ROCKWELL SOFTWARE

RSView Machine Edition™

ENTERPRISE SERIES

Machine-Level HMI for Open and Embedded Solutions

User's Guide

Rockwell Automation

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P Preface

Thank you for choosing RSView Machine Edition. RSView™ is an integrated package for developing and running automation projects.

Designed for use with Microsoft® Windows® 2000 and on RAC6182™ computers running Microsoft Windows CE 3.0, RSView gives you all the tools you need to create effective machine-level monitoring and control projects.

About the documentation

The RSView Machine Edition documentation set includes:

Release Notes: Information to read before you begin installing or working with the software.

RSView Machine Edition Installation Guide: A guide to installing and activating the various components of RSView.

RSView Machine Edition User's Guide: Comprehensive information about RSView, procedures for creating and running an automation project, and reference information.

Help: Online procedures and reference information.

Finding the information you need

You have many options for finding information about how to use RSView, or how to solve problems with RSView.

Try the User's Guide and Help first

The User's Guide and Help provide comprehensive information about typical uses of RSView. Chances are, your question is answered in the documentation.

To find the answer, use the table of contents and the index in the User's Guide and Help.

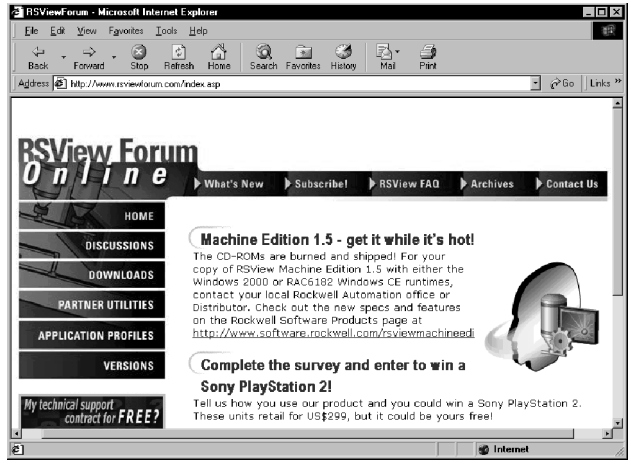
You can also perform a full-text search on both the Help and the .pdf version of the User's Guide. For information about using Help, see Chapter 5, "Getting the information you need," in the *RSView Machine Edition Installation Guide.*

Information on the Internet

If you can't find the answer to your question or problem in the User's Guide or Help, you can also find information on the World Wide Web.

The RSView Forum

http://www.rsviewforum.com



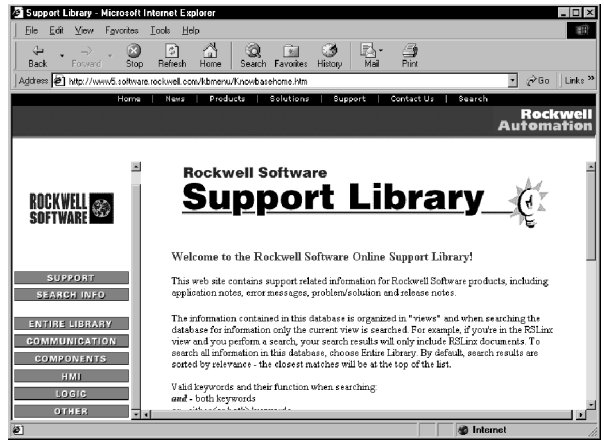
The RSView Forum is a web site for users like you. The RSView Forum offers:

- patches and updates that provide the latest fixes for problems in RSView
- an RSView frequently-asked questions (FAQ) list, for information about how to solve the problems our technical support teams encounter most often
- discussion groups, for exchanging tips and questions with other RSView users

- design resources, to help you put together graphic displays, and ready-made ActiveX® objects you can use in your own RSView projects
- information about what's new, including product announcements, new articles, and information provided by Rockwell Software

The Rockwell Software Support Library

http://www5.software.rockwell.com/kbmenu/knowbasehome.htm



The Rockwell Software Support Library is a comprehensive searchable database of support information for all Rockwell Software products.

You can also access the Support Library from within RSView Studio. To do so, you must have a web browser installed on your computer, and you must have an active Internet connection.

To access support pages from RSView Studio:

▶ On the Help menu, select Rockwell Software on the Web, and then click the name of the web page you want to view.

Contacting Rockwell Software Technical Support

If you can't find the answer to your question using any of the resources suggested above, contact Rockwell Software Technical Support at:

Telephone:	440-646-5800
Fax:	440-646-5801
World Wide Web:	http://www.software.rockwell.com ***or*** http://support.rockwellautomation.com

Support staff are available Monday to Friday from 8 AM to 5 PM Eastern Standard Time, except on statutory holidays.

When you call

When you call, you should be at your computer and ready to give:

- the product serial number

  You'll find this number on the Activation disk label and in the About dialog box that you access from the Help menu in RSView.
- the product version number
- the type of hardware you are using
- the exact wording of any messages that appeared on your screen
- a description of what happened and what you were doing when the problem occurred
- a description of how you tried to solve the problem

Chapter

1

Introducing RSView Machine Edition

RSView Machine Edition is software for developing and running human-machine interface (HMI) projects. RSView Machine Edition is designed for monitoring and controlling automated processes and machines.

For information about installing RSView Machine Edition, see the *RSView Machine Edition Installation Guide*.

The parts of RSView Machine Edition

RSView Machine Edition includes two products:

RSView Studio™ is configuration software for developing machine-level HMI projects. This software runs on the Windows 2000 operating system.

RSView ME Station™ is a stand-alone runtime environment for machine-level HMI projects. Use RSView ME Station to run the projects you develop in RSView Studio.

You can run machine-level projects on RAC6182 computers with the Windows CE 3.0 operating system, and on computers that use the Windows 2000 operating system.

Additional software

The RSView Machine Edition CD also includes two additional software products:

RSLinx™ for RSView Enterprise Series is software that provides communications to a wide range of direct drivers. RSLinx is an OPC™-compliant data server.

Adobe® Acrobat® Reader 5.0 is software for reading the online *RSView Machine Edition User's Guide*. If desired, you can also use the software to print the *User's Guide*.

The RSView Machine Edition tools

These tools are installed with RSView Studio:

- **Project Transport Wizard** is software for renaming, copying, deleting, backing up, and restoring projects.
- **Tag Import and Export Wizard** is software for importing or exporting the RSView tag database.
- **Transfer Utility** is software for moving a runtime machine-level project from the development computer to the RAC6182 terminal.

This tool is installed with RSView ME Station:

- **DeskLock** is software that prevents Windows 2000 users from exiting the RSView program at runtime. You cannot use DeskLock if you are running your project on a RAC6182.

Chapter

2

Exploring RSView Studio

This chapter describes:

- opening and closing RSView Studio
- opening sample projects
- exploring the RSView Studio main window
- using the Project Explorer
- working with editors
- entering information in spreadsheets
- working with components
- printing information in editors and components

Opening and closing RSView Studio

Opening RSView Studio

To open RSView Studio:

▶ On the Windows Start menu, select Programs, and then click RSView Studio.

RSView comes with several sample projects. We suggest you open the Malthouse sample project now to use while you try out the instructions in the remainder of this chapter. See the instructions on page 2-2.

Closing RSView Studio

To close RSView Studio:

▶ On the File menu, click Exit.

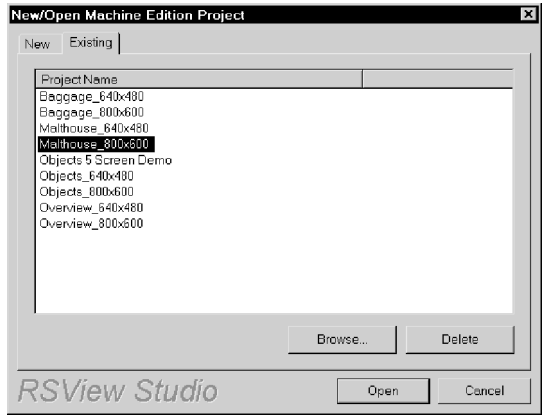
If there are any unsaved changes in open editors, RSView Studio asks you whether to save the changes before closing the program.

Opening sample projects

The sample projects are designed for two screen resolutions: 640 x 480 and 800 x 600. Select the project that matches the screen resolution of your runtime monitor.

To open the Malthouse sample project:

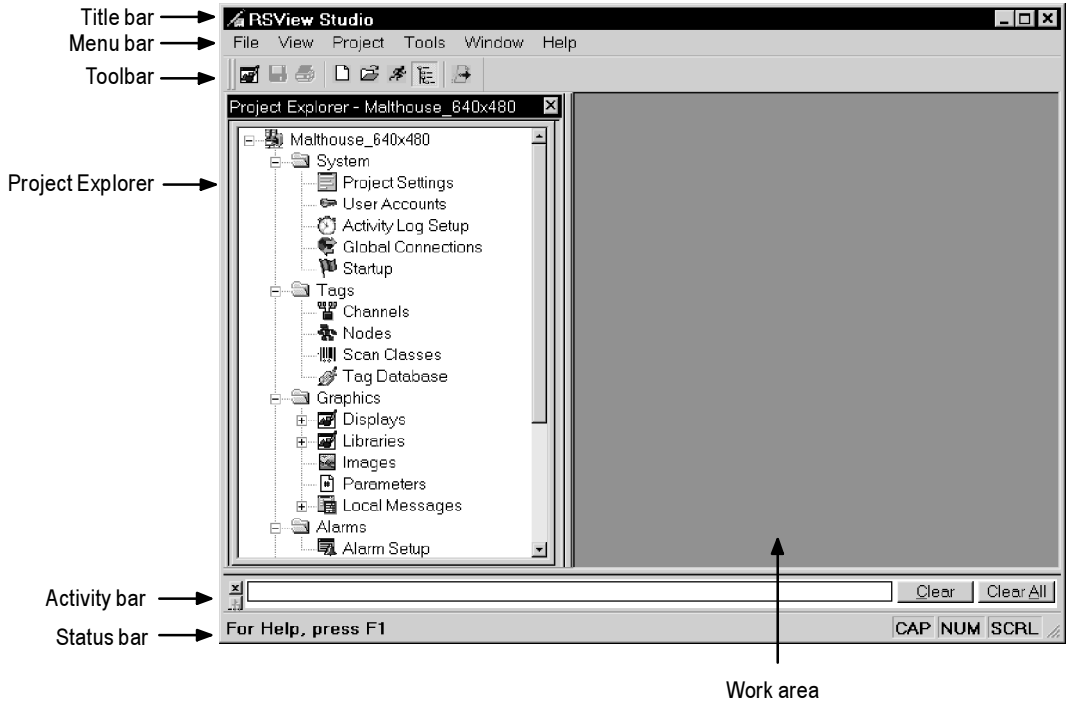
1. Open RSView Studio.



2. Click the Existing tab.
3. Click Malthouse_640x480 or Malthouse_800x600.
4. Click Open.

   RSView Studio displays the sample project in the Project Explorer.

Exploring the RSView Studio main window



The menu bar

The menu bar contains the menu items for the active window. Each editor has its own set of menus.

The toolbar

The toolbar contains buttons for commonly used menu items so you can quickly access the items without opening the menu. When you point to a button on the toolbar, the button name is displayed in a tooltip and in the status bar.

All editors use the Standard toolbar. The Graphics Display, Graphics Library, User Accounts, Nodes, and Tag Database editors have additional toolbars.

The Project Explorer

The Project Explorer contains the editors for creating and editing your project. For more information about the Project Explorer, see page 2-6.

The activity bar

The activity bar shows messages about system activities when you test your graphic displays. You can specify the types of messages to display in the activity bar, move the bar, resize it, and clear the messages in it.

For information about moving and resizing the activity bar, see page 8-6. For information about testing graphic displays, see page 8-9.

Messages in the activity bar

The types of messages that appear in the activity bar depend on how you set up activity logging on the development system. For information about specifying the types of activities to display, see page 15-2.

Activity messages are preceded by a white, yellow, or red icon. White indicates information, yellow indicates a warning, and red indicates an error.

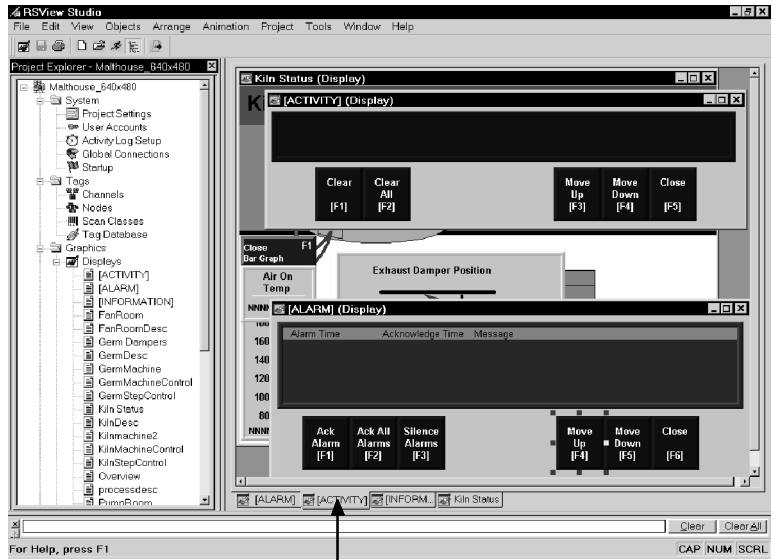
To clear the selected message in the activity bar, click Clear. To clear all the messages in the activity bar, click Clear All.

The status bar

The status bar displays information about the active window or about the selected tool or menu item. The information that is displayed depends on where the mouse pointer is. For example, when you select a graphic object in the Graphics Display editor, the status bar displays information about the selected object.

Workbook tabs

If you select Workbook Mode on the View menu, the work area displays tabs at the bottom for each open editor or component. Workbook Mode allows you to bring forward an open item more quickly than by using the Window menu.



Workbook tabs

Showing and hiding items in the main window

You can display or hide all the items in the main window (except the menu bar) by clicking the items on the View menu.

The status bar, Project Explorer, activity bar, and Standard toolbar are visible. Workbook Mode is turned off.

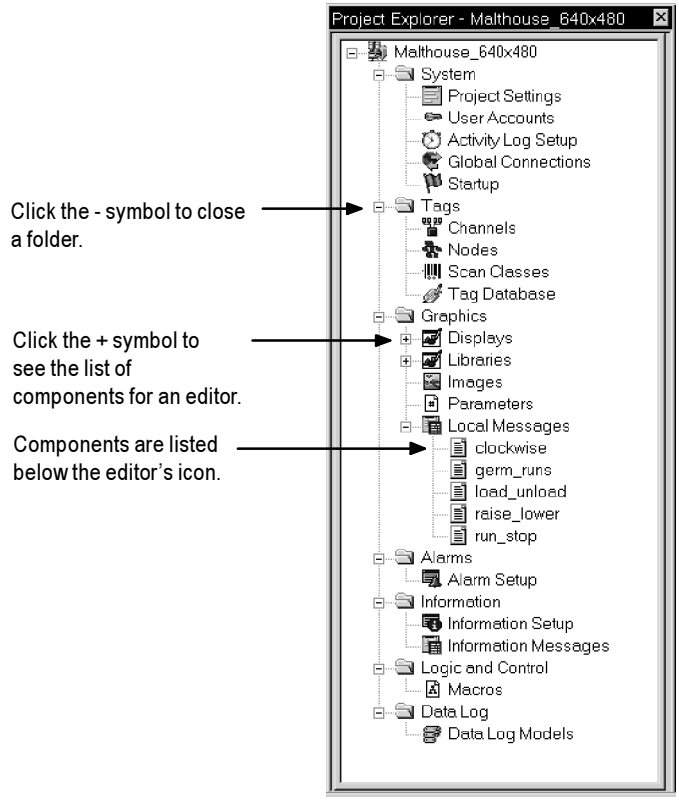
To hide or display the Project Explorer:

Explorer Window tool

- On the View menu, click Explorer Window, or click the Explorer Window tool on the toolbar.

Using the Project Explorer

The Project Explorer is the main tool for working with RSView Studio. It lists the editors you use to develop your project, as well as the components, such as graphic displays, you've created. When you create or open a project, the project name appears in the title bar of the Project Explorer.



You can resize the Project Explorer by dragging its edges.

Viewing the Project Explorer

You can view the Project Explorer in a number of ways:

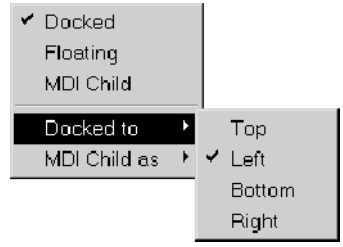
- As a docked window. When docked, the explorer is always on top of other windows that it overlaps. You can dock the explorer to any edge of the main window.
- As a floating window. When floating, the explorer is always on top of other windows that it overlaps, but you can move it to different locations in the middle of the main window.
- As a "child" window. When the explorer is in child mode, you can minimize the explorer or position other windows in front of it. This mode is particularly useful when you are working in multiple editors or working with the Help open.

  To put the explorer in child mode, right-click the Project Explorer title bar, and then click MDI Child.

Moving the Project Explorer

You can move the Project Explorer in a number of ways:

- Click the title bar and drag.
- Double-click the title bar to float the explorer in the middle of the main window, then drag it to a new position.
- Right-click the title bar, then select a new docking location, floating, or child mode.



Working with editors

When developing a project, you will use many different editors, but they have many similar features and often require similar information. Knowing how to use these features saves time.

For information on working with particular editors, see the chapters later in this guide.

Locating editors

The editors are grouped in folders in the Project Explorer (see the illustration on page 2-6). Each editor is displayed with an icon to the left of the editor name.

To open a folder in the Project Explorer:

▶ Click the + symbol to the left of the folder icon, or double-click the folder name.

Viewing an editor's components

With some editors you enter information in a single window or a tabbed dialog box. Other editors allow you to create multiple components, such as graphic displays or message files. Each component is stored in a separate file, with its own name.

You can create components in these editors:

- Graphics Display
- Graphics Library
- Parameters
- Local Messages
- Information Messages
- Data Log Models
- Macros

The Project Explorer lists the components you create under the icon for the editor you used to create the component.

You can use the Images editor to copy bitmap images into your project (but not to create new images). Each image you copy is listed as a component under the editor.

To view a list of components for an editor:

▶ Click the + symbol to the left of the editor icon, or double-click the editor name.

Opening editors

To open an editor:

▶ Right-click the editor, and then click Open or New.

If there are no components in the editor, you can double-click the editor to open it.

Closing editors

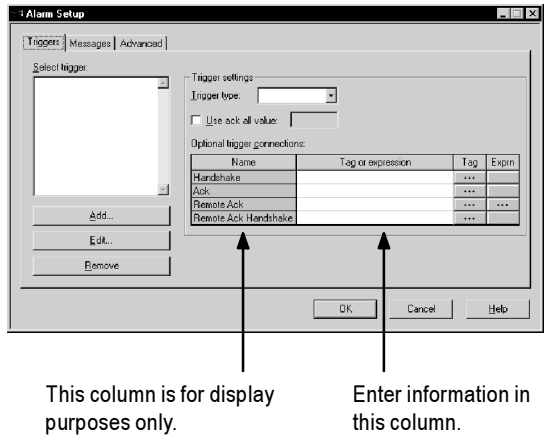
To close an editor:

- Click the close button on the editor's title bar, or on the File menu click Close.

  Some editors have an OK or Close button that you can click to close the editor.

Entering information in spreadsheets

Some editors contain spreadsheets for entering information. You can enter information in the white columns. Gray columns display information; you cannot enter information in them.



These editors contain spreadsheets:

- Nodes*
- Tag Database*
- User Accounts
- Global Connections
- Local Messages
- Alarm Setup
- Information Setup
- Information Messages
- Macros

* You cannot make changes in the spreadsheets in the Nodes and Tag Database editors. In these editors, you must use the Form section of the editor to create and edit components.

In the Graphics Display editor, many of the properties dialog boxes for configuring graphic objects contain spreadsheets for assigning tags or expressions to the objects.

To enter information in a cell in a spreadsheet:

- Click the cell, and then type the information. If the cell already contains text, the new information is added after the current text.

  In the Property Panel, double-click the cell and then type the information. If the cell already contains text, double-clicking highlights the text and typing replaces the highlighted text.

To move to the next cell in the row:

- Press Tab or Enter.

  The method to use depends on which editor you're working in.

To move to the first cell in the next row:

- Press Enter or Down Arrow.

  The method to use depends on which editor you're working in.

To delete a cell's contents:

- Click the cell, and then press Delete or Backspace. Pressing Backspace removes the characters one by one.

  The method to use depends on which editor you're working in.

Working with components

This section describes how to perform basic operations that are common to all components.

For information on working with components in particular editors, see the chapters later in this guide.

Creating components

To create a new component:

▶ Right-click the editor and then click New, or on the File menu select New and then click the type of component to create.

Opening components

To open a component:

▶ Double-click the component, or right-click the component and then click Open, or drag and drop the component from the Project Explorer to the work area.

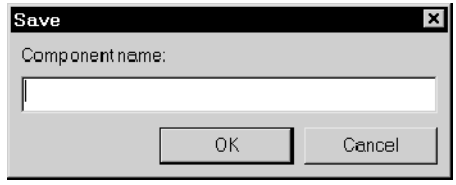
Saving components

Save tool

The Save tool is enabled when the active component contains unsaved changes.

To save a component:

1. On the File menu, click Save, or click the Save tool.

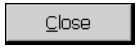


2. If this is the first time you're saving the component, type a name in the Component name box, and then click OK.

Closing components

To close a component:

Close button on title bar



Close button in component

▶ On the File menu, click Close, or click the Close button on the component's title bar.

Some components have a Close button that you can click to close the component.

Before the component closes you are prompted to save unsaved changes, if there are any.

Adding components into a project

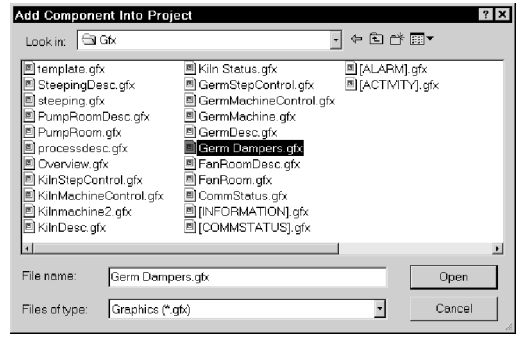
You can use the same components in more than one project by adding components into a project.

For example, if you want to use the same graphic display in Project A and Project B, create the display in Project A, then add the graphic display component from Project A to Project B.

When you add the component into Project B, changes you make to the component in Project B are not reflected in the component in Project A.

To add a component from Project A into Project B:

1. In Project B, right-click the type of editor that was used to create the desired component. For example, to add a graphic display component, right-click the Displays icon in the Graphics folder.
2. Click Add Component Into Project.



3. In the dialog box, navigate to the component to add (in Project A's folder), and then click the component's file name.

   Click and Shift-click to select a group of components, or Ctrl-click to select multiple individual components.

   For information about project folders and files, see Chapter 4.

4. Click Open. The components are listed under the editor in the Project Explorer in Project B.

If you later modify the component in Project A, you can add the component into Project B again using the same steps as described above.

Using Add Component Into Project with graphic displays and graphic libraries

The Add Component Into Project menu command is also useful for:

- adding graphic displays to your project's Libraries folder
- using libraries as graphic displays in your project

For information about graphic libraries, see page 8-16.

Deleting components

Deleting a component deletes it from the Project Explorer and from the hard disk.

To delete a component:

▶ Right-click the component, and then click Delete.

Removing components

You can remove a component from the Project Explorer but leave it on the hard disk, in case you want to use the component in another project.

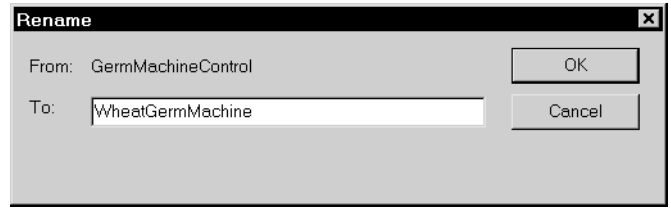
To remove a component:

▶ Right-click the component, and then click Remove.

Renaming components

To rename a component:

1. Right-click the component, and then click Rename.



2. In the To box, type the new name.
3. Click OK.

Duplicating components

The Duplicate option is useful for creating multiple similar components. For example, you could create a graphic display to use as a template, then duplicate the display each time you want to use the template.

To duplicate a component:

1. Right-click the component, and then click Duplicate.

2. In the Component name box, type a name for the duplicate component.
3. Click OK.

Printing

Each editor has a Print item on its File menu.

To print an editor or component's contents:

1. Open the editor or component.
2. On the File menu, click Print.
3. Click OK.

Selecting a printer

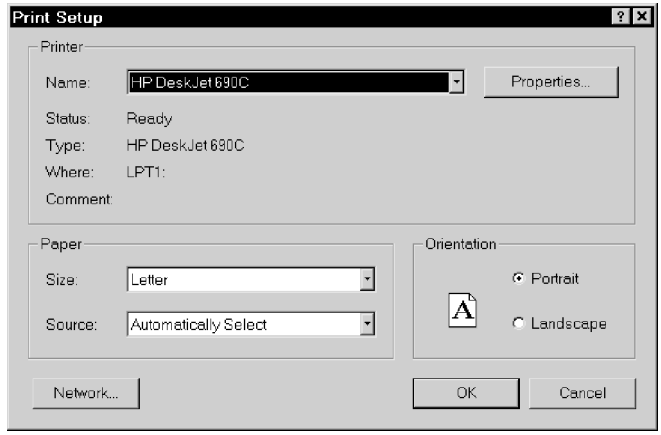
You must install a printer before you can select it. For information on installing a printer, see your Windows documentation.

IMPORTANT The Print Setup menu item in RSView Studio applies to your development computer only.

To print at runtime, set up a printer on the computer you'll be using to run your project. For information about printing at runtime, see page 2-15.

To select a printer:

1. On the File menu in any editor or component, click Print Setup.



2. If you don't want to use the default printer, specify another printer.
3. Choose the appropriate paper and orientation options.
4. Click OK.

Selecting printer setup options

For detailed information about printer options, refer to your Windows documentation.

Selecting a network printer

RSView Studio can print to a network printer. For detailed information about setting up network printers, refer to your Windows documentation.

Printing at runtime

You can print graphic displays at runtime using the Display Print button object or using a remote display print. You can also send activity and alarm messages to a printer at runtime.

For information about	See
Display Print buttons	Page 8-35
Printing graphic displays	Chapter 8
Printing displays remotely	Chapter 19

For information about	See
Printing alarm messages	Chapter 13
Printing activity messages	Chapter 15
Specifying the printers to use at runtime	Chapter 23

Chapter

3

Planning projects

A well-designed project requires planning. To help you plan, this chapter describes:

- understanding the machines and processes you're automating
- collecting data
- designing a tag database
- planning graphic displays and navigating between them
- planning alarms
- providing information for the operator
- using trends
- designing a secure system

RSView comes with several sample projects that can give you guidance when planning your project. For instructions on opening the sample projects, see page 2-2.

Understanding the process

Gather information from a variety of sources so you have a complete and detailed understanding of the machines and processes you're automating.

To gather information:

- Talk to machine operators and other experts who are going to use the system. Find out what information they need to optimize machine operations and processes.
- Talk to management and MIS (Management Information Systems) staff to find out what information they need to support planning decisions.
- Break up each section of the process into its constituent parts.
- Determine what type of communications you'll be using—OPC or direct driver.

- Determine which process variables need to be accessed and identify their locations in the programmable controllers.

For information about setting up direct driver communications, see Chapter 5. For information about setting up OPC communications, see Chapter 6.

Collecting data

When planning data collection, design your system so only essential data is collected. Limiting data collection is important because collection activities require substantial processing power and generate a lot of traffic on the communication channel or network.

Keep data collection requirements in mind when designing the layout of the programmable controller data tables and the tag database. Ideally, tag addresses should reference contiguous blocks of programmable controller data tables to reduce highway traffic and optimize system response. If you're going to use data from an OPC server, read the server documentation to find out how to optimize traffic.

Designing a tag database

Take the time to plan your tag database. A good design helps reduce the time required for maintenance and can improve programmable controller-to-RSView response time.

For information about creating a tag database, see Chapter 7.

Collecting information

Before you begin creating the database, collect:

- flowcharts of your processes (or process and instrument diagrams)
- a list of programmable controller data table or register addresses your project will be accessing
- machinery systems documentation
- alarm requirements (for more detail, see "Planning alarms," later in this chapter)

Organizing tags

Before creating tags:

- Develop naming conventions for tags, choosing names that are familiar and logical to everyone. This makes troubleshooting easier.
- Group related tags.

  Group tags in the way that makes most sense for your project. For example, group all similar devices or group related areas of the plant floor.

  When creating tags, place related tags into folders. For greater organization, nest folders.

Planning graphic displays

When planning displays, determine the best way for users to navigate through your displays and develop a template to establish a common look and feel for your displays.

Also consider factors about the runtime terminal that affect how the project is displayed and used, such as:

- screen size
- whether the operator will be using a keyboard, touch screen, mouse, or combination of navigation and data entry methods

For information about creating graphic displays, see Chapter 8.

Developing a hierarchy of displays

A hierarchy of displays is a series of graphic displays that provide progressively more detail as users move through them. Design your display hierarchy to meet the needs of the various users, including managers, supervisors, and operators.

Well-organized graphic displays present information clearly and consistently and guide users through the system. Before designing individual graphic displays, plan an overall display hierarchy and plan how users will navigate through the hierarchy.

For information about navigation methods and developing a hierarchy of displays, see Chapter 19.

Creating a template to ensure consistency

It is possible to keep a consistent appearance among all the displays in a project by presenting the same pieces of information in the same place on each graphic display. To ensure uniformity, develop a display with common elements that acts as a template. Each time you develop a new display, start with a duplicate of the template.

For example, the template could contain:

- company logo
- title
- date and time
- navigational buttons

The template does not use a special file format like a Microsoft Word template does, but is simply a graphic display that you duplicate for each new display.

When designing displays, applying good visual design principles helps users and increases their efficiency. Remember these important design principles:

Consistency

- Be consistent with your use of symbols and color.
- Be consistent with button labels and button placement.

  When you design several displays, place the same kinds of buttons in the same positions. For example, if you have a Start button in a certain position in one display, don't put a Stop button in the same position in the next display.

Clarity

- Use symbols that are easily recognizable. For example, use the conventional ISA symbols for tanks and valves.
- Don't overload the screen with information.
- Use standard, clear terminology, and avoid abbreviations or acronyms that the user might not understand.
- Use colors with recognizable meanings. For example, in North America the colors red and green usually mean stop and start. Keep color meanings consistent by assigning red only to Stop buttons, and green only to Start buttons.

Some people are color blind to red and green so don't rely on color alone to establish meaning.

- Use high contrast color combinations, such as yellow on blue.

Usability

- If you're designing for a touch screen, don't place important buttons where they'll be blocked by an On Top display. The user can't press a covered button. Also, ensure the button is large enough for users to touch easily.
- Ensure there is always a clear way to move between displays.

Planning alarms

Before setting up alarms, plan:

- what conditions will trigger alarms
- how operators will be notified of alarms
- what information you want alarm messages to contain
- how operators will respond to alarms

For information about setting up alarms, see Chapter 13.

Providing information for the operator

In addition to notifying the operator of alarm conditions, you can provide information and instructions about plant processes, and inform the operator about system activities.

Before setting up information notification, plan:

- what system activity the operator needs to be informed about
- what conditions will trigger information messages
- what information you want the messages to contain

Local and information messages

Use local messages to give the operator information in a specific graphic display while the display is open. Use information messages to give the operator information no matter which display is open.

For information about setting up local messages, see page 8-29. For information about setting up information messages, see Chapter 14.

Activity logging

Set up activity logging to notify the operator of system activity such as tag reads and writes, communication problems, macros, or problems opening displays.

For information about setting up activity logging, see Chapter 15.

Using trends

When planning trends, consider how they will be used. For example, will the trend be used to:

- analyze process trends?
- monitor production efficiency?
- archive process variables to ensure compliance with government regulations?

Based on such considerations, you can determine:

- which tags need to be plotted on the same trend
- which tags need to be logged by using a data log model

For information about setting up data logging, see Chapter 16. For information about creating trend graphic objects, see Chapter 17.

Designing a secure system

When deciding on your security requirements, consider whether to:

- restrict access to every graphic display to prevent accidental changes
- restrict access to certain graphic displays
- have everyone log on
- use the DeskLock tool to prevent users from switching to another application at runtime (Windows 2000 runtime projects only)

Based on these considerations, you can set up security for individual users or groups of users. For example, you might want to set up groups of users, such as a manager group and an operator group.

For more information about setting up security, see Chapter 18.

Chapter

4 Working with projects

This chapter describes:

- project files
- creating, opening, and closing projects
- copying, deleting, backing up, renaming, and restoring projects
- specifying project settings
- viewing project properties

What is a project?

A project is the software application you create in RSView Studio to monitor and control your plant processes.

During project development, the project consists of a folder on your hard disk that contains the main project file (with the extension .med) and a set of folders containing additional project files. The project folder is located in this directory:

C:\Documents and Settings\All Users\Documents\RSView Enterprise\ME\HMI projects

The .med file contains general project information such as a list of project components and the project's directory location and version numbers. You open this file to work on the project in RSView Studio.

When you create a project, some of the folders are empty until you start setting up your project. When you finish developing the project, RSView uses the information in the project's folders and files to create the runtime project.

The runtime project consists of a file with the extension .mer. For information about creating the runtime project, see Chapter 20.

Project files

The following table lists the project folders and the types of files they contain.

This folder	Contains	File extensions
Project name	Main project file and the folders described below	.med
Accounts	User account file	.act
ActivityLog	Activity log setup file	.alg
cache\RDMDATA	Internal communication files	.ctl, .dat, .idx
CommStatus	Internal communication file (created when you test run the project)	.stg
comprf	Internal information on channels, nodes, and scan classes	.csv, .ctl
DLG	Data log models (component files)	.mdf
Gfx	Graphic display component files	.gfx
GlobalConn	Global connections file	.gcn
Images	Image files	.bmp
Information	Information setup file Information message component files	.ifo .ifm
Local	Local message component files	.loc
M_Alarms	Alarm setup file	.mal
Macros	Macro component files	.mcr
PAR	Parameter component files	.par
Project Settings	Project setting file	.pts
Startup	Startup settings file	.stp
TAG	Tag database files Tag cache file	.crc, .ctl, .dat, .db .cac

Component file locations

Component files are located in folders in the project folder, as described in the previous table. For example, graphic display component files (with the extension .gfx) are stored in the Gfx folder.

External folders

The following table lists RSView folders that are external to the project folder, and the types of files they contain.

The folders are located in this directory:

C:\Documents and Settings\All Users\Documents\RSView Enterprise

This folder	Contains	File extensions
Images	Image files for use on graphic objects	.bmp
ME\Libraries	Graphic library component files and image files used in the library displays	.gfx .bmp
ME\Logs*Runtime Project Name*\Dlg*Data Log Model Name*	Data log files for projects that have run on the development computer	.log, .tag
ME\Logs*Runtime Project Name*\M_Alarms	Alarm log file for projects that have run on the development computer	.alm
ME\Runtime	Runtime project files	.mer
ME\HMI projects	Sample project folders, including all files and folders needed for the sample	

If desired, you can specify a different directory in which to store graphic library component files. For more information, see page 8-18.

Default log file locations for RAC6182 projects

On the RAC6182, alarm and data log folders are located by default in this directory:

\Storage Card\Rockwell Software\RSViewME\Logs\

Data log file locations

You can also store data log files in a different location on the runtime computer, on a networked computer, or on a PCMCIA card. For more information, see Chapter 16.

Naming files

File names, including the path, can be up to 200 characters long (file names can contain spaces). For example, the following path and file name contains 114 characters:

C:\Documents and Settings\All Users\Documents\RSView Enterprise\ME\HMI projects\Malthouse_640x480\Gfx\Steeping.gfx

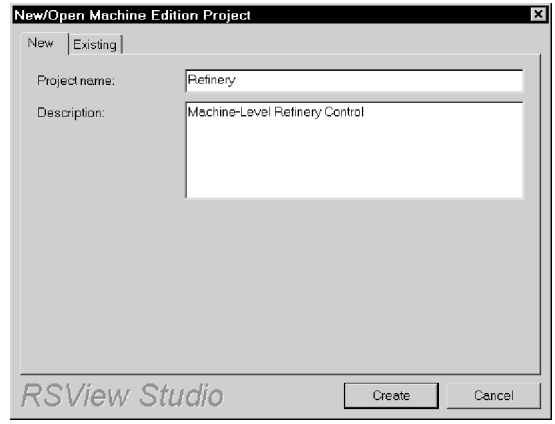
Creating, opening, and closing projects

Creating projects

You can create a new project when you open RSView Studio, or once RSView Studio is already open.

To create a new project when you open RSView Studio:

1. Open RSView Studio.



2. In the New tab, in the Project name box, type a name for your project.

   If desired, type a description of the project. If you don't type a description now, you can add one later, as described on page 4-14.

3. Click Create.

   RSView Studio creates the project's folders and files, and then displays the new project in the Project Explorer.

The project is created in the ME\HMI projects directory, in a folder with the same name as the project name.

This is the path to the ME\HMI projects directory:

C:\Documents and Settings\All Users\Documents\RSView Enterprise\ME\HMI projects

IMPORTANT Once you create the project, specify the project settings. These settings determine the general appearance of your runtime project, and affect how your graphic displays look. For more information, see page 4-7.

To create a new project when RSView Studio is already open:

New Project tool

1. On the File menu, click New Project, or click the New Project tool.

   If a project is already open, RSView Studio asks you whether to close the project that is currently open. Click Yes.

2. Follow steps 2 and 3 in the previous procedure.

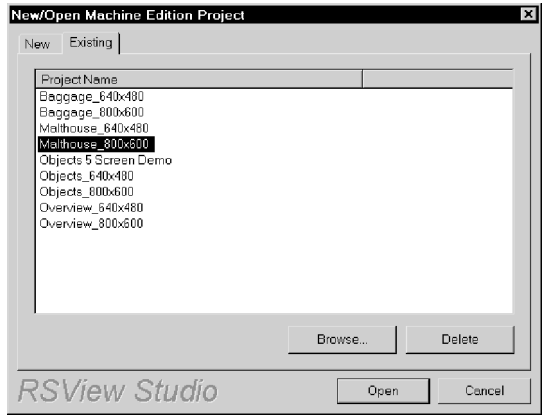
Opening projects

You can open a project when you open RSView Studio, or once RSView Studio is already open.

For information about opening a sample project, see page 2-2.

To open an existing project when you open RSView Studio:

1. Open RSView Studio.



2. Click the Existing tab, and then click the project to open.

   If the project you want to open is not displayed in the list, click Browse, navigate to the folder containing the project's .med file, and then click the file name.

3. Click Open.

   RSView Studio displays the project in the Project Explorer.

To open an existing project when RSView Studio is already open:

Open Project tool

1. On the File menu, click Open Project, or click the Open Project tool.

   If a project is already open, RSView Studio asks you whether to close the project that is currently open. Click Yes.

2. Follow steps 2 and 3 in the previous procedure.

To open a project you used recently:

- On the File menu, select Recent Projects, and then click the name of the project to open.

  If a project is already open, RSView Studio asks you whether to close the project that is currently open. Click Yes.

Opening multiple projects

To open two projects at the same time, for example to copy images and graphic objects between projects, open two instances of RSView Studio.

Closing projects

To close a project:

- On the File menu, click Close Project.

  If there are any unsaved changes in open editors, RSView Studio asks you whether to save the changes before closing the project.

To close a project and close RSView Studio at the same time:

Close button

- Click the Close button at the right end of the RSView Studio title bar.

  If there are any unsaved changes in open editors, RSView Studio asks you whether to save the changes before closing.

Copying, deleting, backing up, renaming, and restoring projects

Use the Project Transport Wizard tool to:

- copy projects
- delete projects
- create a compressed backup copy of the project, with the file extension .mea
- rename projects
- restore a project from the backup file

To start the wizard, do one of the following:

- In RSView Studio, on the Tools menu click Project Transport Wizard.
- On the Windows Start menu, select Programs, Rockwell Software, RSView Enterprise, Tools, and then click ME Project Transport Wizard.

For details about using the wizard, see the wizard's Help.

About project settings

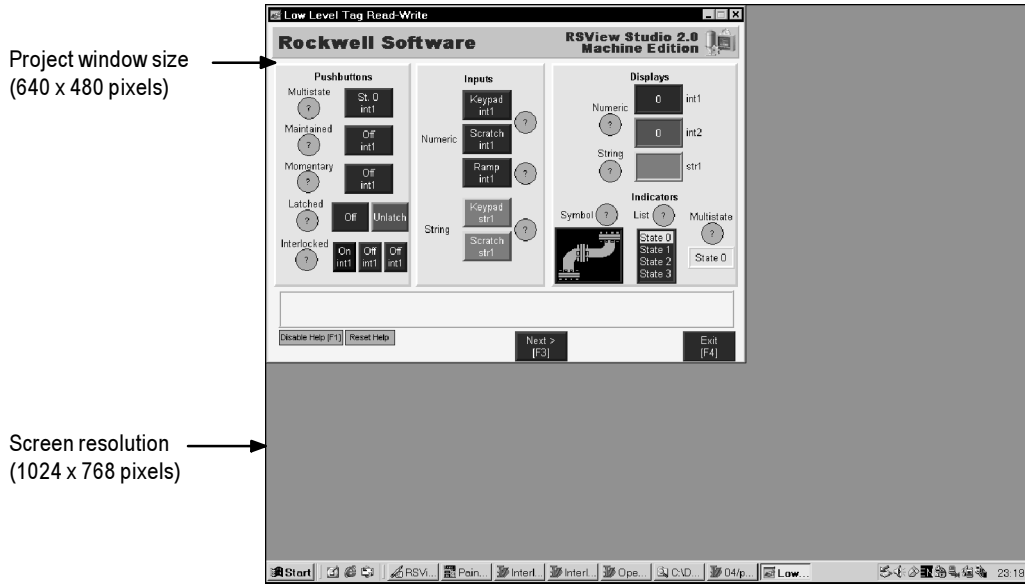
Project settings determine the general appearance of your runtime project, such as the size of the project window and whether a title bar appears in the project window.

Since project settings affect how your graphic displays look, specify the settings before creating graphic displays.

Project window size and runtime screen resolution

This section describes the difference between project window size and runtime screen resolution, and describes how these two settings can affect the behavior of your project at runtime.

The project window size is the amount of room your project occupies on the runtime terminal or computer screen, in pixels. The runtime screen resolution is the actual size of the runtime terminal or computer screen, in pixels. Therefore, the project window size must be less than or equal to the runtime screen resolution.



Usually, a project is designed to completely fill the runtime terminal or computer screen. If you want your project to do this, set the project window size to the resolution of the screen in pixels. For information on setting the project window size, see page 4-12.

Specify the screen resolution in the Display Properties dialog box in the Windows Control Panel of your runtime computer.

Changing the project window size after creating graphic displays

The project window size is used for all graphic displays of the Replace type. If you decrease the window size after you have designed any graphic displays, Replace displays are resized, but any objects in the displays remain the same size and in the same position as before. On Top displays are not resized.

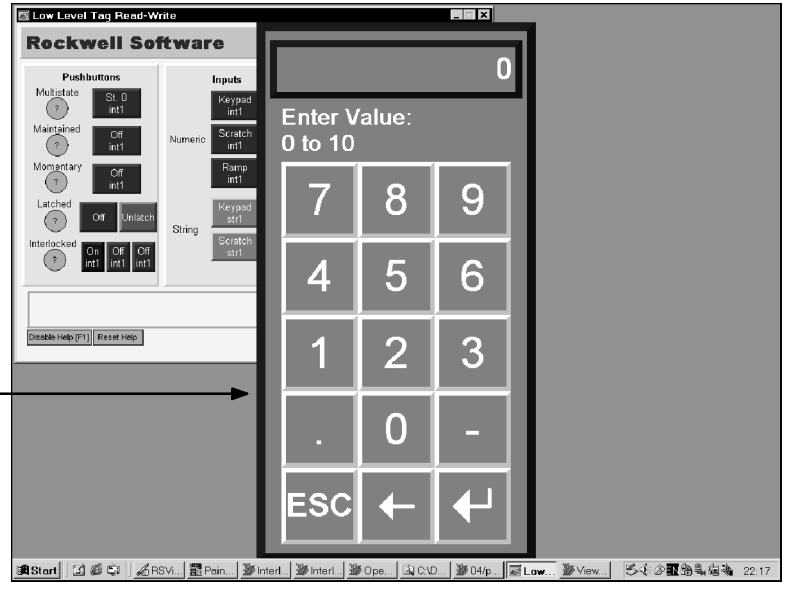
For more information about Replace and On Top displays, see page 8-10.

How the runtime screen resolution affects the pop-up windows

RSView comes with a pop-up Login window, as well as numeric and string pop-ups for runtime data entry. You cannot control the size or position of these pop-up windows. If you plan to use the Login window or numeric or string pop-ups at runtime, the runtime screen resolution must be at least as big as the minimum size for the pop-ups that you want to use.

Pop-up	Minimum width in pixels	Minimum height in pixels
Login window	280	84
Numeric pop-up keypad	124	240
Numeric pop-up scratchpad	124	68
String pop-up keyboard	236	208
String pop-up scratchpad	236	64

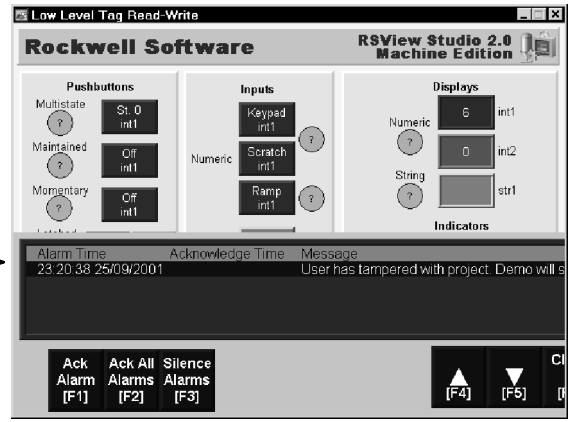
RSView automatically sizes the pop-ups based on the runtime screen resolution. If the runtime screen resolution is smaller than the minimum pop-up size, the pop-up cannot open at runtime.



RSView sizes the pop-up to occupy the center of the screen

How the project window size affects the default message displays

Your project comes with preconfigured, default graphic displays for activity, alarm, and information messages. If the project window size is smaller than the default displays, the edges of the displays are cut off at runtime.



The right edge of the [ALARM] display is cut off.

These are the sizes of the default displays:

Graphic display	Width in pixels	Height in pixels
[ACTIVITY]	640	160
[ALARM]	640	215
[INFORMATION]	640	80

If your project window size is smaller than the default message display sizes, you can resize the displays, or use your own displays instead.

Title bar

If you select this option, a title bar is used for all Replace graphic displays. For information about graphic display types, see page 8-10.

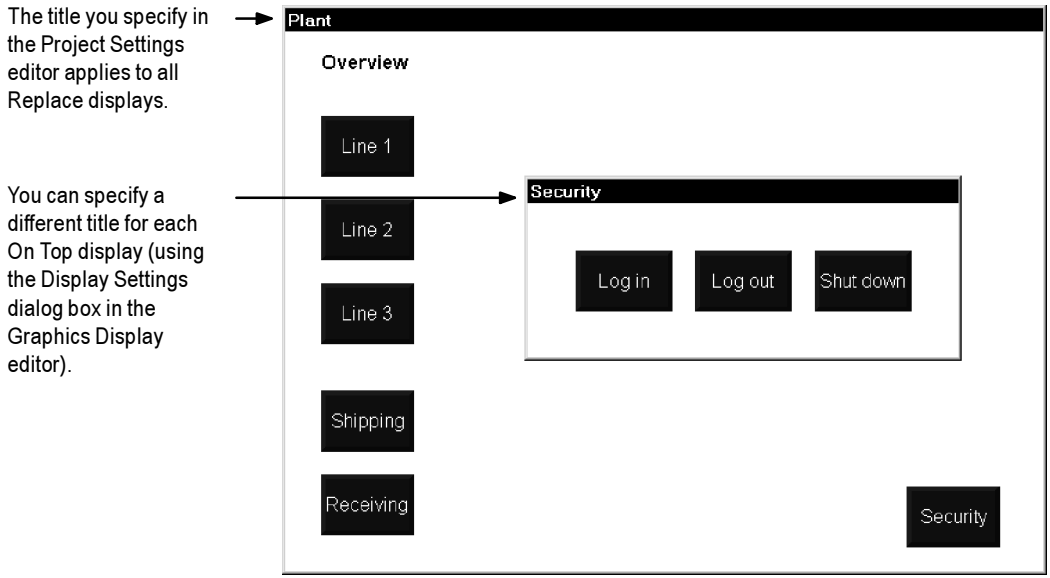
If desired, you can also use a Control box, Minimize button, and Close button on the title bar. The Close button appears only if you select the Control box in the Project Settings editor.

If you plan to set up security for your project and want to prevent unauthorized users from stopping the project, do not use a title bar.

For information about setting up security, see Chapter 18.

Title bar for On Top displays

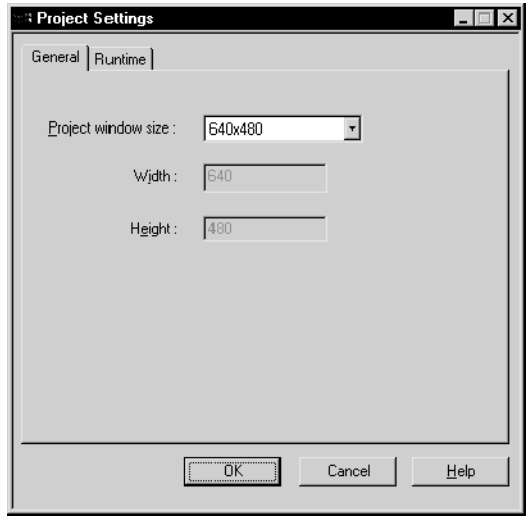
For On Top displays, you can specify a different name to use in the title bar. Use the Display Settings dialog box to specify the name (for details, see page 8-10).



Specifying project settings

To specify project settings:

1. Open the Project Settings editor.

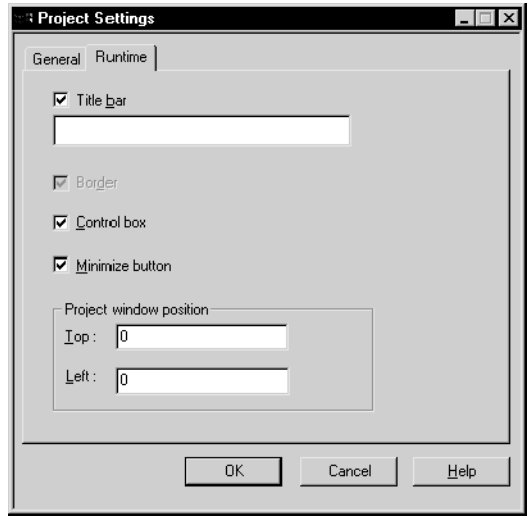


2. In the General tab, specify these settings:

Project window size
Select a standard window size, or to use a different size, select Custom size.

Width
If you select Custom size, type the width of the window in pixels.

Height
If you select Custom size, type the height of the window in pixels.



3. Click the Runtime tab, and then specify these settings:

Title bar
Select this check box to display the name of the project (or other title) in a title bar at the top of the window. Type the title in the box below the check box.

If you select this option, the window border is automatically displayed with the title bar.

Border
Select this check box to display a border around the project window. If you select Title bar, this option is selected automatically.

Control menu

Control box
Select this check box to display a Control box at the left end of the title bar. The user can click the Control box to display the Control menu, which contains options for displaying, moving, sizing, and closing the window.

If you select this option, a Close button appears at the right end of the title bar.

This option is available only if you select Title bar.

Minimize button
Select this check box to display a Minimize button at the right end of the title bar. The Minimize button reduces the window to an icon.

This option is available only if you select Title bar and Control box.

Project window position
Type the number of pixels from the top left corner of the screen to position the window. If the project window occupies the whole screen, accept the default values of 0.

4. Click OK to save the settings and close the editor.

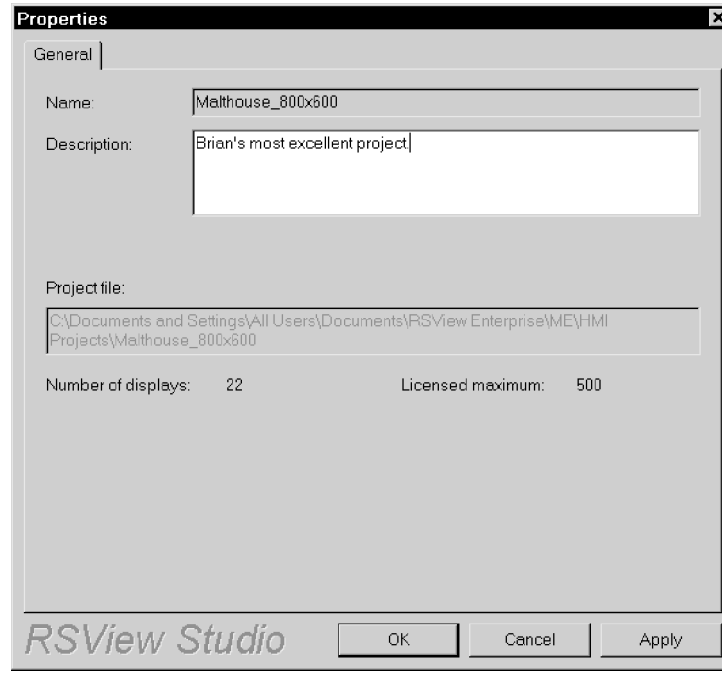
Viewing project properties

You can use the Project Explorer to view this information about your project:

- Project name
- Project description, if any
- Location of the project file
- Number of graphic displays in the project
- Maximum number of displays you're licensed to use

To view project properties:

1. In the Project Explorer, right-click the project name (at the top of the Explorer tree), and then click Properties.



2. If desired, enter or modify the description for the project.

Chapter

5

Setting up direct driver communications

This chapter describes:

- when to use direct driver communications
- how the communication channel, network, device, driver, and nodes work together
- steps for setting up direct driver communications
- configuring channels
- creating direct driver nodes
- configuring scan classes
- monitoring communications

When to use direct driver communications

Use direct drivers to communicate with Allen-Bradley controllers over these network types:

- DH+™
- DH-485
- TCP/IP (Ethernet®)
- ControlNet™

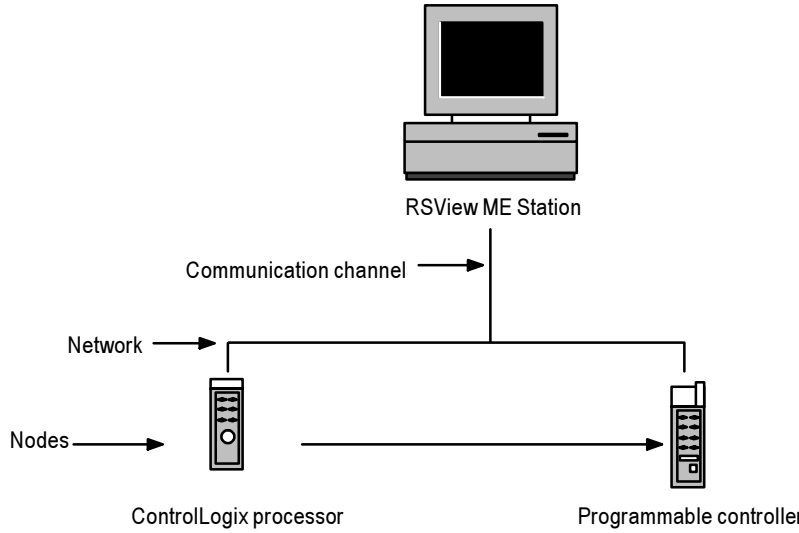
Use OPC (OLE for Process Control) to connect to third-party devices or servers. For details, see Chapter 6.

Overview of direct driver communications at runtime

Communication through direct drivers involves:

- channels
- communication devices
- communication driver software
- nodes (control devices)

The following illustration shows an RSView ME Station installation and its channel and nodes.



Communication channel

The communication channel is the connection from RSView ME Station computer through the network to the data source.

A data source can be memory or a device such as a programmable controller or OPC server. However, you don't need to use channels to communicate with memory tags or OPC servers. Channels are required for communication with direct driver devices only.

When you configure a channel you specify the network type and the communication driver that the runtime computer uses.

Communication device

The communication device is a piece of hardware that connects the runtime computer to the communication channel.

You can use these communication devices with RSView ME Station:

- serial port
- Ethernet port
- Allen-Bradley card in the PCI or ISA slot

The network type and communication driver to use depends on the communication capabilities of the device connected to the runtime computer. See the table in the next section.

For installation information, see the documentation that comes with the communication device you're using.

Communication driver

The communication driver is the software that permits the runtime computer to communicate with the communication device.

Windows 2000

For projects that will run on the Windows 2000 operating system, see RSLinx for a list of available driver types and devices.

RAC6182

For projects that will run on the RAC6182, you can use these communication drivers:

Use this driver	For this network type	Using this device
AB_DF1-1	DH+	RS-232 serial port connected to a KF2 box, or connected directly to a DF1 serial port on a device
AB_ETH-1	TCP/IP: 10Base-T or 100Base-TX Ethernet	RJ45 connector (Ethernet port), communicating with a PLC-5
AB_KT-1	DH+ or DH-485	A-B 1784-PKTX card in the PCI slot

Using SoftLogix 5 controllers

You can use SoftLogix™ 5 controllers with Windows 2000 projects only.

To communicate with a SoftLogix 5 controller using RSLinx and RSView, configure a TCP/IP channel and use one of these drivers:

- SOFT5 driver
- AB_ETH driver.

Configuring the SOFT5 driver

For the SOFT5 driver, when configuring the SoftLogix 5 driver in RSLinx, enter the IP address or UNC name of the SoftLogix 5 controller in the Station Mapping tab.

If the SoftLogix 5 controller is not running on the same computer as RSLinx, the Windows 2000 user account that is running RSLinx must be a member of the SoftLogix Administrators group on the SoftLogix 5 computer.

Configuring the AB_ETH driver

For the AB_ETH driver, when configuring the Ethernet driver in RSLinx, enter the IP address of the SoftLogix 5 controller in the Station Mapping tab. You must also enable the WinSock TCP/IP driver in SoftLogix 5.

Drivers on the development system versus drivers on the RAC6182

The Transfer Utility that you use to download the project to the runtime computer uses an RSLinx driver on the development system. This driver is used for the transfer only.

Therefore, you must configure an RSLinx driver on the development computer when you download the project to the runtime computer, then configure a driver on the RAC6182 before starting the project.

If you will be using an Ethernet network to communicate at runtime, you don't need to configure the communication driver on the RAC6182. If you will be using a DH+ or DH-485 network, you must enable the appropriate communication driver and ensure that it is configured correctly before you begin running your project.

For information about configuring an RSLinx driver for the download, see Chapter 21. For information about configuring a driver on the RAC6182, see Chapter 23.

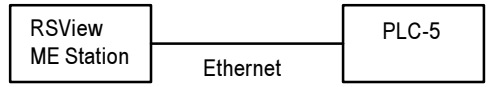
Node (control device)

The node is a data source attached to a network. When your project is running, RSView must periodically update tag values in the value table. This is done by scanning the nodes.

When you configure a node you specify the channel the node is on, its station address, and the type of node (for example, PLC-5®).

Example: Configuring communications with a PLC-5

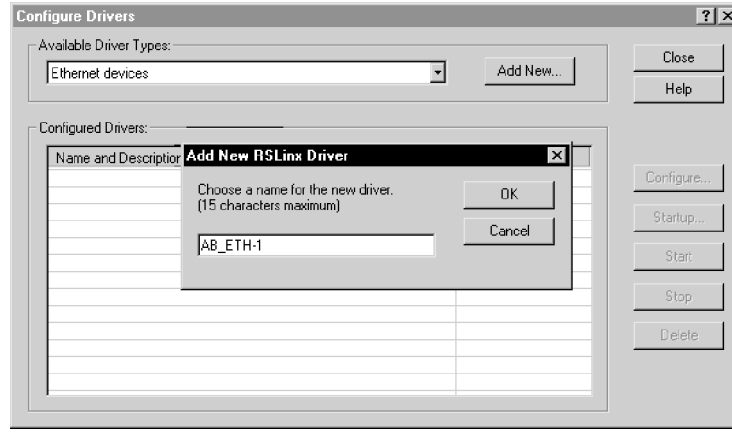
This example shows how to set up communications via Ethernet to a PLC-5.



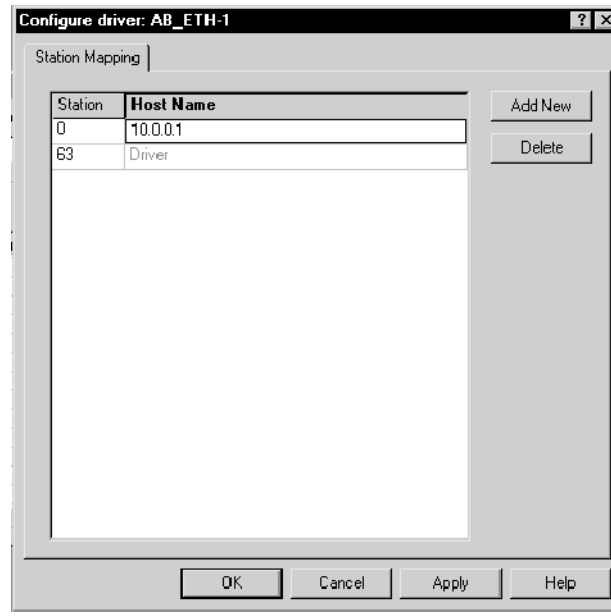
Adding an RSLinx device driver

Use RSLinx to configure the Ethernet driver AB_ETH-1:

1. In RSLinx, on the Communications menu, click Configure Drivers.



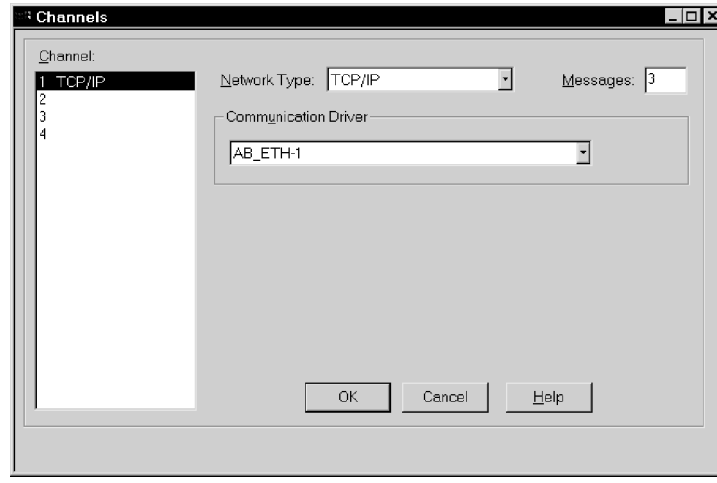
2. In the Available Driver Types box, select Ethernet devices, and then click Add New.
3. In the Add New RSLinx Driver dialog box, accept AB_ETH-1 by clicking OK.



4. In the Host Name column, type the IP address of the PLC-5, and then click OK.
5. Click Close to close the Configure Drivers dialog box.
6. Close RSLinx.

Setting up a channel in RSView Studio

Use the Channels editor to set up a TCP/IP channel.

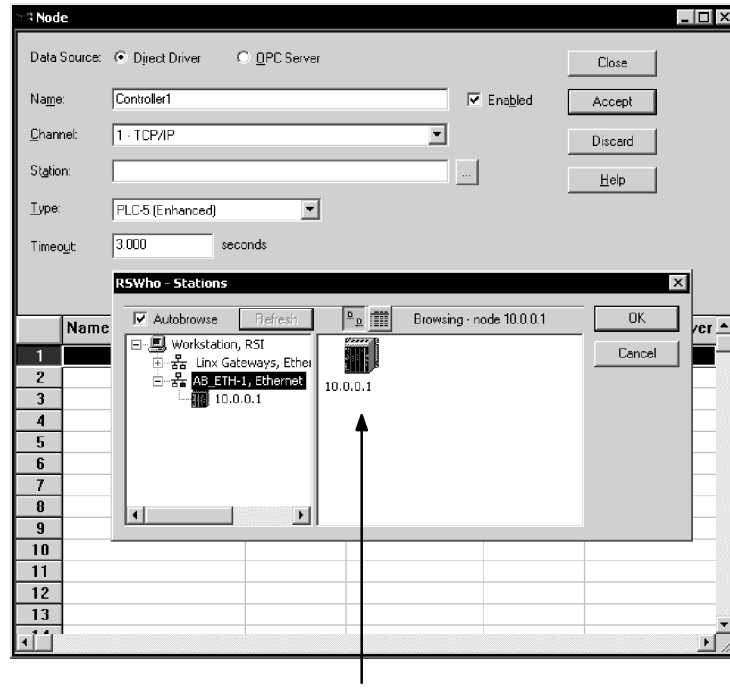


1. In the Channels editor, select a channel, and then select the TCP/IP network type.
2. In the Communication Driver box, select the Ethernet device driver, AB_ETH-1, and then click OK.

Creating a node

Use the Nodes editor to set up a direct driver node to connect to the PLC-5:

1. In the Nodes editor, create a direct driver node called Controller1.



Click the PLC-5 to select it.

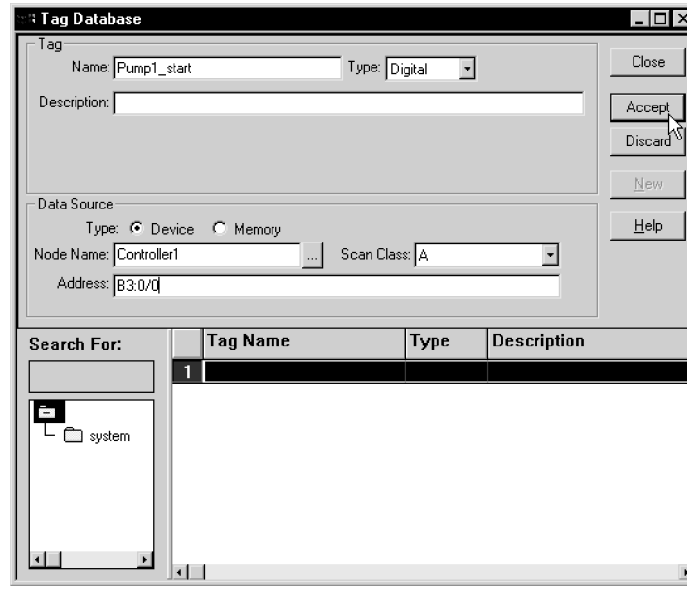
Browse button

2. Select the TCP/IP channel you created, and then click the Browse button beside the Station box.
3. In the RSWho dialog box, browse the AB_ETH-1 driver to the PLC-5.
4. Click the IP address for the PLC-5 (in either pane), and then click OK.
5. In the Type box, select PLC-5, and then click Accept.

Creating a tag

Use the Tag Database editor to create a tag that uses the node you just created:

1. In the Tag Database editor, create a digital tag named Pump1_start.



Browse button

2. Select Device as the data source, click the Browse button next to the Node Name box, and then select the Controller1 node.
3. In the Address box, type the address in the PLC-5: B3:0/0.
4. Click Accept to save the tag.

If desired, you could create additional tags to connect with other addresses in the PLC-5.

Setting up direct driver communication to programmable controllers

The instructions below summarize the steps for setting up direct driver communication with programmable controllers.

You can set up communications in RSView even if you do not have communication drivers and communication hardware installed.

Summary of steps

1. Start RSView Studio and create or open a project.
2. In the Channels editor, select a channel and assign the appropriate network type to it.

In the Communication Driver box, assign a driver to the channel. If you do not have drivers loaded on the development computer, select None Loaded.

For details, see page 5-11.

3. In the Nodes editor, create nodes for each programmable controller you wish to communicate with.

   For details, see page 5-15.

4. If you want to change the default rate at which tags are scanned, open the Scan Classes editor and edit the scan classes.

   For details, see page 5-17.

5. In the Tag Database editor, create tags. For each tag, select Device as the data source and assign the nodes and scan classes that you have defined.

   For details, see Chapter 7.

6. Set up communication monitoring.

   For details, see page 5-19.

7. Develop the other features of your project.

   For details, see the chapters in this book relating to the features you plan to use.

8. Create the runtime project.

   For details, see Chapter 20.

9. Transfer the runtime project to the runtime computer.

   For information about transferring projects to the RAC6182, see Chapter 21. For information about transferring Windows 2000 projects, see Chapter 22.

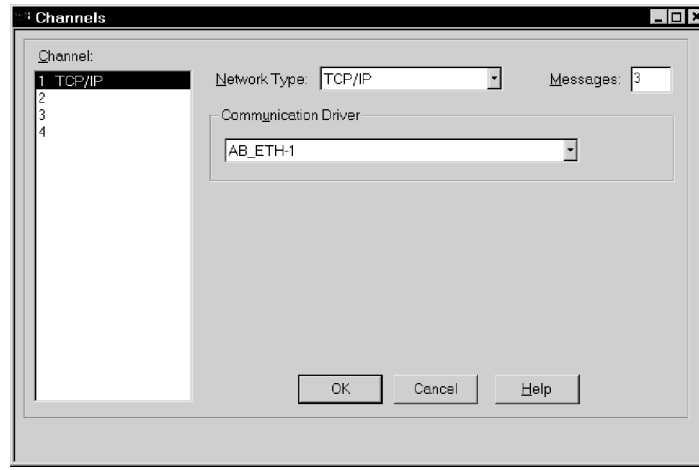
10. Configure the communication driver in RSView ME Station.

    For details, see Chapter 23.

Configuring channels

To configure a channel:

1. Open the Channels editor.



2. Select a channel, and then fill in this information:

Network Type
If you don't want to use the channel, or want to clear a channel configuration, select Unassigned.

Otherwise, using the table as a guide, select a network type.

You can use direct drivers to communicate with ControlLogix processors if you map the ControlLogix addresses to the equivalent PLC-5 addresses. For information about PLC-5 addressing syntax, see Appendix B.

To communicate with ControlLogix processors using their native addressing, use an RSLinx OPC server. For more information, see page 6-4.

To communicate with this controller	Select
▪ PLC 5/C ▪ SLC 5/03™, SLC 5/04™, or SLC 5/05™ (through bridging modules) ▪ ControlLogix processors (with PLC-5 mapping)	ControlNet
▪ PLC-5 ▪ SLC 5/04 (specify the controller as a PLC-5 in RSLinx) ▪ ControlLogix using 1756-DHRIO card (with PLC-5 mapping)	DH+
▪ SLC™ controllers ▪ MicroLogix™ controllers	DH-485
▪ PLC-5E ▪ SLC 5/05E ▪ ControlLogix (with PLC-5 mapping; Windows 2000 projects only) ▪ SoftLogix 5 (Windows 2000 projects only. For details, see page 5-3.)	TCP/IP

IMPORTANT If you set up channels for both DH+ and DH-485, at runtime make sure the driver is configured for the channel you are using. You can configure only one driver at a time for these network types, because both use the same card but with different settings.

Messages

Type a number between 1 and 10. This specifies the maximum number of outstanding messages (that is, programmable controller reads and writes) RSView sends to a channel before sending new requests and waiting for a reply.

These messages are stored in the buffers of the programmable controllers on the channel (each controller has its own buffer). If a buffer overflows at runtime, a communication error is generated. If this happens, reduce the number of messages. For example, some older programmable controllers can handle only one message at a time.

Communication Driver

Select the driver that is appropriate for the type of network you will be using.

For details about the drivers you can use, see page 5-3.

To configure communications without the appropriate hardware or software installed, select None Loaded as the driver, and then assign a driver to the channel when you start the project at runtime.

Or, you can add the driver in RSLinx even though the hardware is not installed (just disregard the error messages in RSLinx). This will allow you to select the correct driver when you set up your channel.

3. When you finish configuring channels, click OK.

Changing the channel configuration

To change the channel configuration once nodes have been assigned—for example, to move a project from a computer using DH+ to a computer using TCP/IP—create a new channel of the correct type. Re-assign the channel number for each node, and then delete the original channel.

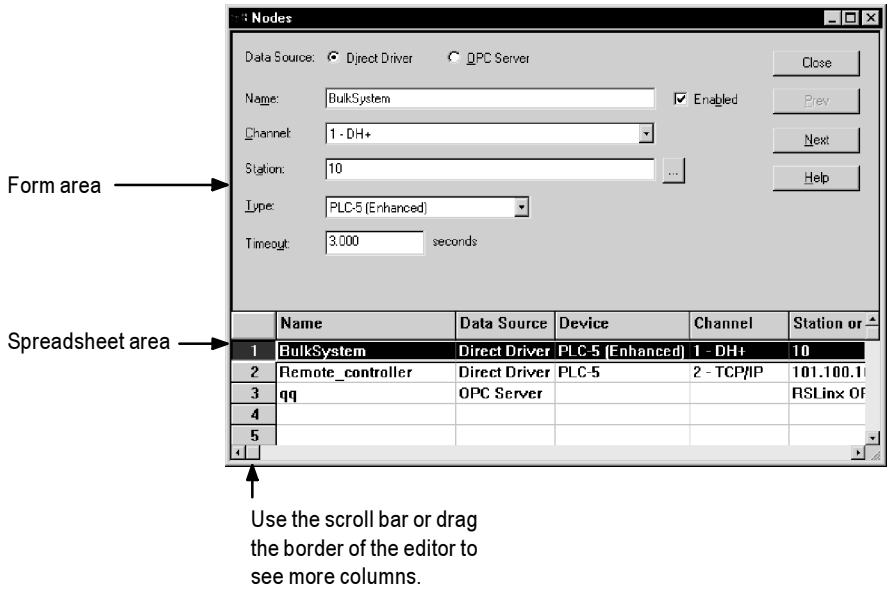
Editing channels at runtime

You can change a channel's configuration on the runtime computer. For example, if you set up a channel without specifying a communication driver, you can specify the driver at runtime. For more information, see page 23-3.

Using the Nodes editor

A node allows you to assign a logical name and address to each data source you want to communicate with. Each data source is then referred to throughout RSView by the node name.

Use the Nodes editor to set up nodes for each data source the project will communicate with at runtime.



The information you enter in the form area is displayed in the spreadsheet area.

Using the View menu

Use the items on the View menu to control the appearance of the Nodes editor.

To do this	On the View menu, click this
Show or hide the spreadsheet area	Spreadsheet
Show or hide the form area	Form
Change the font used in the spreadsheet area	Spreadsheet Font. In the Font dialog box, specify the font, style, and size to use.
Restore the default font	Restore Default Settings

Using the Accept and Discard buttons

When you enter information, the Prev and Next buttons change to Accept and Discard buttons. Click Accept to save node information. Click Discard to cancel changes to a node.

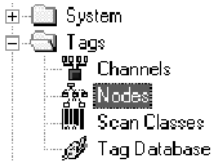
Using the tools

The Nodes editor has these tools for working in the editor:

Use this tool	To do this
Delete	Delete the selected node.
Duplicate	Create a duplicate of the selected node, with all the same settings, except that the name is blank.
Insert Row	Insert a blank row above the selected row.

Creating direct driver nodes

Before you can create a node, you must set up communication channels. For details, see page 5-11.



To create a node:

1. Open the Nodes editor.
2. If the editor already contains node definitions, click the last (blank) row in the spreadsheet, or click Next to scroll to a blank row.
3. Fill in this information for each node:

Data Source
Select Direct Driver.

For details about the OPC Server data source, see Chapter 6.

Name
Type a name up to 40 characters long. This name represents the device on the network. When you create a device tag, you must assign a node to the tag, and this name identifies the node.

The name can have upper and lower case letters, numbers, dashes, and underscores. Spaces are not permitted.

Enabled
Normally nodes are enabled, allowing data collection. However, during setup or troubleshooting you might want to disable a node to prevent communication timeouts or invalid data. When a node is disabled, tag values can still be read and written, but the values are read from and written to the value table in memory instead of the data source.

To disable nodes, clear the Enabled check box.

Channel

Select the channel number on which this node resides. If the channel isn't configured yet, it is designated Unassigned in the list. Configure the channel in the Channels editor.

Station

For TCP/IP networks, type the IP address.

For programmable controllers on other network types, type the physical station address of the programmable controller on the communication channel. The address depends on the channel this node is attached to, and the type of network it is.

Refer to your programmable controller's documentation for details about addressing syntax, or see the help file or manual for the installed drivers. For information about station addressing syntax for nodes connecting to Allen-Bradley devices, see Appendix C.

Browse button

If RSLinx 2.0 or later is installed on your computer, click the Browse button to open the RSWho dialog box, which displays all active stations for the selected channel. (Expand the nodes in the tree to see the active devices.) When you select a station from the RSWho window, the Station and Type boxes are filled in automatically. Verify the entry in the Type box.

The addresses assigned in RSWho are relative to the development computer RSWho is running on, not the runtime computer. If both computers are not on the same physical network, you may have to update your node addresses at runtime.

For the SOFT5 driver, enter the UNC name of the SoftLogix 5 controller without the backslashes. For example, if the UNC computer name is \\ORION, type ORION. The computer name must be 8 characters or less.

For SoftLogix 5 controllers using the AB_ETH driver, enter the controller's IP address.

Type

Select the type of programmable controller you are using.

For this device type	Select
PLC-5/10, PLC-5/12, PLC-5/15, PLC-5/25	PLC-5
PLC-5/11, PLC-5/20™, PLC-5/20C, PLC-5/30, PLC-5/40™, PLC-5/40C, PLC-5/60, PLC-5/80™	PLC-5 (Enhanced)

For this device type	Select
SLC 5, SLC 5/01™, SLC 5/02™, SLC 5/03 (OS 300)	SLC 5
MicroLogix, SLC 5/03 (OS 301), SLC 5/04, SLC 5/05	SLC 5 (Enhanced)
SoftLogix 5 (Windows 2000 projects only)	SoftLogix 5

Timeout
Type the number of seconds you want RSView to wait before reporting a communication error. A timeout period of three seconds is usually enough. You must use a decimal point (.) as the decimal symbol in this box, regardless of which decimal symbol is specified in Regional Options in the Windows Control Panel.

4. Click Accept to save the node configuration.
5. To configure another node, click Next.
6. When you finish configuring nodes, click Close.

Editing nodes at runtime

You can change a node's configuration on the runtime computer. For example, you can change the node's IP address to use the project with a different processor than was specified during project development. To do this, stop the project and then use the Nodes editor to specify another IP address. For more information, see page 23-4.

Configuring scan classes

When your project is running, it must periodically update the tag values in the value table. This is done by scanning.

For projects communicating through direct drivers, values are updated by scanning the data source address at the foreground and background scan rates specified by the scan class.

Scan classes

Any tag that communicates with programmable controllers through direct drivers must be assigned to a scan class, to determine how often the tag's value is updated.

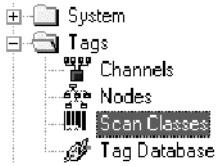
A scan class has two scan periods: the foreground period and the background period. The foreground period applies to all tags except tags used for data logging. The background period applies only to tags used for data logging.

Guidelines for configuring scan classes

- A scan period of zero means scan as quickly as possible. However, using zero is not recommended because this setting can result in so much traffic that overall system communication slows down.

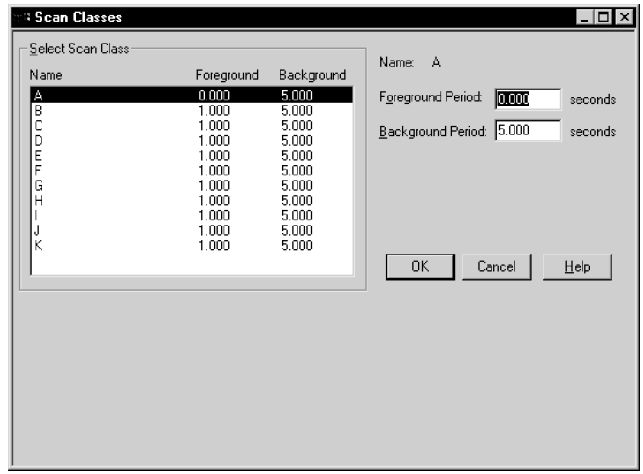
  RSView also scans as quickly as possible if scan rates are configured to be faster than it can handle. For example, if you configure 1,000 tags at 0.1 seconds, no errors are generated and the tags are scanned as quickly as possible. There is no guarantee that the specified scan rate will be met.

- Set the scan period to match the expected rate of change for the tag's data. For example, if you scan every five seconds for a change of state that occurs once an hour, the system is needlessly burdened. Conversely, if you scan too slowly, the system cannot monitor value changes that might occur between scans.



To configure a scan class:

1. Open the Scan Classes editor.



2. Select a scan class and type a foreground and background period in seconds.

   Assign a background period only if the scan class will be assigned to tags used for data logging.

   You can use fractional seconds. For example, if you type .6 the address is scanned every six tenths of a second.

3. To save the configuration for a scan class without closing the editor, select another scan class.
4. When you finish configuring scan classes, click OK.

Monitoring communications

Use any or all of these methods to monitor direct driver communications:

- Activity logging—In the Activity Log Setup editor, ensure that the errors, warnings, and information settings are enabled and are set up to log to the Activity list or printer. At runtime, messages about communications are sent to the specified destination.

  For more information about activity logging, see Chapter 15.

- Communication status—If communication status is on, when communication errors occur, a communication error banner opens to inform the operator about the error. By default, communication status is turned on.

For more information about the communication error banner, see page 24-15.

To check the communication status setting, open the Startup editor. Communication status is on when the Communication status check box is checked.

For more information about the Startup editor, see Chapter 20.

- System tags—System tags are preconfigured tags created by RSView. The system\Com tags provide information about communication status. You can display these tags as needed in your project's graphic displays.

