or by selecting another area or tab.

Figure 3-6 *Click and drag to enter weekly events in the Weekly Schedule tab*



"Tune" event times With any event selected, "fine tune" its start and finish time using the controls, selecting the hours portion or minutes portion (Figure 3-7). Or, click and type values in directly.

Figure 3-7 *Define start and finish time*

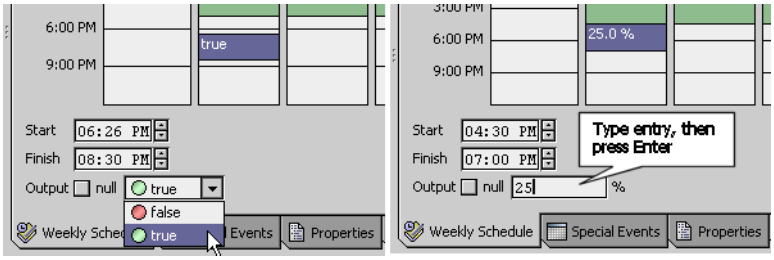


Note: *For any event, start time is inclusive, and the event extends to (but is exclusive of) the end time. In other words, there is no output "blip" between adjacent events, even if across days. For example, if a Monday event ends at midnight, then a Tuesday event starts at midnight, the schedule output is continuous (providing both events have the same Set output values).*

Set output values For any event, you can select the "null" checkbox (the schedule's calculated value is null for that event). However, you typically select or type a value instead, as follows:

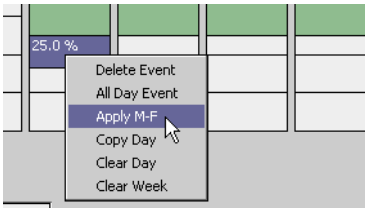
- If your schedule uses Boolean or Enum data (refer to "Types of Weekly Schedule data" for information about these types of data) select the event value in the output field, see Figure 3-8, left.
  Note: *If an EnumSchedule, first specify its facets (on Properties tab tab) before entering values. This allows selection of possible values.*
- If your schedule uses numeric of string data (refer to "Types of Weekly Schedule data" for information about these types of data), *type* the value in the output field, then press Enter to register it in the event block, as shown in Figure 3-8, right.

Figure 3-8 *Select (Boolean, Enum) or type (Numeric, String) output value*



Use the right-click (popup) menus Right-click in the Weekly Schedule area for an event menu. If you have any event *selected*, this menu provides the most commands, as shown in Figure 3-9.

Figure 3-9 *Right-click menu with event selected*



Event menu options are straightforward, and may include the following:

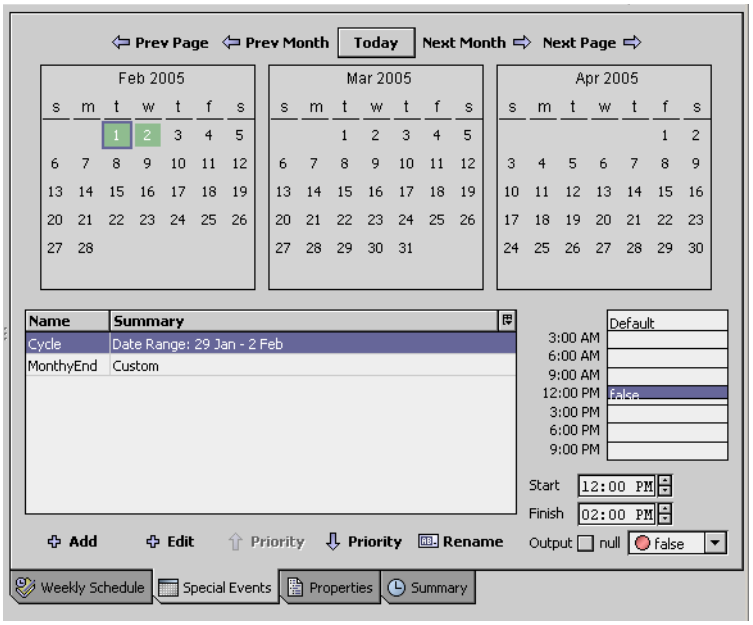
- Delete Event — Deletes the selected event.
- Paste Day — Appears only if copy day option was used first. Copies all events into selected day.
- All Day Event — Makes currently selected (or last entered) event extend to entire day.
- Apply M-F — Copies all events in the selected day to Mon, Tue, Wed, Thu, and Fri (and *overwrites* any existing events on those days).
- Copy Day — Copies all events in the selected day, to use with paste day option.
- Clear Day — Clears all events in the selected day.
- Clear Week — Clears all events in the entire Weekly Schedule.

Special Events tab

Use this tab to enter all *exceptions* to the schedule's Weekly Schedule, broadly called "special events." For general information, see "About special events" on page 3-7.

As shown in Figure 3-10, existing special events (if any) are listed in the table by name and summary. When you select a special event, its day(s) of occurrence are highlighted in the monthly calendars at the top of the view, and its associated event actions are displayed in the right-side column.

Figure 3-10 *Special Events tab in Weekly Schedule*



Additional details about the Special Events tab are described in the following sections:

- About special events
- Adding special events
- Event times and output values
- Special event priorities
- Right-click menus and other controls

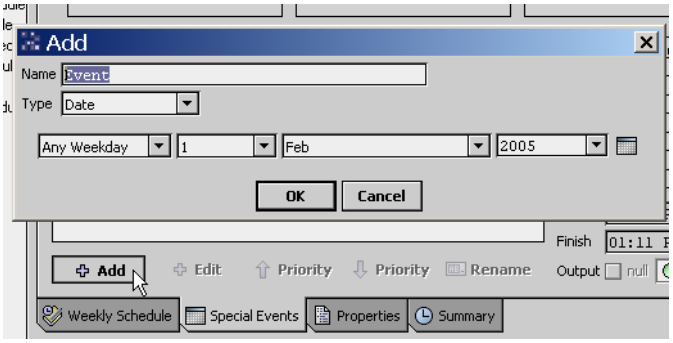
About special events Special events apply to *Weekly Schedules* only, and are considered any exception to the (normal) Weekly Schedule. Special events can be "one-time" only event changes *or* recurring event changes, such as *holidays*. Configuration includes both day(s) of occurrence and related time-of-day events.

In the time-of-day event definitions of special events, you can have them "intermingle" with regular weekly events, or completely override the Weekly Schedule. In addition, you visually prioritize special events, via list order. This allows any overlapping special events to occur in an ordered fashion.

Each individual Weekly Schedule has its *own* special events, configured on the Special Events tab. Event times (and values) entered for any special event apply to that schedule only. However, if the special event is a "reference" type, *days* of its occurrence are specified in the Calendar Schedule that is referenced. This allows you to globally change the days that special events occur in Weekly Schedules, by editing one or more referenced Calendar Schedules. For more details, see "Calendar Schedule usage" on page 3-13.

Adding special events Click the **Add** button to add a new special event. An **Add** dialog appears, as shown in Figure 3-11.

Figure 3-11 *Special Events Add dialog*

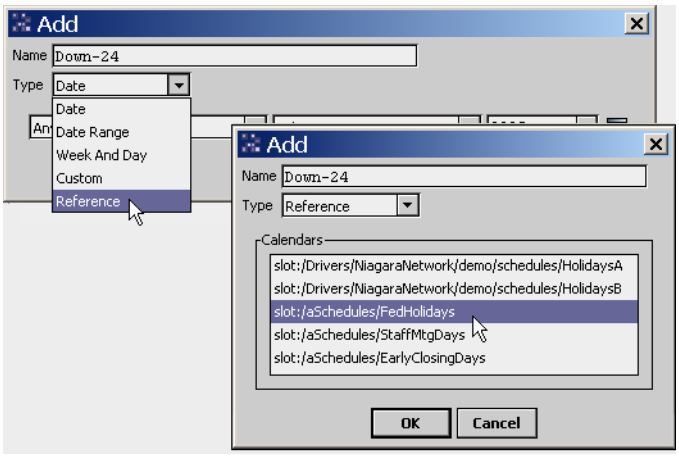


Dialog options are described as follows:

- **Name**
  Your descriptive name for special event, for example, "Christmas_Break" or "Half_Day." The default value is simply "Event." You can change this later, if needed.
- **Type**
  Determines selection criteria for day or days, with the following choices:
  - Date — (default) By various combinations of weekday, numerical date, month or month combinations, and year.
  - Date Range — By start and end range, using for each a combination of day, month, year.
  - Week and Day — By combination of day of week, week in month, month.
  - Custom — By various combinations of day, month, weekdays, and year.
  - Reference — By reference to a specific CalendarSchedule in the station.

For details on most Type selections, see "Calendar day selections" on page 3-15. If you select type *Reference*, a second Add dialog box appears, as shown in Figure 3-12. It lists all CalendarSchedules (Calendars) available in the station, by path. Select any one for the day(s) portion of this special event.

Figure 3-12 *Reference special event Add dialog*

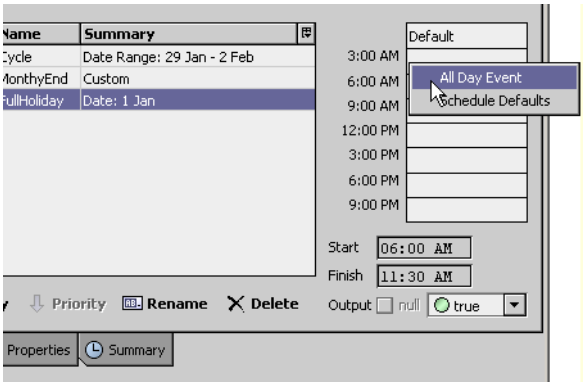


After you have a name and type selected (and defined as needed), click **OK** to add it to this schedule's special events. It remains selected for further editing, *except* for type.

Event times and output values A newly-created special event has no events defined. With the special event selected, click in the right-side events column and enter events as necessary. Start, finish, and output controls work the same as in the Weekly Schedule tab tab. See ""Tune" event times" on page 3-5 and "Set output values" on page 3-6 for details.

You can also right-click in the column for an event menu, as shown in Figure 3-13. This is useful to add an all-day event or set the entire day to the schedule's default value.

Figure 3-13 *Special event schedule actions*



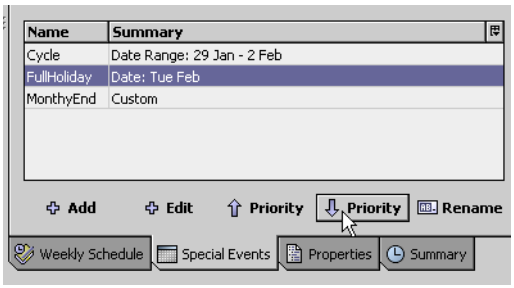
Note: *You must specify events for any special event to occur. Where nothing is scheduled, the special event relinquishes control back to any lower-priority schedule events, and finally "intermingles" with the Weekly Schedule. To completely override the Weekly Schedule, configure a special event for the entire day.*

Special event priorities All special events take priority over regular weekly events. Among special events, you define *relative priorities* by the order of listing in the Special Events table, as follows:

- *Highest* priority is at *top* of list. Events in this special event, when active, always occur.
- *Lowest* priority is at *bottom* of list. Events occur only if not overlapped by other special events active during the same period.

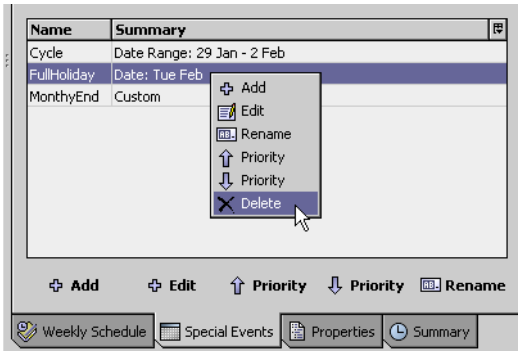
Change a special event's priority by selecting it and using the priority arrow buttons (Figure 3-14).

Figure 3-14 *Change priority by listing order*



Right-click menus and other controls Right-click in the special events table for a menu. If you have any special event *selected*, this menu provides the most commands, as shown in Figure 3-15.

Figure 3-15 *Right-click menu with event selected*



Special event menu options are straightforward, and may include the following:

- Add — Add a new special event (same as using **Add** button).
- Edit — Edit day(s) selection criteria (but *not changing* special event *type*). Same as **Edit** button.
- Rename — Rename selected special event (same as using **Rename** button).
- Priority (up) — Move special event up in priority list (same as using **Priority** button).
- Priority (down) — Move special event down in priority list (same as using **Priority** button).
- Delete — Removes selected special event from the schedule.

Note: *When you delete a special event, a confirmation dialog appears as shown in Figure 3-16.*

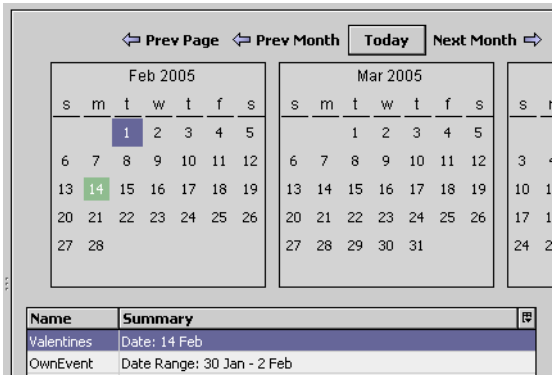
Figure 3-16 *Delete special event confirmation*

Click **Yes** *to delete the special event, or* **No** *to keep it.*

When you first access the Special Events tab, the current day is highlighted in the left-most calendar month at the top of the view. As needed, click on **Next Month** and **Prev Month**, or **Next Page** and **Prev Page** to move the calendar ahead or back in time.

When you select a special event in the table, if it occurs in any currently displayed month, its associated day or days are highlighted as shown in Figure 3-17.

Figure 3-17 *Special event highlights in calendar block*



Note: *A special event must have at least one defined event action to be highlighted in a calendar.*

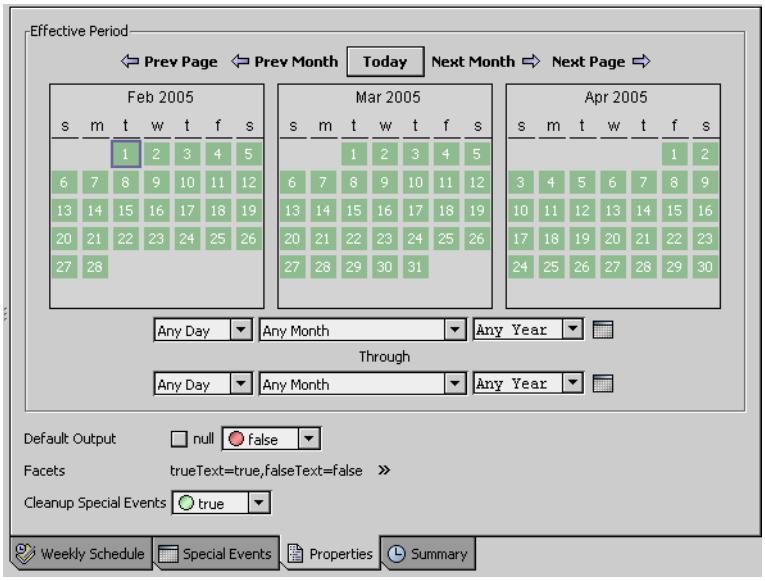
Return to the current calendar month and day by clicking the **Today** button.