  For a complete list of system tags, see Appendix A.

Chapter

6

Setting up OPC communications

This chapter describes:

- when to use OPC communications
- steps for setting up OPC communications
- creating OPC nodes
- scanning for new tag values
- monitoring communications

When to use OPC communications

OPC (OLE for Process Control) connections allow you to communicate with a wide range of local and remote devices through vendor-specific OPC servers and devices, with RSView ME Station as the OPC client.

RSView supports the OPC 2.0 specification.

If you will be connecting to communication devices using direct drivers, see Chapter 5.

OPC for Windows 2000 projects

If your project will run in Windows 2000, the OPC server can be local or remote.

You can use these types of OPC servers with Windows 2000 projects:

- communication devices, using RSLinx as an OPC server
- third-party communication devices, using vendor-specific OPC servers (such as Siemens or Modicon®)
- a third-party application with OPC server support, either on the same computer or on a network

For example, you can communicate with a DeviceNet device using RSLinx as an OPC server. Configure RSLinx to communicate with the device, and set up an OPC node in RSView to communicate with RSLinx.

OPC for RAC6182 projects

If your project will run on a RAC6182, the project can communicate with:

- third-party applications with OPC server support
- the built-in RSLinx OPC server that supports ControlLogix
- third-party communication devices, using vendor-specific OPC servers

The OPC server must be local (that is, on the RAC6182), in the form of a .dll file.

Setting up the OPC server

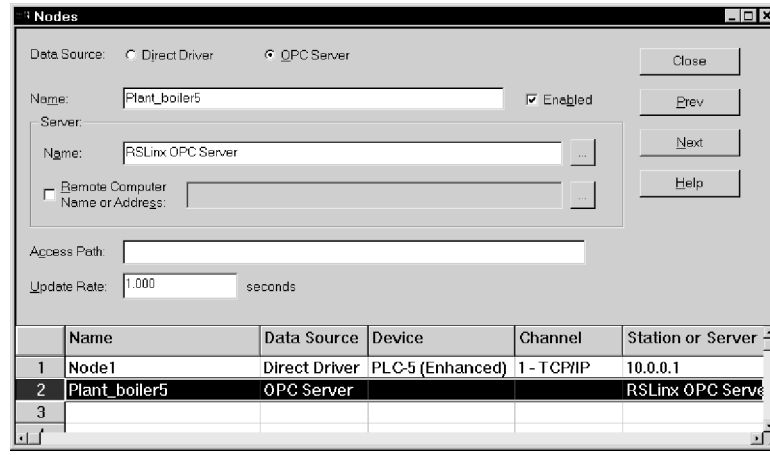
If RSLinx is the OPC server, you must configure the OPC node on the development computer, specifying the IP address of the controller that will be used at runtime. When you create the node, the development computer must be online with the controller (that is, have live communications via RSLinx to the controller that will be used at runtime).

Example: Configuring an OPC node

The following example shows how to create a node to connect to a local OPC server using RSLinx.

Server Name: RSLinx OPC Server. Because the server is RSLinx, you don't need to specify a vendor or version number.

This is how the node looks in the Nodes editor:

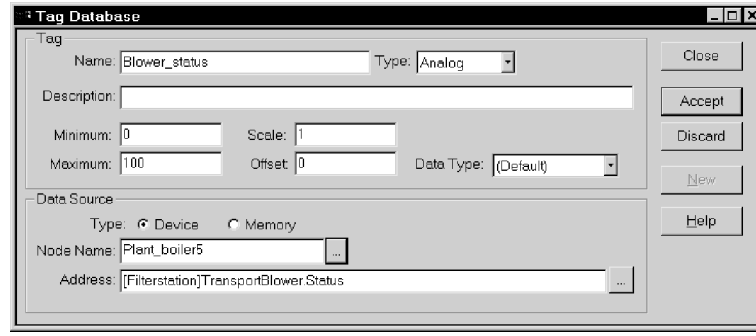


Columns that do not apply to OPC nodes are left blank.

Once you have created the node, assign it to a tag in the Tag Database editor. The address tells RSView where to get the data.

Address: TransportBlower.Status
The ControlLogix controller called Filterstation has been previously set up as an OPC topic in RSLinx; TransportBlower.Status is the address in the controller.

This is how the tag looks in the Tag Database editor:



Example: Configuring an OPC node to connect with a ControlLogix processor

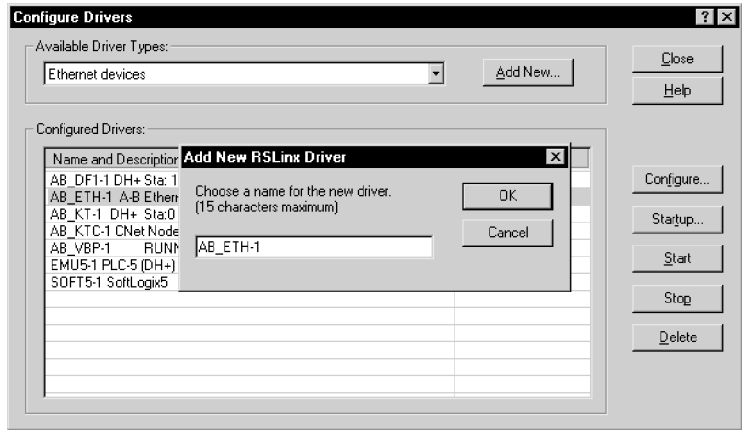
This example shows how to create an OPC node in RSView Studio to connect to a ControlLogix processor.

The development computer must be connected to the same network as the ControlLogix processor.

Adding an Ethernet communication driver and topic

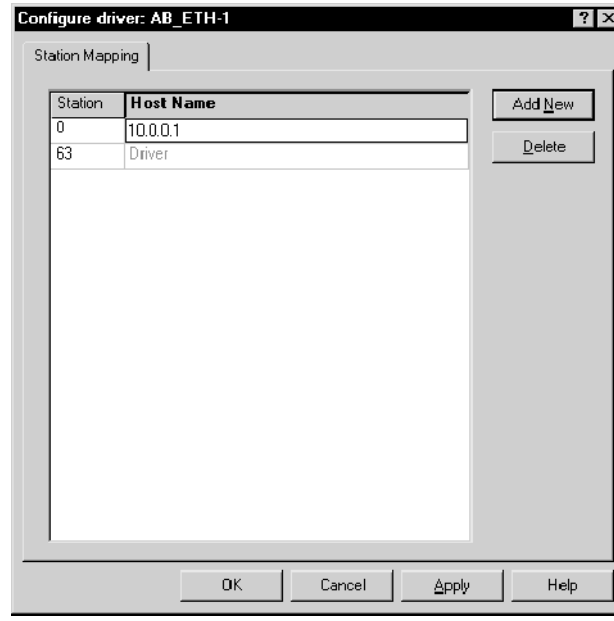
Use RSLinx to configure the Ethernet driver AB_ETH-1:

1. In RSLinx, on the Communications menu, click Configure Drivers.

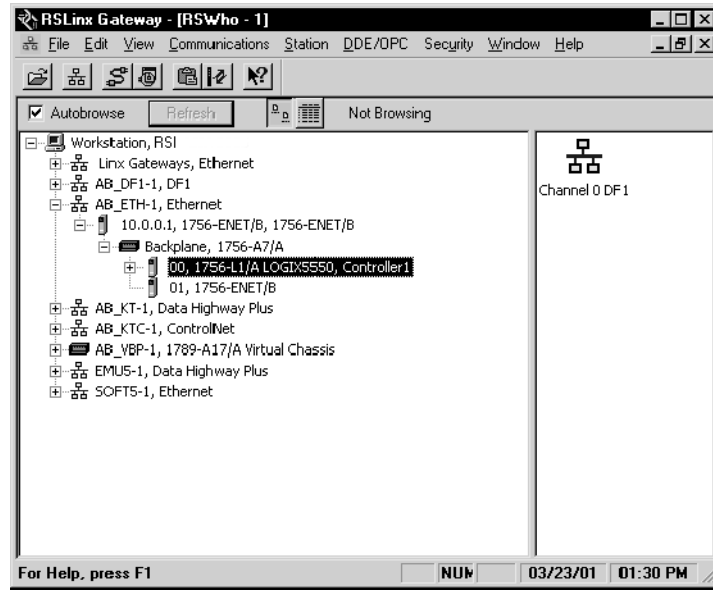


2. In the Available Driver Types box, select Ethernet devices, and then click Add New.
3. In the Add New RSLinx Driver dialog box, click OK to accept the name AB_ETH-1.

   If this driver has already been used, RSLinx assigns the next available number, for example, AB_ETH-2.



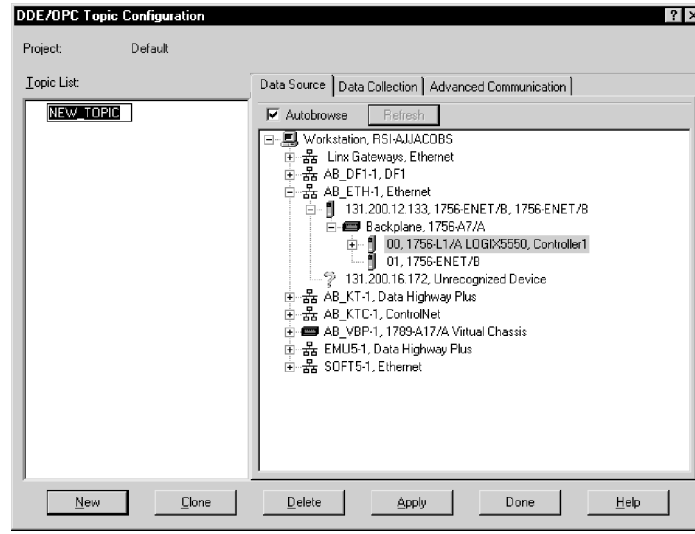
4. In the Host Name column, type the IP address of the 1756-ENET module connected to the ControlLogix processor, and then click OK.
5. Click Close.



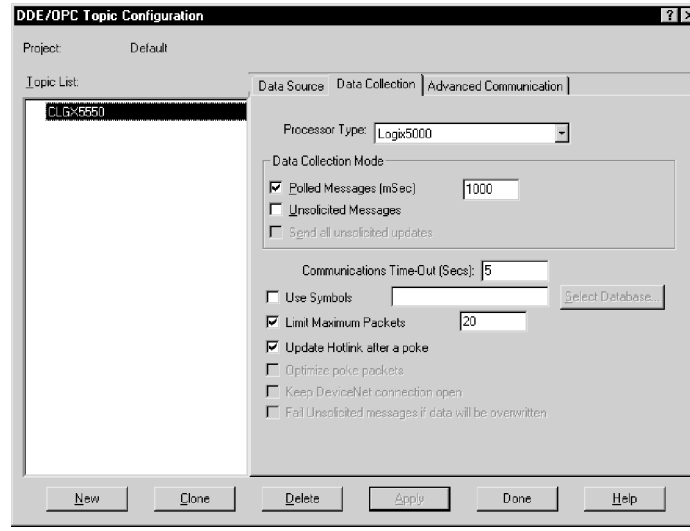
6. To verify that communications are working, use RSWho to browse to the ENET module, open the Backplane, and select the ControlLogix processor.

If RSWho is not open, on the Communications menu click RSWho.

7. On the DDE/OPC menu, click Topic Configuration.



8. Click the ControlLogix processor in the tree in the right pane, and then click New.
9. In the Topic List, type the topic name CLGX5550.
10. Click the Data Collection tab.

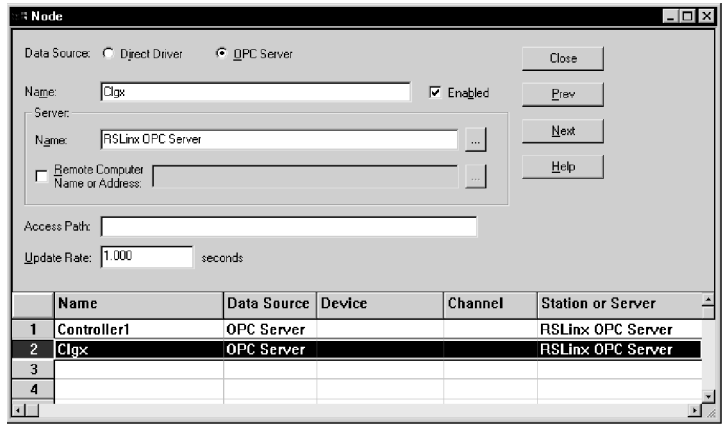


11. Make sure the Polled Messages check box is selected, clear the Unsolicited Messages check box, and then click Done.
12. In the confirmation dialog box, click Yes.

Creating a node in RSView Studio

Use the Nodes editor to set up an OPC node to connect to the ControlLogix processor:

1. In the Nodes editor, in the Name box type Clgx.



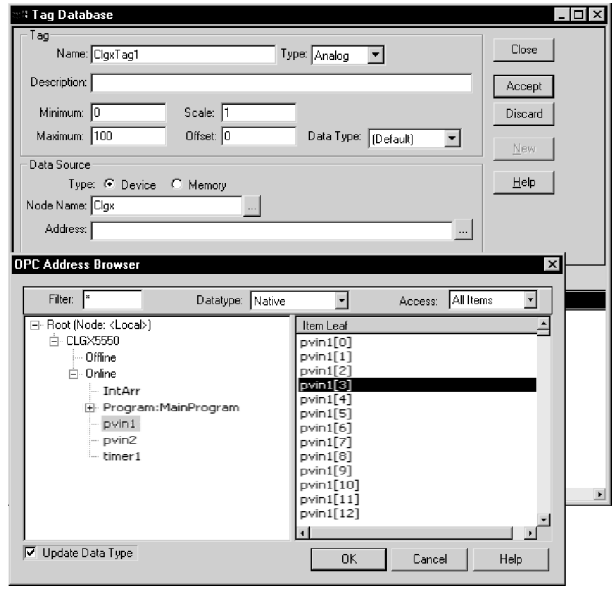
Browse button

2. Click the Browse button next to the Server Name box, and then select RSLinx OPC Server.
3. Click Close.

Creating a tag

Use the Tag Database editor to create a tag to connect to the topic in the ControlLogix processor:

1. In the Tag Database editor, create an analog tag named ClgxTag1.
2. Click the Browse button next to the Node Name box, and then select the Clgx node.
3. Click the Browse button next to the Address box.



4. In the OPC Address Browser box, browse to the item to connect the tag to, click the item to select it, and then click OK.

If desired, you could create additional tags to connect with other items in the ControlLogix processor.

Summary of steps

The instructions below summarize the steps for setting up RSView as an OPC client.

1. Start RSView Studio and create or open a project.
2. In the Nodes editor, create nodes for each OPC server or topic you wish to communicate with. Select the OPC Server data source.
3. In the Tag Database editor, create tags. For each tag, select Device as the data source and assign the OPC nodes that you have created.

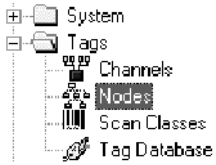
   For details, see Chapter 7.

Creating OPC nodes

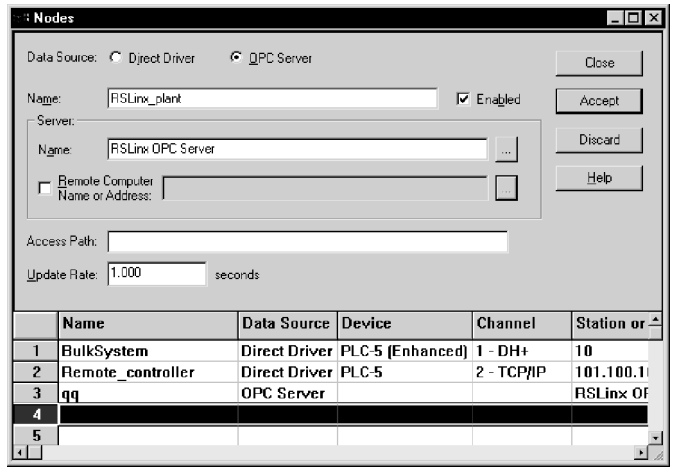
An OPC node allows you to assign a name, server name, and update rate to each OPC server you want to communicate with. The OPC node name can then be used throughout RSView.

For general information about using the Nodes editor, see page 5-13.

To create an OPC node:



1. Open the Nodes editor.



2. If the editor already contains node definitions, click the last (blank) row in the spreadsheet, or click Next to scroll to a blank row.
3. Fill in this information for each node:

Data Source
Select OPC Server.

The Tag Database editor does not check addressing syntax for programmable controllers that communicate through an OPC server. If the syntax is invalid, an error is generated at runtime.

For details about the Direct Driver data source, see Chapter 5.

Name
Type a name up to 40 characters long to represent the OPC node. When you create an OPC tag, you must assign a node to the tag, and this name identifies the node.

The name can have upper and lower case letters, numbers, dashes, and underscores. Spaces are not permitted.

Enabled

Normally nodes are enabled, allowing data collection. However, during setup or troubleshooting you might want to disable a node to prevent communication timeouts or invalid data. When a node is disabled, tag values can still be read and written, but the values are read from and written to the value table instead of the device.

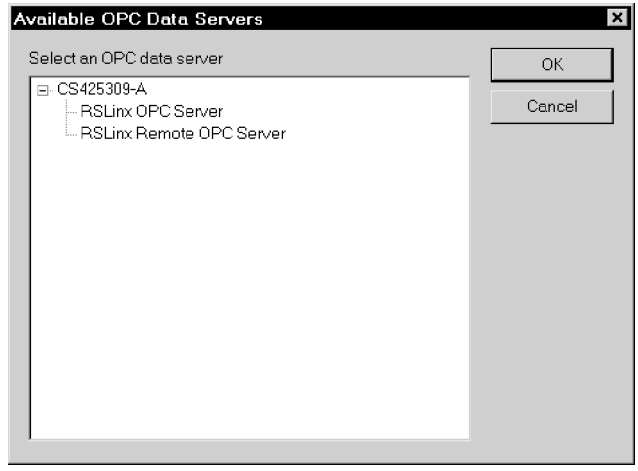
To disable nodes, clear the Enabled check box.

Server Name

Do one of the following:

Browse button

- Click the Browse button beside the Server Name box and select a server from the list of registered servers. The list displays servers on the development computer.



- Type the name of the OPC server that your project will communicate with, in this format:

  <Vendor>.<DriverName>.<Version>

  If the OPC server is RSLinx, you don't need to specify a version number or vendor name.

  You can type the name of an OPC server that has not been installed yet and install the server later.

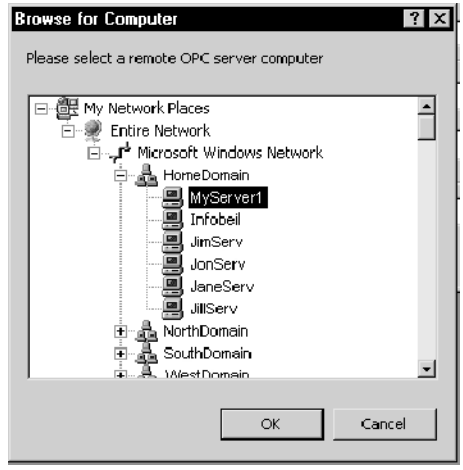
  If you type the name of a remote computer and then click the Browse button, the list displays the OPC servers on the remote computer.

For RAC6182 projects, the server must be on the RAC6182 (you cannot use the RSLinx Remote OPC server).

Remote Computer Name or Address (Windows 2000 projects only)
If the OPC server is remote, check this box, and then do one of the following:


Browse button

- Click the Browse button and select a server computer from the list.



- Type the server computer's name or address.

  You can use these formats to specify the name or address:

Use this syntax	For this format	Example
ComputerName	UNC (Universal Naming Convention)	\\Line1
*ComputerName.Domain.*com	DNS (Domain Name System)	Comp.NET2.COM
XXX.XXX.XXX.XXX	TCP/IP address	134.87.167.148

You set up the computer's name or address in the Windows Control Panel. For more information, see your Windows documentation.

Access Path
If your project will run on the RAC6182, do not specify an access path.

For Windows 2000 projects, the access path is maintained for compatibility with older projects. If you are defining a new node, do not specify an access path.

If you specify an access path for the node, the OPC Address Browser in the Tag Database editor is not available.

Update Rate
Specify the fastest rate at which the OPC server sends data to the OPC client. The default is every 1 second.

To specify that the server use the fastest possible rate, type 0.

If the OPC server is RSLinx, the update rate should not be faster than the topic poll rate.

4. Click Accept to save the node configuration.
5. To configure another node, click Next.
6. When you finish configuring nodes, click Close.

Editing nodes at runtime

You can change a node's configuration on the runtime computer. For example, you can change the node's IP address to use the project with a different processor than was specified during project development. To do this, stop the project and then use the Nodes editor to specify another IP address. For more information, see page 23-4.

For projects running on the RAC6182 and using the RSLinx OPC Server, the only setting you can change at runtime is the node's update rate.

Scanning for new tag values

When your project is running, it must periodically update the tag values in the value table. This is done by scanning.

For projects using OPC, values are updated by the OPC server at the rate specified in the server product. The update rate you specify in the Nodes editor is the requested data rate. The server uses this rate to determine the fastest rate at which to notify your project (the OPC client) of tag value changes, if there are any changes. For more details about setting the poll rate, see your server documentation.

Scan class rates have no effect on OPC communications. They affect only direct driver communications.

Monitoring communications

Use any or all of the following methods to monitor OPC communications:

- Activity logging—In the Activity Log Setup editor, ensure that the errors, warnings, and information settings are enabled and are set up to log to the Activity list or printer. At runtime, messages about communications are sent to the specified destination.

  For more information about activity logging, see Chapter 15.

- Communication status—If communication status is on, when communication errors occur, a communication error banner opens to inform the operator about the error. By default, communication status is turned on.

  For more information about the communication error banner, see page 24-15.

  To check the communication status setting, open the Startup editor. Communication status is on when the Communication status check box is checked.

  For more information about the Startup editor, see Chapter 20.

- System tags—System tags are preconfigured tags created by RSView. The system\com*OPC tags provide information about OPC communication status. You can display these tags as needed in your project's graphic displays.

  For a complete list of system tags, see Appendix A.

Chapter

7 Creating tags

This chapter describes:

- tags and the tag database
- tag types and data sources
- organizing tags
- using the Tag Database editor
- searching for tags
- using folders to group tags
- viewing, creating, editing, duplicating, and deleting tags
- configuring analog, digital, string, and block tags
- other methods for creating tags
- importing tags
- using tags and expressions in your project
- logging tag values
- using macros to assign values to tags

Tags and the tag database

In the tag database, you define the data you want RSView to monitor. Each entry in the database is called a tag. Set up tags corresponding to the addresses at the data source that will store the values you want to monitor when your project is running.

The current value of a tag, when required, is updated from the device it is connected to and stored in computer memory—referred to as the value table—so it is immediately accessible to all parts of RSView. For example, graphic displays use tag values to control animation or update a trend, and data logging stores tag values to create a historical record.

The data source

The data source can be memory or a device such as a programmable controller or an OPC server. RSView writes values to and reads values from the data source. The data source is configured to exchange information (in the form of numeric or string values) between the RSView value table and the physical machine that your project is controlling.

Tag types

You can use these types of tags in RSView:

This tag type	Stores this type of data
Analog	Range of values. Use analog tags to represent variable states such as temperature or the position of rotary controls.
Digital	0 or 1. Use digital tags to represent devices that can only be on or off, such as switches, contacts, and relays.
String	ASCII string, series of characters, or whole words (maximum of 82 characters). Use string tags to represent devices that use text, such as a bar code scanner that uses an alphanumeric product code.
Block	A contiguous bit string of up to 1024 bits. Each bit has a value of either 0 or 1. Block tags allow RSView to process and read an array of values associated with a single tag reference. You can assign block tags to alarm triggers only. Using block tags, alarm triggers can monitor multiple active alarm conditions. Block tags are read only. Block tags are not supported on OPC nodes.
System	Information generated while the system is running, such as communication status, system time and date, and so on. RSView creates system tags when you create a project, and when you create channels or OPC nodes. The system tags are stored in the folder called "system" in the tag database. You cannot edit system tags. You can use system tags anywhere you would use any other type of tag. For a list of system tags, see Appendix A.

Analog tags that use floating point values

You can assign analog tags to most of the controls in RSView. If the analog tag uses the floating point data type but an integer value is required, the floating point value is rounded.

For information about the data types available for analog tags, see page 7-16.

How values are rounded

When a floating point value must be rounded to an integer, this is how the value is rounded:

- If the number after the decimal is 4 or less, the value is rounded down. For example, 8.495 is rounded to 8.
- If the number after the decimal is 6 or more, the value is rounded up. For example, 8.6 is rounded to 9.
- If the number after the decimal is 5, the value is rounded using a "banker's algorithm," to average out the rounding over time:
  - If the number before the decimal is 0, the value is rounded down. For example, 10.5 is rounded to 10.
  - If the number before the decimal is an odd number, the value is rounded up. For example, 11.5 is rounded to 12.
  - If the number before the decimal is an even number, the value is rounded down. For example, 12.5 is rounded to 12.
- Floating point values are rounded to a maximum of seven digits. Therefore, using a floating point data type and adding to it a value that exceeds the seven significant digits will result in a rounding error. For example, adding any number to 9,999,999 will result in a rounding error.

This rounding method is also used for Numeric Input Enable buttons that use the Implicit decimal position, if an integer tag is assigned to the button's Value control.

Data sources

When defining a tag, you must specify a data source. The data source determines whether the tag receives its values externally or internally.

Device

A tag with Device as its data source receives its data from a source external to RSView. The data can come from a direct driver (connected to a programmable controller) or from an OPC server. You can use up to 5,000 device tags.

Memory

A tag with Memory as its data source receives its data from (and stores values in) the RSView internal value table. Tags with Memory as the data source do not count toward the total tag limit.

Organizing tags

Organizing tags makes database creation faster and simpler. To organize your tags, try these tips:

- Establish naming conventions.

  Naming conventions enable you to use wildcards most effectively when searching for and displaying tags during development.

- Use folders to group related tags.

Naming tags

Tag names can be up to 40 characters long. If you create a folder, the folder name becomes part of the tag name.

The tag name can contain the following characters:

- A to Z
- 0 to 9
- underscore (_) and dash (-)

Tag names cannot contain spaces. The tag name can be mixed case. Tag names preserve upper and lower case for readability but are not case sensitive. For example, the tag name MixerValve1 is the same as mixervalve1.

When a tag name starts with a number or contains a dash, enclose the name in braces { } when you use it in an expression, for example, {N33-0}. For more information about using tags in expressions see Chapter 14.

Using folders to group tags

To organize tags, create a folder to store tags that are related to one another. To separate the folder name from the rest of the tag name, use a backslash (\). For example, tags in the folder called Pump would start with Pump\.

For greater organization, you can nest folders. For example, you can organize the tag database first by area, then by machines in the area, and finally by devices in each machine. The result might be Area1\Machine1\Pump.

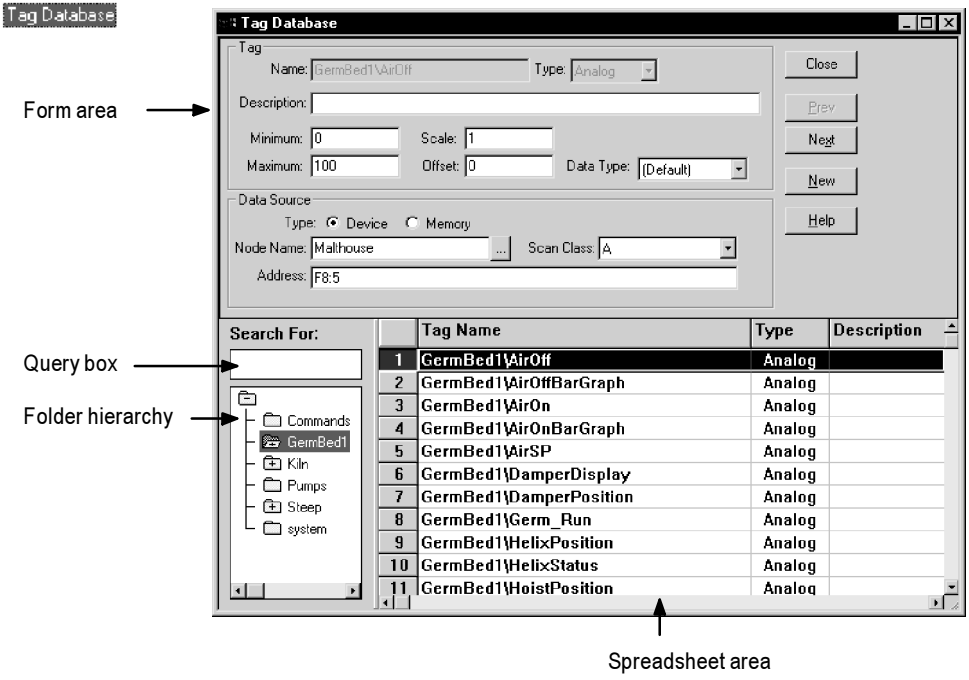
To create similar groups of tags quickly, create one folder with its tags and then duplicate the folder.

Using the Tag Database editor

To open the Tag Database editor:

▶ Double-click the Tag Database icon.

The Tag Database editor has these parts: form, query box, folder hierarchy, and spreadsheet.



The information you enter in the form area is displayed in the spreadsheet area.

Using the View menu

Use the items on the View menu to control the appearance of the Tag Database editor.

To do this	On the View menu, click this
Show or hide the spreadsheet area	Spreadsheet
Show or hide the form area	Form
Change the font used in the spreadsheet area	Spreadsheet Font. In the Font dialog box, specify the font, style, and size to use.
Restore the default font	Restore Default Settings
Update the contents of the editor (for example, when you've created tags in other editors). For details, see page 7-7.	Refresh
View information about the tag database. For details, see page 7-7.	Tag Statistics

Using the Accept and Discard buttons

When you enter information, the Prev and Next buttons change to Accept and Discard buttons. Click Accept to save tag information. Click Discard to cancel changes to a tag.

Using the tools

The Tag Database editor has these tools for working in the editor:

Use this tool	To do this
Delete	Delete the selected tag. For details, see page 7-14.
Duplicate	Create a duplicate of the selected tag, with all the same settings, except for the name. For details, see page 7-13.
Insert Row	Insert a new tag above the selected row. For details, see page 7-13.
Refresh	Update the contents of the database with changes from other editors. For details, see page 7-7.

Use this tool	To do this
Delete Folder	Delete the selected tag folder, including all the tags in the folder. For details, see page 7-12.
Duplicate Tag Folder	Create a copy of the selected tag folder, including all of the tags in the folder. For details, see page 7-11.
Create Folder	Create a tag folder. For details, see page 7-9.
DB Browser	Import tags from a PLC database. For details, see page 7-26.

Updating the contents of the Tag Database editor

You can create tags in the Tag Database editor, but you can also create them "on the fly" in other editors, and you can import them from an existing tag database. To see the result of changes to the database you made in other editors while the Tag Database editor was open, update the contents.

To update the contents of the editor:

Refresh tool

▶ On the View menu, click Refresh, or click the Refresh tool.

When you click Refresh, the undo buffer is cleared and recent changes can't be automatically reversed.

Refresh is not available if you haven't accepted the current tag.

For information about creating tags in other editors, see page 7-23.

Viewing tag statistics

The Tag Statistics dialog box provides a summary of how many tags your project uses, as well as other tag information such as the date the tag database was last modified. To view tag statistics, the Tag Database editor must be open and have focus.

To view tag statistics:

▶ On the View menu, click Tag Statistics.

Searching for tags

Use the query box to select the tags you want to display in the spreadsheet. This allows you to edit tags in different folders without browsing the folder hierarchy. You can:

- select a single tag by typing the tag name
- select multiple tags by typing wildcards

These are the wildcards:

This character	Does this
?	Matches any single character.
*	Matches any number of characters, including the backslash (\) character. Use this wildcard by itself to display all the tags in the tag database.

For example, to search for all the OPC tags in the system folder, open the folder and then type *opc in the Search For box. When you press Enter, a list of tags ending with the letters “OPC” appears in the spreadsheet.

When you do searches, remember that the backslash in a folder name counts as a character in the tag name.

Using folders

The folder hierarchy and spreadsheet work together. The hierarchy shows the tag folders and the spreadsheet shows the tags within the folders.

Use the folder hierarchy to:

- create folders
- open folders
- add tags to folders
- nest folders
- duplicate folders
- delete folders

A folder icon known as root is always present in the hierarchy window, at the top of the folder hierarchy. This folder contains all the tag folders you and RSView create. For example, the system folder holds the system tags that come with RSView. For a complete list of the system tags, display the contents of the folder or see Appendix A.

You can nest folders. If a folder has a plus (+) sign, it contains one or more folders. If a folder is blank, it does not contain any other folders.


This folder contains one or more folders.

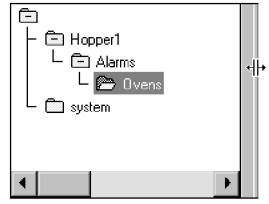

This folder does not contain another folder.

Resizing the hierarchy box

To view a series of nested folders, resize the hierarchy box.

To resize the hierarchy box:

1. Place the cursor over the right border of the box until it changes to a double arrow.
2. Drag the border to the required size.

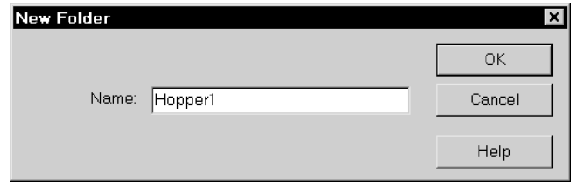


Creating folders

To create a folder:

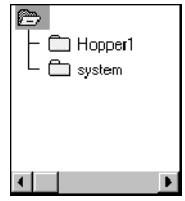
1. On the Edit menu, click New Folder, or click the Create Folder tool.


Create Folder tool



2. Type the folder name.
3. Click OK.

   The new folder appears in the hierarchy window.



Opening folders

When you open a folder, its contents are displayed in the spreadsheet.

To open a folder:

▶ Double-click the folder.

To open multiple folders:

1. Select the folders by doing one of the following:
   - Click a folder and then drag the mouse up or down.
   - Click a folder and Shift-click other folders immediately above or below the first selected folder.
   - Click a folder and Ctrl-click other folders anywhere in the hierarchy.
2. Press Enter.

   The tags in the selected folders are displayed in the spreadsheet.

Creating tags in a folder

Once you have created a folder, you can create tags in it.

To create a tag in a folder:

1. Double-click a folder in the folder hierarchy.

   The folder name is displayed in the Name box of the form.

2. After the backslash (\), type the new tag name.

For information about configuring tags once you've created them, see page 7-14.

Nesting folders

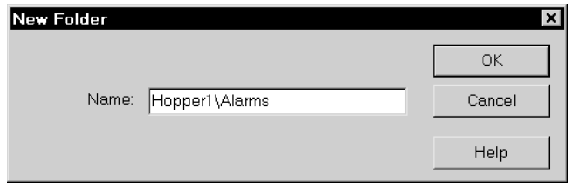
Nesting folders means to create a folder inside another folder.

To create a folder inside another folder:

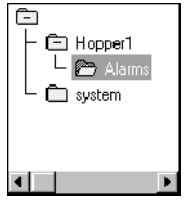
1. Select a folder in the folder hierarchy.
2. On the Edit menu, click New Folder, or click the Create Folder tool.

Create Folder tool

3. After the backslash (\), type the new folder name.



4. Click OK.



When you nest folders, remember that the backslash in a folder name counts as one character in the tag name.

Duplicating folders

When you duplicate a folder, all the tags in the folder are duplicated and automatically given the new folder name. If the folder contains folders, those folders are also duplicated.

IMPORTANT Be sure to choose Duplicate Folder rather than Duplicate. Duplicate only duplicates individual tags.

To duplicate a folder and its tags:

Duplicate Tag Folder tool

1. Select the folder in the hierarchy.
2. On the Edit menu, click Duplicate Folder, or click the Duplicate Tag Folder tool.

3. In the To box, type the new folder name.
4. Click OK.

Deleting folders

To delete folders:

Delete Folder tool

1. Select one or more folders in the hierarchy.
2. On the Edit menu, click Delete Folder, or click the Delete Folder tool.

Working with tags

Use the spreadsheet to:

- view tags
- create tags
- edit tags
- duplicate tags
- delete tags

Use the query box or folder hierarchy to select the tags you want to view.

Moving through the spreadsheet

To scroll through the spreadsheet rows:

- Use the Prev or Next buttons in the form area.

- Use the Up Arrow and Down Arrow keys.
- Use the scroll bars on the spreadsheet.

To select a row, click anywhere in the row or click the row number.

Resizing columns and rows

To resize a column or row:

1. Place the cursor over the division between the column or row, in the top or side border, until it changes to a double arrow.
2. Drag the column or row to the required size.

Creating tags

To create a tag inside a folder, first open the folder. For details, see page 7-10.

To create a tag, use any of these methods:

- Click New in the forms area.
- Click the Insert Row tool.
- On the Edit menu, click Insert Row.

Insert Row tool

Each method inserts a new row above the highlighted row, with the boxes in the form area ready to receive information about the new tag.

For information about configuring tags once you've created them, see page 7-14.

Duplicating tags

To duplicate a tag:

Duplicate Tag tool

1. Select the tag to duplicate.
2. On the Edit menu, click Duplicate, or click the Duplicate Tag tool.

   A new row is inserted below the highlighted row. The new row contains all the same information except the tag name.
3. In the form area, in the Name box, type the name for the new tag.

4. Click Accept.

Editing tags

You can edit all parts of a tag except the tag name and tag type.

To edit a tag:

1. Select the tag to edit.

   The details of the tag appear in the form area.

2. Edit any details except the tag name or tag type.

Deleting tags

Delete tags carefully. Once you click the Delete button, the tag is deleted. There is no confirmation message and you cannot undo the deletion.

To delete a tag:

Delete tool

1. Select the tag you want to delete.
2. On the Edit menu, click Delete, or click the Delete tool, or press the Delete key on your keyboard.

Configuring tag types

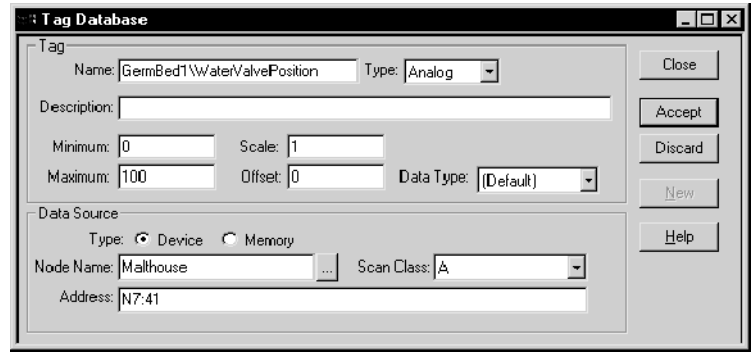
The topics below describe how to complete the boxes in the Tag section of the form. There are separate instructions for analog, digital, string, and block tag types.

For information on filling in the boxes in the Data Source section of the form, see page 7-20.

Configuring analog tags

To configure an analog tag:

1. Create the tag, as described on page 7-13.
2. In the Name box, type a tag name. If the tag is part of a folder, type the name after the backslash (\).
3. In the Type box, select Analog.



4. Fill in the boxes as outlined below.

Numeric values that require a decimal must use the decimal point (.) as the decimal symbol, regardless of which decimal symbol is specified in Regional Options in the Windows Control Panel.

Description

Type a description of the tag, up to 128 characters long.

Minimum and Maximum

Type the minimum and maximum values that can be written to the programmable controller or server. These values do not affect what is read from the programmable controller or server. For example, if you specify a minimum of 0 and a maximum of 100, RSView would be able to read a value of 200 from a PLC and store it in the value table, but would not be able to write this value to the PLC.

The range between the minimum and maximum values cannot exceed the maximum floating point value ($3.402823E^{38}$).

Scale and Offset

Type a number. For the scale, do not use 0. To disable the scale, type 1. To disable the offset, type 0.

The scale and offset modify the "raw data" that comes from the programmable controller before it is saved in the value table. The scale and offset also modify the value specified in RSView before it is written to the programmable controller. The scale is a multiplication factor—the value from the PLC is multiplied by the scale. The offset is a fixed value—after the value from the PLC is multiplied by the scale, the offset amount is added. The following formula shows the relationship between the PLC value and the amount stored in the RSView value table.

RSView value = (PLC value × scale) + offset

IMPORTANT Values from the programmable controller are first scaled and then added to the offset. When a value is written to the programmable controller, the process is reversed: the offset is subtracted and the scale is used for division. This ensures that the correct, unchanged value is sent to the programmable controller.

Data Type

For tags with Device as the data source, select the data type that matches the format of the data stored in the programmable controller or Windows application. If you are using direct driver nodes, use the Default data type to automatically match the data format specified by the address.

For analog tags connecting to a ControlLogix processor, specify a data type that corresponds to the data type in the ControlLogix processor: Byte, Unsigned Integer, Integer, Long Integer, or Floating Point.

For tags with Memory as the data source, select the data type that matches the format of the data you will store in the tag. Choosing Default is the same as choosing Floating Point.

The data types are:

Data type	Description	Range
Default*	Depends on the data source and node type.	See below.
Unsigned Integer	Unsigned 16-bit integer	0 to 65,535

* Do not use this data type with an OPC server, as doing so will produce unexpected results.

Data type	Description	Range
Integer	Signed 16-bit integer	-32,768 to 32,767
Long Integer	Signed 32-bit integer	-2,147,483,648 to 2,147,483,647
Floating Point	Single-precision (32-bit) floating point	$-3.402823E^{+38}$ to $-1.175494E^{-38}$, 0, $1.175494E^{-38}$ to $3.402823E^{+38}$
Byte	Unsigned 8-bit integer	0 to 255
3-Digit BCD*	3-digit binary-coded decimal	0 to 999
4-Digit BCD*	4-digit binary-coded decimal	0 to 9,999

* Do not use this data type with an OPC server, as doing so will produce unexpected results.

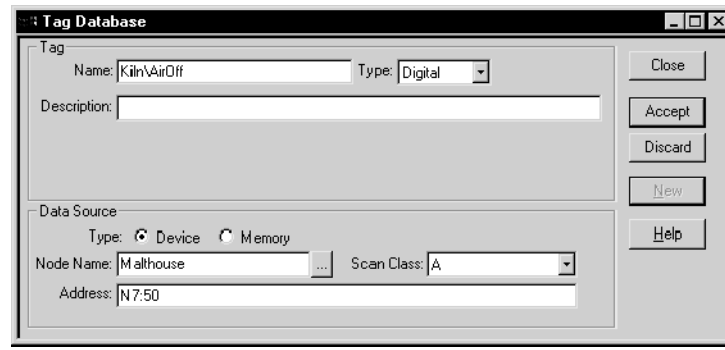
IMPORTANT For a tag with a Long Integer data type, if the minimum, maximum, scale, offset, or initial value is used with a decimal point, the value is stored internally in floating point format. This means that the maximum value for the tag is 16,777,216, which is the maximum integer value for single-precision floating point numbers.

For information on filling in the boxes in the Data Source section of the form, see page 7-20.

Configuring digital tags

To configure a digital tag:

1. Create the tag, as described on page 7-13.
2. In the Name box, type a tag name. If the tag is part of a folder, type the name after the backslash (\).
3. In the Type box, select Digital.



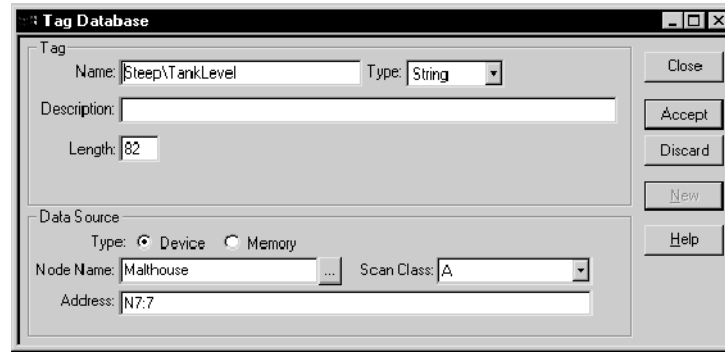
4. In the Description box, type a description of the tag, up to 128 characters long.

For information on filling in the boxes in the Data Source section of the form, see page 7-20.

Configuring string tags

To configure a string tag:

1. Create the tag, as described on page 7-13.
2. In the Name box, type a tag name. If the tag is part of a folder, type the name after the backslash (\).
3. In the Type box, select String.



4. Fill in the boxes as outlined below:

Description
Type a description of the tag, up to 128 characters long.

Length
Type a number between 1 and 82 to specify the length of the string tag in characters. The length must be a multiple of the size

of the programmable controller data element you are addressing. For example, to reference two-byte data elements in an integer section, the length must be a multiple of two.

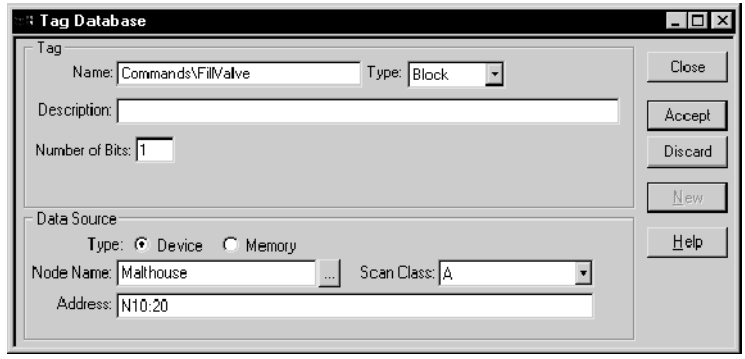
For information on filling in the boxes in the Data Source section of the form, see page 7-20.

Configuring block tags

Block tags are not supported for OPC nodes.

To configure a block tag:

1. Create the tag, as described on page 7-13.
2. In the Name box, type a tag name. If the tag is part of a folder, type the name after the backslash (\).
3. In the Type box, select Block.



4. Fill in the boxes as outlined below:

Description
Type a description of the tag, up to 128 characters long.

Number of Bits
Type a number between 1 and 1024 to define the length of the block tag in bits.

The number of bits must correspond to the element in the address. For example, if the address is located at an integer data file element, the length must be a multiple of 16, the bit length of an integer. To create a block tag starting at N7:0 and reaching to N7:2, you would type 48 (3 x 16).

For information on filling in the boxes in the Data Source section of the form, see the next section.

Specifying a data source

The following topics describe how to fill in the boxes in the Data Source section of the form. For details about filling in the boxes in the Tag section of the form, see page 7-14.

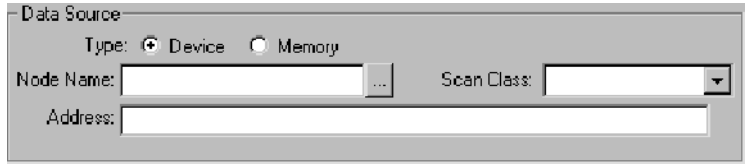
Specifying device as the data source

A tag with device as its data source receives its data from a source external to RSView. The data can come from:

- programmable controllers through direct drivers
- programmable controllers through an OPC server
- another Windows program through an OPC server

To specify device as the data source:

1. Click Device.



2. In the Node Name box, do one of the following:
   - Type a node name.
   - Click the Browse button to open the Node Browser and select a node name.
   - Click the Browse button to open the Node Browser and add a new node.

   For information about adding a node for a direct driver, see page 5-15. For information about adding a node for an OPC server, see page 6-10.

Browse button

3. If you are communicating through direct drivers, in the Scan Class box select a scan class.

   For more information about scan classes, see page 5-17.

4. In the Address box, do one of the following:
   - To communicate through direct drivers to a programmable controller, specify the physical memory location in the programmable controller. The address syntax depends on the controller.

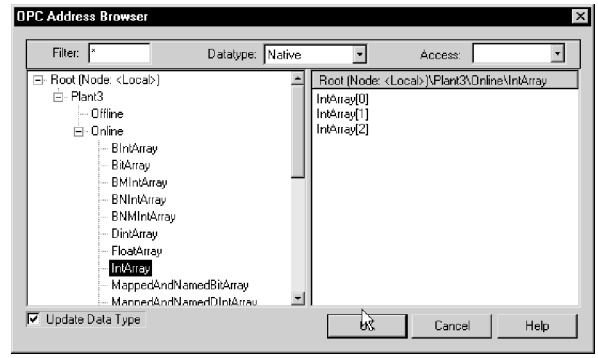
For information about addressing syntax, see the documentation that comes with your controller. For information about addressing syntax for Allen-Bradley controllers, see Appendix B.

- To connect to an OPC server, specify the address of the OPC item in the OPC server. The item syntax depends on the OPC server.

  
  Browse button

  To open the OPC Address Browser and select the OPC item, click the Browse button beside the Address box. The browser is not available if you specify an access path for the OPC node in the Nodes editor.

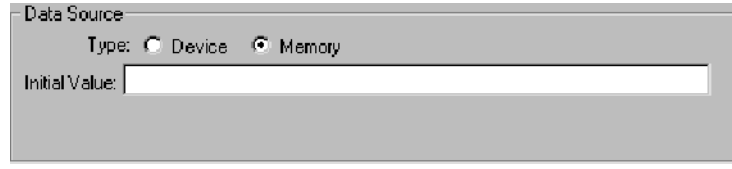
  If the OPC node is for an OPC server on a remote computer, the OPC Address Browser displays the items of the OPC server on the remote computer.



  For more information about OPC see Chapter 6.

To specify memory as the data source:

1. Click Memory.



2. In the Initial Value box, type the tag's starting value.

   Each time you start the project, the value defined in the Initial Value box is assigned to the memory tag.

You can also use macros to assign initial values to tags when the project starts or when a graphic display opens. For information about creating macros, see page 7-32.

Example: ControlLogix addressing

We recommend that you use the OPC Address Browser to select OPC items. When you use the address browser the correct syntax and data types are selected automatically.

However, if you want to define tags before setting up communications, you can type the address manually, as shown in this example. If you type the address manually, be sure to select the data type for the tag that matches the data type used by the ControlLogix processor. Do not use the Default data type.

This example shows you how to specify the OPC topic, item name, and bit level of an item that uses the integer data type in a ControlLogix processor.

OPC topic and item addressing

ControlLogix uses this addressing syntax:

[*OPC topic name*]*item name*

In this example, the RSLinx OPC topic name for the ControlLogix processor is CLGX. To connect to an OPC item called Motor, type this address:

[CLGX]Motor

Bit level addressing

You can access the bit level of an item that uses the integer data type by appending .# to the end of the tag address, where # is the number of the bit to access.

For example, to access the first bit of the integer item Motor, type this address:

[CLGX]Motor.0

Other methods for creating tags

In addition to creating tags in the Tag Database editor as described earlier in this chapter, you can:

- create tags in a third-party application and import them into RSView
- create tags as needed in other editors
- import tags from a PLC or SLC database

Creating tags in a third-party application

You can use a third-party spreadsheet editor such as Microsoft Excel to create your tags, and then import the tags into RSView using the Tag Import and Export Wizard. When you import tags, they can be merged with tags already in the tag database and any tags with the same name can be updated with the new information.

For more information about the wizard, see page 7-28.

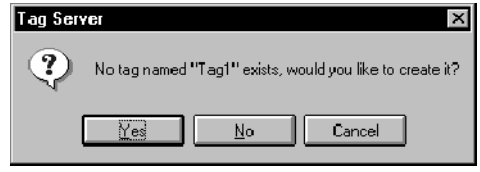
Creating tags as needed in other RSView editors

You can create tags as needed in any editor or dialog box that uses tags. You can add a tag to the database by doing one of the following:

Browse button in the Tag column

- Click the Browse button in the Tag column to open the Tags dialog box and create the tag. For more information, see page 7-25.
- Type a new tag name in the “Tag or expression” column. Keep track of the tag name, and add the tag in the Tag Database editor when convenient.

  In some editors, when you save or close, a message appears prompting you to create the tag. For example, if you typed “Tag1” and it did not exist in the tag database, the following message would appear:



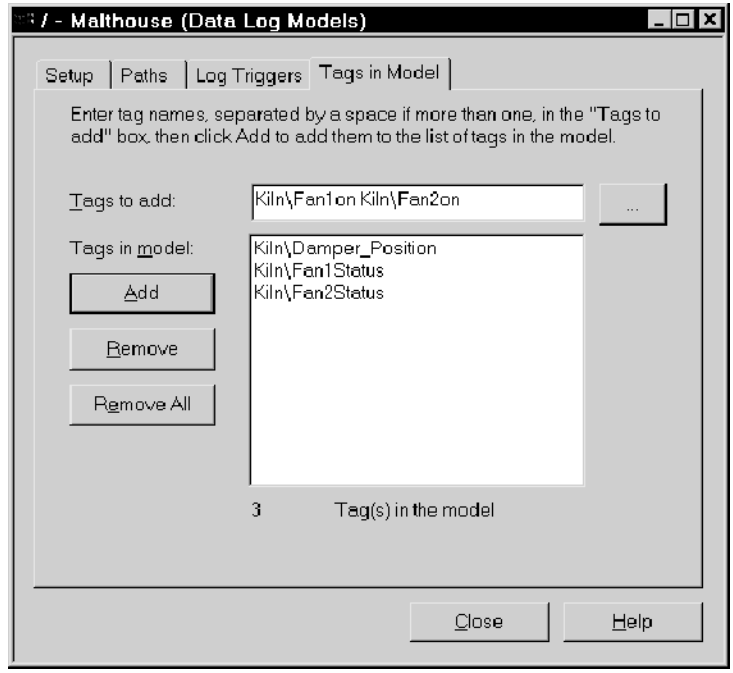
Click Yes to create it now, or click No to create it later.

Creating tags as needed in the Data Log Models editor

In the Data Log Models editor, in the Tags in Model tab, you can add a tag to the database by doing one of the following:

Browse button in the Data Log Models editor

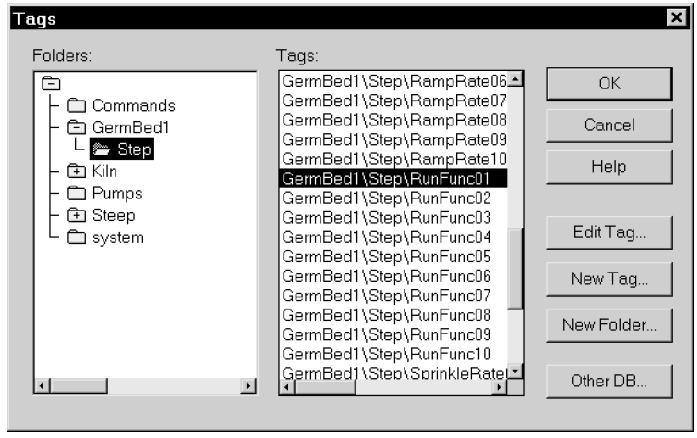
- Click the Browse button beside the “Tags to add” box to open the Tags dialog box and create the tag, as described in the next section.
- Type a new tag name in the “Tags to add” box, and then click Add. You are warned that the tag does not exist. Click Yes to add the tag to the list of tags in the datalog model. Keep track of the tag name, and add the tag in the Tag Database editor when convenient.



For more information about the Data Log Models editor, see Chapter 16.

Using the Tags dialog box

When you click a Browse button in a dialog box or editor's Tag column, or in the Tags in Model tab of the Data Log Models editor, the Tags dialog box opens.



In the Tags dialog box, you can:

- select a tag by double-clicking it, or by highlighting it and then clicking OK
- edit a tag by highlighting it and then clicking Edit Tag. The Tag Editor dialog box opens so you can edit the tag's definition
- create a new tag by opening the desired folder and clicking New Tag. The Tag Editor dialog box opens so you can define the tag.
- create a new folder by clicking New Folder. The New Folder dialog box opens so you can create the folder.
- import tags from a PLC or SLC database by clicking Other DB. The PLC Database Browser opens so you can specify the tags to import.

Importing tags from a PLC database

DB Browser tool in the Tag Database editor

To open the PLC Database Browser, do one of the following:

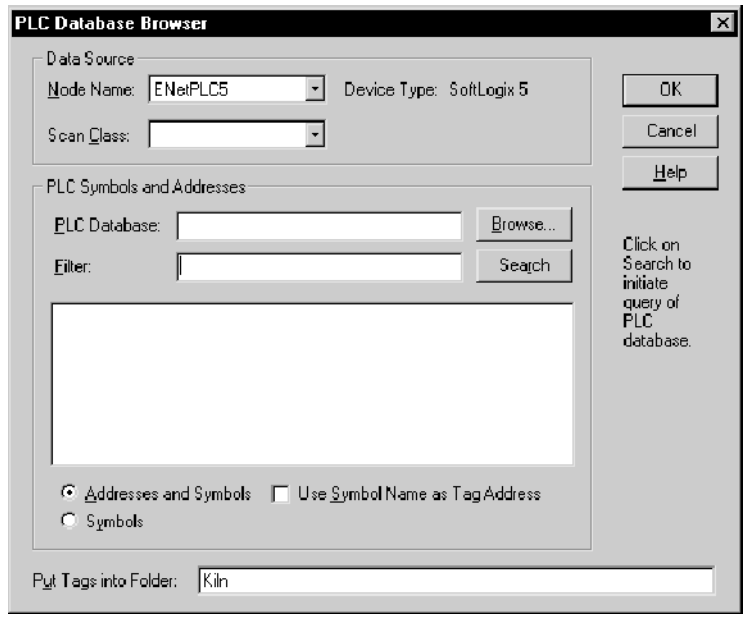
- In the Tags dialog box, click the Other DB button.
- In the Tag Database editor, on the Edit menu click Other Databases, or click the DB Browser tool.

Use the PLC Database Browser to selectively import tags from a PLC or other database into your project's tag database. Tags imported in this way are copied into the database—they are not shared with the source database. This means changes to tags in your project do not affect the database from which they have been imported and vice versa.

You can import tags from any of these databases:

- legacy PLC databases, created using WINtelligent LOGIC 5™ or A.I.™ 5, with file extension .dsc
- RSLogix 5™ or RSLogix 500™, saved as an external database, with file extension .ctd (before importing, explicitly export to the .ctd format to be sure of including the latest changes)
- RSFrameworks databases, with file extension .fm?

For PLC and SLC addresses, the PLC Database Browser shows only addresses that are used in the symbol or address list of the PLC programming software.



To import tags from a PLC database:

1. In the Node Name box, select a node.
2. If the node uses direct driver communications, in the Scan Class box select a scan class.
3. In the PLC Database box, type the path to the database to import tags from, or click Browse to locate and select the database to import tags from.

   The addresses and symbols from the selected database are displayed in the box below the Filter box.
4. To filter the tag list so that only certain addresses or symbols are displayed, in the Filter box type a character string, and then click Search.

   To search on names only, click the Symbols button so that only symbol names are displayed. If an address does not have a symbol name it is not displayed.

   Use filtering if the address or symbol list is too big to display entirely. You cannot filter beyond a slash. For example, a filter of B3/1 will not show B3/10, B3/11, and so on.
5. In the list box, click the symbols to import.

6. In the Put Tags into Folder box, type a folder name if you want the tags to be in a folder. If the folder does not already exist in the project's tag database, it is created.
7. Click OK.

   The selected symbols are added to the tag database for the current project and displayed in the tag list. If you have already imported a particular symbol, you are prompted to change its name if you want to import it again.

Using the Tag Import and Export Wizard

You can also import PLC or SLC databases into RSView using the Tag Import and Export Wizard.

You can use the wizard to:

- import tags from legacy PLC databases, created using WINtelligent LOGIC 5™ or A.I.™ 5, with file extension .dsc
- import tags from RSLogix 5™ or RSLogix 500™, saved as an external database, with file extension .ctd (before importing, explicitly export to the .ctd format to be sure of including the latest changes)
- export your project's tags to a .csv file
- import tags from another RSView project's tag .csv file
- merge tags from another RSView project (that is, import them directly from the project, without first creating a tag .csv file)

To start the wizard, do one of the following:

- In RSView Studio, on the Tools menu click Tag Import and Export Wizard.
- On the Windows Start menu, select Programs, Rockwell Software, RSView Enterprise, Tools, and then click Tag Import and Export Wizard.

For details about using the wizard, see the wizard's Help.

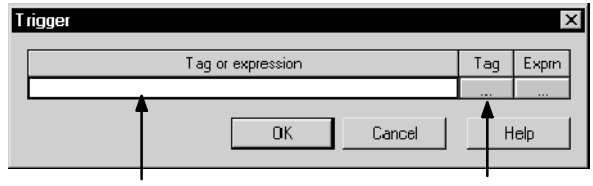
Using tags and expressions in your project

Once you've created tags, assign them to controls in your project to allow the project to interact with the data source and perform actions based on the tag values.

You can assign tags in these editors:

- Global Connections
- Graphics Display
- Parameters
- Alarm Setup
- Information Setup
- Data Log Model
- Macros

This example shows the Trigger dialog box that opens when you click the Add button in the Triggers tab of the Alarm Setup editor:



To specify a tag, do one of the following:

- In the "Tag or expression" column, type the tag name.
- In the Tag column, click the Browse button and then select a tag from the Tags dialog box.

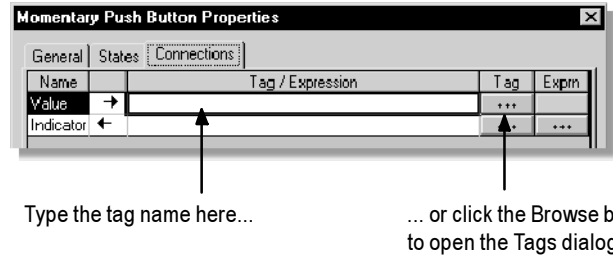
Browse button in the Tag column

Assigning tags to graphic objects

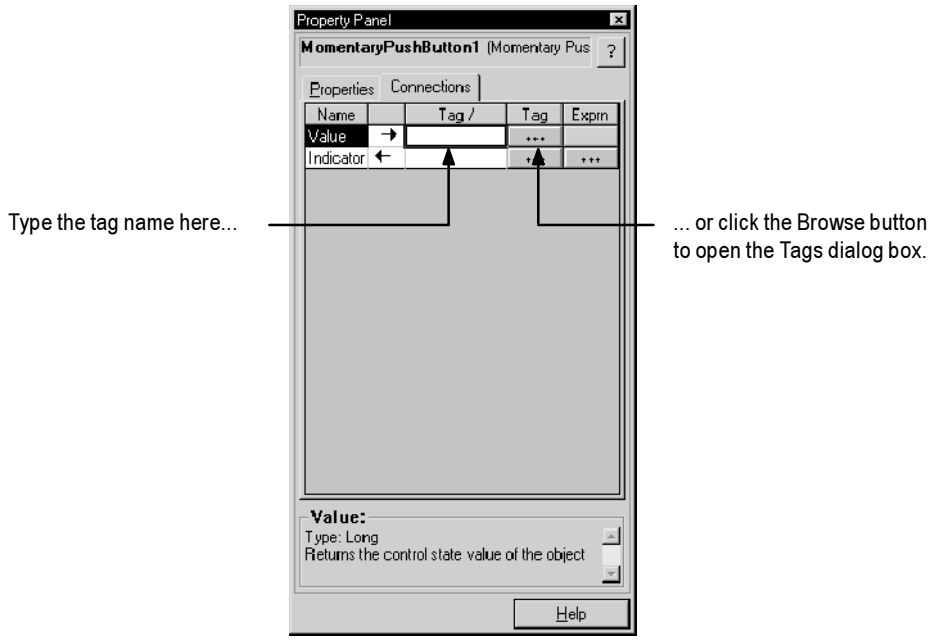
In the Graphics Display editor, you can assign tags to many of the graphic objects you create.

Use one of these methods to assign tags to a graphic object:

- Double-click the object to open the object's Properties dialog box, and then click the Connections tab.



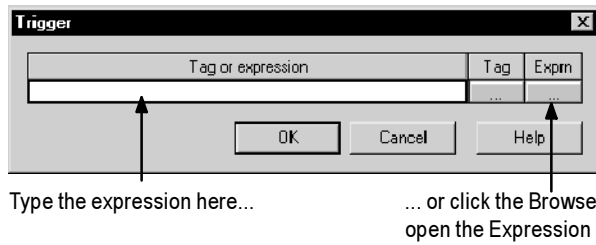
- Select the object, and then assign tags in the Connections tab of the Property Panel.



Using expressions to manipulate tag values

Many of the controls to which you can assign a tag also permit the use of expressions to perform logical or mathematical calculations on tag values. If you assign an expression, RSView monitors the expression value rather than the original tag value. For example, your machine might send values to the data source in the form of temperature in degrees Celsius. You could use an expression to convert the value to degrees Fahrenheit, and then monitor the expression result rather than the original tag value.

If you can assign an expression, a Browse button is present in the Exprn column in the editor or Connections tab.



To specify an expression, do one of the following:

- In the Exprn column, click the Browse button, and then create an expression in the Expression editor. Use this method if you want to check the expression syntax.
- In the "Tag or expression" column, type the expression. The expression syntax is not checked if you use this method.

For more information about expressions, see Chapter 12.

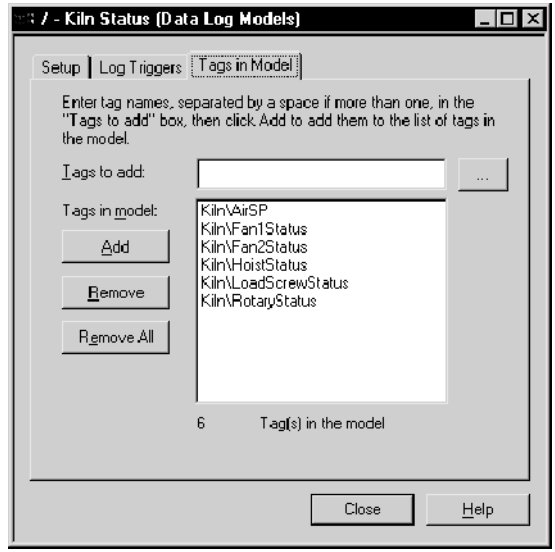
Substituting tag names used in graphic objects

You can use tag substitution to replace tag names assigned to the controls for graphic objects. For example, if you assign a tag to multiple objects in a graphic display, and then decide to use a different name for the tag, you can create a new tag and then use tag substitution to search for all tag references with the old name, and replace them with the new tag name.

For more information about tag substitution, see page 9-34.

Logging tag values

Any analog or digital tag value can be logged. To set up data logging, use the Data Log Models editor. For details, see Chapter 16.



Using macros to assign values to tags

A macro is a list of tag assignments stored in a text file, in the format <*tag*>=<*value*>. Each assignment assigns a value to a tag. The value can be in the form of another tag, an expression, a numeric constant, or a string.

Examples: Using macros to set tag values

Tag1 = 8
Sets the value of Tag1 to 8.

Tank1\Message = “Tank1 Overflow”
Sets the string tag Tank1\Message to Tank1 Overflow.

Tag1 = Tag2
Sets the value of Tag1 to be the same as Tag2.

Tag1 = Tag1 + 1
Increases the value of Tag1 by 1.

Tag1 = If (Tag2 < Tag1) Then 4 Else 3
Performs the if-then-else calculation and stores the result in Tag1.

1Pump = {Industry-2} + {2Pump}
Adds the values of Industry-2 and 2Pump and stores the result in 1Pump.

Braces surround Industry-2 because of the dash in the name. Braces surround 2Pump because the name starts with a number. No braces are used for 1Pump because this name is on the left side of the equal sign.

For more information about expression syntax, see Chapter 12.

When to use macros

You can assign macros to run when:

- the project starts or stops
- a graphic display opens or closes
- a user logs in or out
- a specified tag or expression changes to a new non-zero value

At runtime, when the macro runs, the values are sent to the tags at the data source.

IMPORTANT At runtime, the tag assignments are executed asynchronously. That is, the system does not wait for the completion of one tag assignment before executing the next. Therefore, do not rely on the order of assignments to control your process.

Example: Using a Goto Display button to run a macro

This example shows you how to run a macro when the operator presses a Goto Display button. The macro resets a group of production tags to 0.

1. Create a macro called Reset, with these tag assignments:

   TotalProductionUnits=0
   LineDownTime=0
   TotalRejects=0

2. Create an On Top display containing the text "Production values have been reset." Create a Close Display button in the display, with the caption "OK." Call the display Reset Message.

3. Create a Goto Display button with the caption "Reset Production Data." Assign the Reset Message display and the Reset macro to the button.

At runtime when the operator presses the Reset Production Data button, the display opens and the macro runs. When the operator presses OK the display closes.

Running macros when tags or expressions change value

You can use global connections to run macros when tags or expressions change value. This means you can use the data source to trigger the macro to run.

RSView allows you to create up to five macros for use with global connections. The macros must be named Macro1, Macro2, Macro3, Macro4, and Macro5 in order to work with global connections.

For more information about global connections, see Chapter 19.

Example: Using macros to reset tag values

This example shows you how to run a macro whenever the operator needs to reset production information tags to known values.

The macro writes the desired values to the tags whenever the operator presses a Momentary Push button.

1. Create a memory tag called ResetProdData.
2. Create a Momentary Push button with the caption "Reset Production Data." Assign the ResetProdData tag to the Value control.
3. Create a macro called Macro1, with these tag assignments:

   ```
   TotalProductionUnits=0
   LineDownTime=0
   TotalRejects=0
   ```

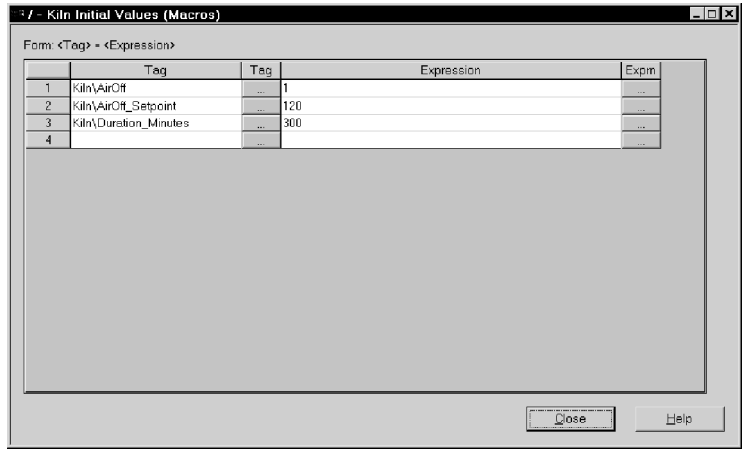
4. In the Global Connections editor, assign the ResetProdData tag to the Remote Macro1 control.

When the operator presses the Reset Production Data button, the value of the ResetProdData tag changes from 0 to 1. This tells RSView to run Macro1, which writes the specified values to the tags in the macro.

Creating macros

To create a macro:

1. Open the Macros editor.



Browse button in the Tag column

2. In the Tag column, type the name of the tag to assign a value to, or click the Browse button to open the Tags dialog box and select a tag.
3. In the Expression column, type a tag name, expression, or numeric value, or click the Browse button to open the Expression editor and create an expression.

   Create the expression in the Expression editor if you want to check the expression syntax.
4. Repeat steps 2 and 3 to assign values to other tags.

Save tool

5. On the File menu click Save, or click the Save tool.
6. In the Component name box, type a name for the macro, and then click OK.
7. Click Close.

What to do next

Once you've created the macros you want to use, assign the macros in these editors:

In this editor	Do this
Startup	Assign project startup and shutdown macros. See Chapter 20.
Graphics Display	Assign macros to run when displays open or close, using the Display Settings dialog box. See Chapter 8.
User Accounts	Assign macros to run when users log in and log out. See Chapter 18.
Global Connections	Specify the tags or expressions that will start the macros named Macro1 to Macro5. See Chapter 19.

Chapter

8

Creating graphic displays

This chapter describes the editors in the Graphics folder and outlines how to:

- create and open graphic displays
- use the Graphics Display editor
- test your displays as you work
- specify display settings
- create a background for your displays
- use graphic libraries
- import graphic images
- create parameters to use the same display with different tags
- create local messages in your displays
- print graphic displays at runtime

IMPORTANT Before creating graphic displays, specify project settings. Project settings determine important aspects of your graphic displays such as display size and position. For more information, see page 4-7.

About graphic displays and graphic objects

A graphic display represents the operator's view of plant activity. The display can show system or process data and provide operators with a way to write values to an external data source. The data source can be memory or a device such as a programmable controller or an OPC server.

Operators can print the display at runtime to create a visual record of tag values, object states, or current messages.

The elements that make up a graphic display are called graphic objects. You can create objects in the Graphics Display editor, or copy them from a graphic library or from another project.

For information about creating and copying graphic objects, see Chapter 9.

Before you begin

Before you begin, plan your displays. Think about what information the operator needs to see, and the best way to provide the information. For example:

- Does the operator need to know the exact speed of a conveyor belt, or just whether the belt is moving, jammed, or stopped?
- Do different users need to have access to different types of information?
- Do you want to limit access to certain types of information?

Also consider the runtime environment and how the operator will use the project:

- Does the runtime computer have a touch screen, mouse, keyboard, or some combination of these?
- How will the operator navigate through the displays of the project?

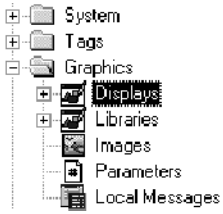
Review the chapters on planning, security, and navigation before you begin creating displays. Browse through the sample projects for design ideas. Map out a display hierarchy. Then create a graphic display to use as a template.

The time you spend planning your displays will make your project easy to use and will save you time in the long run.

For information about	See
Planning your displays and creating a template	Chapter 3
Setting up project security to control access to displays	Chapter 18
Setting up display navigation and creating a display hierarchy	Chapter 19
Setting up how objects are used at runtime	Chapter 10

Using the Graphics Display editor

The Graphics Display editor opens when you create or open a graphic display. Each display is stored in the Displays folder. You can open and work on multiple graphic displays at the same time.



Creating and opening graphic displays

To create a graphic display:

1. In the Graphics folder, do one of the following:
   - right-click Displays and then click New
   - click the New Display tool
   - drag and drop the Displays icon into the work area

New Display tool

2. On the Edit menu, click Display Settings to open the Display Settings dialog box and specify settings for the display.

   For more information, see page 8-10.

3. Create the objects you want to put in the display.

   For information about creating graphic objects, see Chapter 9.

Save tool

4. On the File menu click Save, or click the Save tool.
5. In the Component name box, type a name for the display, and then click OK.

   The display is added to the list in the Displays folder.

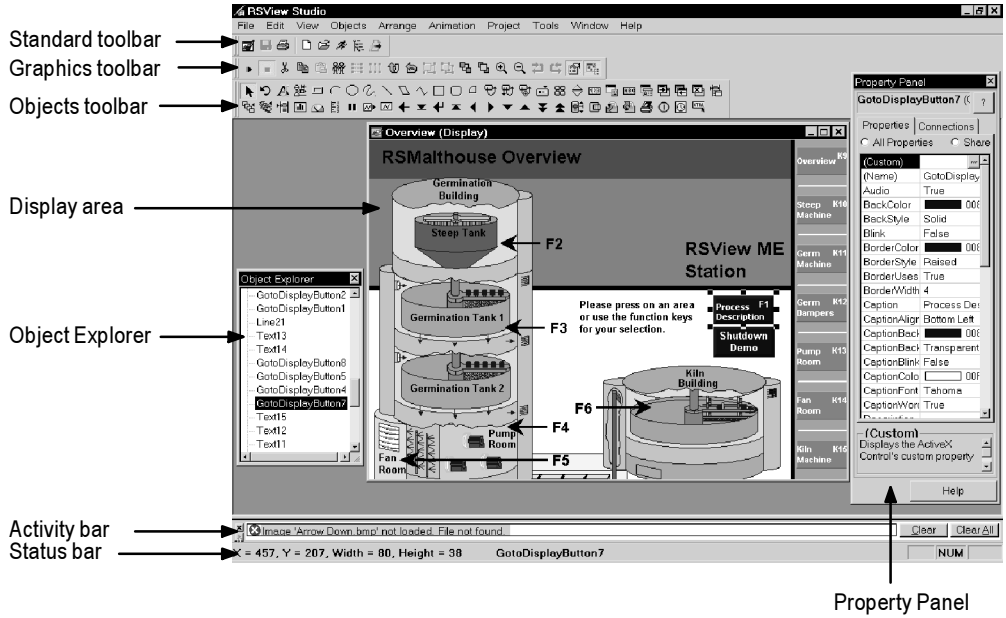
   The display is created as a Replace display by default, but you can change it to an On Top display in the Display Settings dialog box. For more information, see page 8-12.

To open a graphic display:

▶ In the Graphics folder, open the Displays folder and then double-click the display name, or right-click the display name and then click Open.

You can also drag and drop the display from the Project Explorer to an empty area in the RSView Studio main window.

This example shows a graphic display from the Malthouse sample project, with the Project Explorer closed.



The parts of the editor

This section provides an overview of the main parts of the Graphics Display editor that you use to create your graphic displays.

Toolbars

The Graphics Display editor provides an array of toolbars in addition to the Standard toolbar available in other editors. The toolbars contain tools for creating and configuring graphic objects.

The illustration shows the Graphics and Objects toolbars, which you'll probably want to keep open at all times. There are other toolbars that you can use when performing specific tasks such as assigning colors to objects. For more information, see page 8-6.

Display area

This area is your graphic display. The appearance of the display in the Graphics Display editor is similar to what you see at runtime, except for the title bar and the display position. If you change the zoom settings, or resize a Replace display by dragging the borders, these changes do not affect the appearance of the runtime display.

If you want to use a title bar at runtime, set up the title bar in the Project Settings editor. Also use the Project Settings editor to specify the display size (for Replace displays), position, and whether to use a border at runtime. For more information, see page 4-7.

You can change the display type, color, and other settings in the Display Settings dialog box. For more information, see page 8-12.

Property Panel

The Property Panel displays the properties of the selected objects, and shows what values are assigned to the properties. For example, it shows whether an object's background style (BackStyle) is solid or transparent. It also lists the object's controls, and shows which tags or expressions have been assigned to them.

In addition to displaying information, you can use the Property Panel to modify the properties of graphic objects and assign tags and expressions to the objects.

You can keep the Property Panel open as you work on different objects and in different displays. For more information, see page 9-24.

Object Explorer

The Object Explorer lists all the objects and groups of objects in your display (except objects that are converted to wallpaper). You can click an object in the list to select it in your display. You can also right-click the object to open the context menu for the object.

You can keep the Object Explorer open as you work on different objects and in different displays. For more information, see page 9-20.

Status bar

The status bar describes the action to be performed by the selected menu item or tool. The status bar also displays the X and Y coordinates, width, height, and name of the selected object.

Tools and tips for working in the Graphics Display editor

This section describes features of the Graphics Display editor that help you create your displays. It describes how to:

- use context menus and toolbars to perform actions quickly
- set up a grid that you can use to position and size objects precisely

- zoom in when you need to look at details closely
- correct mistakes
- test your displays as you work

Using context menus

No matter where you are in the Graphics Display editor, you can open a menu by clicking the right mouse button. This is often quicker than moving the mouse up to the menus at the top of the screen.

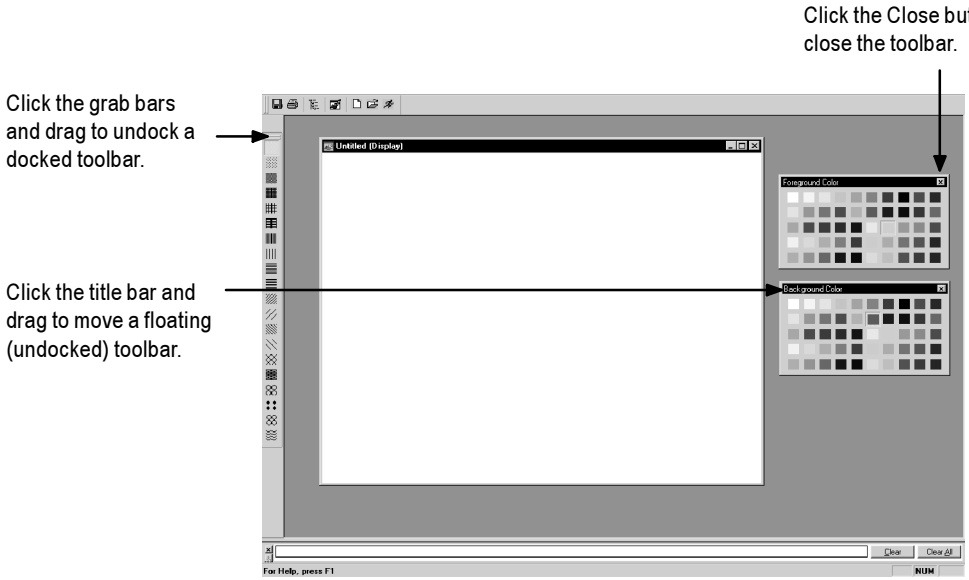
The items on the menu depend on the cursor's location. For example, when you right-click an object, the menu contains the most common actions you can perform on that object.

When you right-click an object...

... a menu opens. It contains menu items for working with the selected object.

Using the toolbars

The toolbars provide another convenient way to perform an action quickly. You can customize your work area by dragging the toolbars to any location on the screen. You can also dock them to the inside edges of the RSView Studio main window.



To display a toolbar:

- On the View menu, select Toolbars, and then click the toolbar to display.

  The menu displays a check mark beside the toolbars that are already open.

To undock a toolbar:

- Click the double "grab bars" at the left or top of the toolbar, and then drag. Press the Ctrl key to prevent accidental redocking.

To move an undocked toolbar:

- Click the toolbar's title bar, and then drag. Press the Ctrl key to prevent accidental redocking.

To dock a toolbar:

- Click the toolbar's title bar, and then drag to any edge of the work area.

To close a toolbar:

- On the View menu, select Toolbars, and then click the toolbar to close, or click the toolbar's Close button.

Using the grid

To size and position objects precisely, use the grid. You can change the grid settings at any time during the drawing process.