Properties tab

As shown in Figure 3-18, this tab in About the Weekly Schedule is where you specify the schedule's:

- Effective Period
- Default Output
- Facets
- Cleanup Special Events action

Figure 3-18 *Properties tab in Weekly Schedule*

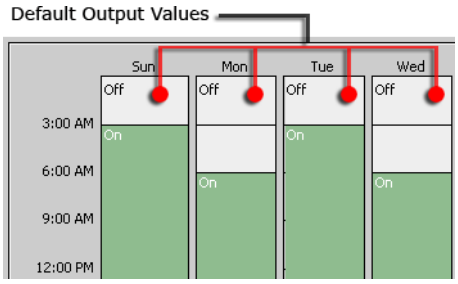


Effective Period By default, a Weekly Schedule is always "in effect" because of the "Any..." settings. Whenever a schedule is *not effective*, its *output* goes to its default output value, regardless of its Weekly Schedule or any special events.

In most cases, you *leave* Weekly Schedules as *always effective*. However, if you have an application for a schedule effective only at certain times, use the "start" through "end" range fields to limit the effective period. When you save the changes, only effective days in the calendar months are shown highlighted green.

Default Output Whenever a schedule event (special or weekly) is not defined, the schedule output value is set to this "default" value. The white area in listed events (Figure 3-19) displays the current default value. The default output value is also used whenever the schedule is *not effective*.

Figure 3-19 *Default output is white area in schedule events*



Note that "null" is an available choice—depending on control logic, this may be a valid choice.

Null means that no value is output from the schedule. The original *default* "Default Output" varies by schedule type (see "Types of Weekly Schedule data" on page 3-4), as follows:

- BooleanSchedule — false
- EnumSchedule — null
- NumericSchedule — null
- StringSchedule — null

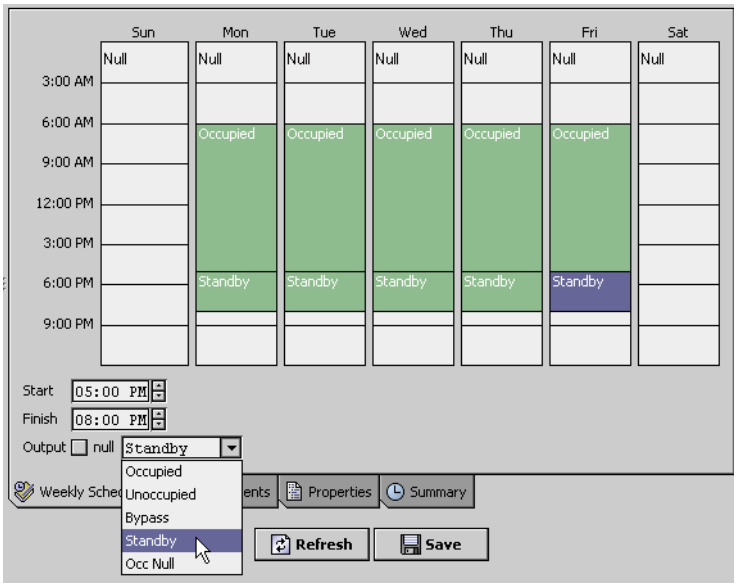
Facets The schedule facets determine how its output value is formatted for display. For example, instead of "true" and "false" for a BooleanSchedule, you may need "On" and "Off" instead. Assigned facets appear in schedule views when adding events, displaying summary data, and so on.

Note: *Facets are especially important for Enum type schedules. You need to define "range" facets before you add Weekly Schedule events (in order to pick an event's enumerated value). Range facets should match those used in any controlled (output-linked) points.*

In the case of string type schedules, facets have no application.

Figure 3-20 shows output selections for an Enum type schedule.

Figure 3-20 *Facets determine event value selections for Enum type schedules*



By default, facets for schedules are as follows:

- Boolean type schedule — trueText: true, falseText: false
- Enum type schedule — range: <not defined>
- Numeric type schedule — units: (null), precision: 1
- String schedule — (not applicable)

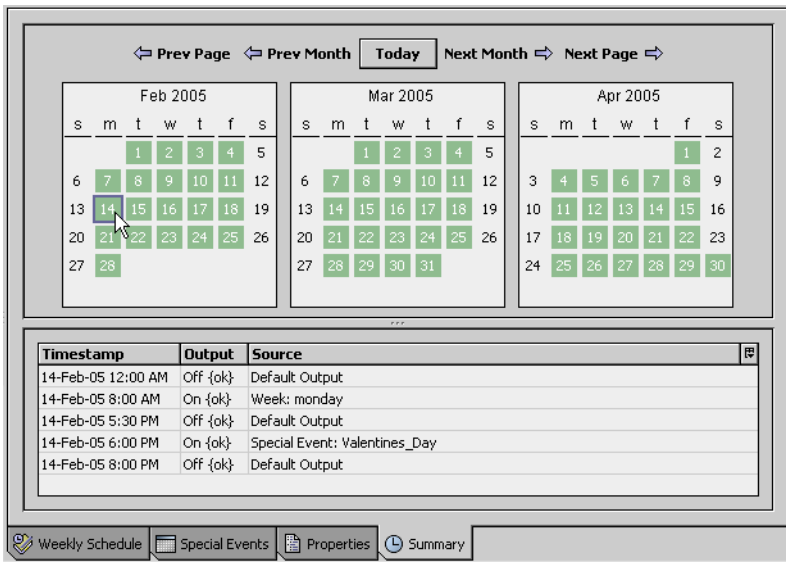
Cleanup Special Events This property is either true (default) or false.

- If true, "one-time" special events that have occurred (and will not be effective again) are automatically *deleted*. When a special event is deleted, a message is sent to the schedule log, and that special event no longer appears in the Special Events tab.
- If false, "one-time" special events are retained, even though they will not occur again.

Summary tab

The Summary tab in the shows an brief listing of *all* scheduled events for *any one selected day* in a Weekly Schedule (Figure 3-21). Events may be from the normal Weekly Schedule, Special Events, or a combination of both. Unlike with other tabbed views, this one is *read-only*.

Figure 3-21 *Summary tab shows all events for any selected day*



In the top calendar month area:

- Days *with schedule events* are shown *highlighted green*.
- Days *without schedule events* (only default output) are shown *in white*.

As needed, click on **`Next Month`** and **`Prev Month`**, or **`Next Page`** and **`Prev Page`** to move the calendar ahead or back in time.

- Click any day to see its events.
- Click **`Today`** (at top) to see the *current* day's events.

The table lists each event's *start* timestamp, the schedule's output value, and the event *source*.

About Calendar Schedules (holidays)

Calendar Schedules specify *entire days*, using the following four types of day event selections:

- Date
- Date Range
- Week and Day
- Custom

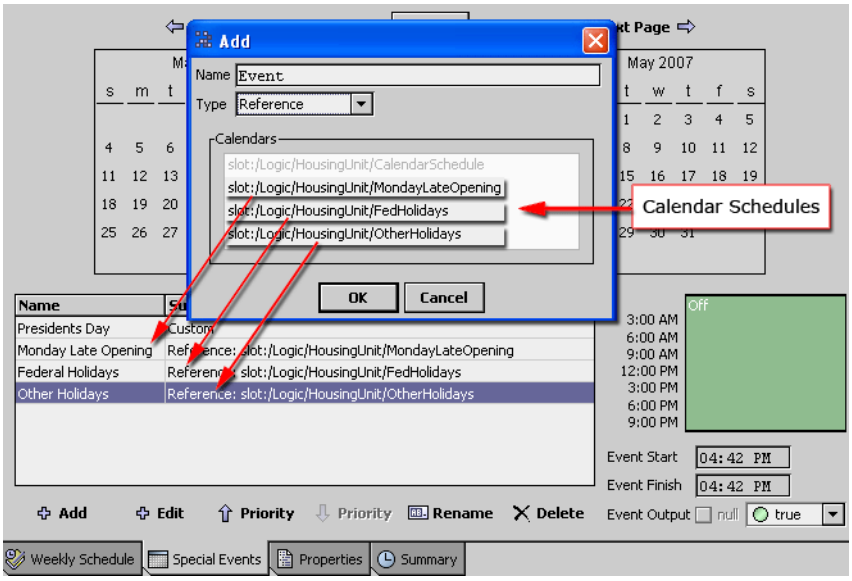
You can add as many day events as needed in the same Calendar Schedule. The following sections provide more details:

- Calendar Schedule usage
- Calendar Schedule view
- Calendar day selections

Calendar Schedule usage

Instead of directly linking different Calendar Schedules, you typically "reference" them from the "special events" configuration of one or more Weekly Schedules. Each referenced Calendar Schedule defines the "day portion" of a special event. Then, you configure time-of-day events in each special event, as needed.

Figure 3-22 *Example referenced CalendarSchedules*



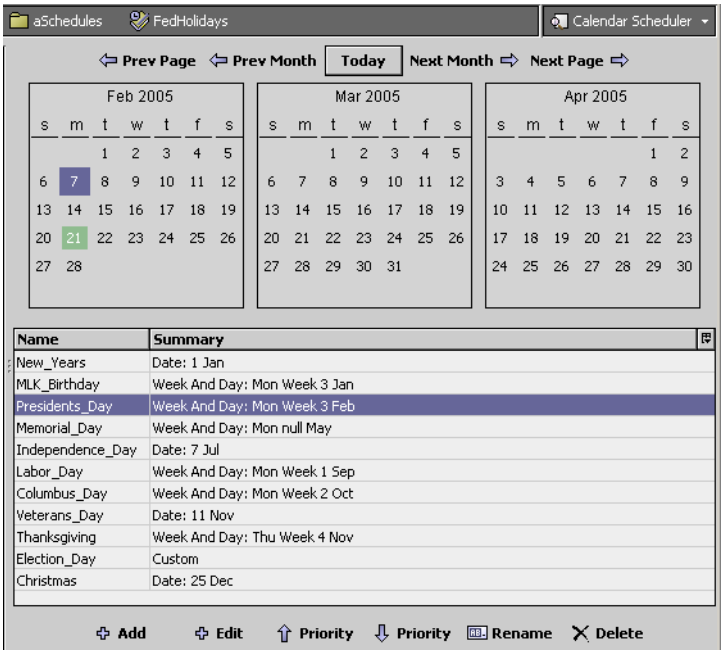
For example, Figure 3-22 shows a Weekly Schedule and a portion of its special events tab, listing four special events. Three of these are "Reference" types, meaning their calendar day(s) are defined *remotely* in the configuration of the referenced Calendar Schedules. Although all special event links are shown here in the same container ("…/HousingUnit"), quite often Calendar Schedules are located elsewhere in the station.

Calendar Schedule usage by "special event reference" allows *global changing* of day definitions, where *many* Weekly Schedules can reference one or more Calendar Schedules. Any edit of a Calendar Schedule affects all Weekly Schedules containing a special event that references it.

Calendar Schedule view

The default view of a Calendar Schedule is shown in Figure 3-23.

Figure 3-23 *Calendar Schedule view*



As shown in Figure 3-23, existing calendar events (if any) are listed in the table by name and summary. When you select a calendar event, its day(s) of occurrence are highlighted in green in the monthly calendars at the top of the view.

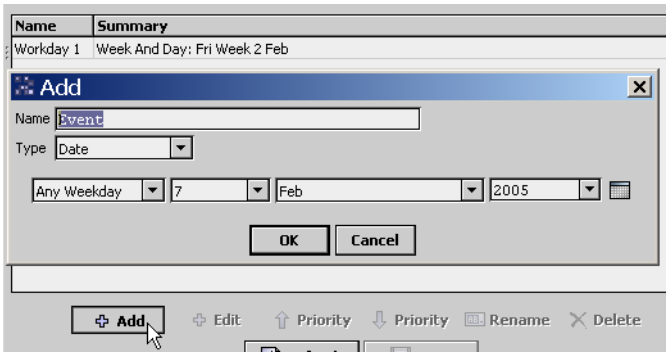
Additional Calendar Schedule topics include:

- Adding calendar events
- Right-click menus and other controls

Adding calendar events

Click the **Add** button to add a new calendar event. An Add dialog appears, as shown in Figure 3-24.

Figure 3-24 *Special Events Add dialog*



Dialog options are described as follows:

- **Name**
  Your descriptive name for the calendar days, perhaps “Thanksgiving_Break” or “Cleaning_2.” The default value is simply “Event.” You can change this later, if needed.
- **Type**
  Determines selection criteria for day or days, with the following choices:
  - Date — (default) By various combinations of weekday, numerical date, month or month combinations, and year.
  - Date Range — By start and end range, using for each a combination of day, month, year.
  - Week and Day — By combination of day of week, week in month, month.
  - Custom — By various combinations of day, month, weekdays, and year.

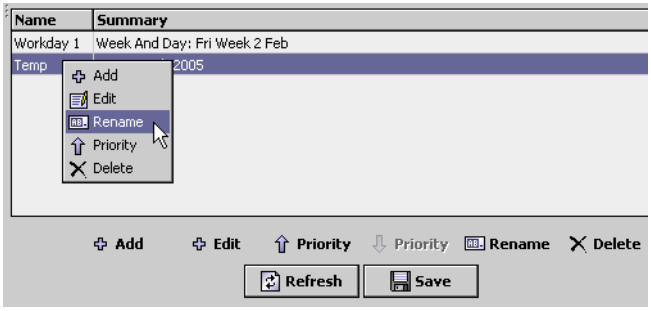
For details on Type selections, see “Calendar day selections” on page 3-15.

After you have a name and type selected (and defined as needed), click **OK** to add it to this calendar's days. It remains selected for further editing, *except* for type.

Right-click menus and other controls

Right-click in the calendar events table for a menu. If you have any calendar event *selected*, this menu provides the most commands, as shown in Figure 3-25.

Figure 3-25 *Right-click menu with event selected*



Note: *Priority selections (right-click menu or in bottom buttons) only affect the list order for events in a CalendarSchedule—true priority applies only to special events (in Weekly Schedules).*

Calendar event menu options are straightforward, and may include the following:

- Add — Add a new calendar event (same as using **Add** button).
- Edit — Edit day(s) selection criteria (but *not changing* calendar *type*). Same as **Edit** button.
- Rename — Rename selected calendar event (same as using **Rename** button).
- Priority (up) — Move calendar event up in display list (same as using **Priority** button).
- Priority (down) — Move calendar event down in display list (same as using **Priority** button).
- Delete — Removes selected calendar event from the schedule.

Note: *When you delete a calendar event, a confirmation dialog appears as shown in Figure 3-26.*

Figure 3-26 *Delete calendar event confirmation*

Click **Yes** *to delete the calendar entry, or* **No** *to keep it.*

When you first access the Calendar Schedule, the current day is highlighted in the left-most calendar month at the top of the view. As needed, click on **Next Month** and **Prev Month**, or **Next Page** and **Prev Page** to move the calendar ahead or back in time.

Return to the current calendar month and day by clicking the **Today** button.

Calendar day selections

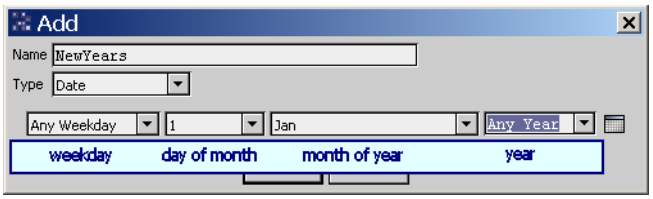
When adding calendar days in a CalendarSchedule, a special event in a Weekly Schedule, or a trigger event in a Trigger Schedule, the following "Type" selections are available:

- Date — see "Date selection notes" on page 3-15
- Date Range — see "Date range selection notes" on page 3-16
- Week and Day — see "Week and day selection notes" on page 3-16
- Custom — see "Custom selection notes" on page 3-17

Date selection notes

As shown in Figure 3-27, *Date* calendar selection has 4 criteria: weekday, day-of-month, month-of-year, and year.

Figure 3-27 *Calendar selection by date*



You can make only *one* selection in each criteria.

Each criteria offers an "any" selection, in addition to a specific selection (weekday, day-of-month, month-of-year, year). In addition, the *month-of-year* criteria provides an "every other month" selection, as one of the following:

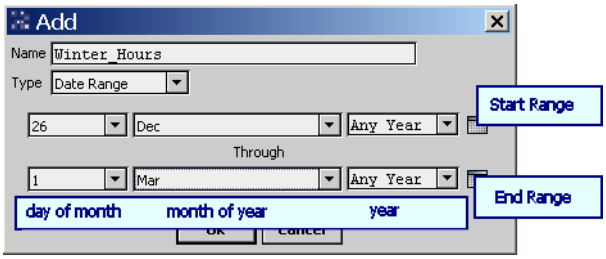
- Jan-Mar-May-Jul-Sep-Nov
- Feb-Apr-Jun-Aug-Oct-Dec

Result of selections is by "ANDing" all criteria. For example, if you select weekday of Tuesday, day of month as 5, and remaining criteria "any," the event is specified only on Tuesday, the fifth of any month in any year. If a month does not have Tuesday the fifth, then there is no event that month.

Date range selection notes

As shown in Figure 3-28, *Date Range* calendar selection has a start range and end range, each with 3 criteria: day-of-month, month-of-year, and year.

Figure 3-28 *Calendar selection by date range*



You can make only *one* selection in each criteria.

Each criteria offers an "any" selection, in addition to a specific selection (day-of-month, month-of-year, year). In addition, the month-of-year criteria provides an "every other month" selection, as one of the following:

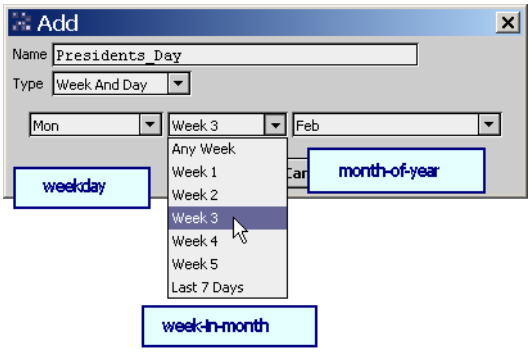
- Jan-Mar-May-Jul-Sep-Nov
- Feb-Apr-Jun-Aug-Oct-Dec

In each date range, result is from "ANDing" the criteria. In addition, the start day can be after the end date. For example, as shown in Figure 3-28, the start day can be in December and the end date in March. This event occurs December, January and February.

Week and day selection notes

As shown in Figure 3-29, *Week and Day* calendar selection has 3 criteria: weekday, week-in-month, and month-of-year.

Figure 3-29 *Calendar selection by week and day*



You can make only *one* selection in each criteria.

Each criteria offers an "any" selection, in addition to a specific selection (weekday, week-in-month, month-of-year). In addition, the following criteria offer additional selections, as follows:

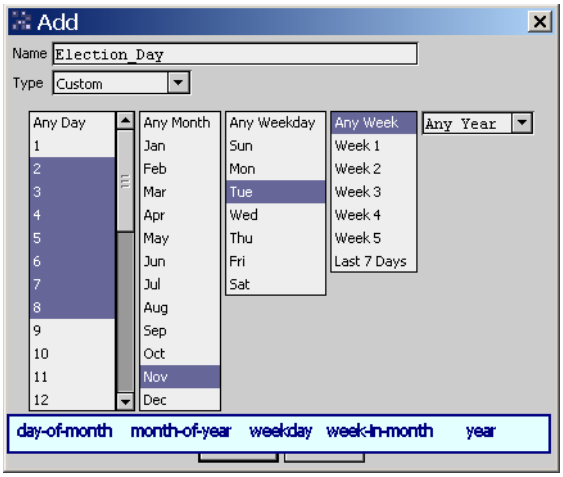
- week-in-month: last 7 days
- month-of-year:
  - Jan-Mar-May-Jul-Sep-Nov
  - Feb-Apr-Jun-Aug-Oct-Dec

The result is from "ANDing" the criteria. For example, as shown in Figure 3-29, if selections are for weekday as Monday, the month as February, and the week as 3, the event occurs only on the third Monday in February.

Custom selection notes

As shown in Figure 3-30, *Custom* calendar selection has 5 criteria: day-of-month, month-of-year, weekday, week-in-month, and year.

Figure 3-30 *Calendar selection by custom*



Unlike with other calendar types, you can make *multiple* selections within each criteria (except if you select "any," which allows only that selection). To select multiples, first select something other than "Any," then hold down the Ctrl or Shift key while you select more values.

Each criteria offers an "any" selection, in addition to a specific selection. In addition, the following criteria offer additional selections, as follows:

- day-of-month:
  - Last Day
  - Last 7 Days
- week-in-month: Last 7 Days

Within any criteria, selections are "OR'ed." The overall result is from "AND'ing" all criteria. For example, Figure 3-30 shows a custom selection for U.S. General Election Day, which must be configured as the "first Tuesday after the first Monday in November."

About Trigger Schedules

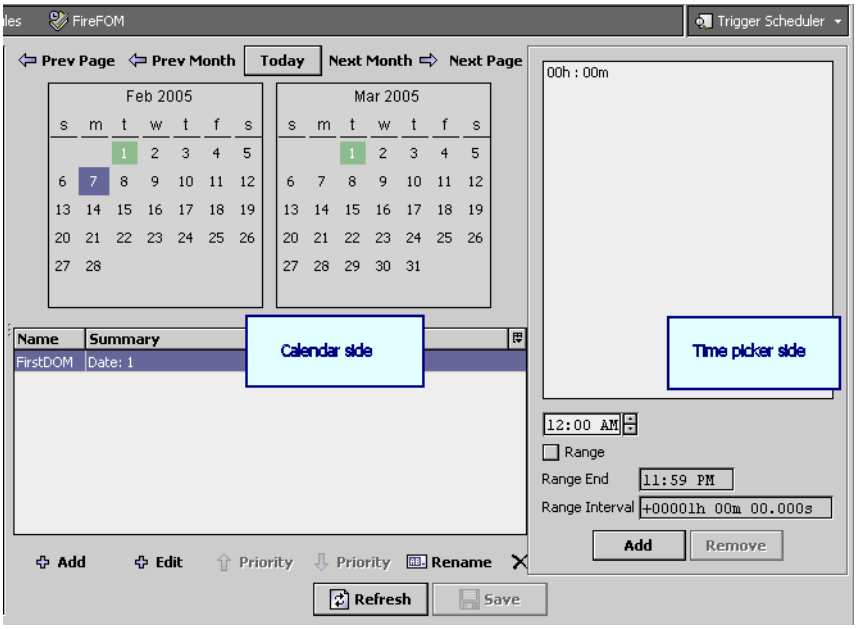
TriggerSchedules are special-purpose schedules, providing scheduling control for either linked *actions*.

This schedule is configured to simply fire *once* at midnight on the first day of every month. The trigger zeroes the runtime accumulated from the previous month.

Trigger Schedule view

The default Trigger Schedule view, is shown in Figure 3-31.

Figure 3-31 *Trigger Schedule view*



As shown in Figure 3-31, the Trigger Schedule has two sides:

- Calendar (left) side — where you *add* events. It operates like the Calendar Schedule view.
- Time picker (right) side — where you add *trigger times* for the schedule to fire its trigger output. Included is the ability to add repeating intervals.
  Note: *Trigger times, as set in the time picker, apply to all calendar events (if more than one).*

Existing trigger events (if any) are listed in the table by name and summary. When you select a trigger event, its day(s) of occurrence are highlighted in green in the monthly calendars at the top of the view. Trigger times are listed in the time picker area.

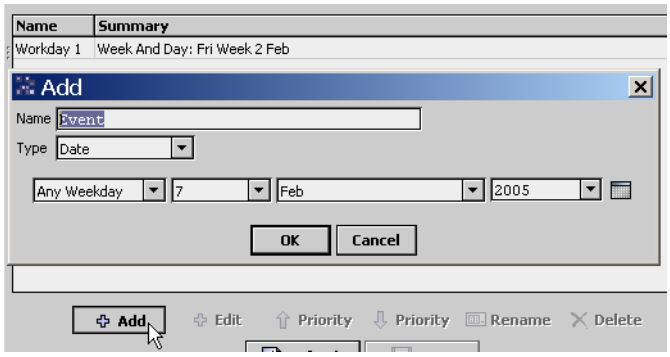
Additional Trigger Schedule topics include:

- Adding trigger events
- Adding trigger event times

Adding trigger events

Click the **Add** button to add a new trigger event. An Add dialog appears, as shown in Figure 3-32.

Figure 3-32 *Trigger Event Add dialog*



Dialog options are described as follows:

- **Name**
  Your descriptive name for the trigger events, for example, “FirstDOM” or “Each_WorkHr.” The default value is simply “Event.” You can change this later, if needed.
- **Type**
  Determines selection criteria for day or days, with the following choices:
  - Date — (default) By various combinations of weekday, numerical date, month or month combinations, and year.
  - Date Range — By start and end range, using for each a combination of day, month, year.

- Week and Day — By combination of day of week, week in month, month.
- Custom — By various combinations of day, month, weekdays, and year.

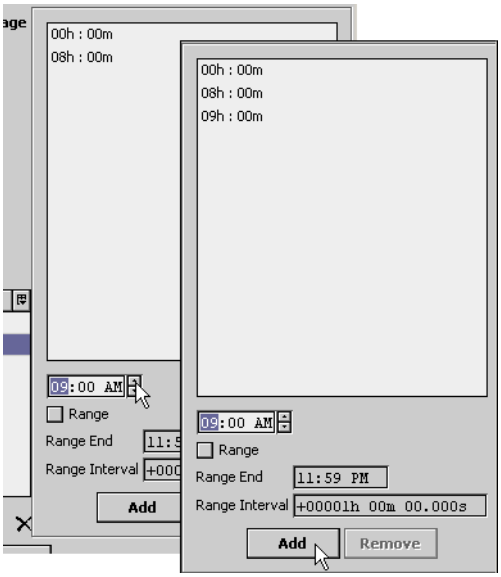
For details on Type selections, see "Calendar day selections" on page 3-15.

After you have a name and type selected (and defined as needed), click **OK** to add it to this calendar's days. It remains selected for further editing, *except* for type. Typically, you add one or more trigger event *times* on the time picker side. See "Adding trigger event times" on page 3-19.

Adding trigger event times

By default, a single "midnight" trigger time already exists (you can delete it if desired). To add other trigger times, use the controls at the bottom of the time picker side, as shown in Figure 3-33.

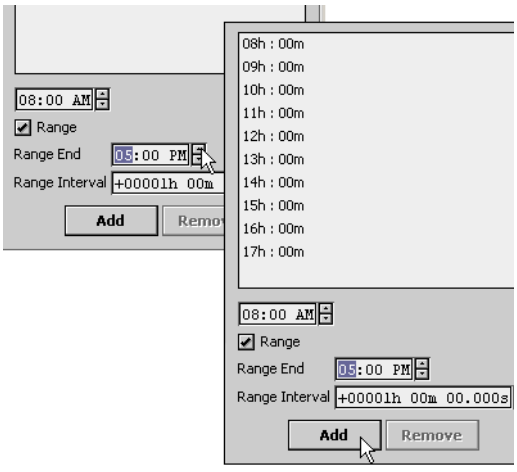
Figure 3-33 *Trigger time picker controls*



Set the desired time in the `hour:minute` editor, either by clicking up/down controls or typing in times directly. Click the **Add** button to add a trigger at that time, which adds it to the list. You can also enter multiple triggers simultaneously, using the Range option.

Range option To add multiple triggers that occur at a repeating interval, select the Range checkbox. This enables the Range End and Range Interval fields for entering values, as shown in Figure 3-34.

Figure 3-34 *Range option in trigger time picker*



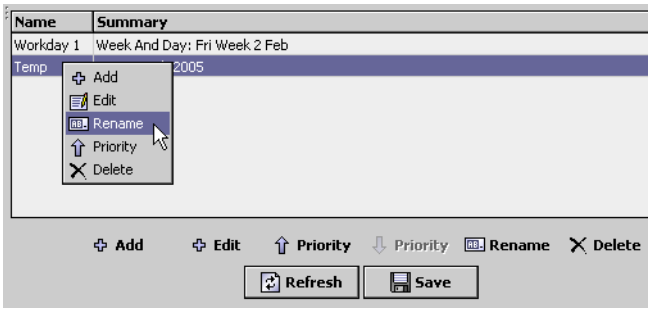
When entering a trigger range, note that the top (`hour:minute`) editor acts as the *first* (or Range Begin) trigger time. By default, the Range Interval is set to one hour ("`+00001h 00m 00.000s`"). You can set this to whatever interval is needed.

To delete a trigger time, click to select, then click the **Remove** button. To select multiple trigger times, hold down the Ctrl or Shift key while you select.

Right-click menus and other controls

The time picker (right side) has no right-click menu—simply use the bottom controls to configure trigger times. The calendar (left side) has an available right-click menu. If you have any calendar event *selected*, this menu provides the most commands, as shown in Figure 3-35.

Figure 3-35 *Right-click menu with event selected*



Note: *Priority selections (right-click menu or in bottom buttons) only affect the list order for events in a Trigger-Schedule—true priority applies only to special events (in Weekly Schedules).*

Event menu options are straightforward, and may include the following:

- Add — Add a new calendar event (same as using **Add** button).
- Edit — Edit day(s) selection criteria (but *not changing* calendar *type*). Same as **Edit** button.
- Rename — Rename selected calendar event (same as using **Rename** button).
- Priority (up) — Move calendar event up in display list (same as using **Priority** button).
- Priority (down) — Move calendar event down in display list (same as using **Priority** button).
- Delete — Removes selected calendar event from the schedule.

Note: *When you delete a calendar event, a confirmation dialog appears as shown in Figure 3-36.*

Figure 3-36 *Delete calendar event confirmation*

Click **Yes** *to delete the calendar entry, or* **No** *to keep it.*

When you first access the Trigger Schedule, the current day is highlighted in the left-most calendar month at the top of the view. As needed, click on **Next Month** and **Prev Month**, or **Next Page** and **Prev Page** to move the calendar ahead or back in time.

Return to the current calendar month and day by clicking the **Today** button.