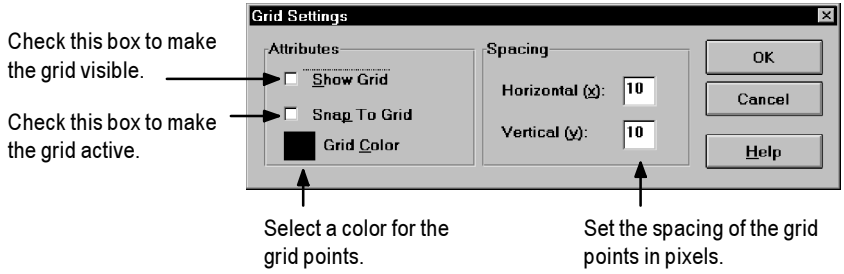
The grid can be active or passive. When the grid is active, all the objects you draw or position are pulled to the closest grid point. This makes it easy to align and size objects. When the grid is passive, it is visible but does not affect the position of your objects.

Make the grid passive to position an element between the grid lines. Make the grid active, and the next object you draw or place is automatically aligned with the grid. Making the grid active does not affect the placement of existing objects.

The grid is visible during project development only. It is not visible at runtime.

To set up the grid:

1. On the View menu, click Grid Settings, or right-click an empty area of the display and then click Grid Settings.



2. Specify the color and spacing of the grid points.
3. To turn on the grid, click Show Grid.

   When the Grid Settings dialog box is not open you can turn the grid on by clicking Show Grid on the View menu.
4. To make the grid active, click Snap To Grid.

   When the Grid Settings dialog box is not open you can make the grid active by clicking Snap On on the View menu.
5. Click OK.

To make the grid passive:

- In the Grid Settings dialog box, clear the Snap To Grid check box, or on the View menu deselect Snap On.

There is no check mark beside the menu item when it is deselected.

To turn off the grid:

▶ In the Grid Setting dialog box, clear the Show Grid check box, or on the View menu, deselect Show Grid.

Zooming in and out

To magnify or reduce your view of a graphic display, use Zoom In and Zoom Out. Zoom In magnifies objects; Zoom Out reduces magnification.


Zoom In tool

To zoom in on objects:

1. Select the objects you want to zoom in on.
2. On the View menu, click Zoom In, or click the Zoom In tool.


Zoom Out tool

To zoom out:

▶ On the View menu, click Zoom Out, or click the Zoom Out tool.

Correcting mistakes

If you change your mind about something you did, you can undo the action. If you change your mind again, you can redo the action.

You can undo and redo all the operations you performed since you last saved the display, one operation at a time.

The operations you perform between opening and closing a dialog box are treated as a single operation. Operations you perform in the Property Panel are treated as separate operations.


Undo tool

To undo an operation:

▶ On the Edit menu, click Undo, or click the Undo tool.


Redo tool

To redo an operation:

▶ On the Edit menu, click Redo, or click the Redo tool.

Testing your displays as you work

To test the objects in your displays as you work, use the Test Display tool to switch to test display mode. When you are finished testing, switch back to edit display mode to continue editing.

IMPORTANT Test display mode is not the same as running the display. It does not change the appearance or position of the display as set up in the Display Settings dialog box. Alarm and information messages are not displayed, although if communications are set up, tag values are read and written. Display navigation, data logging, parameters, and macros do not work in this mode. If you want to test these features, test the project as described on page 20-3.

Using the activity bar when in test display mode

The activity bar shows messages about system activities when you test your graphic displays. You can specify the types of messages to display in the activity bar, move the bar, resize it, and clear the messages in it.

For information about using the activity bar, see page 2-4. For information about specifying the types of activities to show in the activity bar, see page 15-2.


Test Display tool

To use test display mode:

- On the View menu, click Test Display, or click the Test Display tool.


Edit Display tool

To return to edit display mode:

- On the View menu, click Edit Display, or click the Edit Display tool.

Setting up graphic displays

To set up a graphic display, specify its type, background color, and runtime behavior in the Display Settings dialog box. You can specify and edit the display settings at any time while you work on your display.

About display types

Replace

Replace is the default display type. Replace displays are full-sized displays. They use the project window size specified in the Project Settings editor.

For more information about the project window size, see page 4-8.

At runtime, you can have only one Replace display open at a time. When the operator opens a Replace display, this is what happens:

- The Replace display that was open closes.
- On Top displays that *do not* use the Cannot Be Replaced option are closed.
- The new Replace display opens.
- On Top displays that use the Cannot Be Replaced option remain open, on top of the new Replace display.

If the operator attempts to open a Replace display that is already open (for example, using a Goto Display button to which the same display is assigned), the display does not close and RSView sends an error message to the activity log.

On Top

Use this option to create "pop-up" displays that open on top of the current Replace display. Usually, On Top displays are smaller than Replace displays, so the operator doesn't lose track of display navigation.

You can open multiple On Top displays. If more than one On Top display is open, the display that has focus, or had the most recent focus, appears on top.

Use the Cannot Be Replaced option if you want the On Top display to remain open when a new Replace display is opened.

On Top displays do not have a Close button in the title bar. Be sure to create a Close button graphic object in On Top displays so the operator can close them.

The operator cannot move an On Top display by dragging its title bar. The runtime position of the display is fixed (according to the position settings defined for the display).

Resizing displays

The project window size is used for all Replace displays. If you change the project window size after you have designed any graphic displays, Replace displays are resized, but any objects in the displays remain in the same position as before. On Top displays are not resized.

For information about specifying the project window size, see page 4-8.

Changing the display area while working

You can change the display area of a display while you're working on it by dragging the border of the display area. For example, you might want to make the display area smaller so you can see parts of two displays in order to drag and drop objects between them.

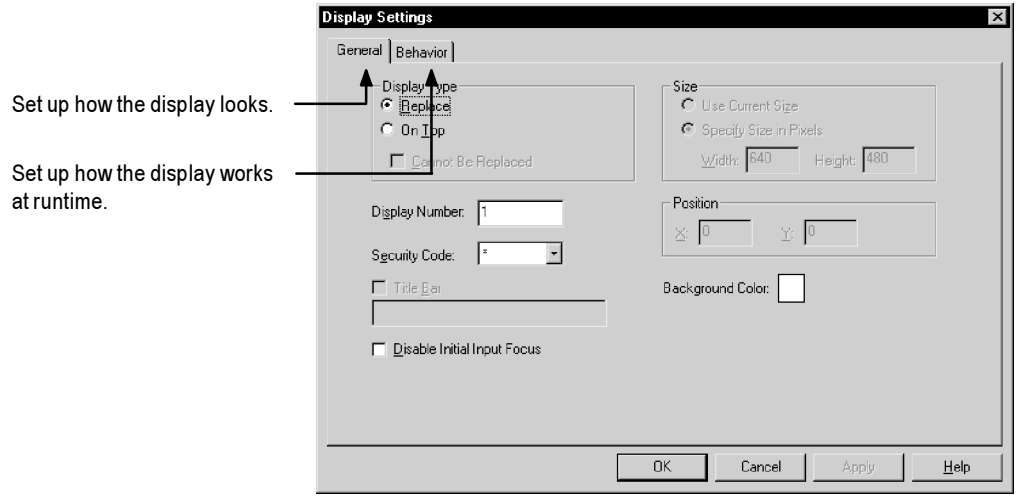
Changing the display area in this manner does not change the display size for Replace displays. For On Top displays that are sized with the "Use Current Size" option, dragging the border does resize the display.

Another way to arrange multiple displays while working on them is to use the options on the Windows menu. For example, Tile Horizontal arranges all the open displays with as much of the top part of each display showing as possible.

Specifying display settings

To specify display settings:

1. On the Edit menu, click Display Settings, or right-click an empty area of the display and then click Display Settings.



2. In the General tab, specify these settings:

Display Type
Select the display type.

If you select On Top and you want the display to remain open when a new Replace display opens, select Cannot Be Replaced.

Display Number
For Replace displays, if you want the data source to open the display remotely at runtime, specify a unique display number. Otherwise, accept the default number.

For information about remote display changes, see page 19-7.

Security Code
To restrict access to the display, select a security code. At runtime, only users with access to the security code can open the display.

For information about setting up security and user accounts, see Chapter 18.

Title Bar
This option is available only for On Top displays. To use a title bar, check this box and then type the title in the box below.

Disable Initial Input Focus
Check this box if you don't want the display to have input focus when it opens.

This option is useful for On Top displays, if you want the Replace display to retain the focus after the On Top display opens.

The operator can still touch or click the On Top display to give it input focus.

Size
For On Top displays, specify the display size. The operator cannot resize the display at runtime.

- Use Current Size—Select this option to size the display using the mouse.
- Specify Size in Pixels—Select this option to specify the width and height manually. Type the width and height (in pixels) in the boxes.

Position

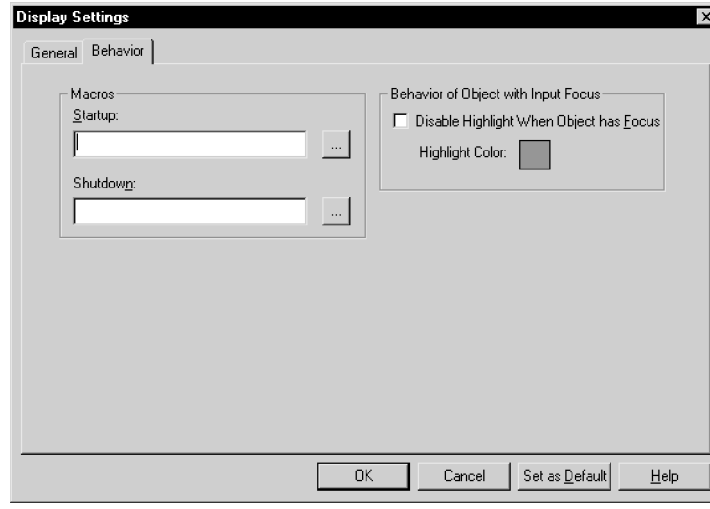
For On Top displays, specify the display position relative to the upper left inside corner of the project window. (That is, inside the window's border and below the title bar, if these are selected in the Project Settings editor.)

- X—Type the number of pixels from the left of the project window's edge.
- Y—Type the number of pixels from the top of the project window's edge.

IMPORTANT If the operator opens the display using a Goto Display button that uses the "Display position enabled" option, the position specified by the button overrides the position specified in the Display Settings dialog box.

Background Color

Click this box to select a different background color for the display.



3. Click the Behavior tab, and then specify these settings:

Startup Macro

Browse button

Click the Browse button to select a macro to run while the display opens.

A macro assigns values to tags. For more information, see page 7-32.

Shutdown Macro
Click the Browse button to select a macro to run after the display closes.

Disable Highlight When Object has Focus
Check this box if you don't want a highlight box to appear around objects when they have the input focus. (When an object has input focus it is ready to accept keyboard input.)

The operator can still select and use input objects, but there is no visual indicator that the object is selected.

For more information about input focus, see page 10-8.

Highlight Color
Click this box to select a different highlight color for input objects.

Select a color that stands out from the display's background color or wallpaper objects. For information about wallpaper objects, see the next section.

4. Click OK to save your changes and close the dialog box.

Creating a background for your display

You can create a background for your graphic display by converting graphic objects to wallpaper. When objects are converted to wallpaper, they are locked into position and become an unchanging background for the other objects in the display.

Converting objects that do not need to be animated or updated with tag values can significantly improve the runtime performance of a graphic display.

Objects that have been converted to wallpaper cannot be selected or edited until you unlock the wallpaper. Also, animations attached to the wallpaper objects are not in effect. However, animations are restored when you unlock the wallpaper.

Similarly, any tags or expressions assigned to an object become inactive when the object is converted to wallpaper. Connections are restored if you unlock the wallpaper.

To manage a number of objects easily, group the objects, and then convert the group to wallpaper.

To convert objects to wallpaper:

1. Select the objects to convert.

For information about selecting objects, see page 9-19.

2. On the Edit menu, select Wallpaper, and then click Convert to Wallpaper.

   For a single object, you can right-click it and then click Convert to Wallpaper.

To unlock the wallpaper:

▶ On the Edit menu, select Wallpaper, and then click Unlock All Wallpaper.

All objects in the graphic display are converted back to their original state.

Using graphic libraries

RSView Studio comes with a set of libraries, contained in the Libraries folder. As with a public library, the graphics libraries can provide you with source materials and reference information.

Each graphic library consists of a graphic display, with the file extension .gfx. The library displays contain graphic objects that you might find useful in your own project. Many of the objects are preconfigured with animation. For example, see the Conveyor parts library.

You can:

- look at the objects and displays to get ideas for your own project
- drag and drop (or copy and paste) objects from the libraries into your own displays

  For information about copying objects from a library into your graphic display, see page 9-38.
- use the objects as they are or change them to suit your needs
- create your own libraries of objects
- use libraries as displays in your project

To open a graphic library:

1. In the Project Explorer, open the Graphics folder, and then open the Libraries folder.
2. Double-click the library name, or right-click it and then click Open.

Creating graphic libraries

You can create a graphic library in the Libraries folder, or create a graphic display in the Displays folder and then add the display to the Libraries folder.

To create a graphic library:

1. In the Graphics folder, right-click Libraries and then click New.
2. Create the objects you want to put in the library.

   For information about creating graphic objects, see Chapter 9.
3. On the File menu click Save, or click the Save tool.
4. In the Component name box, type a name for the library, and then click OK.

   The library is added to the list in the Libraries folder.


Save tool

You can also create a graphic display and then use Add Component Into Project to add the display to the Libraries folder.

To add a graphic display to the library:

1. Create the graphic display.
2. In the Project Explorer, in the Graphics folder, right-click the Libraries icon.
3. Click Add Component Into Project.
4. In the dialog box, navigate to the Gfx folder, and then click the .gfx file for the display to use.

   The Gfx folder is located in \Documents and Settings\All Users\Documents\RSView Enterprise\ME\HMI projects*Project Name*

   where *Project Name* is the name of your project.
5. Click Open. The display is copied into the Libraries folder.

Using libraries as displays in your project

The graphic libraries are available on the development computer, but do not appear at runtime. To use a library as a graphic display at runtime, you must add the library into your project's folder of graphic displays.

To use a library as a display in your project:

1. In the Project Explorer, in the Graphics folder, right-click the Displays icon.
2. Click Add Component Into Project.
3. In the dialog box, navigate to the Libraries folder, and then click the .gfx file for the library to use.

   The Libraries folder is located in \Documents and Settings\All Users\Documents\RSView Enterprise\ME.
4. Click Open. The library is copied into the Displays folder.

Location of library components

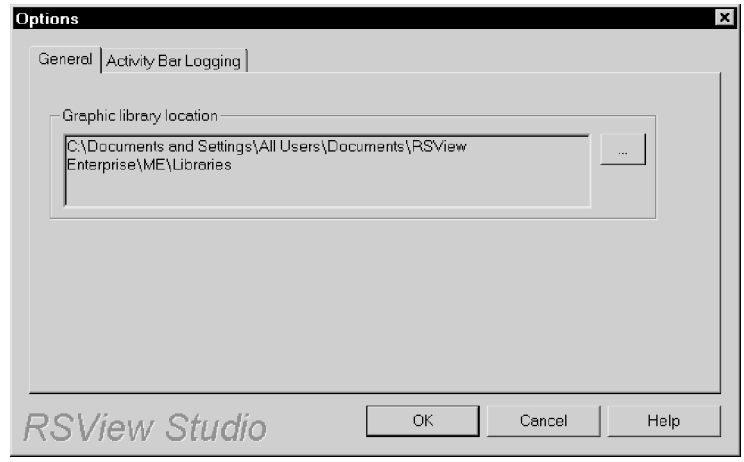
The Libraries folder is located in \Documents and Settings\All Users\Documents\RSView Enterprise\ME.

If desired, you can specify a different directory in which to store library components. If you specify a different directory, RSView saves graphic libraries that you add or create in the new directory. Similarly, when you open a library component RSView looks for the component in the specified directory.

If you specify a different directory but want to use the libraries that come with RSView, use My Computer or Windows Explorer to copy the library component files into the directory you've specified, or else change the path back to the default path when you want to open an RSView library component.

To specify a new path for graphic libraries:

1. On the Tools menu, click Options.



2. Click the Browse button.

Browse button

3. In the dialog box, navigate to the directory where you want to store library component files.

   To create a new folder, click New Folder and then specify the name for the folder. Click the new folder to select it.

4. With the desired folder selected, click OK.

5. Click OK to close the Options dialog box.

Importing images into your project

You can use these types of external graphic files in your graphic displays:

- .bmp—bitmap images
- .dxf—AutoCAD® files
- .wmf—Windows meta files

You import and place .dxf and .wmf files in your displays in one step. Once imported, they are converted to drawing objects. For more information about using these types of files in your displays, see page 9-17.

Bitmap images that come with RSView Studio

RSView Studio comes with sets of bitmaps that are useful for illustrating graphic objects and displays:

- arrows
- DIN symbols
- ISA symbols
- keyboard button symbols such as Enter and Page Up
- parts such as buttons, conveyors, pipes, tanks, and valves

The symbols and most of the arrows are monochrome (that is, use only two colors, one for the foreground and one for the background).

You can configure the foreground and background colors for the monochrome images that you use for your objects.

For color images, you can specify whether to use a transparent or solid background. If you select the transparent background style, the black portions of the image become transparent.

For detailed information about configuring objects, see Chapter 10.

Location of bitmap files

The bitmap files that come with RSView Studio are stored in this directory:

\Documents and Settings\All Users\Documents\RSView Enterprise\Images

The images are in folders called Arrows, DIN, ISA, ListKey, and Parts.

Importing bitmap images

To use bitmap images, you can:

- import the images first, and then place them in your displays as needed. This method is useful for bitmaps that you use to illustrate your displays.

  For information about placing images in your display once you've imported them, see page 9-11.

- use the Image Browser to import images as needed while configuring your graphic objects. This method is useful for bitmaps that you use for labels on your graphic objects.

  For information about using the Image Browser, see page 8-22.

- copy and paste images from the graphic libraries

  For information about copying and pasting objects, see page 9-39.

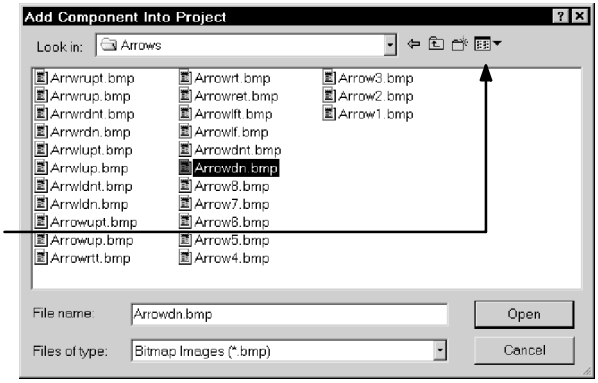
- copy and paste images from one project to another

  For information about opening two projects at once, see page 4-6.

If you will be using bitmaps that have more than 256 colors, before importing the bitmaps configure your video adapter to display more than 256 colors. This will ensure that the colors of imported images appear the same as in the original. For more tips about using bitmap images, see page 8-24.

To import bitmap images:

1. In the Graphics folder, right-click Images and then click Add Component Into Project.



To view the bitmap images, click this button and then click Thumbnails.

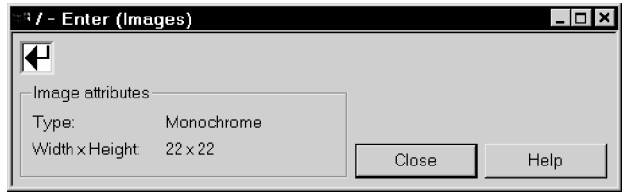
2. Navigate to the directory where the bitmap file is stored, and then click the file name.

   Shift-click or Ctrl-click to select additional files.

3. Click Open to add the selected files to the list in the Images folder.

To view a bitmap image that you've already imported:

▶ In the Images folder, double-click the image name, or right-click it and then click Open.



Using the Image Browser to import bitmaps

Use the Image Browser to import bitmap images as needed while you configure graphic objects.

In the Image Browser you can:

- import images into the project

- select the image to use on a graphic object
- remove images from the project

To open the Image Browser, use one of these methods:

Browse button

- In an object's Properties dialog box, click the Browse button next to the Image box.

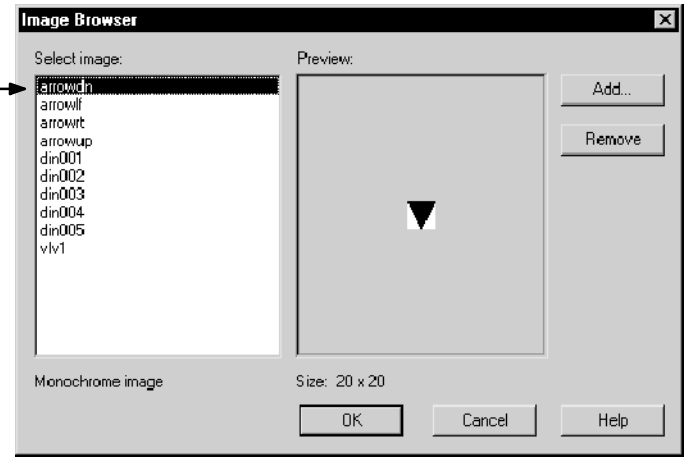
  Depending on the type of object, the Image box could be located on the General tab, Label tab, or States tab.

  For information about opening the Properties dialog box, see page 9-23.

- With one or more objects selected, in the Property Panel click the Image property, and then click the Browse button.

  For information about opening the Property Panel, see page 9-24.

Click an object to select it.



To use the Image Browser to import and select an image:

1. Click Add.
2. Navigate to the directory where the bitmap file is stored, and then click the file name.

   Shift-click or Ctrl-click to select additional files.

3. Click Open to add the images to the Select image list. The first image you added is displayed in the Preview box.

   The images are also added to the Images folder in the Project Explorer.

4. To view another image, click it in the list.

   To scroll quickly through all the images in the list, select the first image and then press the Down Arrow key.

5. When you're finished viewing images, click the image to use on the object's label.

6. Click OK to close the Image Browser and use the selected image on the object's label. To close the browser without using the selected image, click Cancel.

   Clicking Cancel does not remove the imported images from the Images folder.

To use the Image Browser to remove images from the project:

1. In the Select image list, click the file to remove.

   Shift-click or Ctrl-click to select additional files.

2. Click Remove to delete the images from the project.

3. To close the browser, click OK or Cancel.

   Clicking Cancel does not restore the images you removed.

You can also remove an image by clicking it in the Images folder and then right-clicking Remove or Delete. For more information, see page 2-13.

Tips for using bitmaps

Bitmaps consume Windows resources, so when using bitmaps follow these guidelines:

- Avoid unnecessary color depth.

  The more colors you use, the more memory is consumed:

This bitmap type	Consumes this many bits per pixel
Monochrome	1
16-color	4
256-color	8 (1 byte)
64-K color	16 (2 bytes)
16 million color	24 (3 bytes)

For example, a 24-bit image that measures 800x600 pixels consumes 1440 KB of memory. If the bitmap color depth is decreased to 256 colors, the image might have minor color loss, but the new image uses only 480 KB of memory.

- Avoid using unnecessary bitmaps.

  For simple illustrations, create graphic objects using the drawing tools. You can change a bitmap to a collection of drawing objects by converting the bitmap to wallpaper, tracing over the bitmap with the drawing tools, and then deleting the bitmap.

  Use your judgement here; if the illustration is complex, a bitmap might display more quickly at runtime than a huge number of drawing objects would.

Using parameter files

To use the same graphic display with different sets of tags, use parameter files and tag placeholders. Using tag placeholders can be quicker than duplicating a display and reconfiguring the objects in it to use a different set of tags, especially when the display uses a lot of tags. Using parameter files also reduces the size of the runtime project file.

The parameter file specifies which tags to substitute for the placeholders in the display, by assigning one tag to each unique placeholder in the display. Create a parameter file for each set of tags that you want to use with the same graphic display.

At runtime, the tag values that are displayed depend on which parameter file is used when the display opens. When you open the display, the tags specified in the parameter file replace the tag placeholders.

About tag placeholders

A tag placeholder consists of the # symbol and a number between 1 and 500, for example, #1. You can use a placeholder anywhere that you would normally assign a tag.

For more information about using tag placeholders, see page 9-36.

Assigning parameter files to graphic displays

You can use parameter files with:

- the graphic display that opens when the project is first run. Specify the graphic display to open, and the parameter file to use with it, in the Startup editor.
- graphic displays that are opened using Goto Display buttons. Specify the graphic display to open, and the parameter file to use with it, when you set up the button.

Example: Using a parameter file to replace tag placeholders

This example shows how to use a graphic display called Canning Overview with two sets of tags, one for canning corn, and one for canning peas.

The Canning Overview display is opened from a graphic display called Main Menu.

1. Create these sets of tags:

Tag type	Tag name	Tag name
String	Corn_Name	Pea_Name
Analog	Corn_Temp	Pea_Temp
Analog	Corn_Weight	Pea_Weight
Analog	Corn_Level	Pea_Level

2. Create two parameter files, called Corn and Peas, containing these parameters:

Corn	Peas
#1=Corn_Name	#1=Pea_Name
#2=Corn_Temp	#2=Pea_Temp
#3=Corn_Weight	#3=Pea_Weight
#4=Corn_Level	#4=Pea_Level

3. In the Canning Overview display, assign tag placeholders to the Value controls for these graphic objects:

This graphic object	Uses this tag placeholder
String display	#1
Numeric display 1	#2

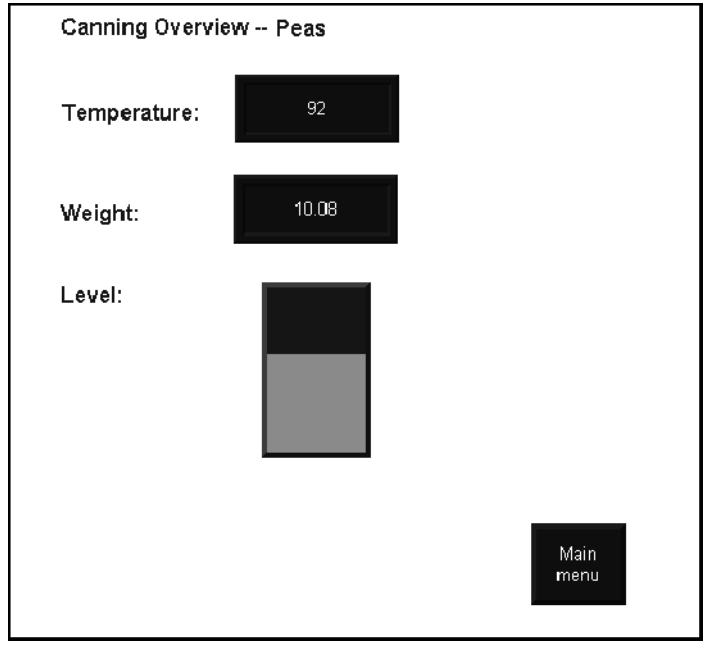
This graphic object	Uses this tag placeholder
Numeric display 2	#3
Bar Graph	#4

4. Use descriptive text to illustrate the objects in the display.

5. In the Main Menu display, create two Goto Display buttons for opening the Canning display. Assign the Corn parameter file to one button, and the Peas parameter file to the other.

At runtime, when the operator presses the Peas button in the Main Menu, the Canning Overview display opens and shows the values of the Pea_ tags. When the operator presses the Corn button, the values of the Corn_ tags are displayed.

The Canning Overview display looks like this when the operator presses the Peas button:



Summary of steps

Follow these steps to use parameter files and tag placeholders:

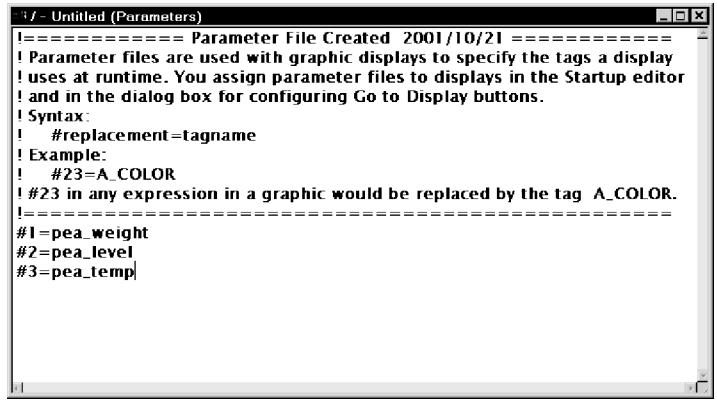
1. In the Parameters editor, create parameter files for each set of tags that the display will use. In the parameter files, specify which tags to substitute for which placeholders.
2. In the Graphics Display editor, create graphic objects and assign tag placeholders to the objects.

   For information about creating graphic objects and assigning tag placeholders, see Chapter 9.
3. In the Graphics Display editor, create Goto Display buttons for opening the display containing tag placeholders. Specify the appropriate parameter files in the Goto Display Button Properties dialog box.
4. If the startup display uses tag placeholders, in the Startup editor specify the parameter file to use with the startup display.

   For information about the Startup editor, see Chapter 20.

Using the Parameters editor

Use the Parameters editor to create one or more files of tag placeholder replacements. Each file is stored in the editor's folder. You can open and work on multiple parameter files at the same time.



Creating parameter files

To create a parameter file:

1. Open the Parameters editor.
2. Type one entry for each unique placeholder in the display, in the format <placeholder>=<tag name>.

   The placeholder consists of the # symbol and a number between 1 and 500. For example:

   #1=pea_weight
   #2=pea_level
   #3=pea_temp

   To open the Tags dialog box and select a tag, double-click the editor where you want to insert the tag name. The selected tag name is inserted in front of the cursor.


Save tool

3. On the File menu click Save, or click the Save tool.
4. In the Component name box, type a name for the file, and then click OK.

Using local messages

Use local messages to give the operator ongoing information about the status of devices and processes. For example, you might use local messages to describe the status of a device whose condition cannot be shown graphically with complete accuracy.

The messages you create in the Local Messages editor are displayed in Local Message display objects in graphic displays. You can use multiple Local Message display objects in your project, and link each object to a different file of messages. Or, you can use the same file of messages for multiple Local Message display objects.

When to use local messages

Use local messages to give the operator information in a specific graphic display while the display is open. To give the operator information no matter which display is open, use information messages.

For details about information messages, see Chapter 14.

Preparing to set up local messages

As your project is running, information is continually sent to the data source about the state of various processes. For example, your project might be monitoring whether a valve is open or closed, or the temperature in a boiler. Values representing the status of these processes are sent to the data source.

The data source

The data source can be memory or a device such as a programmable logic controller or OPC server. RSView writes values to and reads values from the data source. The data source is configured to exchange information (in the form of numeric or string values) between RSView and the physical machine that your project is controlling.

Identifying the tags and values to monitor

To set up local messages, determine which tags associated with machine processes to monitor, and identify the values for those tags that will trigger local messages.

For information about creating tags, see Chapter 7.

How local messages work

These are the key parts of the local message system:

- Local message files—text files containing lists of messages, with a numeric trigger value for each message
- Local Message display object—a graphic object that displays local messages when the Value control assigned to the object matches a message's trigger value
- Value control—a tag or expression. When the value of this control matches a message's trigger value, the local message display object displays the associated message.

The Local Message display object always appears in the graphic display it's placed in, whether or not there is a message to display. However, the operator does not see the message unless the object is located in the display the operator is currently viewing.

The following example shows how the key parts of the local message system work together.

Example: Displaying local messages

This example shows how to notify the operator of the status of a hoist.

1. Create an analog tag called Hoist_Status. This tag points to an address in a programmable controller that is linked to sensors on the hoist. The tag has five possible values:

The tag has this value	When the hoist has this status
1	At bottom
2	Raising
3	Stopped between the top and bottom
4	Lowering
5	At top

2. In the Local Messages editor, create these messages with trigger values matching the values that will be sent to the Hoist_Status tag:

Trigger value	Message
1	The hoist is ready to rise.
2	The hoist is raising the pallet.
3	The hoist has stopped.
4	The hoist is lowering the pallet.
5	The hoist is finished rising.

   Save the message file with the name "Hoist status."

3. In the Graphics Display editor, create a Local Message display object. In the object's Properties dialog box, assign the Hoist_Status tag to the Value control, and select the Hoist status message file.

At runtime, when the operator views the graphic display containing the Local Message display object, the status of the hoist is displayed.

Local messages and trigger values

Create messages associated with each tag value that you want to inform the operator about. Assign each message a trigger value, and configure the data source to send the trigger value to the Value control.

The trigger value can be any non-zero integer value (positive or negative). Trigger values do not need to be contiguous, but they must be unique for each message. For example, you could use trigger values of 1, 2, and 3, or values of 10, 20, and 30.

If you use an analog tag or an expression, you can use any non-zero integer or floating point value to trigger an alarm. Floating point values are rounded to the nearest integer. For information about how values are rounded, see page 7-3.

Trigger values cannot be 0. Digital tags have two possible values, 0 and 1. Therefore, if you use a digital tag you can only use the value 1 to trigger a message. If you want to use a digital tag to trigger two different messages, create an expression that adds 1 to the digital tag's value. That way, you can use the trigger values 1 and 2.

When the Value control's value is 0, the Local Message display object is cleared.

Summary of steps

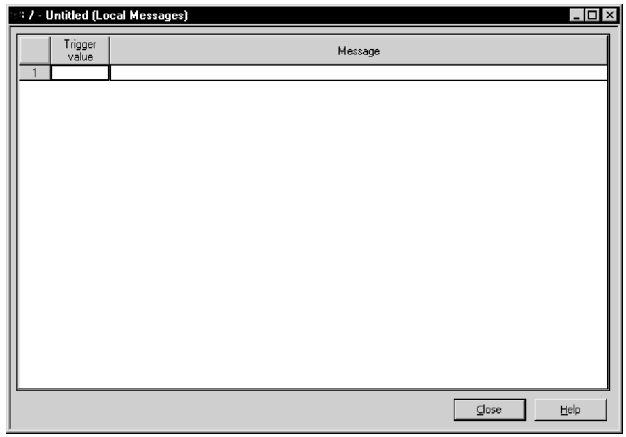
Follow these steps to configure local messages:

1. In the Local Messages editor, set up the messages and their trigger values.
2. In the Graphics Display editor, create Local Message display objects in the graphic displays in which you want the messages to appear at runtime. For each Local Message object, assign a tag or expression to the Value control and specify the file of messages to display.

   For information about creating graphic objects, see Chapter 9.

Using the Local Messages editor

Use the Local Messages editor to create one or more files of local messages. Each file is stored in the editor's folder. You can open and work on multiple message files at the same time.



You can define up to 10,000 messages in each message file.

Creating local messages

To create local messages:

1. Open the Local Messages editor.
2. Specify these properties for the message:

   Trigger value
   Type a non-zero integer value. When the Value control changes to this value, the associated message is generated. This column cannot be blank.

   For more information about trigger values, see page 8-32.

   Message
   Type the message, up to 256 characters. You can use the new line characters, \n, to specify that the message continues at the beginning of the next line.

   If you want the character sequence "\n" to appear in the message, type "\\n". This way the sequence won't be interpreted as the new line characters. For example, to create the message "Logging to \norm's bakery\logs has been interrupted." you would type this: Logging to \\norm's bakery\logs has been interrupted.

3. Repeat steps 1 and 2 to create additional messages.
4. To sort the messages by trigger value, highlight the rows to sort, right-click in any of the selected rows, and then click Sort.
5. On the File menu click Save, or click the Save tool.
6. In the Component name box, type a name for the file, and then click OK.
7. Click Close.


Save tool

To delete a message:

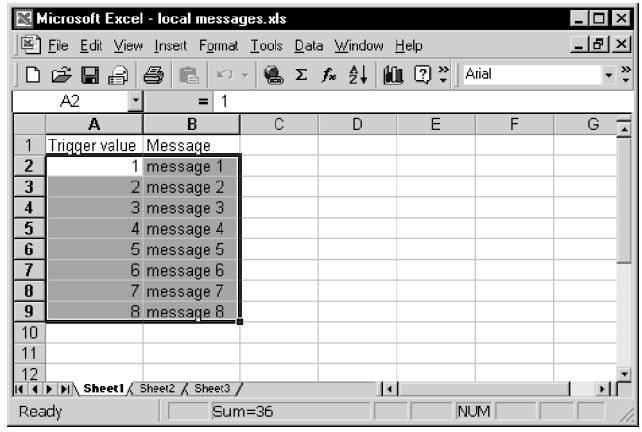
▶ Select any cell in the message's row, and then press Delete. Shift-click in a column to select cells for multiple messages.

To copy a message:

1. In the Message column, select one or more messages and then press Ctrl-C (or right-click the selected cells and then click Copy).
2. In the Message column, click the cell to paste the first message in, and then press Ctrl-V (or right-click the cell and then click Paste).

Creating messages in a spreadsheet application

You can also create local messages in a spreadsheet application such as Microsoft Excel, and then copy the messages into the Local Messages editor.



To create messages in a spreadsheet application:

▶ Create one message per row, as follows:

- In column 1, type the trigger value.
- In column 2, type the message.

Type the messages in the order you want them to appear in the Local Messages editor.

To copy the messages into the Local Messages editor:

1. In the application where you created the messages, select the cells for the trigger values and messages to copy, and then press Ctrl-C (or right-click the selected cells and then click Copy).
2. In the Local Messages editor, click in the Trigger value column for the first message and then press Ctrl-V (or right-click in the column and then click Paste).

   The cell contents from the spreadsheet application are pasted into the current and succeeding rows.

How the Local Message display graphic object works

When you open a graphic display at runtime, RSView reads the value of the Value control and updates the Local Message display object based on the value.

What is displayed

- If the Value control is unassigned, the display is filled with question marks (?).
- The Value control is rounded to the nearest integer. If the value does not match any of the trigger values in the specified message file, the display is filled with questions marks (?).

  For information about how values are rounded, see page 7-3.
- If the message is too long to fit in the object, the last displayed character is replaced with an asterisk (*).
- When the Value control's value is 0, the display is cleared.

Printing displays

You can print your graphic displays on the development computer. This might be useful if you want other people to review the displays before implementing the project, or if you want to keep a visual record of the displays.

You can also print graphic displays at runtime, to provide a printed record of process values such as trend data.

For information about printing on the development computer, see page 2-14.

Printing displays at runtime

When you print a display at runtime, everything on the screen is printed, including the current display, pop-up windows, and any visible background applications.

For information on specifying the printer to use at runtime, see page 22-6.

To print graphic displays at runtime, use one or both of these methods:

- Create Display Print buttons in the graphic displays you want to print. At runtime, the operator presses the buttons to print the displays.

  For information about creating graphic objects, see Chapter 9.

- Assign a tag or expression to the Remote Display Print control (in the Global Connections editor). When the value of the tag or expression changes from 0 to a non-zero value, the current displays are automatically printed.

  Program the data source to trigger the change as often as you want the data printed.

  For more information about setting up remote display printing, see page 19-10.

Chapter

9

Creating and working with graphic objects

This chapter describes the types of graphic objects and outlines how to:

- create interactive, drawing, and ActiveX objects
- select and deselect objects and use the Object Explorer
- use the Properties dialog box and Property Panel to configure objects
- color objects
- name objects
- test how objects look in different states
- assign tags and expressions to objects
- replace tags using tag substitution
- use tag placeholders
- move, copy, duplicate, resize, reshape, and delete objects
- group and ungroup objects, and edit group objects
- arrange objects and lock objects into position

For information about configuring graphic objects, see Chapter 10.

For examples of how to configure objects, see the sample projects that come with RSView Studio. The Help also provides examples of how to use objects.

Types of graphic objects

The components that make up a graphic display are called graphic objects. Use objects to control your process and project.

RSView comes with a complete range of configurable objects such as push buttons, list selectors, bar graphs, and trends. Some objects interact with the data source, allowing the operator to change or view tag values. For example, the operator can push a button to set a tag value to 1, causing a programmable controller to start a conveyor belt. Other objects are used to control your project. For example, there are button objects that you can use to change displays and scroll through lists.

RSView also comes with drawing objects that you can use to illustrate your graphic displays. The drawing objects include text, bitmap images, and geometric and freehand shapes.

RSView also supports the use of ActiveX objects—third-party software components that you can use to control processes and display information. The ActiveX objects available depend on which third-party applications are installed on your development computer. For example, products such as Microsoft Visual Basic®, Rockwell Software RSTools™, and Microsoft Office provide ActiveX objects that are configurable in RSView Studio.

Using the tables

The tables beginning on the next page will help you choose which objects to use to control your project and process. The tables group the objects according to function, provide an overview of what each object does, and list cross-references to more detailed information about using the objects.

About controls

Many of the objects use *controls* to interact with the data source. A control is the link between the object and the data source. Depending on an object's function, the object may have more than one control. For example, a Momentary Push button has a Value control and an Indicator control. The Value control is used to set a value at the data source, and the Indicator control is used to display the data source value in your graphic display.

By assigning tags or expressions to an object's controls, you control the flow of data between the project and the data source, which in turn controls your process or equipment. Assign tags or expressions to an object's controls in the Connections tab of the object's Properties dialog box (see page 9-22) or in the Connections tab of the Property Panel (see page 9-24).

Illustrating your displays

Use this graphic object	To do this
Text	Create text for labels or instructions in the display. See page 9-10.
Image	Place bitmap images in your display. For information about bitmaps, see page 8-20. For details about creating image graphic objects, see page 9-11.
Panel	Draw rectangles that have borders. See page 9-12.
Arc	Draw an arc (a segment of an ellipse or circle's perimeter). See page 9-12.
Ellipse	Draw ellipses and circles. See page 9-13.
Freehand	Draw freehand shapes as you would with a pen on paper. See page 9-14.
Line	Draw straight diagonal, horizontal, and vertical lines. See page 9-14.
Polygon	Draw a series of connected straight lines forming a closed shape. See page 9-14.
Polyline	Draw a series of connected straight lines. See page 9-14.
Rectangle	Draw rectangles and squares. See page 9-15.
Rounded Rectangle	Draw rectangles or squares with rounded corners. See page 9-16.
Wedge	Draw a filled segment of an ellipse or circle. See page 9-12.

Controlling the project

Use this graphic object	To do this
Goto Display button	Open a graphic display. For details, see page 19-4.
Return to Display button	Close a display and return to the previous display. For details, see page 19-5.
Close Display button	Close a display. For details, see page 19-6.
Display List selector	Select a display to open from a list of displays. For details, see page 19-6.
Login button	Open the Login dialog box and then log in. For details, see page 18-9.
Logout button	Log out of the project. For details, see page 18-9.
Display Print button	Print the current display. For details, see page 8-35.
Shutdown button	Stop the project and close RSView ME Station. For details, see page 19-7.

Starting and controlling processes

Use this graphic object	To do this
Momentary Push button	Start a process or action by sending one value to the tag when pressed, and another value when released. For details, see page 10-30.
Maintained Push button	Toggle between two values, by sending one value to the tag when pressed, and a second value the next time the button is pressed and released. This button is useful for changing a setting within a machine or process, but not for starting the machine or process. For details, see page 10-37.
Latched Push button	Start a machine or process. The button remains set (latched) until the process is complete. For example, use this button to start a bag filling machine. When the process is complete (the bag is full), the button is reset (unlatched) by the Handshake control. For details, see page 10-43.
Multistate Push button	Cycle through a series of values. Each time the operator presses the button, the value for the next state is sent to the tag. When the button is in its last state, pressing it changes the button to its first state and writes out the first state value. This button is useful when you want the operator to see and select multiple options in sequence, using a single button. The button displays the current state of a process or operation by showing a different color, caption, or image to reflect the different states. For details, see page 10-49.
Interlocked Push button	Use a group of buttons to send values to the same tag. When the operator presses one button in the group, the button's value is sent to the tag, and the button remains highlighted as long as the tag value is the same as the button's value. Pressing another button in the group releases the first button, and sends a new value to the tag. For details, see page 10-57.
Ramp button	Increase or decrease the value of a tag by a specified integer or floating point value. For example, use two ramp buttons together to create a raise/lower control. For details, see page 10-62.
Control List selector	Select from a list of states for a process or operation. The list is highlighted to show the current state, and the operator can scroll through the list to select a different state. The value assigned to the selected state is written to the tag. For details, see page 10-126.
Drawing object with horizontal or vertical slider animation	Set the value of a tag by dragging the slider object. The pixel position of the slider is translated into a value that is written to the tag. If the value of the tag is changed at the data source, the position of the slider changes to reflect this. For information about animation, see Chapter 11.
ActiveX object	Change tag values using a third-party object connected to an analog, digital, or string tag. When the object's property value changes, the new value is written to the associated tag. For details, see page 9-17.

Displaying processes and values graphically

Use this graphic object	To display this
Bar Graph	Numeric values in bar graph format. The bar graph increases or decreases in size to show the changing value. For details, see page 10-115.
Gauge	Numeric values in dial format. The gauge's needle moves around the dial to show the changing value. For details, see page 10-115.
Scale	A static indication of the range of values for a bar graph. For details, see page 10-115.
Multistate indicator	The state of a process, on a panel that changes its color, image, or caption to indicate the current state. Each state is configured to correspond to a numeric tag value. For details, see page 10-100.
Symbol	The state of a process, using a monochrome image that changes color to indicate the current state. Each state corresponds to a numeric tag value. This object is useful for showing the state of a process or operation at a glance. For details, see page 10-100.
List indicator	The state of a process, using a list of possible states with the current state highlighted. Each state is represented by a caption in the list, and corresponds to a numeric tag value. This indicator is useful if you want to view the current state, but also want to see the other possible states. For sequential processes, the list can alert the operator about what happens next in the process. For details, see page 10-100.
Trend	Historical or real-time numeric tag values, plotted against time or displayed in an XY plot, where one or more tags' values are plotted against another tag's values to show the relationship between them. For details, see Chapter 17.
Time and Date display	Display the current time and date. For details, see page 10-136.
ActiveX object	Data using a third-party object connected to an analog, digital, or string tag. The format of the data displayed depends on the object. For details, see page 9-17.
Drawing object with rotation, width, height, fill, color, or horizontal or vertical position animation	The value of a tag using a pictorial representation of the current value in relation to a range of possible values. For example, use rotation animation to show the tag value as a needle's position on a dial. For color animation, assign different colors to represent different values. For information about animation, see Chapter 11.

Working with lists and trends

Use this button	With this graphic object	To do this
Pause button	Trend	Toggle a trend between pausing and automatic scrolling.
Next Pen button	Trend	Change the vertical axis labels for a trend to the scale for the next pen.
Backspace button	Control List selector	Move the cursor back to the highlighted item in the list.
End button	Lists and trends	List—move to the bottom item visible in the list. Trend—resume trend scrolling and move to the current (latest) data in the trend.
Enter button	Lists	Select the item the cursor is pointing to.
Home button	Lists and trends	List—move to the top item visible in the list. Trend—pause the trend and move to the earliest data in the trend.
Move Left / Right buttons	Trend	Pause the trend and scroll to the left or right.
Move Up / Down buttons	Lists and trends	List—move up or down one item in the list. Trend—scroll up or down to display lower values on the vertical scale.
Page Up / Down buttons	Lists	Move up or down one page in the list.
Acknowledge Alarm button	Alarm list	Acknowledge and silence the selected alarm.
Acknowledge All Alarms button	Alarm list	Acknowledge and silence all currently unacknowledged alarms.
Clear Alarm History button	Alarm list	Remove all alarms from the alarm log file and all Alarm lists.
Silence Alarms button	Alarm list	Silence the audio indicator for all current alarms (Windows 2000 projects only).
Activity Clear button	Activity list	Remove the selected message from all Activity lists.
Activity Clear All button	Activity list	Remove all activity messages from all Activity lists.
Information Acknowledge button	Information Message display	Acknowledge the current message in the display.

For more information about using the buttons with lists and trends, see the topics on these pages:

For information about	See
Linking a button to a specific list or trend object	Page 10-9
Using buttons with Alarm lists	Page 13-28
Using buttons with Information Message displays	Page 14-10
Using buttons with Activity lists	Page 15-9
Using buttons with trends	Page 17-24

Entering and displaying numeric and string values

Use this graphic object	To do this
Numeric Input Enable button	Enter a numeric value and then write the value to a tag or an expression. For details, see page 24-3.
String Input Enable button	Enter a string value and then write the value to a tag. For details, see page 24-7.
Numeric display	Display numeric tag values. For example, display the current temperature of an oven. For details, see page 10-68.
String display	Display string tag values. For example, set up the data source to generate strings that report on the state of a process or operation, or that provide the operator with instructions about what to do next. For details, see page 10-80.
ActiveX object	Enter or display data using a third-party object connected to an analog, digital, or string tag. The format of the data entered or displayed depends on the object. For details, see page 9-17.

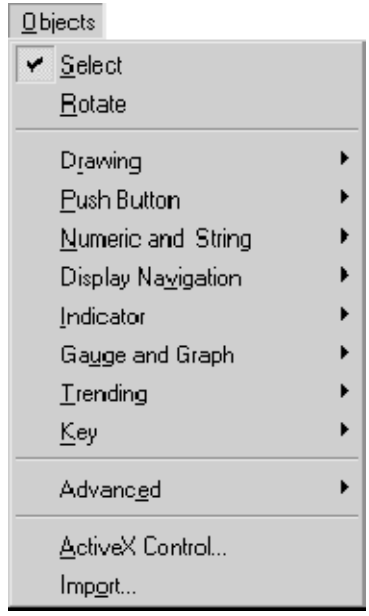
Displaying alarms and messages

Use this graphic object	To display this
Alarm list	Alarm messages that notify the operator when a situation requiring immediate attention occurs. For details, see page 13-27.
Activity list	Messages about system activity such as tag reads, tag writes, and communication errors. For details, see page 15-8.
Information Message display	Messages about the process, prompts or instructions, and information about current states. For details, see page 14-12.
Local Message display	Ongoing information about the status of devices or processes. For details, see page 8-29.

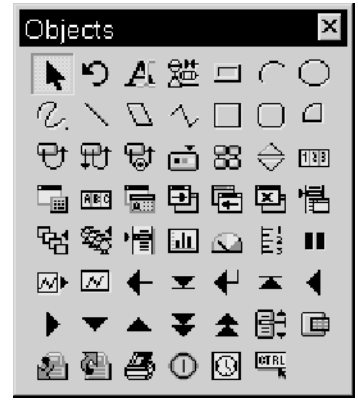
Selecting tools for creating graphic objects

The Objects menu in the Graphics Display editor contains items for creating objects, as well as items for selecting and rotating objects. You can also create most objects using the tools on the Objects toolbar.

Objects menu



Objects toolbar



Before you can create an object, you must select the object's tool, either by clicking a menu item or by clicking the tool on the toolbar. When you position a cursor over a tool on the toolbar, the name of the tool is displayed in a tooltip and in the status bar.

To select a tool:

- Click the tool on the toolbar or on the Objects menu. When you click a tool, the pointer changes to show which tool is active.

Freehand tool

Text tool

To deselect a tool, do one of the following:

- Double-click an empty area in the display.

Select tool

- Click the Select tool.
- Click another tool.

For some drawing objects, double-clicking an empty area of the display creates another instance of the object. For these objects, to finish drawing, click the Select tool. For more information, see the instructions for creating drawing objects, beginning on page 9-10.

Before you begin creating objects

To size and position objects precisely as you create them, use the grid.

To use the grid:

▶ On the View menu, click Show Grid, and then click Snap On.

For information about setting up the grid, see page 8-8.

The next sections describe how to create graphic objects. For information about attaching animation to the objects you create, see Chapter 11.

Creating graphic objects

This section applies to graphic objects in general.

ActiveX objects and some drawing objects require extra steps to create them. For details about creating drawing objects, see the next section. For information about ActiveX objects, see page 9-17.

To create a graphic object:

1. Select the tool for the object to create.
2. Click the mouse where you want to position the object, and then drag to draw a rectangle the general size you want the object to be.
3. Double-click the object to open its Properties dialog box.
4. In the dialog box, specify how the object looks, its behavior, and controls. For more information about the dialog box, see page 9-22.

   You can also use the Property Panel to configure objects. For information about using the Property Panel, see page 9-24.

For information about configuring a specific object, see Chapter 10.

Creating drawing objects

The following instructions for creating drawing objects describe how to create the objects and then open the objects' Properties dialog boxes to configure how the objects look. For information about using the Properties dialog box, see page 9-22.

You can also use the Property Panel to configure objects. For information about using the Property Panel, see page 9-24.

For detailed information about configuring a specific object, see Chapter 10.

Creating text

Choosing fonts

You can select any font you have installed, but TrueType™ and OpenType® fonts are recommended. These fonts can be resized easily, without losing text quality.

If you run a project on a computer that does not have the fonts you used when configuring the project, Windows substitutes with the fonts that most closely match the fonts you specified.

To create a text object:

1. Select the Text tool.

   The pointer becomes an I-beam (I).

2. Click the I-beam where you want the text to start.
3. Type the text.

   To move the cursor to the next line of text, press Enter.

4. To create another text object, move to a new area in the display, click, and then type the text.
5. To finish entering text, right-click or double-click the text.
6. To change how the text looks, right-click the text and then click Properties on the context menu, or double-click the text to open the Text Properties dialog box.

7. In the dialog box, specify how the text looks and the font to use.

   For example, if the text has a solid background and you don't want the background to show, select the transparent background style.

8. To close the dialog box, click OK.

After you've configured one text object to look the way you want, copy and paste it to create additional text objects with the same formatting. Then edit the text of the new objects.

To edit a text object:

1. Right-click the text, and then click Edit.

   The pointer becomes an I-beam (I).

2. Click where you want to make the change. To delete text characters, use the Backspace and Delete keys.

You can also edit the text in the Text Properties dialog box.

Creating images

Use the image graphic object to place bitmap images in your graphic displays.

Images support visibility animation only.

Using bitmaps

Before you can place a bitmap image in a display, you must import the image into your project. For more information, see page 8-20.

To place a bitmap image in a display:

1. Select the Image tool.
2. Click the mouse where you want to position the image, and then drag to draw a rectangle.
3. Double-click the rectangle to open the Image Properties dialog box.
4. In the dialog box, specify the bitmap image to use.

   The image is placed where you drew the rectangle, but the actual size of the image is used, rather than the size of the rectangle you drew.

5. For monochrome bitmaps, specify the image color, background style, and whether the image blinks.

   For color bitmaps, specify the background style.

6. Click OK to close the dialog box.

Creating panels

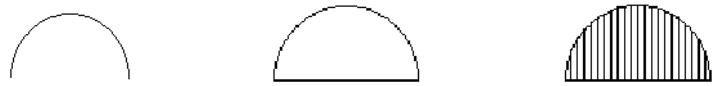
Panels support visibility animation only.

To create a panel:

1. Select the Panel tool.
2. Click the mouse where you want to position the panel, and then drag to draw a rectangle the general size you want the panel to be.
3. To change how the panel looks, double-click the panel to open the Panel Properties dialog box.
4. In the dialog box, specify how the panel looks.
5. To close the dialog box, click OK.

Creating arcs and wedges

Arcs and wedges are drawn in two steps: first you create an ellipse or circle, and then you reshape it into the segment you want.

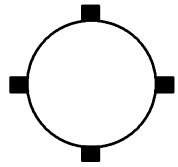


To create an arc or wedge:

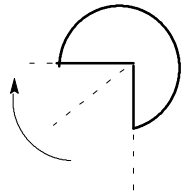
1. Select the Arc or Wedge tool.
2. Click the mouse where you want to position the object, and then drag to draw an ellipse or circle.

   To base the arc or wedge on a circle rather than an ellipse, hold down Ctrl while you drag.

   When you release the mouse button, a set of handles appears so you can decrease the angle of the wedge or arc from 360 degrees to the desired angle.



3. Click a handle, and drag the mouse to 'cut out' part of the circle.



4. To finish drawing, right-click the object.
5. To change how the object looks, click Properties on the context menu, or double-click the object to open its Properties dialog box.
6. In the dialog box, specify how the object looks.

   For example, if the shape you created has a solid background and you don't want the shape to be filled, select the transparent background style.
7. To close the dialog box, click OK.

You can also use the Arc and Wedge tools to reshape arcs and wedges. For more information, see page 9-42.

Creating ellipses and circles

Use the Ellipse tool to draw an ellipse or circle.

To create an ellipse or circle:

1. Select the Ellipse tool.
2. Click the mouse where you want to position the object, and then drag to draw an ellipse or circle of the desired size.

   To draw a circle, hold down Ctrl while you drag.
3. To change how the object looks, double-click it to open the object's Properties dialog box.
4. In the dialog box, specify how the object looks.

5. To close the dialog box, click OK.

Creating freehand shapes

Using the Freehand tool is similar to drawing with a pen on paper.

To create a freehand shape:

1. Select the Freehand tool.
2. Click and drag to create the shape you want.
3. To change how the object looks, double-click it to open the Freehand Properties dialog box.
4. In the dialog box, specify how the object looks.

   For example, if the shape you created has a solid background and you don't want the shape to be filled, select the transparent background style.
5. To close the dialog box, click OK.

Creating lines

To create a line:

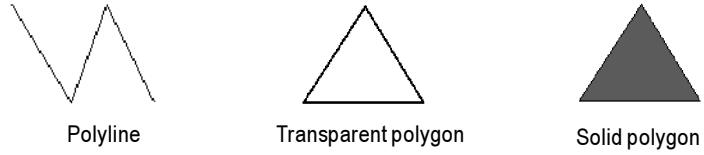
1. Select the Line tool.
2. Click where you want the line to start, and then drag from the beginning point to the end point.

   To draw horizontal or vertical lines, hold down Ctrl while you drag the mouse.
3. To change how the line looks, right-click the line and then click Properties on the context menu. The Line Properties dialog box opens.
4. In the dialog box, specify how the line looks.
5. To close the dialog box, click OK.

You can use the Polyline tool to convert the line into a polyline. For more information, see page 9-42.

Creating polygons and polylines

A polyline is a series of connected line segments. A polygon is a multi-sided object (with three or more sides). For example, use the polygon shape if you want to create triangles.



To create a polygon or polyline:

1. Select the Polygon or Polyline tool.
2. Click and drag to create the first segment of the object. Release the mouse button.

   To draw horizontal or vertical lines, hold down Ctrl while you drag.

3. Move the mouse to where you want the next segment to end, and then click.

   Repeat this step until you have completed the object.

4. To finish drawing, double-click an empty area of the display, or click the Select tool.
5. To change how the object looks, double-click it to open the object's Properties dialog box.
6. In the dialog box, specify how the object looks.

   For example, if the shape you created has a solid background and you don't want the shape to be filled, select the transparent background style.
7. To close the dialog box, click OK.

You can use the Polygon tool to reshape lines, polygons, polylines, and rectangles. For more information, see page 9-42.

Creating rectangles and squares

To create a rectangle or square:

1. Select the Rectangle tool.
2. Click the mouse where you want to position the object, and then drag until the rectangle or square is the size you want.

To draw a square, hold down Ctrl while you drag.

3. To change how the object looks, double-click it to open the object's Properties dialog box.
4. In the dialog box, specify how the object looks.
5. To close the dialog box, click OK.

You can use the Polygon tool to reshape the rectangle into a polygon. For more information, see page 9-42.

Creating rounded rectangles and squares

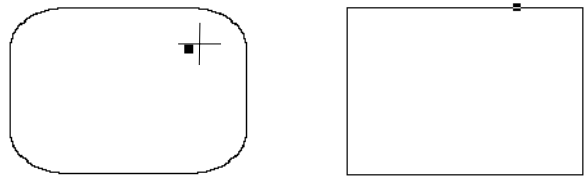
Due to a Windows limitation, you cannot rotate rounded rectangles and rounded squares.

To create a rounded rectangle or square:

1. Select the Rounded Rectangle tool.
2. Click the mouse where you want to position the object, and then drag until the rectangle or square is the size you want.

   To draw a square, hold down Ctrl while you drag.

   You can change how rounded the corners are by using the handle that appears inside the rounded rectangle. Click the handle and drag inward to increase roundedness, or outward to decrease roundedness.



3. To finish drawing, right-click the object.
4. To change how the object looks, click Properties on the context menu, or double-click the object to open its Properties dialog box.
5. In the dialog box, specify how the object looks.
6. To close the dialog box, click OK.

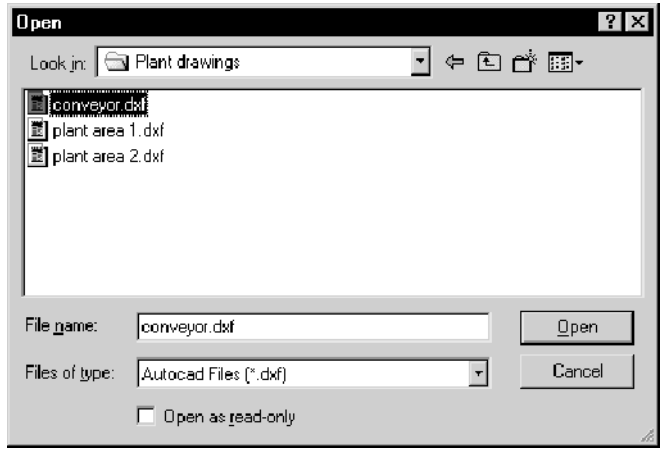
For information about using the Rounded Rectangle tool to reshape the rounded rectangle, see page 9-43.

Using .wmf and .dxf files

Windows metafiles (.wmf) and AutoCAD (.dxf) files are converted to drawing objects (such as lines, ellipses, and polygons) when you import them. You can edit the drawing objects the same way you edit drawing objects that you create in RSView.

To place a .wmf or .dxf file in a display:

1. On the Objects menu, click Import.
2. Click the mouse where you want to position the file, and then drag to draw a rectangle the general size you want the final object to be.



3. In the "Files of type" box, select the type of file to import.
4. Navigate to the directory where the file is stored, and then click the file to import.
5. Click Open.

   The file is converted to drawing objects and grouped, and then the grouped object is placed in the graphic display.

Using ActiveX objects

ActiveX objects use tags or expressions to exchange information with the data source.

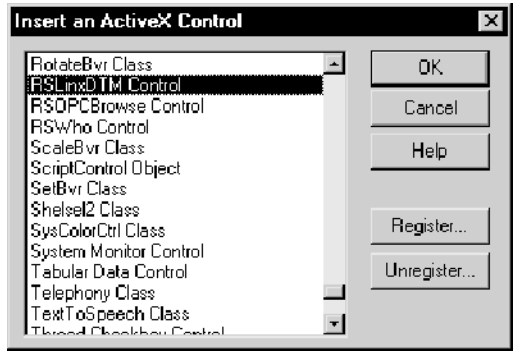
The properties and controls available for a particular ActiveX object depend on the third-party vendor's implementation.

IMPORTANT If your project will run on a RAC6182, the ActiveX object must be available for both Windows 2000 and RAC6182 platforms. Make sure you install and register the RAC6182 version of the ActiveX object on the runtime computer.

ActiveX objects support visibility animation only.

To create an ActiveX object:

1. Select the ActiveX Control tool.
2. Click the mouse where you want to position the object, and then drag until the object is the size you want.



3. In the dialog box, click the object you want to add to your graphic display. The list of objects depends on the software you have installed.

   If an object you have installed does not appear in the list, the object might not be registered. To register an object, click Register, select the object to add to the list, and then click Open.

   To remove an object from the list, select the object, and then click Unregister.

4. Click OK.

   The object is placed in the display. Depending on how the third party implemented the object, it may be a different size than the rectangle you drew.

5. To specify the object's properties and assign tags or expressions to its controls, do one of the following:

   - Right-click the object, and then click Properties to open the object's Properties dialog box.

Depending on how the third party implemented the object, it may not have a Properties dialog box. If the Properties menu item is not available, use the next method.

- Right-click the object, and then click Property Panel.

6. In the Properties dialog box or Properties tab of the Property Panel, specify the object's properties.
7. In the Connections tab, assign tags or expressions to the object's controls.
8. To close the Properties dialog box, click OK. To close the Property Panel, click the Close button.

For information about using the Properties dialog box, see page 9-22. For information about using the Property Panel, see page 9-24.

Tools and tips for working with objects

This section describes features of the Graphics Display editor that help you work with the objects you create. It describes how to:

- select and deselect objects
- use the Object Explorer to view and select objects
- use an object's Properties dialog box to configure the object's properties and assign tags and expressions to its controls
- use the Property Panel to configure individual and group object properties, and to assign tags and expressions to individual objects' controls
- color objects
- name objects
- test how objects look in different states

Selecting and deselecting objects

To work with an object, you must first select it. You can use the Select tool or the Object Explorer to select objects.

For information about using the Object Explorer, see page 9-20.

To select the Select tool:

▶ On the Objects menu, click Select, or on the Objects toolbar click the Select tool.

The mouse pointer changes to a single arrow.

To select objects, follow the procedures in this table:

To select	Do this
An object or group of objects	▪ Click the object or group. ▪ In the Object Explorer, click the object or group.
An object within a group of objects	▪ Double-click the group, and then click the object. ▪ In the Object Explorer, open the group, and then click the object.
Several objects	Click the first object, and then Ctrl-click additional objects.
All objects in an area	Click and drag diagonally to draw a selection border around the objects. Ctrl-click objects outside the border to add them to the selection.
All objects in the drawing area or in a group you are editing	On the Edit menu, click Select All, or press Ctrl-A.

To deselect objects, follow the procedures in this table:

To deselect	Do this
An object	Ctrl-click the object.
Several objects	Hold down Ctrl and drag a selection border around the objects.
All selected objects	Click in the drawing area, away from any objects.

Using the Object Explorer

Use the Object Explorer to view and select objects from a tree-list of all the objects in a display. Groups are listed as expandable items in the tree, with a + icon.

Use the Object Explorer to select an object that is hidden behind other objects in the display, without bringing it to the front. Objects are listed in front-to-back order.

The Object Explorer does not show wallpaper objects, nor objects within ActiveX composite objects.

Object Explorer tool

To open the Object Explorer, use one of these methods:

- On the Graphics toolbar, click the Object Explorer tool.
- On the View menu, click Object Explorer.
- Right-click an object, and then click Object Explorer.

You can keep the Object Explorer open as you work in the Graphics Display editor.

To view the objects in a group:

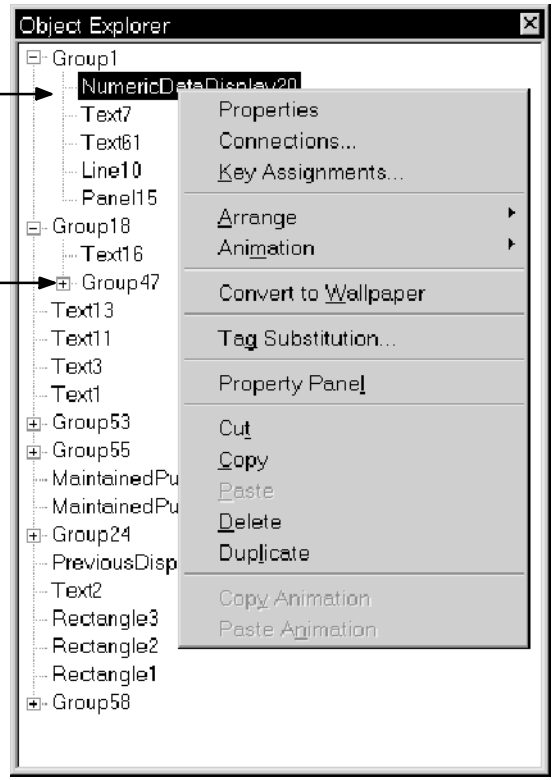
▶ Click the + icon next to the group name, or double-click the group name.

The list expands to show the objects and groups within the group.

If the list is already expanded, double-clicking the group name collapses the group.

Right-click an object to open its context menu.

Click the + icon to view the objects and groups within a group.



To select an object in the Object Explorer:

▶ Click the object.

The object is selected in the Object Explorer and selection handles appear around the object in the graphic display.

Double-clicking objects in the Object Explorer

Double-clicking an object in the Object Explorer is the same as double-clicking it in the display:

- For most graphic objects, including drawing objects, double-clicking the object in the Object Explorer opens the object's Properties dialog box.
- For ActiveX objects, the behavior of the object when double-clicked depends on the vendor's implementation.

Using the Properties dialog box

Every graphic object has a Properties dialog box that you can use to configure the object. Depending on how the vendor implemented the object, third-party ActiveX objects might have a Properties dialog box as well.

The Properties dialog box contains tabs that you can use to configure the object's properties and controls:

In this tab	Do this
General	Configure the object's appearance, audio indicator and touch margins (for buttons), and settings that are unique to the object, such as the button action for a push button, whether to use key navigation to select the object, or whether to link a button to a specific object. For information about touch margins, see page 10-4. For information about key navigation, see page 10-8. For information about linking buttons to objects, see page 10-9.
States	Configure the states for the object, including the value for each state and whether to display a caption or image for the state. For information about checking that the states are configured the way you intended, see page 9-31.
Label	For objects that don't have multiple states, specify whether to use a caption or image on the object. For information about using the Image Browser to select an image to use in the label, see page 8-22.

In this tab	Do this
Timing	Configure the object's auto repeat (see page 10-11) or Enter key handshaking (see page 10-12) settings.
Connections	Assign tags and expressions to the object's controls. For information about assigning tags and expressions, see page 9-32.

The tabs that are available depend on the object:

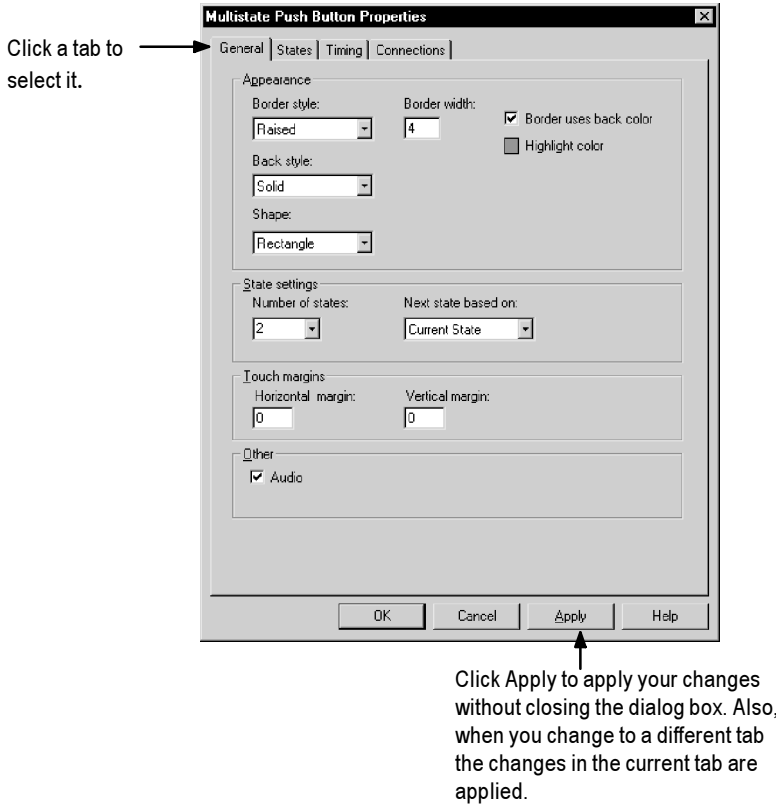
- Some objects have only a General tab.
- If an object can have more than one state, the object's dialog box contains a States tab.
- The trend and gauge objects have unique tabs that are not listed in the table above.
- The tabs that an ActiveX object has depends on the vendor's implementation, though if you can assign tags or expressions to the object it has a Connections tab.

To open an object's Properties dialog box, use one of these methods:

- Double-click the object.
- Right-click the object and then click Properties.
- Select the object, and then on the Edit menu, click Properties.

Browse button

- In the Property Panel, with the object selected, click the (Custom) property and then click the Browse button.
- In the Property Panel, with the object selected, double-click the (Custom) property.
- In the Object Explorer, double-click the object.



You can also use the Property Panel to configure an object's properties, as described next.

For more information about assigning tags and expressions to objects, see page 9-32. For details about configuring a particular object, see Chapter 10.

Using the Property Panel

Use the Property Panel to modify the properties of graphic objects and assign tags and expressions to the objects.

The Property Panel is especially useful for making changes to the properties of multiple objects at the same time.

To open the Property Panel, use one of these methods:

Property Panel tool

- On the Graphics toolbar, click the Property Panel tool.
- On the View menu, click Property Panel.

- Right-click an object, and then click Property Panel.
- Right-click an empty area of the display, and then click Property Panel.

You can keep the Property Panel open as you work in the Graphics Display editor. You can drag the panel's borders to make the Property Panel larger or smaller.

Configuring properties

Use the Property Panel's Properties tab to configure the properties of the selected object or objects.

Viewing properties for multiple objects

If multiple objects are selected, you can specify which properties to display in the Property Panel:

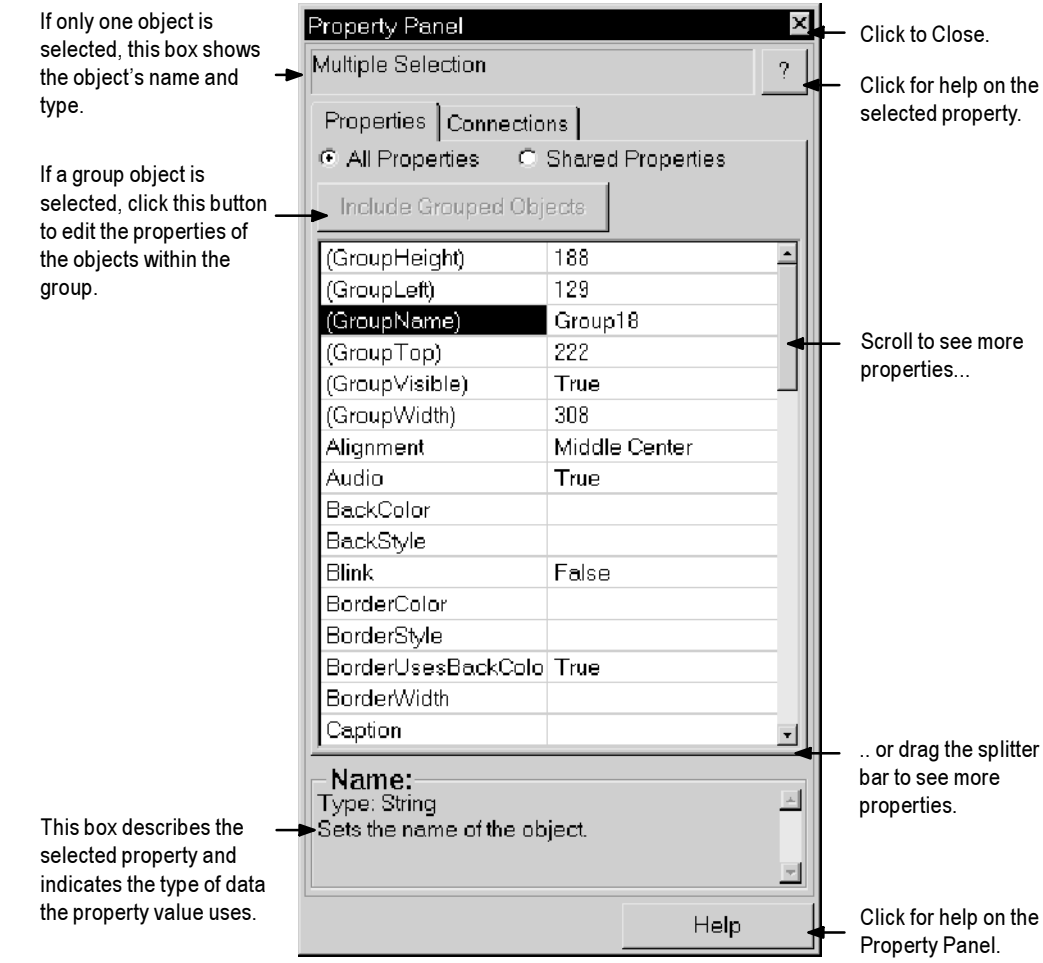
- To view all the properties of all the selected objects, click All Properties.
- To view only the properties that are common to the selected objects, click Shared Properties.

Viewing properties for group objects

When you first select a group object, the Property Panel displays the group properties only, such as the group's name and height. To view and edit the properties of the individual objects within the group, click Include Grouped Objects.

When you click Include Grouped Objects, if Shared Properties is selected, only the properties that are common to the selected objects are displayed. To view all the properties of all the objects in the group, click All Properties.

If different objects in the group have different values assigned to a property, the cell next to the property name is blank.



To configure an object's properties:

1. Select one or more objects.
2. Click the Properties tab if it is not already selected.
3. Double-click a property's row to select the property.

   If the property has a list of values associated with it, pressing Enter or double-clicking in the property's row changes the property's value to the next available value. A down-arrow appears in the right column. Click it to see the options for the property.

   If the property has a dialog box (such as the Font dialog box) associated with it, double-clicking the row opens the dialog box.

Browse button

Or, a Browse button appears in the right column—click it to open the dialog box.

If the selected object has a dialog box for setting up properties, a (Custom) property appears in the first or second row of the grid. To open the object's dialog box, double-click the row, or click the Browse button.

4. Type the new value for the property, select one from the list, or make selections from the dialog box.
5. Press Enter or click another cell in the grid to save the change. The selected object is updated with the new property value and its appearance in the display changes, if appropriate.

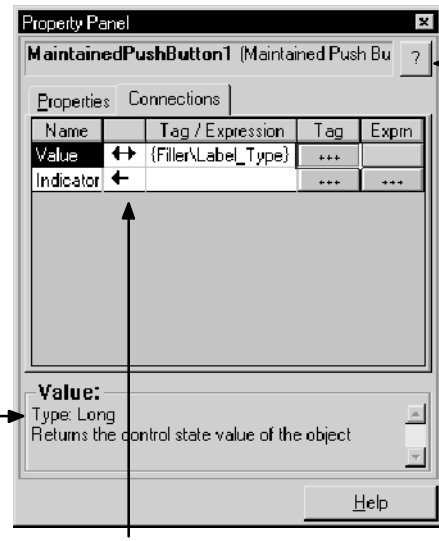
Assigning tags and expressions to an object's controls

Use the Property Panel's Connections tab to assign tags or expressions to the selected object's controls. If multiple objects are selected the tab is blank, because you can assign tags or expressions to only one object at a time.

How values are updated

The arrows indicate the direction in which the data flows between the control and the data source:

- A right arrow indicates that the control sends values to the data source. The control is a write control.
- A left arrow indicates that the data source sends values to the control. The control is a read control.
- A double arrow indicates that the data flows in both directions. The control is a read-write control.



Click for help on the selected control.

This box describes the selected control and indicates the type of data the control uses.

The arrows show the direction in which data flows between the control and the data source.

To assign tags and expressions to an object's controls:

1. Select an object.
2. Click the Connections tab if it is not already selected.
3. Click a control's row to select it.
4. In the "Tag or expression" column, type a tag name or expression. You can assign an expression only if the Browse button is available in the Exprn column.

   To open the Tags dialog box and select a tag, click the Browse button in the Tag column. For information about using the Tags dialog box, see page 7-25.

   To open the Expression editor and use it to create an expression, click the Browse button in the Exprn column. For information about creating expressions, see Chapter 12.

   For the Numeric Input Enable button's Optional Expression control, you can assign write expressions only. For information about write expressions, see page 12-20.
5. Press Enter or click another row to save the tag or expression assignment.

Browse button in the Exprn column

For more information about assigning tags and expressions to objects, see page 9-32.

To delete a tag or expression assignment:

▶ Click the row and press Delete.

Coloring objects using the color toolbars

The Foreground Color and Background Color toolbars contain a selection of colors you can assign to objects' color properties.

About color properties

The number of color properties an object has depends on the type of object and how you configure it. For example, a button with states can use up to seven different colors for each state. When you select colors using the color toolbars, some properties are assigned the foreground color and some are assigned the background color. Other color properties, such as Fill color, cannot be assigned using the color toolbars (instead, use the object's Properties dialog box or the Property Panel).

This table lists the color properties you can assign using the color toolbars:

Property	Foreground color	Background color
Back color		✓
Background color		✓
Border color	✓	
Caption color	✓	
Caption back color		✓
Fore color	✓	
Foreground color	✓	
Image color	✓	
Image back color		✓
Legend color	✓	
Needle color	✓	
Pattern color	✓	

For objects with states, the selected color is applied to the current state's color properties only. In the Property Panel, properties that apply to states have "St_" at the beginning of the property name.

When to select colors using the toolbars

For all the drawing objects except Image and Panel, you can select colors from the color toolbars before you draw an object (either before or after you click the object's tool).

The other objects are always drawn using their default colors, but you can select the objects and then click the toolbars to change their colors. The toolbars are especially useful for quickly assigning the same colors to multiple objects.

To display a color toolbar:

- On the View menu, select Toolbars, and then click Foreground Colors or Background Colors.

To close a color toolbar:

- On the View menu, select Toolbars, and then click Foreground Colors or Background Colors, or click the toolbar's Close button.

Other methods for assigning colors

You can also assign colors using an object's Properties dialog box or the Property Panel. Use one of these methods if you want to assign separate colors to different foreground or background color properties, or to choose colors that don't appear in the toolbars.

For example, if you want to use a dark blue background color for a button, with a light blue background color for its image label, you must assign the colors separately. Using the toolbar would assign the same color to both properties.

Also use the Properties dialog box or Property Panel to change the default colors for properties that cannot be assigned using the color toolbars.

Naming objects

Objects (and groups of objects) are automatically given a name and number when you create them, for example NumericInputEnable4. If desired, you can assign a more meaningful name to the object, for example Conveyor_Speed_Input.

The object name appears in the status bar, activity bar, Property Panel, and Object Explorer in RSView Studio, and in activity log messages at runtime.

To name an object:

1. Select the object.
2. In the Property Panel, click the Properties tab.
3. Double-click the (Name) row, and then type the name.

   The name must start with a letter, and cannot contain spaces. You can use the underscore character (_).

To name a group object:

1. Select the group object.
2. In the Property Panel, click the Properties tab.
3. Double-click the (GroupName) row, and then type the name.

   The name must start with a letter, and cannot contain spaces. You can use the underscore character (_).

Testing how objects look in different states

To make sure the different states for an object are configured correctly, you can view them using the States toolbar or the Property Panel.

To open the States toolbar:

▶ On the View menu, select Toolbars, and then click States.