Using schedules and calendars

Typically, you configure any schedule or calendar from its default view. For an overview description of common schedule controls, see "Common schedule characteristics and properties" on page 3-2.

- Using Weekly Schedules
- Configuring Calendar Schedules
- Configuring Trigger Schedules

Using Weekly Schedules

Weekly schedules are the most commonly used type of schedules. There are many ways you can use or configure a schedule, the following procedure is only one way that involves the following process:

1. Select the Weekly Schedule view that you want to configure (Figure 3-3 on page 3).
2. Configure important properties. See "To configure a Weekly Schedule's properties" on page 3-21.
3. Configure the normal Weekly Schedule. See "To configure the weekly (normal) schedule" on page 3-21.
4. Configure special events, if any. See "To add and configure special events" on page 3-21.
5. Review all configuration. See "To review a Weekly Schedule's configuration" on page 3-21.

To configure a Weekly Schedule's properties

To configure a Weekly Schedule's properties, do the following:

Step 1 In the schedule view, click the Properties tab, and configure the following:

- Facets — This is critical for an Enum type of schedule, and optional if you are working with a Boolean or Numeric type of Schedule. Note that facets do not apply to String type schedules.
- Default Output — This is the schedule's output whenever an event (either weekly or special event) is not active. It is also used whenever the schedule is "not effective."

Typically, you leave other properties at default values.

Step 2 Click **Save**.

To configure the weekly (normal) schedule

To configure the normal Weekly Schedule, do the following:

Step 1 In the schedule view, click the Weekly Schedule tab.

Step 2 In the events table, click and drag to add an event, and enter its output value.

For details, see ""Tune" event times" on page 3-5 and "Set output values" on page 3-6.

Note: *If a Boolean or Enum type schedule, select an output value from the drop-down control.*

If a Numeric or String type Schedule, type the output value and press Enter.

Step 3 Right-click the event and use whatever menus are needed.

For details, see "Use the right-click (popup) menus" on page 3-6.

Step 4 Continue to add, delete, or adjust events as needed.

Step 5 When the Weekly Schedule is setup like you want, click **Save**.

To add and configure special events

Special events are exceptions to the normal Weekly Schedule, and typically include recurring holidays and "one-time" events. For more details, see "About special events" on page 3-7.

To add and configure special events in a Weekly Schedule, do the following:

Step 1 In the schedule view, click the Special Events tab.

Step 2 Click the **Add** button to open a dialog box to add a special event.

In the **Add** dialog box, specify:

- Name — Type a unique, identifiable name.
- Type — Select the calendar type, and enter specific day criteria (according to type).

For details, see "Adding special events" on page 3-7 and "Calendar day selections" on page 3-15.

Step 3 After naming, selecting the event type, and entering the selection criteria, click **OK**.

The special event is listed in the special events table, with your assigned name.

Step 4 Click the special event to select it.

Step 5 In the right-side events column, you can either:

- Click and drag to enter events that override (yet "intermingle" with) normal weekly events.
- Right-click and select an all-day event or default output value. This negates the normal Weekly Schedule.

For more details see "Event times and output values" on page 3-8.

Step 6 Continue to add, edit, rename, or delete special events as needed. See "Right-click menus and other controls" on page 3-9, and "Special event priorities" on page 3-9.

Step 7 When special events are like you want, click **Save**.

To review a Weekly Schedule's configuration

Use the *read-only* Summary tab to review a Weekly Schedule's configuration.

To review the configuration of a Weekly Schedule, do the following:

Step 1 In the schedule view, click the Summary tab.

The calendar shows the current day with its schedule events, including output and output source.

Step 2 Click any day on any calendar month to see its schedule events.

Step 3 If adjustments are necessary, click the appropriate tab Weekly, Special Events, or Properties) as needed, and make changes. Click the **Save** button when done.

Configuring Calendar Schedules

Calendar Schedules let you globally specify holidays and other special days in the system. For details, see "About Calendar Schedules (holidays)" on page 3-12.

To configure a Calendar Schedule

You use the Calendar Schedule view to configure a Calendar Schedule.

To configure a Calendar Schedule, do the following:

Step 1 Select the Calendar Schedule that you want to configure.

The Calendar Schedule displays, as shown in Figure 3-23 on page 14.

Step 2 Click the **Add** button for a dialog box to add a calendar event.

In the **Add** dialog box, specify the following:

- Name — Type a unique, identifiable name.
- Type — Select the calendar type, and enter specific day criteria (according to type).

For details, see "Calendar day selections" on page 3-15.

Step 3 After naming, selecting the event type, and entering the selection criteria, click **OK**.

The calendar event is listed in the events table, with your assigned name.

Step 4 Continue to add, edit, rename, or delete calendar events as needed. See "Right-click menus and other controls" on page 3-15.

Step 5 When calendar events are like you want, click **Save**.

Configuring Trigger Schedules

Trigger schedules provide scheduling control for certain *actions*. For more details, see "About Trigger Schedules" on page 3-17.

To configure a Trigger Schedule

You use the Trigger Schedule view to configure a TriggerSchedule.

To configure a Trigger Schedule, do the following:

Step 1 Select the Trigger Schedule view that you want to configure.

The Trigger Schedule displays, as shown in Figure 3-31 on page 18.

This view has a calendar side (left) and time picker (right side).

Step 2 Click the **Add** button for a dialog box to add a trigger event.

In the **Add** dialog, specify:

- Name — Type a unique, identifiable name.
- Type — Select the calendar type, and enter specific day criteria (according to type).

For details, see "Adding trigger events" on page 3-18 and "Calendar day selections" on page 3-15.

Step 3 After naming, selecting the event type, and entering the selection criteria, click **OK**.

The event is listed in the (calendar-side) events table, with your assigned name.

Step 4 Click an event to select it.

Step 5 In the right-side time picker area, add one or more triggers, as needed.

Note the following:

- By default, a "midnight" trigger may exist (`00h:00m`); you can delete it if needed.
- Using the Range option, you can add multiple triggers at some repeating interval.
- Triggers apply to *all* trigger events (calendar-side entries).

For more details see "Adding trigger event times" on page 3-19.

Step 6 Continue to add, edit, rename, or delete trigger events as needed. See "Right-click menus and other controls" on page 3-20.

Step 7 When trigger events and triggers are like you want, click the **Save** button.

Chapter 4

About Alarms

Alarms notify personnel that a predefined set of parameters has been met and records the conditions when any monitored point is out of "normal" parameters. The "normal" parameters for an individual point are properties that may be set and edited, as desired, by a user with proper access and privileges. Typically, an alarm provides some visual and audible indication that a limit or value is met or exceeded. Alarm notifications may be routed and displayed in a variety of ways, including the following:

- alarm console (Workbench or browser-based)
- email
- line printer
- remote station(s)

In addition, in some applications, alarm "portals" are available to simultaneously monitor alarms from one or more remote stations.

Alarm examples

The following are examples of possible ways that alarms are used:

- **Out of operating range notification (offNormal)**
  An alarm is most commonly used to indicate that some value is not within an appropriate or expected range. For example, the normal operating temperature range of a device may be 70 to 100 degrees F. You can set the "out of range" parameters to generate an "alarm" if the operating temperature exceeds the upper limit or goes below the lower limit of this range.
- **Advisory notification (alert)**
  You may use an alarm in situations to report on a parameter that does not really have a "normal" state. For example, a motor may require lubrication after every 400 hours of operation (this is not an "out of range" condition). Using the alert function, a system integrator can setup an control point that monitors accumulated device run-time and sends an email *alert* notification at or before the 400 hours run-time has occurred.
- **Device fault notifications (fault)**
  Some devices may report values that are so far out of range that it is obvious that there is a device or system "fault" that needs attention. For example, if a device with a normal operating temperature of between 70 to 100 degrees reports a temperature of 0 degrees F or 1000 degrees F, then it is probable that there is a device or system fault and that the reported temperature is not the actual temperature at the device. The system engineer or supervisor can set parameters and enable alarms for a separate notification for values that are judged to be "faults" as opposed to simply "out of range".

This chapter includes the following topics that describe alarming in terms of:

Alarm concepts

This section describes the following alarm concepts:

Types of alarms

Alarms may originate from different types of control points, using different types of data and may represent an alarm state for a variety of reasons. The following list provides a short description of different types of alarms:

- **Out of range (numeric)**
  This type of alarm provides alarming based upon numeric high and low limits that you set. For example, temperature values that are outside of a defined temperature range may generate an alarm when alarming is enabled for that point.
- **Change of state (boolean)**
  This type of alarm provides alarming based upon one of two possible values (state) as an alarm condition. For example, any time a device is turned off, the state change from ON to OFF could generate an alarm, if alarming is enabled for that point.
- **Command failure (boolean)**
  This type of alarm provides alarming based upon a mismatch between a commanded value and actual (sensed) value. For example, if a device is commanded to turn on but does not come on (or is sensed to have not come on) an alarm is generated.
- **Change of state (enum)**
  This type of alarm provides alarming based upon one of several possible values (state) as an alarm condition. For example, any time a device is commanded to change state, the state change from OFF to LOW, Medium, or High (for example) could generate an alarm, if alarming is enabled for that point.
- **Command failure (enum)**
  This type of alarm provides alarming based upon a mismatch between a commanded value and actual (sensed) value. For example, if a device is commanded to change from a Low to High state but the device does not change that state (or is sensed to have not changed to the correct state) an alarm is generated.
- **Status**
  Provides alarming based upon any one or more specified status flags. For example, a Status Alarm can be generated if any one or more of the following status conditions are specified as "offnormal" or "fault" conditions: disabled, fault, down, alarm, stale, overridden, null, unacknowledged (unacked) alarm.

Types of alarm Source States

An alarm source has a set of "states" that indicate the *current* device status, based on the actual values at the device and the alarm parameters set in the point's alarm properties. These alarm source states are displayed under the "Source State" column in the Alarm Console and include the following:

- **Normal**
  The normal state of an alarm source indicates that the monitored values on that point are within the specified "normal" range.
- **Offnormal**
  The Offnormal state of an alarm source indicates that the monitored values on that point are out of the specified "normal" range.
- **Fault**
  The Fault state of an alarm source indicates that the monitored values on that point are outside of the specified "normal" range.
- **Alert**
  An alert state is used for alarm sources that do not have a "normal" state. For example accumulated run-time or change of state count.
- **Loop alarm**
  This is a sliding alarm limit that is used with a LoopPoint based upon a controlled process deviation from setpoint.
- **Elapsed time**
  Provides alarming based upon accumulated runtime (elapsed active time).
- **Change of state count**
  Provides alarming based upon accumulated changes of state.

Note: *Alarms originating from systems that are engineered with the older NiagaraAX r2.x version software, alarms may have the additional state—"Alerts".*

Types of alarm Ack States

Alarm records are stored in a special alarm database that is maintained or managed by a user that has the proper access and privileges. Each alarm is a single record in the alarm database that changes throughout the alarm record life cycle. An alarm has "states" that directly relate to the alarm notification itself. These are listed as the "Ack State" in the Alarm Console and include the following:

- **Unacked (unacknowlwedged)**
  The Unacked state is the initial state of an alarm. This state remains in effect until the alarm is acknowledged. Unacknowledged alarms typically demand the most attention by repeating an audible alert and blinking until they are acknowledged. System designers can use a variety of methods to present or deliver an alarm notification in order to maximize or minimize the alarm's visibility.
- **Acked (acknowledged)**
  The Acked state is achieved after an alarm is acknowledged. The record of the alarm remains in the database but the visual and audible signals stop when the alarm is acknowledged.
- **Ack Pending**
  While in the Unacked state, an alarm state may report that an acknowledgment is pending by displaying the "Ack Pending" state. This means that a user has initiated an acknowledgement by clicking the Acknowledge button, or other means. Depending on network connections, an Ack Pending state may display only momentarily, if at all. However, for some situations, with less

About alarm data

Alarm record data is displayed in various places, including in tabular form in the Alarm Console and the Alarm Database Maintenance view. It also appears in listings in the Alarm Record dialog box and in the Alarm Details dialog box. The following list provides a brief description of the alarm data:

- **Timestamp**
  This data field is the time that the alarm record is created.
- **UUID**
  This data field displays the unique universal identifier (UUID) of the alarm record.
- **Source State**
  This data field displays the status of the listed alarm source; for example, "High Limit" or "Normal".
- **Ack State**
  This data field displays either "Acked" or "Unacked" to indicate whether the alarm has been acknowledged or not.
- **Ack Required**
  This data field displays either "True" or "False" to indicate whether or not an acknowledgement is required for this alarm.
- **Source**
  This data field displays the alarm source name.
- **Alarm Class**
  This data field identifies the name of the alarm class that the extension is assigned to (defaultAlarmClass or other class).
- **Priority**
  This data field displays the priority number of the alarm.
- **Normal Time**
  This data field displays the time that the alarm went to normal (if applicable)
- **Ack Time**
  This data field displays the time that the alarm was acknowledged (if applicable)
- **User**
  This data field identifies the name of the user that acknowledged the alarm. An unacknowledged alarm will display "unknown" in this field.
- **Alarm Data**
  This data field includes a list of data values associated with a specific alarm record. In tabular views the data may be more difficult to read, as it is presented in a single column. The data is also presented in dialog box views (Alarm Record and Alarm Details dialog boxes).
- **Alarm Transition**
  This data field displays the last transition type of the alarm.
- **Last Update**
  This data field displays the time of the last alarm update.

About alarm class

Every point that is monitored for alarms has an associated *alarm class*. This alarm class contains properties that designate alarm routing for all alarms that are associated with it. Alarm class properties also specify which alarms require an acknowledgement and provide the basis for how alarms are grouped in the alarm console.

Systems can have multiple alarm classes in order to have a variety of alarming and routing options available for selection by the system integrator or system engineer. For example, you may have an alarm class that routes alarms to the alarm console and to a remote station, while you may use another alarm class that routes alarms only via email.

About alarm class properties

Alarm class properties allow for the control, display and grouping of the following types of information:

- **Alarm acknowledgement**
  This property sets the requirement to acknowledge the alarm to true or false. So, while some alarms require an acknowledgement
- **Set alarm priority level**
  This property group allows for custom priority levels for each alarm transition type. The priority levels are associated with the alarms and are indicated graphically by colors.
- **Total number of alarms**
  This property allows for displaying the total number of alarms that have been assigned to the alarm class from all alarm sources that belong to that class.
- Total number of ***open*** alarms
  This property displays the current total number of open alarms.
  Note: *An "Open Alarm" is an alarm that is in normal status and is not acknowledged (or acknowledged and in alert status).*
- **Total number of alarms currently "in alarm"**
  This property displays the total number of in alarm conditions.
- **Unacked Alarm Count**
  This property displays the total number of alarms that have not been acknowledged.
- **Time of Last Alarm**
  This property displays the time that the last alarm (assigned to this alarm class) was generated.
- **Alarm escalation**
  These properties allow for alarms to be sent again to a different "recipient", they are not acknowledged after a certain amount of time. There are three levels of escalation allowed, so to help make sure that unacknowledged alarms are not ignored.