To view an object's states using the States toolbar:

1. Select one or more objects.
2. In the States toolbar, select the state to view.

   If you selected multiple objects, the toolbar shows the states that are common to all the objects.
3. To view the next state, select it in the toolbar or press the Down Arrow key on your keyboard.

   You can also use these keys to select the next state to view:

   - To view the previous state, press the Up Arrow key.

- To view the first state, press the Home key.
- To see the last state, press the End key.

To view an object's states using the Property Panel:

1. Select one or more objects.
2. In the Property Panel, click the State property and then select the state to view.
3. To view the next state quickly, double-click the row, or press the Enter key on your keyboard.

Assigning tags and expressions to graphic objects

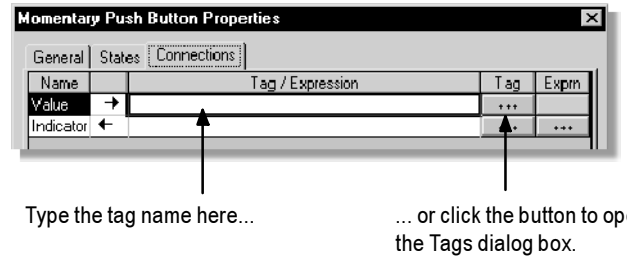
You can assign tags and expressions to many of the graphic objects, including ActiveX objects (depending, of course, on how the vendor implemented the object). This section describes how to:

- assign tags to graphic objects
- use expressions to manipulate tag values
- replace tags using tag substitution
- use tag placeholders so the same display can be used with different sets of tags

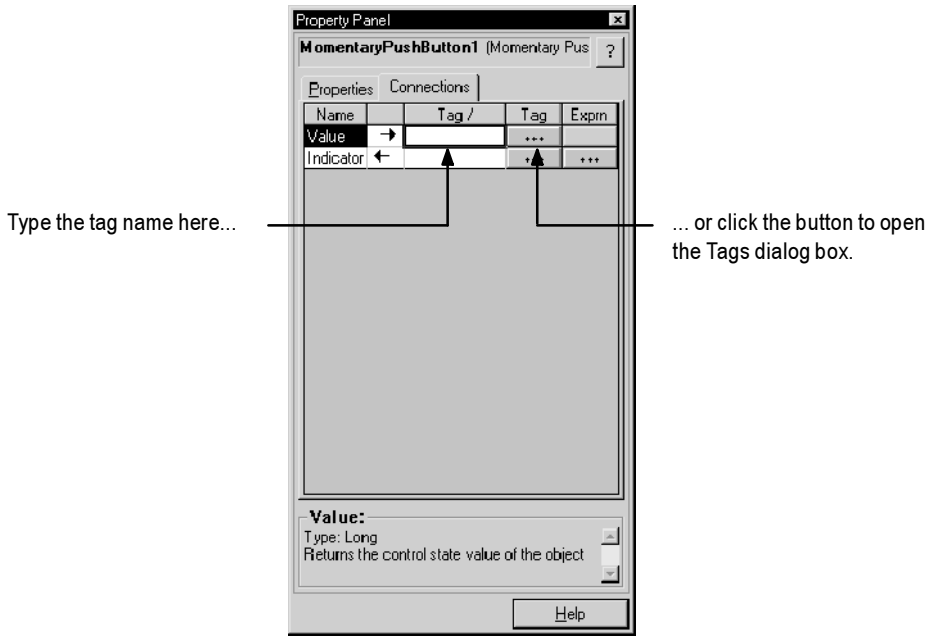
Assigning tags

To assign tags to a graphic object, use one of these methods:

- Double-click the object to open the object's Properties dialog box, and then assign tags in the Connections tab.



- Select the object and then assign tags in the Connections tab of the Property Panel.



- Select the object, and then on the Edit menu click Connections. Assign tags in the Connections tab of the Properties dialog box.
- Right-click the object, and then click Connections. Assign tags in the Connections tab of the Properties dialog box.

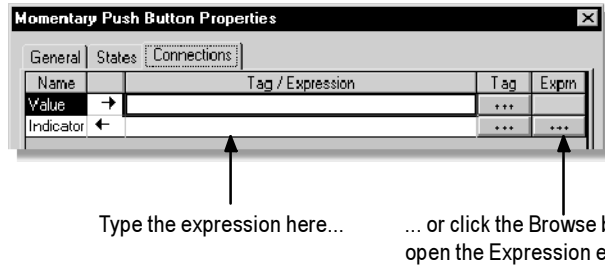
For information about:

- using the Tags dialog box, see page 7-25
- using the Properties dialog box, see page 9-22
- using the Property Panel, see page 9-24

Using expressions to manipulate tag values

Many of the controls to which you can assign a tag also permit the use of expressions to perform logical or mathematical calculations on tag values. If you assign an expression, RSView monitors the expression value rather than the original tag value. For example, your machine might send values to the data source in the form of temperature in degrees Celsius. You could use an expression to convert the value to degrees Fahrenheit, and then monitor the expression result rather than the original tag value.

If you can assign an expression, a Browse button is present in the Exprn column in the Connections tab.



To specify an expression, do one of the following:

- In the "Tag or expression" column, type the expression.
- In the Exprn column click the Browse button and then create an expression in the Expression editor. Use this method if you want to check the expression syntax, or to use multiple lines for the expression.

For more information about expressions, see Chapter 12.

Replacing tags using tag substitution

You can replace tags assigned to the graphic objects in your display by using tag substitution. You can also replace the tags used in expressions assigned to graphic objects.

For example, if you assign a tag called HoistHeight to multiple objects in the display, and then decide to use the tag Hoist_Height instead, you can use tag substitution to quickly replace the old tag with the new tag.

You can replace:

- a tag name (with or without folder names)
- a folder name
- the text in an expression

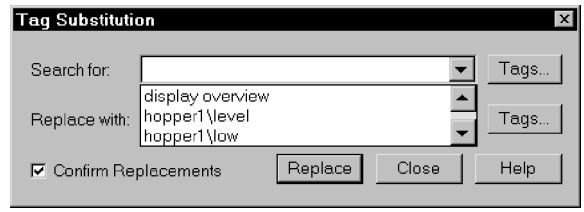
To replace tags:

1. Select one or more objects.

   To select all the objects in the display, on the Edit menu, click Select All.

2. On the Edit menu, click Tag Substitution.

   To replace the tags for a single object, right-click it and then click Tag Substitution.



3. In the Search for box, type the name of the tag, folder, or expression to replace, or click the down arrow to display a list of the possible items you can search for and replace.

   To open the Tags dialog box and select a tag, click Tags.

4. In the Replace with box, type the name of the new tag, folder, or expression.

   To open the Tags dialog box and select a tag, click Tags.

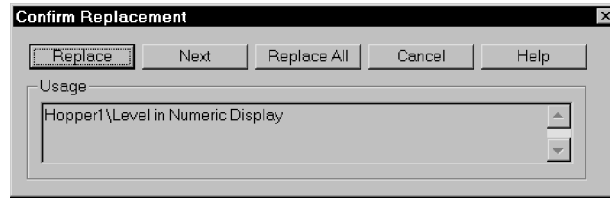
5. To confirm each replacement before it is made, check Confirm Replacements.

   To automatically replace all occurrences of the tag, folder, or expression for the selected object or objects, leave the box unchecked.

6. Click Replace.

   If the Confirm Replacements check box is *not* selected, all occurrences of the text in the Search for box are automatically replaced with the text in the Replace with box (for the selected object or objects).

   If the Confirm Replacements check box is selected, the Confirm Replacement dialog box opens, showing the objects in which the text is used. The first object is selected.



7. To replace the text in the selected object, click Replace.

   To move to the next object that uses the text string, click Next.

   To replace the text for all the objects in the dialog box, click Replace All.

8. When all replacements are done, click Cancel to close the Confirm Replacements dialog box. (It closes automatically if you click Replace All.)
9. To close the Tag Substitution dialog box, click Close.

Using tag placeholders

Tag placeholders provide a way to use one graphic display to represent a number of similar operations.

For example, suppose you are creating displays for a plant that cans corn and peas. The machinery used in both processes is identical. Instead of creating two displays and specifying corn-related tags in one display and pea-related tags in another, you can create one display and not specify any tag names. Where a tag name is required, type a tag placeholder.

You can use tag placeholders wherever you would normally assign a tag to an object, including in expressions. You can also use tag placeholders in the expressions you create to animate objects.

You can use tag placeholders in:

- the graphic display that opens when the project is first run
- graphic displays that are opened using a Goto Display button

Use parameter files to specify which tags to substitute for which placeholders. For information about creating parameter files, see page 8-25.

Creating tag placeholders

A tag placeholder is the cross-hatch character (#) followed by a number from 1 to 500, as shown in this example:

You can use tag placeholders in:

- the Connections tab of an object's Properties dialog box
- the Connections tab of the Property Panel

- the Expression box in the Animation dialog box

To create a tag placeholder:

▶ Type the cross-hatch character followed by a number (no space in between). For example, #1.

Performing basic operations on objects

Once you have drawn an object, you can select the object and work with it. You can:

- move objects
- copy objects
- duplicate objects
- resize objects
- reshape drawing objects
- delete objects

Moving objects

You can move objects using the mouse or the keyboard. The keys give you fine positioning, allowing you to move objects in small increments. You can also use the grid to position objects precisely.

Another option is to position an object using the object's Top and Left properties in the Property Panel. For information about using the Property Panel, see page 9-24.

Once you've moved objects into position, you might want to align other objects with them, or lock them into place. For information about aligning objects, see page 9-47. For information about locking objects into position, see page 9-52.

To automatically align objects to the grid as you move them:

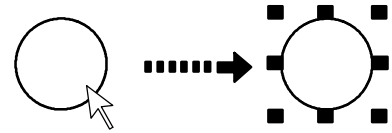
▶ On the View menu, select Snap On. A check mark appears beside the menu item when the option is selected.

For information about setting up the grid, see page 8-8.

To move objects by dragging with the mouse:

1. Select one or more objects.

2. Place the pointer on an object (*not* on the edge or on the handles).
3. Drag the objects to the desired position.



If you selected several objects, dragging one of the objects moves all the selected objects. The objects maintain their position relative to each other.

To move objects in small increments using the keyboard:

1. Select one or more objects.
2. Place the pointer on the object, not on its edge or handle.
3. Hold down Shift while you press an arrow key.

   To adjust the amount of the increment, first hold down the Shift key and press the + or - keys on the keyboard's numeric keypad.
4. Release the Shift key when the object is in place.

Copying objects

To copy objects, you can:

- drag and drop objects in the same display
- drag and drop objects between displays, or from a graphic library to a display
- copy and paste objects

When an object is copied, any animation attached to the object is also copied. If a group is copied, the new copy of the group can be ungrouped to individual objects, just like the original.

To drag objects in the same display:

1. Select one or more objects.
2. Drag the object, and then press Ctrl.

When you press Ctrl, a plus sign is added to the cursor.

3. When the object is where you want it, release the mouse button and then the Ctrl key.

   A new copy of the object is created.

   If you selected several objects, dragging one of the objects copies all the selected objects. The objects maintain their position relative to each other.

To drag objects between displays:

1. Open both displays (or a graphic library and a display).
2. Position or resize the displays so both are visible.

   For more information, see page 8-12.

3. Select one or more objects.
4. Click the selected object and drag it to the new display.

   If you selected several objects, dragging one of the objects copies all the selected objects. The objects maintain their position relative to each other.

Copying and pasting objects

You can cut, copy, or paste objects using the menu items on the Edit menu or the buttons on the toolbar.

Once you cut or copy an object, you can paste it anywhere in the drawing area of:

- the same graphic display
- a graphic display in the same or a different project
- a graphic library in the same or a different project

To cut or copy objects:

1. Select one or more objects.
2. On the Edit menu, click Cut or Copy, or click the Cut or Copy tool on the Graphics toolbar.
   - To remove the original object, click Cut.
   - To retain the original object, click Copy.

To paste objects:

1. Click in the display or library to paste to.

2. On the Edit menu, click Paste, or click the Paste tool on the Graphics toolbar.

Duplicating objects

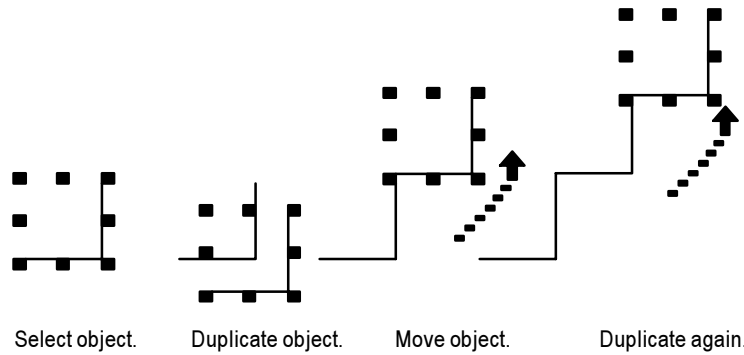
When an object is duplicated, any animation attached to the object is also duplicated. If a group is duplicated, the new copy of the group can be ungrouped to individual objects, just like the original.

To duplicate objects:

1. Select one or more objects.
2. On the Edit menu, click Duplicate, or click the Duplicate tool on the Graphics toolbar.

   The duplicated object is placed slightly offset from the original.

Duplicate also duplicates actions. For example, if you duplicate an object, move it, and then duplicate it again, the second Duplicate will, in one step, duplicate *and* move the object. This is useful for creating a series of objects with an equal distance between them.



Duplicate works until you deselect the object.

Resizing objects

You can resize objects using the mouse or using the keyboard. The keys let you resize objects in small increments. You can also use the grid to resize objects precisely.

Another option is to size an object using the object's Height and Width properties in the Property Panel. This method is especially useful for quickly resizing multiple objects to the same size. For information about using the Property Panel, see page 9-24.

When you resize text objects, the font size is adjusted to fit the new object size as closely as possible.

To automatically align objects to the grid as you resize them:

▶ On the View menu, select Snap On. A check mark appears beside the menu item when the option is selected.

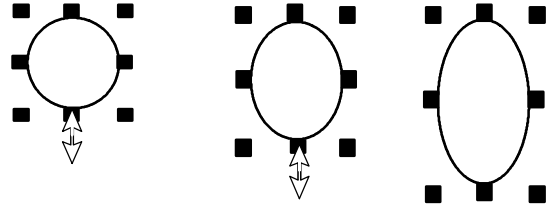
For information about setting up the grid, see page 8-8.

To resize an object using the mouse:

1. Select the object.
2. Place the pointer on one of the handles.

   A double arrow appears.
3. Drag the handle until the object is the desired size or shape.

   Drag a side handle to change width or height, or a corner handle to change both.



   For perfect circles and squares, press Ctrl and hold the key down while you drag a *corner* handle.

   To maintain the object's original proportions (width to height), press Shift and hold the key down while you drag a *corner* handle.

To resize an object in small increments using the keyboard:

1. Select the object.
2. Place the pointer on one of the handles.

   A double arrow appears.
3. Hold down Shift and press an arrow key until the object is the desired size.

To adjust the amount of the increment, first hold down the Shift key and press the + or - keys on the keyboard's numeric keypad.

Reshaping drawing objects

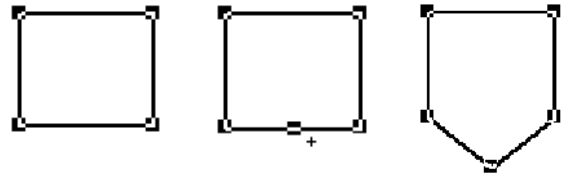
You can reshape arcs, lines, polygons, polylines, rectangles, rounded rectangles, and wedges.

To reshape lines, rectangles, polylines, and polygons:

1. Select the object you want to reshape.
2. Click the Polygon tool, or right-click the object and then click Edit.

   The cursor changes to the Polygon tool, and handles appear on the object.
3. Move the cursor over any line or corner of the object.

   A handle with a cross-hair appears.
4. Drag the handle until the object is the desired shape.



   Dragging from a point along the line (between corners) creates a new angle between the two corners.
5. To delete an angle, position the pointer at the tip of the angle, and then press Delete.

To reshape arcs and wedges:

1. Select the object you want to reshape.
2. Click the Arc or Wedge tool, or right-click the object and then click Edit.

   The cursor changes to the Arc or Wedge tool, and handles appear on the object.
3. Place the pointer on one of the handles.

   A cross-hair appears.

4. Drag the handle until the object is the desired shape.

To reshape rounded rectangles:

1. Select the rounded rectangle.
2. Click the Rounded Rectangle tool, or right-click the object and then click Edit.

   A handle appears inside the rounded rectangle.
3. Click the handle and drag inward to increase roundedness, or outward to decrease roundedness.

Deleting objects

If you accidentally delete an object, use the Undo tool to restore it.

To delete objects:

1. Select one or more objects.
2. On the Edit menu, click Delete, or press Delete on the keyboard.

To delete all the objects in the display:

▶ On the Edit menu, click Clear All.

Working with groups of objects

Grouping and ungrouping objects

Grouping combines several objects into a single object so you can manipulate them as a single object. Grouping is useful for keeping objects in the same position relative to each other. You can cut, copy, and paste groups, arrange the group as a single object relative to other objects, and apply the same properties to all the members of the group at once.

You can attach animation to a group, and any animation attached to individual objects in the group remains active. The group animation generally takes precedence over the animation of individual objects within the group. For more information, see page 11-27.

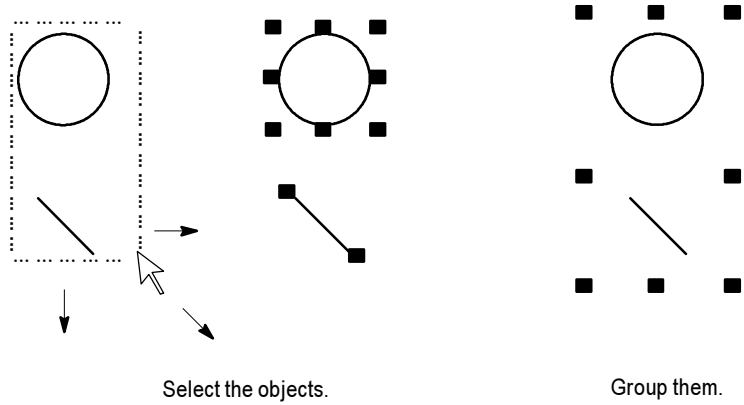
Deleting a group deletes all individual objects in the group.

To group objects:

1. Select all the objects you want grouped.

2. On the Arrange menu, click Group, or on the Graphics toolbar click the Group tool.

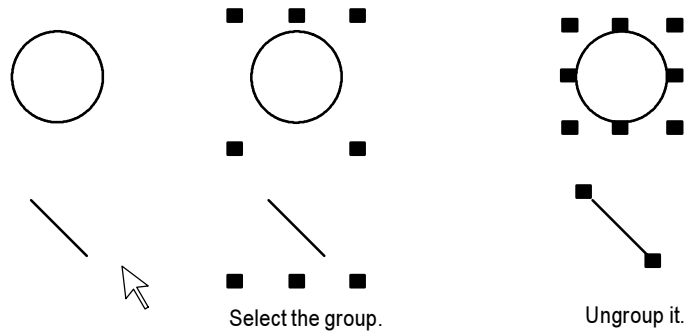
   The handles around each object are replaced by a set of handles around the group.



To ungroup objects:

1. Select the group of objects to ungroup.
2. On the Arrange menu, click Ungroup, or on the Graphics toolbar click the Ungroup tool.

   The handles around the group are replaced with handles around each object.



Ungrouping deletes any animation attached to the group, because the group no longer exists. However, animation attached to the individual objects that were in the group remains active.

Editing groups of objects

Edit a group the same way you would edit an individual object. You can:

- use the Property Panel to apply the same properties to all the members of the group at once. For example, change the line width of all objects in the group to 2 pixels.

  For information about using the Property Panel to edit groups of objects, see page 9-24.

- use the toolbars to apply the same pattern style, background style, foreground colors, and background colors to all the members of the group
- for objects with states, use the States toolbar to cycle through the states and apply the same properties to the states for each object in the group at once. When you select a group containing objects with states, only the states that are common to all objects in the group appear in the toolbar.

  For information about using the States toolbar, see page 9-31.

Editing objects within a group

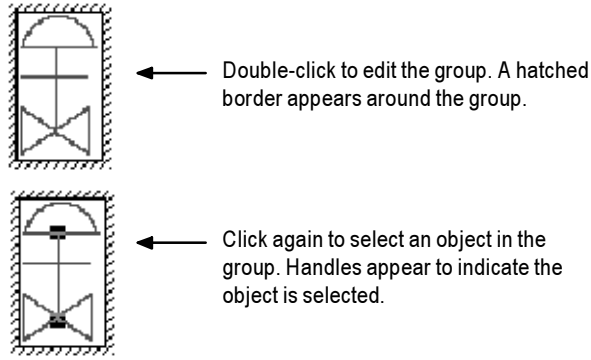
You can also edit individual objects within the group without breaking the group, which is particularly useful when you have animation attached to the group.

To edit objects within a group:

1. Double-click the grouped object, or right-click it and then click Edit. A hatched border appears around the group.

   When the hatched border is around the group, you are in group edit mode. In this mode, you can select individual objects in the group and modify them.

   You can also add new objects to the group.



2. To select an individual object (or a group) in the group, click it. You can also use the Object Explorer to select objects within the group. For details, see page 9-20.

   The status bar and Object Explorer indicate which object or group is selected.

3. Make your changes to the object.

   You can change the selected object's shape, size, or position, or use the object's Properties dialog box or the Property Panel to edit the object's properties.

4. If desired, create new objects inside the hatched border.
5. To stop editing, click outside the group.

Arranging objects

You can arrange objects (or groups of objects) in a number of ways. You can:

- layer objects by moving them in front of or behind other objects
- align objects with each other and with the grid
- space objects horizontally or vertically
- flip drawing objects horizontally or vertically
- rotate drawing objects
- lock objects into position

Layering objects

You can layer objects (or groups of objects) on top of each other. Objects are layered in the order they are created, with the most recently created object on top. Change the layer order with Send to Back and Bring to Front.

Send to Back moves the selected object to the bottom layer.

Bring to Front moves the selected object to the top layer.

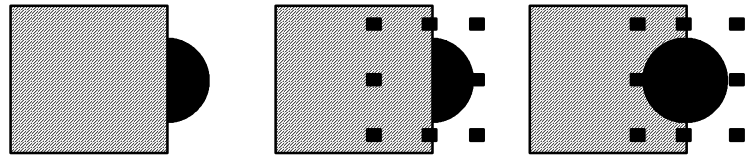
To bring an object to the front:

1. Select the object.

   To select an object that's behind another object, place your pointer on the front object, click once, pause, and then click again. Do not double-click and do not move the mouse.

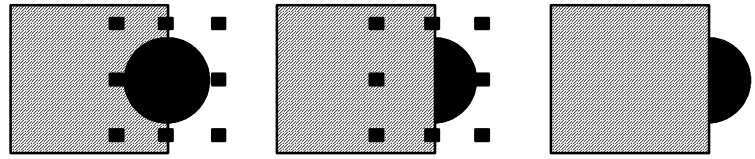
   You can also select a concealed object easily by clicking the object in the Object Explorer.

2. On the Arrange menu, click Bring to Front, or click the Bring to Front tool.



To send an object to the back:

1. Select an object.
2. On the Arrange menu, click Send to Back, or click the Send to Back tool.



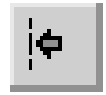
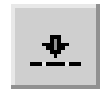
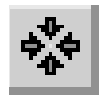
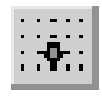
Aligning objects

You can align objects (or groups of objects) with each other and with the grid.

To align objects:

1. Select the objects you want to align.

2. On the Arrange menu, click the appropriate menu item, or click a tool on the Alignment toolbar:

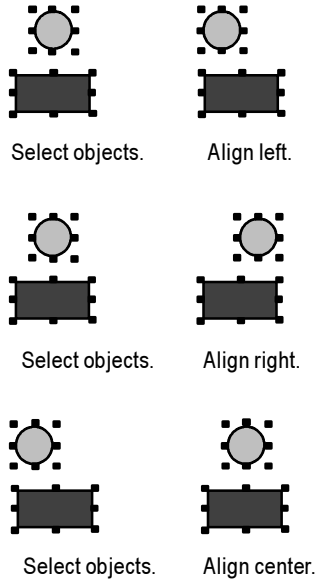
This tool or menu item	Aligns selected objects with
 Align Left	Left-most selected object
 Align Center	Horizontal center of all selected objects
 Align Right	Right-most selected object
 Align Top	Top-most selected object
 Align Middle	Vertical center of all selected objects
 Align Bottom	Bottom-most selected object
 Align Center Points	Center of all selected objects
 Align to Grid	Grid

To automatically align objects to the grid as you create or move them:

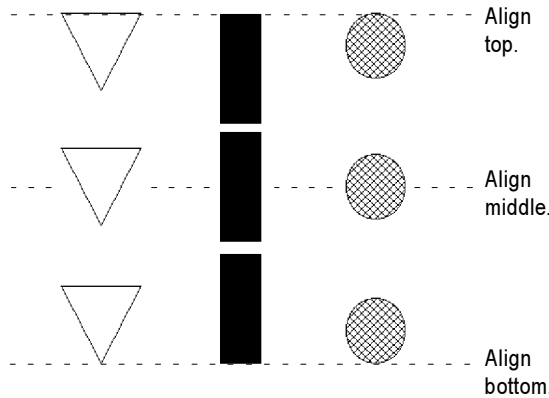
▶ On the View menu, select Snap On. A check mark appears beside the menu item when the option is selected.

For information about setting up the grid, see page 8-8.

Examples: Aligning objects left, right, and center



Examples: Aligning objects top, middle, and bottom



Spacing objects

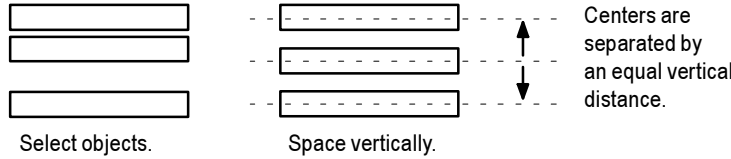
With Space Vertical and Space Horizontal, objects (or groups of objects) are moved vertically or horizontally to have the same amount of space from the *center point* of each object.

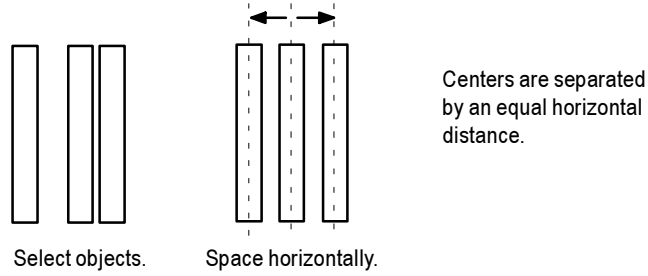
To space objects:

1. Select the objects you want to space.
2. On the Arrange menu, click the appropriate menu item, or click a tool on the Graphics toolbar:

This tool or menu item	Does this
Space Horizontal	Places the centers of the selected objects an equal distance apart horizontally.
Space Vertical	Places the centers of the selected objects an equal distance apart vertically.

Examples: Spacing objects vertically and horizontally





Flipping drawing objects

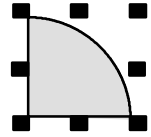
Flipping an object creates a mirror image of the object. You can flip all the drawing objects (or groups of drawing objects) except text, images, and panels.

To flip a drawing object:

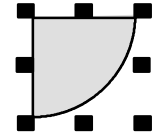
1. Click the object.
2. On the Arrange menu, click the appropriate menu item, or click a tool on the Graphics toolbar:

This tool or menu item	Flips selected objects
Flip Vertical	Top to bottom (upside-down)
Flip Horizontal	Left to right

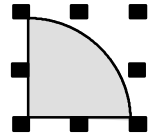
Examples: Flipping drawing objects vertically and horizontally



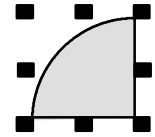
Select object.



Flip vertical.



Select object.



Flip horizontal.

Rotating drawing objects

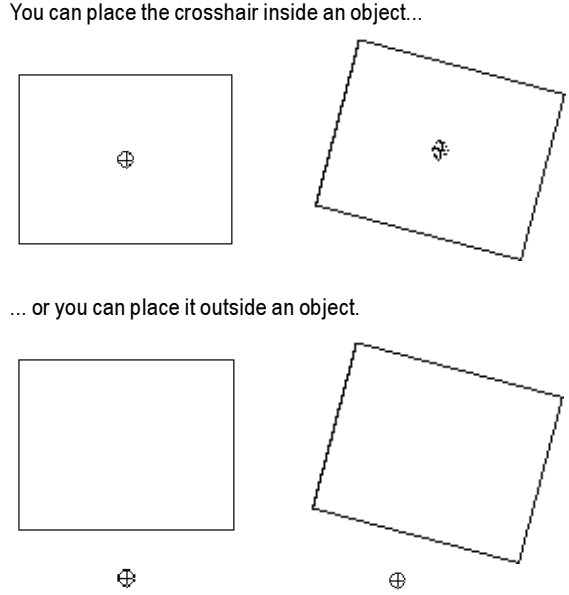
You can rotate all the drawing objects (or groups of drawing objects) except images, panels, and rounded rectangles.

You can attach rotation animation to the same drawing objects. With rotation animation, the object rotates around an anchor point to indicate a tag's value at runtime. For details about rotation animation, see page 11-22.

When you rotate text, it rotates around the anchor point but the text itself remains upright.

To rotate a drawing object:

1. On the Objects menu, click Rotate, or on the Objects toolbar click the Rotate tool.
2. Click the object you want to rotate. A small crosshair circle appears in the middle of the object. This is the anchor point that is used as the center of rotation.
3. To move the center of rotation, click the cross-hair and drag it to a new anchor position. The anchor can be inside or outside the object.



4. Click on an edge of the object and drag in the direction you want to rotate it.

   To rotate the object in five-degree increments, press Ctrl while you drag.
5. When the object is in the desired position, release the mouse button.

Locking objects into position

You can lock graphic objects (or groups of objects) into position by converting them to wallpaper. Once you convert objects to wallpaper, you cannot select or edit them unless you unlock the wallpaper. Wallpaper objects cannot be animated at runtime.

If the grid is on, wallpaper objects are positioned behind the grid.

If you just want to lock the objects into place while you're working in the display, unlock the wallpaper when you're finished. If you want to use the wallpaper objects as a background for your display, leave the wallpaper locked.

For more information about creating a background for your display, see page 8-15.

To convert objects to wallpaper:

1. Select the objects to convert.
2. On the Edit menu, select Wallpaper, and then click Convert to Wallpaper.

   For a single object, you can right-click it and then click Convert to Wallpaper.

To unlock the wallpaper:

- On the Edit menu, select Wallpaper, and then click Unlock All Wallpaper.

  All objects in the graphic display are converted back to their original state.

Chapter

10 Configuring graphic objects

This chapter describes how to set up graphic objects. It describes how to:

- work with objects that have states
- position objects for touch screens
- assign function keys to buttons
- use the keyboard to navigate to and select objects
- link buttons to lists and trends
- repeat a button's action by holding down the button
- ensure values are read by the data source before sending new values
- use objects' Properties dialog boxes to set up options for the individual graphic objects

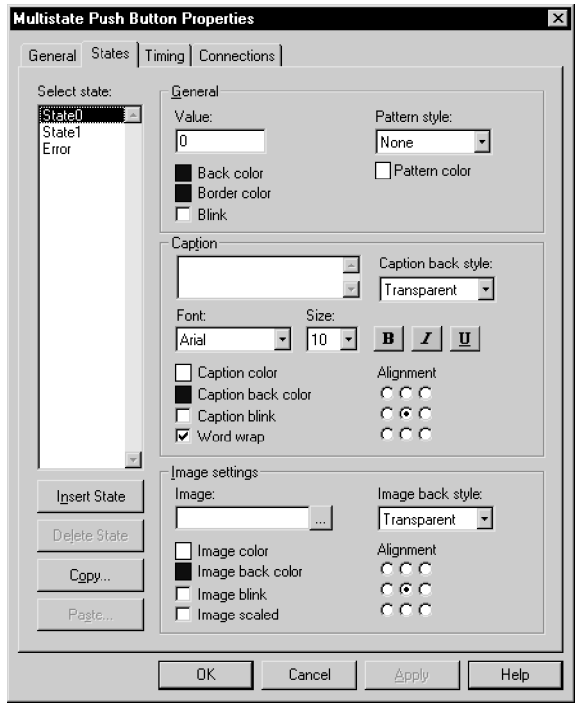
For objects that are not described in other chapters of the manual, this chapter provides information about how to use the objects.

For information about creating graphic objects, see Chapter 9.

For information about creating and configuring the trend graphic object, see Chapter 17.

Tips for configuring objects with states

The graphic objects that have configurable states have a States tab in their Properties dialog box.



To set up the properties for a state:

1. Click the States tab.
2. In the Select state list, click the state.
3. Specify options for the state.
4. Repeat steps 2 and 3 for each additional state, including the error state if the object has one.

Copying and pasting properties from one state to another

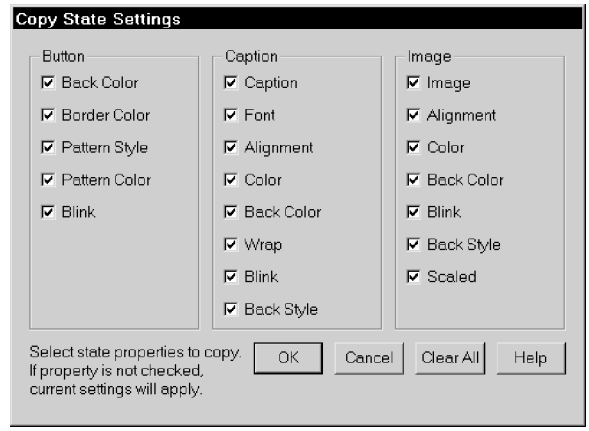
Often, you'll want most of the properties to be the same from state to state, with only one or two settings changing to distinguish the different states.

To simplify setting up states when many of the properties are the same, you can copy and paste settings from one state to another.

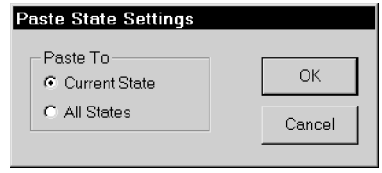
To copy settings from one state to another:

1. In the Select state box, click the state whose settings you want to copy.

2. Click the Copy button.



3. In the Copy State Settings dialog box, select the settings to copy. Clear the check boxes for settings you don't want to copy, or click Clear All to clear all the check boxes and then specify the settings to copy.
4. Click OK.
5. In the Select state box, click the state to which to paste the settings.
6. Click the Paste button.



7. In the Paste State Settings dialog box, specify whether to paste the settings to the selected (current) state only, or to all the object's states.
8. Click OK.

Adding and removing states

Some graphic objects have a configurable number of states. For these objects, you can use the Insert State and Delete State buttons in the States tab, to add and remove states without returning to the General tab. The "Number of States" setting on the General tab is automatically updated.

Insert State Click a state, and then click Insert State. The new state is inserted above the selected state.

Delete State Click the state to delete, and then click Delete State.

Setting up how objects are used at runtime

Just as you must provide operators with a way to navigate between displays at runtime, you must also make sure that operators can use the objects within the displays. The next sections in this chapter describe how to set up your objects so the operator can:

- access objects using a touch screen
- use function keys to press buttons when a mouse or touch screen is not available on the runtime computer
- use the keyboard or keypad to navigate to and select lists, trends, and ActiveX input objects
- use buttons to work with lists and trends
- repeat a button's action by pressing and holding it
- ensure that tag values are read by the data source before sending new values

Positioning objects for touch screens

If the operator will be using a touch screen at runtime, keep these tips in mind when positioning graphic objects in your displays:

- Don't place important buttons where they'll be blocked by an On Top display. The user can't press a covered button.
- Ensure buttons are large enough for users to touch easily.
- Use touch margins for buttons that are positioned close together, to ensure that the adjacent button is not pressed by mistake.

Using touch margins

Touch margins are touch-insensitive borders inside the button's margin. If the operator presses on the touch margin, the button press is not registered. Touch margins are useful when buttons are positioned close to each other and you want to make sure the operator doesn't press the wrong button by mistake.

You can create touch margins at the top and bottom of the button, at the sides, or on all four sides.

In the illustration below, the button's border and touch margins are the same size, 12 pixels. A button press would be registered only when the darker rectangle in the middle of the button is pressed.

The bounding box

If the button shape is a circle or ellipse, the touch margin applies to the button's bounding box, not the object's border. The bounding box is an invisible square or rectangle that surrounds the button. When you select the button, the selection handles show the location of the bounding box.

To create touch margins, use one of these methods:

- In the General tab of the button's Properties dialog box, type the number of pixels for the touch margins in the Horizontal margin and Vertical margin boxes.
- In the Properties tab of the Property Panel, type the number of pixels for the HorizontalMargin and VerticalMargin properties.

Assigning function keys to buttons

You can assign function keys to the buttons in your displays to allow the operator to press the buttons using the function keys on the runtime terminal (or the function keys on a keyboard, if one is available).

You can assign up to 34 function keys to each graphic display.

Here are some tips for assigning function keys:

- Where possible, use the same function keys for the same operations in all your graphic displays. For example, if every display contains a Goto Display button that returns the operator to a graphic display called Main Menu, assign the same function key to this button in each display.
- Include the name of the function key assigned to a button in a caption on the button.

  For buttons with multiple states, include the function key name in the caption for each state, or create a text object to use as a label for the button (so that you don't have to configure the caption for each state), and then group the text and button together.

Function key equivalents

If your project will run on the RAC6182, the function keys correspond to the keys F1 to F14 and K1 to K20 on the computer's keypad.

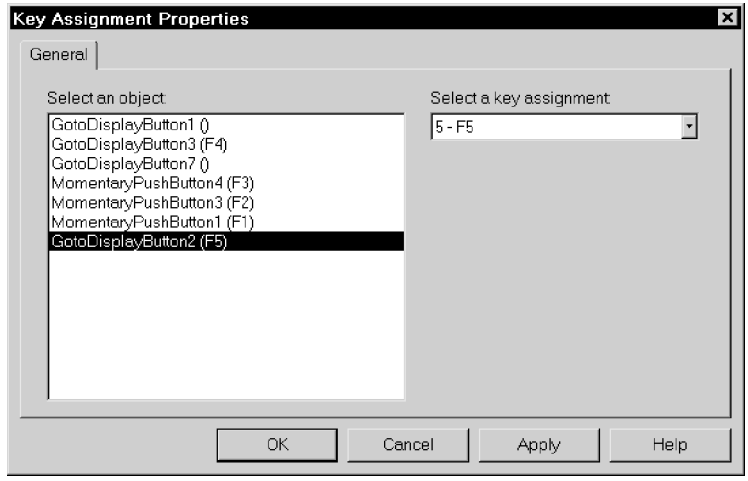
If your project will run in Windows 2000, the keyboard contains the function keys F1 to F12 only. The remaining function keys are associated with these key combinations:

For this function key	Use this key combination
F13	Left Shift-F1
F14	Left Shift-F2
K1 - K12	Right Alt-F1 to Right Alt-F12
K13	Right Shift-F1
K14	Right Shift-F2
K15	Right Shift-F3
K16	Right Shift-F4
K17	Right Shift-F5
K18	Right Shift-F6
K19	Right Shift-F7
K20	Right Shift-F8

At runtime, the operator presses the key combination to activate the object to which the function key is assigned.

To assign function keys to buttons:

1. On the Edit menu, click Key Assignments, or right-click a button and then click Key Assignments.



   The list shows all the buttons in the graphic display to which a function key can be assigned, and indicates which keys have already been assigned.

2. In the "Select an object" list, click the button to which to assign a function key.
3. In the "Select a key assignment" box, select the key to assign.

   The assigned key appears after the button name in the list.

4. Repeat steps 2 and 3 to assign keys to the other buttons in the display.
5. Click OK to close the dialog box.

To change the function key assigned to a button:

- In the Key Assignment Properties dialog box, select the button and then select a new function key.

Using the keyboard to navigate to and select objects

If a mouse or touch screen is not available on the runtime computer, the operator can use the keys on a keyboard or keypad to select (give the input focus to) these objects:

- lists: Control List selector, Display List selector, Activity list, and Alarm list
- trends
- third-party ActiveX input objects

What input focus looks like

The object with focus is surrounded by a highlight box, unless the "Disable Highlight When Object has Focus" box is selected (in the Display Settings dialog box). You can specify the color of the highlight in this dialog box as well. For more information, see page 8-15.

Using the keys on the keyboard or keypad

When a graphic display opens, the list, trend, or ActiveX input object that is closest to the top left corner of the display is selected. The operator can use these keys to move to and select a different object:

Use this key	To do this
Tab	Move from the upper left to the lower right.
Shift-Tab	Move from the lower right to the upper left.
Ctrl-arrow key	Move left, right, up, or down

Removing objects from the tab sequence

By default, you can use the keys to navigate to all lists, trends, and ActiveX input objects in a display. However, you can disable the key navigation for objects if desired.

When an object's key navigation is disabled, the operator can still select the object using a mouse or touch screen, if available.

To disable key navigation, use one of these methods:

- In the Properties tab of the Property Panel, set the KeyNavigation property to False.
- In the General tab of the object's Properties dialog box, clear the Key navigation box. (This method is not available for trends and ActiveX objects.)

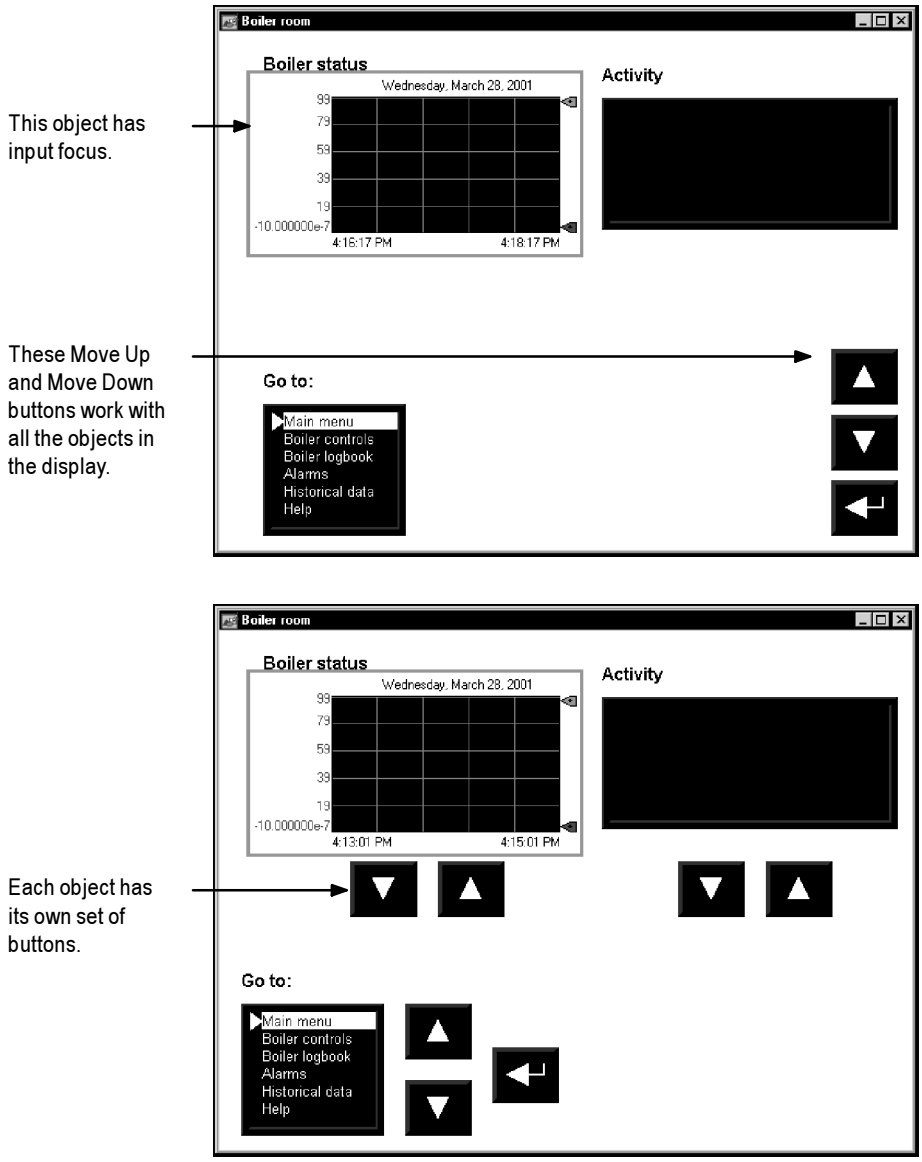
Linking buttons to lists and trends

The table on page 10-22 lists buttons that work with the trend and list objects. For the buttons in the list, you can specify whether the button works with a specific object only, or whether it works with whichever trend or list is selected in the display.

If you are creating small graphic displays that don't have much room, you might prefer to use one set of buttons to work with all the lists and trends in the display.

By default, the buttons are configured to work with whichever object has input focus (is selected) in the display.

However, if space isn't a concern, you can create multiple copies of the buttons you want to use and link them to specific lists or trends. One benefit of linking a button to a specific object is that the operator doesn't have to select the list or trend before pressing the button. Another benefit is that you can position the buttons close to the specified object, making it easier for the operator to understand which buttons work with which objects.

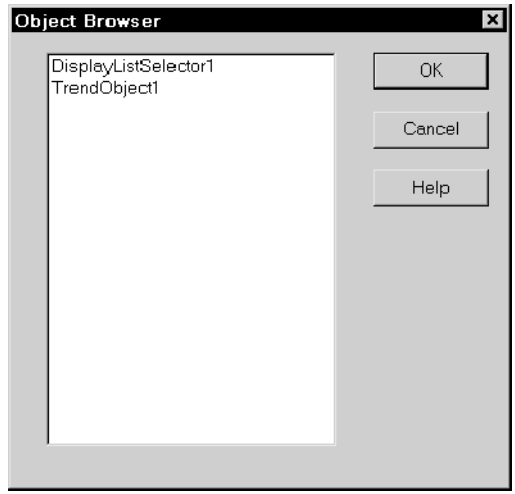


To link a button to a specific object using the button's Properties dialog box:

1. Double-click the button to open its Properties dialog box.
2. In the General tab, in the "Send press to" box, select Linked Object.

Browse button

3. To select from a list of all the objects in the display that you can link the button to, click the Browse button next to the Linked object box.



4. Click the name of the object to link the button to, and then click OK.
5. Click OK to close the button's Properties dialog box.

To link a button to a specific object using the Property Panel:

▶ In the Properties tab, specify the SendPressTo and LinkedObject properties.

Once you have linked buttons to an object, you might want to disable the object's key navigation, since this option is no longer needed. For details, see page 10-8.

Repeating a button's action by holding down the button

To repeat a button's action by pressing and holding it, set up auto repeat for the button. If you set up auto repeat, when the operator presses and holds down the button, repeated button presses are registered until the operator releases the button.

A button press occurs when the operator clicks an object with the mouse, presses it on a touch screen, or presses the function key associated with the object. Auto repeat works with all these methods of pressing buttons.

You can use auto repeat with these buttons:

For this button	Each button press does this
Multistate Push	Sends the value for the next state to the data source. External changes to the Value control are not recognized when the button is in auto repeat mode.
Ramp	Sends the new ramped value to the data source. External changes to the Value control are not recognized when the button is in auto repeat mode.
Move Up	Moves the highlight up an item in the list, or scrolls up in the trend.
Move Down	Moves the highlight down an item in the list, or scrolls down in the trend.
Page Up	Moves the highlight up a page in the list.
Page Down	Moves the highlight down a page in the list.
Move Left	Scrolls the trend to the left.
Move Right	Scrolls the trend to the right.

For each button that uses auto repeat, you can specify:

- Auto repeat rate—the number of times per second a button press is registered when the button goes into auto repeat mode. The default rate is 0, which means that auto repeat is disabled.
- Auto repeat delay—the length of time the button has to be pressed and held down before auto repeat starts.

To set up auto repeat for a button, use one of these methods:

- In the Timing tab of the button's Properties dialog box, specify the Auto repeat rate and Auto repeat delay properties.
- In the Properties tab of the Property Panel, specify the AutoRepeatRate and AutoRepeatDelay properties.

Ensuring values are read by the data source before sending new values

To ensure a value is read by the data source before the operator sends a new value, use Enter key handshaking. While Enter key handshaking is in effect for an object, the operator cannot send a new value to the object's Value control.

You can use Enter key handshaking with these graphic objects:

- Control List selector
- Numeric Input Enable button
- String Input Enable button

If Enter key handshaking is in effect for one of these objects, the operator can still provide input to other objects in the graphic display.

If the graphic display is closed while Enter key handshaking is in effect, the handshaking is cancelled.

Methods of Enter key handshaking

Enter key handshaking works by setting the object's Enter control to 1. As long as the Enter control is set to 1, new values cannot be sent to the Value control. How the Enter control is reset to 0 depends on how you set up Enter key handshaking.

There are two ways you can use Enter key handshaking:

- To hold the value at the data source for a specific period of time.
- To hold the value at the data source until the data source notifies RSView that the value has been read.

Choose the method that best suits your project needs and communication system.

Holding the value for a specific period of time

To configure an object's Enter key handshaking so that the value at the Value control is held for a specific period of time, assign a tag to the Enter control and specify the Enter key hold time. You can also specify an Enter key control delay, if desired.

How handshaking works

This method of Enter key handshaking works as follows:

1. When the operator presses the Enter button, the value is sent to the Value control and the "Enter key control delay" timer begins timing. (The use of a delay is optional.)
2. If you specify an Enter key control delay, when the time is up, the Enter control is set to 1. If you don't use the delay, the Enter control is set to 1 as soon as the operator presses Enter.

As long as the Enter control is set to 1, the operator cannot send new values to the data source.

3. When the Enter control is set to 1, the "Enter key hold time" timer begins timing.
4. When the Enter key hold time has expired, the Enter control is reset to 0 and the operator can send a new value to the Value control.

To set up Enter Key Handshaking to hold the value for a specific period of time:

1. In Timing tab of the object's Properties dialog box, specify the Enter key control delay (optional) and Enter key hold time properties.
2. In the Connections tab, assign a tag to the Enter control. A digital tag is recommended.

You can also use the Property Panel to specify the properties and assign a tag to the Enter control.

Holding the value until the data source acknowledges that it has read the value

To configure an object's Enter key handshaking so that the value at the Value control is held until the data source notifies RSView that it has read the value, use two controls: the Enter control and the Enter handshake control.

Instead of using an Enter key hold time, specify an Enter key handshake time. You must also specify the Handshake reset type. You can use an Enter key control delay, if desired.

How the Handshake reset type works

How the Enter handshake control resets the Enter control depends on which Handshake reset type you select:

With this Handshake reset type	The Enter control is set to 0 when
Non-zero value	The Enter handshake control has a non-zero value. If the Enter handshake control already has a non-zero value when the value is sent to the Value control (or when the Enter key control delay has expired, if the delay is used), then the Enter control is not set to 1, and Enter key handshaking does not take place.
Zero to non-zero transition	The Enter handshake control changes from 0 to a non-zero value.

Configure the data source to send a non-zero value to the Enter handshake control when it has read the new value at the Value control, and then to reset the Enter handshake control to 0.

If the Enter key handshake time expires before the Enter handshake control resets the Enter control, an error message is sent to the activity log.

How handshaking works

If you use the Enter handshake control, handshaking works like this:

1. When the operator presses the Enter button, the value is sent to the Value control and the "Enter key control delay" timer begins timing. (The use of a delay is optional.)
2. If you specify an Enter key control delay, when the time is up, the Enter control is set to 1. If you don't use the delay, the Enter control is set to 1 as soon as the operator presses Enter.

   As long as the Enter control is set to 1, the operator cannot send new values to the data source.

   If the Handshake reset type is Non-zero value, the Enter handshake control must be 0 when the delay expires in order to set the Enter control to 1.

If the data source has already read the value at the Value control and set the Enter handshake control to a non-zero value, it's not necessary to set the Enter control to 1. The operator can send a new value to the Value control.

3. When the Enter control is set to 1, the "Enter key handshake time" timer begins timing.
4. The Enter control remains set until the Enter key handshake time expires or until reset by the Enter handshake control, whichever happens first.
5. The Enter control is reset to 0 and the operator can send a new value to the Value control.

To set up Enter Key Handshaking to hold the value until the data source has read it:

1. In the Timing tab of the object's Properties dialog box, specify these properties:
   - Enter key control delay (optional)
   - Enter key handshake time
   - Handshake reset type
2. In the Connections tab, assign these controls:
   - Enter—assign a tag. A digital tag is recommended.
   - Enter handshake—assign a tag or expression.
3. Configure the data source to send a non-zero value to the Enter handshake control when it has read the new value at the Value control, and then to reset the Enter handshake control to 0.

You can also use the Property Panel to specify the properties and assign tags to the controls.

Using buttons to operate the project

Use these button graphic objects to operate the project:

Use this button	To do this
Return to Display button	Close a display and return to the previous display. For details, see page 19-5.
Close Display button	Close a display. For details, see page 19-6.
Login button	Open the Login dialog box and then log in. For details, see page 18-9.
Logout button	Log out of the project. For details, see page 18-9.
Display Print button	Print the current display. For details, see page 8-35.
Shutdown button	Stop the project and close RSView ME Station. For details, see page 19-7.
Acknowledge All Alarms button	Acknowledge and silence all currently unacknowledged alarms. For details, see page 13-30.
Clear Alarm History button	Remove all alarms from the alarm log file and all Alarm lists. For details, see page 13-30.
Silence Alarms button	Silence the audio indicator for all current alarms (Windows 2000 projects only). For details, see page 13-30.
Activity Clear All button	Remove all activity messages from all Activity lists. For details, see page 15-9.
Information Acknowledge button	Acknowledge the current message in the Information Message display. For details, see page 14-10.

You can set up any combination of these buttons in a graphic display. For example, you might want to put a Login, Logout, and Shutdown button in the same graphic display.

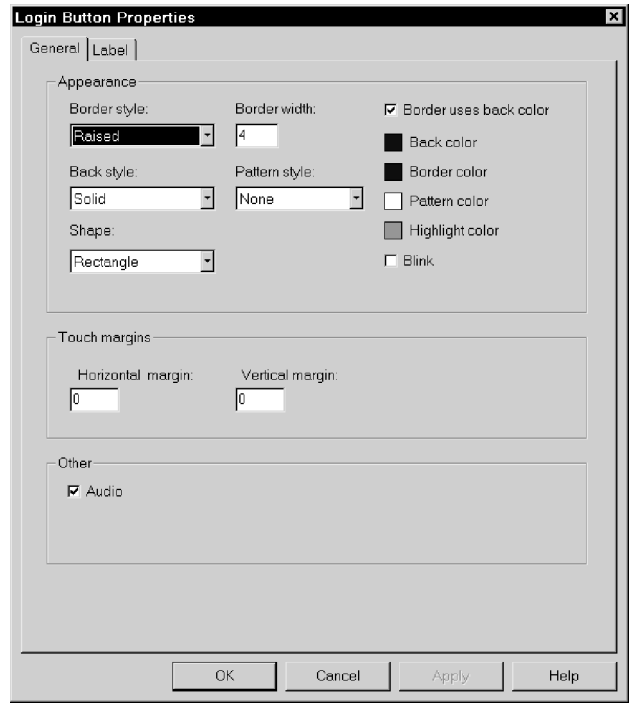
Create and then set up each button separately.

Setting up buttons to operate the project

All of the buttons listed in the previous table are configured the same way. This section shows how to set up the Login button, but you can use these instructions to set up any of the buttons in the table.

To set up a button:

1. Double-click the button.



2. In the button's Properties dialog box, fill in the options on each tab, as described in the sections that follow. When you are finished, click OK.

Setting up the appearance of the button

In the General tab, specify what the button looks like at runtime.

Border style Click a border style in the list, or click None to remove the border.

Border width Type a number to change the thickness of the button's border. Border width is measured in pixels.

Border uses back color Select the check box if you want the button's border to have the same color as the button's background.

Clear the check box if you want the button's border to have a different color than the button's background, and then choose a Border color.

Back color Click the color box, and then click a color for the button's background.

Border color Click the color box, and then click a color for the button's border.

Back style Click Solid to cover objects or the display background behind the button. Click Transparent to allow objects or the display background behind the button to show through.

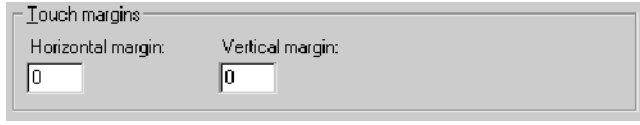
Pattern style Click a pattern style for the button.

Pattern color Click the color box, and then click a color for the pattern.

Highlight color Click the color box, and then click a color for the selection border that appears around the button when it is pressed. If the button does not use a border, the highlight color is not visible when the button is pressed.

Blink Select the check box to make the button blink at runtime. Clear the check box to prevent the button from blinking at runtime.

Shape Click a shape for the button.



Horizontal margin Type the number of pixels for the touch-insensitive margin inside the object's left and right edges.

For information about using touch margins, see page 10-4.

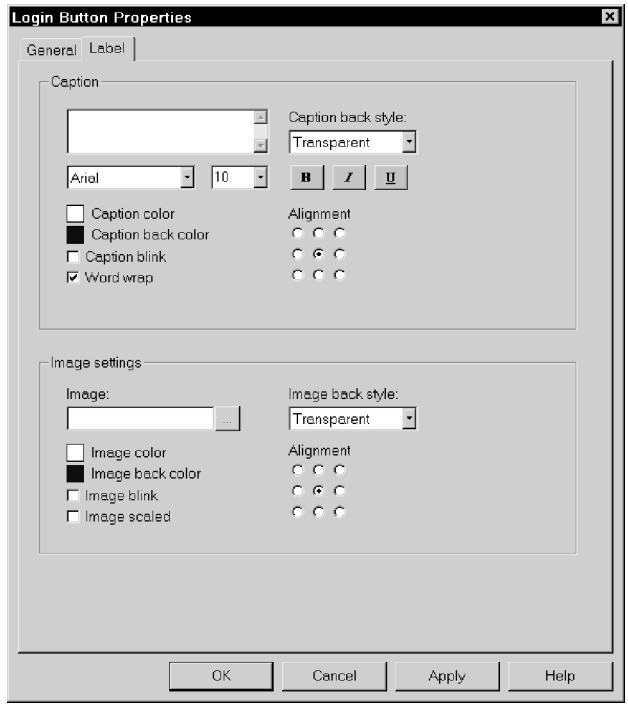
Vertical margin Type the number of pixels for the touch-insensitive margin inside the object's top and bottom edges.

Audio Select this check box to beep the computer's internal speaker when the operator presses the button.

If the computer running the display does not have an internal speaker, pressing the button does not trigger a beep.

Setting up a caption or image for the button

In the Label tab, specify what text or image to display on the button.



Caption Type the text you want to appear on the button. If you don't want any text on the button, leave the Caption box blank.

Caption back style Click Solid to cover the button's background (such as a graphic image) with the text. Click Transparent to allow the button's background to show through between the letters.

Font, size, and style Click a font for the caption in the font list. Type or click a size for the font in the size box. Click B to make the font bold, click I to make the font italic, click U to underline the text.

Caption color Click the color box, and then click a color for the caption's text.

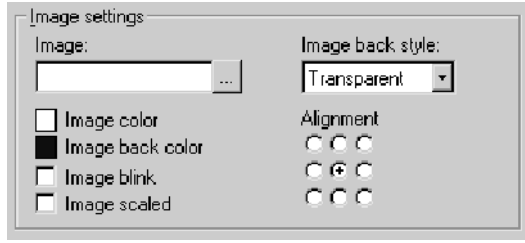
Caption back color Click the color box, and then click a color for the caption's background.

The caption's background color is visible only if the Caption back style is Solid.

Caption blink Select the check box to make the caption blink at runtime. Clear the check box to prevent the caption from blinking at runtime.

Word wrap Select this check box to wrap words to the next line if they are too long for the width of the caption. Clear this check box to wrap on characters instead.

Alignment Click a position in the grid, relative to the button. In the default alignment position, the text is centered vertically and horizontally on the button.



Browse button

Image Type the name of the image file to display on the button, or click the Browse button to browse for the image.

If you click the Browse button, the Image Browser opens. Click an image in the Select image box, and then click OK.

Image back style Click Solid to cover the button's background behind the image. Click Transparent to allow the button's background to show through spaces in the image.

Image color Click the color box, and then click a color for a monochrome image. You cannot change the color of grayscale or color images.

Image back color Click the color box, and then click a color for the background of a monochrome image. You cannot change the background color of grayscale or color images.

Image blink Select the check box to make a monochrome image blink at runtime. Clear the check box to prevent the image from blinking at runtime. You cannot make grayscale or color images blink.

Image scaled Select the check box to scale the image to fit the area of the button. Clear this check box to crop the image to the area of the button if it is too large to fit on the button.

If the button's shape is a Circle or Ellipse, the image is shaped to fit inside the circle or ellipse.

Alignment Click a position in the grid, relative to the button. In the default alignment position, the image is centered vertically and horizontally on the button.

Using buttons with lists and trends

These button graphic objects are useful for scrolling through and selecting items in lists and trends:

Use this button	With this graphic object	To do this
Pause button	Trend	Toggle a trend between pausing and automatic scrolling.
Next Pen button	Trend	Change the vertical axis labels for a trend to the scale for the next pen.
Backspace button	Control List selector	Move the cursor back to the highlighted item in the list.
End button	Lists and trends	List—move to the bottom item visible in the list. Trend—resume trend scrolling and move to the current (latest) data in the trend.
Enter button	Lists	Select the item the cursor is pointing to.
Home button	Lists and trends	List—move to the top item visible in the list. Trend—pause the trend and move to the earliest data in the trend.
Move Left button	Trend	Pause the trend and scroll to the left.
Move Right button	Trend	Pause the trend and scroll to the right.
Move Down button	Lists and trends	List—move down one item in the list. Trend—scroll down to display lower values on the vertical scale.

Use this button	With this graphic object	To do this
Move Up button	Lists and trends	List—move up one item in the list. Trend—scroll up to display higher values on the vertical scale.
Page Down button	Lists	Move down one page in the list.
Page Up button	Lists	Move up one page in the list.
Acknowledge Alarm button	Alarm list	Acknowledge and silence the selected alarm.
Activity Clear button	Activity list	Remove the selected message from all Activity lists.

Working with lists and trends

The buttons in the table work with these graphic objects:

- Control List selectors
- Display List selectors
- Activity lists
- Alarm lists
- trends

You can set up any combination of these buttons in a graphic display that contains a list object or trend. Create and then set up each button separately.

For information about	See
Using buttons with Alarm lists	Page 13-28
Using buttons with Activity lists	Page 15-9
Using buttons with trends	Page 17-24

Linking buttons to objects

You can link the buttons to specific objects in a display, or use the same buttons with multiple objects. If you use the same buttons with multiple objects in a display, the button press goes to whichever object has input focus.

For more information about linking buttons to graphic objects, see page 10-9.

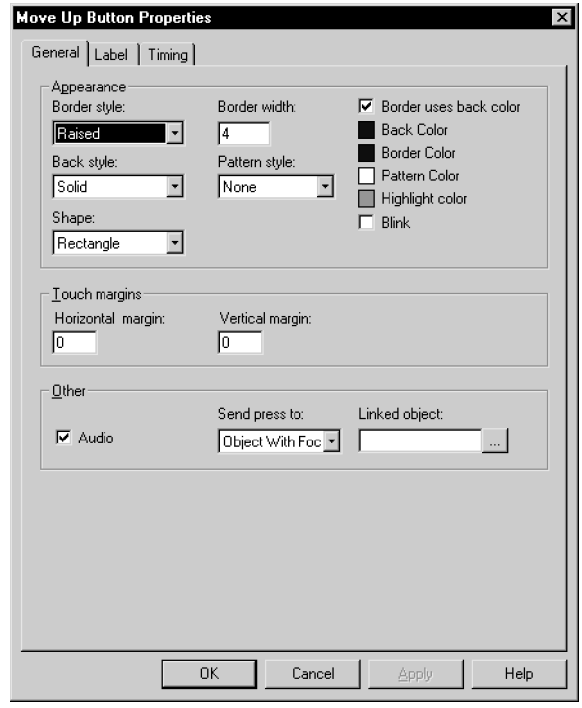
Setting up buttons to use with lists and trends

All of the buttons listed in the previous table are configured the same way, except that the Move Up, Move Down, Move Left, Move Right, Page Up, and Page Down buttons can be set up to auto repeat. The other buttons have no auto repeat function.

This section shows how to set up the Move Up button, but you can use these instructions to set up any of the buttons in the table.

To set up a button:

1. Double-click the button.



2. In the button's Properties dialog box, fill in the options on each tab, as described in the sections that follow. When you are finished, click OK.

Setting up the appearance of the button

In the General tab, specify what the button looks like at runtime.

Border style Click a border style in the list, or click None to remove the border.

Border width Type a number to change the thickness of the button's border. Border width is measured in pixels.

Border uses back color Select the check box if you want the button's border to have the same color as the button's background.

Clear the check box if you want the button's border to have a different color than the button's background, and then choose a Border color.

Back color Click the color box, and then click a color for the button's background.

Border color Click the color box, and then click a color for the button's border.

Back style Click Solid to cover objects or the display background behind the button. Click Transparent to allow objects or the display background behind the button to show through.

Pattern style Click a pattern style for the button.

Pattern color Click the color box, and then click a color for the pattern.

Highlight color Click the color box, and then click a color for the selection border that appears around the button when it is pressed. If the button does not use a border, the highlight color is not visible when the button is pressed.

Blink Select the check box to make the button blink at runtime. Clear the check box to prevent the button from blinking at runtime.

Shape Click a shape for the button.

Horizontal margin Type the number of pixels for the touch-insensitive margin inside the object's left and right edges.

For information about using touch margins, see page 10-4.

Vertical margin Type the number of pixels for the touch-insensitive margin inside the object's top and bottom edges.

Audio Select this check box to beep the computer's internal speaker when the operator presses the button.

If the computer running the display does not have an internal speaker, pressing the button does not trigger a beep.

Send press to Click Object With Focus to send the button's press action to the object that is selected on the display.

Click Linked Object to send the button's press action to the object to which the button is linked.

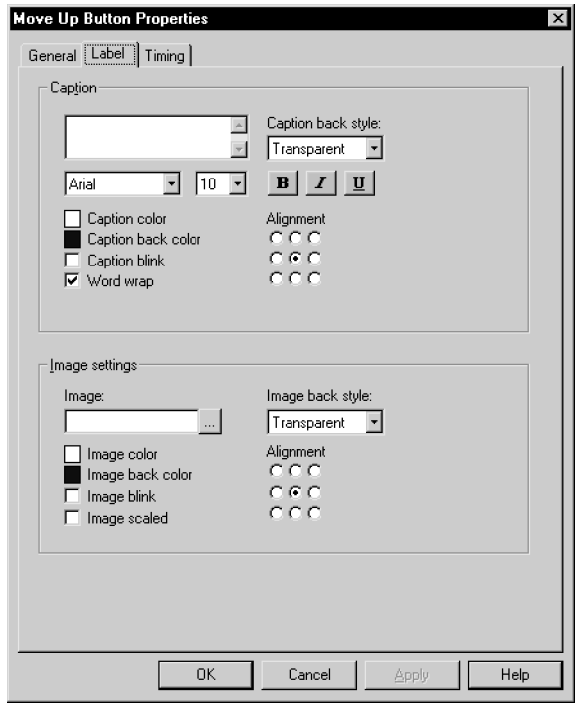
For more information about linking buttons to graphic objects, see page 10-9.


Browse button

Linked object Click the Browse button, and then click the object you want to link the button to.

Setting up a caption or image for the button

In the Label tab, specify what text or image to display on the button.



Caption Type the text you want to appear on the button. If you don't want any text on the button, leave the Caption box blank.

Caption back style Click Solid to cover the button's background (such as a graphic image) with the text. Click Transparent to allow the button's background to show through between the letters.

Font, size, and style Click a font for the caption in the font list. Type or click a size for the font in the size box. Click B to make the font bold, click I to make the font italic, click U to underline the text.

Caption color Click the color box, and then click a color for the caption's text.

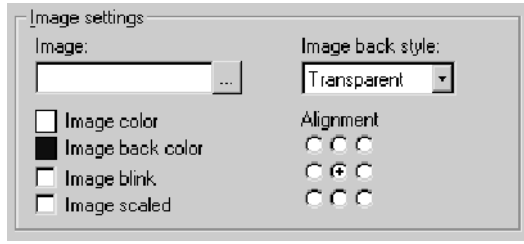
Caption back color Click the color box, and then click a color for the caption's background.

The caption's background color is visible only if the Caption back style is Solid.

Caption blink Select the check box to make the caption blink at runtime. Clear the check box to prevent the caption from blinking at runtime.

Word wrap Select this check box to wrap words to the next line if they are too long for the width of the caption. Clear this check box to wrap on characters instead.

Alignment Click a position in the grid, relative to the button. In the default alignment position, the text is centered vertically and horizontally on the button.



Browse button

Image Type the name of the image file to display on the button, or click the Browse button to browse for the image.

If you click the Browse button, the Image Browser opens. Click an image in the Select image box, and then click OK.

Image back style Click Solid to cover the button's background behind the image. Click Transparent to allow the button's background to show through spaces in the image.

Image color Click the color box, and then click a color for a monochrome image. You cannot change the color of grayscale or color images.

Image back color Click the color box, and then click a color for the background of a monochrome image. You cannot change the background color of grayscale or color images.

Image blink Select the check box to make a monochrome image blink at runtime. Clear the check box to prevent the image from blinking at runtime. You cannot make grayscale or color images blink.

Image scaled Select the check box to scale the image to fit the area of the button. Clear this check box to crop the image to the area of the button if it is too large to fit on the button.

If the button's shape is a Circle or Ellipse, the image is shaped to fit inside the circle or ellipse.

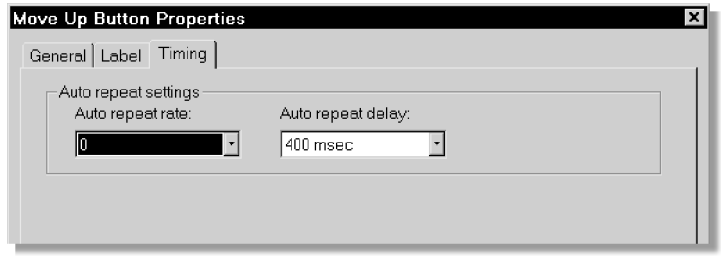
Alignment Click a position in the grid, relative to the button. In the default alignment position, the image is centered vertically and horizontally on the button.

Setting up whether the button press repeats when held down

The Timing tab is available only for the Move Up, Move Down, Move Left, Move Right, Page Up, and Page Down buttons.

In the Timing tab, set up whether or not the button press repeats automatically when the operator presses and holds the button down. You can also set up the rate at which the button press repeats.

For more information about auto repeat, see page 10-11.



Auto repeat rate Select the number of times per second a button press is registered when the button goes into auto repeat mode. If you don't want the button press to repeat automatically, click 0.

Auto repeat delay Click the number of milliseconds or seconds the button must remain pressed before auto repeat starts.

How to use push buttons

Push buttons start or stop processes or actions by changing tag values.

IMPORTANT Never use push buttons for emergency stops. Emergency stop buttons must always be hard-wired.

You can use different kinds of push buttons, depending on what kind of machinery you are running or process you are controlling:

Momentary Push buttons change a tag to one value when the button is pressed, and another value when the button is released. Momentary push buttons work like the Pulse button on a food processor. The machine is on only while the button is held down. When the button is released, the machine turns off. Momentary push buttons are useful for jogging a motor, and they can be set up to start and stop a machine or process.

Maintained Push buttons toggle between two values. This type of button is useful for changing a setting within a machine or process, but not for starting the machine or process. For example, use the Maintained Push button for changing modes, such as Auto to Manual, or Metric to Imperial.

Latched Push buttons latch in the on position, and must be unlatched by another button or process to return to the off position. This type of button is useful for starting a machine or process.

Multistate Push buttons allow an operator to cycle through multiple options consecutively, using a single button. The current state of a process or operation is displayed on the button by a different color, caption, or image for each state.

Interlocked Push buttons work in groups, and share the same tag. The buttons work together like the preset station selector buttons on a car radio: pressing one button cancels another. Although Interlocked Push buttons work as a group, you add them to the display one at a time.

Ramp buttons increase or decrease the value of a tag by either an integer or floating point value. You can use two ramp buttons together to create an increase/decrease control, for example for the speed of a motor.

Setting up Momentary Push buttons

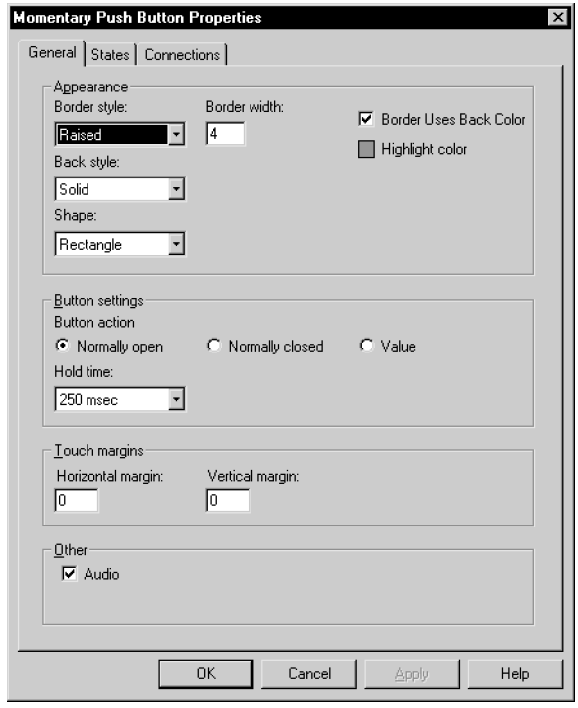
Use the Momentary Push button to start a process or action. When pressed, the button changes a tag to one value, and when released, the button changes the tag to another value.

The Momentary Push button's states can perform one of three kinds of actions:

- Change the Value control to 1 when the button is pressed, and to zero when the button is released. This kind of button is called **normally open**, because its released state is *off.* Pressing the button completes the circuit.
- Change the Value control to zero when the button is pressed, and to 1 when the button is released. This kind of button is called **normally closed**, because its released state is *on.* Pressing the button breaks the circuit.
- Change the Value control to a **value** you specify. You assign the desired values to the button's press and release actions. For example, 50 when pressed, and 100 when released.

To set up a Momentary Push button:

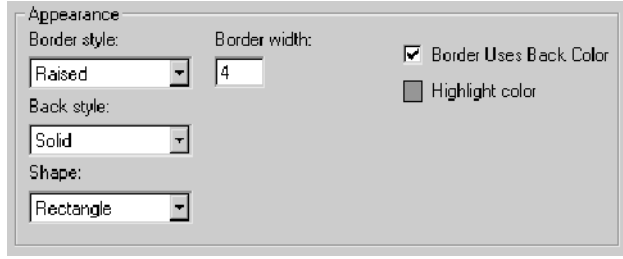
1. Double-click the Momentary Push button.



2. In the Momentary Push Button Properties dialog box, fill in the options on each tab, as described in the sections that follow. When you are finished, click OK.

Setting up the appearance and action of the Momentary Push button

In the General tab, specify what the Momentary Push button looks like at runtime, and what type of action the button performs.



Border style Click a border style in the list, or click None to remove the border.

Border width Type a number to change the thickness of the button's border. Border width is measured in pixels.

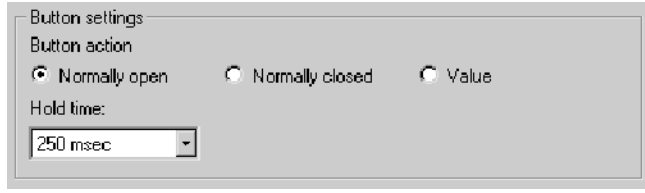
Border uses back color Select the check box if you want the button's border to have the same color as the button's background.

Clear the check box if you want the button's border to have a different color than the button's background, and then choose a Border color on the States tab.

Highlight color Click the color box, and then click a color for the selection border that appears around the button when it is pressed. If the button does not use a border, the highlight color is not visible when the button is pressed.

Back style Click Solid to cover objects or the display background behind the button. Click Transparent to allow objects or the display background behind the button to show through.

Shape Click a shape for the button.



Button action Click Normally open to change the button's tag to 1 when the button is pressed, and zero when the button is released.

Click Normally closed to change the button's tag to zero when the button is pressed, and 1 when the button is released.

Click Value to specify values for each of the button's states. Type values on the States tab, described on page 10-33.

Hold time Select the amount of time the button remains pressed before the Release action takes effect, even if the operator releases the button sooner.

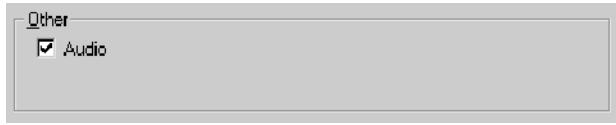
The hold time should reflect network traffic. Increasing the hold time prevents a very quick object press from being missed by the programmable controller. If you are using a memory tag, click the shortest hold time.

The operator cannot press the object again until the hold time has expired. If a display change occurs before the hold time has expired, the value for the released state is sent immediately to the tag.

Horizontal margin Type the number of pixels for the touch-insensitive margin inside the object's left and right edges.

For information about using touch margins, see page 10-4.

Vertical margin Type the number of pixels for the touch-insensitive margin inside the object's top and bottom edges.



Audio Select this check box to beep the computer's internal speaker when the operator presses the button.

If the computer running the display does not have an internal speaker, pressing the button does not trigger a beep.

Setting up what the Momentary Push button does when it is pressed and released

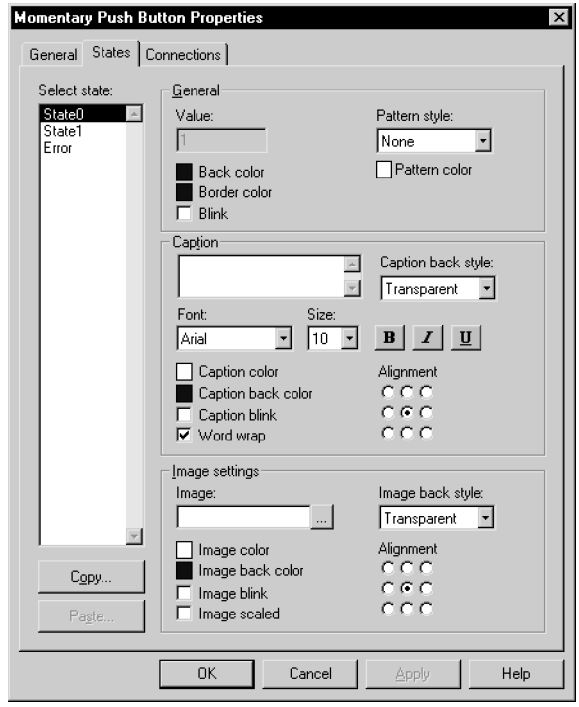
In the States tab, specify what the button does when it is pressed and released.

For tips about configuring states, see page 10-1.

The error state

The button's error state is displayed at runtime when:

- the Value control is unassigned
- the Indicator control's value does not match one of the state values you set up



Value The value to which the button changes the Value control when the selected state is in effect. When the Indicator control changes to this value, the button's appearance changes to the settings you specify for the state.

If you clicked Value for the button action on the General tab, you can type a value for the state in this box. You cannot type a value for the button's error state.

If you clicked Normally open for the button action on the General tab, state 0 has a value of 0, and state 1 has a value of 1. You cannot change these values.

If you clicked Normally closed for the button action on the General tab, state 0 has a value of 1, and state 1 has a value of 0. You cannot change these values.

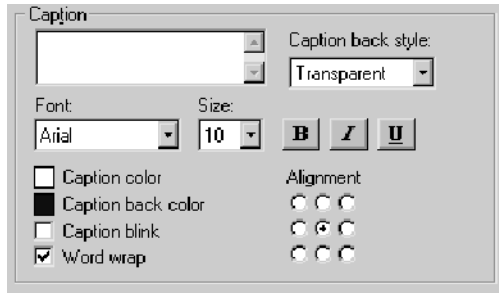
Back color Click the color box, and then click a color for the button's background.

Border color Click the color box, and then click a color for the button's border.

Blink Select the check box to make the button blink at runtime. Clear the check box to prevent the button from blinking at runtime.

Pattern style Click a pattern style for the button.

Pattern color Click the color box, and then click a color for the pattern.



Caption Type the text you want to appear on the button. If you don't want any text on the button, leave the Caption box blank.

Caption back style Click Solid to cover the button's background (such as a graphic image) with the text. Click Transparent to allow the button's background to show through between the letters.

Font, size, and style Click a font for the caption in the Font list. Type or click a size for the font in the Size box. Click B to make the font bold, click I to make the font italic, click U to underline the text.

Caption color Click the color box, and then click a color for the caption's text.

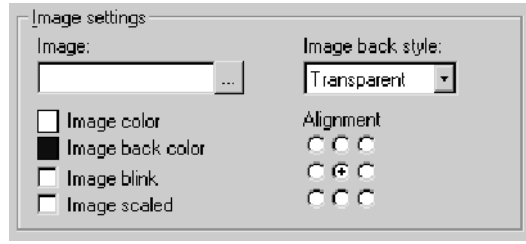
Caption back color Click the color box, and then click a color for the caption's background.

The caption's background color is visible only if the Caption back style is Solid.

Caption blink Select the check box to make the caption blink at runtime. Clear the check box to prevent the caption from blinking at runtime.

Word wrap Select this check box to wrap words to the next line if they are too long for the width of the caption. Clear this check box to wrap on characters instead.

Alignment Click a position in the grid, relative to the button. In the default alignment position, the text is centered vertically and horizontally on the button.



Browse button

Image Type the name of the image file to display on the button, or click the Browse button to browse for the image.

If you click the Browse button, the Image Browser opens. Click an image in the Select image box, and then click OK.

Image back style Click Solid to cover the button's background behind the image. Click Transparent to allow the button's background to show through spaces in the image.

Image color Click the color box, and then click a color for a monochrome image. You cannot change the color of grayscale or color images.

Image back color Click the color box, and then click a color for the background of a monochrome image. You cannot change the background color of grayscale or color images.

Image blink Select the check box to make a monochrome image blink at runtime. Clear the check box to prevent the image from blinking at runtime. You cannot make grayscale or color images blink.

Image scaled Select the check box to scale the image to fit the area of the button. Clear this check box to crop the image to the area of the button if it is too large to fit on the button.

If the button's shape is a Circle or Ellipse, the image is shaped to fit inside the circle or ellipse.

Alignment Click a position in the grid, relative to the button. In the default alignment position, the image is centered vertically and horizontally on the button.

Connecting the Momentary Push button to data

In the Connections tab, specify the tags or expression with which button exchanges data. For information about assigning tags and expressions, see page 9-32.

The arrow shows whether the control is a read control (arrow points left), a write control (arrow points right), or a read and write control (double-headed arrow).

Type the tag name, or expression if applicable, here.

Value The Value control triggers the button's action. For example, when the tag assigned to the control is set to 1, the data source starts a motor.

Indicator The Indicator control provides visual feedback to the button of its state. For example, the control can show whether a motor is running. If you assign this control, the button does not display the pressed state until it receives a response from the Indicator control. Configure the data source to change the Indicator control's value when it has read the Value control's value.

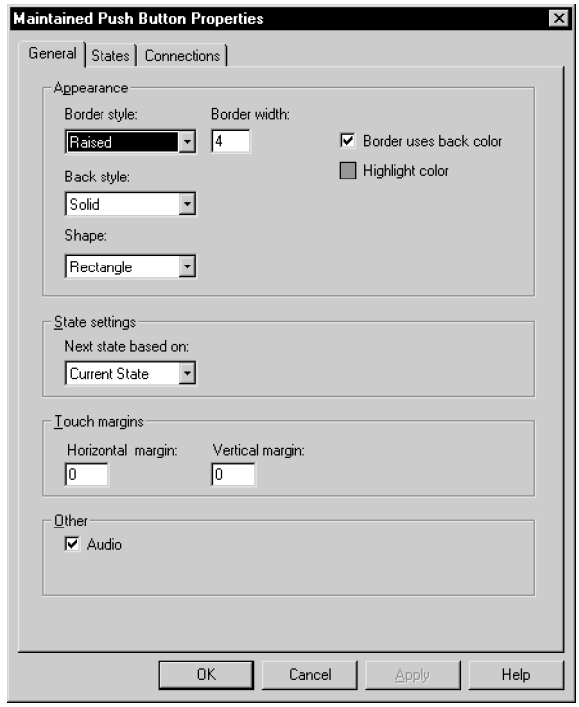
Setting up Maintained Push buttons

Use the Maintained Push button to change a setting in a machine or process. Maintained push buttons are not useful for starting or stopping a machine or process.

When pressed the first time, the Maintained Push button changes a tag to one value. When pressed and released a second time, the button changes the tag to another value.

To set up a Maintained Push button:

1. Double-click the Maintained Push button.



2. In the Maintained Push Button Properties dialog box, fill in the options on each tab, as described in the sections that follow. When you are finished, click OK.

Setting up the appearance of the Maintained Push button and how it changes state

In the General tab, specify what the button looks like at runtime, and how the button changes state.

Border style Click a border style in the list, or click None to remove the border.

Border width Type a number to change the thickness of the button's border. Border width is measured in pixels.

Border uses back color Select the check box if you want the button's border to have the same color as the button's background.

Clear the check box if you want the button's border to have a different color than the button's background, and then choose a Border color on the States tab.

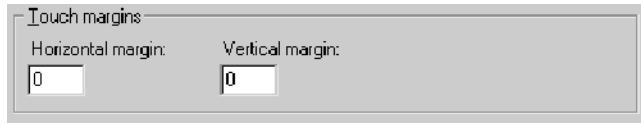
Highlight color Click the color box, and then click a color for the selection border that appears around the button when it is pressed. If the button does not use a border, the highlight color is not visible when the button is pressed.

Back style Click Solid to cover objects or the display background behind the button. Click Transparent to allow objects or the display background behind the button to show through.

Shape Click a shape for the button.

Next state based on Click Current state to toggle the button's state relative to its current state. For example, if the button's current state is zero, its next state is 1. If the button's current state is 1, its next state is zero.

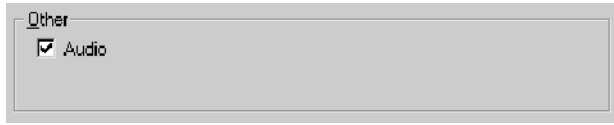
Click Value control to toggle the button's state relative to the Value control. If the operator presses the button, changing its state to 1, and then the data source changes the button's state to zero, the next time the operator presses the button, the button's state will be 1.



Horizontal margin Type the number of pixels for the touch-insensitive margin inside the object's left and right edges.

For information about using touch margins, see page 10-4.

Vertical margin Type the number of pixels for the touch-insensitive margin inside the object's top and bottom edges.



Audio Select this check box to beep the computer's internal speaker when the operator presses the button. If the computer running the display does not have an internal speaker, pressing the button does not trigger a beep.

Setting up what the Maintained Push button does when it is pressed and released

In the States tab, specify what the button does when it is pressed and released.

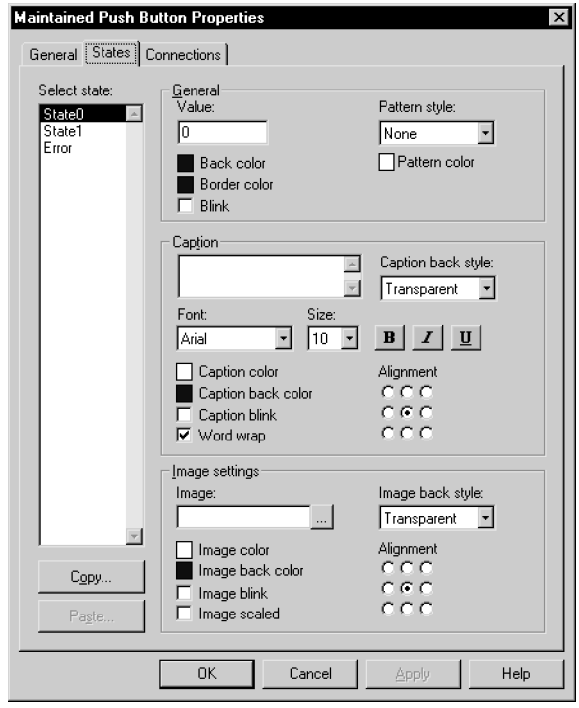
For tips about configuring states, see page 10-1.

The error state

The button's error state is displayed at runtime when:

- the Value control is unassigned
- the Indicator control's value does not match one of the state values you set up

The error state is also displayed when the display containing the Maintained Push button first opens, if the Value control's value does not match one of the state values you set up.



Value The value to which the button changes the Value control when the selected state is in effect. When the Indicator control changes to this value, the button's appearance changes to the settings you specify for the state.

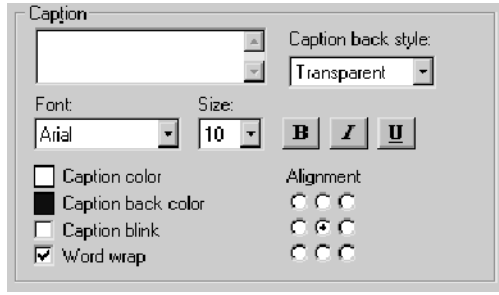
Back color Click the color box, and then click a color for the button's background.

Border color Click the color box, and then click a color for the button's border.

Blink Select the check box to make the button blink at runtime. Clear the check box to prevent the button from blinking at runtime.

Pattern style Click a pattern style for the button.

Pattern color Click the color box, and then click a color for the pattern.



Caption Type the text you want to appear on the button. If you don't want any text on the button, leave the Caption box blank.

Caption back style Click Solid to cover the button's background (such as a graphic image) with the text. Click Transparent to allow the button's background to show through between the letters.

Font, size, and style Click a font for the caption in the Font list. Type or click a size for the font in the Size box. Click B to make the font bold, click I to make the font italic, click U to underline the text.

Caption color Click the color box, and then click a color for the caption's text.

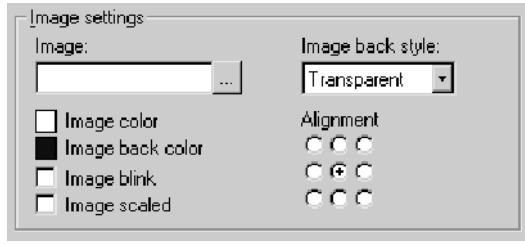
Caption back color Click the color box, and then click a color for the caption's background.

The caption's background color is visible only if the Caption back style is Solid.

Caption blink Select the check box to make the caption blink at runtime. Clear the check box to prevent the caption from blinking at runtime.

Word wrap Select this check box to wrap words to the next line if they are too long for the width of the caption. Clear this check box to wrap on characters instead.

Alignment Click a position in the grid, relative to the button. In the default alignment position, the text is centered vertically and horizontally on the button.



Browse button

Image Type the name of the image file to display on the button, or click the Browse button to browse for the image.

If you click the Browse button, the Image Browser opens. Click an image in the Select image box, and then click OK.

Image back style Click Solid to cover the button's background behind the image. Click Transparent to allow the button's background to show through spaces in the image.

Image color Click the color box, and then click a color for a monochrome image. You cannot change the color of grayscale or color images.

Image back color Click the color box, and then click a color for the background of a monochrome image. You cannot change the background color of grayscale or color images.

Image blink Select the check box to make a monochrome image blink at runtime. Clear the check box to prevent the image from blinking at runtime. You cannot make grayscale or color images blink.

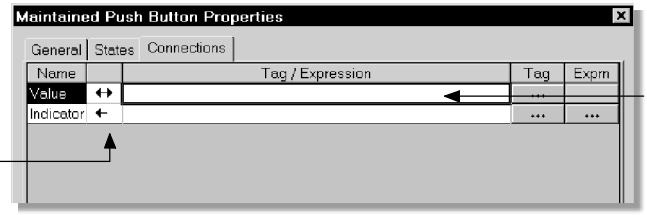
Image scaled Select the check box to scale the image to fit the area of the button. Clear this check box to crop the image to the area of the button if it is too large to fit on the button.

If the button's shape is a Circle or Ellipse, the image is shaped to fit inside the circle or ellipse.

Alignment Click a position in the grid, relative to the button. In the default alignment position, the image is centered vertically and horizontally on the button.

Connecting the Maintained Push button to data

In the Connections tab, specify the tags or expression with which the button exchanges data. For information about assigning tags and expressions, see page 9-32.



The arrow shows whether the control is a read control (arrow points left), a write control (arrow points right), or a read and write control (double-headed arrow).

Type the tag name, or expression if applicable, here.

Value The Value control triggers the button's action. For example, when the tag assigned to the control is set to 1, the data source changes the machine to Auto mode.

Indicator The Indicator control provides visual feedback to the button of its state. For example, the control can show which mode a machine is using. If you assign this control, the button does not display the pressed state until it receives a response from the Indicator control. Configure the data source to change the Indicator control's value when it has read the Value control's value.

Setting up Latched Push buttons

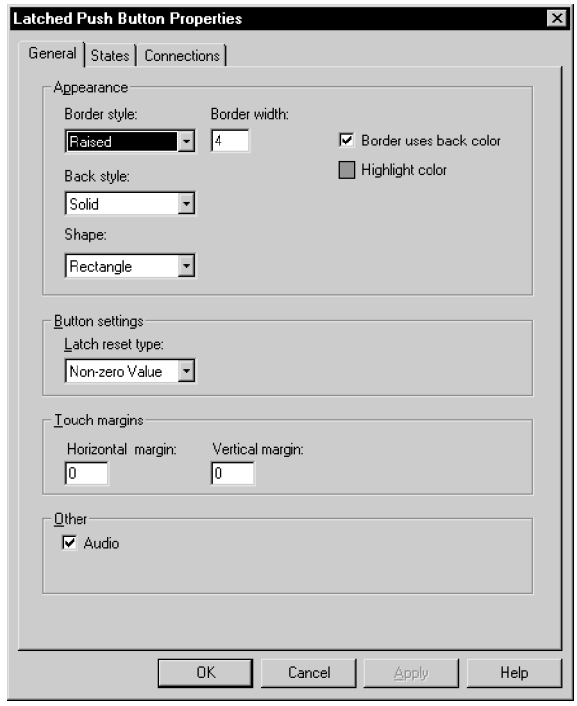
The Latched Push button latches in the on position, and must be unlatched by another button or process to return to the off position.

Latched Push buttons work like Momentary Push buttons, except that the tag doesn't change to the button's release value until the button is unlatched by another button or process. This type of button is useful for starting a machine or process.

When the operator presses a Latched Push button, it changes a tag to one value, and remains at that value until the operator presses another button to change the Handshake control to a different value.

To set up a Latched Push button:

1. Double-click the Latched Push button.



2. In the Latched Push Button Properties dialog box, fill in the options on each tab, as described in the sections that follow. When you are finished, click OK.

Setting up the appearance of the Latched Push button and how to unlatch it

In the General tab, specify what the button looks like at runtime, and how to unlatch it.

Border style Click a border style in the list, or click None to remove the border.

Border width Type a number to change the thickness of the button's border. Border width is measured in pixels.

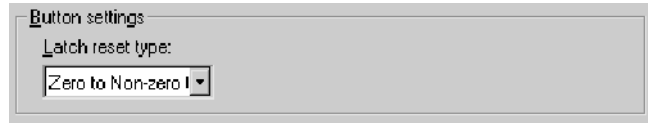
Border uses back color Select the check box if you want the button's border to have the same color as the button's background.

Clear the check box if you want the button's border to have a different color than the button's background, and then choose a Border color on the States tab.

Highlight color Click the color box, and then click a color for the selection border that appears around the button when it is pressed. If the button does not use a border, the highlight color is not visible when the button is pressed.

Back style Click Solid to cover objects or the display background behind the button. Click Transparent to allow objects or the display background behind the button to show through.

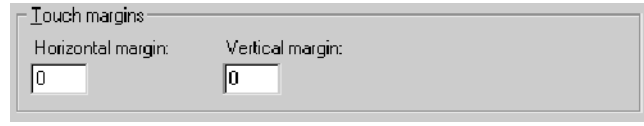
Shape Click a shape for the button.



Latch reset type To unlatch the push button when the Handshake control has a non-zero value, click Non-zero Value.

To unlatch the push button when the Handshake control changes from a zero to a non-zero value, click Zero to Non-zero transition.

Be sure to assign values to states 0 (unlatched) and 1 (latched) on the States tab, and assign a tag or expression to the Handshake control in the Connections tab.



Horizontal margin Type the number of pixels for the touch-insensitive margin inside the object's left and right edges.

For information about using touch margins, see page 10-4.

Vertical margin Type the number of pixels for the touch-insensitive margin inside the object's top and bottom edges.

Audio Select this check box to beep the computer's internal speaker when the operator presses the button.

If the computer running the display does not have an internal speaker, pressing the button does not trigger a beep.

Setting up what the Latched Push button does when it is latched and unlatched

In the States tab, specify what the button does when it is latched and unlatched.

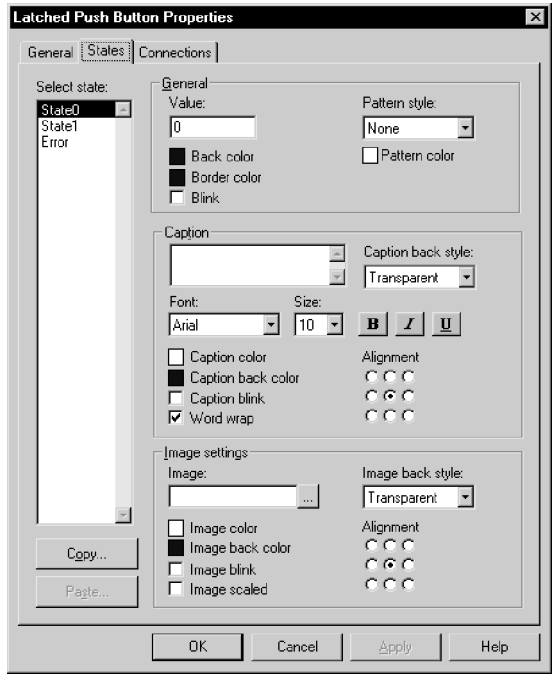
For tips about configuring states, see page 10-1.

The error state

The button's error state is displayed at runtime when:

- the Value control is unassigned
- the Indicator control's value does not match one of the state values you set up

The error state is also displayed when the display containing the Latched Push button first opens, if the Value control's value does not match one of the state values you set up.



Value The value to which the button changes the Value control when the selected state is in effect. When the Indicator control changes to this value, the button's appearance changes to the settings you specify for the state.

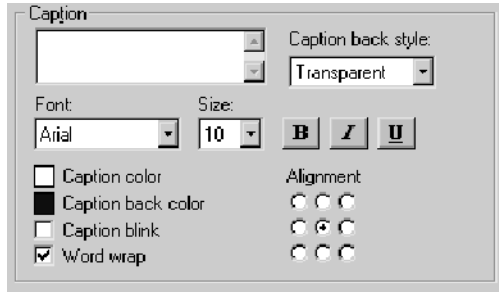
Back color Click the color box, and then click a color for the button's background.

Border color Click the color box, and then click a color for the button's border.

Blink Select the check box to make the button blink at runtime. Clear the check box to prevent the button from blinking at runtime.

Pattern style Click a pattern style for the button.

Pattern color Click the color box, and then click a color for the pattern.



Caption Type the text you want to appear on the button. If you don't want any text on the button, leave the Caption box blank.

Caption back style Click Solid to cover the button's background (such as a graphic image) with the text. Click Transparent to allow the button's background to show through between the letters.

Font, size, and style Click a font for the caption in the Font list. Type or click a size for the font in the Size box. Click B to make the font bold, click I to make the font italic, click U to underline the text.

Caption color Click the color box, and then click a color for the caption's text.

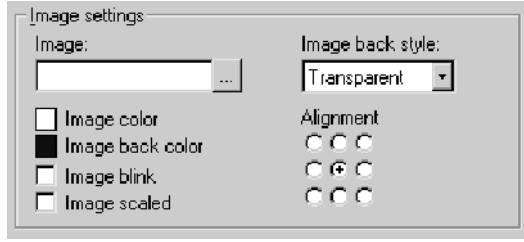
Caption back color Click the color box, and then click a color for the caption's background.

The caption's background color is visible only if the Caption back style is Solid.

Caption blink Select the check box to make the caption blink at runtime. Clear the check box to prevent the caption from blinking at runtime.

Word wrap Select this check box to wrap words to the next line if they are too long for the width of the caption. Clear this check box to wrap on characters instead.

Alignment Click a position in the grid, relative to the button. In the default alignment position, the text is centered vertically and horizontally on the button.



Browse button

Image Type the name of the image file to display on the button, or click the Browse button to browse for the image.

If you click the Browse button, the Image Browser opens. Click an image in the Select image box, and then click OK.

Image back style Click Solid to cover the button's background behind the image. Click Transparent to allow the button's background to show through spaces in the image.

Image color Click the color box, and then click a color for a monochrome image. You cannot change the color of grayscale or color images.

Image back color Click the color box, and then click a color for the background of a monochrome image. You cannot change the background color of grayscale or color images.

Image blink Select the check box to make a monochrome image blink at runtime. Clear the check box to prevent the image from blinking at runtime. You cannot make grayscale or color images blink.

Image scaled Select the check box to scale the image to fit the area of the button. Clear this check box to crop the image to the area of the button if it is too large to fit on the button.

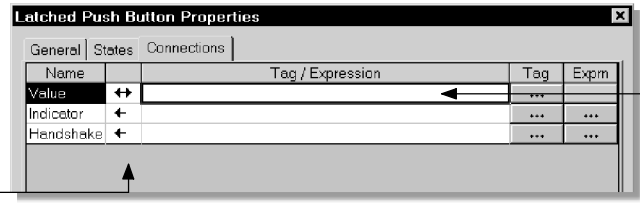
If the button's shape is a Circle or Ellipse, the image is shaped to fit inside the circle or ellipse.

Alignment Click a position in the grid, relative to the button. In the default alignment position, the image is centered vertically and horizontally on the button.

Connecting the Latched Push button to data

In the Connections tab, specify the tags or expressions with which the button exchanges data. For information about assigning tags and expressions, see page 9-32.

The arrow shows whether the control is a read control (arrow points left), a write control (arrow points right), or a read and write control (double-headed arrow).



Type the tag name, or expression if applicable, here.

Value The Value control triggers the button's action. For example, when the tag assigned to the control is set to 1, the data source starts a motor.

Indicator The Indicator control provides visual feedback to the button of its state. For example, the control can show whether a motor is running. If you assign this control, the button does not display the pressed state until it receives a response from the Indicator control. Configure the data source to change the Indicator control's value when it has read the Value control's value.

Handshake To unlatch the button, the Handshake control works with the "Latch reset type" setting (on the General tab, see page 10-45).

Depending on which latch reset method you select, the Handshake control unlatches the button either when the Handshake control has a non-zero value, or when the Handshake control changes from a zero to a non-zero value.

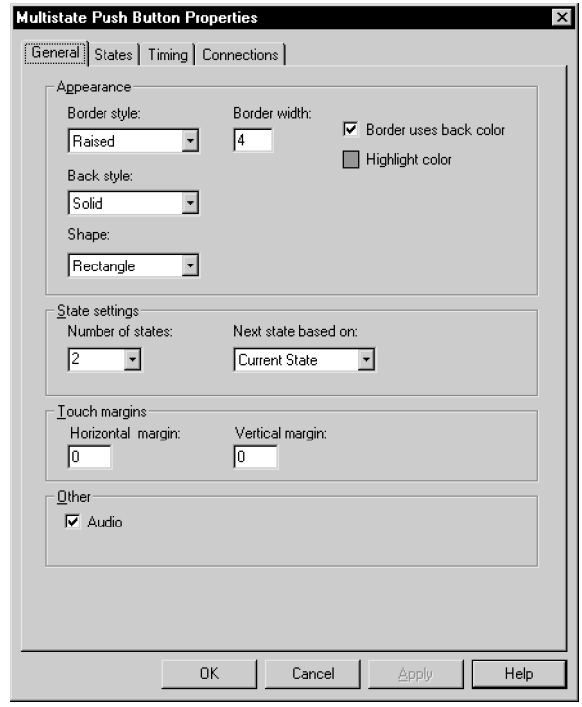
Setting up Multistate Push buttons

The Multistate Push button displays—and allows an operator to cycle through—multiple options consecutively. The Multistate Push button displays the current state of a process or operation by showing a different color, caption, or image to reflect different states.

Each time the operator presses the button, the tag changes to the value for the next state. When the button is in its last state and the operator presses the button, the button returns to its first state.

To set up a Multistate Push button:

1. Double-click the Multistate Push button.



2. In the Multistate Push Button Properties dialog box, fill in the options on each tab, as described in the sections that follow. When you are finished, click OK.

Setting up the appearance of the Multistate Push button and how it changes state

In the General tab, specify what the button looks like, and how the button changes state.

Border style Click a border style in the list, or click None to remove the border.

Border width Type a number to change the thickness of the button's border. Border width is measured in pixels.

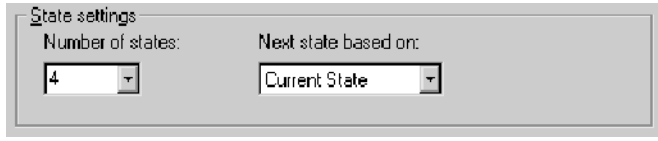
Border uses back color Select the check box if you want the button's border to have the same color as the button's background.

Clear the check box if you want the button's border to have a different color than the button's background, and then choose a Border color on the States tab. For details, see page 10-53.

Highlight color Click the color box, and then click a color for the selection border that appears around the button when it is pressed. If the button does not use a border, the highlight color is not visible when the button is pressed.

Back style Click Solid to cover objects or the display background behind the button. Click Transparent to allow objects or the display background behind the button to show through.

Shape Click a shape for the button.



Number of states Click the number of states you want the button to have.

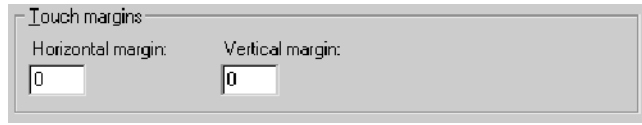
Select only as many states as you want to use. If you don't assign values to all the states the button has, the operator must press the button repeatedly through all the empty states before the first state becomes available again.

Next state based on When the operator presses the button, the next state that is displayed can be based on the current state, or on the value of the Value control.

Click Current state to use the current state as the basis for deciding what the next state will be. With this method, the button itself determines what its next state will be.

Click Value control to use the Value control as the basis for deciding what the next state will be. With this method, other devices can change the Value control's value, and determine what the button's next state will be.

If the Value control does not match one of the button's state values, the button changes to State 0, and changes the Value control to the value of State 0.



Horizontal margin Type the number of pixels for the touch-insensitive margin inside the object's left and right edges.

For information about using touch margins, see page 10-4.

Vertical margin Type the number of pixels for the touch-insensitive margin inside the object's top and bottom edges.

Audio Select this check box to beep the computer's internal speaker when the operator presses the button.

If the computer running the display does not have an internal speaker, pressing the button does not trigger a beep.

Setting up what the Multistate Push button does when it is pressed and released

In the States tab, specify what the button does when it is pressed and released.

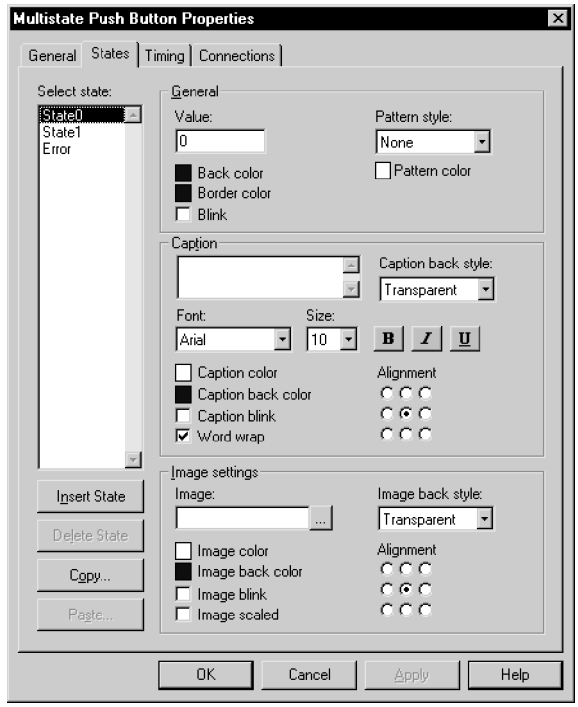
For tips about configuring states, see page 10-1.

The error state

The button's error state is displayed at runtime when:

- the Value control is unassigned
- the Indicator control's value does not match one of the state values you set up

The error state is also displayed when the display containing the Multistate Push button first opens, if the Value control's value does not match one of the state values you set up.



Value The value to which the button changes the Value control when the selected state is in effect. When the Indicator control changes to this value, the button's appearance changes to the settings you specify for the state.

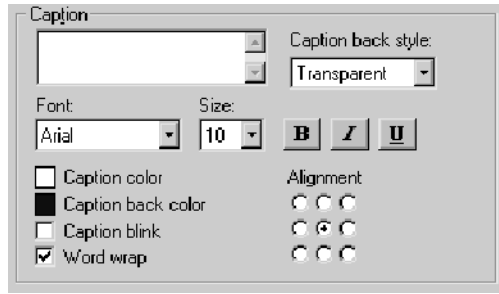
Back color Click the color box, and then click a color for the button's background.

Border color Click the color box, and then click a color for the button's border.

Blink Select the check box to make the button blink at runtime. Clear the check box to prevent the button from blinking at runtime.

Pattern style Click a pattern style for the button.

Pattern color Click the color box, and then click a color for the pattern.



Caption Type the text you want to appear on the button. If you don't want any text on the button, leave the Caption box blank.

Caption back style Click Solid to cover the button's background (such as a graphic image) with the text. Click Transparent to allow the button's background to show through between the letters.

Font, size, and style Click a font for the caption in the Font list. Type or click a size for the font in the Size box. Click B to make the font bold, click I to make the font italic, click U to underline the text.

Caption color Click the color box, and then click a color for the caption's text.

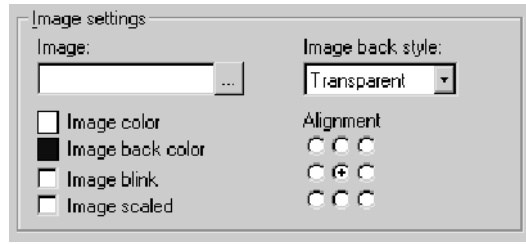
Caption back color Click the color box, and then click a color for the caption's background.

The caption's background color is visible only if the Caption back style is Solid.

Caption blink Select the check box to make the caption blink at runtime. Clear the check box to prevent the caption from blinking at runtime.

Word wrap Select this check box to wrap words to the next line if they are too long for the width of the caption. Clear this check box to wrap on characters instead.

Alignment Click a position in the grid, relative to the button. In the default alignment position, the text is centered vertically and horizontally on the button.



Browse button

Image Type the name of the image file to display on the button, or click the Browse button to browse for the image.

If you click the Browse button, the Image Browser opens. Click an image in the Select image box, and then click OK.

Image back style Click Solid to cover the button's background behind the image. Click Transparent to allow the button's background to show through spaces in the image.

Image color Click the color box, and then click a color for a monochrome image. You cannot change the color of grayscale or color images.

Image back color Click the color box, and then click a color for the background of a monochrome image. You cannot change the background color of grayscale or color images.

Image blink Select the check box to make a monochrome image blink at runtime. Clear the check box to prevent the image from blinking at runtime. You cannot make grayscale or color images blink.

Image scaled Select the check box to scale the image to fit the area of the button. Clear this check box to crop the image to the area of the button if it is too large to fit on the button.

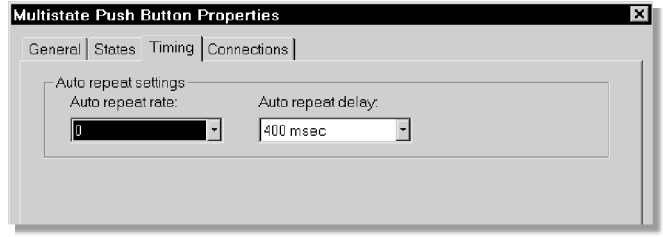
If the button's shape is a Circle or Ellipse, the image is shaped to fit inside the circle or ellipse.

Alignment Click a position in the grid, relative to the button. In the default alignment position, the image is centered vertically and horizontally on the button.

Setting up whether the Multistate Push button press repeats when held down

In the Timing tab, set up whether or not the button press repeats automatically when the operator presses and holds the button down. You can also set up the rate at which the button press repeats.

For more information about auto repeat, see page 10-11.

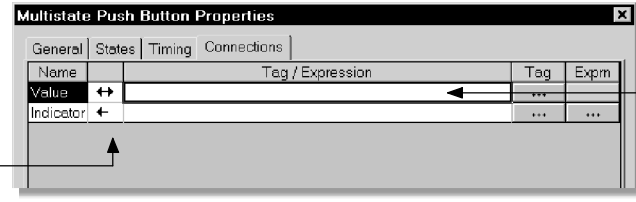


Auto repeat rate Select the number of times per second a button press is registered when the button goes into auto repeat mode. If you don't want the button press to repeat automatically, click 0.

Auto repeat delay Click the number of milliseconds or seconds the button must remain pressed before auto repeat starts.

Connecting the Multistate Push button to data

In the Connections tab, specify the tags or expression with which the button exchanges data. For information about assigning tags and expressions, see page 9-32.



Value The Value control triggers the button's action. For example, when the tag assigned to the control changes to the next state, the data source changes the speed of a conveyor belt.

Indicator The Indicator control provides visual feedback to the button of its state. For example, the control can show the speed of a conveyor belt. If you assign this control, the button does not display the pressed state until it receives a response from the Indicator control. Configure the data source to change the Indicator control's value when it has read the Value control's value.

Setting up Interlocked Push buttons

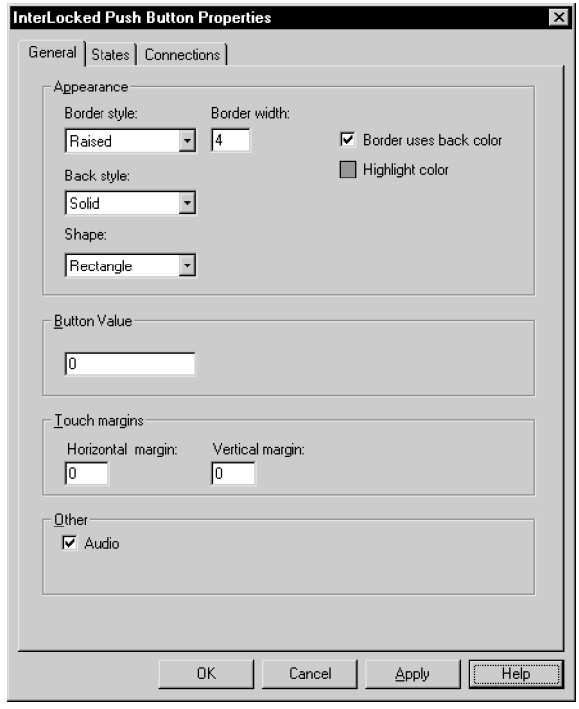
Multiple Interlocked Push buttons work together and share the same tag.

The buttons work together like the preset station selector buttons on a car radio: pressing one button cancels another. Although Interlocked Push buttons work as a group, you add them to the display one at a time.

When the operator presses one of the Interlocked Push buttons, the tag assigned to its Value control changes to one value. When the operator presses a different Interlocked Push button, the tag changes to another value. Assign the same tag to each button's Value control.

To set up an Interlocked Push button:

1. Double-click the Interlocked Push button.



2. In the Interlocked Push Button Properties dialog box, fill in the options on each tab, as described in the sections that follow. When you are finished, click OK.

Setting up the Interlocked Push button's appearance and value

In the General tab, specify the button's appearance, and the value it sends to the Value control.

Border style Click a border style in the list, or click None to remove the border.

Border width Type a number to change the thickness of the button's border. Border width is measured in pixels.

Border uses back color Select the check box if you want the button's border to have the same color as the button's background.

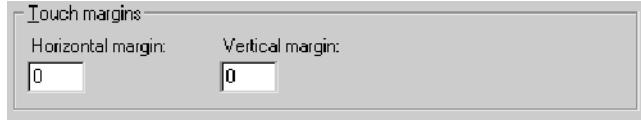
Clear the check box if you want the button's border to have a different color than the button's background, and then choose a Border color on the States tab.

Highlight color Click the color box, and then click a color for the selection border that appears around the button when it is pressed. If the button does not use a border, the highlight color is not visible when the button is pressed.

Back style Click Solid to cover objects or the display background behind the button. Click Transparent to allow objects or the display background behind the button to show through.

Shape Click a shape for the button.

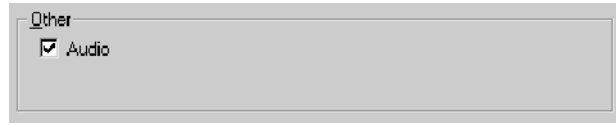
Button value Type an integer value for the button. When the operator presses the button, the button changes to State 1, and changes the Value control to this value.



Horizontal margin Type the number of pixels for the touch-insensitive margin inside the object's left and right edges.

For information about using touch margins, see page 10-4.

Vertical margin Type the number of pixels for the touch-insensitive margin inside the object's top and bottom edges.



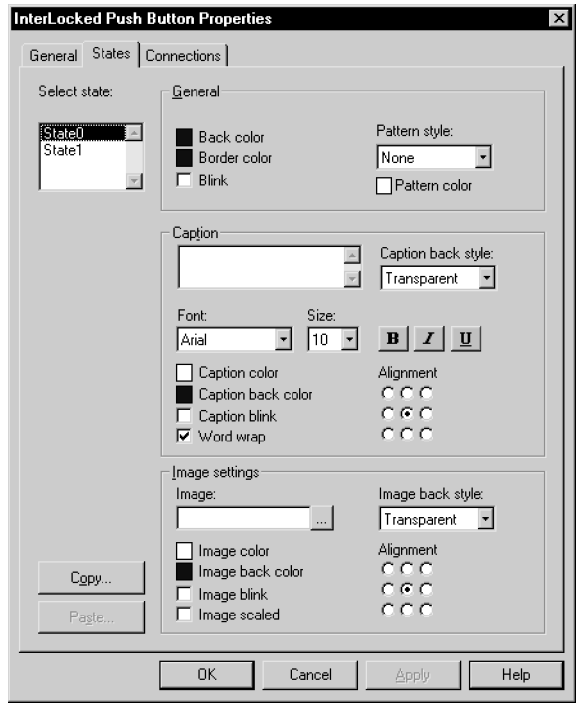
Audio Select this check box to beep the computer's internal speaker when the operator presses the button.

If the computer running the display does not have an internal speaker, pressing the button does not trigger a beep.

Setting up the appearance of the Interlocked Push button when it is pressed and released

In the States tab, specify what the button looks like when it is pressed and released at runtime.

For tips about configuring states, see page 10-1.



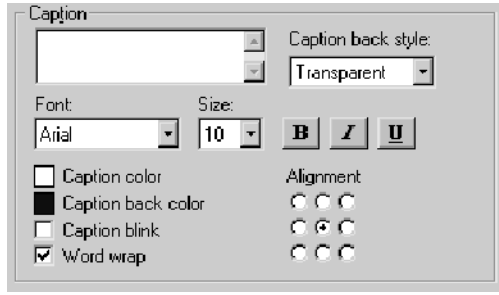
Back color Click the color box, and then click a color for the button's background.

Border color Click the color box, and then click a color for the button's border.

Blink Select the check box to make the button blink at runtime. Clear the check box to prevent the button from blinking at runtime.

Pattern style Click a pattern style for the button.

Pattern color Click the color box, and then click a color for the pattern.



Caption Type the text you want to appear on the button. If you don't want any text on the button, leave the Caption box blank.

Caption back style Click Solid to cover the button's background (such as a graphic image) with the text. Click Transparent to allow the button's background to show through between the letters.

Font, size, and style Click a font for the caption in the Font list. Type or click a size for the font in the Size box. Click B to make the font bold, click I to make the font italic, click U to underline the text.

Caption color Click the color box, and then click a color for the caption's text.

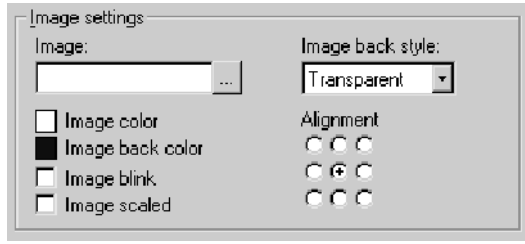
Caption back color Click the color box, and then click a color for the caption's background.

The caption's background color is visible only if the Caption back style is Solid.

Caption blink Select the check box to make the caption blink at runtime. Clear the check box to prevent the caption from blinking at runtime.

Word wrap Select this check box to wrap words to the next line if they are too long for the width of the caption. Clear this check box to wrap on characters instead.

Alignment Click a position in the grid, relative to the button. In the default alignment position, the text is centered vertically and horizontally on the button.



Browse button

Image Type the name of the image file to display on the button, or click the Browse button to browse for the image.

If you click the Browse button, the Image Browser opens. Click an image in the Select image box, and then click OK.

Image back style Click Solid to cover the button's background behind the image. Click Transparent to allow the button's background to show through spaces in the image.

Image color Click the color box, and then click a color for a monochrome image. You cannot change the color of grayscale or color images.

Image back color Click the color box, and then click a color for the background of a monochrome image. You cannot change the background color of grayscale or color images.

Image blink Select the check box to make a monochrome image blink at runtime. Clear the check box to prevent the image from blinking at runtime. You cannot make grayscale or color images blink.

Image scaled Select the check box to scale the image to fit the area of the button. Clear this check box to crop the image to the area of the button if it is too large to fit on the button.

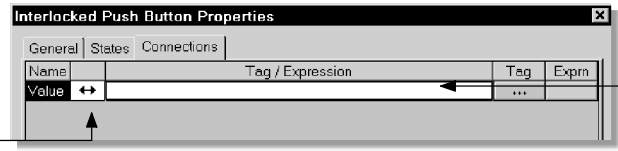
If the button's shape is a Circle or Ellipse, the image is shaped to fit inside the circle or ellipse.

Alignment Click a position in the grid, relative to the button. In the default alignment position, the image is centered vertically and horizontally on the button.

Connecting the Interlocked Push button to data

In the Connections tab, specify the tag with which the button exchanges data. Interlocked push buttons have no Indicator control. For information about assigning tags, see page 9-32.

The arrow shows whether the control is a read control (arrow points left), a write control (arrow points right), or a read and write control (double-headed arrow).



Type the tag name here.

Value The Value control triggers the button's action. For example, when the tag assigned to the control is set to 1, the data source changes the machine to Auto mode.

Setting up Ramp buttons

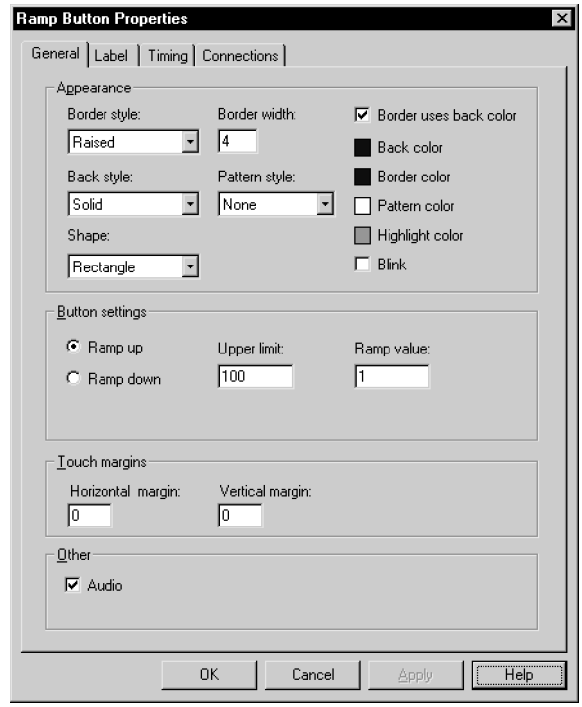
Use the Ramp button to increase or decrease the value of a tag.

Ramp buttons can change a tag by either an integer or floating point value. You can use two ramp buttons together to create an increase/decrease control.

Each time the operator presses the button, the tag changes to the next highest or next lowest value, depending on how you set up the button.

To set up a Ramp button:

1. Double-click the Ramp button.



2. In the Ramp Push Button Properties dialog box, fill in the options on each tab, as described in the sections that follow. When you are finished, click OK.

Setting up the appearance of the Ramp button and how it works

In the General tab, specify what the button looks like, and whether the button ramps a value up or down.

Border style Click a border style in the list, or click None to remove the border.

Border width Type a number to change the thickness of the button's border. Border width is measured in pixels.

Border uses back color Select the check box if you want the button's border to have the same color as the button's background.

Clear the check box if you want the button's border to have a different color than the button's background, and then choose a Border color.

Back color Click the color box, and then click a color for the button's background.

Border color Click the color box, and then click a color for the button's border.

Back style Click Solid to cover objects or the display background behind the button. Click Transparent to allow objects or the display background behind the button to show through.

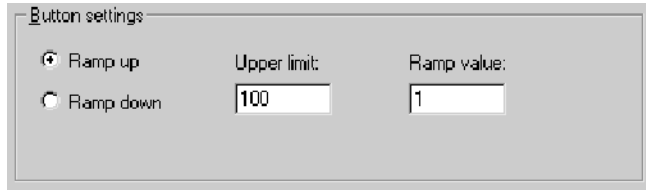
Pattern style Click a pattern style for the button.

Pattern color Click the color box, and then click a color for the pattern.

Highlight color Click the color box, and then click a color for the selection border that appears around the button when it is pressed. If the button does not use a border, the highlight color is not visible when the button is pressed.

Shape Click a shape for the button.

Blink Select the check box to make the button blink at runtime. Clear the check box to prevent the button from blinking at runtime.



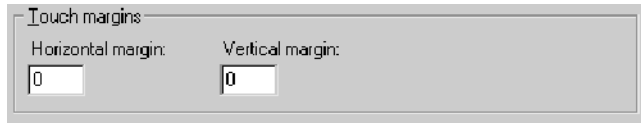
Ramp up Click Ramp up to increase the value of the tag.

Ramp down Click Ramp down to decrease the value of the tag.

Upper limit This box appears only if you click Ramp up. Type the upper limit for the tag's value.

Lower limit This box appears only if you click Ramp down. Type the lower limit for the tag's value.

Ramp value Type the positive value by which the button increases or decreases the tag's value.



Horizontal margin Type the number of pixels for the touch-insensitive margin inside the object's left and right edges.

For information about using touch margins, see page 10-4.

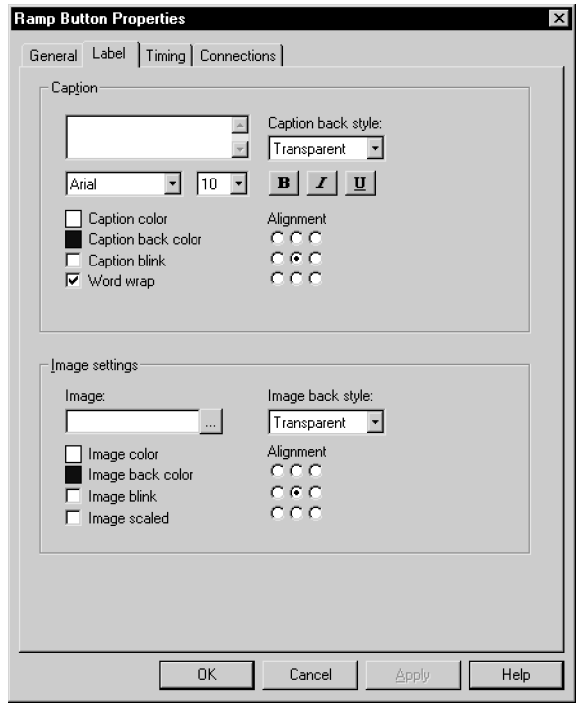
Vertical margin Type the number of pixels for the touch-insensitive margin inside the object's top and bottom edges.

Audio Select this check box to beep the computer's internal speaker when the operator presses the button.

If the computer running the display does not have an internal speaker, pressing the button does not trigger a beep.

Setting up a caption and image for the Ramp button

In the Label tab, specify what text or image appears on the button.



Caption Type the text you want to appear on the button. If you don't want any text on the button, leave the Caption box blank.

Caption back style Click Solid to cover the button's background (such as a graphic image) with the text. Click Transparent to allow the button's background to show through between the letters.

Font, size, and style Click a font for the caption in the Font list. Type or click a size for the font in the Size box. Click B to make the font bold, click I to make the font italic, click U to underline the text.

Caption color Click the color box, and then click a color for the caption's text.

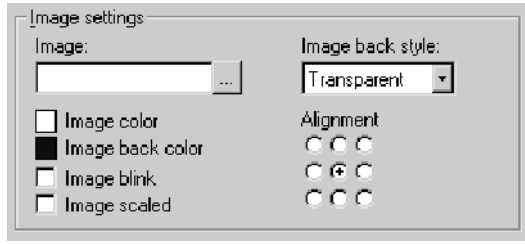
Caption back color Click the color box, and then click a color for the caption's background.

The caption's background color is visible only if the Caption back style is Solid.

Caption blink Select the check box to make the caption blink at runtime. Clear the check box to prevent the caption from blinking at runtime.

Word wrap Select this check box to wrap words to the next line if they are too long for the width of the caption. Clear this check box to wrap on characters instead.

Alignment Click a position in the grid, relative to the button. In the default alignment position, the text is centered vertically and horizontally on the button.



Browse button

Image Type the name of the image file to display on the button, or click the Browse button to browse for the image.

If you click the Browse button, the Image Browser opens. Click an image in the Select image box, and then click OK.

Image back style Click Solid to cover the button's background behind the image. Click Transparent to allow the button's background to show through spaces in the image.

Image color Click the color box, and then click a color for a monochrome image. You cannot change the color of grayscale or color images.

Image back color Click the color box, and then click a color for the background of a monochrome image. You cannot change the background color of grayscale or color images.

Image blink Select the check box to make a monochrome image blink at runtime. Clear the check box to prevent the image from blinking at runtime. You cannot make grayscale or color images blink.

Image scaled Select the check box to scale the image to fit the area of the button. Clear this check box to crop the image to the area of the button if it is too large to fit on the button.

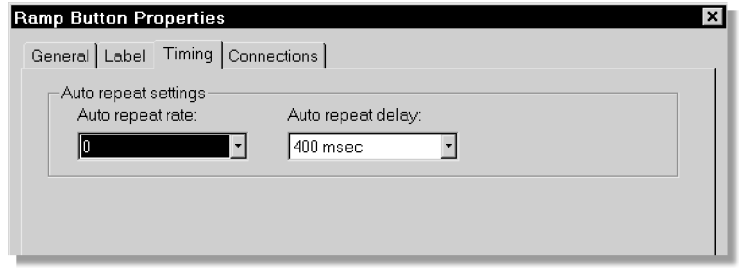
If the button's shape is a Circle or Ellipse, the image is shaped to fit inside the circle or ellipse.

Alignment Click a position in the grid, relative to the button. In the default alignment position, the image is centered vertically and horizontally on the button.

Setting up whether the Ramp button press repeats when held down

In the Timing tab, set up whether or not the button press repeats automatically when the operator presses and holds the button down. You can also set up the rate at which the button press repeats.

For more information about auto repeat, see page 10-11.



Auto repeat rate Select the number of times per second a button press is registered when the button goes into auto repeat mode. If you don't want the button press to repeat automatically, click 0.

Auto repeat delay Click the number of milliseconds or seconds the button must remain pressed before auto repeat starts.

Connecting the Ramp button to data

In the Connections tab, specify the tag with which the button exchanges data. Ramp buttons have no Indicator control. For information about assigning tags, see page 9-32.

Value The Value control triggers the button's action. For example, when the tag assigned to the control is increased, the data source increases a motor's speed.

How to use Numeric displays

Use the Numeric display object to show the operator numeric information from the data source. For example, you might use a Numeric display to show the current temperature of an oven.

How values are displayed

The Numeric display shows the value of the Value control at the data source. The value shown depends on whether the Value control value is a floating point or integer. Integer values are displayed as is. Floating point values are rounded to fit the display.

For example, if the Numeric display is configured to show 6 digits, 1234.56 is rounded to 1234.6. 1234.44 is rounded to 1234.4. The decimal counts as one of the digits.

For more information about how values are rounded, see page 7-3.

Number formats

The Numeric display uses the number format you set up on the runtime computer. For example, if the runtime computer is set up to use a comma for the decimal symbol, the Numeric display uses a comma for the decimal symbol.

For information about specifying time, date, and number formats on the RAC6182, see page 21-3. For information about specifying time, date, and number formats in Windows 2000, see page 22-3.

Problems with displaying values

- If the Value control is unassigned, the Numeric display is filled with asterisks (*).
- If the value, including the decimal point and minus sign, contains more digits than specified for the display, the Numeric display is filled with asterisks.
- If the Numeric display is sized so that the value cannot be fully displayed, the value is truncated and the last displayable digit is replaced with an asterisk.
- If the value doesn't fit on the first line of the display, and there is room for a second line, the value continues onto the second line.

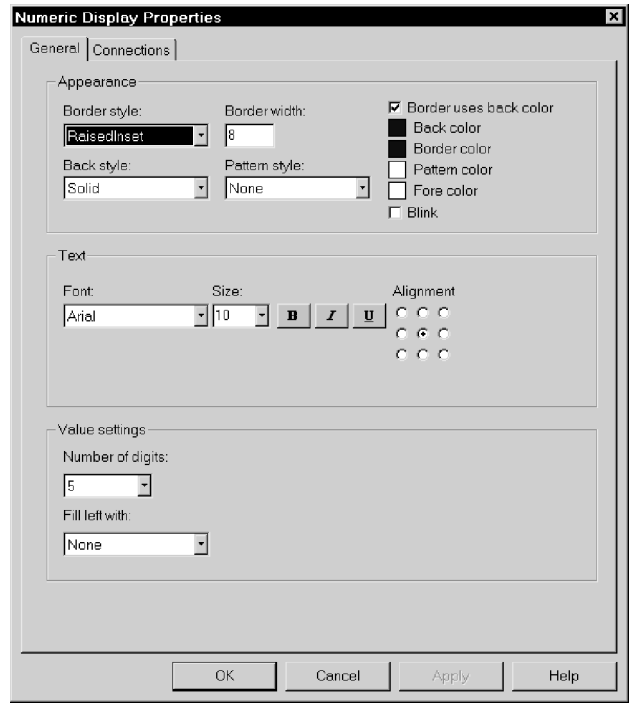
Setting up Numeric displays

The Numeric display shows the operator numeric values from the data source.

Specify the appearance of the display, the number of digits to display, and the tag or expression to display.

To set up a Numeric display:

1. Double-click the Numeric display.



2. In the Numeric Display Properties dialog box, fill in the options on each tab, as described in the sections that follow. When you are finished, click OK.

Setting up the appearance of the Numeric display

In the General tab, specify what the Numeric display looks like at runtime.

Border style Click a border style in the list, or click None to remove the border.

Border width Type a number to change the thickness of the Numeric display's border. Border width is measured in pixels.

Border uses back color Select the check box if you want the Numeric display's border to have the same color as the display's background.

Clear the check box if you want the Numeric display's border to have a different color than the display's background, and then choose a Border color.

Back color Click the color box, and then click a color for the Numeric display's background.

Border color Click the color box, and then click a color for the Numeric display's border.

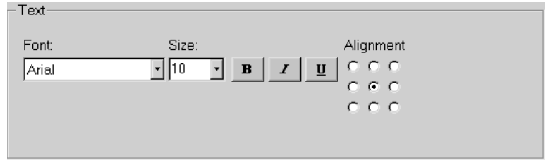
Back style Click Solid to cover objects or the display background behind the Numeric display. Click Transparent to allow objects or the display background behind the Numeric display to show through.

Pattern style Click a pattern style for the display.

Pattern color Click the color box, and then click a color for the pattern.

Fore color Click the color box, and then click a color for the text in the display.

Blink Select the check box to make the display blink at runtime. Clear the check box to prevent the display from blinking at runtime.



Font, size, and style Click a font for the caption in the Font list. Type or click a size for the font in the Size box. Click B to make the font bold, click I to make the font italic, click U to underline the text.

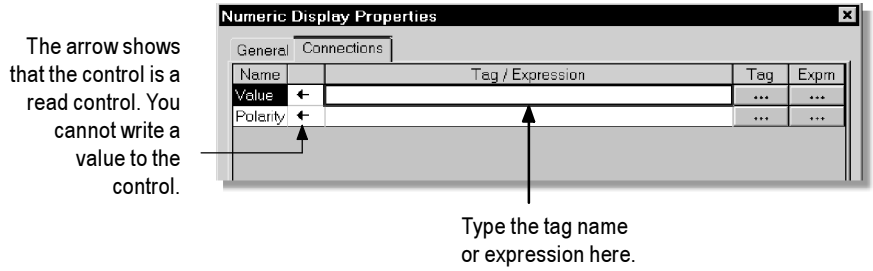
Alignment Click a position in the grid, relative to the Numeric display. In the default alignment position, the text is centered vertically and horizontally on the display.

Number of digits Click the maximum number of digits to display, up to 17 digits. The decimal point and minus sign each count as a digit.

Fill left with Select a character to fill the left of the display with if the value at the data source contains fewer than the maximum number of digits. If you don't want to use a fill character, select None.

Connecting the Numeric display to data

In the Connections tab, specify the tags or expressions whose data is displayed. For information about assigning tags and expressions, see page 9-32.



Value The Value control's value is shown in the display. For example, the display can show the temperature of an oven.

Polarity The Polarity control determines whether or not a minus sign is displayed. A minus sign is displayed when this control has a positive non-zero value.

If the Polarity control is assigned, it overrides the polarity of the Value control's value.

If the Polarity control uses a tag with a floating point value, values of less than .5 are rounded down (to zero) and values of .5 or greater are rounded up (to 1).

Setting up Numeric Input Enable buttons

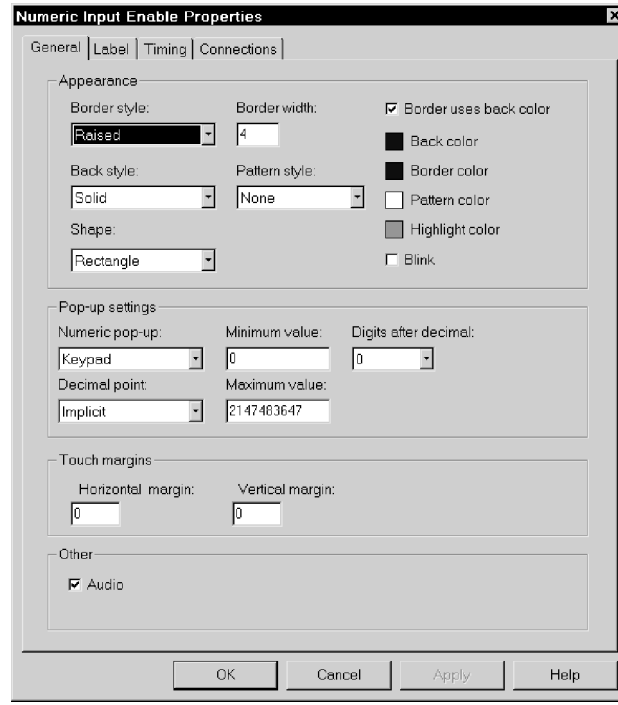
The operator can press the Numeric Input Enable button to open a numeric pop-up keypad or scratchpad. The operator can enter a number in the keypad or scratchpad, and then send the number to the data source.

For more information about using the Numeric Input Enable button and the numeric pop-ups, see page 24-3.

Specify the appearance of the button, whether the button opens a keypad or scratchpad, and how the button interacts with the data source.

To set up a Numeric Input Enable button:

1. Double-click the Numeric Input Enable button.



2. In the Numeric Input Enable Properties dialog box, fill in the options on each tab, as described in the sections that follow. When you are finished, click OK.

Setting up the appearance and action of the Numeric Input Enable button

In the General tab, specify what the button looks like at runtime, whether the button opens the keypad or scratchpad, and the type of data the operator can enter.

Border style Click a border style in the list, or click None to remove the border.

Border width Type a number to change the thickness of the button's border. Border width is measured in pixels.

Border uses back color Select the check box if you want the button's border to have the same color as the button's background.

Clear the check box if you want the button's border to have a different color than the button's background, and then choose a Border color.

Back color Click the color box, and then click a color for the button's background.

Border color Click the color box, and then click a color for the button's border.

Back style Click Solid to cover objects or the display background behind the button. Click Transparent to allow objects or the display background behind the button to show through.

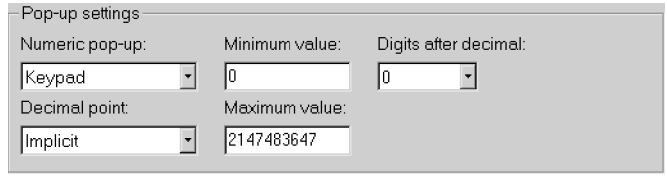
Pattern style Click a pattern style for the button.

Pattern color Click the color box, and then click a color for the pattern.

Highlight color Click the color box, and then click a color for the selection border that appears around the button when it is pressed. If the button does not use a border, the highlight color is not visible when the button is pressed.

Blink Select the check box to make the button blink at runtime. Clear the check box to prevent the button from blinking at runtime.

Shape Click a shape for the button.



Numeric pop-up Select whether to use the keypad or scratchpad.

To use the scratchpad, the runtime computer must have an external keyboard or keypad.

Decimal point Click Implicit if the operator manually enters the decimal point and you want the decimal point to be used when the value is sent to the Value control.

Click Fixed Position if the values to enter in the pop-up always have the same number of digits after the decimal point. If you select this type of decimal point, specify a "Digits after decimal" value. The decimal point is stripped when the value is sent to the Value control.

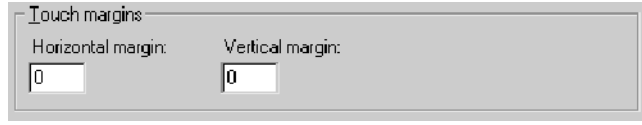
Minimum value Type the minimum value to send to the Value control. For the Fixed Position decimal point, the minimum applies to the stripped value, not the displayed value.

If you use the Optional Expression control, the minimum also applies to the value sent to the expression.

Maximum value Type the maximum value to send to the Value control. For the Fixed Position decimal point, the maximum applies to the stripped value, not the displayed value.

If you use the Optional Expression control, the maximum also applies to the value sent to the expression.

Digits after decimal If you select the Fixed Position decimal point, select the number of digits to appear after the decimal point.



Horizontal margin Type the number of pixels for the touch-insensitive margin inside the object's left and right edges.

For information about using touch margins, see page 10-4.

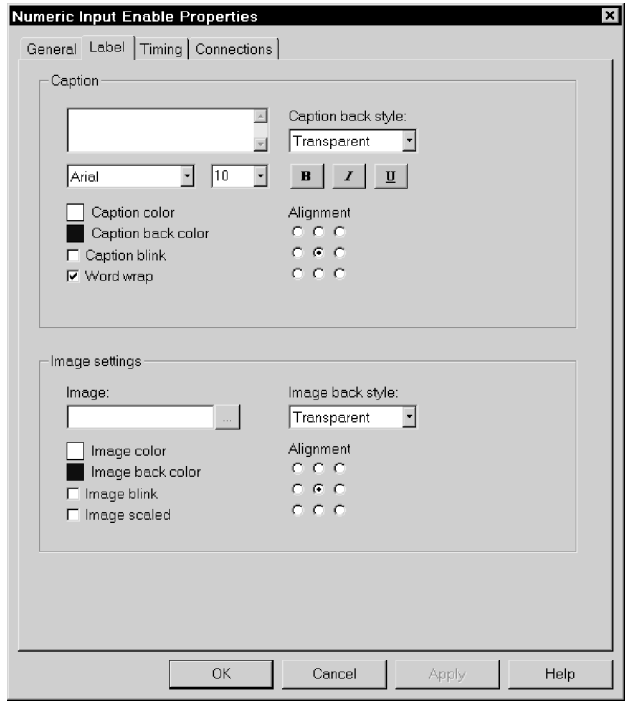
Vertical margin Type the number of pixels for the touch-insensitive margin inside the object's top and bottom edges.

Audio Select this check box to beep the computer's internal speaker when the operator presses the button.

If the computer running the display does not have an internal speaker, pressing the button does not trigger a beep.

Setting up a caption or image for the Numeric Input Enable button

In the Label tab, specify what text or image to display on the button.



Caption Type the text you want to appear on the button. If you don't want any text on the button, leave the Caption box blank.

Caption back style Click Solid to cover the button's background (such as a graphic image) with the text. Click Transparent to allow the button's background to show through between the letters.

Font, size, and style Click a font for the caption in the font list. Type or click a size for the font in the size box. Click B to make the font bold, click I to make the font italic, click U to underline the text.

Caption color Click the color box, and then click a color for the caption's text.

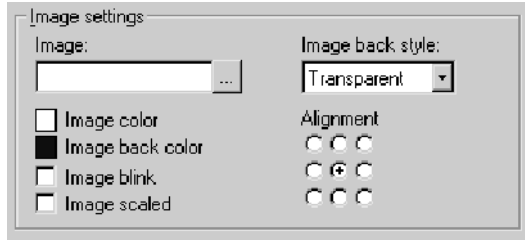
Caption back color Click the color box, and then click a color for the caption's background.

The caption's background color is visible only if the Caption back style is Solid.

Caption blink Select the check box to make the caption blink at runtime. Clear the check box to prevent the caption from blinking at runtime.

Word wrap Select this check box to wrap words to the next line if they are too long for the width of the caption. Clear this check box to wrap on characters instead.

Alignment Click a position in the grid, relative to the button. In the default alignment position, the text is centered vertically and horizontally on the button.



Browse button

Image Type the name of the image file to display on the button, or click the Browse button to browse for the image.

If you click the Browse button, the Image Browser opens. Click an image in the Select image box, and then click OK.

Image back style Click Solid to cover the button's background behind the image. Click Transparent to allow the button's background to show through spaces in the image.

Image color Click the color box, and then click a color for a monochrome image. You cannot change the color of grayscale or color images.

Image back color Click the color box, and then click a color for the background of a monochrome image. You cannot change the background color of grayscale or color images.

Image blink Select the check box to make a monochrome image blink at runtime. Clear the check box to prevent the image from blinking at runtime. You cannot make grayscale or color images blink.

Image scaled Select the check box to scale the image to fit the area of the button. Clear this check box to crop the image to the area of the button if it is too large to fit on the button.

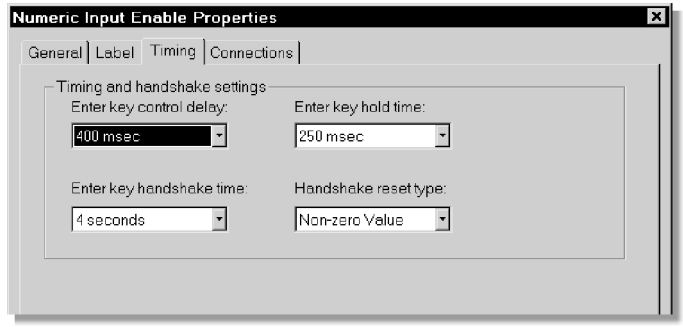
If the button's shape is a Circle or Ellipse, the image is shaped to fit inside the circle or ellipse.

Alignment Click a position in the grid, relative to the button. In the default alignment position, the image is centered vertically and horizontally on the button.

Setting up the how the Numeric Input Enable button's pop-up works with an Enter key

In the Timing tab, set up the timing and handshake settings for the Enter key.

For information about using Enter key handshaking, see page 10-12.



Enter key control delay Click the number of milliseconds or seconds to delay between pressing the Enter key and setting the Enter control to 1. Specify the tag to use for the Enter control in the Connections tab.

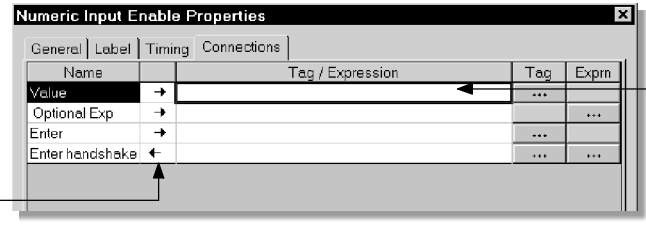
Enter key hold time Click the number of milliseconds or seconds the Enter control remains at a value of 1. This setting applies only if the Enter control is assigned and the Enter handshake control is *not* assigned (in the Connections tab).

Enter key handshake time Click the maximum number of seconds the Enter control remains at a value of 1. This setting applies only if the Enter control and Enter handshake control are both assigned (in the Connections tab).

Handshake reset type Click Non-zero Value to reset the Enter control when the Enter handshake control is a non-zero value. Click Zero to Non-zero transition to reset the Enter control when the Enter handshake control changes from zero to a non-zero value.

Connecting the Numeric Input Enable button to data

In the Connections tab, specify the tags or expression with which the Numeric Input Enable button exchanges data. For information about assigning tags and expressions, see page 9-32.



Value The numeric value the operator enters is sent to the Value control. For example, the operator could enter a value to change the fill level for a tank.

If you do not assign a tag to this control, at runtime when the operator presses the button the pop-up keypad or scratchpad does not open.

Optional Expression The Optional Expression control is an optional write control. Assign a write expression to this control. When the operator enters a value, the expression's logic is performed on the value, and the result is sent to the Value control.

The write expression must contain a question mark (?) as a placeholder for the value the operator enters at runtime.

For more information about write expressions, see page 12-20.

Enter The Enter control accepts values of 0 or 1 only. The control determines how long the Enter key press is registered. No further values can be entered by the button when the Enter control is set to 1.

Enter handshake The Enter handshake control resets the Enter control, using the "Handshake reset type" option specified on the Timing tab.

Use this control for Enter key handshaking if you want to reset the Enter control when a value in the programmable controller changes.

How to use String displays

Use the String display object to show the operator messages from the data source. For example, you might configure the data source to generate strings that report on the state of a process or operation, or that provide instructions about what the operator should do next. At runtime the display shows the operator the string value of the Value control at the data source.

You can use hex control codes to format and position the text strings. For more information, see the Help.

How values are displayed

- If the Value control is unassigned, the String display is blank.
- RSView displays the number of characters (bytes) specified for the tag assigned to the Value control. If a longer string is sent to the control, only the specified number of characters is displayed.

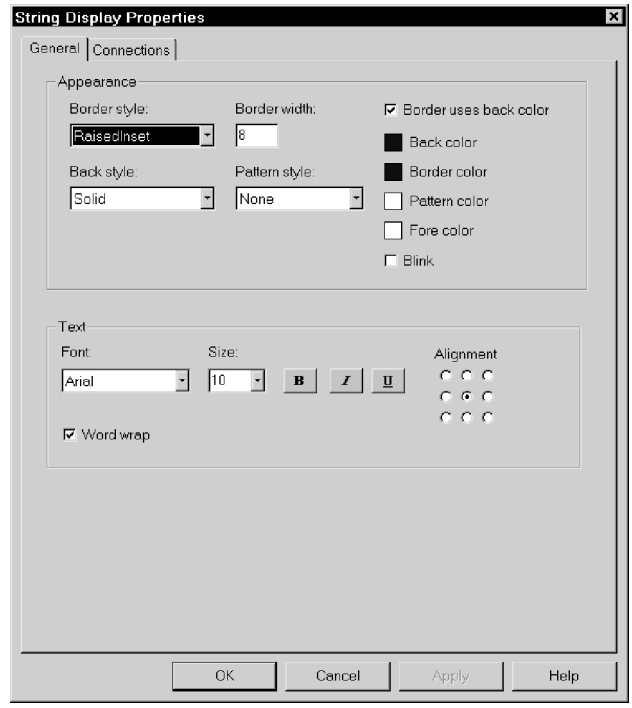
Setting up String displays

The String display shows the operator string values from the data source.

Specify the appearance of the display and the tag or expression to display.

To set up a String display:

1. Double-click the String display.



2. In the String Display Properties dialog box, fill in the options on each tab, as described in the sections that follow. When you are finished, click OK.

Setting up the appearance of the String display

In the General tab, specify what the String display looks like at runtime.

Border style Click a border style in the list, or click None to remove the border.

Border width Type a number to change the thickness of the String display's border. Border width is measured in pixels.

Border uses back color Select the check box if you want the String display's border to have the same color as the display's background.

Clear the check box if you want the String display's border to have a different color than the display's background, and then choose a Border color.

Back color Click the color box, and then click a color for the String display's background.

Border color Click the color box, and then click a color for the String display's border.

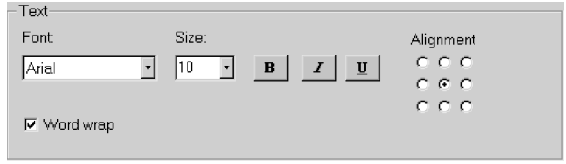
Back style Click Solid to cover objects or the display background behind the String display. Click Transparent to allow objects or the display background behind the String display to show through.

Pattern style Click a pattern style for the display.

Pattern color Click the color box, and then click a color for the pattern.

Fore color Click the color box, and then click a color for the text in the display.

Blink Select the check box to make the display blink at runtime. Clear the check box to prevent the display from blinking at runtime.



Font, size, and style Click a font for the text in the Font list. Type or click a size for the font in the Size box. Click B to make the font bold, click I to make the font italic, click U to underline the text.

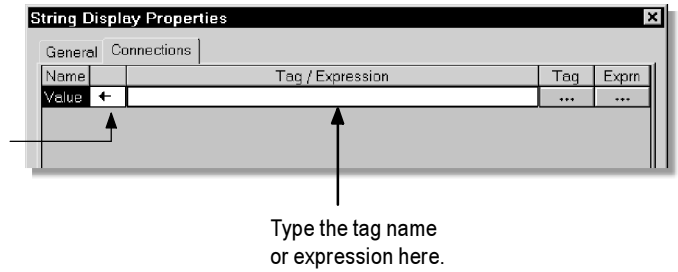
Alignment Click a position in the grid, relative to the String display. In the default alignment position, the text is centered vertically and horizontally on the display.

Word wrap Select this check box to wrap words to the next line if they are too long for the width of the display.

Clear this check box to wrap on characters instead. If there is room for another line, the rest of the truncated word is displayed on the next line.

Connecting the String display to data

In the Connections tab, specify the tag or expression whose data is displayed. For information about assigning tags and expressions, see page 9-32.



Value The Value control's value is shown in the display. For example, the display can show a message about the status of a conveyor belt.

Assign a tag or expression that can support up to 82 characters (bytes).

Setting up String Input Enable buttons

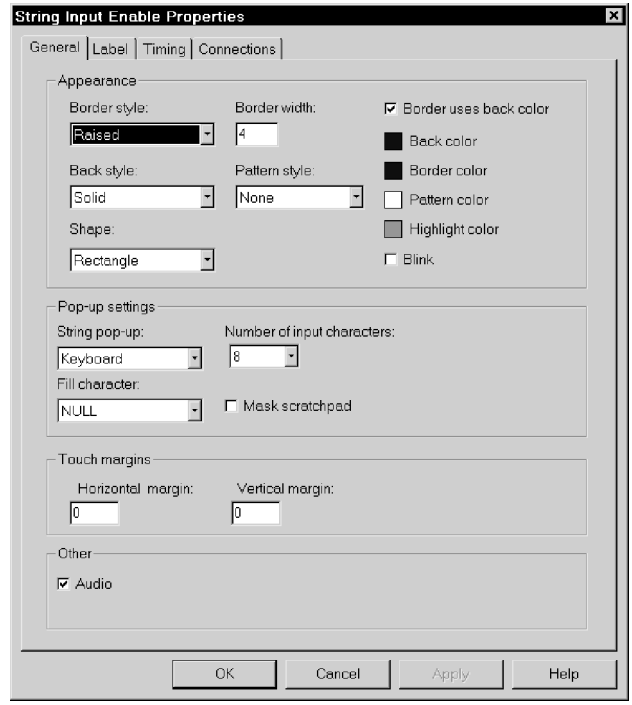
The operator can press the String Input Enable button to open a string pop-up scratchpad or keyboard. The operator can enter text in the scratchpad or keyboard, and then send the string to the data source.

For more information about using the String Input Enable button and the string pop-ups, see page 24-7.

Specify the appearance of the button, whether the button opens a scratchpad or keyboard, and how the button interacts with the data source.

To set up a String Input Enable button:

1. Double-click the String Input Enable button.



2. In the String Input Enable Properties dialog box, fill in the options on each tab, as described in the sections that follow. When you are finished, click OK.

Setting up the appearance and action of the String Input Enable button

In the General tab, specify what the button looks like at runtime, whether the button opens the scratchpad or keyboard, and the number of characters the operator can enter.

Border style Click a border style in the list, or click None to remove the border.

Border width Type a number to change the thickness of the button's border. Border width is measured in pixels.

Border uses back color Select the check box if you want the button's border to have the same color as the button's background.

Clear the check box if you want the button's border to have a different color than the button's background, and then choose a Border color.

Back color Click the color box, and then click a color for the button's background.

Border color Click the color box, and then click a color for the button's border.

Back style Click Solid to cover objects or the display background behind the button. Click Transparent to allow objects or the display background behind the button to show through.

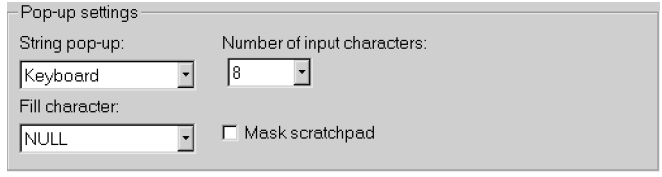
Pattern style Click a pattern style for the button.

Pattern color Click the color box, and then click a color for the pattern.

Highlight color Click the color box, and then click a color for the selection border that appears around the button when it is pressed. If the button does not use a border, the highlight color is not visible when the button is pressed.

Blink Select the check box to make the button blink at runtime. Clear the check box to prevent the button from blinking at runtime.

Shape Click a shape for the button.



String pop-up Select whether to use the scratchpad or keyboard.

To use the scratchpad, the runtime computer must have an external keyboard or keypad.

Number of input characters Specify the maximum number of input characters for the pop-up to accept, up to 82 characters.

Fill character Select a character to pad the string with if the operator enters fewer than the maximum number of input characters.

When the value is sent to the Value control, the fill characters are placed after the string the operator enters. The characters do not appear in the pop-up.

Mask scratchpad Check this box to hide the text the operator enters by using the # character instead of the actual text.

If you don't want to hide the text the operator types, clear the check box.

Horizontal margin Type the number of pixels for the touch-insensitive margin inside the object's left and right edges.

For information about using touch margins, see page 10-4.

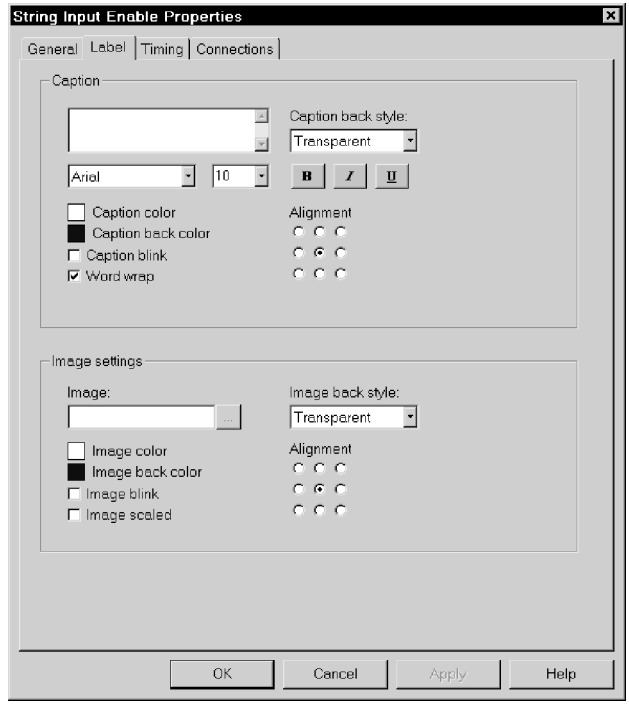
Vertical margin Type the number of pixels for the touch-insensitive margin inside the object's top and bottom edges.

Audio Select this check box to beep the computer's internal speaker when the operator presses the button.

If the computer running the display does not have an internal speaker, pressing the button does not trigger a beep.

Setting up a caption or image for the String Input Enable button

In the Label tab, specify what text or image to display on the button.



Caption Type the text you want to appear on the button. If you don't want any text on the button, leave the Caption box blank.

Caption back style Click Solid to cover the button's background (such as a graphic image) with the text. Click Transparent to allow the button's background to show through between the letters.

Font, size, and style Click a font for the caption in the font list. Type or click a size for the font in the size box. Click B to make the font bold, click I to make the font italic, click U to underline the text.

Caption color Click the color box, and then click a color for the caption's text.

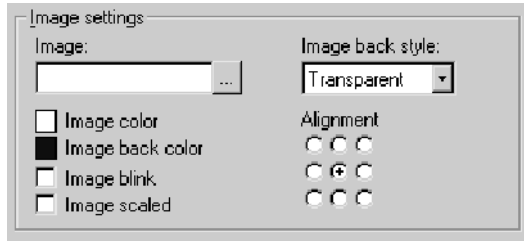
Caption back color Click the color box, and then click a color for the caption's background.

The caption's background color is visible only if the Caption back style is Solid.

Caption blink Select the check box to make the caption blink at runtime. Clear the check box to prevent the caption from blinking at runtime.

Word wrap Select this check box to wrap words to the next line if they are too long for the width of the caption. Clear this check box to wrap on characters instead.

Alignment Click a position in the grid, relative to the button. In the default alignment position, the text is centered vertically and horizontally on the button.



Browse button

Image Type the name of the image file to display on the button, or click the Browse button to browse for the image.

If you click the Browse button, the Image Browser opens. Click an image in the Select image box, and then click OK.

Image back style Click Solid to cover the button's background behind the image. Click Transparent to allow the button's background to show through spaces in the image.

Image color Click the color box, and then click a color for a monochrome image. You cannot change the color of grayscale or color images.

Image back color Click the color box, and then click a color for the background of a monochrome image. You cannot change the background color of grayscale or color images.

Image blink Select the check box to make a monochrome image blink at runtime. Clear the check box to prevent the image from blinking at runtime. You cannot make grayscale or color images blink.

Image scaled Select the check box to scale the image to fit the area of the button. Clear this check box to crop the image to the area of the button if it is too large to fit on the button.

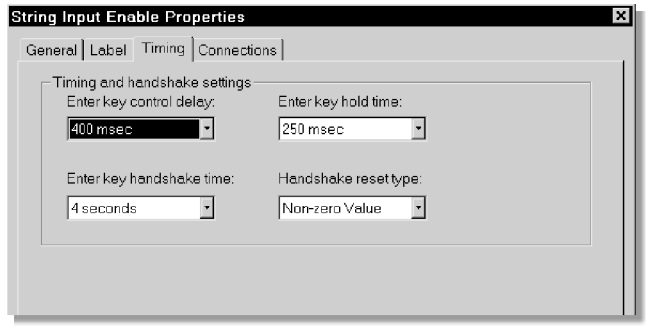
If the button's shape is a Circle or Ellipse, the image is shaped to fit inside the circle or ellipse.