Types of alarm recipients

Alarm recipients are linked to an alarm class. Recipients may be configured to receive alarms at certain times of the day, certain days of the week, and to receive alarms of only specified transitions. There are several subclasses of the alarm recipient that allow for alarms to routed in the following ways:

- to an alarm console
- to another station
- via email
- to line printer

About alarm instructions

Each alarm can have "instructions" assigned to it so that any time an alarm is generated, the instructions are presented with the alarm notification to provide information that may be important or helpful to the user. Instructions are created, assigned, and edited from the Instructions view. Refer to "About the Instructions Manager view" on page 8 for details about the Instructions view.

About notes

Notes are simple text entries that are associated with a particular alarm. It is possible to add a Note to one alarm or to multiple alarms. Alarm records that have notes are indicated by a "note" icon". Refer to "Notes dialog box" on page 6 for more information about Notes.

Alarm views

This section describes the alarm views as well as the controls and options that are common to one or more of the views. The following topics are included:

Common alarm controls and indicators

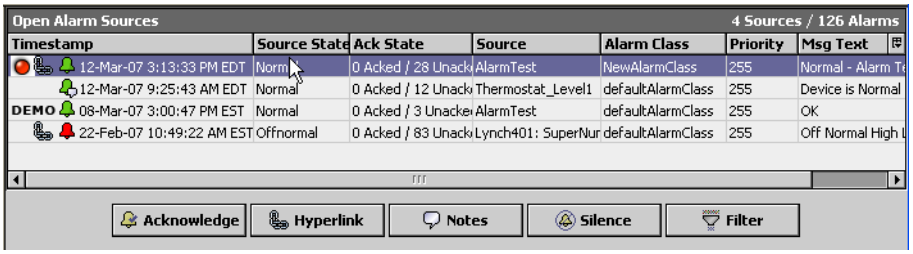
The following alarm controls and indicators are common to several alarm views:

- **Alarm control buttons**
  The following buttons appear in one or more alarm views:
  - Acknowledge
    Use the **Acknowledge** button to acknowledge *all selected* alarms.
  - Hyperlink
    Use the **Hyperlink** button to change the current view to the hyperlinked target associated with the selected alarm. If no hyperlink is associated with the alarm, the Hyperlink button is not available.
  - Notes
    Click the **Notes** button to display the **Notes** dialog box and add a note to the selected alarm or alarms.
  - Silence
    Click the **Silence** button to stop the audible notification associated with the selected alarm.
  - Filter
    Click the **Filter** button to display the Filters dialog box for setting the filter parameters.
  - Close
    Click the **Close** button to cancel the current interface actions without saving changes.
- **Alarm icons**
  Alarm icons appear with color coding and symbolic images:
  - A red alarm icon in the table indicates that the current state of the alarm source is not “offnormal” and “not acknowledged”.
  - An orange alarm icon in the table indicates that the current state of the alarm source is “alert” and is “not acknowledged”.
  - A yellow alarm icon in the table indicates that the current state of the alarm source is “not acknowledged” and “acknowledged”.
  - A green alarm icon in the table indicates that the current state of the alarm source is “normal” and “not acknowledged”.
  - A white alarm icon in the table indicates that the current state of the alarm source is “normal” and “acknowledged”.
  - A note alarm icon (it may be *any* color) in the table indicates that there is a note associated with the alarm
  - A link icon in the table indicates that the alarm has a link associated with it. When an alarm displays this icon, the **Hyperlink** button is also active.
  - An optional icon may display if it is setup in the alarm properties. If included, this graphic appears at the left end of the alarm record row.

About the alarm console

The alarm console, which is usually the default alarm view, displays a table of all the alarms that have been routed to it. Although the view may be customized, it typically looks like the illustration in Figure 4-1. Alarm records are presented in a table with columns that may be viewed or hidden using the drop–down menu in the top right corner of the column title bar.

Figure 4-1 *Alarm console*

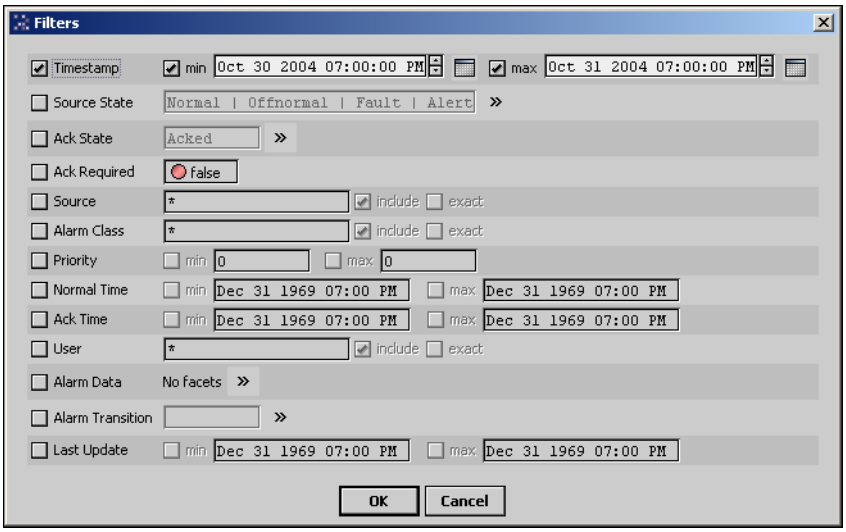


The alarm console manages alarms on a per–point basis, which means that each row in the alarm console is the *most recent* alarm from a point. To view all the current alarms or to get more details about a particular alarm from that point, double click on a record and use the Open Alarm Sources - details view.

Filters dialog box

The **Filters** dialog box displays parameters, as shown in Figure 4-2, that you can use to include or exclude alarms from the alarm console by selecting or deselecting parameters. This filter action only affects which alarms display in the alarm console, it does not edit any alarm record data or perform any alarm "maintenance".

Figure 4-2 *Alarm filter dialog box*



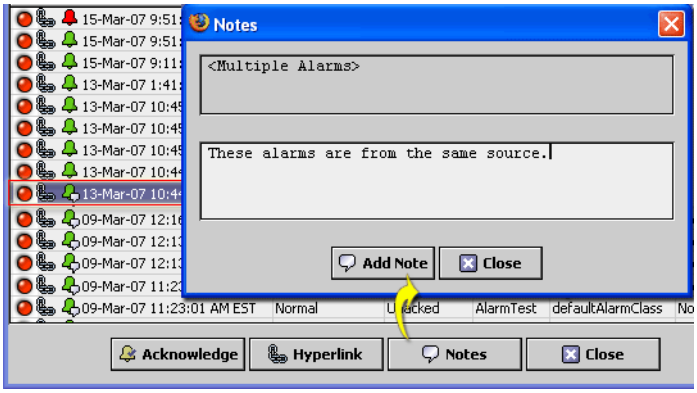
You can choose, for example, to filter out any alarms in the alarm console that are currently in a "Normal" state by selecting the "Source State" check box and then selecting all states except "Normal" and clicking the **OK** button. This action filters out all alarm records that have "Normal" current Source States. If the source state changes or if you change the settings in the Filters dialog box, the alarm console table will update to change the display, as indicated.

Note: *It is important to remember that the settings do not reset automatically—you must remove any filters that you set in order to view all alarm records.*

Notes dialog box

Use the **Notes** dialog box to add a note to one or more alarms. To add a note to all the alarms from a selected source, open the **Notes** dialog box directly from the alarm console view, using the **Notes** button. If the selected alarm record represents a source with multiple alarms, any note that you add is added to all the alarms associated with that alarm source. When there is more than one alarm associated with an alarm record, the Notes dialog box displays a <Multiple Alarms> message, as shown in

Figure 4-3 *Adding a single Note to more than alarm*



The **Notes** dialog box is comprised of the following:

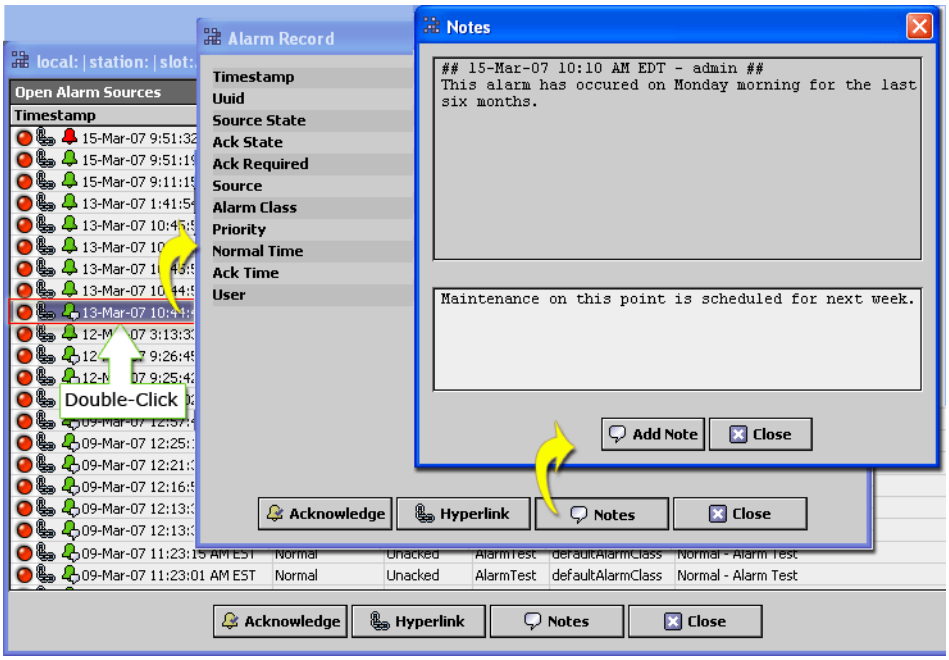
- **Message pane**

The message pane is located in the upper half of the dialog box. It displays the text of any notes that are already associated with the selected alarm record. If multiple alarms are associated with the selected alarm record, the message pane also displays a "<Multiple Alarms>" notice to alert you to the fact that adding a note adds the note to all the alarms associated with the selected alarm source.

- **Editor pane**
  The Editor pane is located in the lower half of the dialog box and is a text field that allows you to type the text for any note that you are adding.
- **`Add Note`** button
  This button saves the note to the alarm record and dismisses the Notes dialog box.
- **`Close`** button
  This button closes the **`Notes`** dialog box without saving any information.

You can also open the Notes dialog box from the **`Alarm Record`** dialog box. Since the **`Alarm Record`** dialog box displays single alarm records, notes are added to only one alarm at a time using this method.

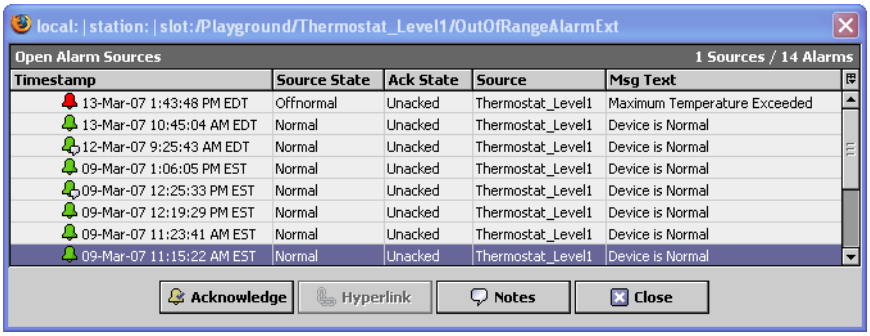
Figure 4-4 *Opening the Notes dialog box from the Alarm Record dialog box*



Open Alarm Sources - detail view

To view all the open alarms from a particular point, double-click the record in the Alarm Console. The Open Alarm Sources - detail view appears, as shown in Figure 4-5.

Figure 4-5 *Open alarm sources - detail view*



This view has two main display areas:

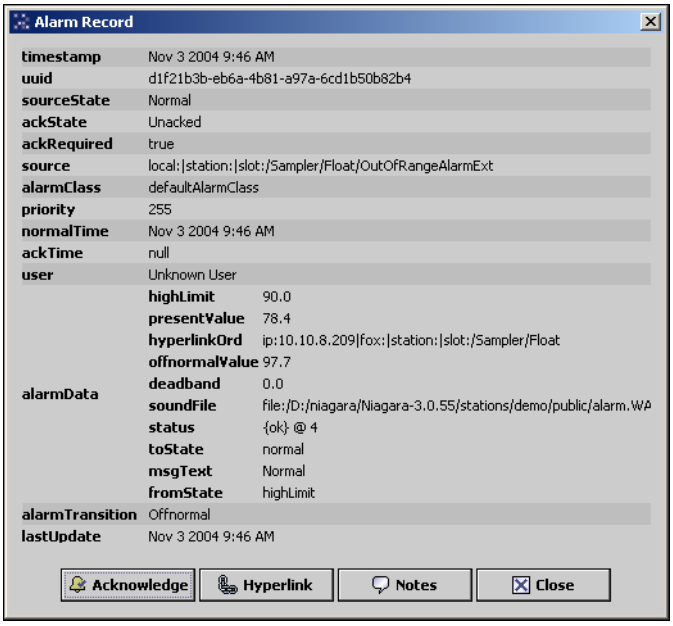
- **Open Alarm Sources table**
  This table occupies most of the view. As with other tables, you can show or hide the columns using the **`Table Options`** menu in the top right corner of the table (refer to "Common table view controls and display options" on page 1-12).
- **Control buttons**

Control buttons are located along the lower edge of the view: Acknowledge, Hyperlink, Notes, and Close. These buttons are described in "Common alarm controls and indicators" on page 4-5 To see alarm data associated with a particular alarm record, double-click on an alarm record to display the Alarm Record dialog box.

Alarm Record dialog box

The **Alarm Record** dialog box (show in Figure 4-6) displays additional detailed information about a specific point alarm record and is accessible from the Open Alarm Sources - detail view, by double-clicking on a single alarm record.

Figure 4-6 *Alarm record dialog box*



The following control buttons are located at the bottom of the dialog box, below the detailed alarm data information:

- **Acknowledge**
- **Hyperlink**
- **Notes**
- **Close**

Refer to "Common alarm controls and indicators" on page 4-5 for details about using these buttons.

About the Instructions Manager view

The Instructions Manager view displays a standard table-type report that provides a way to view, assign, and edit alarm instructions. The view is comprised of three primary panes:

- **Points**
  This pane is located in the left half of the Master Instructions view and displays all points that are currently available for instruction assignment or editing. These points may have instructions assigned to them or they may have no instructions—they are simply the points that are available. The "Point" column contains the name of the control point source associated with the alarm and the "Conditions" column provides the name of property that is holds the alarm instructions.
  Note: *You can select more than one point at a time by using the Shift key or Ctrl key. If the alarm instructions for all selected points are identical, then all associated instructions display in the Point Instructions pane. If there are any differences in alarm instructions for the selected points, no instructions display.*
- **Point Instructions**
  This pane is located in the top right portion of the **Assign Instructions** dialog box and it includes a list of instructions that are associated with the point or points currently selected in the Points pane.
  You can add, remove, reorder, or edit instructions in this pane using the following controls:
  Note: *Always remember to click the Save button immediately after making any changes.*
  - **Add**

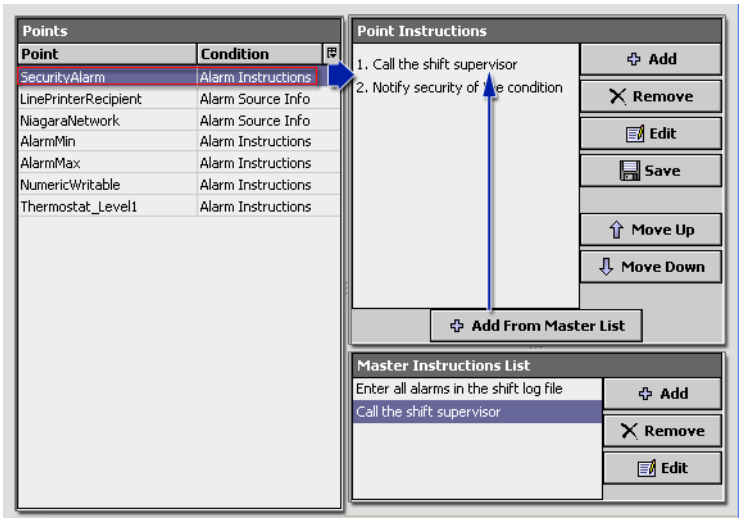
Clicking the **Add** button produces the **Add** dialog box that allows you to type in the text for an instruction.