Alignment Click a position in the grid, relative to the button. In the default alignment position, the image is centered vertically and horizontally on the button.

Setting up the how the String Input Enable button's pop-up works with an Enter key

In the Timing tab, set up the timing and handshake settings for the Enter key.

For information about using Enter key handshaking, see page 10-12.



Enter key control delay Click the number of milliseconds or seconds to delay between pressing the Enter key and setting the Enter control to 1. Specify the tag to use for the Enter control in the Connections tab.

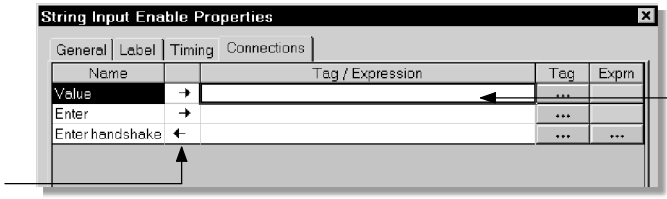
Enter key hold time Click the number of milliseconds or seconds the Enter control remains at a value of 1. This setting applies only if the Enter control is assigned and the Enter handshake control is *not* assigned (in the Connections tab).

Enter key handshake time Click the maximum number of seconds the Enter control remains at a value of 1. This setting applies only if the Enter control and Enter handshake control are both assigned (in the Connections tab).

Handshake reset type Click Non-zero Value to reset the Enter control when the Enter handshake control is a non-zero value. Click Zero to Non-zero transition to reset the Enter control when the Enter handshake control changes from zero to a non-zero value.

Connecting the String Input Enable button to data

In the Connections tab, specify the tags or expression with which the String Input Enable button exchanges data. For information about assigning tags and expressions, see page 9-32.



Value The string value the operator enters is sent to the Value control. Assign a tag that can support up to 82 characters (bytes).

When the operator presses the Enter key, the alphanumeric string is sent to the data source.

If you do not assign a tag to this control, at runtime when the operator presses the button the pop-up does not open.

Enter The Enter control accepts values of 0 or 1 only. The control determines how long the Enter key press is registered. No further values can be entered by the button when the Enter control is set to 1.

Enter handshake The Enter handshake control resets the Enter control, using the "Handshake reset type" option specified on the Timing tab.

Use this control for Enter key handshaking if you want to reset the Enter control when a value in the programmable controller changes.

Setting up Goto Display buttons

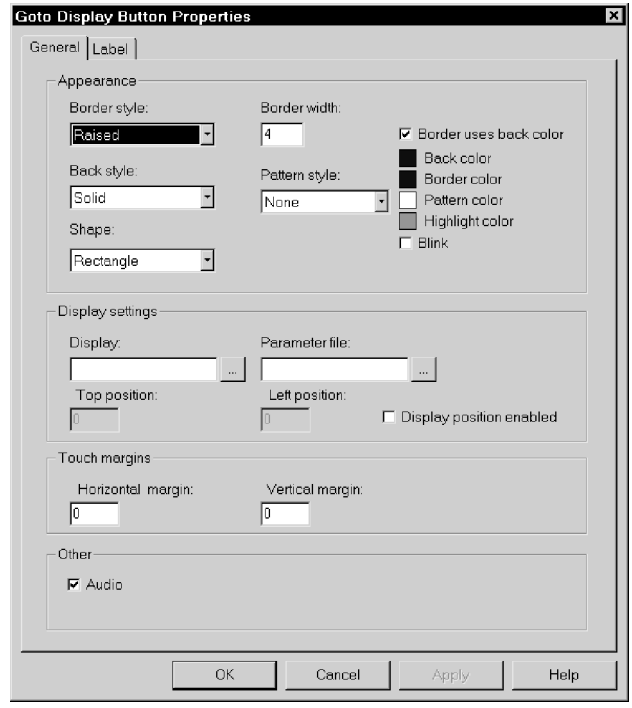
Use the Goto Display button to open a graphic display. You can create as many Goto Display buttons as you need, but each button opens a single display only.

For more information about using Goto Display buttons, see page 19-4.

Specify the graphic display to open, and a parameter file to use with tag placeholders in the display (if any).

To set up a Goto Display button:

1. Double-click the Goto Display button.



2. In the Goto Display Button Properties dialog box, fill in the options on each tab, as described in the sections that follow. When you are finished, click OK.

Setting up the appearance of the Goto Display button

In the General tab, specify what the button looks like at runtime.

Border style Click a border style in the list, or click None to remove the border.

Border width Type a number to change the thickness of the button's border. Border width is measured in pixels.

Border uses back color Select the check box if you want the button's border to have the same color as the button's background.

Clear the check box if you want the button's border to have a different color than the button's background, and then choose a Border color.

Back color Click the color box, and then click a color for the button's background.

Border color Click the color box, and then click a color for the button's border.

Back style Click Solid to cover objects or the display background behind the button. Click Transparent to allow objects or the display background behind the button to show through.

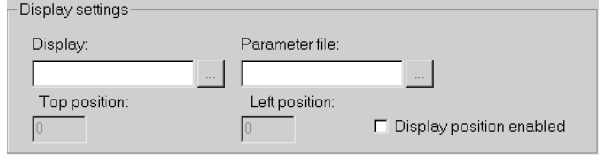
Pattern style Click a pattern style for the button.

Pattern color Click the color box, and then click a color for the pattern.

Highlight color Click the color box, and then click a color for the selection border that appears around the button when it is pressed. If the button does not use a border, the highlight color is not visible when the button is pressed.

Blink Select the check box to make the button blink at runtime. Clear the check box to prevent the button from blinking at runtime.

Shape Click a shape for the button.



Browse button

Display Type the name of the graphic display to open when the button is pressed. To browse for a graphic display, click the Browse button.

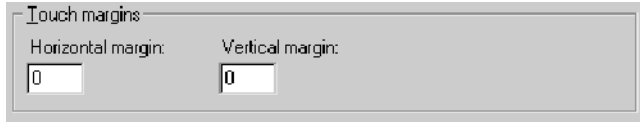
Parameter file Type the name of the parameter file to run when the button is pressed. To browse for a parameter file, click the Browse button.

A parameter file assigns tags to tag placeholders in the display when the display opens.

Top position Type the number of pixels from the top edge of the project window to position the display. This option applies only if the graphic display the button opens is an On Top display.

Left position Type the number of pixels from the left edge of the project window to position the display. This option applies only if the graphic display the button opens is an On Top display.

Display position enabled Check this box if you want to use the Top position and Left position options to position the display the button opens.



Horizontal margin Type the number of pixels for the touch-insensitive margin inside the object's left and right edges.

For information about using touch margins, see page 10-4.

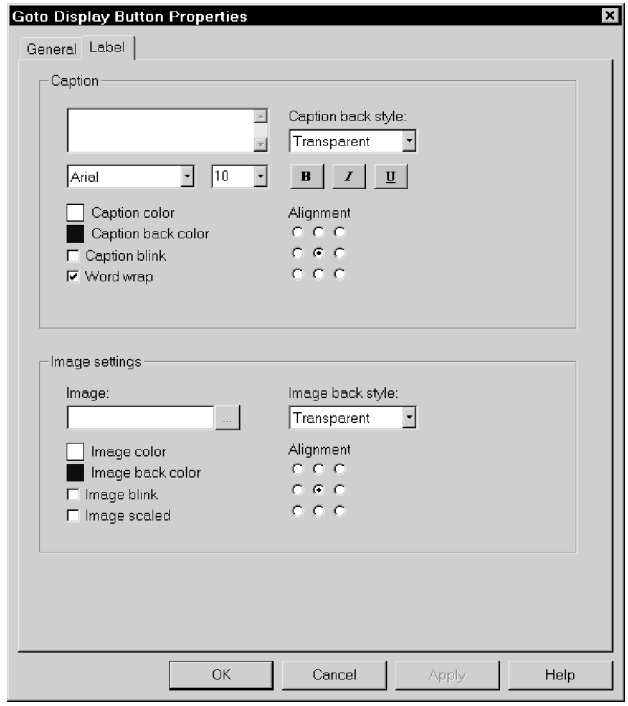
Vertical margin Type the number of pixels for the touch-insensitive margin inside the object's top and bottom edges.

Audio Select this check box to beep the computer's internal speaker when the operator presses the button.

If the computer running the display does not have an internal speaker, pressing the button does not trigger a beep.

Setting up a caption or image for the Goto Display button

In the Label tab, specify what text or image to display on the button.



Caption Type the text you want to appear on the button. If you don't want any text on the button, leave the Caption box blank.

Caption back style Click Solid to cover the button's background (such as a graphic image) with the text. Click Transparent to allow the button's background to show through between the letters.

Font, size, and style Click a font for the caption in the font list. Type or click a size for the font in the size box. Click B to make the font bold, click I to make the font italic, click U to underline the text.

Caption color Click the color box, and then click a color for the caption's text.

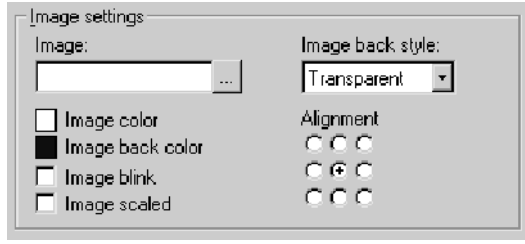
Caption back color Click the color box, and then click a color for the caption's background.

The caption's background color is visible only if the Caption back style is Solid.

Caption blink Select the check box to make the caption blink at runtime. Clear the check box to prevent the caption from blinking at runtime.

Word wrap Select this check box to wrap words to the next line if they are too long for the width of the caption. Clear this check box to wrap on characters instead.

Alignment Click a position in the grid, relative to the button. In the default alignment position, the text is centered vertically and horizontally on the button.



Browse button

Image Type the name of the image file to display on the button, or click the Browse button to browse for the image.

If you click the Browse button, the Image Browser opens. Click an image in the Select image box, and then click OK.

Image back style Click Solid to cover the button's background behind the image. Click Transparent to allow the button's background to show through spaces in the image.

Image color Click the color box, and then click a color for a monochrome image. You cannot change the color of grayscale or color images.

Image back color Click the color box, and then click a color for the background of a monochrome image. You cannot change the background color of grayscale or color images.

Image blink Select the check box to make a monochrome image blink at runtime. Clear the check box to prevent the image from blinking at runtime. You cannot make grayscale or color images blink.

Image scaled Select the check box to scale the image to fit the area of the button. Clear this check box to crop the image to the area of the button if it is too large to fit on the button.

If the button's shape is a Circle or Ellipse, the image is shaped to fit inside the circle or ellipse.

Alignment Click a position in the grid, relative to the button. In the default alignment position, the image is centered vertically and horizontally on the button.

Setting up Display List selectors

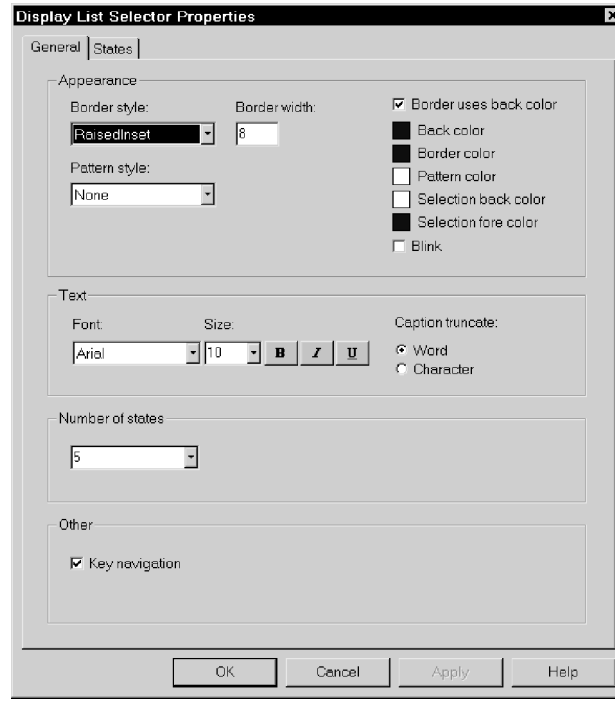
The Display List selector is a list of displays in the project. Each graphic display is represented by a different state in the Display List selector. An operator can scroll through the list of displays, and then select the display to open.

For more information about using Display List selectors, see page 19-6.

Specify the graphic displays associated with each state. At runtime, the operator selects a graphic display by highlighting the state in the list, and then pressing an Enter button or key to select the state.

To set up a Display List selector:

1. Double-click the Display List selector.



2. In the Display List Selector Properties dialog box, fill in the options on each tab, as described in the sections that follow. When you are finished, click OK.

Setting up the appearance of the Display List selector

In the General tab, specify what the Display List selector looks like at runtime.

Border style Click a border style in the list, or click None to remove the border.

Border width Type a number to change the thickness of the Display List selector's border. Border width is measured in pixels.

Border uses back color Select the check box if you want the Display List selector's border to have the same color as the selector's background.

Clear the check box if you want the Display List selector's border to have a different color than the selector's background, and then choose a Border color.

Back color Click the color box, and then click a color for the Display List selector's background.

Border color Click the color box, and then click a color for the Display List selector's border.

Pattern style Click a pattern style for the Display List selector.

Pattern color Click the color box, and then click a color for the pattern.

Selection back color Click the color box, and then click a color for the background of a selected item in the list.

Selection fore color Click the color box, and then click a color for the text of a selected item in the list.

Blink Select the check box to make the Display List selector blink at runtime. Clear the check box to prevent the selector from blinking at runtime.

Font, size, and style Click a font for the caption in the Font list. Type or click a size for the font in the Size box. Click B to make the font bold, click I to make the font italic, click U to underline the text.

Caption truncate Click Word to cut off captions that exceed the maximum length at the beginning of a word. Click Character to cut off captions that exceed the maximum length in the middle of a word.

The maximum caption length depends on the width of the Display List selector and the font size.

When a caption has been truncated, an asterisk (*) appears at the right end of the caption to indicate that text is missing.

Number of states Click the number of states you want the Display List selector to have.

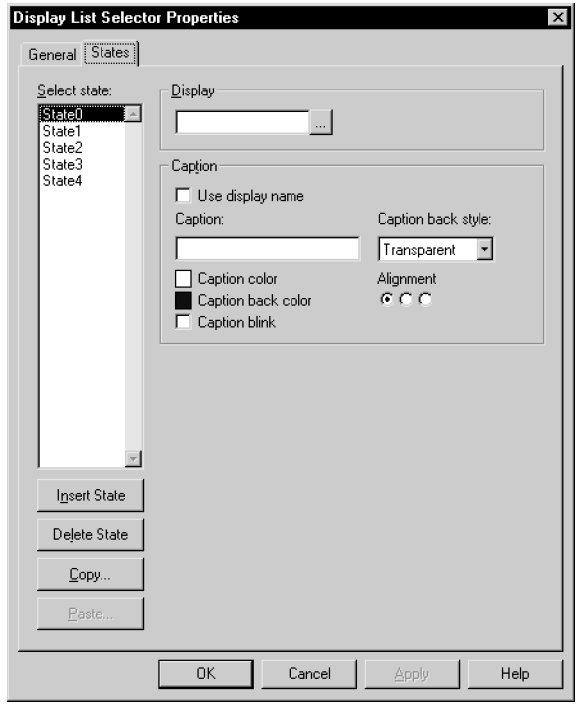
Key navigation Select this check box to allow the operator to navigate to the Display List selector and give it focus using the keyboard.

For more information about key navigation, see page 10-8.

Setting up which displays appear in the Display List selector

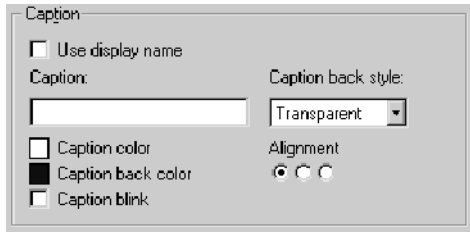
In the States tab, specify which graphic display to use for each of the Display List selector's states, and how each graphic display is named in the list.

For tips about configuring states, see page 10-1.



Browse button

Display Type the name of the graphic display for the selected state. To browse for a graphic display, click the Browse button.



Use display name Select this check box to use the name of the graphic display as the caption for the state. Clear this check box to type a different caption for the state.

Caption Type the text you want to appear as the name of the graphic display in the Display List selector.

Caption back style Click Solid to cover the Display List selector's background with the text. Click Transparent to allow the Display List selector's background to show through between the letters.

Caption color Click the color box, and then click a color for the caption's text.

Caption back color Click the color box, and then click a color for the caption's background.

The caption's background color is visible only if the Caption back style is Solid.

Caption blink Select the check box to make the caption blink at runtime. Clear the check box to prevent the caption from blinking at runtime.

Alignment Click a position in the grid for the text, relative to the Display List selector. In the default alignment position, the text is aligned at the left edge of the Display List selector.

How to use indicators

Indicators display the status of processes or operations by showing different colors, captions, images, or options to reflect different states.

You can create different kinds of indicators, depending on your needs:

Multistate indicators display the current state of a process or operation by showing a different color, caption, or image to reflect different states.

Symbols display a symbol that changes to match the state of a process or operation. This allows the operator to see the status of a process or operation at a glance.

List indicators display a list of states for a process or operation, and highlight the current state. Each state is represented by a caption in the list. This type of indicator is useful if you want operators to view the current state, but also see the other possible states. For sequential processes, the list can inform the operator about what happens next.

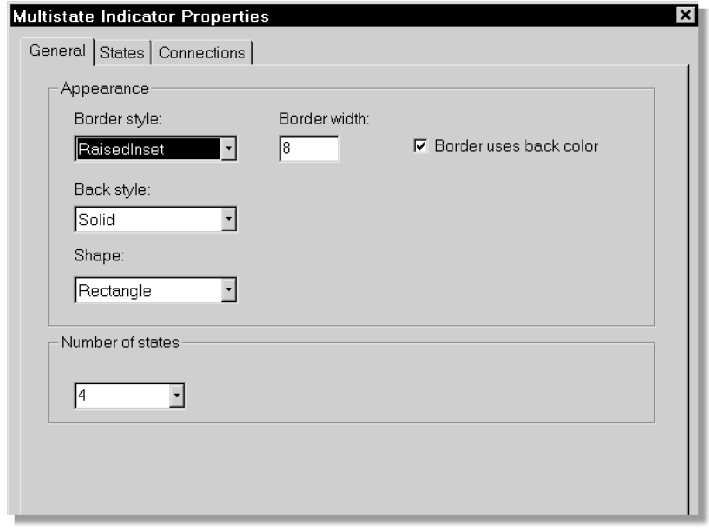
Setting up Multistate indicators

The Multistate indicator displays the current state of a process or operation by showing a different color, caption, or image for each state.

Specify the state values of the Multistate indicator. At runtime, the indicator displays the state whose value matches the Indicator control's value.

To set up a Multistate indicator:

1. Double-click the Multistate indicator.



2. In the Multistate Indicator Properties dialog box, fill in the options on each tab, as described in the sections that follow. When you are finished, click OK.

Setting up the appearance of the Multistate indicator and its number of states

In the General tab, specify what the indicator looks like, and the number of states for the indicator.

Border style Click a border style in the list, or click None to remove the border.

Border width Type a number to change the thickness of the indicator's border. Border width is measured in pixels.

Border uses back color Select the check box if you want the indicator's border to have the same color as the indicator's background.

Clear the check box if you want the indicator's border to have a different color than the indicator's background, and then choose a Border color on the States tab.

Back style Click Solid to cover objects or the display background behind the indicator. Click Transparent to allow objects or the display background behind the indicator to show through.

Shape Click a shape for the indicator.

Number of states Click the number of states you want the indicator to have.

Setting up how the Multistate indicator's appearance changes to match its value

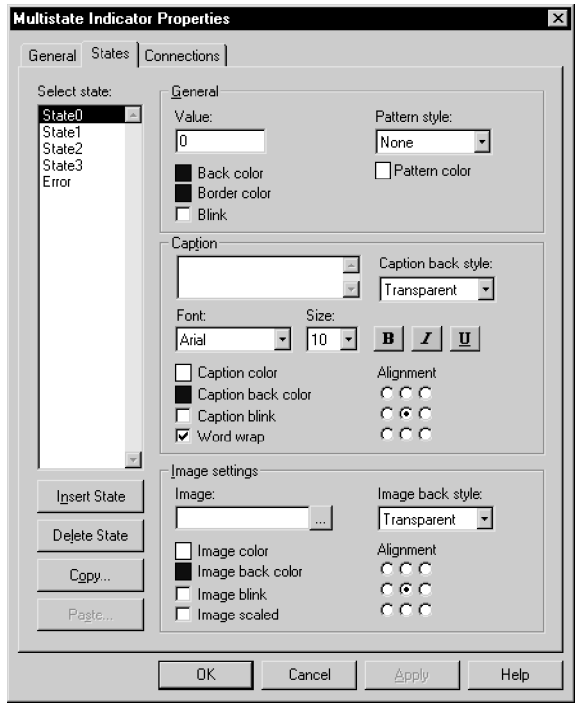
In the States tab, specify how the indicator's appearance changes when its tag or expression's value changes.

For tips about configuring states, see page 10-1.

The error state

The Multistate indicator's error state is displayed at runtime when:

- the Indicator control is unassigned
- the Indicator control's value does not match one of the state values you set up.



Value Type the integer value for the selected state. When the Indicator control changes to this value, the indicator's appearance changes to use the settings you specify for the state.

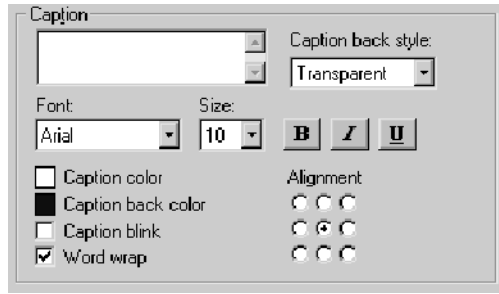
Back color Click the color box, and then click a color for the indicator's background.

Border color Click the color box, and then click a color for the indicator's border.

Blink Select the check box to make the indicator blink at runtime. Clear the check box to prevent the indicator from blinking at runtime.

Pattern style Click a pattern style for the indicator.

Pattern color Click the color box, and then click a color for the pattern.



Caption Type the text you want to appear on the indicator. If you don't want any text on the indicator, leave the Caption box blank.

Caption back style Click Solid to cover the indicator's background (such as a graphic image) with the text. Click Transparent to allow the indicator's background to show through between the letters.

Font, size, and style Click a font for the caption in the Font list. Type or click a size for the font in the Size box. Click B to make the font bold, click I to make the font italic, click U to underline the text.

Caption color Click the color box, and then click a color for the caption's text.

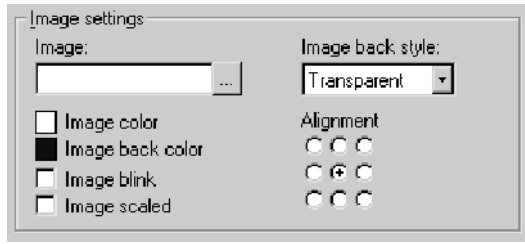
Caption back color Click the color box, and then click a color for the caption's background.

The caption's background color is visible only if the Caption back style is Solid.

Caption blink Select the check box to make the caption blink at runtime. Clear the check box to prevent the caption from blinking at runtime.

Word wrap Select this check box to wrap words to the next line if they are too long for the width of the caption. Clear this check box to wrap on characters instead.

Alignment Click a position in the grid for the text, relative to the indicator. In the default alignment position, the text is centered vertically and horizontally on the indicator.



Browse button

Image Type the name of the image file to display on the indicator, or click the Browse button to browse for the image.

If you click the Browse button, the Image Browser opens. Click an image in the Select image box, and then click OK.

Image back style Click Solid to cover the indicator's background behind the image. Click Transparent to allow the indicator's background to show through spaces in the image.

Image color Click the color box, and then click a color for a monochrome image. You cannot change the color of grayscale or color images.

Image back color Click the color box, and then click a color for the background of a monochrome image. You cannot change the background color of grayscale or color images.

Image blink Select the check box to make a monochrome image blink at runtime. Clear the check box to prevent the image from blinking at runtime. You cannot make grayscale or color images blink.

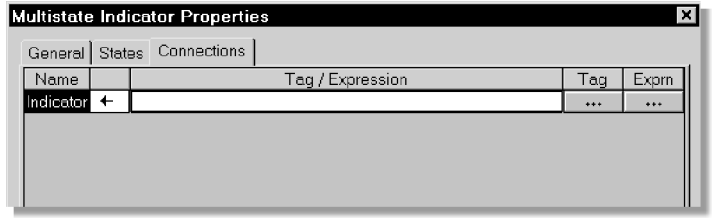
Image scaled Select the check box to scale the image to fit the area of the indicator. Clear the check box to crop the image to the area of the indicator if it is too large to fit on the indicator.

If the indicator shape is a Circle or Ellipse, the image is shaped to fit inside the circle or ellipse.

Alignment Click a position in the grid for the image, relative to the indicator. In the default alignment position, the image is centered vertically and horizontally on the indicator.

Connecting the Multistate indicator to data

In the Connections tab, specify the tag or expression from which the indicator receives data. For information about assigning tags and expressions, see page 9-32.



Indicator The Indicator control provides visual feedback to the indicator object of its state. For example, the control can show the status of a hoist.

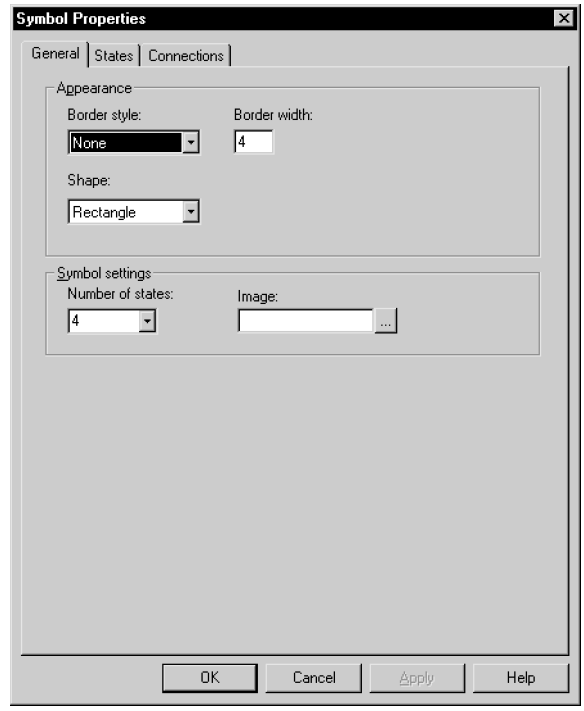
Setting up Symbols

The Symbol is an indicator that displays a single monochrome image that changes color to match the state of a process or operation. This allows the operator to see the status of a process or operation at a glance.

Specify the state values, and the color of the image for each state. At runtime, the indicator displays the state that matches the Indicator control's value.

To set up a Symbol:

1. Double-click the Symbol.



2. In the Symbol Properties dialog box, fill in the options on each tab, as described in the sections that follow. When you are finished, click OK.

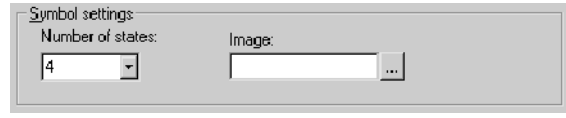
Setting up the appearance of the Symbol and its number of states

In the General tab, specify what the indicator looks like at runtime, and the number of states for the indicator.

Border style Click a border style in the list, or click None to remove the border.

Border width Type a number to change the thickness of the indicator's border. Border width is measured in pixels.

Shape Click a shape for the indicator.



Number of states Click the number of states you want the indicator to have.

Browse button

Image Type the name of the monochrome image file to display on the indicator, or click the Browse button to browse for the image.

If you click the Browse button, the Image Browser opens. Click an image in the Select image box, and then click OK.

Setting up how the Symbol changes appearance when its value changes

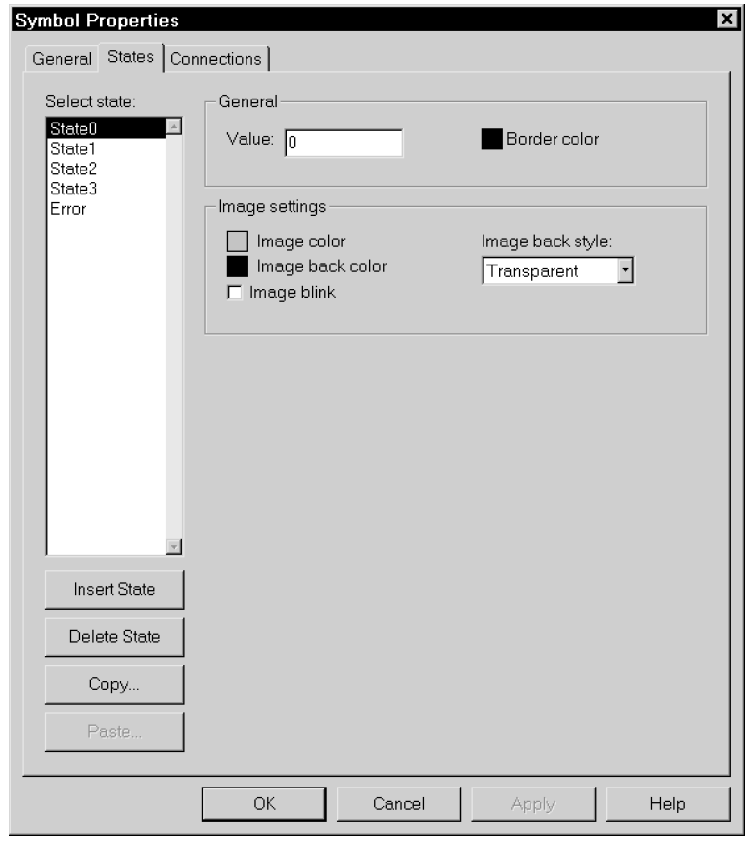
In the States tab, specify how the indicator's appearance changes when its tag or expression's value changes.

For tips about configuring states, see page 10-1.

The error state

The Symbol's error state is displayed at runtime when:

- the Indicator control is unassigned
- the Indicator control's value does not match one of the state values you set up.



Value Type the integer value for the selected state. When the Indicator control changes to this value, the indicator's appearance changes to the settings you specify for the state.

Border color Click the color box, and then click a color for the indicator's border.

Image color Click the color box, and then click a color for the monochrome image.

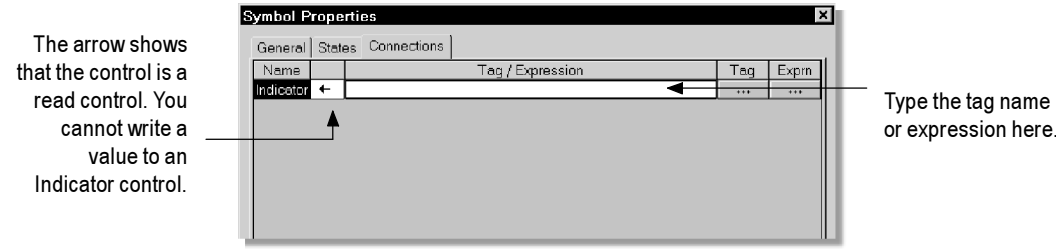
Image back color Click the color box, and then click a color for the background of the monochrome image.

Image back style Click Solid to cover the indicator's background behind the image. Click Transparent to allow the indicator's background to show through spaces in the image.

Image blink Select the check box to make the monochrome image blink at runtime. Clear the check box to prevent the image from blinking at runtime.

Connecting the Symbol to data

In the Connections tab, specify the tag or expression from which the indicator receives data. For information about assigning tags and expressions, see page 9-32.



Indicator The Indicator control provides visual feedback to the indicator object of its state. For example, the control can show the state of a pump.

Setting up List indicators

The List indicator displays a list of states for a process or operation, and highlights the current state.

Each state is represented by a caption in the list. This type of indicator is useful if you want operators to view the current state, but also see the other possible states.

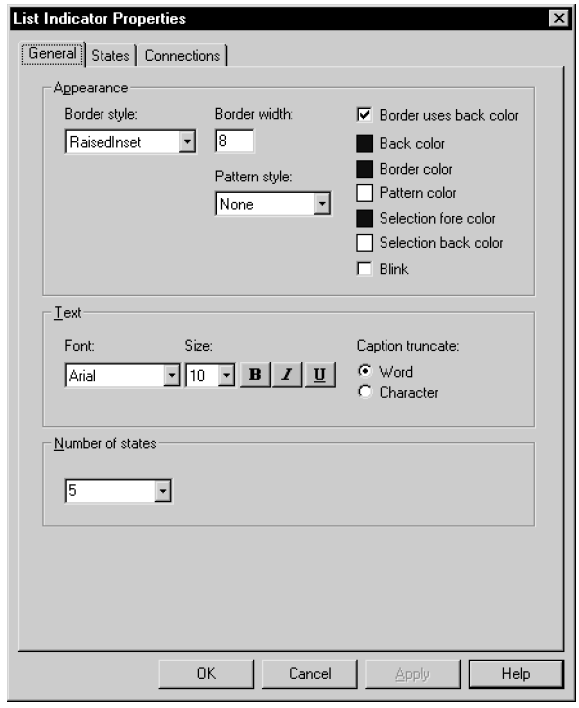
For sequential processes, the list can inform the operator about what happens next.

Specify the state values of the List indicator. At runtime, the indicator highlights the state whose value matches the Indicator control's value.

The List indicator has no error state. If the value of the Indicator control does not match any of the available states, none of the states is highlighted.

To set up a List indicator:

1. Double-click the List indicator.



2. In the List Indicator Properties dialog box, fill in the options on each tab, as described in the sections that follow. When you are finished, click OK.

Setting up the appearance of the List indicator and its number of states

In the General tab, specify what the indicator looks like at runtime, and the number of states for the indicator.

Border style Click a border style in the list, or click None to remove the border.

Border width Type a number to change the thickness of the indicator's border. Border width is measured in pixels.

Border uses back color Select the check box if you want the indicator's border to have the same color as the indicator's background.

Clear the check box if you want the indicator's border to have a different color than the indicator's background, and then choose a Border color.

Back color Click the color box, and then click a color for the indicator's background.

Border color Click the color box, and then click a color for the indicator's border.

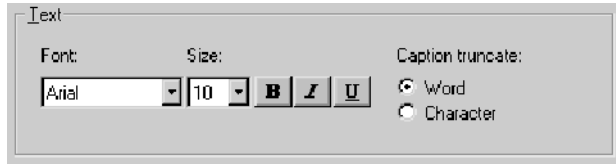
Pattern style Click a pattern style for the indicator.

Pattern color Click the color box, and then click a color for the pattern.

Selection fore color Click the color box, and then click a color for the text of a selected item in the list.

Selection back color Click the color box, and then click a color for the background of a selected item in the list.

Blink Select the check box to make the indicator blink at runtime. Clear the check box to prevent the indicator from blinking at runtime.



Font, size, and style Click a font for the indicator's text in the Font list. Type or click a size for the font in the Size box. Click B to make the font bold, click I to make the font italic, click U to underline the text.

Caption truncate Click Word to cut off captions that exceed the maximum length at the beginning of the word. Click Character to cut off captions that exceed the maximum length in the middle of a word.

The maximum caption length depends on the width of the indicator and the font size.

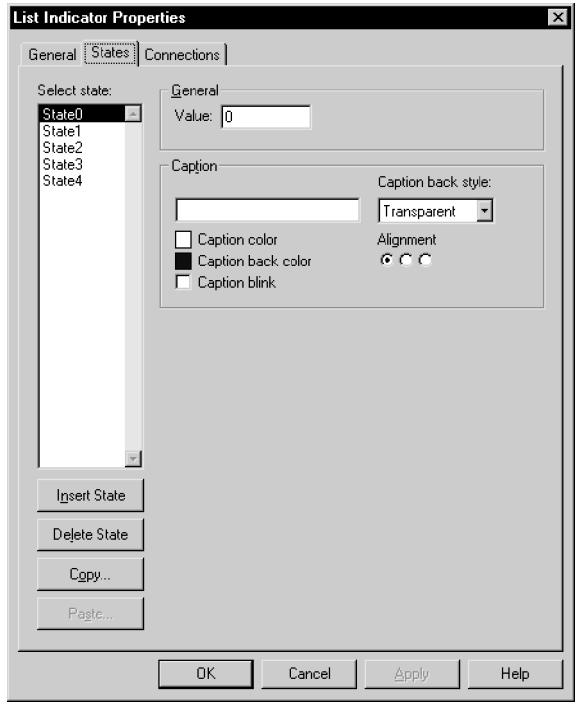
When a caption has been truncated, an asterisk (*) appears on the right of the caption to indicate that text is missing.

Number of states Click the number of states you want the indicator to have.

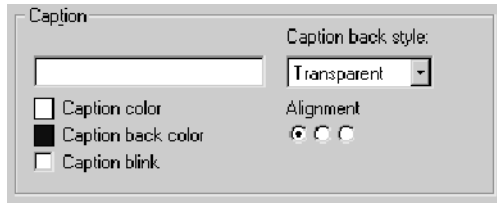
Setting up how the List indicator's appearance changes when its value changes

In the States tab, specify how the indicator's appearance changes when its tag or expression's value changes.

For tips about configuring states, see page 10-1.



Value Type the integer value for the selected state. When the Indicator control changes to this value, this state becomes the selected state.



Caption Type the text to display on the indicator for this state.

Caption back style Click Solid to use the Caption back color behind the text. Click Transparent to allow the indicator's background to show through between the letters.

Caption color Click the color box, and then click a color for the caption's text.

Caption back color Click the color box, and then click a color for the caption's background.

The caption's background color is visible only if the Caption back style is Solid.

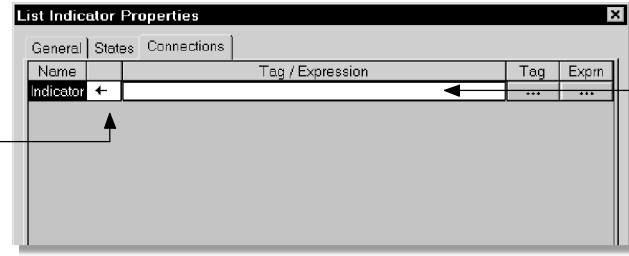
Caption blink Select the check box to make the caption blink at runtime. Clear the check box to prevent the caption from blinking at runtime.

Alignment Click a position in the grid for the text, relative to the indicator. In the default alignment position, the text is positioned at the left of the indicator, inside the border (if a border is used).

Connecting the List indicator to data

In the Connections tab, specify the tag or expression from which the indicator receives data. For information about assigning tags and expressions, see page 9-32.

The arrow shows that the control is a read control. You cannot write a value to an Indicator control.



Type the tag name or expression here.

Indicator The Indicator control provides visual feedback to the indicator object of its state. For example, the control can show the mode of operation of a blower.

How to use bar graphs, gauges, and scales

Bar graphs and gauges display graphical representations of numeric values.

Bar graphs make it easy to compare values

Bar graphs display numeric values in bar graph format. They are useful for allowing comparisons between multiple values, or for representing the fill levels of tanks for which a reading on a vertical scale is appropriate.

For example, one bar graph can show the required level of a tank, and a second bar graph can show the actual level of the tank. The first graph changes to represent the required level for a particular application, and the second graph changes as the actual level in the tank rises or drops.

Bar graphs are more useful than Numeric displays when it's important for the operator to analyze the relationships between numeric values. It's easier for the operator to see that one graph is at a lower level than the other, or that one's fill is blue and the other's is yellow, than it is to subtract one numeric value from another.

Thresholds change a bar graph's fill color

As it fills, a bar graph can change its fill color to help an operator recognize abnormal conditions. The change in color happens when the tag (or expression) value crosses a threshold you set up for the graph. For example:

- if the level of the tank of ingredients is lower than the recipe requires, the graph can show the tank's level in red
- if the recipe will empty the tank, the graph can show the level in yellow
- if the level is higher than the level the recipe requires, the graph can show the level in green

If you want to use a different fill color on a bar graph to show abnormal conditions, make sure enough of the new fill color is visible when the abnormal condition occurs that the operator can see the condition.

Use bar graphs with scales to show limits

Unlike gauges, bar graphs do not have integrated scales. You can show values on a bar graph using a scale graphic object and text.

Scales consist of major ticks, represented by long lines, and minor ticks, represented by short lines. To indicate the values of major or minor ticks, use text objects.

Gauges make it easy to see limits

Gauges display numeric values in dial format. They are useful for displaying a value in relation to its lower and upper limits.

For example, a temperature gauge shows the current temperature in relation to its minimum and maximum extremes. By looking at the position of the needle on the gauge (pointing left, up, or right), the operator can tell at a glance whether the temperature is nearer its lower limit, nearer the middle, or nearer its upper limit.

Gauges are used instead of Numeric displays when it's important for the operator to recognize an abnormal condition instantly, either from far away when the scale on the gauge isn't visible, or before the operator has had the opportunity to determine the exact reading on the gauge. This characteristic of gauges is one of the reasons why they are used in automobile instrumentation.

Thresholds change a gauge's fill color

As the needle sweeps higher on a gauge, the gauge can fill the area behind the needle with a color. The gauge can change its fill color to help an operator recognize abnormal conditions. The change in color happens when the tag (or expression) value crosses a threshold you set up for the gauge. For example:

- if the temperature of an oven is lower than required for a recipe, the gauge can show the temperature in blue
- if the temperature is in the correct range for the recipe, the gauge can show the temperature in green
- if the temperature is higher than the recipe allows, the gauge can show the temperature in red

If you plan to use colored fills on a gauge to show abnormal conditions, make sure enough of the fill is visible when the abnormal condition occurs that the operator can see the condition.

IMPORTANT Some people are color blind to red and green so don't rely on color alone to establish meaning.

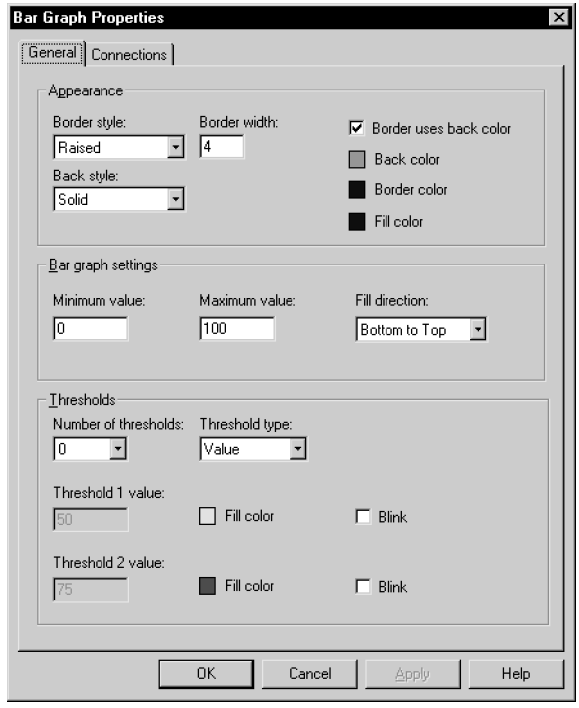
Setting up bar graphs

Use bar graphs to represent numeric values by filling and emptying as the values rise and fall.

Specify the minimum and maximum values of the bar graph, and the tag or expression to which the graph is connected. At runtime, the graph shows the value of the tag or expression in relation to the graph's minimum and maximum values.

To set up a bar graph:

1. Double-click the bar graph.



2. In the Bar Graph Properties dialog box, fill in the options on each tab, as described in the sections that follow. When you are finished, click OK.

Setting up the appearance of the bar graph

In the General tab, specify what the bar graph looks like at runtime.

Border style Click a border style in the list, or click None to remove the border.

Border width Type a number to change the thickness of the bar graph's border. Border width is measured in pixels.

Border uses back color Select the check box if you want the bar graph's border to have the same color as the bar graph's background.

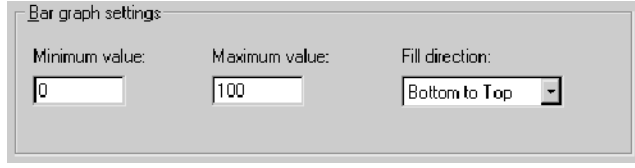
Clear the check box if you want the bar graph's border to have a different color than the bar graph's background.

Back style Click Solid to cover objects or the display background behind the bar graph. Click Transparent to allow objects or the display background behind the bar graph to show through.

Back color Click the color box, and then click a color for the bar graph's background.

Border color Click the color box, and then click a color for the bar graph's border.

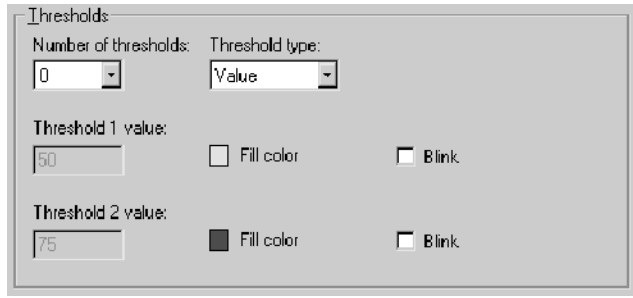
Fill color Click the color box, and then click a color for the filled part of the graph. The filled part represents a numeric value, and is displayed against the graph's background. If you use thresholds, this color is used until the graph's value reaches the first threshold.



Minimum value Type the minimum value to display on the graph. If the Value control is at or below this value, the graph is empty.

Maximum value Type the maximum value to display on the graph. If the Value control is at or above this value, the graph is filled.

Fill direction Click the direction in which to fill the graph.



Number of thresholds Click the number of thresholds you want the graph to have, or click 0 if you don't want to use thresholds.

Threshold type Click Value to set up thresholds using constant values. Click Percentage to set up thresholds using percentages of the graph's total range.

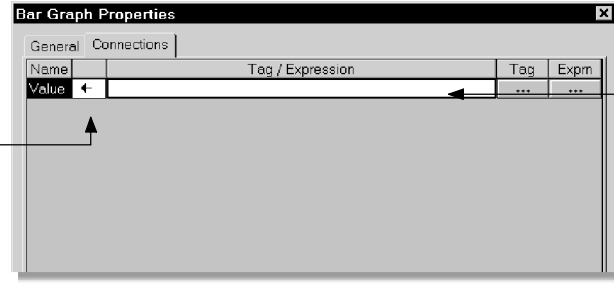
Threshold 1 value, Threshold 2 value Type a constant value, or a percentage, depending on the threshold type. When the tag or expression crosses this value, the fill color changes. The section of the graph above the threshold can also begin to blink.

Fill color Click the color box, and then click a color for the filled part of the graph above the threshold.

Blink Select the check box to make the filled section above the threshold blink at runtime. Clear the check box to prevent the filled section from blinking at runtime.

Connecting the bar graph to data

In the Connections tab, specify the tag or expression from which the bar graph receives data. For information about assigning tags and expressions, see page 9-32.



Value The Value control changes the fill level on the bar graph. For example, the Value control can show the temperature in an oven going up.

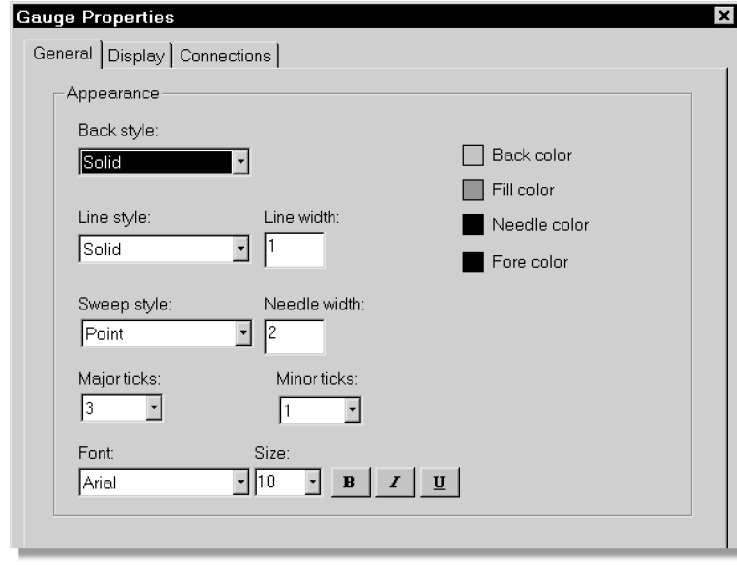
Setting up gauges

The gauge graphic object represents numeric values using a needle on a dial.

Specify the minimum and maximum values of the gauge, and the tag or expression to which the gauge is connected. At runtime, the gauge indicates the value of the tag or expression in relation to the gauge's minimum and maximum values.

To set up a gauge:

1. Double-click the gauge.



2. In the Gauge Properties dialog box, fill in the options on each tab, as described in the sections that follow. When you are finished, click OK.

Setting up the appearance of the gauge

In the General tab, specify what the gauge looks like at runtime.

Back style Click Solid to cover objects or the display background behind the gauge. Click Transparent to allow objects or the display background behind the gauge to show through.

Back color Click the color box, and then click a color for the gauge's background.

Fill color Click the color box, and then click a color for the filled part of the gauge. The filled part represents a numeric value, and is displayed against the gauge's background. If you use thresholds, this color is used until the gauge's value reaches the first threshold.

Line style Click a line style for the gauge's scale. If you want a line style other than solid, the line width must be 1 pixel.

Line width Type a number to change the line thickness of the gauge's scale. Line width is measured in pixels.

Needle color Click the color box, and then click a color for the gauge's needle.

Fore color Click the color box, and then click a color for the gauge's scale. The scale is the curved line and ticks that form the dial shape.

Sweep style Click Point to point the needle at the scale as the needle sweeps over the gauge. Click Fill to fill the area behind the needle with color as the needle sweeps over the gauge.

Needle width Type a number to change the thickness of the gauge's needle. Needle width is measured in pixels.

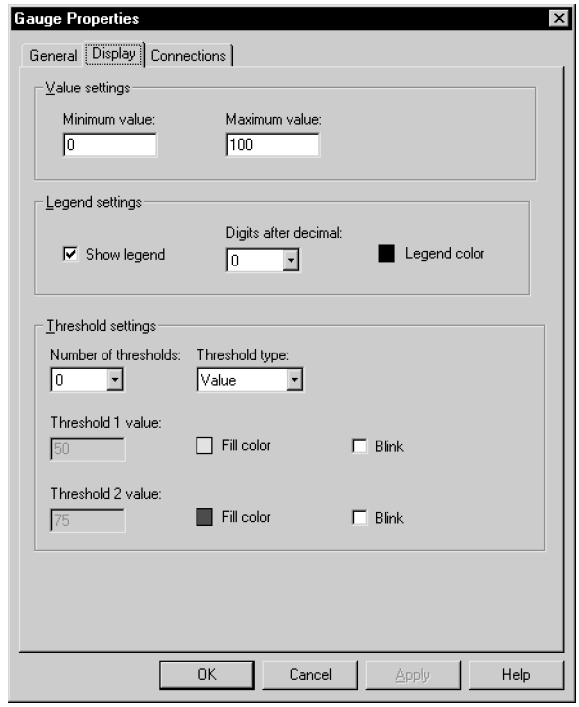
Major ticks Click the number of major ticks you want on the gauge's scale.

Minor ticks Click the number of minor ticks you want on the gauge's scale. Minor ticks are spaced evenly between the major ticks.

Font, size, and style Click a font for the gauge's legends in the Font list. Type or click a size for the font in the Size box. Click B to make the font bold, click I to make the font italic, click U to underline the text.

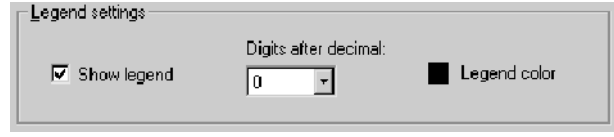
Setting up how the gauge works

In the Display tab, specify how the gauge displays values at runtime.



Minimum value Type the minimum value to display on the gauge. If the Value control is at or below this value, the needle is at the left end of the dial.

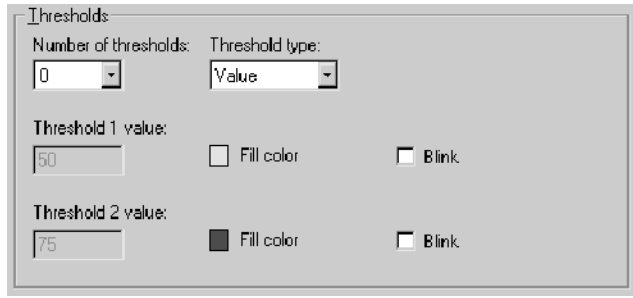
Maximum value Type the maximum value to display on the gauge. If the Value control is at or above this value, needle is at the right end of the dial.



Show legend Select this check box to show numeric labels on the gauge. The labels show the numeric value for each major tick on the gauge. Clear this check box to remove labels from the gauge.

Digits after decimal Click the number of digits to display after the decimal point for the numeric labels on the gauge's scale.

Legend color Click the color box, and then click a color for the numeric labels on the gauge's scale.



Number of thresholds Click the number of thresholds you want the gauge to have, or click 0 if you don't want to use thresholds.

Threshold type Click Value to set up thresholds using constant values. Click Percentage to set up thresholds using percentages of the gauge's total range.

Threshold 1 value, and Threshold 2 value Type a constant value, or a percentage, depending on the threshold type. When the tag or expression crosses this value, the fill color changes. The section of the gauge above the threshold can also begin to blink.

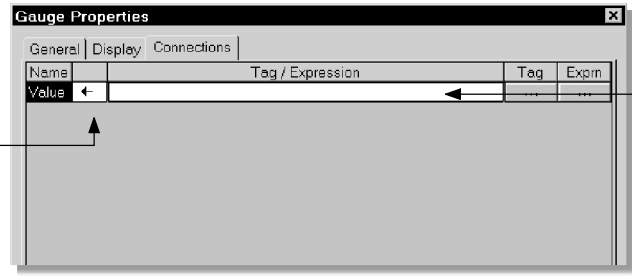
Threshold fill and blink indicators do not appear if the Sweep style is Point. The Sweep style is specified in the General tab.

Fill color Click the color box, and then click a color for the filled part of the gauge above the threshold.

Blink Select the check box to make the filled section above the threshold blink at runtime. Clear the check box to prevent the filled section from blinking at runtime.

Connecting the gauge to data

In the Connections tab, specify the tag or expression from which the gauge receives data. For information about assigning tags and expressions, see page 9-32.



Value The Value control changes the position of the needle on the gauge. For example, the Value control can show that a machine is overheating, or that a tank is empty.

Setting up scales

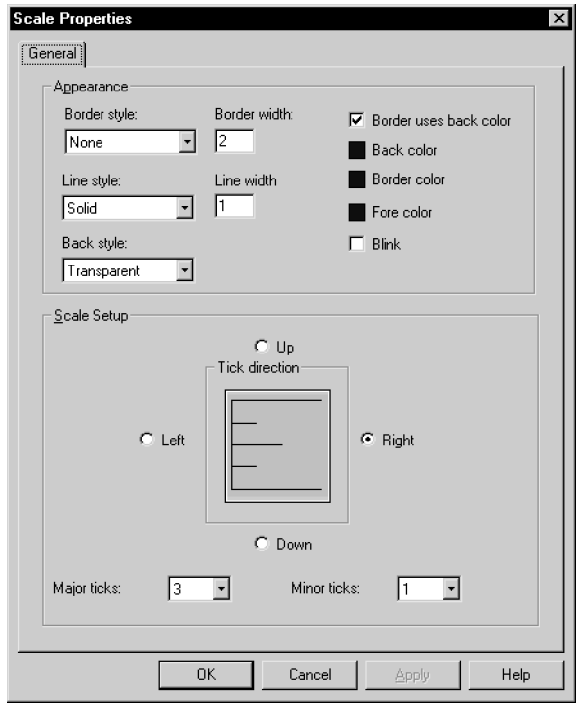
Use the scale graphic object to show the possible range of values for a bar graph.

Specify how the scale looks. Because the scale doesn't change at runtime, you don't need to assign tags or expressions to it.

To place value labels on the scale (to create a legend), use text objects. Create the text objects and then position them next to the tick marks on the scale.

To set up a scale:

1. Double-click the scale.



2. In the Scale Properties dialog box, fill in the options on the General tab, as described in the next section. When you are finished, click OK.

Setting up the appearance of the scale

In the General tab, specify what the scale looks like at runtime.

Border style Click a border style in the list, or click None to remove the border.

Border width Type a number to change the thickness of the scale's border. Border width is measured in pixels.

Border uses back color Select the check box if you want the scale's border to have the same color as the scale's background.

Clear the check box if you want the scale's border to have a different color than the scale's background, and then choose a Border color.

Back color Click the color box, and then click a color for the scale's background.

Border color Click the color box, and then click a color for the scale's border.

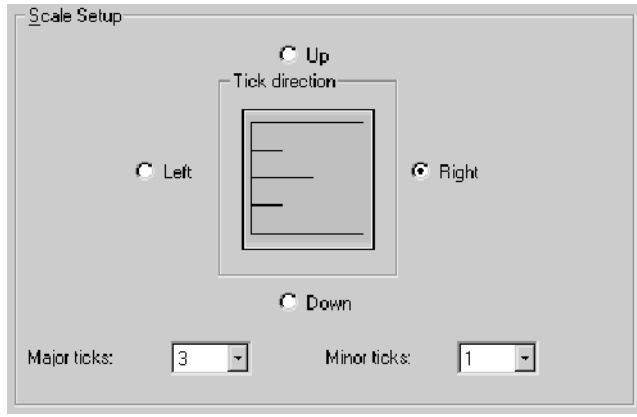
Line style Click a line style for the scale. If you want a line style other than solid, the line width must be 1 pixel.

Line width Type a number to change the line thickness of the scale. Line width is measured in pixels.

Fore color Click the color box, and then click a color for the lines of the scale.

Blink Select the check box to make the scale blink at runtime. Clear the check box to prevent the scale from blinking at runtime.

Back style Click Solid to cover objects or the display background behind the scale. Click Transparent to allow objects or the display background behind the scale to show through.



Tick direction Click the direction for the ticks to face. For example, if you are positioning the scale to the right of a vertical bar graph, click right.

The tick direction graphic illustrates the selected tick direction.

Major ticks Click the number of major ticks to use on the scale.

Minor ticks Click the number of minor ticks to use on the scale. Minor ticks are spaced evenly between the major ticks.

How to use Control List selectors

Control list selectors allow an operator to scroll through a list of states for a process and select one of the states. A highlight in the list shows the current state.

A Control List selector can show several states at the same time, but only one state can be selected at a time. As the operator scrolls through the list, each successive state is selected automatically. If you want the operator to confirm the selection of a particular state before the state's value is written to the programmable controller, create an Enter button on the same display as the Control List selector, and select the "Write on enter" option.

The operator can scroll through the Control List selector using:

- button objects. These are graphic objects that duplicate the functions of keyboard keys. Use them with touch-screen terminals. For details, see page 10-24.
- the arrow keys and Enter key on a terminal's keypad
- the arrow keys and Enter key on a keyboard

The operator presses the buttons to scroll up or down the list, or to make selections from the list. The buttons can be set up to work with the Control List selector that has input focus, or you can link the buttons to a specific Control List selector. For information about how particular buttons work with the Control List selector, see page 10-24.

How Enter key handshaking works

When the operator selects a state in the Control List selector and presses an Enter button or Enter key, the highlighted state's value is written to the programmable controller or device.

You can use Enter key handshaking to hold the value of the tag at the programmable controller or device for a specific period of time, to ensure the value is read before the Control List selector overwrites the value with a new value.

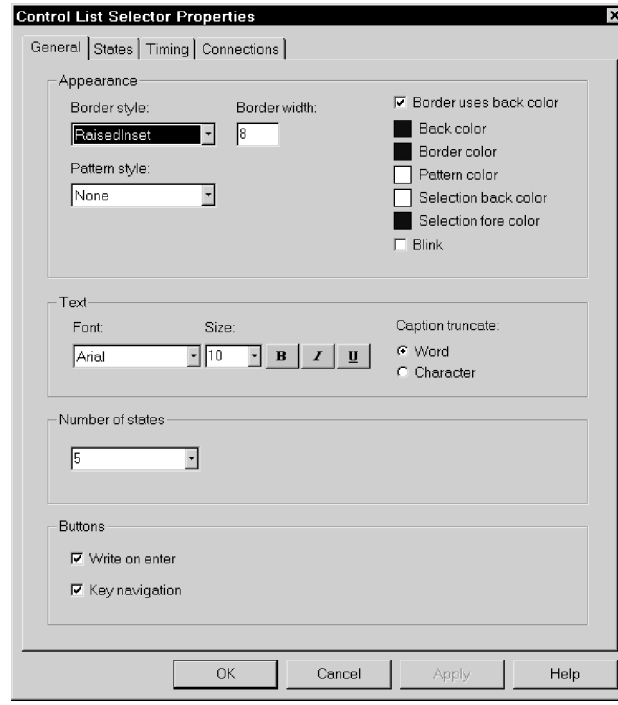
For more information about using Enter key handshaking, see page 10-12.

Setting up Control List selectors

The Control List selector is a list that allows an operator to cycle through and select from multiple options. The Control List selector displays the current state of a process or operation by highlighting the state.

To set up a Control List selector:

1. Double-click the Control List selector.



2. In the Control List Selector Properties dialog box, fill in the options on each tab, as described in the sections that follow. When you are finished, click OK.

Setting up the appearance of the Control List selector

In the General tab, specify what the Control List selector looks like at runtime.

Border style Click a border style in the list, or click None to remove the border.

Border width Type a number to change the thickness of the Control List selector's border. Border width is measured in pixels.

Border uses back color Select the check box if you want the Control List selector's border to have the same color as the selector's background.

Clear the check box if you want the Control List selector's border to have a different color than the selector's background, and then choose a Border color.

Back color Click the color box, and then click a color for the Control List selector's background.

Border color Click the color box, and then click a color for the Control List selector's border.

Pattern style Click a pattern style for the selector.

Pattern color Click the color box, and then click a color for the pattern.

Selection back color Click the color box, and then click a color for the background of a selected item in the list.

Selection fore color Click the color box, and then click a color for the text of a selected item in the list.

Blink Select the check box to make the selector blink at runtime. Clear the check box to prevent the selector from blinking at runtime.

Font, size, and style Click a font for the caption in the Font list. Type or click a size for the font in the Size box. Click B to make the font bold, click I to make the font italic, click U to underline the text.

Caption truncate Click Word to cut off captions that exceed the maximum length at the beginning of a word. Click Character to cut off captions that exceed the maximum length in the middle of a word.

The maximum caption length depends on the width of the selector and the font size.

When a caption has been truncated, an asterisk (*) appears on the right of the caption to indicate that text is missing.

Number of states Click the number of states you want the selector to have.

Write on enter Select this check box to send the Control List selector's state value to the programmable controller when the operator presses Enter.

Clear this check box to send the state value as soon as the operator selects a new state.

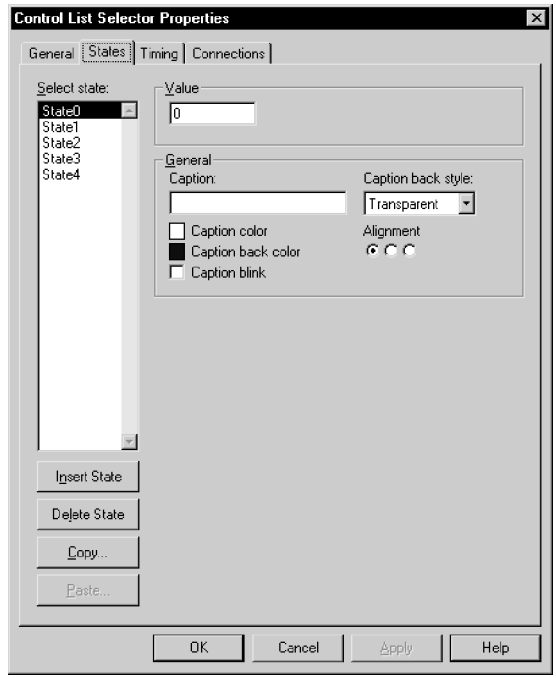
Key navigation Select this check box to allow the operator to navigate to the Control List selector and give it focus using the keyboard.

For more information about key navigation, see page 10-8.

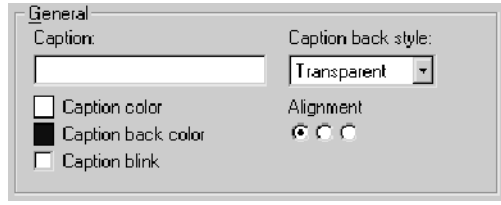
Setting up the Control List selector's state values and captions

In the States tab, set up the value and caption for each state. The value defines the Control List selector's action, by changing the Value control to the value you specify when the selected state is in effect.

For tips about configuring states, see page 10-1.



Value Type the integer value for each state. The Value control changes to this value when the selected state is in effect.



Caption Type the text to display in the list for this state.

Caption back style Click Solid to cover the Control List selector's background color with the caption's background color. Click Transparent to hide the caption's background color.

Caption color Click the color box, and then click a color for the caption's text.

Caption back color Click the color box, and then click a color for the caption's background.

The caption's background color is visible only on items in the list that are not highlighted, and if the Caption back style is Solid.

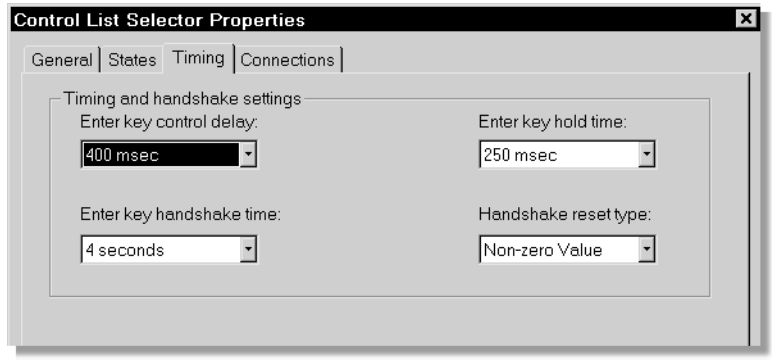
Caption blink Select the check box to make the caption blink at runtime. Clear the check box to prevent the caption from blinking at runtime.

Alignment Click a position in the grid, relative to the Control List selector. In the default alignment position, the text is aligned on the left side of the Control List selector.

Setting up the Control List selector to work with an Enter key

In the Timing tab, set up the timing and handshake settings for the Enter key.

For information about using Enter key handshaking, see page 10-12.



Enter key control delay Click the number of milliseconds or seconds to delay between pressing the Enter key and setting the Enter control to 1. Specify the tag to use for the Enter control in the Connections tab.

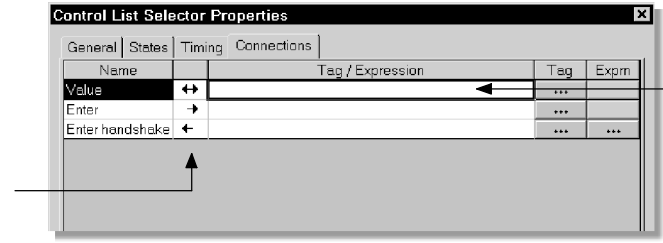
Enter key hold time Click the number of milliseconds or seconds the Enter control remains at a value of 1. This setting applies only if the Enter control is assigned and the Enter handshake control is *not* assigned (in the Connections tab).

Enter key handshake time Click the maximum number of seconds the Enter control remains at a value of 1. This setting applies only if the Enter control and Enter handshake control are both assigned (in the Connections tab).

Handshake reset type Click Non-zero Value to reset the Enter control when the Enter handshake control is a non-zero value. Click Zero to Non-zero transition to reset the Enter control when the Enter handshake control changes from zero to a non-zero value.

Connecting the Control List selector to data

In the Connections tab, specify the tags or expression with which the Control List selector exchanges data. For information about assigning tags and expressions, see page 9-32.



Value The Value control triggers the state's action. For example, when the tag assigned to the control changes to a new state, the data source changes a motor's speed to a new setting.

Enter The Enter control accepts values of 0 or 1 only. The control determines how long the Enter key press is registered. No further values can be entered by the selector when the Enter control is set to 1.

Enter handshake The Enter handshake control resets the Enter control, using the "Handshake reset type" option specified on the Timing tab.

Use this control for Enter key handshaking if you want to reset the Enter control when a value in the programmable controller changes.

Setting up Local Message displays

Use Local Message displays to provide the operator with information about what to do next, or with information about a process. At runtime, the Local Message display shows one message at a time.

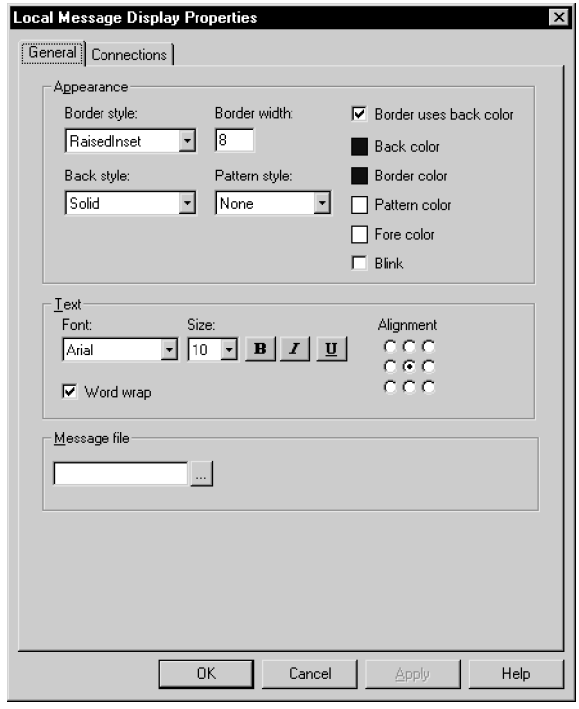
To use local messages, create a Local Message display object in a graphic display, and then assign a local message file to the Local Message display.

For more information about local messages, see page 8-29. For information about creating local message files, see page 8-33.

Specify the Local Message display's appearance, the file of messages to use with the display, and the tag or expression to monitor for message trigger values.

To set up a Local Message display:

1. Double-click the Local Message display.



2. In the Local Message Display Properties dialog box, fill in the options on each tab, as described in the sections that follow. When you are finished, click OK.

Setting up the appearance of the Local Message display

In the General tab, specify what the Local Message display looks like at runtime.

Border style Click a border style in the list, or click None to remove the border.

Border width Type a number to change the thickness of the Local Message display's border. Border width is measured in pixels.

Border uses back color Select the check box if you want the Local Message display's border to have the same color as the display's background.

Clear the check box if you want the Local Message display's border to have a different color than the display's background, and then choose a Border color.

Back color Click the color box, and then click a color for the Local Message display's background.

Border color Click the color box, and then click a color for the Local Message display's border.

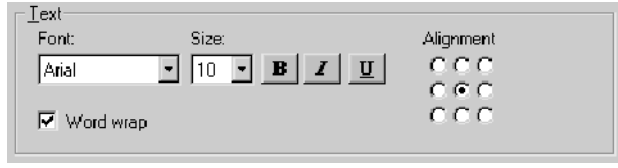
Back style Click Solid to cover objects or the display background behind the Local Message display. Click Transparent to allow objects or the display background behind the Local Message display to show through.

Pattern style Click a pattern style for the Local Message display.

Pattern color Click the color box, and then click a color for the pattern.

Fore color Click the color box, and then click a color for the text of the message in the Local Message display.

Blink Select the check box to make the Local Message display blink at runtime. Clear the check box to prevent the display from blinking at runtime.



Font, size, and style Click a font for the caption in the Font list. Type or click a size for the font in the Size box. Click B to make the font bold, click I to make the font italic, click U to underline the text.

Word wrap Select this check box to wrap words to the next line if they are too long for the width of the Local Message display. Clear this check box to wrap on characters instead.

The maximum number of characters displayed in the Local Message display depends on the size of the display and the font.

Alignment Click a position in the grid, relative to the Local Message display. In the default alignment position, the text is centered vertically and horizontally on the Local Message display.

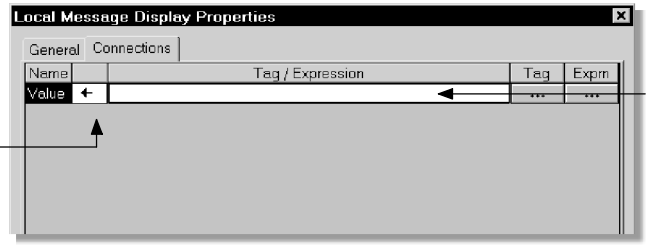
Browse button

Message file Type the name of the message file to use for this Local Message display. Click the Browse button to browse for the file instead of typing its name.

Connecting the Local Message display to data

In the Connections tab, specify the tag or expression the Local Message display is connected to. For information about assigning tags and expressions, see page 9-32.

The arrow shows that the tag or expression is read only. You cannot write a value to the tag or expression.



Type the tag name or expression here.

Value The Value control determines which message in the message file is displayed in the Local Message display. For example, if the Value control is 1, the Local Message display shows the message whose trigger value is 1.

If no message exists for the trigger value, the display is filled with question marks (?).

Setting up Time and Date displays

A Time and Date display shows the current time and date in a graphic display.

Specify the appearance of the Time and Date display, and the format in which the time and date appear.

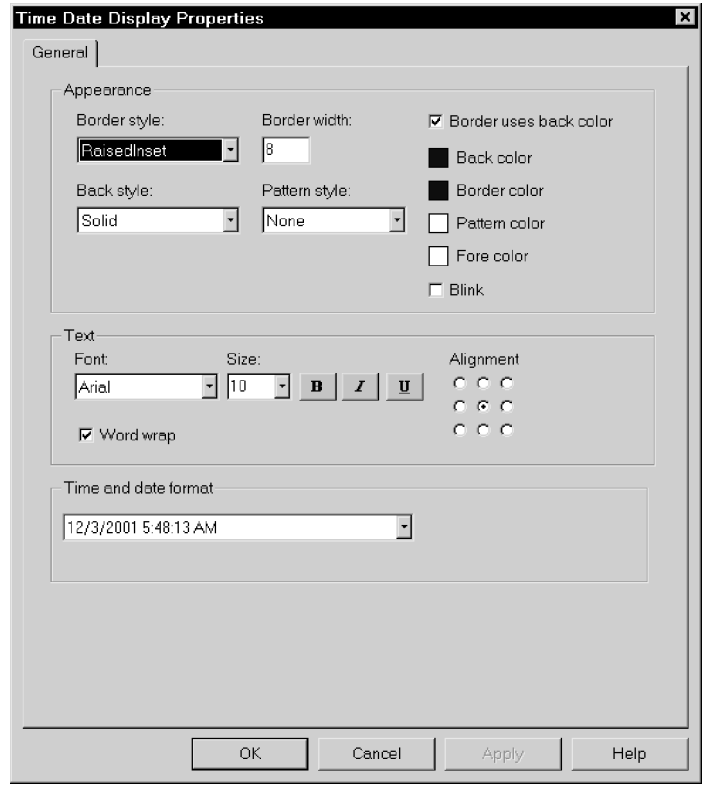
Time and date formats

The Time and Date display uses the time and date formats you set up on the runtime computer. For example, if you set up the display to use the short date format, at runtime the display uses the short date format for the runtime computer.

For information about specifying time, date, and number formats on the RAC6182, see page 21-3. For information about specifying time, date, and number formats in Windows 2000, see page 22-3.

To set up a Time and Date display:

1. Double-click the Time and Date display.



2. In the Time Date Display Properties dialog box, fill in the options on the General tab, as described in the next section. When you are finished, click OK.

Setting up the appearance of the Time and Date display

In the General tab, specify what the Time and Date display looks like at runtime.

Border style Click a border style in the list, or click None to remove the border.

Border width Type a number to change the thickness of the Time and Date display's border. Border width is measured in pixels.

Border uses back color Select the check box if you want the Time and Date display's border to have the same color as the display's background.

Clear the check box if you want the Time and Date display's border to have a different color than the display's background, and then choose a Border color.

Back color Click the color box, and then click a color for the Time and Date display's background.

Border color Click the color box, and then click a color for the Time and Date display's border.

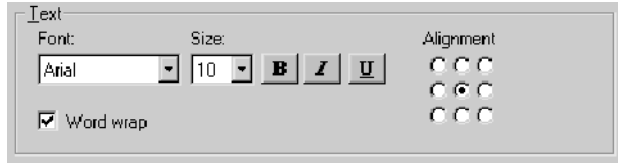
Back style Click Solid to cover objects or the display background behind the Time and Date display. Click Transparent to allow objects or the display background behind the Time and Date display to show through.

Pattern style Click a pattern style for the Time and Date display.

Pattern color Click the color box, and then click a color for the pattern.

Fore color Click the color box, and then click a color for the text of the Time and Date display.

Blink Select the check box to make the Time and Date display blink at runtime. Clear the check box to prevent the display from blinking at runtime.



Font, size, and style Click a font for the caption in the Font list. Type or click a size for the font in the Size box. Click B to make the font bold, click I to make the font italic, click U to underline the text.

Word wrap Select this check box to wrap words to the next line if they are too long for the width of the Time and Date display. Clear this check box to wrap on characters instead.

The maximum number of characters displayed in the Time and Date display depends on the size of the display and the font.

Alignment Click a position in the grid, relative to the Time and Date display. In the default alignment position, the text is centered vertically and horizontally on the display.

Time and date format Click the format in which to display the time and date.

Setting up Alarm lists

The Alarm list graphic object notifies the operator when a situation requiring immediate attention occurs. For example, the list could display a message that warns the operator that the pressure in a boiler is too high.

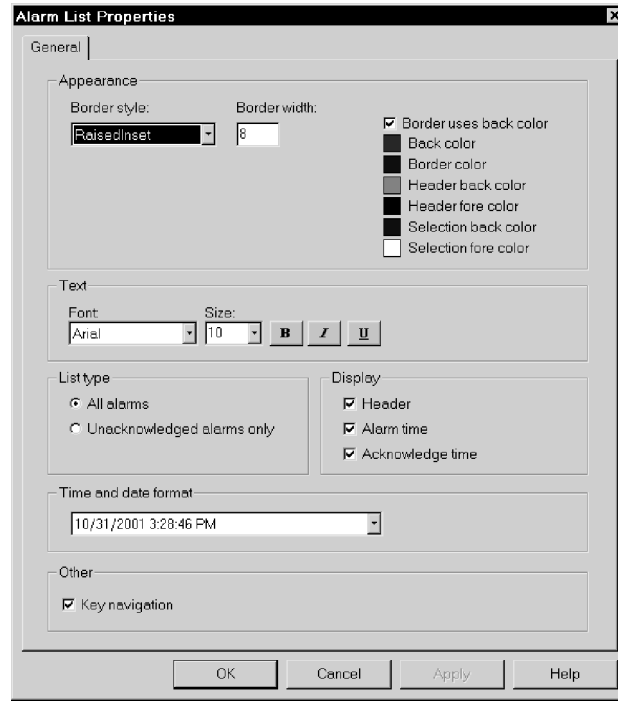
RSView comes with a default graphic display called [ALARM] that contains an Alarm list object. You can use the display and object as is, customize them, or create your own.

For more information about using Alarm lists, see page 13-27.

Specify the appearance of the Alarm list, and whether it displays all alarms or only unacknowledged alarms.

To set up an Alarm list:

1. Double-click the Alarm list.



2. In the Alarm List Properties dialog box, fill in the options on the General tab, as described in the next section. When you are finished, click OK.

Setting up the appearance and content of the Alarm list

In the General tab, specify what the Alarm list looks like at runtime, and which alarms and alarm information it contains.

Border style Click a border style in the list, or click None to remove the border.

Border width Type a number to change the thickness of the Alarm list's border. Border width is measured in pixels.

Border uses back color Select the check box if you want the Alarm list's border to have the same color as the list's background.

Clear the check box if you want the Alarm list's border to have a different color than the list's background, and then choose a Border color.

Back color Click the color box, and then click a color for the Alarm list's background.

Border color Click the color box, and then click a color for the Alarm list's border.

Header back color Click the color box, and then click a color for the heading bar at the top of the list.

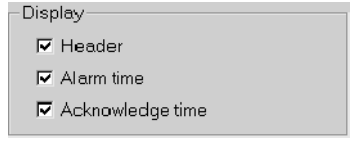
Header fore color Click the color box, and then click a color for the text in the heading bar at the top of the list.

Selection back color Click the color box, and then click a color for the background of a selected item in the list.

Selection fore color Click the color box, and then click a color for the text of a selected item in the list.

Font, size, and style Click a font for the caption in the Font list. Type or click a size for the font in the Size box. Click B to make the font bold, click I to make the font italic, click U to underline the text.

List type Select whether to show all alarms or only alarms that haven't been acknowledged.



Header Select the check box to display a heading bar at the top of the alarm list. The heading bar provides titles for the columns of information in the list.

Clear the check box if you don't want to use a heading bar.

Alarm time Select the check box to display the Alarm time column. This column shows the time the alarm was triggered.

Clear the check box if you don't want to use the Alarm time column.

Acknowledge time Select the check box to display the Acknowledge time column. This column shows the time the alarm was acknowledged. Don't use this column if the List type is "Unacknowledged alarms only."

Clear the check box if you don't want to use the Acknowledge time column.

Time and date format Click the format in which to display the time and date.

Key navigation Select this check box to allow the operator to navigate to the Alarm list and give it focus using the keyboard.

For more information about key navigation, see page 10-8.

Setting up Activity lists

The Activity list graphic object displays runtime information about system activity:

- Information messages, such as messages about tag assignments, tag read and write activity, and macro usage.
- Warning messages.
- Error messages, such as messages about communication errors, invalid values, and unassigned controls.