- **Remove**
  Select an instruction then click the **Remove** button to delete the instruction.
- **Edit**
  Select an instruction and then click the **Edit** button to open a dialog box that allows editing of the selected instruction.
- **Save**
  Clicking the **Save** button commits any changes made to the point instructions. The Save action applies to all instructions and all points that are selected when the **Save** button is clicked. Changes are lost if the screen or if just the pane is refreshed before saving.
- **Move Up and Move Down**
  Select an instruction in the point instruction window, then click either the **Move Up** or **Move Down** button to reorder the instructions in the window.

- **Master Instructions List**
  This pane is located in the lower right portion of the Instructions Manager view and it displays all master instructions that are available for adding to the Point Instructions pane. Master Instructions allow you to choose and assign a pre-listed set of instructions to one or more points.
  Note: *You can select more than one Master Instruction at a time using the Shift key or Ctrl key. If the alarm instructions for all selected points are identical, then all associated instructions display in the Point Instructions pane. If there are any differences in alarm instructions for the selected points, no instructions display.*

  To add or remove one or more Master Instruction to one or more *selected points*, first select the Master Instruction(s) in the Master Instructions list and then click the **Add From Master List** button. Be sure to click the **Save** button immediately after making any edits.
  Figure 4-7 shows an example of the Instructions Manager view with one point and one master instruction selected. You can Add, Remove and Edit Master Instructions using the following controls:
- **Add**
  Clicking the **Add** button produces the **Add** dialog box which allows entering a text instruction to the Master Instructions list. The master instructions list allows you to enter instructions that are available to be assigned to any alarms. After entering instructions in the Master Instruction list, the instructions are available to be added to individual selected point instructions by first selecting the instruction in the list and then clicking the **Add From Master List** button.
- **Remove**
  Select an instruction in master instructions list and then click the **Remove** button to delete the instruction.
- **Edit**
  Select an instruction and then click the **Edit** button to open a dialog box allowing the instruction to be modified.

Figure 4-7 *Instructions Manager view with one point and one master instruction selected*

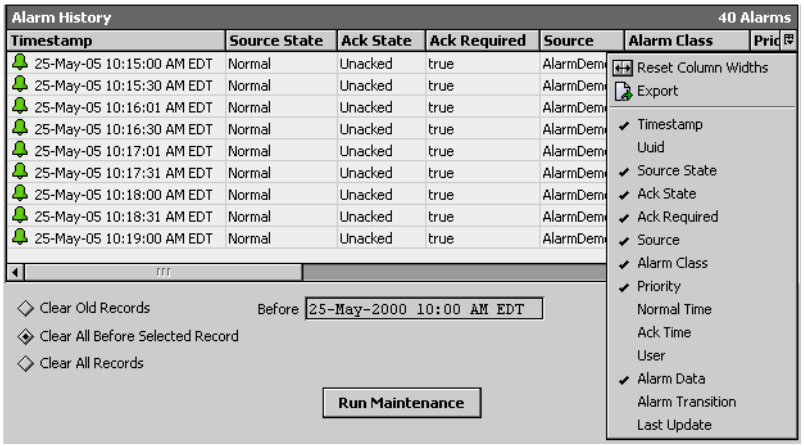


About the alarm database maintenance view

The alarm database maintenance view presents alarm data in a table view to make it easy to view and edit the alarm database. As with other tables, you can show or hide columns and use other standard table controls and options that are provided in the **`Table Options`** menu. The **`Table Options`** menu is located in the top right corner of the table and is described in "Common alarm controls and indicators" on page 4-5.

An example of the alarm database maintenance view is shown in Figure 4-8.

Figure 4-8 *Alarm database maintenance view*



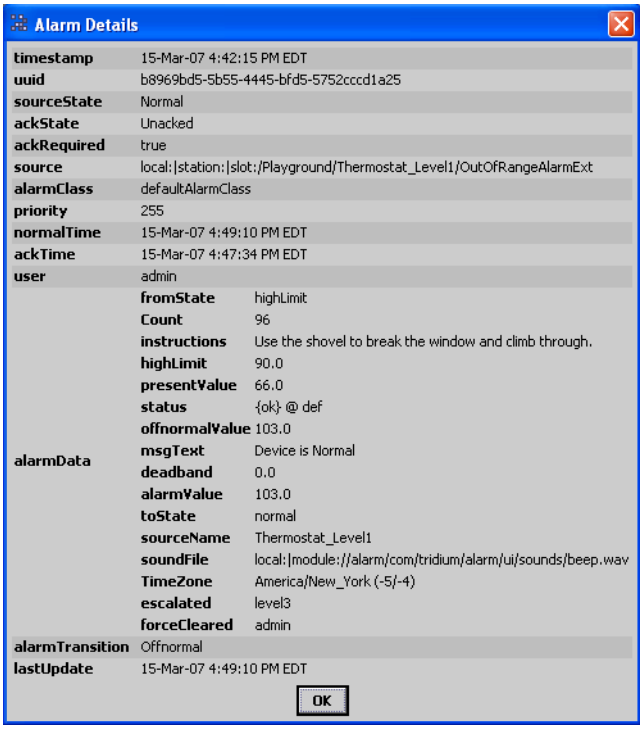
The Alarm Database Maintenance view has two main sections:

- **Alarm History pane**
  This pane is located in the upper part of the view and contains a table of alarm history data. Alarm data types are described in "About alarm data" on page 4-3.
- **Maintenance controls pane**
  These controls are located below the table pane and contain the following controls and parameter options:
  - **Clear Old Records option**
    allows you to clear alarm records before a certain date and time. The **`Before`** field is provided to allow you to set the date and time for removing old records.
  - **Clear All Before Selected Record option**
    allows you to delete all records that have a timestamp earlier than the timestamp of the record that is currently highlighted in the table.
  - **Clear All Records options**
    allows you to delete all records, regardless of the date.
  - **Run Maintenance button**
    This button initiates the maintenance action.

About the alarm details dialog box

The **`Alarm Details`** dialog box (show in Figure 4-9) displays additional detailed information about a specific point alarm record and is accessible from the Alarm Database Maintenance view, by double-clicking on a single alarm record in that view.

Figure 4-9 *Alarm Details dialog box*



The following control buttons are located at the bottom of the dialog box, below the detailed alarm data information:

- **`Acknowledge`**
- **`Hyperlink`**
- **`Notes`**
- **`Close`**

Refer to "Common alarm controls and indicators" on page 4-5 for details about using these buttons.

Alarm tasks

The following tasks are common procedures used to manage alarms in a system.

Acknowledging alarms from the alarm console view

Note: *Alarms are not removed from the alarm console view until both of the following conditions exist:*

- alarm acknowledged
- alarm source is in a normal (not alarm) state

To acknowledge alarms from the alarm console view, do the following:

Step 1 Open the alarm console using the navigation links provided for your application interface.

The alarm console view appears with all alarm sources displayed in the **`Open Alarm Sources`** pane.

Step 2 In the **`Open Alarm Sources`** pane, select one or more alarm sources that you want to acknowledge. Select multiple alarms using the Shift or Ctrl key.

Note: *Each record that appears in the alarm console table represents one alarm source and one or more alarms from that source. You may acknowledge either the latest (most recent) alarm or acknowledge all alarms that are reported from that source by choosing either the "Acknowledge" command or the "Acknowledge All" command, as described in the following step.*

Step 3 Acknowledge selected alarm(s) by doing one of the following:

- At the bottom of the **Open Alarm Sources** pane, click the **Acknowledge** button (to acknowledge all alarms associated with the selected alarm sources)
  OR
- Right click on any selected alarm and select **Acknowledge Most Recent** from the popup menu.
  The selected alarms are acknowledged.

Viewing alarm notes

Any alarm record that has one or more associated notes displays the alarm note icon . Notes are visible from several different views, including the following:

- Open Alarm Sources pane
- Open Alarm Sources - detail view (using **Notes** button or viewing in the properties listing).
- Alarm dialog box

The following steps describe how to view notes in **Notes** dialog box opened from the Alarm Sources pane. Other methods are available and the procedure is similar to the following one.

To view alarm notes, do the following:

Step 1 In the **Open Alarm Sources** pane, select the desired alarm record.

Step 2 At the bottom of the **Open Alarm Sources** pane, click the **Notes** button.

The **Notes** dialog box appears with all associated notes displaying in the upper half of the dialog box. You can add more notes to the alarm source, if desired.

Step 3 Click the **Close** button to dismiss the dialog box without adding note text to the alarm source.

The **Notes** dialog box disappears.

Adding alarm notes

To add alarm notes, do the following:

Step 1 In the **Open Alarm Sources** pane, select the desired alarm source.

Note: *If you select an alarm record that has multiple alarms, you are adding notes to all alarms. To add alarm notes to a single alarm, select the single alarm record from the Open Alarm Sources - detail view or the Alarm Record dialog box.*

Step 2 At the bottom of the **Open Alarm Sources** pane, click the **Notes** button.

The **Notes** dialog box appears.

Step 3 In the text field of the **Notes** dialog box, type any desired information.

Step 4 Click the **Add Notes** button to add the note text information to the selected alarm source. Click the **Close** button to dismiss the dialog box without adding note text to the alarm source.

The **Notes** dialog box closes.

Silencing alarms

A silenced alarm sounds again if the screen is refreshed.

To silence an alarm, do the following:

- Click the **Silence** button in the Alarm Console view.
  The audio alert is silenced for the current session of the Alarm Console view.

Note: *The Silence mode is cancelled if the Alarm Console view is refreshed. This includes any time you use the Filter button to update or change Alarm Console view data.*

Filtering alarms in the Alarm view

To filter alarms in the Alarm view, do the following:

Step 1 In the Alarm Console view, click the **Filter** button.

The **Filters** dialog box appears.

Step 2 In the **Filters** dialog box, set the desired parameters for filtering the alarms and click **OK**.

The **Filters** dialog box disappears and the Alarm Console view is updated to include only those alarms that meet the specifications of the filter parameters.

Note: *Filter settings do not automatically reset. To see all alarms again (unfiltered) you must open the* **Filters** *dialog box and deselect any filter parameters that you have selected.*

For more information about the **Filters** dialog box, refer to "Filters dialog box" on page 4-6.

Viewing individual alarm record properties

To view individual alarm records, do the following:

Step 1 From the Alarm Console view, double-click the desired alarm source table row.

The **Open Alarm Sources** dialog box appears, displaying all open alarms related to the alarm source.

Step 2 Double-click on the desired alarm record.

The **Alarm Record** dialog box appears, displaying the alarm source properties.

Step 3 View properties, as desired and click the **Close** button in all open dialog boxes when finished.

All dialog boxes disappear.

Viewing individual open alarm sources

To view individual open alarm sources, do the following:

Step 1 From the Alarm Console view, double-click the desired alarm source table row.

The **Open Alarm Sources** dialog box appears, displaying individual open alarms related to the alarm source.

Step 2 View properties, as desired and click **Close** when finished.

All dialog boxes disappear.

To delete alarm records

The Alarm Database Maintenance view provides three ways to delete alarm records from the alarm database. To delete old alarm records, do the following:

Step 1 In the Alarm Database Maintenance view, select one of the following three options:

- **Clear Old Records option**
  to clear alarm records *before* a certain date and time. The **Before** field is provided to allow you to set the date and time for removing old records. The Before field is not available when you select either of the other options.
- **Clear All Before Selected Record option**
  to delete all records that have a timestamp earlier than the timestamp of the record that you select in the Alarm History pane table. The selected record is not deleted.
- **Clear All Records options**
  to delete all records that appear in the Alarm History pane table, regardless of the date.

Step 2 Click the **Run Maintenance** button to initiate the delete action.

The **Confirm Clear** dialog box displays to clarify that you are about to delete records and that the operation cannot be "undone".

Step 3 If the information in the **Confirm Clear** dialog box confirms that you are deleting the desired alarm records, click the **Yes** button (otherwise click the **No** button).

The alarm records are deleted and removed from the Alarm History table in the Alarm History pane.

To acknowledge alarms from the alarm console view

Note: *Alarms are not removed from the alarm console until both the following conditions exist:*

- alarm acknowledged
- alarm source is in a normal (not alarm) state

To acknowledge alarms from the alarm console view, do the following:

Step 4 In the alarm console view, select alarm sources that you want to acknowledge. Select multiple alarms, if desired, using the Shift or Ctrl key.

Note: *Each record that appears in the alarm console table represents one alarm source and one or more alarms from that source. You may acknowledge either the latest (most recent) alarm or acknowledge all alarms that are reported from that source by choosing either the "Acknowledge" command or the "Acknowledge All" command, as described in the following step.*

Step 5 Acknowledge selected alarm(s) by doing one of the following:

- At the bottom of the alarm console view, click the **Acknowledge** button (to acknowledge all alarms associated with the alarm source).

All alarms at that alarm source are acknowledged.
OR

- Right-click on the selected alarm(s) and select **Acknowledge** from the popup menu (to acknowledge all alarms reported from that source). Alternatively, you may click the **Acknowledge Most Recent** from the popup menu, to acknowledge only the latest alarm associated with the alarm source.
  All alarms from each selected alarm source are acknowledged.

Chapter 5

About Histories

In NiagaraAX, a data log is referred to as a **history**. Histories are ordered collections of timestamped records. A single "history" is a collection of specific data values from a point within any station - local or remote. Histories are organized (or grouped) by their source station (device).

History examples

The following examples illustrate possible ways that histories are used:

- **Intervals**
  Control points that are configured to collect history data have properties that may be set to record this data at specific time intervals. For example, in a manufacturing facility, a control point may be configured to record conveyor belt speed every 15 minutes. In this case, the history data is collected and timestamped to identify the belt speed values at each 15 minute interval. The history records may then be displayed in various different views, including tables and charts.
- **Change of value**
  Control points are often configured to record data whenever there is a change in value at that control point. A change in value may be defined as any of the following: a change in state—such as ON to OFF, a change in a setting—from LOW to MEDIUM or HIGH, or it may be defined as any temperature change greater than .03 degrees, for example. These parameters are set by a systems engineer or integrator who "configures" the control point history properties. Timestamped history data is collected and stored based on these "change of value" property settings. The history records may then be displayed in various different views, including tables and charts.