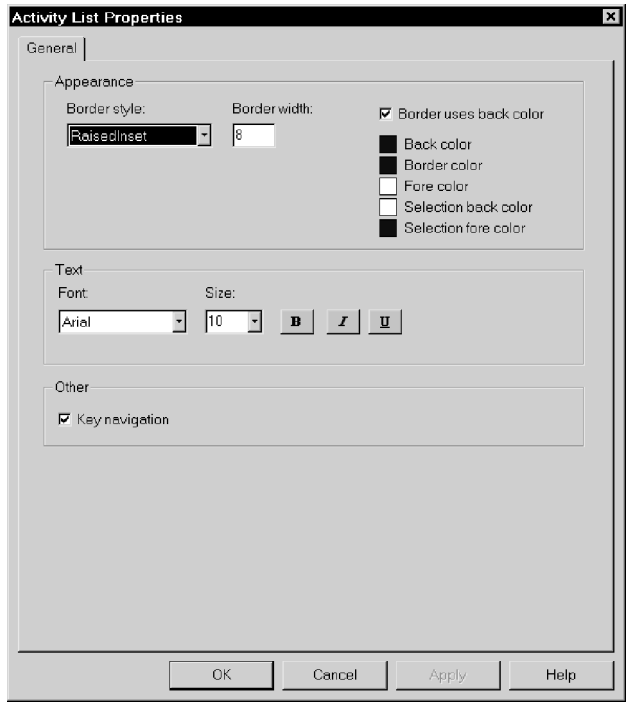
RSView comes with a default graphic display called [ACTIVITY] that contains an Activity list object. You can use the display and object as is, customize them, or create your own.

For more information about using Activity lists, see page 15-8.

Specify the appearance of the Activity list, and whether the operator can navigate to the list using a keyboard.

To set up an Activity list:

1. Double-click the Activity list.



2. In the Activity List Properties dialog box, fill in the options on the General tab, as described in the next section. When you are finished, click OK.

Setting up the appearance of the Activity list

In the General tab, specify what the Activity list looks like at runtime.

Border style Click a border style in the list, or click None to remove the border.

Border width Type a number to change the thickness of the Activity list's border. Border width is measured in pixels.

Border uses back color Select the check box if you want the Activity list's border to have the same color as the list's background.

Clear the check box if you want the Activity list's border to have a different color than the list's background, and then choose a Border color.

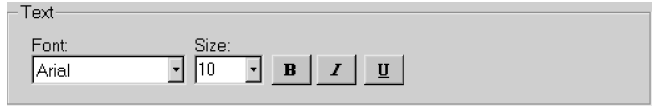
Back color Click the color box, and then click a color for the Activity list's background.

Border color Click the color box, and then click a color for the Activity list's border.

Fore color Click the color box, and then click a color for the text in the Activity list.

Selection back color Click the color box, and then click a color for the background of a selected item in the list.

Selection fore color Click the color box, and then click a color for the text of a selected item in the list.



Font, size, and style Click a font for the caption in the Font list. Type or click a size for the font in the Size box. Click B to make the font bold, click I to make the font italic, click U to underline the text.

Key navigation Select this check box to allow the operator to navigate to the Activity list and give it focus using the keyboard.

For more information about key navigation, see page 10-8.

Setting up Information Message displays

The Information Message display graphic object gives the operator runtime messages about information that requires immediate attention.

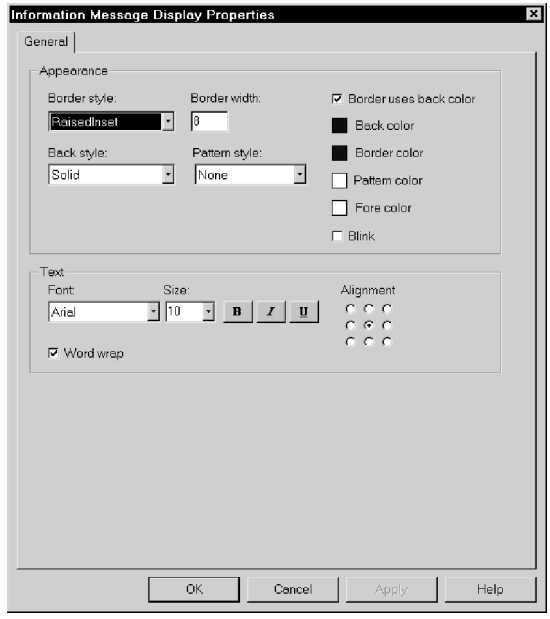
RSView comes with a default graphic display called [INFORMATION] that contains an Information Message display object. You can use the display and object as is, customize them, or create your own.

For more information about using Information Message displays, see page 14-12.

Specify the appearance of the Information Message display.

To set up an Information Message display:

1. Double-click the Information Message display.



2. In the Information Message Display Properties dialog box, fill in the options on the General tab, as described in the next section. When you are finished, click OK.

Setting up the appearance of the Information Message display

In the General tab, specify what the Information Message display looks like at runtime.

Border style Click a border style in the list, or click None to remove the border.

Border width Type a number to change the thickness of the Information Message display's border. Border width is measured in pixels.

Border uses back color Select the check box if you want the Information Message display's border to have the same color as the display's background.

Clear the check box if you want the Information Message display's border to have a different color than the display's background, and then choose a Border color.

Back color Click the color box, and then click a color for the Information Message display's background.

Border color Click the color box, and then click a color for the Information Message display's border.

Back style Click Solid to cover objects or the display background behind the Information Message display. Click Transparent to allow objects or the display background behind the Information Message display to show through.

Pattern style Click a pattern style for the Information Message display.

Pattern color Click the color box, and then click a color for the pattern.

Fore color Click the color box, and then click a color for the text of the Information Message display.

Blink Select the check box to make the Information Message display blink at runtime. Clear the check box to prevent the display from blinking at runtime.

Font, size, and style Click a font for the caption in the Font list. Type or click a size for the font in the Size box. Click B to make the font bold, click I to make the font italic, click U to underline the text.

Word wrap Select this check box to wrap words to the next line if they are too long for the width of the Information Message display. Clear this check box to wrap on characters instead.

The maximum number of characters displayed in the Information Message display depends on the size of the display and the font.

Alignment Click a position in the grid, relative to the Information Message display. In the default alignment position, the text is centered vertically and horizontally on the display.

Chapter

11 Animating graphic objects

This chapter describes:

- the types of animation and which objects support which types of animation
- using the Animation dialog box
- testing animation
- using tag names, tag placeholders, and expressions when attaching animation
- setting the minimum and maximum values for animation that uses a range of motion
- using Object Smart Path™ to define an object's range of motion
- configuring each type of animation
- applying animation to groups
- checking what kind of animation is attached to an object
- changing animation settings
- copying and pasting animation

Types of animation

Animation associates graphic objects with tags so the appearance or position of an object changes to reflect changes to the tag's value. For example, the object's color could change from yellow to orange to red as the tag's value increases. Or a slider could move from left to right as a tag's value increases.

You can use these types of animation:

- color
- fill
- height
- horizontal position
- horizontal slider
- rotation

- vertical position
- vertical slider
- visibility
- width

The Objects sample project contains many examples of animation. In particular, see the graphic displays called "Animation I" and "Animation II."

Which objects can have which types of animation?

This table summarizes which types of objects support which types of animation. For information about the different types of graphic objects, see page 9-1.

These objects	Support these types of animation
Drawing objects, except images, panels, and rounded rectangles	All types
Rounded rectangles	All types except rotation
All other objects	Visibility

You can also attach all types of animation to groups of drawing objects. For more information, see page 11-27.

You can attach as many types of animation to a drawing object as you like. For example, apply width, height, horizontal position, and vertical position animation to an object to give it the appearance of moving into or out of the display as it shrinks and grows.

Using the Animation dialog box

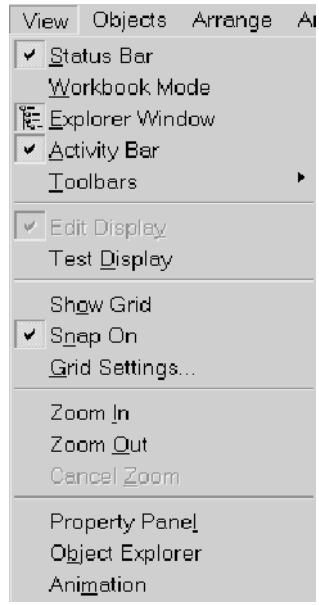
To attach animation, use the Animation dialog box.

To open the Animation dialog box, do one of the following:

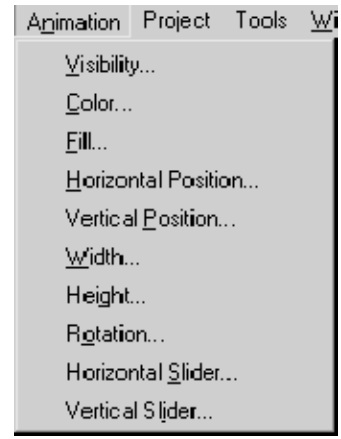
- Select an object, and then on the View menu click Animation.
- Select an object, and then on the Animation menu click an animation type. Animation types that are not supported for the selected object are disabled.

- Right-click an object, select Animation, and then click an animation type. Animation types that are not supported for the selected object are disabled.

View menu

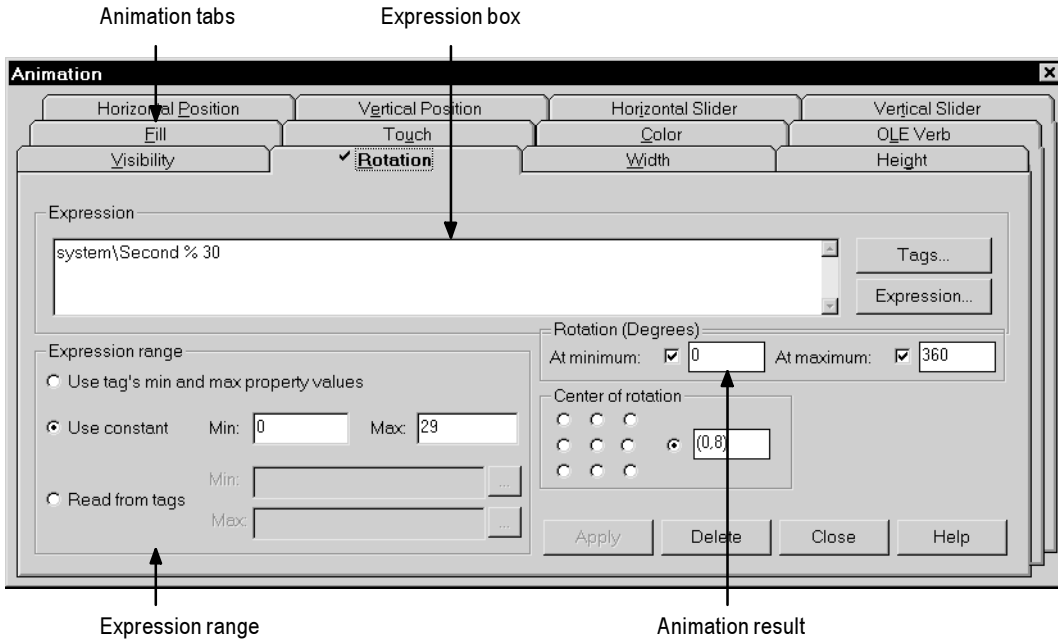


Animation menu



About the Animation dialog box

The Animation dialog box is a floating dialog box, which means you can keep it open all the time and can move it around the screen, select other objects, and open other dialog boxes.



Animation tabs

Click the tab for the type of animation to configure. If the animation type is not supported for the selected object, the boxes in the tab are dimmed.

Touch and OLE Verb animation are not supported in machine-level projects.

Expression box

Create an expression either by typing it or by clicking the Expression button.

To supply a tag name for an expression, click the Tags button and then select a name, or type the name in the Expression box. If you use multiple tags in an expression, the first tag's minimum and maximum values are used if you select the "Use tag's min and max property values" expression range.

Enclose tag names that contain dashes or start with a number in braces { } when you use them in an expression. This distinguishes the characters in the tag name from the characters in the expression.

For more information about creating expressions, see Chapter 12.

For horizontal and vertical sliders, you assign a single tag to define animation. In the Animation tabs for slider animation, there is a Tags box rather than an Expression box.

Expression range

Specify how to calculate the minimum and maximum values for the tag or expression. If a value falls outside the specified range, it will be evaluated as either the minimum or maximum value. For details, see page 11-7.

Animation Result

Specify how the object's appearance changes based on the result of the expression. The boxes in this area change for each type of animation.

For some types of animation, you specify a change of state. For example, an object with visibility animation switches between visible and invisible.

For other types of animation, you specify a range of motion. For example, an object can move from a fixed starting point to a fixed end point. The range of motion is related to the minimum and maximum values for the expression. The object moves from the At Minimum position to the At Maximum position as the expression value changes to the maximum value.

Apply, Delete, and Close Buttons

These buttons do the following:

This button	Does this
Apply	Applies the animation configured for the selected object or group of objects. Choosing another tab is the same as choosing Apply—the animation you configured is applied to the object.
Delete	Deletes the animation for the selected object.
Close	Prompts to apply changes and closes the dialog box.

Using Object Smart Path to visually set animation

Because the Animation dialog box stays open, you can go back and forth between the dialog box and the graphic display. This makes it easy to set the range of motion for an object because you do not have to know how many pixels you want an object to move. Instead, use the Object Smart Path feature. For details, see page 11-8.

Testing animation

Test Display tool

Edit Display tool

To test the animation you have set up in a graphic display, use the Test Display tool to switch to test display mode. When you are finished testing, switch back to edit display mode to continue editing.

To switch between test display and edit display modes:

- On the View menu, click Test Display or Edit Display, or click the Test Display and Edit Display tools.

IMPORTANT Test display mode is not the same as running the display. Test display mode does not change the appearance or position of the display as set up in the Display Settings dialog box.

Using tag names and tag placeholders

When configuring animation for objects, you are linking objects to tags, so you have to specify a tag name or tag placeholder. Following is a brief description of how to use tag names and placeholders.

Tag names

You can use tag names that you have already added to the tag database or you can use a new tag name.

Tag placeholders

Tag placeholders allow you to create displays that can be used with different tags.

You can use tag placeholders in:

- the graphic display that opens when the project is first run
- graphic displays that are opened using a Goto Display button

Use parameter files to specify which tags to substitute for which placeholders. For information about creating parameter files, see page 8-25.

To create a tag placeholder:

- In the Expression box, type the cross-hatch character followed by a number (no space in between). For example, #1.

Using expressions

Many types of animation require an expression. You can use expressions containing tag values, constants, mathematical equations, and if-then-else logic. A tag name or tag placeholder can be included as part of an expression, or it can stand alone as the entire expression.

For more information about expressions, see Chapter 12.

Setting minimum and maximum values

Many types of animation require a minimum and maximum range for the tag or expression. These values determine the start and end points for a range of motion.

For example, if you specify a minimum of 0 and a maximum of 100, the object will not react to values outside of this range. So, even if the expression has a value of 200, the object does not change from its At Maximum position.

When configuring animation, select one of these methods for calculating the minimum and maximum values:

- Use tag's min and max property values—select this method to use the minimum and maximum values of the first tag in the expression. That is, if multiple tags are used in the expression, the first tag's minimum and maximum values are used.

  For analog tags, the values are taken from the Minimum and Maximum boxes in the Tag Database editor. For digital tags, the minimum is 0 and the maximum is 1.

- Use constant—select this method to use numeric constants. Type the minimum and maximum values in the boxes.

Browse button

- Read from tags—select this method to read two tags' values to determine the minimum and maximum values. Type the tag names in the boxes, or click the Browse buttons to open the Tags dialog box and select the tags.

  If you use this method, the tags are read when the graphic display opens. Their values at that time are used for the minimum and maximum values. The tags are not read again after this.

Defining a range of motion

To define a range of motion for an object, do one of the following:

- Use the mouse to move the object in the display. This uses the Object Smart Path feature to visually define the range of motion.
- Type values in the At Minimum and At Maximum boxes.

All motion is defined in pixels.

Animation that does not use a range of motion

Visibility and color animation do not use a range of motion, because these types of animation represent a change of state, not a range.

Using Object Smart Path

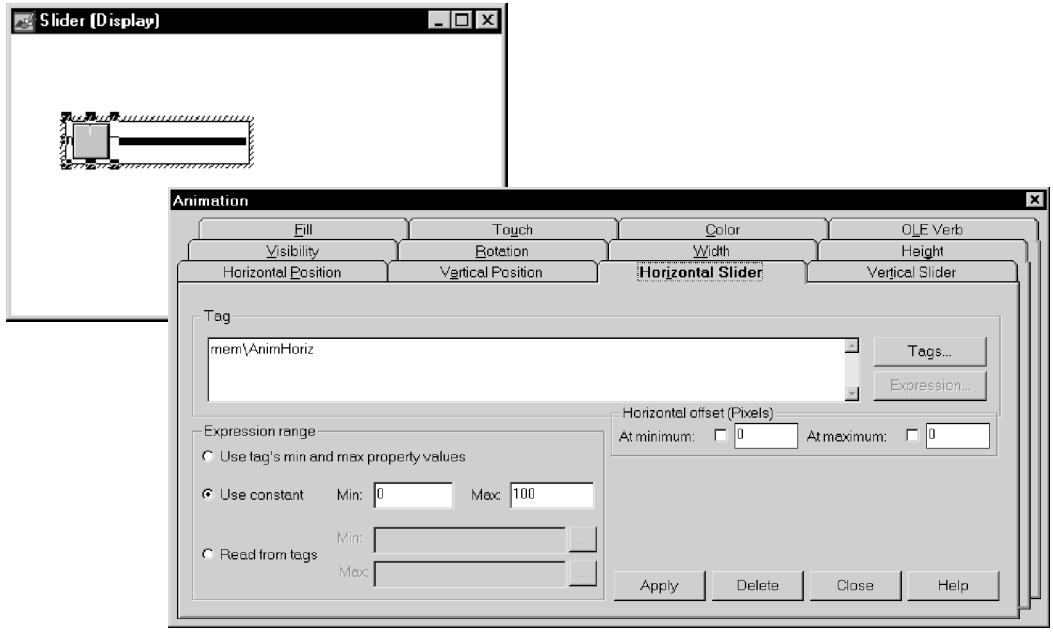
With Object Smart Path, you can easily set the range of motion for an object. The following example shows how Object Smart Path works.

Example: Using Object Smart Path to define the range of motion for horizontal slider animation

To define a range of motion for a slider object:

1. In the Graphics Display editor, create a slider object using a line and a rectangle, or copy a slider object from the Sliders graphic library.
2. Open the Animation dialog box and click the Horizontal Slider tab.
3. In the display, select the rectangle in the slider object.

4. In the Tag box of the Animation dialog box, specify a tag name.



5. In the display, drag the rectangle to the position that will indicate the lowest number in the range.

In the Animation dialog box, set this position by clicking the At Minimum check box.

6. In the display, drag the rectangle to the position that will indicate the highest number in the range.

In the Animation dialog box, set this position by clicking the At Maximum check box.

7. To save the settings, click Apply.

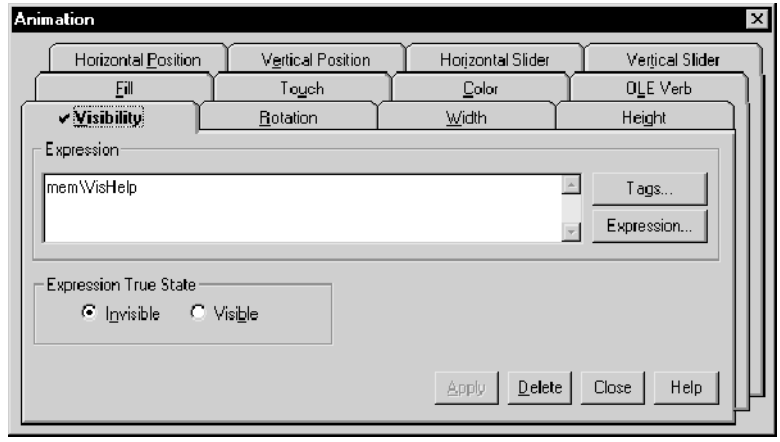
   When you finish configuring the animation, the rectangle returns to its original position.

Configuring visibility animation

With visibility animation, an object becomes visible or invisible based on a tag value or the result of an expression.

If an object is invisible, it is disabled.

Visibility animation is available for all objects. Visibility animation overrides an object's Visible property.



To configure visibility animation:

1. Select the object.
2. In the Animation dialog box, click the Visibility tab.
3. In the Expression box, create an expression.

4. Specify the Expression True State:
   - Invisible—Click this if you want the object to be invisible when the tag or expression value is true—that is, when it does not equal 0.
   - Visible—Click this if you want the object to be visible when the tag or expression value is true—that is, when it does not equal 0.
5. Click Apply.

Example: Using visibility animation to set up security for a graphic display

This example shows how to use visibility animation to control what operators can see. In a graphic display that all users can access, only the Admin user can see the graphic object to which this animation is attached.

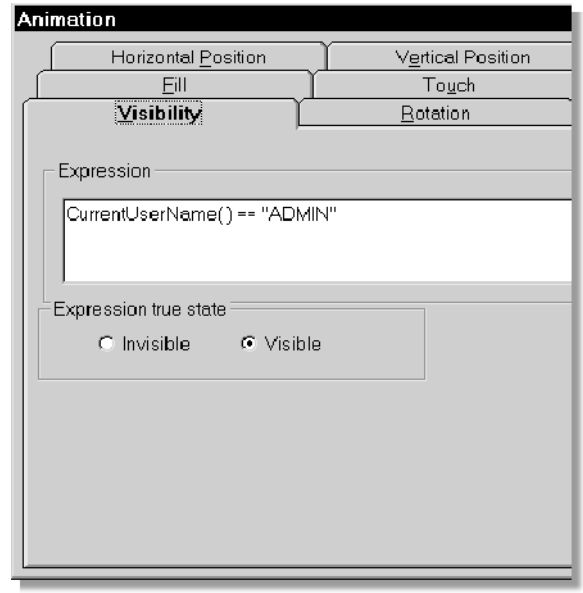
This example uses the security function CurrentUserName( ). The function returns the string value of the Account ID (user name) for the user who is currently logged in.

The CurrentUserName( ) function is case sensitive. All user names use upper case letters, so make sure that you use upper case letters in your expression.

To specify which user can view an object in a display:

1. Select the object to which to limit visibility.
2. Open the Animation dialog box and click the Visibility tab.
3. In the Expression box, type this:

   CurrentUserName( ) == "ADMIN"
4. For the Expression True State, click Visible.



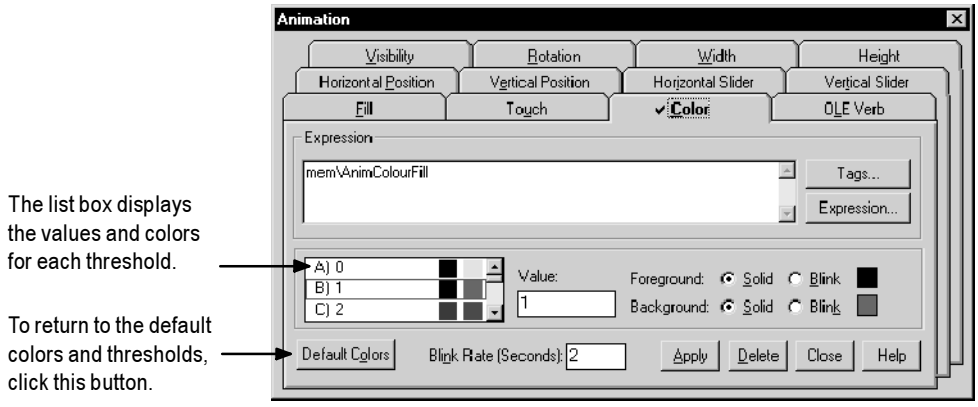
5. Click Apply, and then click Close.

At runtime, the object will only be visible if the Admin user is logged in.

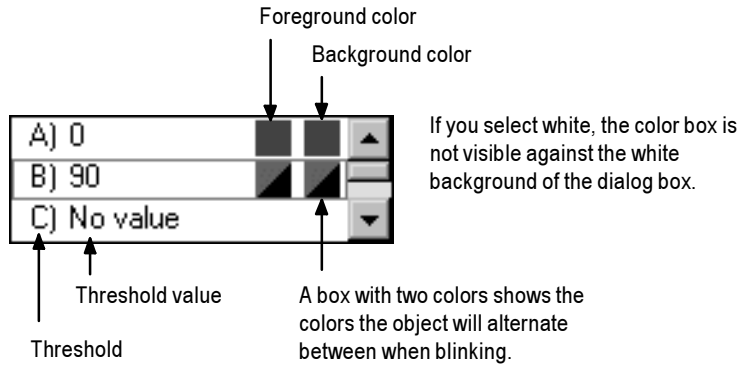
Configuring color animation

With color animation, an object changes color based on a tag value or the result of an expression. You can specify up to 16 color changes (A to P) for any object. Colors can be solid or blinking. For each color change, specify the value or threshold at which the color is to change and specify the colors to change to. At runtime, when the value reaches or crosses the threshold, the color changes.

Color animation is available for all drawing objects except images and panels.



The parts of the list box



To configure color animation:

1. Select the object.
2. In the Animation dialog box, click the Color tab.
3. In the Expression box, create an expression.
4. In the list box, select a threshold (A through P) for which to configure a value and colors. You can change the default values and colors for thresholds A and B. The other thresholds have no defaults.

5. In the Value box, type the threshold value. When the expression value reaches this threshold, the object's color changes.

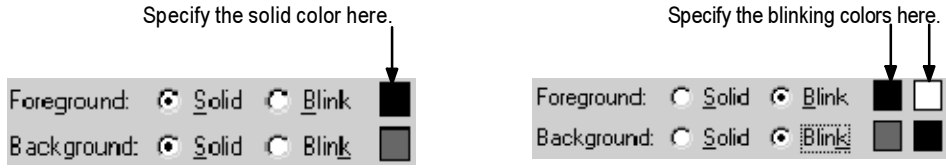
   Enter threshold values in ascending order. That is, A must be lower than B, B must be lower than C, and so on.

   To delete a value for a threshold (A - P), select the threshold and delete the value in the Value box. In the list box, the value is replaced with "No value."

6. Click Solid or Blink for the foreground and background colors, and then select the foreground and background colors to use.

   Foreground colors apply to the object's Fore color and Pattern color properties. Background colors apply to the object's Back color properties.

   To select a color, click the color box, and then click the desired color.



   If you select blink, the two colors must be different.

7. Repeat steps 4 through 6 to configure additional thresholds.
8. In the Blink Rate box, specify how many seconds each blink cycle will be. For example, if you specify four seconds, the object will be one color for two seconds and the other color for two seconds.
9. Click Apply.

Example 1: Creating a Text object that blinks

This example describes how to create a text object that constantly blinks between two colors. Since the blinking is not based on changes in tag values, the expression is simply a constant value that matches the value for the selected threshold.

For details about creating text, see page 9-10.

1. Select the text object.
2. Open the Animation dialog box, and then click the Color tab.

3. In the Expression box, type 0.

   Zero is the default value for threshold A.

4. In the list box, click threshold A. (Leave the value in the Value box as 0.)

5. For the foreground color, click Blink. (If desired, click Blink for the background color too.)

6. For each color, click the color box, and then click the color to use.

7. Click Apply.

Example 2: Creating an object that changes color as the fill level changes

This example describes how to create a rectangle object that changes color as the object's fill level increases. This example uses a tag called Hopper1\FlourLevel. The tag has a range of 1 to 100. When the flour level reaches 80, the rectangle blinks between gray and yellow to warn the operator that the hopper is nearly full. When the flour level reaches 95, the rectangle blinks between gray and red.

You could use a Bar Graph object (without animation) to achieve a similar result.

1. Double-click the rectangle to open its Properties dialog box. Assign these properties to the rectangle:
   - In the Back style box, select Solid.
   - For the Fore color and Back color, select gray.

2. Click OK to close the properties dialog box.

3. With the rectangle selected, open the Animation dialog box, and then click the Fill tab. Attach fill animation as follows:
   - In the Expression box, type Hopper1\FlourLevel (this is the tag that controls the fill level).
   - For Fill Direction, click Up.

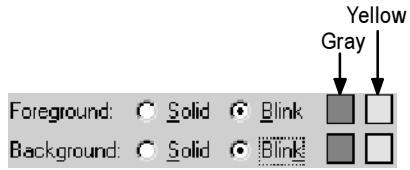
4. Click the Color tab and then attach color animation as follows:
   - In the Expression box, type Hopper1\FlourLevel (the same tag that was used in the Fill tab).

Configure the color for the normal state

- In the list box, click A. (In the Value box, leave the value as 0.)
- For foreground and background colors, click Solid.
- For each, click the color box, and then click gray (the same gray used for the rectangle).

Configure the color for the first warning

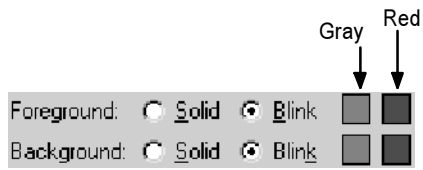
- In the list box, click B.
- In the Value box, type 80.
- For foreground and background colors, click Blink.



- For the foreground colors, select gray for the first color and yellow for the second color. Repeat for the background colors.

Configure the color for the second warning

- In the list box, click C.
- In the Value box, type 95.
- For the foreground and background colors, click Blink.



- For the foreground colors, select gray for the first color and red for the second color. Repeat for the background colors.

5. Click Apply.

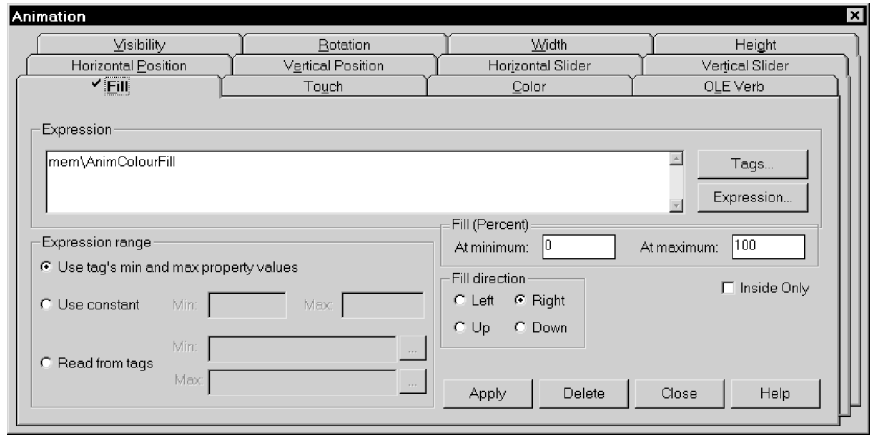
Configuring fill animation

With fill animation, the level of fill in an object is based on a tag value (or the result of an expression) in relation to the specified minimum and maximum values. For example, if the value of the expression is halfway between the minimum and maximum values, the object will be half full.

Fill animation is available for all drawing objects (including group objects) except images and panels.

If you select the Inside Only check box, fill animation does not affect line objects or objects with transparent backgrounds.

If you clear the Inside Only check box, fill animation does not affect horizontal lines.



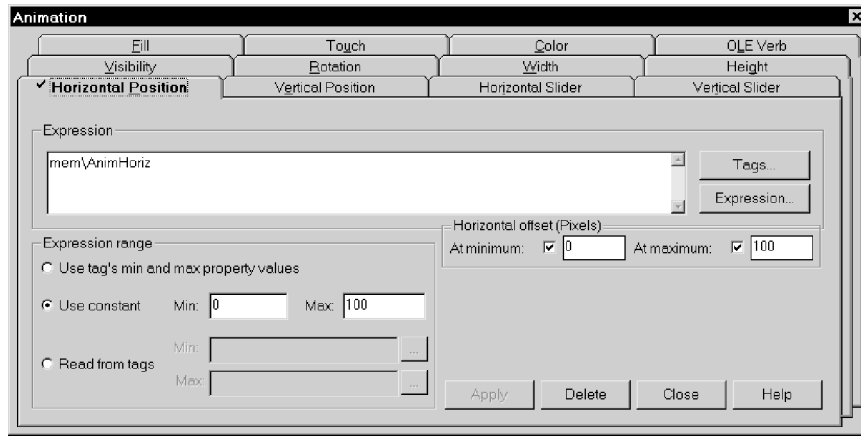
To configure fill animation:

1. Select the object.
2. In the Animation dialog box, click the Fill tab.
3. In the Expression box, create an expression.
4. Specify At Minimum and At Maximum values for the fill percentage levels.
5. Click a fill direction.
6. If you want the object's outline to remain constant so only the inside fill level varies, select the Inside Only check box.
7. Select the method to use to calculate the expression's minimum and maximum values.
8. Click Apply.

Configuring horizontal position animation

With horizontal position animation, an object moves horizontally based on a tag value (or the result of an expression) in relation to the specified minimum and maximum values. For example, if the value of the expression is halfway between the minimum and maximum values, the object will be halfway between its minimum and maximum pixel offset.

Horizontal position animation is available for all drawing objects except images and panels.



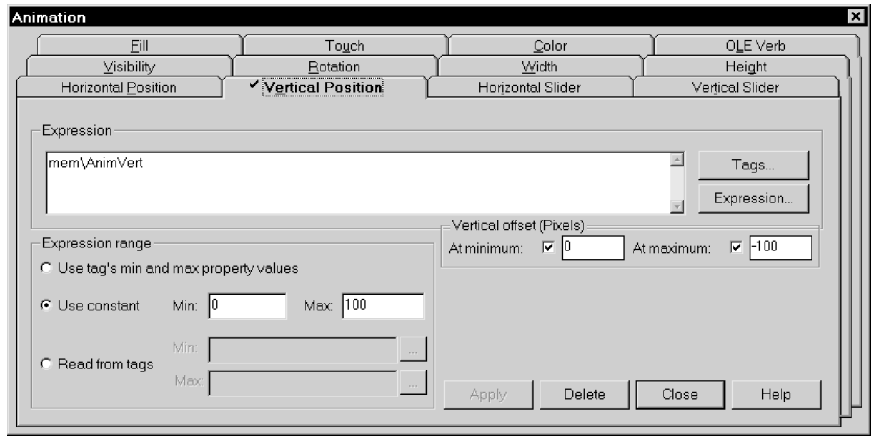
To configure horizontal position animation:

1. Select the object.
2. In the Animation dialog box, click the Horizontal Position tab.
3. In the Expression box, create an expression.
4. Set the starting point for the object by dragging the object or by typing a value in pixels (in relation to its current position on the display). Click the At Minimum check box.
5. Set the ending point for the object by dragging the object or by typing a value in pixels (in relation to its current position on the display). Click the At Maximum check box.
6. Select the method to use to calculate the expression's minimum and maximum values.
7. Click Apply.

Configuring vertical position animation

With vertical position animation, an object moves vertically based on a tag value (or the result of an expression) in relation to the specified minimum and maximum values. For example, if the value of the expression is halfway between the minimum and maximum values, the object will be halfway between its minimum and maximum offset.

Vertical position animation is available for all drawing objects except images and panels.



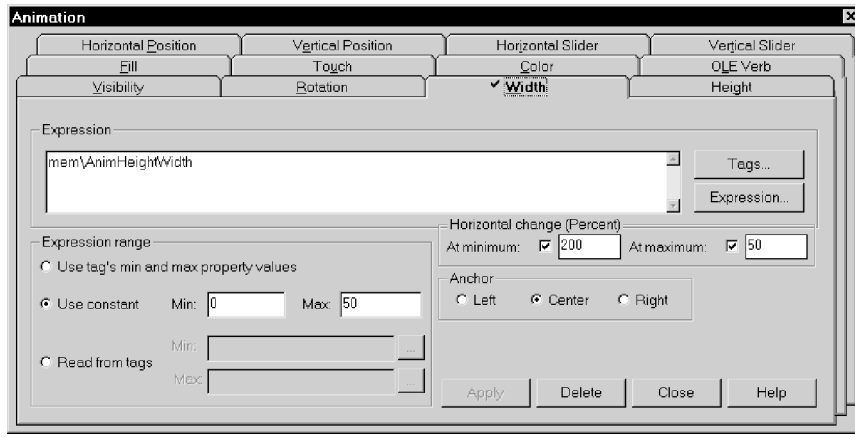
To configure vertical position animation:

1. Select the object.
2. In the Animation dialog box, click the Vertical Position tab.
3. In the Expression box, create an expression.
4. Set the starting point for the object by dragging the object or by typing a value in pixels (in relation to its current position on the display). Click the At Minimum check box.
5. Set the ending point for the object by dragging the object or by typing a value in pixels (in relation to its current position on the display). Click the At Maximum check box.
6. Select the method to use to calculate the expression's minimum and maximum values.
7. Click Apply.

Configuring width animation

With width animation, an object's width changes based on a tag value (or the result of an expression) in relation to the specified minimum and maximum values. For example, if the value of the expression is halfway between the minimum and maximum values, the object will be half the full width.

Width animation is available for all drawing objects except images and panels.



To configure width animation:

1. Select the object.

   When the object is first selected, its width is 100 percent.

2. In the Animation dialog box, click the Width tab.

3. In the Expression box, create an expression.

4. Set the minimum width for the object by doing one of the following:

   - Click a handle on the left or right side of the object and drag it to resize the object.
   - Type the width (as a percentage of the full width) you want the object to be when the expression evaluates to its minimum value.

   Select the At Minimum check box.

5. Set the maximum width for the object by doing one of the following:
   - Click a handle on the left or right side of the object and drag it to resize the object.
   - Type the width (as a percentage of the full width) you want the object to be when the expression evaluates to its maximum value.

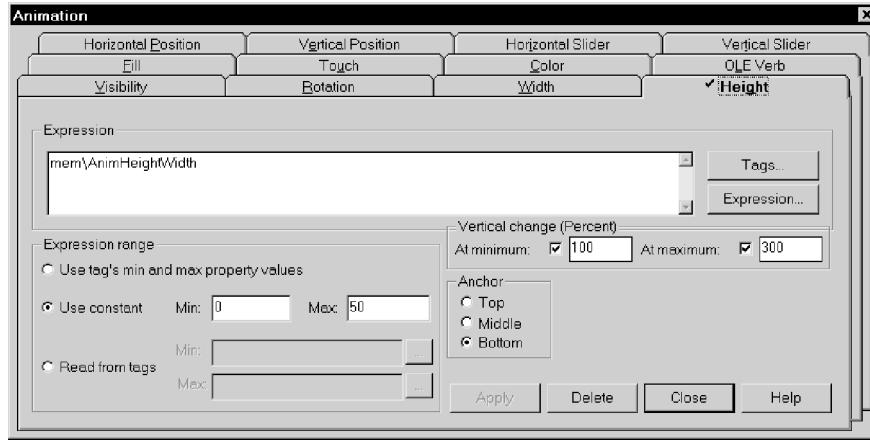
   Select the At Maximum check box.
6. Click an anchor point.

   This is the part of the object that does not move. For example, click Left if you do not want the left side of the object to move. As the value of the expression changes, the object will grow to or shrink from the right.
7. Select the method to use to calculate the expression's minimum and maximum values.
8. Click Apply.

Configuring height animation

With height animation, an object's height changes based on a tag value (or the result of an expression) in relation to the specified minimum and maximum values. For example, if the value of the expression is halfway between the minimum and maximum values, the object will be half the full height.

Height animation is available for all drawing objects except images and panels.



To configure height animation:

1. Select the object.

   When the object is first selected, its height is 100 percent.

2. In the Animation dialog box, click the Height tab.
3. In the Expression box, create an expression.
4. Set the minimum height for the object by doing one of the following:
   - Click a handle on the top or bottom of the object and drag it to resize the object.
   - Type the height (as a percentage of the full height) you want the object to be when the expression evaluates to its minimum value.

   Select the At Minimum check box.

5. Set the maximum height for the object by doing one of the following:
   - Click a handle on the top or bottom of the object and drag it to resize the object.
   - Type the height (as a percentage of the full height) you want the object to be when the expression evaluates to its maximum value.

   Click the At Maximum check box.

6. Click an anchor point.

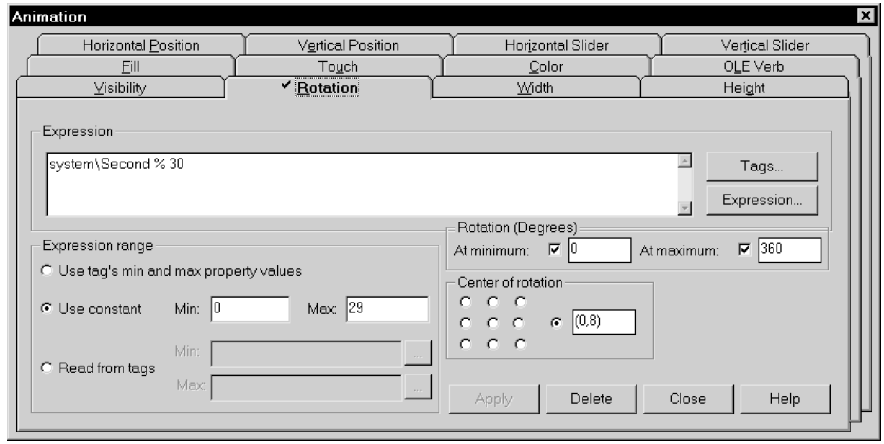
   This is the part of the object that does not move. For example, click Top if you do not want the top of the object to move. As the value of the expression changes, the object will grow to or shrink from the bottom.

7. Select the method to use to calculate the expression's minimum and maximum values.
8. Click Apply.

Configuring rotation animation

With rotation animation, an object rotates around an anchor point based on a tag value (or the result of an expression) in relation to the specified minimum and maximum values. For example, if the value of the expression is halfway between the minimum and maximum values, the object will rotate half the specified amount.

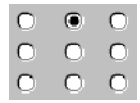
Rotation animation is available for all drawing objects except images, panels, and rounded rectangles. If you apply rotation animation to text, the text rotates around the anchor point but remains in the upright position.



To configure rotation animation:

1. Select the object.
2. In the Animation dialog box, click the Rotation tab.
3. In the Expression box, create an expression.
4. Set the center of rotation using one of the methods described below. The center of rotation is the point around which the object will rotate. This point can be inside or outside of the object. If it is outside, the object will appear as if it is moving in an arc.

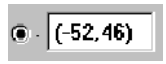
   Using the Default Center Points

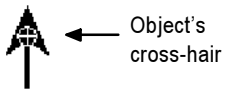
   To use the default center points, click a Center of Rotation button.

   Why use the default center points? If you set the center of rotation with the default center points, the object will rotate around the same point even if the object is resized. For example, the top-middle point will always be the center of rotation no matter what size the object is.

Specifying Coordinates



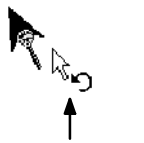
The default coordinates 0,0 are the center of the object; all coordinate values are relative to the center. To specify coordinates, do one of the following:



- Select the button beside the coordinates box. Place the mouse pointer over the object's cross-hair until the cursor changes to a cross-hair, and then click and drag the cross-hair to the desired center of rotation.
- Type values in the coordinates box, and then select the button beside the box.

5. Set the range of motion for the object.

To set the minimum, do one of the following and then select the At Minimum check box:



- With the cursor indicating the Rotate tool (not the cross-hair), visually set the degree of rotation by clicking the mouse and dragging until the object is in the desired minimum (beginning) position.
- Type the desired minimum degree of rotation (this value is relative to the object's current position). For clockwise rotation, use a positive number. For counterclockwise rotation, use a negative number.

To set the maximum, do one of the following and then select the At Maximum check box:

- With the cursor indicating the Rotate tool (not the cross-hair), visually set the degree of rotation by clicking the mouse and dragging until the object is in the desired maximum (ending) position.
- Type the desired maximum degree of rotation (this value is relative to the object's current position). For clockwise rotation, use a positive number. For counterclockwise rotation, use a negative number.

6. Select the method to use to calculate the expression's minimum and maximum values.

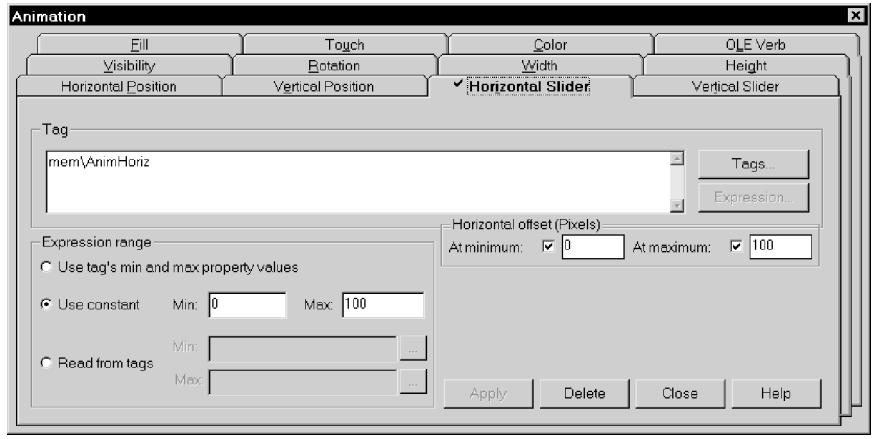
7. Click Apply.

Configuring horizontal slider animation

With horizontal slider animation, you can use a drawing object to set the value of a tag. To do this, define a path for the object. At runtime, when the operator moves the object horizontally (using a mouse), the pixel position of the object is translated into values that are written to the tag. If the tag value is changed externally, the position of the slider changes as well.

An object can have both vertical and horizontal slider animation.

Horizontal slider animation is available for all drawing objects except images and panels.



Here are some tips for creating slider objects:

- The Sliders graphic library contains several slider objects you can drag and drop into your graphic displays. Attach slider animation to the button portion of the slider object.
- If you create your own slider object, it's useful to draw an object (for example, a line) to represent the path the slider will move along.

To configure horizontal slider animation:

1. Select the object.
2. In the Animation dialog box, click the Horizontal Slider tab.
3. In the Tag box, type the name of the tag whose value will be set by the slider.
4. Set the starting point for the slider object by dragging the object or by typing a value (in relation to its current position on the display). Select the At Minimum check box.

5. Set the ending point for the slider object by dragging the object or by typing a value (in relation to its current position on the display). Select the At Maximum check box.
6. Select the method to use to calculate the minimum and maximum values that are written to the tag.
7. Click Apply.

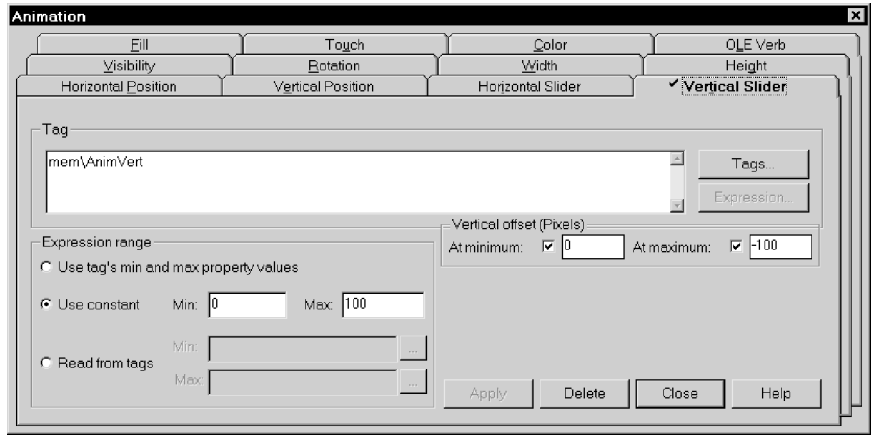
Configuring vertical slider animation

With vertical slider animation, you can use a drawing object to set the value of a tag. To do this, define a path for the object. At runtime, when the operator moves the object vertically (using a mouse), the pixel position of the object is translated into values that are written to the tag. If the tag value is changed externally, the position of the slider changes as well.

An object can have both vertical and horizontal slider animation.

Vertical slider animation is available for all drawing objects except images and panels.

For tips for creating slider objects, see page 11-25.



To configure vertical slider animation:

1. Select the object.
2. In the Animation dialog box, click the Vertical Slider tab.
3. In the Tag box, type the name of the tag whose value will be set by the slider.

4. Set the starting point for the slider object by dragging the object or by typing a value (in relation to its current position on the display). Select the At Minimum check box.
5. Set the ending point for the slider object by dragging the object or by typing a value (in relation to its current position on the display). Select the At Maximum check box.
6. Select the method to use to calculate the minimum and maximum values that are written to the tag.
7. Click Apply.

Applying animation to groups

You can apply animation to objects and then group those objects and apply animation to the group. When the display is running, animation is applied as follows:

These types of animation	Are applied like this
Color, fill	Animation attached to individual objects within the group overrides group animation.
Horizontal slider, vertical slider	Group animation overrides animation attached to individual objects within the group.
Height, width, horizontal position, vertical position, and rotation	Animation results for individual objects and the group are combined. For example, if an individual's horizontal position animation result is to offset the object by 100 pixels, and the group's result is to offset the group by 200 pixels, the individual object is offset by 300 pixels.
Visibility	When the group's animation visibility is False (the group is not visible), then no objects in the group are visible, regardless of the animation status of the individual objects. When the group's animation visibility is True (the group is visible), the visibility of an object within the group is determined by the individual object animation.

Test your animation to ensure you achieve the intended results.

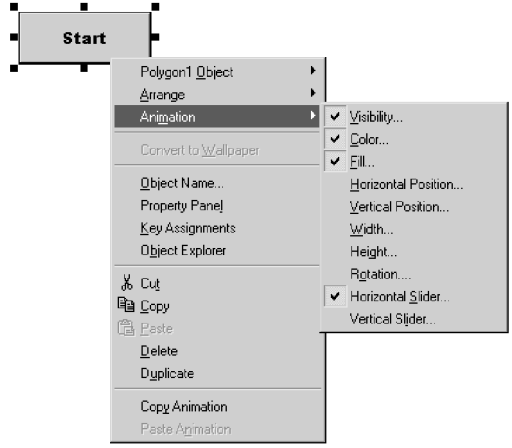
To apply animation to objects within groups, use the group edit feature. For details, see page 9-45.

Checking the animation on objects

To see what type of animation has been set up for an object or group of objects, use the Animation menu or the Animation dialog box. To see what type of animation has been set up for objects within a group, use the group edit feature. For details, see page 9-45.

To view the animation on an object using the menu:

1. Select an object.
2. View the animation by doing one of the following:
   - Click the Animation menu and see which items have a check mark.
   - Right-click the object and then select Animation to see which items have a check mark.

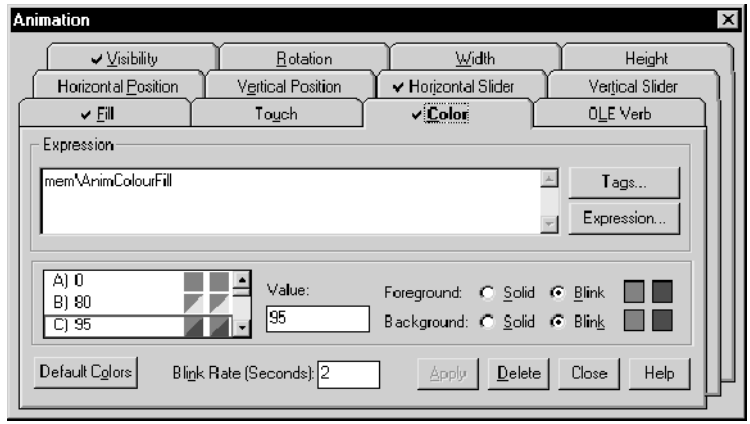


This strangely-designed object has visibility, color, fill, and horizontal slider animation.

To view the animation on an object using the Animation dialog box:

1. Select an object.
2. On the View menu, click Animation.

   When the Animation dialog box opens, look at which tabs have check marks on them to see which types of animation have been set up.



Changing the animation on objects

You can change the animation attached to an object, a group of objects, or to individual objects within the group. To access objects within a group, use the group edit feature. For details, see page 9-45.

To change the animation on objects:

1. Select the object or group.
2. Open the Animation dialog box.
3. Make the required changes.
4. Click Apply.

Copying or duplicating objects with animation

You can copy or duplicate objects that have animation attached to them. When you do, the animation attached to the objects is also copied or duplicated. If you copy or duplicate a group, the copy of the group can be ungrouped to individual objects, just like the original.

For information about copying and duplicating objects, see pages 9-38 and 9-40.

Copying animation without copying objects

If you have attached animation to an object, you can copy the animation and paste it onto another object. If the object has more than one type of animation, all animation is copied and pasted. Note that you can only copy animation to an object that supports the same type of animation.

To copy and paste animation:

1. Select the object that has the animation you want to copy.
2. On the Edit menu, click Copy Animation, or right-click the object and then click Copy Animation.
3. Select the objects to copy the animation to.
4. On the Edit menu, click Paste Animation.

   To paste to a single object, you can right-click the object and then click Paste Animation.

Chapter

12 Creating expressions

This chapter describes:

- the types of expression components
- which editors use expressions
- using the Expression editor
- creating and formatting expressions
- using tag names and tag placeholders with expressions
- using constants
- using operators, math and security functions, and if-then-else logic in expressions
- the evaluation order of operators
- using write expressions

About expressions

Sometimes the data you gather from devices is meaningful only when you:

- compare it to other values
- combine it with other values
- create a cause-effect relationship with other values

Expressions allow you to create mathematical or logical combinations of data that return more meaningful values. Depending on the components used in the expression, the value returned can be in the form of a numeric value, a true/false value, or a text string.

Expressions that result in floating point values

You can assign expressions to many of the controls in RSView. If the expression results in a floating point value but an integer value is required, the floating point value is rounded.

For information about how values are rounded, see page 7-3.

Expression components

Expressions can be built from:

- tag values
- constants
- arithmetic, relational, logical, and bitwise operators
- mathematical and security functions
- if-then-else logic

Tags, arithmetic operators, bitwise operators, and mathematical functions such as SQRT (square root) return numeric values.

Relational and logical operators return true/false values. The security function CurrentUserHasCode(*x*) also returns a true/false value.

The security function CurrentUserName( ) returns a string value.

Expressions that use if-then-else logic can return numeric values, true/false values, or text strings, depending on how they are structured. These are called conditional expressions because the result of the expression depends on whether the If statement is true or false. When the If statement evaluates to true, the result is defined by the Then statement. When the If statement is false, the result is defined by the Else statement.

The Objects sample project contains many examples of expressions. For example, see the alarm triggers in the Alarm Setup editor.

Where you can use expressions

You can use expressions in these editors:

- Graphics Display—You can define an expression to control various aspects of a graphic object's appearance. For more information, see Chapter 9.

  You can also use expressions to attach animation to graphic objects. For more information, see Chapter 11.
- Global Connections—You can use expressions to remotely control the opening and printing of displays, as well as the date and time to display. For more information, see Chapter 19.
- Alarm Setup—When configuring alarms, you can use expressions for alarm triggers, and with some of the controls that silence and acknowledge alarms. For more information, see Chapter 13.

- Information Setup—You can use expressions to determine when to display information messages. For more information, see Chapter 14.
- Macros—You can use expressions in macros to assign values to tags. For more information, see page 7-32.

Using the Expression editor

To create an expression, you can:

- type it directly in the "Tag or expression" column, for any control that accepts expressions, or in the Expression box (for animation)
- open the Expression editor, and then create the expression in the editor, as described on page 12-5

Using the Expression editor versus typing expressions directly

Once you are familiar with expression syntax, you might find it quicker to create short expressions by typing them directly in the "Tag or expression" column.

The Expression editor allows you to see more text at once, which is useful for longer, more complicated expressions. Also, you can click buttons to enter tag names, operators, and functions, thus avoiding typing mistakes. Also, in the Expression editor, you can check that the syntax of the expression you've created is valid.

To create an expression by typing it directly:

▶ Type an expression up to 999 characters long.

Expressions that you type directly are not checked for syntax.

To open the Expression editor, do one of the following:

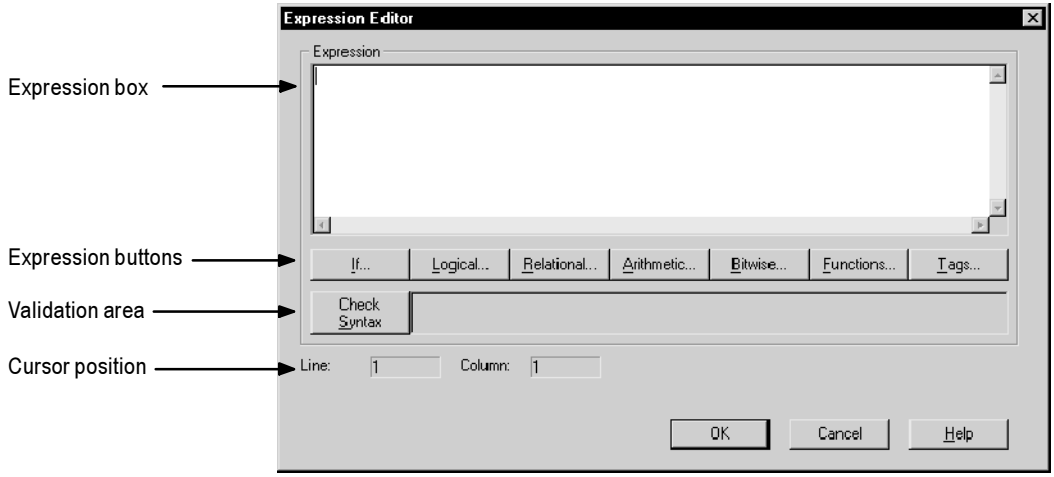
Browse button in the Exprn column

- Click the Browse button in the Exprn column for a control that accepts expressions.

  The Browse button is not available for controls to which you can assign only tags.
- In the Animation dialog box only, click the Expression button.

About the Expression editor

The Expression editor has these parts:



Expression box

The Expression box is a text edit area where you can build expressions. Enter text directly and use the expression buttons to build the expression.

Expression buttons

These are the expression buttons:

This button	Displays a list of
If	If-then-else operators
Logical	Logical operators
Relational	Relational operators
Arithmetic	Arithmetic operators
Bitwise	Bitwise operators
Functions	Mathematical and security functions (clicking the button opens the Functions box)
Tags	Tags in the tag database

Validation area

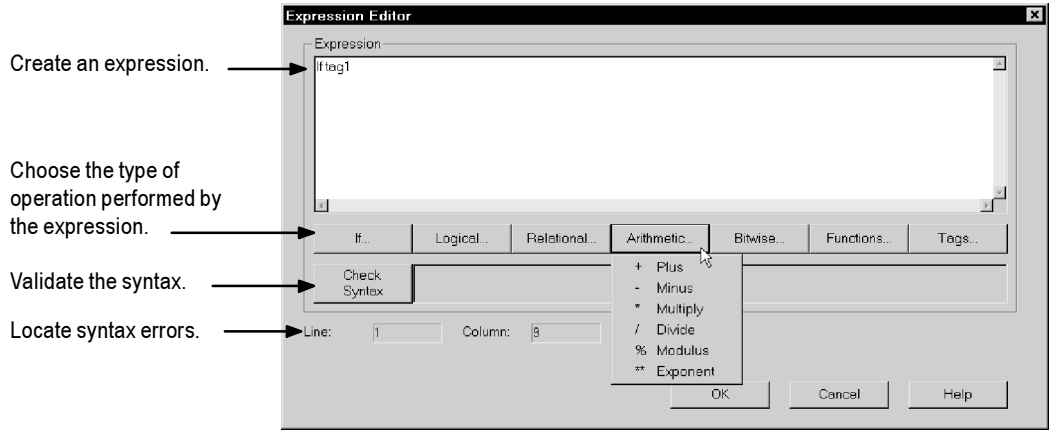
To validate your expression, click the Check Syntax button. You can check the syntax as often as you like. When you make changes, the expression is no longer validated.

- If an expression is without errors, "Valid" appears in the text box.
- If an expression has not been validated, the text box remains empty.
- If there are errors in the expression, a description of the error and the location appears in the text box.

Cursor position

The Line and Column boxes show the cursor position in the Expression box.

Creating expressions



To create an expression in the Expression editor:

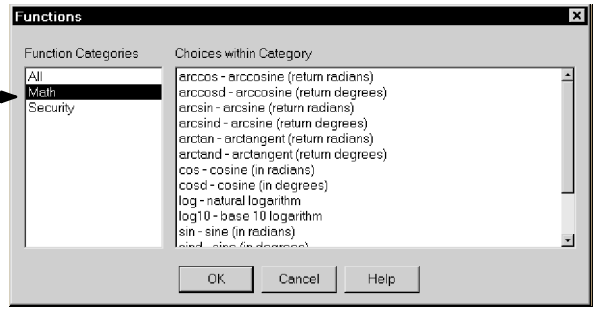
1. Type the expression in the Expression box, up to 999 characters long.
2. To use a tag in the expression, you can type the tag name directly or click Tags and then select the tag to use.

   You cannot use block tags in expressions.

For more information about using tags in expressions, see page 12-7.

3. To use an operator, you can type it directly or click an expression button and then click the operator to use.
4. To use a function, click Functions.

To limit the functions in the list to the type of function you want to use, click a category.



5. In the Functions box, click the function to use, and then click OK.
6. To validate your expression, click Check Syntax.

   If your expression has a syntax error, the line and column location appears beside the Check Syntax button.

For information about formatting expressions, see page 12-6.

Cutting, copying, and pasting expressions

You can cut, copy, or paste an expression or parts of an expression between objects and editors.

To do this	Do this	And then press this
Cut	Select the text	Ctrl-X
Copy	Select the text	Ctrl-C
Paste	Double-click in the column or click in the Expression box and then position the cursor where you want the text	Ctrl-V

Formatting expressions

You can format expressions so they are easier to read. However, do not let tag names, function names, or function arguments span more than one line.

When formatting expressions, you can use line returns and multiple spaces.

Enclose strings in quotes. The string can contain any character, and can include spaces.

Example: Formatting an expression

To format this if-then-else statement, you can align the Else with the appropriate If so the logic is easy to understand:

```
If (tag1 > tag2) Then 0
Else If (tag1 > tag3) Then 2
Else 4
```

Or you can condense it to the following:

```
If (tag1 > tag2) Then 0 Else If (tag1 > tag3) Then 2 Else 4
```

Using tag names and tag placeholders

A tag name can be included as part of an expression or can stand alone as the entire expression.

To supply a tag name, do one of the following:

- Type a tag name.

  You can type a tag name that does not exist in the tag database. When you click OK, you are prompted to create the tag. You can create it now, or write down the name and create it later.
- Click the Tags button and select a tag from the Tags dialog box.

Enclose tag names that contain dashes or start with a number in braces { } when you use them in an expression. This distinguishes the characters in the tag name from the characters in the expression.

You can use string tags as operands with the plus (+) arithmetic operator and with the relational operators.

You cannot use block tags in expressions.

Using tag placeholders instead of tag names

The Graphics Display editor accepts tag placeholders instead of tag names. Placeholders allow you to use the same display with different sets of tags.

You can use tag placeholders in:

- the graphic display that opens when the project is first run
- graphic displays that are opened using a Goto Display button

Use parameter files to specify which tags to substitute for which placeholders. For information about creating parameter files, see page 8-25.

To create a tag placeholder in an expression:

▶ Type the cross-hatch character followed by a number (no space in between). For example, #1.

Constants

A constant can have any of the following formats:

- integer (123)
- floating point (123.45)
- string constant ("character string")

Arithmetic operators

Arithmetic operators calculate values based on two or more numeric values. The arithmetic operators are:

Symbol	Operator	Example (For these examples, tag1 = 5 and tag2 = 7)
+	addition	tag1 + tag2 returns a value of 12 You can also use this operator with string operands. See page 12-9.
-	subtraction	tag1 - tag2 returns a value of -2
*	multiplication	tag1 * tag2 returns a value of 35
/	division	tag1 / tag2 returns a value of 0.7142857

Symbol	Operator	Example (For these examples, tag1 = 5 and tag2 = 7)
MOD, %	modulus (remainder)	tag2 MOD tag1 returns a value of 2 The modulus operator is the remainder of one number divided by another. For example, the remainder of 13 divided by 5 is 3; so 13 % 5 = 3. **Important:** This operator is for integers only, not floating point numbers.
**	exponent	tag1 ** tag2 returns a value of 78125

IMPORTANT Be sure that any tag value you use as a divisor cannot at some point have a value of zero. Expressions that attempt to divide a number by zero produce an error at runtime.

String operands

The + operator can be used to join string operands. For example, the expression "hello" + "world" returns: helloworld.

Relational operators

Relational operators compare two numeric or string values to provide a true or false result. If the statement is true, a value of 1 is returned. If false, 0 is returned.

The relational operators are:

Symbols	Operator	Numeric Examples	String Examples
For the numeric examples, tag1 = 5 and tag2 = 7 For the string examples, serial_no = "ST009"			
EQ, ==	equal	tag1 == tag2 false	serial_no == "ST011" false
NE, <>	not equal	tag1 <> tag2 true	serial_no <> "ST011" true
LT, <	less than	tag1 < tag2 true	serial_no < "ST011" true

Symbols	Operator	Numeric Examples	String Examples
GT, >	greater than	tag1 > tag2 false	serial_no > “ST011” false
LE, <=	less than or equal to	tag1 <= tag2 true	serial_no <= “ST011” true
GE, >=	greater than or equal to	tag1 >= tag2 false	serial_no >= “ST011” false

How string operands are evaluated

String operands are evaluated by case and by alphabetical order. Upper case letters are greater than lower case letters. For example, H is greater than h. Letters later in the alphabet are greater than those earlier in the alphabet. For example, B is greater than A.

Logical operators

Logical operators determine the validity of one or more statements. There are three logical operators: AND, OR, and NOT. The operators return a non-zero value if the expression is true, or a zero if the expression is false.

Any statement that evaluates to a non-zero value is regarded as true. For example, the statement tag1 will be false if the value of tag1 is 0, and true if tag1 has any other value.

The logical operators are:

Symbols	Operator	Action	Example (For these examples, tag1 = 5 and tag2 = 7)
AND, &&	and	Returns a 1 if the statements to the right and left of the operator are both true.	(tag1 < tag2) AND (tag1 == 5) both statements are true; returns a 1
OR, ||	or	Returns a 1 if either the statement to the left or right of the operator is true.	(tag1 > tag2) OR (tag1 == 5) tag1 == 5 is true; returns a 1
NOT	negation	Reverses the logical value of the statement it operates on.	NOT (tag1 < tag2) although tag1 < tag2 is true, NOT reverses the logical value; returns a 0

IMPORTANT The parentheses are essential in the above expressions. See page 12-13.

Bitwise operators

Bitwise operators examine and manipulate individual bits within a value.

IMPORTANT These operators are for integers only, not floating point numbers. Do not use them with tags or expressions that return floating point values.

Symbol	Operator	Action
&	AND	Compares two integers or tags on a bit-by-bit basis. Returns an integer with a bit set to 1 if both the corresponding bits in the original numbers are 1. Otherwise, the resulting bit is 0.
|	inclusive OR	Compares two integers or tags on a bit-by-bit basis. Returns an integer with a bit set to 1 if either or both of the corresponding bits in the original numbers are 1. If both bits are 0, the resulting bit is 0.
^	exclusive OR (XOR)	Compares two integers or tags on a bit-by-bit basis. Returns an integer with a bit set to 1 if the corresponding bits in the original numbers differ. If both bits are 1 or both are 0, the resulting bit is 0.
>>	right shift	Shifts the bits within an integer or tag to the right. Shifts the bits within the left operand by the amount specified in the right operand. The bit on the right disappears. Either a 0 or a 1 is shifted in on the left, depending on whether the left-most bit is a 0 or a 1. If the left-most bit is 0, a 0 is shifted in. If the left-most bit is 1, a 1 is shifted in. In other words, the sign of the number is preserved.
<<	left shift	Shifts the bits within an integer or tag to the left. Shifts the bits within the left operand by the amount specified in the right operand. The bit on the left disappears and 0 always shifts in on the right. See "Using the left shift operator," next.
~	complement	Returns one's complement; that is, it toggles the bits within an integer or tag. Reverses every bit within the number so every 1 bit becomes a 0 and vice versa.

Using the left shift operator

If the left bit is a 1 an overflow will occur, and an error message is created. To prevent this, use the bitwise And (&) operator with the left shift operator in an expression. For example:

(dev << 1) & 65535

where dev is a tag whose value is being shifted left, and 65535 is 1111 1111 1111 1111 in binary form.

Examples: Bitwise operators

For these examples tag1 = 5 (binary 0000 0000 0000 0101), tag2 = 2 (binary 0000 0000 0000 0010)

tag1 & tag2
Returns 0 (binary 0000 0000 0000 0000).

tag1 | tag2
Returns 7 (binary 0000 0000 0000 0111).

tag1 ^ tag2
Returns 7 (binary 0000 0000 0000 0111).

tag1 >> 1
Returns 2 (binary 0000 0000 0000 0010).

tag1 << 1
Returns 10 (binary 0000 0000 0000 1010).

~ tag1
Returns -6 (binary 1111 1111 1111 1010).

Evaluation order of operators

Expressions with more than one operator are evaluated in this order:

- Operators in parentheses are evaluated first.

  Therefore, to change the order of precedence, use parentheses.
- The operator with the highest precedence is evaluated next.
- When two operators have equal precedence, they are evaluated from left to right.

Operators are evaluated in this order:

Evaluation order	Symbols
1 (highest)	( )
2	NOT ~
3	* / MOD, % ** AND, && & >> <<
4	+ - OR, || | ^
5 (lowest)	EQ, == NE, <> LT, < GT, > LE, <= GE, >=

Examples: Evaluation order

For these examples, tag1 = 5, tag2 = 7, and tag3 =10.

(tag1 > tag2) AND (tag1 < tag3)

is evaluated in this sequence:

1. tag1 > tag2 = 0
2. tag1 < tag3 = 1
3. 0 AND 1 = 0

The expression evaluates to 0 (false).

---

tag1 > tag2 AND tag3

is evaluated in this sequence:

1. tag2 AND tag3 = 1
2. tag1 > 1 = 1

The expression evaluates to 1 (true).

NOT tag1 AND tag2 > tag3 ** 2

is evaluated in this sequence:

1. NOT tag1 = 0
2. 0 AND tag2 = 0
3. tag3 ** 2 = 100
4. 0 > 100 = 0

The expression evaluates to 0 (false).

Mathematical functions

Use math functions to calculate the square root, log (natural or base 10), or trigonometry ratios (in radians or degrees) of a tag.

These functions perform math on an expression:

This function	Returns this value
SQRT (expression)	The square root of the expression
LOG (expression)	The natural log of the expression
LOG10 (expression)	The base ten log of the expression
SIN (expression)	The sine of the expression in radians
COS (expression)	The cosine of the expression in radians
TAN (expression)	The tangent of the expression in radians
ARCSIN (expression)	The arc sine of the expression in radians
ARCCOS (expression)	The arc cosine of the expression in radians
ARCTAN (expression)	The arc tangent of the expression in radians
SIND (expression)	The sine of the expression in degrees
COSD (expression)	The cosine of the expression in degrees
TAND (expression)	The tangent of the expression in degrees
ARCSIND (expression)	The arc sine of the expression in degrees
ARCCOSD (expression)	The arc cosine of the expression in degrees
ARCTAND (expression)	The arc tangent of the expression in degrees

Security functions

Use security functions to control access to your project.

These functions allow you to determine a user's identity or security rights in order to limit access to the project based on these criteria.

This function	Returns this value
CurrentUserHasCode (*Security Code Letters*)	True (1) if any of the specified security codes have been assigned to the user; False (0) if not. If checking multiple security codes, do not type a space between the security code letters. For example: CurrentUserHasCode (ABP) returns the value 1 if the user has been assigned one or more of the specified codes.
CurrentUserName( )	A string containing the name of the current user. The name does not include the name of the user's domain. This function is case sensitive. All user names use upper case letters, so make sure that you use upper case letters in your expression.

For more information about setting up security for your project, see Chapter 18.

For an example of using the CurrentUserHasCode( ) function, see page 18-3. For examples of using the CurrentUserName( ) function, see page 18-13.

If-then-else

If-then-else expressions carry out an action conditionally or branch actions depending on the statements in the expression. The if-then-else statements enable the expression to perform different actions in different situations and to repeat activities until a condition changes.

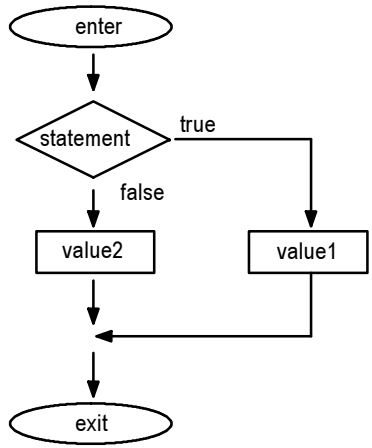
To build conditional expressions, use the relational operators and the logical operators.

The if-then-else structure is:

if *statement* then *value1* else *value2*

If the *statement* is true then the expression returns *value1*; if the *statement* is false then the expression returns *value2*. Keep in mind that the *statement* is a mathematical equation and true means a non-zero value, and false means zero.

The if-then-else structure is illustrated below.



Nested if-then-else

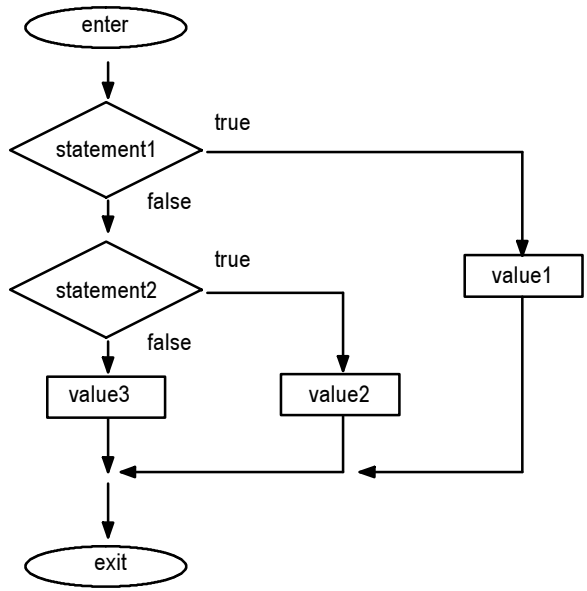
You can also nest an if-then-else structure inside the 'then' or 'else' part of an if-then-else structure.

Example 1: Nested if-then-else

This expression:

if (statement1) then (value1)
else if (statement2) then (value2)
else (value3)

has this interpretation:

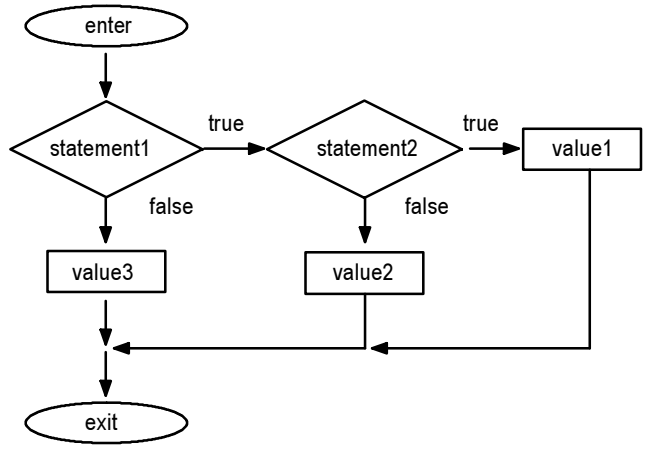


Example 2: Nested if-then-else

This expression:

if (statement1) then
if (statement2) then (value1)
else (value2)
else (value3)

has this interpretation:



Using write expressions

Write expressions allow the operator to enter a value at runtime. RSView substitutes the value the operator enters for the placeholder in the expression, calculates the value of the expression, and writes the result to the Value control. All write expressions must contain a question mark (?) as a placeholder for the value the operator enters.

You can use write expressions with the Numeric Input Enable button graphic object. When the operator presses the button, a keypad or scratchpad opens. The operator enters a value in the keypad or scratchpad, and this value is substituted for the ? placeholder in the write expression.

Example: Using write expressions

In this example, the operator regulates the speed of a conveyor belt by entering a value in feet or meters per second. When the operator enters the value in meters per second, the value is converted to feet per second before being passed to the data source.

The operator first indicates whether the value is in feet or meters by pushing a Maintained Push button. The push button has one state corresponding to feet per second, and the other state to meters per second.

Then the operator presses the Numeric Input Enable button and enters the value for the conveyor speed in a numeric pop-up keypad. The ? character in the write expression is the placeholder for the value the operator enters.

To configure the Maintained Push button:

1. In the Maintained Push Button Properties dialog box, in the States tab, configure these states:
   - State 0—Value: 0, Caption: Feet/S
   - State 1—Value: 1, Caption: Meters/S
2. In the Connections tab, assign a digital tag called Feet_or_meters to the Value control.

To configure the Numeric Input Enable button:

1. In the Numeric Input Enable Properties dialog box, in the Label tab, type the caption "Enter conveyor speed."
2. In the Connections tab, assign an analog tag called Conveyor_speed to the Value control.
3. Assign this expression to the Optional Exp control:

   ```
   If Feet_or_meters == 0 Then
   ?
   Else
   ? * 3.281
   ```

RSView writes the result of the expression to the Conveyor_speed tag at the data source.

Chapter

13 Setting up alarms

This chapter describes:

- preparing to set up alarms
- how alarms work
- alarm trigger data types
- optional alarm controls
- steps for configuring alarms
- using the Alarm Setup editor
- configuring alarms
- the [ALARM] display and [HISTORY] library
- creating your own alarm display
- opening and closing the alarm display
- how the Alarm list works
- using alarm buttons to acknowledge, silence, and clear alarms

About alarms

An alarm occurs when something goes wrong or is about to go wrong. Alarms can signal that a device or process has ceased operating within acceptable, predefined limits, and can indicate breakdown, wear, or process malfunctions. Alarms are also used to indicate the approach of a dangerous condition.

Alarms are an important part of most plant control applications because an operator must know the instant something goes wrong. It is often equally important to have a record of the alarm and whether the alarm was acknowledged.

Preparing to set up alarms

As your project is running, information is continually sent to the data source about the state of the various processes. For example, your project might be monitoring whether a valve is open or closed, or the temperature in a boiler. Values representing the status of these processes are sent to the data source.

The data source

The data source can be memory or a device such as a programmable controller or an OPC server. RSView writes values to and reads values from the data source. The data source is configured to exchange information (in the form of numeric or string values) between RSView and the physical machine that your project is controlling.

Tags and expressions

Before setting up alarms, you must set up tags corresponding to the addresses at the data source that will store the values you want to monitor for alarm conditions. You can monitor analog, digital, and block tags for alarm conditions. You cannot monitor string tags.

For information about creating tags, see Chapter 7.

You can also use expressions to perform logical or mathematical calculations on tag values, and monitor the expression value rather than the original tag value. For example, you could use an expression to monitor whether a tag value has increased or decreased beyond a threshold value: If Tag1 > 100 then 1 else 0.

For information about creating expressions, see Chapter 12.

Identifying alarm conditions

Once you have identified the processes you want to monitor for alarms, and the tag addresses or expressions that will store the values representing the status of the processes, you must determine the acceptable range of values for each tag or expression. Then you can set up alarms to notify the operator when a value is outside the normal operating range.

How alarms work

This section provides an overview of the key components of your project's alarm system, and describes how the different parts work together.

Alarm triggers and trigger values

You specify the tags and expressions (also known as controls) to monitor for alarm conditions by creating an alarm trigger for each control.

Each alarm trigger can generate one or more alarm messages, associated with different trigger control values. For each alarm trigger, you specify the trigger values that will generate alarm messages, and create the messages to display for the trigger values.

The trigger value can be a non-zero integer value or a bit position, depending on which trigger data type you assign. For more information about trigger data types, see page 13-6.

Alarm notification methods

You can use any combination of these methods to notify the operator that an alarm condition has occurred:

- Open an alarm graphic display containing an appropriate alarm message.
- Set off an audible signal (if the project is running in Windows 2000).
- Send a message to a printer.

To use these methods, select the Display, Audio, and Print options when you create your messages, as described on page 13-18.

IMPORTANT Be sure to select the Print option if you need to keep a permanent record of alarms.

Displaying alarm information

RSView comes with a preconfigured alarm graphic display called [ALARM] and a graphic library called [HISTORY]. Both contain Alarm list graphic objects for displaying alarm information. By default, the [ALARM] graphic display opens automatically at runtime when an alarm is generated.

You can accept the default, edit the [ALARM] display, or use your own display. If you elect not to open a graphic display for alarm notification, an alternative is to place the Alarm list object in a graphic display that doesn't open automatically when an alarm is generated.

For information about	See
The [ALARM] display	Page 13-23
The [HISTORY] graphic library	Page 13-24
Creating your own alarm display	Page 13-26
The Alarm list graphic object	Page 13-27

Responding to alarms

Depending on how you configure alarms, the operator can:

- acknowledge one or all alarms
- clear all alarms
- silence alarms (if the project is running in Windows 2000)

For information about the alarm button graphic objects the operator can use to acknowledge, clear, and silence alarms, see page 13-28.

You can also set up remote acknowledgement or silencing of alarms, to allow the data source to acknowledge or silence the alarms. For more information, see pages 13-12 and 13-14.

Methods for acknowledging alarms

A single alarm is acknowledged when:

- the operator selects an alarm in the Alarm list and presses the Acknowledge Alarm button
- the operator selects an alarm in the Alarm list and presses an Enter button object, or the Enter key on an external keyboard or keypad

All alarms for a single trigger's trigger value (or bit position) are acknowledged when:

- the Remote Ack control's value changes to an alarm's trigger value (or bit position, for bit triggers)

All alarms for a trigger are acknowledged when:

- the Remote Ack control's value changes to the "Acknowledge all" value. The "Acknowledge all" value is specified in the "Use ack all value" box in the Alarm Setup editor.

All alarms are acknowledged when:

- the operator presses the Acknowledge All Alarms button
- the Remote Ack All control's value changes to a new non-zero value

Methods for clearing alarms

All alarms are cleared from the alarm log file and from all Alarm lists when the operator presses the Clear Alarm History button.

Methods for silencing alarms

The audio alarm indicator is available for projects running in Windows 2000 only.

All alarms are silenced when:

- the operator presses the Silence Alarms button
- an alarm is acknowledged
- the Remote Silence control's value changes to a new non-zero value
- the operator presses the Clear Alarm History button

The alarm log file

As soon as the project starts running, RSView begins monitoring trigger controls for alarm conditions. When an alarm occurs, RSView adds the associated message to the alarm log file. When the file is full, the oldest messages are deleted to make room for new messages. Specify the maximum number of messages to store in the Alarm Setup editor, as described on page 13-22.