The following topics describe user-related interfaces and interactions that are related to working with histories:

- History concepts
- Types of history views
- History tasks

History concepts

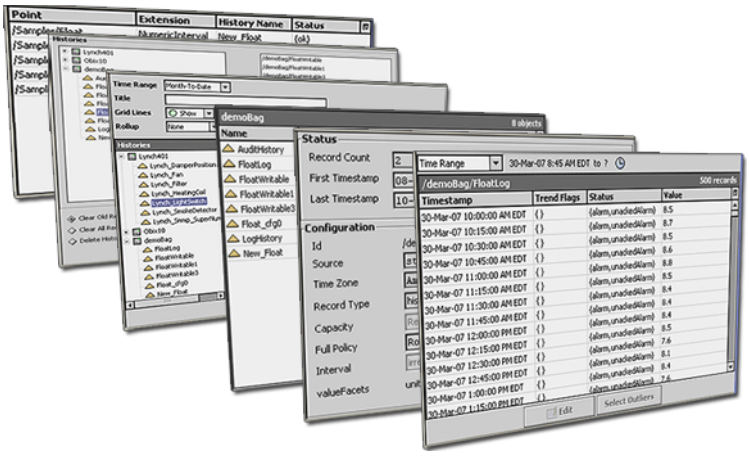
The following history concepts are addressed

- Various History views
- Types of histories
- About history data

History views

When you access a NiagaraAX station from the browser, you may have access to a variety of views that look different from the graphics in the topics presented here. Also, depending on your privelege level, the history views that you can access and the tasks that you can perform, may vary. The following topics address user interactions that are representative of what an average user may see when working with histories.

Figure 5-1 *Various History views*



Types of histories

Histories may be associated with different types of control points using different types of data. The following list provides a short description of the different types of histories:

- **Interval (numeric)**
  This type of history records numeric history data at a specified time interval that can be set in hours, minutes and seconds. For example, temperature values may be recorded at a control point every hour, every 22 minutes or every 13 seconds, if desired.
- **Change of value (numeric)**
  This type of history records numeric data whenever a control point value changes by an amount greater than a specified "tolerance" amount or whenever there is a status change. The change tolerance amount may be zero or greater.
- **Interval (boolean)**
  This type of history records boolean history data at a specified time interval that can be set in hours, minutes and seconds. For example, ON or OFF equipment state values may be recorded at a control point every hour, every 22 minutes or every 13 seconds, if desired.
- **Change of value (boolean)**
  This type of history records boolean data whenever a control point value changes or when there is a status change. For example, a history record can be created every time a control point detects the state of a door going from OPEN to CLOSED.
- **Interval (enum)**
  This type of history records enum (enumerated) history data at a specified time interval that can be set in hours, minutes and seconds. For example, enum data could be something like Fan Speed (LOW, MED, HIGH) values. These values may be recorded at a control point every hour, every 22 minutes or every 13 seconds, if desired.
- **Change of value (enum)**
  This type of history records enum (enumerated) history data whenever a control point value changes or when there is a status change.
- **Interval (string)**
  This type of history records string history data at a specified time interval that can be set in hours, minutes and seconds.
- **Change of value (string)**
  This type of history records string history data at any time that the string data changes or on any status change.

About history data

History records are collected, stored, edited, and archived, as required by the system design and function. A user may have some control or input at any of these points in the life cycle of history data, depending on the available views and the assigned privileges and duties. The following list describe some history data concepts.

- **History data collection**
  History data collection (or what actually gets recorded and when it is recorded) depends on the parameters associated with a control point. For example, a system integrator or engineer may configure a point to collect data whenever a change of value occurs—or at a regular specified time. It may

also be set to only do this collection on certain days of the week.

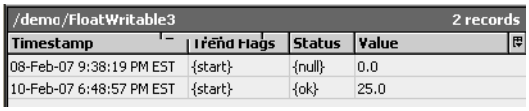
- **History capacity**
  Each history has a capacity property that allows you to collect a finite number of records *or* to choose to collect an unlimited number of records. If you choose the `Record Count` option, an additional "records" field displays. In the "records" field, type in the maximum number of records that you want to save in the history database. If you choose the `unlimited` option, the history file continues to collect records until the history collection is disabled.
- **Full Policy - (Roll or Stop)**
  Each history has a Full Policy property that allows you to choose what to do when the capacity number is reached (as specified in the Records field). The `Roll` option drops the oldest record to make room for the newest record. The `Stop` option simply causes the history to stop recording.
- **History data storage**
  With certain views and privileges, users can define parameters of the history database file. For example, it is possible to customize the name of the database file, define the maximum number of records to save, and choose metadata to add to history data records.
- **History data editing**
  Users can edit and filter history data using the history editor view (described in "About the history editor view" on page 5-9).
- **History archive (transfer)**
  Archiving is the process of saving a copy of history data to a location (station). There are two general methods (or directions) for archiving, which may be done on a scheduled basis or manually, depending on the system configuration.
  - Pushing data (exporting histories)
  - Pulling data (importing histories)

  History archiving includes importing and exporting records from one station to another station for the purpose of data backup or for just limiting the amount of data that is stored on a single host. For example, you can limit your local station records to a small number that you specify and archive all records to another station.

Types of history data fields

The following types of data are common to several history table views and appear as columns that may be hidden or displayed using the **`Table Options`** menu. Refer to "Common table view controls and display options" on page 1-12 for information about using the **`Table Options`** menu.

Figure 5-2 *History data fields in the History Table view*



- **Timestamp**
  This data field indicates the time that the recorded value occurred.
- **Trend Flags**
  This data field displays trend flag information about the recorded data - for trend record types. These flags provide extra context information about the record data. For example: "Start", "OutofOrder", "Hidden", "Modified", and "Interpolated" are possible trend flags.
- **Status**
  This data field displays the status of the history's parent component; for example, "OK" or "null".
- **Value**
  This data field displays the record value.

Types of history views

Some views may be customized, so they may vary from one system to another. However the following views are representative of views that may be available to users with browser access:

- **Chart builder**
  Use this view to build a chart from the data that is stored in one or more histories. See "About the chart builder view" for details.
- **Database maintenance**
  Use this view to clear records or delete histories. See "About the database maintenance view" on page 5-6
- **History manager**

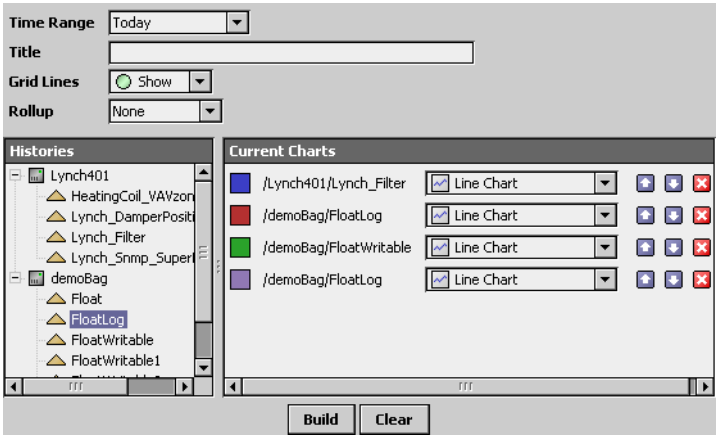
Use this view to display all control points that are configured for history collection. See "About the history manager view" on page 5-6

- **Nav container**
  Use this view to display all histories in the station. See "About the nav container view" on page 5-7
- **History chart**
  This view shows a plotted chart of the history data. Refer to "About the history chart view" on page 5-7 for more details.
- **History table**
  This table shows a view of history data that you can export and view in the following formats: PDF, CSV, Text. Refer to "About the history table view" on page 5-8 for more information.
- **Collection table**
  This view shows an unfiltered table of logged data (in this case history data). You can export and view this data in the following formats: PDF, CSV, Text. Refer to "About the collection table view" on page 5-8 for more information.
- **History summary**
  This view shows a summary of the history's status and configuration properties. Refer to "About the history summary view" on page 5-9 for more information.
- **History editor**
  This view allows you to edit data and filter histories. Refer to "About the history editor view" on page 5-9 for more information.

About the chart builder view

The chart builder view is shown in Figure 5-3. Using this view, you can select the histories that you want to use to create a chart.

Figure 5-3 *Chart builder view*



The Chart Builder view is comprised of the following:

- **`Histories`** pane
  This pane is located on the left side of the view and displays all histories that are available in your local station or any station histories that are available on your system network connection. Histories are grouped under their parent station device icon .
- **`Current Charts`** pane
  The left side of this view contains the **`Histories`** pane. Histories are grouped under the station according station name.
  Drag and drop any available history (from the **`Histories`** pane) onto this area. Each history displays as a row in the pane with the following configurable options:
  - Editable plot color icon allows you to change the plot color in the history chart.
  - Chart Type option list allows you to select the type of plot that you want to use for each individual history file (Line Chart, Area Chart, Pie Chart, or others).
  - The "up" and "down" arrows allow you to rearrange the vertical order of the history files in the pane. This also affects the display order in the History Chart legend.
  - The "delete" icon allows you to remove a file from the **`Current Charts`** pane.
- **`Chart configuration options`**
  Three option lists and a text field allow you to set the following parameters for a chart:
  - **Time Range**
    Select a time parameter option from the list, including an option that allows you to set a specific

time range using the **Edit Time Range** dialog box.

- **Title**
  Type a title for your chart in this text field. This title is displayed at the top of the generated chart.
- **Grid Lines**
  Select yes or no to show or hide grid lines on the history chart.
- **Histories pane**
  Select histories from this pane and drag them to the Current Charts pane, as desired. Histories are grouped under the station that they originate from.
- **Rollup**
  Use rollup options to create plots that display minimum, maximum, average, and the sum of values. Rollup settings allow you to chart data at various intervals using the two rollup option parameters:
  – Interval option
    The interval option allows you to choose an interval at which data is evaluated. Choose None if you do not want to use the rollup function.
  – Rollup option
    These options allow you to choose how the data is to be treated.
- **Current Charts pane**

- **Control** buttons
  The following buttons are located at the bottom of the view:
  - **Build** button
    Click this button to build the chart using the histories that are in the selected histories target area.
  - **Clear** button
    this button to remove histories from the selected histories target area.

The right side of the view contains the following fields and options for configuring the chart that you want to build:

Figure 5-4 shows an example of chart that displays two histories.

Figure 5-4 *History chart using chart builder view*

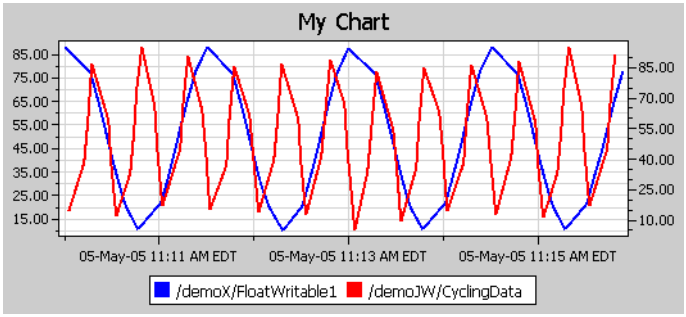
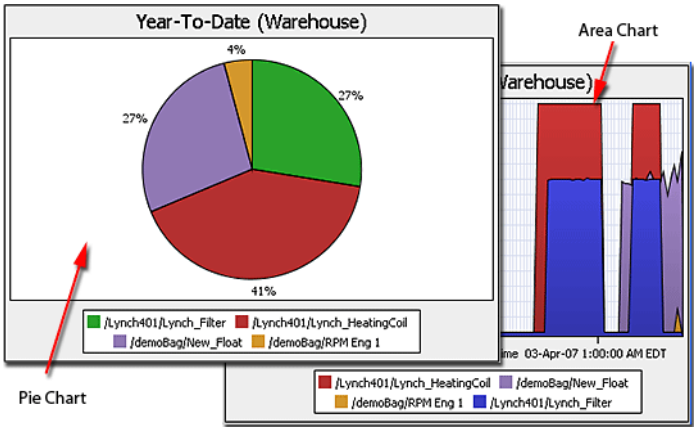


Figure 5-5 shows an example of a pie chart and an area chart.

Figure 5-5 *History "Pie Chart" and "Area Chart" created using chart builder view*

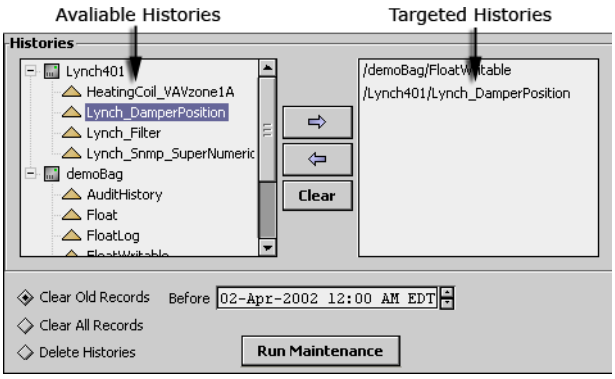


Refer to Refer to "Chart controls and options" on page 1-13 for more details about chart displays.

About the database maintenance view

The database maintenance view is shown in Figure 5-6. Using this view, you can clear records and delete complete histories from your history database.

Figure 5-6 *Database maintenance view*



The left side of this view contains the **`available histories`** pane. This pane displays all histories that are available in your local station or any station histories that are available via a network connection. Histories are grouped under the station according station name.

The right side of the **`Histories`** area contains the targeted histories pane. This pane displays the histories that are affected when you click the **`Run Maintenance`** button. Move the histories that you want to manage into this pane using the control buttons, as described below:

Controls and options for the database maintenance view are described in the following list:

- **Add history button (right arrow)**
  Click this button to move histories that are selected in the **`available histories`** pane to the targeted histories pane.
- **Remove history button (left arrow)**
  Click this button to remove histories from the **`targeted histories`** pane.
- **Clear Old Records option**
  Select this option and use the **`Before`** date selector to remove records, based on date, from the histories that are in the targeted histories pane.
- **Before date field**
  Use this field with the `Clear old records` option to set the year, month, day, and time parameters that you want to use for removing old records.
- **Clear all records**
  Select this option to delete all records from the selected history database. The actual history *file* is not deleted and remains in the pane.
- **Delete Histories**
  Select this option to delete all histories that are in the targeted histories pane. the history file is deleted and no longer appears in either of the panes.
- **Run Maintenance button**
  Click this button to execute the option that you have selected on the histories in the targeted histories pane.

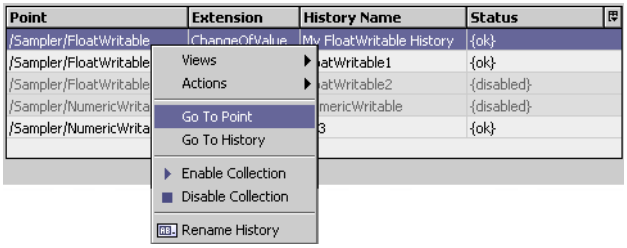
About the history manager view

The history manager view shows all points in your system that are configured for creating history files. Using this view as both a management and navigational tool, you can double-click on any entry-row to go directly to the property sheet view of that extension.

Note: *Many of the views available from the history manager view are typically used only by system engineers or system integrators. Not all of the properties and features available in these views are explained in this section but are described in the NiagaraAX User Guide.*

This table has the standard table features. Use the **`Table Options`** menu in the top right corner of the history table to modify the table view or to export the data in the view, as desired. Refer to "Common table view controls and display options" on page 1-12 for information about using the tabular view, including the **`Table Options`** menu.

Figure 5-7 *History manager view*



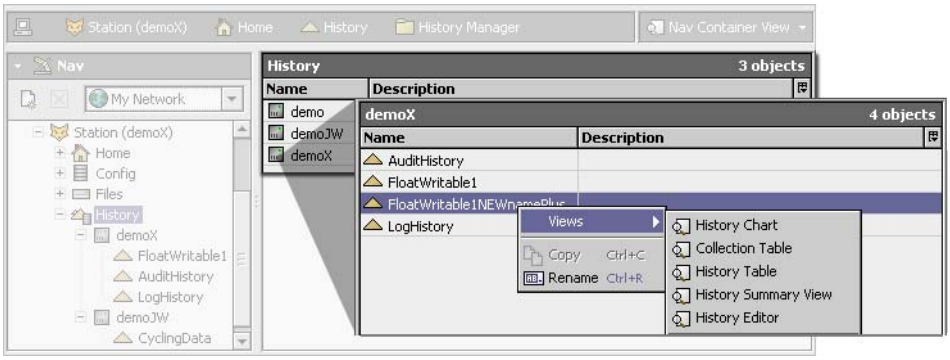
The history manager popup menu has the following items:

- **Views**
  This menu item provides a submenu that lists all the available views of the history manager.
- **`Actions > Update History Id`**
  This menu item provides a way to refresh the History Id after a rename. It applies the formatting property of the Name Format field to the Id of the history config Id.
- **Go To Point**
  This menu item displays the property sheet view of the point associated with the selected entry.
- **Go To History**
  This menu item displays the default view of the history associated with the selected entry.
- Enable Collection
  Select this menu item to enable (start the collection process) for the selected entries.
- Disable Collection
  Select this menu item to disable (stop the collection process) for the selected entries.
- Rename History
  Select this menu item to rename the selected history. This menu item displays the Set History Name dialog box. You can only rename one history at a time.

About the nav container view

The history nav container view is shown in Figure 5-8. This view displays a row for each available history file.

Figure 5-8 *Nav container view*

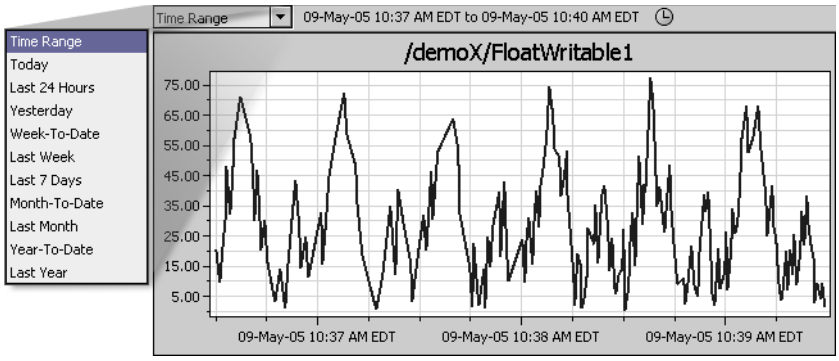


Double-click on any of the history rows to display the individual histories in the History Chart view. Or right-click on any history and switch to any other view of that history using the popup menu.

About the history chart view

The history chart view plots the data of the selected history log along x and y axes. An example of the history chart view is shown in Figure 5-9.

Figure 5-9 *History chart view*

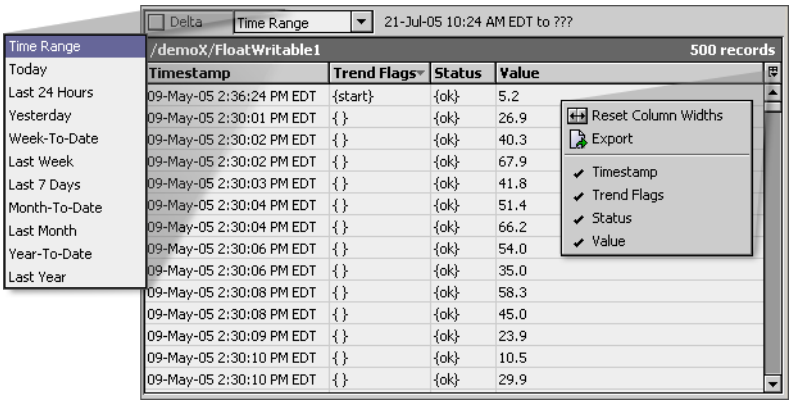


The history chart view contains the standard chart controls and options to help you customize and view the data. Refer to "Chart controls and options" on page 1-13.

About the history table view

The history table view displays history records with columns of data that you can customize by displaying or hiding selected columns. An example of the history table view is shown in Figure 5-10. Refer to "Common table view controls and display options" on page 1-12 for details about table controls and options that are common to many table views.

Figure 5-10 *History table view*



In addition to a title bar that displays the history name and number of records in the table, the history table has the following four columns that are described in "Types of history data fields" on page 5-3.

- **Timestamp**
- **Trend Flags**
- **Status**
- **Value**

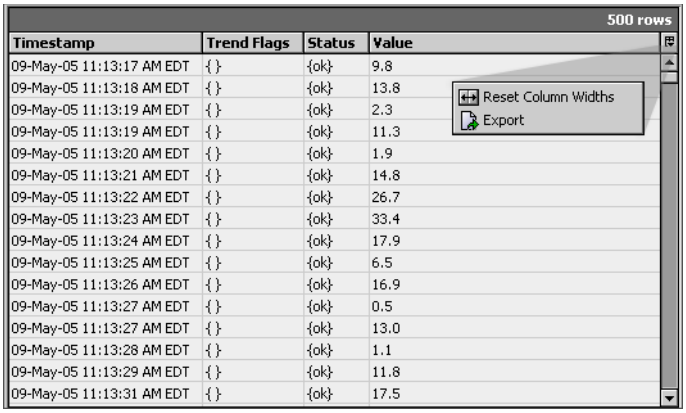
Use the **`Table Options`** menu in the top right corner of the history table to modify the table view or to export the data in the view, as desired. Refer to "Common table view controls and display options" on page 1-12 for a description of the **`Table Options`** menu.

About the collection table view

The collection table view displays records with columns of data that you can customize by displaying or hiding selected columns.

An example of the collection table view is shown in Figure 5-11.

Figure 5-11 *Collection table view*



In addition to a title bar that displays the number of rows in the table, the history table has the following four columns that are described in "Types of history data fields" on page 5-3.

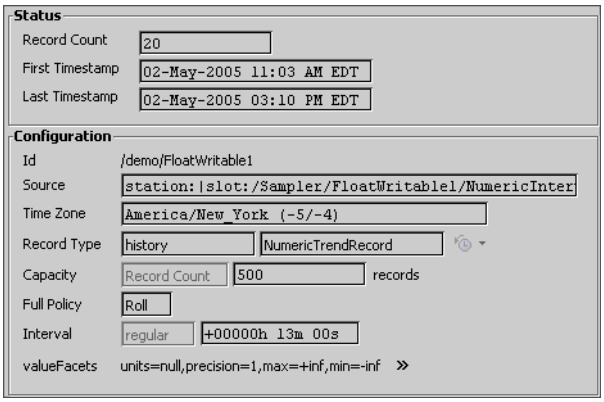
- **Timestamp**
- **Trend Flags**
- **Status**
- **Value**

Use the **`Table Options`** menu in the top right corner of the history table to modify the table view or to export the data in the view, as desired. Refer to "Common table view controls and display options" on page 1-12 for a description of the **`Table Options`** menu.

About the history summary view

The history summary view is shown in Figure 5-12. This read-only view displays the details of the history's status and configuration properties in two groups, as follows:

Figure 5-12 *History summary view*

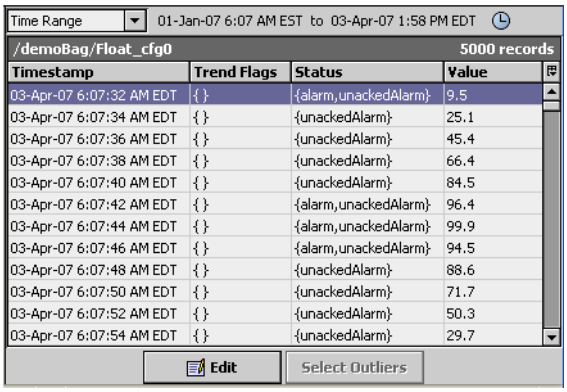


- **Status parameters**
  These parameters display data that is updated as of the time you select the history summary view.
  - **Record count**
    This is the current number of total records, as of the Last Timestamp.
  - **First Timestamp**
    This is the date, time, and timezone information for the initial history record.
  - **Last Timestamp**
    This is the date, time, and timezone information for the latest history record in the history file.
- **Configuration parameters**
  These parameters display data that identifies and characterizes the specific history. Configuration parameters are typically edited by a system engineer or system integrator.

About the history editor view

An example of the history editor view is shown in Figure 5-15. The history editor view allows you to edit data and filter histories. This view also allows batch editing (selecting multiple rows and using the popup menu or the Edit menu). Time range options allow you to filter data records, depending on settings that you specify in the Edit Time Range dialog box. You can also hide and unhide data records.

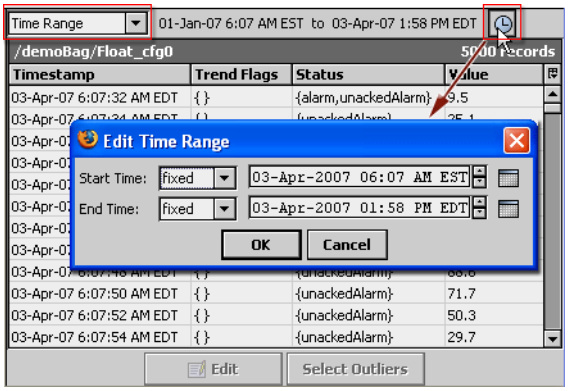
Figure 5-13 *History Editor - edit record data*



The history editor view is comprised of the following main areas:

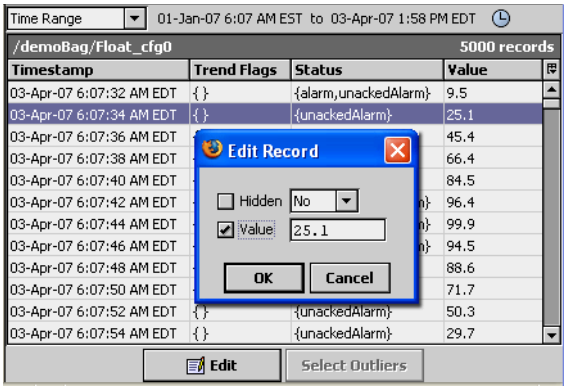
- **Title bar**
  The title bar area displays the history name and number of records in the history.
- **Time range options**
  This menu is located in the top left corner of the history editor view. You can select one of the pre-defined times or select the **`Time Range`** option that allows you to set a specific time range using the **`Edit Time Range`** dialog box.

Figure 5-14 *History Editor - set time range*



- **Table options menu**
  Use the **`Table Options`** menu in the top right corner of the history editor view to change which columns are displayed or to export the data in the view, as desired.
- **Table columns**
  In addition to a title bar that displays the history name and number of records in the table, the history table has the following four columns that are described in "Types of history data fields" on page 5-3.
  - **Timestamp**
  - **Trend Flags**
  - **Status**
  - **Value**
- **Control buttons**
  The following two control buttons are used to initiate record editing in the history editor view:
  - **`Edit`**
    This button is available when one or more records are selected in the history editor table. When you click **`Edit`**, the **`Edit Records`** dialog box appears, as shown in Figure 5-15.

Figure 5-15 *History Editor - edit record data*



- **`Select Outliers`**
  This button is not typically available for users. When it is available, it opens the **`Configure Outliers`** dialog box that allows you to set outlier filter parameters for filtering data in the history file.

History tasks

Following are common tasks that are performed using history files:

- To create a history chart using the Chart Builder view
- To edit history data (History Editor view)

To create a history chart using the Chart Builder view

The chart builder allows you to create a chart from one or more history files. Refer to "About the chart builder view" on page 5-4 for more details about the view.

To create a history chart in the Chart Builder view, make sure you have the Chart Builder view displayed and do the following:

Step 1 In the top of the Chart Builder view, specify information for the following four options, as desired:

- **Time Range**
  Select a time parameter option from the list. This includes an option that allows you to set a specific time range using the **`Edit Time Range`** dialog box.
- **Title**
  Type a title for your chart in this text field.
- **Show Grid Lines**
  Select `Yes` or `No` to show or hide grid lines on the history chart.
- **Rollup options**
  Select a rollup option from the dropdown list(s). Rollup options allow you to display data in different ways, depending on your Rollup option selections. Refer to "About the chart builder view" on page 5-4 for details about rollup options.

Step 2 In the Chart Builder view, from the **`Histories`** pane, drag one or more history files ( ) into the history **`Current Charts`** pane.

Each history file should display as a separate row in the **`Current Charts`** pane with a colored square indicating the plot color that is associated with it.

Step 3 For each history file that is represented in the **`Current Charts`** pane you can do any of the following, as desired:

- Click the plot color icon to change the plot color associated with the history.
- From the Chart Type option list, select the type of plot that you want to use for each individual history file (Line Chart, Area Chart, Pie Chart, or others).
- Click the "up" and "down" arrows, as desired, to rearrange the vertical order of the history files.
- Click the "delete" icon to remove a file from the **`Current Charts`** pane.
- Click the **`Clear`** button to remove all files from the **`Current Charts`** pane.

Step 4 Click the **`Build`** button to plot all history file data that is in the **`Current Charts`** pane.

The history chart displays in a Chart view.

To edit history data (History Editor view)

You can edit, hide, or unhide individual data values in a history file using the History Editor view. Refer to "About the history editor view" on page 5-9 for more information about this view.

To edit history data using the History Editor view, do the following:

Step 1 From the Nav Container view, right-click the history file that you want to edit and select **History Editor** from the popup menu.

The History Editor view displays a table of the selected history records.

Step 2 In the History Editor view, select the record or records that you want to edit.

Note: *If you want to apply the same edit simultaneously to more than one record, select multiple records using the Shift or Ctrl keys, as desired.*

Step 3 Click the **Edit** button at the bottom of the view.

The **Edit Record** dialog box appears.

Step 4 In the **Edit Record** dialog box, select and set the following options, as desired:

- **Hidden:**
  Choose `Yes` to hide the selected data. Choose `No` to show the selected data. Any change in the option list selects the associated option box and indicates the selection by placing a check in the option box. If you decide not to apply a change to this parameter, deselect the option by clearing the check box.
- **Value**
  Type in the desired data value in the text field. Any change in the text field selects the associated option box and indicates the selection by placing a check in the option box. If you decide not to apply a change to this parameter, deselect the option by clearing the check box.

Step 5 In the **Edit Record** dialog box, click the OK button.

The data is changed or hidden in all selected records. Records with changed values display a "modified" flag in the "Trend Flags" column of the history editor table. Hidden records display a "hidden" flag in the "Trend Flags" column.