For each message, the log file records the time the alarm was triggered and the time the alarm was acknowledged (if it was acknowledged).

The log file is saved every 30 seconds, if there are new alarms. The log file is also saved when the project is shut down.

If the operator presses the Clear Alarm History button, all alarms are removed from the log file.

The alarm log file is retained when you restart a project after a shutdown or power loss. You can delete the log file from the runtime computer at project startup. For information about deleting the log file, see Chapter 23.

If you download a newer version of a project to the runtime computer, the alarm log file for the older version is deleted automatically.

The Alarm list

The contents of the alarm log file are displayed in the Alarm list graphic object.

You can specify the information that is displayed in the list:

- messages for unacknowledged alarms only
- messages for all alarms
- the time the alarm was triggered
- the time the alarm was acknowledged (if you display messages for all alarms)

The Alarm list in the [ALARM] display is configured to display all alarms, and to display both the alarm time and the acknowledge time.

For more information about the Alarm list, see page 13-27.

Alarm trigger data types

When you create alarm triggers, you must specify the type of data the trigger's tag or expression uses. The type of data affects how alarms are triggered.

The Value trigger type

If the trigger's control uses integer or floating point values, use the Value trigger type. When the value of the trigger control equals the trigger value of a message, an alarm is generated.

If you use an analog tag or an expression, you can use any non-zero integer or floating point value to trigger an alarm. Floating point values are rounded to the nearest integer. For information about how values are rounded, see page 7-3.

Trigger values cannot be 0. Digital tags have two possible values, 0 and 1. Therefore, if you use a digital tag you can only use the value 1 to trigger a message. If you want to use a digital tag to trigger two different messages, create an expression that adds 1 to the digital tag's value. That way, you can use the trigger values 1 and 2.

Example: Integer trigger values

This example shows how to set up alarms using integer trigger values to monitor the level of acid in a 100-gallon tank. Alarms are generated when the tank is 75% full and 90% full.

1. Create an alarm trigger for the analog tag Acid_Tank_Level. This tag points to an address in a programmable controller that is linked to a sensor in the tank. The tag's minimum value is 0 and its maximum value is 100.

   Use this expression for the alarm trigger:

   If ((Acid_Tank_Level > 74) AND (Acid_Tank_Level < 90))

   then 1

   else if (Acid_Tank_Level > 89)

   then 2

   else 0

2. Use the Value trigger type for the alarm trigger.

3. Specify these trigger values and alarm messages for the alarm trigger:

Trigger value	Message
1	Warning! The acid tank has exceeded safe fill levels.
2	Danger! The acid tank is overflowing.

At runtime, when the value of Acid_Tank_Level is 75 or greater, RSView generates the first alarm message. The second message is generated when the tag value is 90 or greater.

Using the expression illustrated above allows a range of values to trigger each alarm. This is useful in case the tag is not being scanned at the exact moment it reaches a threshold level.

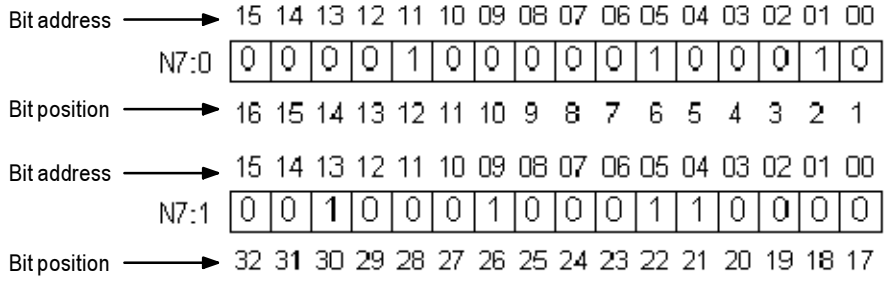
The Bit trigger type

If the trigger's control is a block tag (a bit array consisting of up to 1024 bit positions), use the Bit trigger type to generate multiple simultaneous alarm messages. Each bit in the array whose value changes from 0 to 1 triggers an alarm (if a message is configured for the bit position).

Example: Trigger values using bit positions

This example shows how to use the bit positions in a block tag to generate multiple simultaneous alarms. The block tag uses 32 bits, from N7:0/00 to N7:1/15.

This diagram shows the bit addresses and bit positions for the block tag:



The tag is currently generating alarms at bit positions 2, 6, 12, 21, 22, 26, and 30.

To set up alarms for this block tag:

1. Create an alarm trigger for the block tag. Use the Bit trigger type.
2. Specify trigger values and alarm messages for the alarm trigger. Each trigger value corresponds to a bit position (not a bit address).

Bit position	Trigger value	Message
1	1	Line 1: Conveyor has stopped.
2	2	Line 1: Power failure.
3	3	Line 2: Conveyor has stopped.
4	4	Line 2: Power failure.
..	..	..
32	32	Oven door open.

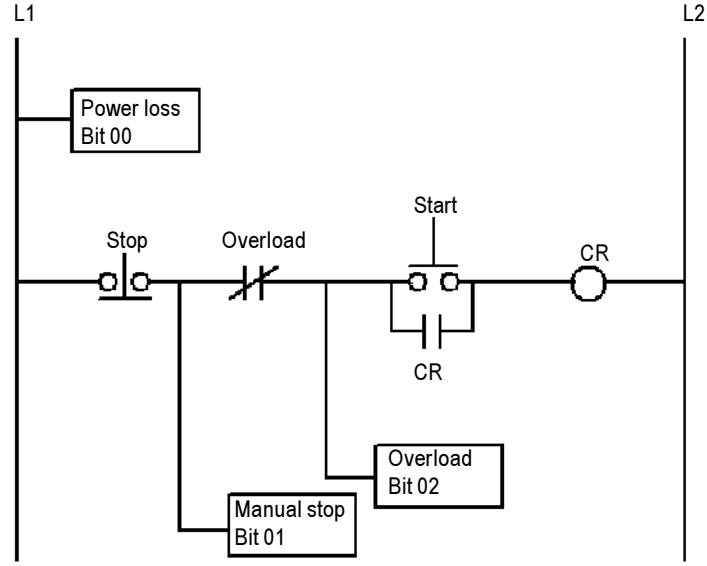
The Least Significant Bit (LSBit) trigger type

If the trigger's control is a block tag (a bit array consisting of up to 1024 bit positions), use the Least Significant Bit trigger type to generate alarm messages based on a priority sequence that is determined by bit position. When multiple bits in the array change from 0 to 1, only the alarm with the lowest bit position is generated.

Example: Trigger values using least significant bits

This example shows how to use the Least Significant Bit trigger type to prioritize which alarm is generated when multiple alarm conditions occur.

In this example, a programmable controller monitors a motor's power, manual stop, and overload status. The diagram indicates the location of sensors that are linked to a block tag in the programmable controller.



If power to the motor is lost, the manual stop and overload switch also lose power, generating alarms for all three components. The only alarm the operator needs to see is the alarm for the motor, since the cause of the alarm is power loss to the motor, not a problem with the other two components.

If someone stops the motor manually, power to the overload switch is lost. Alarms are generated for the manual stop and the overload switch, but the only alarm the operator needs to see is the alarm for the manual stop.

1. Create an alarm trigger for the block tag Motor_Starter. The tag uses 16 bits, and points to the programmable controller address N7:61, although only the first three bit positions are used in this example. Use the LSBit (Least Significant Bit) trigger type.
2. Specify these trigger values and alarm messages for the alarm trigger:

Bit in the array	Bit position	Trigger value	Message
00	1	1	The motor has lost power.
01	2	2	The motor has stopped.
02	3	3	The overload switch has lost power.

At runtime, if power to the motor is lost, the programmable controller changes all three bit values from 0 to 1, but RSView generates the first alarm message only (since bit 00 is the lowest—that is, least significant—bit in alarm). If the operator acknowledges the first alarm and power is not yet restored, the second alarm is generated, and so on.

Optional alarm controls

When an operator acknowledges an alarm (by pressing the Acknowledge Alarm button), the acknowledge time is recorded in the alarm log file and the alarm is silenced. This might be all you require of your alarm system.

However, you can use the optional alarm controls to set up more sophisticated interactions with the data source when alarms are triggered, acknowledged, and silenced, and to allow the data source to acknowledge and silence alarms.

There are two sets of optional alarm controls:

- controls that work with a specific alarm trigger. You can assign a different set of controls to each alarm trigger.
- controls that apply to all alarms

Controls that work with a specific alarm trigger

You can assign a different set of these controls to each alarm trigger, or to only one or some alarm triggers:

- Handshake—Assign a digital tag to this control to notify the data source when the trigger's value changes.
- Ack—Assign an analog or digital tag to this control to notify the data source when the operator acknowledges an alarm (or all alarms).
- Remote Ack—Assign an analog tag or an expression to this control to allow the data source to acknowledge alarms.
- Remote Ack Handshake—Assign a digital tag to this control to notify the data source when a remote acknowledgement occurs.

Assign tags or expressions to these controls when you create your alarm triggers, as described on page 13-16. For more detailed information about how these controls work, see the next sections.

How the Handshake control works

The Handshake control is useful for triggers that use the Value data type. Program the data source to queue alarm notifications when multiple alarms are generated for the same trigger. Use the Handshake control to notify the data source that RSView has detected the alarm notification. Then the data source can send the next alarm to RSView.

When the project starts, the Handshake control has a value of 1. When the trigger control's value changes, the Handshake control's value toggles from 1 to 0. The next time the trigger value changes, the Handshake control's value toggles from 0 to 1.

When the trigger control's value changes, this does not necessarily indicate an alarm—the value might still be within acceptable limits.

How the Ack control works

When the project starts, this control has a value of 0.

When the operator acknowledges an alarm by pressing the Acknowledge Alarm button, RSView sends the alarm's trigger value (or bit position, for bit triggers) to this control, and holds the value as long as the operator presses the button, or for the duration of the notification hold time, whichever is longer. Then the control's value is reset to 0.

When the operator acknowledges all alarms by pressing the Acknowledge All Alarms button, RSView sends the trigger's "Acknowledge all" value to this control, and holds the value as long as the operator presses the button, or for the duration of the notification hold time, whichever is longer. Then the control's value is reset to 0.

To avoid confusion about whether a specific trigger's alarm has been acknowledged or all alarms have been acknowledged, make sure the "Acknowledge all" value is not the same as one of the trigger values.

How the Remote Ack control works

The Remote Ack control allows for the remote acknowledgement of alarms. The data source writes the alarm's trigger value (or bit position, for bit triggers) to this control, and the unacknowledged alarm with this trigger value is acknowledged.

If you assign this control and specify an "Acknowledge all" value for the trigger, when the data source sends the "Acknowledge all" value to this control, all unacknowledged alarms for the trigger are acknowledged.

Make sure that the "Acknowledge all" value is not the same as one of the trigger values.

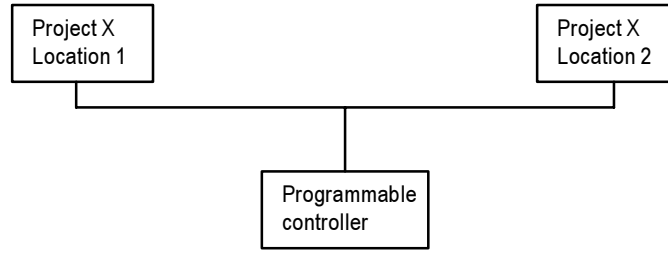
Configure the data source to send the correct value to the Remote Ack control when you want a remote acknowledgement to take place.

Remote acknowledgement does not take place if the notification hold time is in effect for the Ack control.

Example: Using the Remote Ack control

This example shows how to use the Remote Ack control to acknowledge an alarm.

In this example, the same project is run at two different locations on the plant floor, and both terminals are connected to the same programmable controller. All the tags in the example refer to addresses in the programmable controller.



1. Create an alarm trigger for an analog tag called Alarm. Use the Value trigger type.
2. Assign an analog tag called Ack to the Ack control.
3. Assign an analog tag called Remote_Ack to the Remote Ack control.
4. Create four alarm messages for the alarm trigger, with the trigger values 1 to 4.
5. Configure the data source to write the value at the Ack control to the Remote Ack control whenever the value of the Ack control changes from 0 to a non-zero value.

At runtime, when an alarm with the trigger value 1 is generated, the first alarm message appears at both locations simultaneously. If the operator acknowledges the alarm at Location 1, RSView writes the value 1 to the Ack control.

Since the Ack control is write-only (not read), the acknowledgement doesn't appear at Location 2. However, the programmable controller writes the value from the Ack control (1) to the Remote Ack control, and the alarm at Location 2 is acknowledged.

How the Remote Ack Handshake control works

This control is used to notify the data source that the remote acknowledgement has been detected by RSView.

When the project starts, the Remote Ack Handshake control has a value of 1. When the Remote Ack control value changes, the Remote Ack Handshake control's value toggles from 1 to 0. The next time the Remote Ack value changes, the Remote Ack Handshake value toggles from 0 to 1.

The Remote Ack Handshake value toggles whether or not the new Remote Ack value matches a trigger value.

Controls that apply to all alarms

These controls apply to all alarms:

- Silence—Assign a digital tag to this control to notify the data source that all alarms have been silenced (Windows 2000 projects only).
- Remote Silence—Assign an analog tag or an expresson to this control to allow the data source to silence all alarms (Windows 2000 projects only).
- Remote Ack All—Assign an analog tag to this control to allow the data source to acknowledge all alarms at once.

Assign tags or expressions to these controls in the Advanced tab of the Alarm Setup editor, as described on page 13-21. For more detailed information about how these controls work, see the next sections.

How the Silence control works

When the project starts, this control has a value of 0. When alarms are silenced, this control is set to 1 for the notification hold time and the internal beeper is turned off. At the end of the notification hold time, the control is reset to 0.

If subsequent alarms (that have been set up to sound the internal beeper) are generated, the alarms sound the beeper regardless of the Silence control value or notification hold time status.

While the notification hold time is in effect, new alarms cannot be silenced.

How the Remote Silence control works

When this control changes to a new non-zero value, all alarms are silenced. Alarms can be silenced using other methods regardless of this control's value.

Configure the data source to send a new non-zero value to the Remote Silence control each time you want a remote silencing of alarms to take place.

How the Remote Ack All control works

When this control changes to a new non-zero value, all alarms are acknowledged.

Configure the data source to send a new non-zero value to the Remote Ack All control each time you want a remote acknowledgement of all alarms to take place.

Summary of steps

Follow these steps to configure alarms:

1. In the Alarm Setup editor, set up alarm triggers (the tags or expressions to monitor), define the alarm messages and their trigger values, and specify the graphic display to open when alarms occur (if any).

   Also use this editor to specify trigger data types, "Acknowledge all" values, the maximum alarm log file size, the notification hold time, and optional controls.

2. In the Startup editor, ensure that the Alarms box is checked (it is checked by default). See Chapter 20.

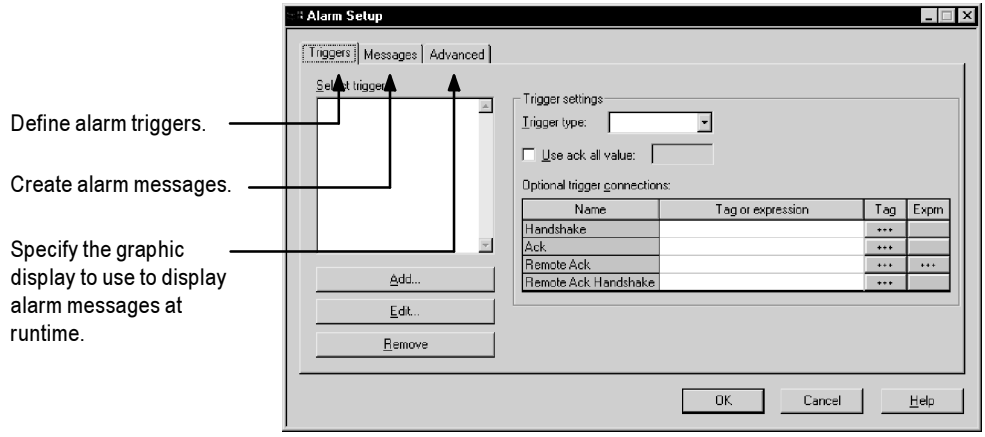
3. If desired, in the Graphics Display editor modify the default [ALARM] display, or create your own graphic display to use for alarms. For example, if you won't be using audible alarm signals, edit the default display to remove the Silence Alarms button.

   For information about graphic displays, see Chapter 8.

4. Test alarms on the runtime system.

Using the Alarm Setup editor

Use the Alarm Setup editor to configure alarms.



To configure alarms:

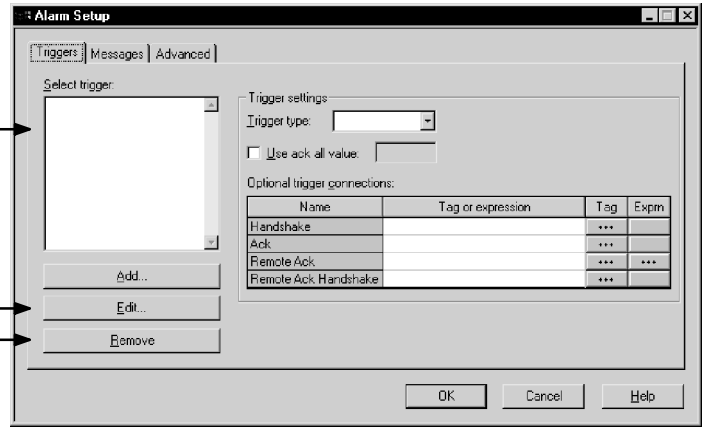
1. Open the Alarm Setup editor
2. Configure alarms in the tabs of the editor, as described in the sections that follow.
3. Click OK.

Creating alarm triggers

The "Select trigger" box displays the tags and expressions that have been added so far.

To edit a trigger, click it and then click Edit. Make your changes in the Trigger dialog box.

To remove a trigger, click it and then click Remove.



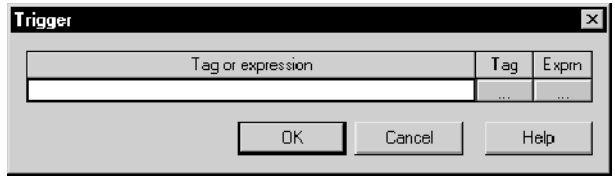
Each trigger is a control (a tag or an expression) you want to monitor for alarm conditions. For detailed information about alarm triggers, see page 13-2.

The Select trigger box lists the triggers you create.

To create alarm triggers:

1. In the Triggers tab, click Add.

   The Trigger dialog box opens.



2. Specify the tag or expression to use.

   You can use analog, digital, and block tags to generate alarms.

For information about specifying tags and expressions, see page 7-28.

3. Click OK. The trigger you created is selected in the "Select trigger" box.
4. Specify these properties for the trigger:

Trigger type
Select the type of data the trigger's tag or expression uses (for details, see page 13-6):

- Value—integer or floating point values. Floating point values are rounded to the nearest integer. Use with analog or digital tags.
- Bit—a bit array consisting of one or more bit positions. Use this trigger type with block tags, to generate multiple alarm messages with a single tag or expression.
- LSBit—a bit array consisting of one or more bit positions. Use this trigger type with block tags, to trigger alarms based on a priority sequence determined by bit position.

Use ack all value
Check this box to send a value to the data source when the operator presses the Acknowledge All Alarms button. Type the integer value to send.

The "Acknowledge all" value works with the Ack and Remote Ack controls. For details see page 13-11.

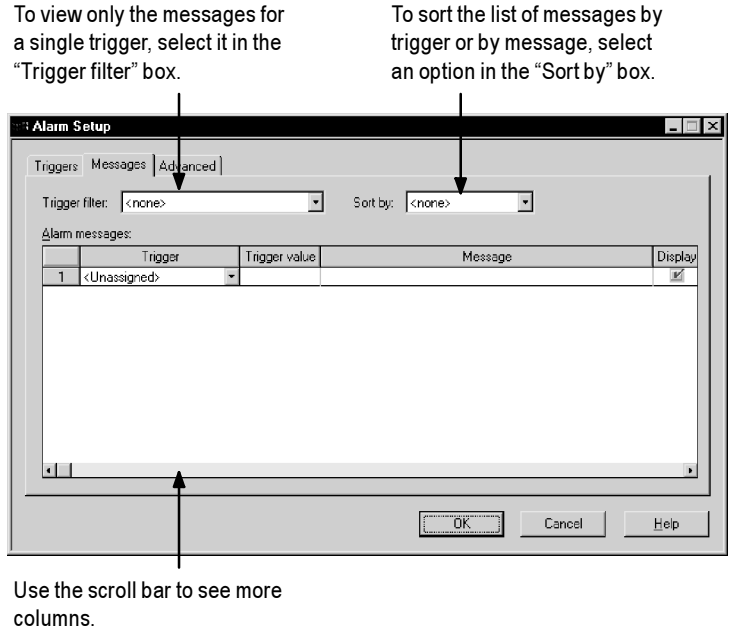
Optional trigger connections
If desired, assign tags to use for handshaking and acknowledgement for the selected trigger (for details, see page 13-11):

- Handshake—Assign a digital tag to this control to notify the data source when the trigger's value changes.
- Ack—Assign an analog or digital tag to this control to notify the data source when the operator acknowledges an alarm (or all alarms).
- Remote Ack—Assign an analog tag or an expression to this control to allow the data source to acknowledge alarms.
- Remote Ack Handshake—Assign a digital tag to this control to notify the data source when a remote acknowledgement has been detected by RSView.

For information about assigning tags and expressions, see page 7-28.

5. Repeat steps 1 through 4 to create and configure additional triggers.

Creating alarm messages



To create alarm messages:

1. In the Messages tab, in the Trigger column, select the trigger for which to create messages.

   To assign the same message to all the triggers you set up in the Triggers tab, select <AllTriggers>.

   If you are creating messages before setting up triggers, select <Unassigned>. Once you set up triggers, select the appropriate trigger for each message.

2. Specify these properties for the message:

   Trigger value
   Type a non-zero integer value or bit position. When the trigger control's value changes to this value, or when the bit in this position changes from 0 to 1, the associated message is generated. This column cannot be blank.

For more information about trigger values, see page 13-2.

Message
Type the message, up to 256 characters.

Display
Check this box to open the alarm graphic display (if it is not already open) when this alarm is generated.

The message is added to the alarm log file, and to any Alarm list objects in your graphic displays, even if you do not check this box.

Audio
For Windows 2000 projects, check this box to sound the runtime computer's internal beeper when this alarm is generated. The beeper beeps continuously, .5 seconds on and .5 seconds off, until the alarm is silenced.

Print
Check this box to print the alarm message when this alarm is generated.

To print alarm messages at runtime, set up a printer on the runtime terminal. For more information, see Chapter 23.

Background
Click this button to select a different color for the background of the message text.

Foreground
Click this button to select a different color for the message text.

3. Repeat steps 1 and 2 to create additional messages.

Deleting messages

To delete a message:

▶ Select any cell in the message's row, and then press Delete. Shift-click in a column to select cells for multiple messages.

Copying messages

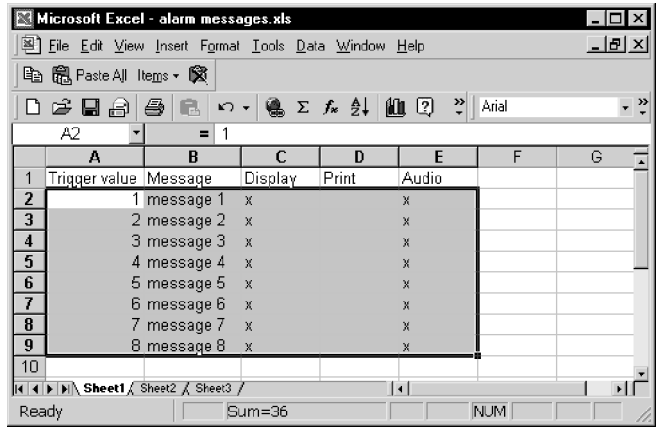
To copy a message:

1. In the Message column, select one or more messages and then press Ctrl-C (or right-click the selected cells and then click Copy).

2. In the Message column, click the cell to paste the first message in, and then press Ctrl-V (or right-click the cell and then click Paste).

Creating messages in a spreadsheet application

You can also create alarm messages in a spreadsheet application such as Microsoft Excel, and then copy the messages into the Alarm Setup editor.



To create messages in a spreadsheet application:

1. Create one message per row, as follows:
   - In column 1, type the trigger value.
   - In column 2, type the message.

   Type the messages in the order you want them to appear in the Alarm Setup editor.
2. If desired, in columns 3 through 5 configure the display, audio, and print options. To use a display, audio, or print option, type a character in the column. If you don't want to use the option, leave the column blank.

To copy the messages into the Alarm Setup editor:

1. In the Alarm Setup editor, create a row for each message by clicking in the Trigger column and selecting the trigger to use.

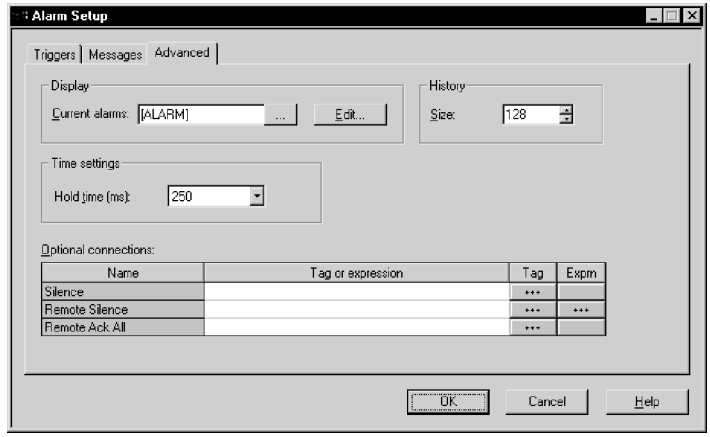
   To select a trigger without opening the list, type the first character in the trigger name.

2. In the application where you created the messages, select the cells to copy, and then press Ctrl-C (or right-click the selected cells and then click Copy).
3. In the Alarm Setup editor, click in the Trigger value column for the first message and then press Ctrl-V (or right-click in the column and then click Paste).

   The cell contents from the spreadsheet application are pasted into the first and succeeding rows.
4. If desired, configure the background and foreground settings for the messages.

Specifying how alarms are displayed, stored, and silenced

The options in the Advanced tab apply to all alarms (as opposed to a single alarm trigger or message).



To specify how alarms are displayed, stored, and silenced:

Browse button

1. In the Advanced tab, in the Current alarms box, select the graphic display to use to display alarm messages. Click the Browse button to select from a list of all the graphic displays in the project.

   The specified display opens when an alarm occurs, if you select the Display option for the alarm message (in the Messages tab).

   If you don't want to open a graphic display automatically when alarms occur, clear the box.

For information about the different graphic displays you can use to display alarm information, see page 13-3.

2. To edit the selected graphic display, click Edit. The Graphics Display editor opens with the selected display open for editing.

   For information about graphic displays, see Chapter 8.

3. Specify these settings:

   History Size
   Type the number of alarms to retain in the alarm log file, up to 10,000. When the log file contains this number of alarms, the oldest alarms are deleted when new alarms occur.

   For more information about the alarm log file, see page 13-5.

   Hold time
   Select the hold time to use when acknowledging and silencing alarms. RSView holds the values at the Ack and Silence controls for the specified length of time, then resets the controls to 0.

   Optional connections
   If desired, assign tags to use for silencing and remotely acknowledging all alarms (for details, see page 13-14).

   The Silence and Remote Silence controls apply to projects that will run in Windows 2000 only.

   - Silence—Assign a tag to this control to notify the data source that alarms have been silenced.
   - Remote Silence—Assign a tag or an expression to this control to allow the data source to silence alarms.
   - Remote Ack All—Assign a tag to this control to allow the data source to acknowledge all alarms at once.

   For information about assigning tags and expressions, see page 7-28.

What to do next

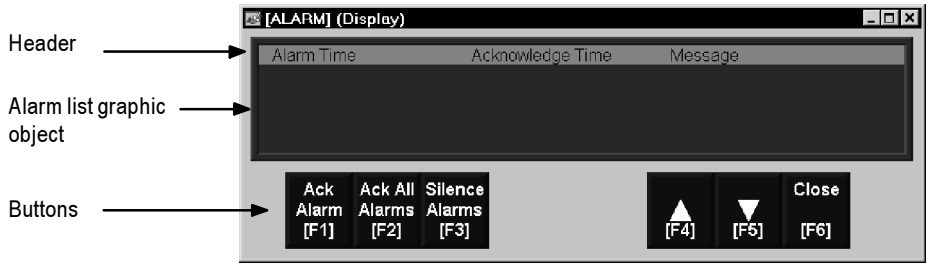
Now that you've configured alarms:

- In the Startup editor, ensure that the Alarms box is checked (it is checked by default). For more information, see Chapter 20.
- If desired, in the Graphics Display editor, modify the default [ALARM] display, or create your own graphic display to use for alarms. For example, if you won't be using audible alarm signals, edit the default display to remove the Silence Alarms button.

  See the topics in the remainder of this chapter.
- Test alarms on the runtime system.

The [ALARM] display

When you create a project, it comes with a graphic display called [ALARM]. The [ALARM] display is the default display for showing alarm messages at runtime.



You can use the [ALARM] display as is, or modify the display. For example, you can change the color of the objects, or add and remove buttons.

Another option is to create your own graphic display to use when an alarm occurs. For example, you could create a display with a static text object that notifies the operator that an alarm has occurred, and a Goto Display button that the operator can press to open a display that lists the actual alarm message.

In the Advanced tab of the Alarm Setup editor, specify the display to use.

The Alarm list graphic object

The [ALARM] display contains an Alarm list graphic object, which lists the alarm messages. You can configure the Alarm list to show all alarms, or to show unacknowledged alarms only. The Alarm list in the [ALARM] display is configured to show all alarms (but you can edit it, if desired).

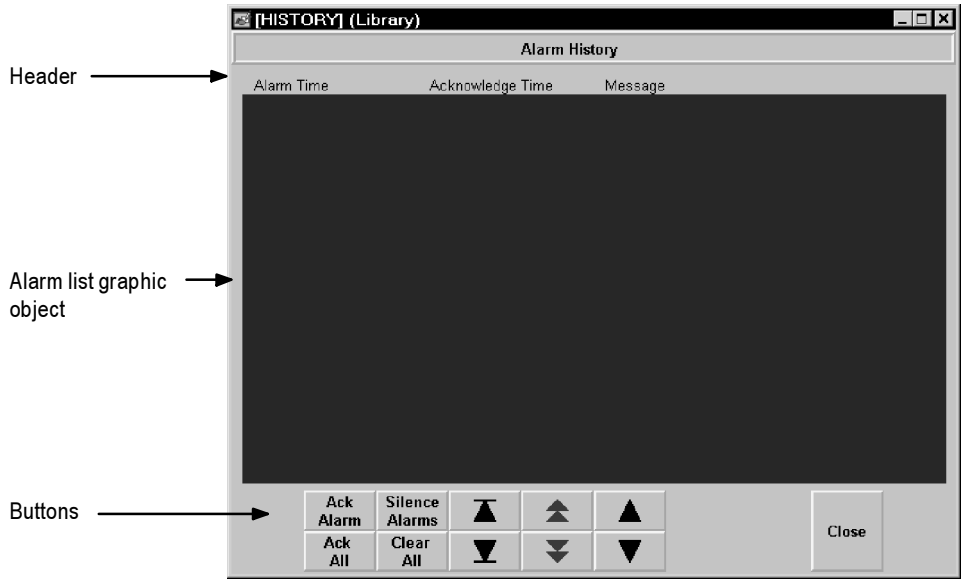
For more information about the Alarm list, see page 13-27.

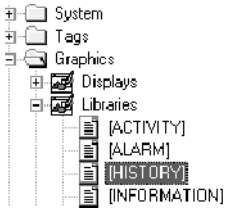
Buttons in the [ALARM] display

The [ALARM] display contains alarm buttons for acknowledging, clearing, and silencing alarms, as well as buttons for scrolling the list and closing the display. For information about how the buttons work, see page 13-28.

The [HISTORY] library

The Graphics Library contains a [HISTORY] library. It is similar to the [ALARM] display, but the Alarm list graphic object is larger (to display more alarm messages at once), and the library contains additional Key buttons.





To use objects in the [HISTORY] library in your project, copy the objects to your own graphic displays. For information about copying objects from a library into your graphic display, see page 9-38.

You can also add the [HISTORY] library component into your project. The graphic libraries are available on the development computer, but do not appear at runtime. To use a library as a graphic display at runtime, you must add the library into your project's folder of graphic displays.

To add the [HISTORY] library into your project:

1. In the Project Explorer, in the Graphics folder, right-click the Displays icon.
2. Click Add Component Into Project.
3. In the dialog box, navigate to the Libraries folder, and then click [HISTORY].gfx.

   The Libraries folder is located in \Documents and Settings\All Users\Documents\RSView Enterprise\ME.

   For information about changing the location of library component files see page 8-18.
4. Click Open. The [HISTORY] library is copied into the Displays folder.

Once you copy the library into your project, you can use the [HISTORY] display as the display to open when alarms are triggered, or use it in conjunction with the [ALARM] display or with an alarm display that you create.

Example: Using the [ALARM] and [HISTORY] displays together

To use the [ALARM] display to alert the operator about unacknowledged alarms only, and the [HISTORY] display as a full record of all alarms:

1. In the Alarm Setup editor, in the Advanced tab, select the [ALARM] display as the display to open when alarms are triggered.

2. Edit the [ALARM] display as follows:
   - Configure the Alarm list to show unacknowledged alarms only. The list will display both new alarms and past alarms that have not been acknowledged.
   - Create a Goto Display button that opens the [HISTORY] display when pressed.

Creating your own alarm display

You can create your own graphic display for displaying alarms, containing an Alarm list graphic object and the buttons the operator needs for responding to alarms.

If you create your own graphic display, use an On Top display and select the Cannot Be Replaced option.

For more information about the Alarm list, see page 13-27. For information about the buttons you can use with the list, see page 13-28. For information about creating graphic displays and graphic objects, see Chapters 8 and 9.

Opening and closing the alarm display

Opening the display

The alarm display you specify in the Advanced tab of the Alarm Setup editor (either the default [ALARM] display, the [HISTORY] display you create, or your own display) is automatically opened whenever a trigger control's value matches a trigger value.

You can also create a Goto Display button that the operator can press to open the alarm display. For information about configuring a Goto Display button and specifying the display to open, see Chapter 10.

Closing the display

The operator can close the display by pressing a Close Display button.

How the Alarm list works

At runtime, when a trigger control at the data source matches a message's trigger value, an alarm appears in the Alarm list. The Alarm list can be in the [ALARM] or [HISTORY] display, in an alarm display you have created, or can be placed on any display in your project.

You can use multiple Alarm lists, in the same display or in different displays. Each Alarm list displays information from the same alarm log file, although you can configure different lists to display different information (all alarms or only unacknowledged alarms).

What is displayed

- If you configure the list to display a header, a heading bar containing column headings appears at the top of the list.
- If you configure the list to display the alarm time or acknowledge time, these columns appear in the list.
- If the list is configured to show unacknowledged alarms only, only alarms that haven't been acknowledged appear in the list. The acknowledge time column, if any, is always blank.
- If the list is configured to show all alarms, when an alarm has been acknowledged, an asterisk (*) appears at the left end of the row, and the acknowledge time appears in the acknowledge time column, if any.
- If the message is too long to fit in the object, the last displayed character is replaced with an asterisk.
- The number of alarm messages that fits in the display depends on the height of the Alarm list and the list's font size.
- Alarms are listed with the newest alarms on top.

How the list scrolls

- When a display containing an Alarm list is opened, the highlight bar is at the top of the list, on the most recent alarm. As new alarms come in, the old alarms scroll down, but the highlight remains at the top.
- If the operator highlights an alarm other than the top one in the list (by using the Move Down button), and new alarms come in, they appear at the top of the list and all other alarms, including the highlighted alarm, scroll down.

The highlighted alarm never scrolls off the bottom of the list. Therefore, once the list fills it stops scrolling, and the operator is unable to see new alarms that come in above the top alarm in the list.

- If the operator scrolls up to the top of the list (using the Move Up button), the top alarm is highlighted. As new alarms come in the old alarms scroll down but the highlight remains at the top, on the most recent alarm.

Using buttons with the Alarm list

Alarm buttons

You can use these alarm buttons to interact with the Alarm list:

This button	Does this
Acknowledge Alarm	Acknowledges and silences the selected alarm.
Acknowledge All Alarms	Acknowledges and silences all currently unacknowledged alarms.
Silence Alarms	Silences the audio indicator for all alarms (Windows 2000 projects only).
Clear Alarm History	Removes all alarms from the alarm log file and all Alarm lists. If the Ack control is assigned for any of the alarm triggers, the operator is prompted to acknowledge all alarms before clearing them.

You can assign any caption you choose to the labels on the alarm buttons.

You can link the Acknowledge Alarm button to a specific Alarm list, or configure the button to work with whichever Alarm list is selected in the graphic display. This option is useful if you have multiple Alarm lists in the same graphic display. For more information, see page 10-9.

For information about configuring alarm buttons, see Chapter 10. For information about how the alarm buttons work at runtime, see page 13-29.

Key buttons

You can also use these Key button graphic objects to interact with the Alarm list:

This button	Does this
Move Up	Scrolls up one row in the list.
Move Down	Scrolls down one row in the list.

This button	Does this
Page Up	Moves the highlight bar up one page in the list.
Page Down	Moves the highlight bar down one page in the list.
Home	Moves the highlight bar to the top alarm in the list.
End	Moves the highlight bar to the bottom alarm in the list.
Enter	Acknowledges the currently highlighted alarm.

You can link Key buttons to a specific Alarm list, or configure the buttons to work with whichever object is selected in the graphic display. For more information, see page 10-9.

For information about creating graphic objects, see Chapter 9. For information about configuring buttons, see Chapter 10.

Using alarm buttons to acknowledge, silence, and delete alarms

Acknowledging messages does not remove them from the alarm log file. You can still display acknowledged alarms in an Alarm list that is configured to show all alarms.

Acknowledging the selected alarm

When the operator presses the Acknowledge Alarm button, an Enter button object, or the Enter key on an external keyboard or keypad, the selected alarm is acknowledged and the audio indicator for the alarm, if any, is silenced.

This is what happens when the alarm is acknowledged:

- If assigned, the alarm trigger's Ack control is set to the alarm trigger value at the data source. The value is held as long as the operator presses the button, or for the notification hold time, whichever is longer.

  If the hold time is still in effect and the operator acknowledges a new instance of the same alarm, the new acknowledgment is ignored.
- If the list is configured to display unacknowledged alarms only, the alarm is removed from the list. The highlight bar moves up to the next unacknowledged alarm, unless it is already on the top unacknowledged alarm.

- If the highlight bar is on an acknowledged alarm when the operator presses the Acknowledge Alarm button, the button press is ignored.

Acknowledging all alarms

When the operator presses the Acknowledge All Alarms button, all unacknowledged alarms in the system are acknowledged.

This is what happens when all alarms are acknowledged:

- For each alarm trigger to which an "Acknowledge all" value is assigned, the specified "Acknowledge all" value is sent to the trigger's Ack control. The value is held as long as the operator presses the button, or for the notification hold time, whichever is longer. Then the control's value is reset to 0.

  If the "Acknowledge all" value is not assigned for a trigger, no value is sent to the trigger's Ack control.

  If the hold time for any alarm is still in effect and the operator presses Acknowledge All Alarms, the button press is ignored.

- If the list is configured to display unacknowledged alarms only, all alarms are removed from the list.

Silencing alarms

When the operator presses the Silence Alarms button, any audible signal triggered by an alarm is silenced and the Silence control is set to 1 for the notification hold time. Then the control's value is reset to 0.

If the hold time for any alarm is still in effect and the operator presses Silence Alarms, the button press is ignored.

The audio alarm indicator is available for projects running in Windows 2000 only.

Deleting messages

When the operator presses the Clear Alarm History button, all alarms in the system are deleted from the alarm log file and from all Alarm lists. For information about the alarm log file, see page 13-5.

If the Ack control is assigned for any of the alarm triggers, the operator is prompted to acknowledge the unacknowledged messages before deleting them. If the operator chooses to acknowledge the alarms, the "Acknowledge all" value (if any) is sent to the Ack control before deleting the messages. If the Ack control is not assigned, or if the operator chooses not to acknowledge alarms, all messages are deleted immediately.

Chapter

14 Creating information messages

This chapter describes:

- preparing to set up information messages
- how information messages work
- steps for setting up information messages
- using the Information Messages and Information Setup editors
- creating information messages
- setting up how messages are displayed
- the [INFORMATION] display
- creating your own information message display
- opening and closing the information message display
- how the Information Message display graphic object works
- changing the information message file used at runtime

About information messages

Use information messages to give the operator messages about the process, prompts or instructions, and information about current states.

When to use information messages

Use information messages to give the operator information no matter which display is open. To give the operator information in a specific graphic display while the display is open, use local messages.

For details about local messages, see page 8-29.

Preparing to set up information messages

As your project is running, information is continually sent to the data source about the state of various processes. For example, your project might be monitoring whether a valve is open or closed, or the temperature in a boiler. Values representing the status of these processes are sent to the data source.

The data source

The data source can be memory or a device such as a programmable controller or an OPC server. RSView writes values to and reads values from the data source. The data source is configured to exchange information (in the form of numeric or string values) between RSView and the physical machine that your project is controlling.

Identifying the tags and values to monitor

To set up information messages, determine which tags associated with machine processes to monitor, and identify the values for those tags that will trigger information messages.

For information about creating tags, see Chapter 7.

How information messages work

These are the key parts of the information message system:

- Information message file—a text file containing a list of messages, with a numeric trigger value for each message.
- Information message display—a graphic display that opens at runtime and displays information messages.
- Value control—a tag or expression. When the value of this control matches a message's trigger value, the information message display opens with the associated message displayed.

The following example shows how the key parts of the information message system work together.

Example: Configuring the data source to display information messages

This example shows how to configure the data source to notify the operator that a conveyor belt has stopped. In this example, there are two conveyor belts whose statuses are monitored.

1. Create a digital tag called Conveyor_1_Status. This tag points to an address in a programmable controller that is linked to a sensor on the first conveyor belt. When the belt is running, the tag's value is 0. When the belt stops running, the value changes to 1.

2. Create a second digital tag called Conveyor_2_Status, pointing to an address in the programmable controller that is linked to a sensor on the second conveyor belt. When the belt is running, the tag's value is 0. When the belt stops running, the value changes to 1.

3. Create an analog tag called Information_Messages, and configure the data source to send a value of 1 to this tag when Conveyor_1_Status has a value of 1. Configure the data source to send a value of 2 to the Information_Messages tag when the Conveyor_2_Status tag has a value of 1.

4. In the Information Messages editor, create these messages with trigger values matching the values that will be sent to the Information_Messages tag:

Trigger value	Message
1	Conveyor belt 1 has stopped.
2	Conveyor belt 2 has stopped.

   Save the message file with the name "Conveyor belts."

5. In the Information Setup editor, assign the Information_Messages tag to the Value control, and select the Conveyor belts message file.

At runtime, when the value of Conveyor_1_Status changes to 1, the first message is displayed (in the default information message display). When the value of Conveyor_2_Status changes to 1, the second message is displayed.

Information messages and trigger values

Create messages associated with each tag value change that you want to inform the operator about. Assign each message a trigger value, and configure the data source to send the trigger value to the Value control.

The trigger value can be any non-zero integer value (positive or negative). Trigger values do not need to be contiguous, but they must be unique for each message. For example, you could use trigger values of 1, 2, and 3, or values of 10, 20, and 30.

Trigger values cannot be 0. Digital tags have two possible values, 0 and 1. Therefore, if you use a digital tag you can only use the value 1 to trigger a message. If you want to use a digital tag to trigger two different messages, create an expression that adds 1 to the digital tag's value. That way, you can use the trigger values 1 and 2.

If you use an analog tag or an expression, you can use any non-zero integer or floating point value to trigger an alarm. Floating point values are rounded to the nearest integer. For information about how values are rounded, see page 7-3.

You can create multiple information message files, but you can use only one message file at runtime. For information about using a different message file, see page 14-12.

The information message display

RSView comes with a preconfigured information message graphic display called [INFORMATION]. It contains an Information Message display graphic object and buttons for acknowledging the displayed message and closing the display. By default, the [INFORMATION] graphic display opens automatically at runtime when an information message is generated.

You can accept the default, edit the [INFORMATION] display, or create your own display. Another option is to place the Information Message display object in a graphic display that doesn't open automatically when a message is generated.

For more information about the [INFORMATION] display, see page 14-10. For information about creating your own information message display, see page 14-11. For information about the Information Message display graphic object, see page 14-12.

Summary of steps

Follow these steps to configure information messages:

1. In the Information Messages editor, set up the messages and their trigger values.
2. In the Information Setup editor, specify the graphic display to open when information messages occur, and the file of messages to display.

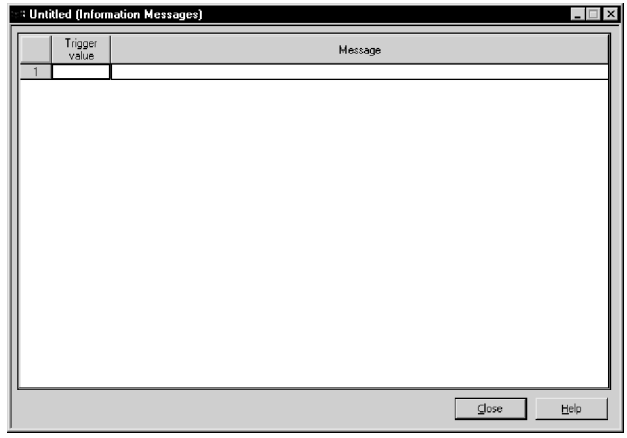
   Also use this editor to assign a tag or expression to the Value control. If you want the operator to acknowledge messages, assign the Ack control and specify the acknowledge hold time.

3. In the Startup editor, ensure that the Information messages box is checked (it is checked by default). See Chapter 20.
4. If desired, in the Graphics Display editor modify the default [INFORMATION] display, or create your own graphic display to use for information messages. For example, if you don't want the operator to acknowledge messages, edit the default display to remove the Information Acknowledge button.

   For information about graphic displays, see Chapter 8.

Using the Information Messages editor

Use the Information Messages editor to create one or more files of information messages. Each file is stored in the editor's folder. You can open and work on multiple message files at the same time.



You can define up to 10,000 messages in each message file.

Creating information messages

To create information messages:

1. Open the Information Messages editor.
2. Specify these properties for the message:

   Trigger value
   Type a non-zero integer value. When the Value control changes to this value, the associated message is generated. This column cannot be blank.

   For more information about trigger values, see page 14-3.

Message
Type the message, up to 256 characters. You can use the new line characters, \n, to specify that the message continues at the beginning of the next line.

3. Repeat steps 1 and 2 to create additional messages.
4. To sort the messages by trigger value, highlight the rows to sort, right-click in any of the selected rows, and then click Sort.


Save tool

5. On the File menu click Save, or click the Save tool.
6. In the Component name box, type a name for the file, and then click OK.
7. Click Close.

Deleting messages

To delete a message:

- Select any cell in the message's row, and then press Delete. Shift-click in a column to select cells for multiple messages.

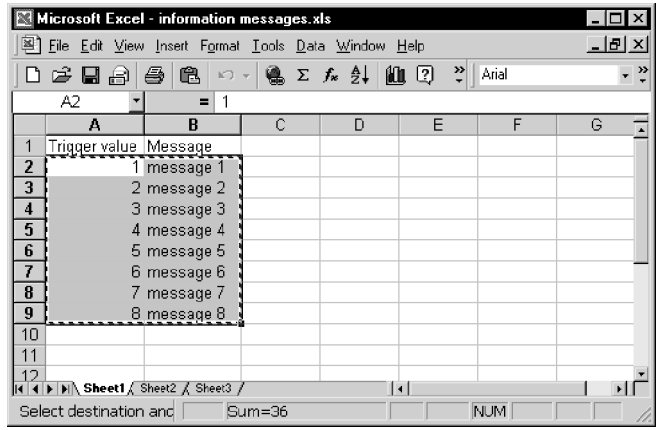
Copying messages

To copy a message:

1. In the Message column, select one or more messages and then press Ctrl-C (or right-click the selected cells and then click Copy).
2. In the Message column, click the cell to paste the first message in, and then press Ctrl-V (or right-click the cell and then click Paste).

Creating messages in a spreadsheet application

You can also create information messages in a spreadsheet application such as Microsoft Excel, and then copy the messages into the Information Messages editor.



To create messages in a spreadsheet application:

▶ Create one message per row, as follows:

- In column 1, type the trigger value.
- In column 2, type the message.

Type the messages in the order you want them to appear in the Information Messages editor.

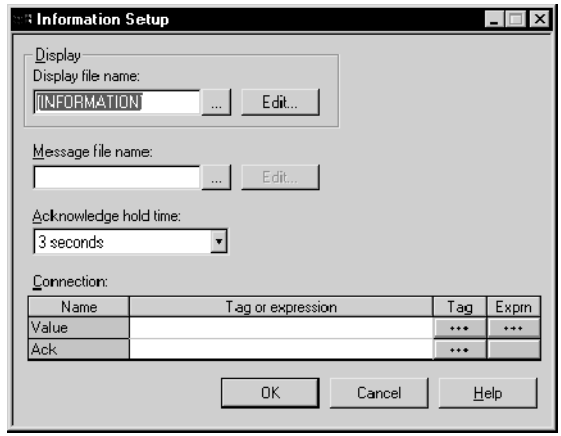
To copy the messages into the Information Messages editor:

1. In the application where you created the messages, select the cells for the trigger values and messages to copy, and then press Ctrl-C (or right-click the selected cells and then click Copy).
2. In the Information Messages editor, click in the Trigger value column for the first message and then press Ctrl-V (or right-click in the column and then click Paste).

   The cell contents from the spreadsheet application are pasted into the current and succeeding rows.

Setting up how information messages are displayed

Use the Information Setup editor to set up how information messages are displayed.



To set up how information messages are displayed:

1. Open the Information Setup editor.
2. In the "Display file name" box, select the graphic display to use to display information messages. Click the Browse button to select from a list of all the graphic displays in the project.

   If you clear the box, no display is opened when the Value control changes to an assigned trigger value.

   For information about the different graphic displays you can use to display information messages, see page 14-4.

Browse button

3. To edit the selected graphic display, click Edit. The Graphics Display editor opens with the selected display open for editing.

   For information about graphic displays, see Chapter 8.
4. In the "Message file name" box, select the file of information messages to display. Click the Browse button to select from a list of all the information message files in the project.

   If you leave the box blank, no messages are ever displayed. If you specify a message file, it is used for all Information Message display objects you place in your graphic displays.

   For information about creating information message files, see page 14-5.

5. To edit the selected message file, click Edit. The Information Messages editor opens with the selected message file open for editing.

6. Specify these settings:

   Acknowledge hold time
   Select the hold time to use when acknowledging information messages. RSView sets the value at the Ack control to 1 for the specified length of time (or as long as the operator presses the Information Acknowledge button, whichever is longer), then resets the control to 0.

   Connection
   Assign a tag or expression to these controls:

   - Value—Assign a tag or expression to this control. The information message graphic display opens when the Value control at the data source changes from 0 to a non-zero value.

     If you assign an expression, RSView calculates the value of the expression and opens the display when the expression value changes from 0 to a non-zero value.

   - Ack—Assign a digital tag to this control to notify the data source when the operator acknowledges an information message.

   For information about assigning tags and expressions, see page 7-28.

7. Click OK.

What to do next

Now that you've configured information messages:

- In the Startup editor, ensure that the Information messages box is checked (it is checked by default). For more information, see Chapter 20.
- If desired, in the Graphics Display editor, modify the default [INFORMATION] display, or create your own graphic display to use for information messages. For example, if you don't want the operator to acknowledge information messages, edit the default display to remove the Information Acknowledge button.

  See the topics in the remainder of this chapter.

The [INFORMATION] display

When you create a project, it comes with a graphic display called [INFORMATION]. The [INFORMATION] display is the default display for showing information messages at runtime.

You can use the [INFORMATION] display as is, or modify the display. For example, you can change the color of the objects, or add and remove buttons. Or, you can create your own graphic display to use for displaying information messages. In the Information Setup editor, specify the display to use.

The Information Message display graphic object

The [INFORMATION] display contains an Information Message display graphic object, which lists one information message at a time.

For information about how the Information Message display object works at runtime, see page 14-12.

Buttons in the [INFORMATION] display

The [INFORMATION] display contains these buttons:

This button	Does this
Ack (Information Acknowledge)	Acknowledges the information message.
Close (Close Display)	Closes the information message graphic display.

You can assign any caption you choose to the labels on the buttons.

Using the Information Acknowledge button

When the operator presses the Information Acknowledge button, if the Ack control is assigned, the control value is set to 1 at the data source. The value is held as long as the operator presses the button, or for the acknowledge hold time, whichever is longer. Then the control is reset to 0.

Creating your own information message display

You can create your own graphic display for displaying information messages, containing an Information Message display graphic object and the buttons you want to use in the display.

If you create your own graphic display, use an On Top display and select the Cannot Be Replaced option.

For more information about the Information Message display graphic object, see page 14-12. For information about creating graphic displays and graphic objects, see Chapters 8 and 9.

Opening and closing the information message display

Opening the display

The information message display you specify in the Information Setup editor (either the default [INFORMATION] display or your own display) is automatically opened whenever the Value control's value matches a trigger value.

You can also create a Goto Display button that the operator can press to open the information message display. For information about configuring a Goto Display button and specifying the display to open, see Chapter 10.

Closing the display

The information message display closes when the Value control's value changes to 0.

To automatically close the display when the operator acknowledges a message, configure the data source to set the Value control to 0 when the Ack control is set to 1.

The operator can also close the display by pressing a Close Display button.

How the Information Message display graphic object works

At runtime, when the Value control at the data source changes from 0 to a non-zero value, the assigned information message display opens. If the value matches a message's trigger value, the associated information message appears in the Information Message display graphic object. The object can be in the default [INFORMATION] display, in an information message display you have created, or can be placed in any display in your project.

What is displayed

- If the Value control is unassigned, the information message graphic display never opens automatically. If the operator opens a graphic display containing an Information Message display object, the object is blank.
- The Value control is rounded up to the nearest integer. If the value does not match any of the trigger values in the specified message file, the display is filled with questions marks (?).

  For information about how values are rounded, see page 7-3.
- If the message is too long to fit in the Information Message display object, the last displayed character is replaced with an asterisk (*).
- When the Value control's value is 0, the information message graphic display is closed.

Changing the message file used at runtime

Your project can use only one message file at a time. Follow this procedure to switch message files.

To use a different message file:

1. Shut down the project.
2. Open RSView Studio and open the project.
3. In the Information Setup editor, specify the new information message file.
4. Create the runtime project. See Chapter 20.
5. Transfer the runtime project to the runtime platform.

For information about transferring projects to a Windows CE platform, see Chapter 21.

For information about transferring projects to a Windows 2000 platform, see Chapter 22.

6. Run the new project.

Chapter

15 Setting up activity logging

This chapter describes:

- what activity logging is
- message severities and categories of system activities
- displaying activity messages during project development
- displaying activity messages at runtime
- steps for changing the default settings for runtime activity logging
- using the Activity Log Setup editor
- the [ACTIVITY] display
- creating your own activity display
- opening and closing the activity display
- how the Activity list works

About activity logging

While you develop your project, use activity logging to track what the system is doing and to ensure you've set things up the way you intend. At runtime, use activity logging to show the operator messages about system activity.

Message severity

There are three different severities of activity messages:

- Information—messages about activities such as tag read and write activity, users logging in and out, and server usage (RSView uses servers to control different aspects of runtime operations, such as data logging and alarm monitoring).

- Warnings—messages about activities such as tag read and write failures, server failures, or problems opening and closing graphic displays.
- Errors—messages about activities such as communication errors, invalid values, connection failures, and unassigned controls.

Activity messages are preceded by a white, yellow, or red icon. White indicates information, yellow indicates a warning, and red indicates an error. The content of the messages is provided by the system—you don't need to do anything to set up message content.

You can choose which message severities to log.

Which activities can be logged?

While your project is running, various system activities occur. You can log any or all of these categories of system activity:

- application messages (about server status, server activity, and problems running the project)
- communication errors (from the communication network)
- macro usage
- tag write activity
- tag read activity (normal scanning is not logged as a tag read)

For each category of system activity, you can specify whether to display any or all severities of messages.

Displaying activity messages during project development

During project development, activity messages are displayed when you test your graphic displays. The messages are displayed in the activity bar at the bottom of the RSView Studio window.

By default, all warning and error messages are displayed.

For information about testing graphic displays, see page 8-9.

To display the activity bar:

▶ On the View menu, click Activity Bar. A check mark beside the menu item indicates the Activity Bar is displayed.

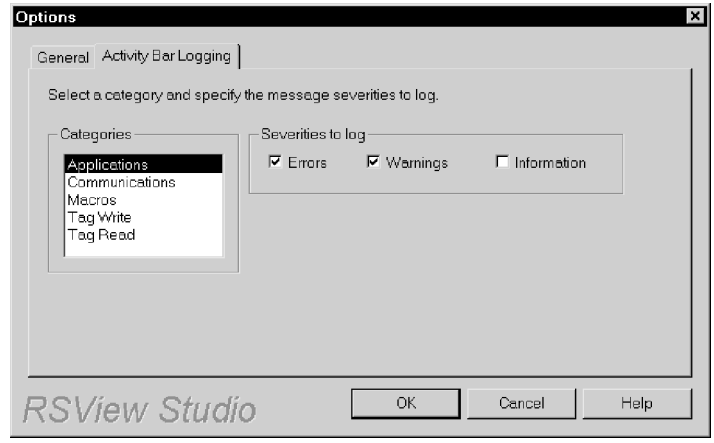
For information about moving, resizing, and clearing messages in the activity bar, see page 2-4.

If you don't want to display activity messages:

▶ On the View menu, deselect Activity Bar. The menu item is deselected when no check mark appears.

To change the categories and severities of messages that are displayed:

1. On the Tools menu, click Options.
2. Click the Activity Bar Logging tab.



3. In the Categories list, click a category of system activities.
4. To display a severity of messages, check the box for the severity. Clear the check box for the severity of message you don't want to display. To disable all messages for the category, clear all the boxes.
5. Repeat steps 2 and 3 to set up additional categories and severities of messages.
6. Click OK.

Displaying activity messages at runtime

At runtime, you can display activity messages in a graphic display. You can also print the messages.

Printed messages list the date and time, the category of system activity, and the message text.

By default, your project is set up to display errors and warnings (but not information messages) for all categories of system activity at runtime. If you want to use the default settings, you don't need to do anything further to set up activity logging.

If you don't want to display activity messages at runtime:

- In the Activity Log Setup editor, clear the Display name box, or clear the three "Open display automatically when" boxes.

The activity message display

RSView comes with a preconfigured activity message graphic display called [ACTIVITY]. It contains an Activity list graphic object, which lists the activity messages, and buttons for scrolling through the list of messages, clearing messages, and closing the display. By default, the [ACTIVITY] graphic display opens automatically at runtime when an activity warning or error message is generated.

You can use the [ACTIVITY] display as is, edit the display, or create your own display. Another option is to place the Activity list object in a graphic display that doesn't open automatically when a message is generated.

For more information about the [ACTIVITY] display, see page 15-7. For information about creating your own activity message display, see page 15-7. For more information about the Activity list, see page 15-8.

Summary of steps

Follow these steps to change the default settings for runtime activity logging:

1. In the Activity Log Setup editor, specify the categories of system activity and severities of messages to log, how to display information at runtime, the graphic display to use, and the maximum number of messages to store in memory.
2. If desired, in the Graphics Display editor modify the default [ACTIVITY] display, or create your own graphic display to use for activity messages. For example, if you don't want the operator to clear all messages at once, edit the default display to remove the Clear All button.

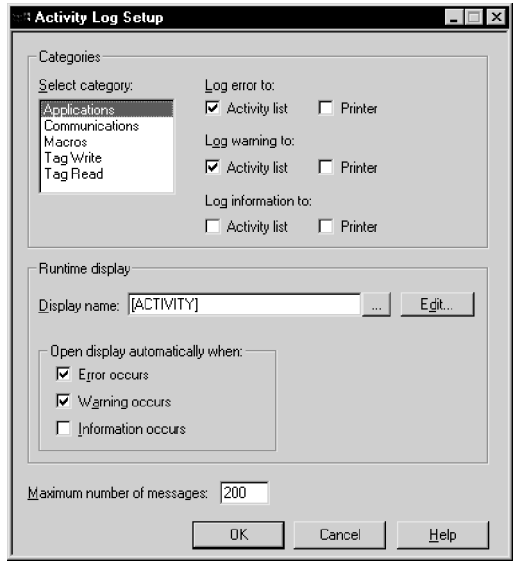
   For information about graphic displays, see Chapter 8.

Using the Activity Log Setup editor

Use the Activity Log Setup editor to set up how activity logging works at runtime.

To set up how activity logging works at runtime:

1. Open the Activity Log Setup editor.



2. In the Select category list, click a category of system activities.
3. Select one or both destinations for logging errors, warnings, and information messages. If you don't want to log to either destination, clear the check boxes.

   To print activity messages at runtime, check the appropriate Printer boxes and set up a printer on the runtime terminal.

   For information about specifying the printer to use at runtime, see Chapter 23.
4. Repeat steps 2 and 3 to set up logging destinations for additional categories of system messages.

Browse button

5. In the Display name box, select the graphic display to use to display activity messages. Click the Browse button to select from a list of all the graphic displays in the project.

   If you don't want to display activity messages at runtime, clear the box.

For information about the different graphic displays you can use to display activity messages, see page 15-4.

6. To edit the selected graphic display, click Edit. The Graphics Display editor opens with the selected display open for editing.

   For information about graphic displays, see Chapter 8.

7. Specify these settings:

   Open display automatically when
   Specify when to open the activity display. Select any or all options:

   - Error occurs—RSView opens the activity display when a new error occurs.
   - Warning occurs—RSView opens the activity display when a new warning occurs.
   - Information occurs—RSView opens the activity display when a new information message occurs.

   If you don't want the activity display to open automatically, clear all the check boxes.

   The specified categories and severities of activity messages are logged to the Activity list whether or not you set up the activity display to open automatically.

   If you elect not to open an activity display automatically, you can still display activity messages in any Activity list graphic object, in any graphic display. Create a Goto Display button that the operator can use to open the graphic display containing the Activity list.

   Maximum number of messages
   Type the maximum number of messages to store in memory, up to 2000. When this number is reached, the oldest message is deleted to make room for a new message. When you stop running the project, the messages are removed from memory.

8. Click OK.

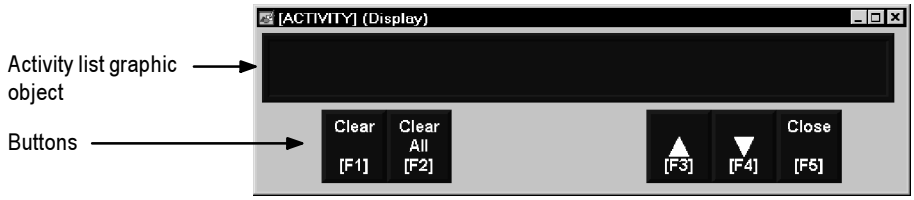
What to do next

Now that you've set up activity logging, you can, if you like, use the Graphics Display editor to modify the default [ACTIVITY] display or to create your own graphic display for activity messages. For example, if you don't want the operator to clear all messages at once, edit the default display to remove the Clear All button.

See the topics in the remainder of this chapter.

The [ACTIVITY] display

When you create a project, it comes with a graphic display called [ACTIVITY]. The [ACTIVITY] display is the default display for showing activity messages at runtime.



You can use the [ACTIVITY] display as is, or modify the display. For example, you can change the color of the objects, or add and remove buttons. Or, you can create your own graphic display to use for displaying activity messages. In the Activity Log Setup editor, specify the display to use.

The Activity list graphic object

The [ACTIVITY] display contains an Activity list graphic object, which lists the activity messages. For more information about the Activity list, see page 15-8.

Buttons in the [ACTIVITY] display

The [ACTIVITY] display contains activity log buttons for clearing the messages, as well as buttons for scrolling the list and closing the display. For information about how the buttons work, see page 15-9.

Creating your own activity display

You can create your own graphic display for displaying activity messages, containing an Activity list graphic object and the buttons the operator needs for using the display.

If you create your own graphic display, use an On Top display and select the Cannot Be Replaced option.

For more information about the Activity list, see page 15-8. For information about the buttons you can use with the list, see page 15-9. For information about creating graphic displays and graphic objects, see Chapters 8 and 9.

Opening and closing the activity display

Opening the display

The activity display you specify in the Activity Log Setup editor (either the default [ACTIVITY] display or a display you create) is automatically opened whenever an activity message of the specified severity occurs.

The display remains open until the operator closes the display.

If you decide not to open the activity display automatically, you can create a Goto Display button that the operator can press to open the activity display. For information about configuring a Goto Display button and specifying the display to open, see Chapter 10.

Closing the display

The operator can close the display by pressing a Close Display button.

How the Activity list works

At runtime, when a category and severity of system activity occurs that you've configured to log, a message about the activity is added to the Activity list. The Activity list can be in the [ACTIVITY] display, in an activity display you have created, or can be placed on any display in your project.

You can use multiple Activity lists, in the same display or in different displays. Each Activity list displays the same information.

What is displayed

- If the message is too long to fit in the list, the last displayed character is replaced with an asterisk (*).
- The number of activity messages that is visible at one time depends on the height of the Activity list and the list's font size.
- Activity messages are listed with the newest activity message on top.

Using buttons with the Activity list

Activity buttons

You can use these activity buttons to interact with the Activity list:

This button	Does this
Activity Clear	Clears the selected message from all Activity lists in the project.
Activity Clear All	Clears all activity messages from all Activity lists in the project.

You can assign any captions you choose to the labels on the activity buttons.

You can link the Clear button to a specific Activity list. When the operator presses the button, the selected message is deleted from the linked activity list, and also from any other activity lists in the project. For information about linking buttons to objects, see page 10-9.

Key buttons

You can also use these Key button graphic objects to interact with the Activity list:

This button	Does this
Move Up	Scrolls up one row in the list.
Move Down	Scrolls down one row in the list.
Page Up	Moves the cursor up one page in the list.
Page Down	Moves the cursor down one page in the list.
Home	Moves the cursor to the top message in the list.
End	Moves the cursor to the bottom message in the list.

You can configure the Key buttons to work only with the specified Activity list, or to work with whichever object is selected in the graphic display. For information about linking buttons to objects, see page 10-9.

For information about creating graphic objects, see Chapter 9. For information about configuring buttons, see Chapter 10.

Chapter

16 Setting up data logging

This chapter describes:

- data logging and the trend graphic object
- data log models
- the different data logging methods
- data storage locations
- steps for configuring data logging
- using the Data Log Models editor
- creating and configuring data log models
- changing the data log model used at runtime
- problems with data logging

Data logging and the trend graphic object

Use data logging to keep a permanent record of tag data. You can record tag data as tag values change, or on a periodic basis (for example, every minute).

You can use the trend graphic object to display the data that you've logged. At runtime, when the operator opens a graphic display containing a trend, the trend displays values from the data log file for the data log model that is running. The data log model specifies which data to collect in the data log file.

In addition to displaying historical values from the data log file, trends can display current tag values for the tags in the model. Trends can also display current values for tags or expressions that are not in a data log model. For more information about trends, see Chapter 17.

What is a data log model?

A data log model defines which tags to log data for, as well as how and where the data is logged. For information about creating a data log model, see page 16-5.

You can configure multiple data log models, but you can run only one data log model at a time. For information about running a different data log model, see page 16-10.

Tags in the data log model

The data log model can contain up to 100 analog or digital tags.

You cannot use string tags, block tags, tag placeholders, or expressions in your data log model.

Deleting tags from the model

If you delete a tag from the data log model, previously logged data for the tag is not accessible unless you add the tag back to the model.

Data log files

As soon as the project starts running, RSView begins logging tag values to the data log files. When the maximum number of data points have been logged, the oldest data is deleted to make room for the new data. RSView supplies data from the log files to the trend object for the requested tags and time span.

The data log files are retained when you restart a project after a shutdown or power loss. You can delete the log files from the runtime computer at project startup.

For information about deleting the log files, see Chapter 23.

File names

RSView creates two data log files:

- *Data Log Model Name*.log
- *Data Log Model Name*.tag

You'll need this information if you log to a custom path and want to delete the log files manually.

Data logging methods

There are two methods for triggering data logging. You can set up logging so tag values are logged:

- periodically (periodic logging)
- only when a tag value changes (on-change logging)

Logging periodically

Periodic logging is used to take a snapshot of all tag values at a particular point in time. Tag values are logged even if there has been no change.

Do not set the logging interval to be faster than the scan class rate or OPC update rate, or you will log redundant data. For information about scan classes, see page 5-17. For information about OPC update rates, see page 6-13.

You cannot change the periodic log rate at runtime.

Logging on change

On-change logging is used to log only tags whose values have changed. Before logging occurs, the change must equal a specified percentage of change in the tag value.

The percentage is based on the tag's minimum and maximum values as configured in the Tag Database editor. Only the tags that change by the specified percentage are logged. If you specify a percentage of 0, all changes are logged.

You can also specify a heartbeat rate, to log values at specified times even if no tag value changes have occurred. The heartbeat ensures that the data in the log file is current. The heartbeat is also a good way to ensure that data logging is working and acquiring valid data. If you specify a heartbeat of 0, the heartbeat is not used.

Data storage locations

You can store data log files in any one of these locations:

- on the runtime computer
- on another computer on the network
- on a PCMCIA card (for RAC6182 projects only)

Logging to a network location

To log data to a network location, the runtime computer must be logged in to the same domain as the computer on the network. To do this, the user must have access rights for the domain.

For information on logging in to a Windows domain, see page 24-1.

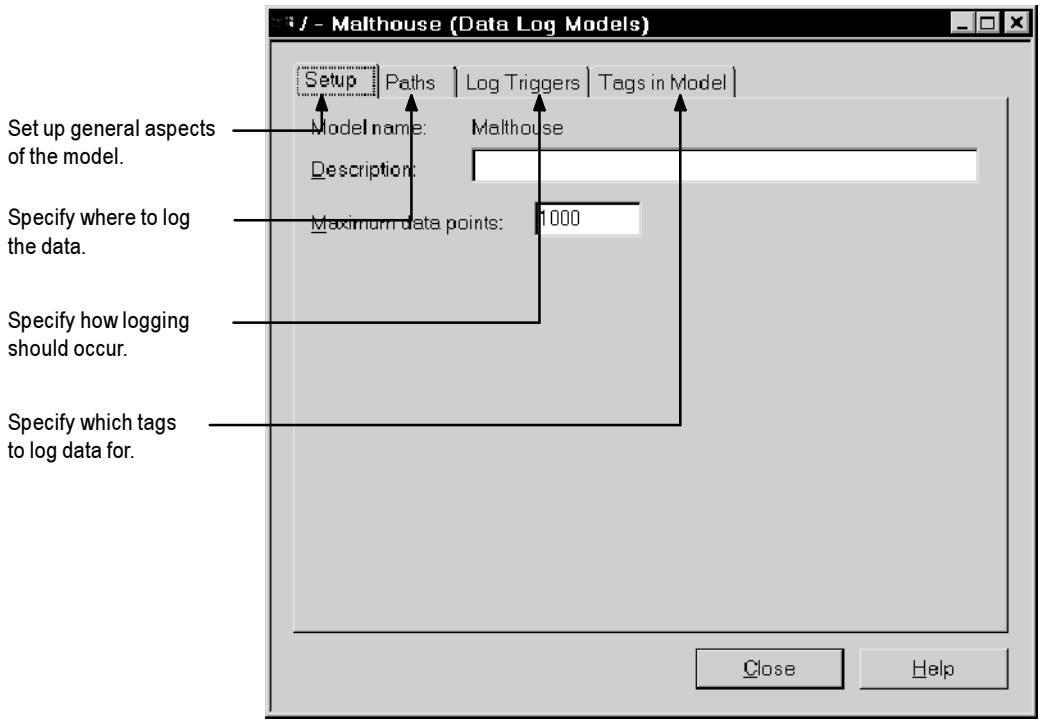
Summary of steps

Follow these steps to set up data logging:

1. In the Data Log Models editor, set up a data log model that specifies how many log values to store, the conditions that trigger data logging, where to log data, and which tags to monitor.
2. In the Startup editor, turn on data logging by selecting the Data logging check box. Also use this editor to specify the data log model to use at runtime. See Chapter 20.
3. In the Graphics Display editor, create a graphic display containing the trend graphic object, and set up how the object looks, which tag values to display, the start time, and the time span for the data. Also specify the name of the data log model to use. See Chapters 8 and 17.

Using the Data Log Models editor

Use the Data Log Models editor to create one or more data log models. Each data log model is a file stored in the editor's folder—you can open and work on multiple models at the same time.



Creating data log models

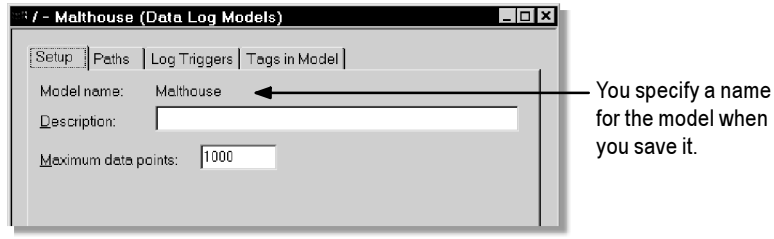
Save tool

To create a data log model:

1. Open the Data Log Models editor.
2. Configure the model in the tabs of the editor, as described in the sections that follow.
3. On the File menu click Save, or click the Save tool.
4. In the Component name box, type a name for the model, and then click OK.
5. Click Close.

Configuring data log models

Specifying how much data to store

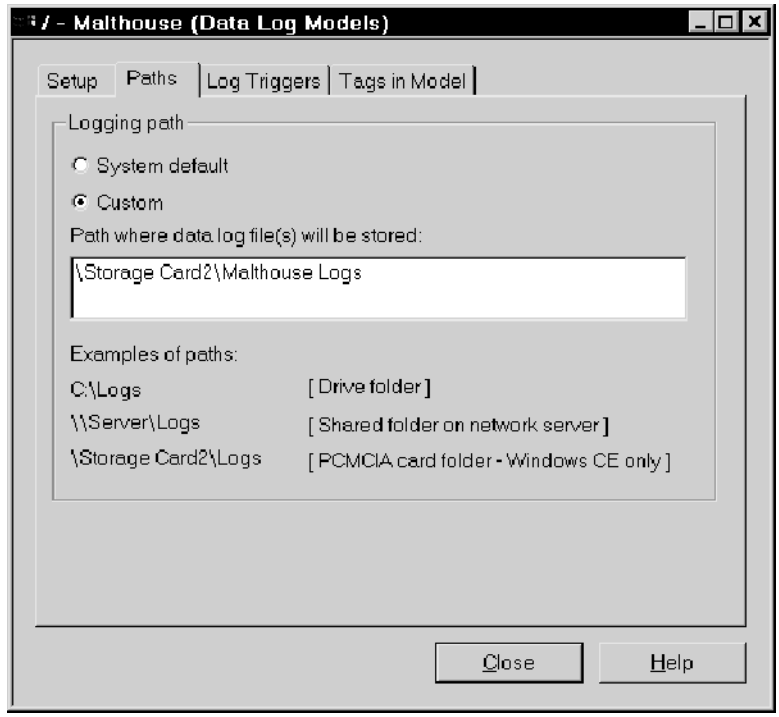


To specify the maximum amount of data to store:

1. In the Setup tab, type a description of the model, up to 50 characters. This is for your information only.
2. Type the maximum number of data values to store, between 100 and 300,000.

   When your data exceeds the limit, the oldest data is deleted from the data log file. The higher the limit, the more space the data log file requires on the runtime computer, or on the remote computer (if logging to a custom path on a remote PC).

Specifying where to store the data



To specify where to store the data:

▶ In the Paths tab, click System default or Custom.

System default
If you select this option, the location where log files are stored depends on the runtime platform.

- Log files for Windows 2000 projects are stored in this folder:

  \Documents and Settings\All Users\Documents\ RSView Enterprise\ME\Logs*Runtime Project Name*\ DLGLOG*Data Log Model Name*

- Log files for RAC6182 projects are stored in this folder:

  \Storage Card\Rockwell Software\RSViewME\Logs\ *Runtime Project Name*\DLGLOG*Data Log Model Name*

Custom
If you select this option, type the path to the folder where you want the log files to be stored. The path syntax depends on the runtime platform.

- For Windows 2000 projects, the path must contain a drive letter (such as C:\) or use the Universal Naming Convention (UNC) style.

  Paths using UNC style begin with two backslashes. For example, \\server\logs uses UNC style. In this example, logs is a shared folder on a network server.

- For RAC6182 projects, you can log to a location on the RAC6182 or to a PCMCIA card. For example, \Storage Card\Data\Logs specifies a location on the RAC6182.

  To log from the RAC6182 to a network folder, use UNC style.

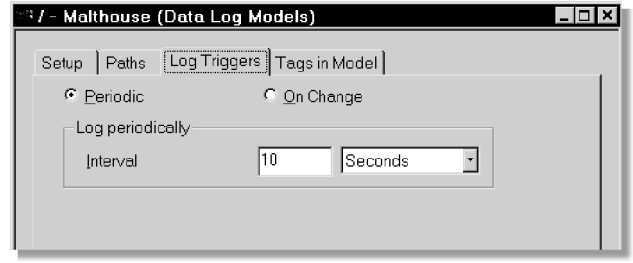
You can specify a path to a folder that does not exist. If it doesn't exist, it is created at runtime, as long as the user logged in to the runtime computer has folder creation rights at the specified location.

Specifying when to log data

To specify when to log data:

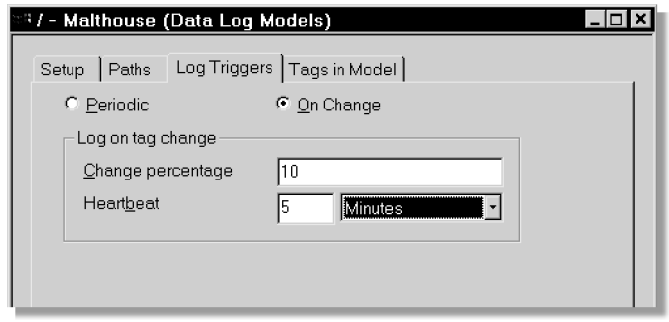
1. In the Log Triggers tab, click Periodic or On Change to specify whether logging takes place at regular intervals or when tag values change.
2. Fill in the boxes as follows:

   Log Periodically



   In the Interval box, type a time and click a time unit to specify how often tag values are logged. All tags in the model are logged each time this interval expires.

Log on tag change



In the Change Percentage box, type the percent the tag value has to change in order to trigger logging. To log all changes, type 0.

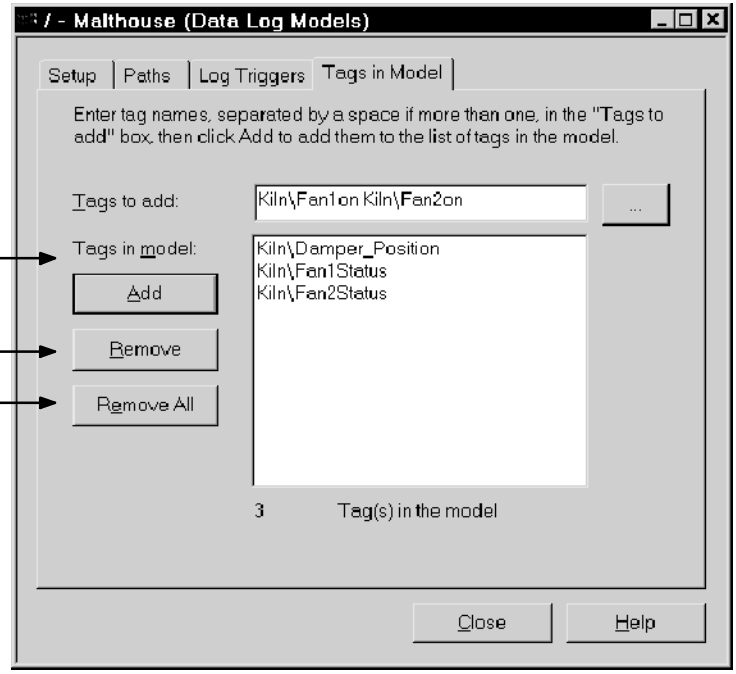
To specify how often tag values are logged even if no change has occurred, in the Heartbeat box type a time, and then click a time unit. If you do not want to use the heartbeat, type 0. If you type 0, tags values are logged only when a tag value changes.

Specifying the tags to log data for

The "Tags in model" box displays the tags that have been added to the model so far.

To remove a tag from the model, click it and then click Remove.

To remove all the tags from the model, click Remove All.




Browse button

To specify the tags to log data for:

1. In the Tags in Model tab, in the "Tags to add" box, specify the tags to log by doing one of the following:
   - Type the tag names, with a space between each tag name.
   - Click the Browse button to open the Tags dialog box, and then select tags. Shift-click or click and drag to select groups of tags. Ctrl-click to select multiple individual tags. Click OK when you're finished selecting tags.
2. Click Add. The tags listed in the "Tags to add" box move to the "Tags in model" box.

What to do next

Now that you've created the data log model:

- In the Startup editor, turn on data logging and specify the data log model to use at runtime. For more information, see Chapter 20.
- In the Graphics Display editor, create a display containing a trend graphic object, and configure the trend to display the values from the data log model. For more information, see Chapters 8 and 17.

Changing the data log model used at runtime

Your project can run only one data log model at a time. Follow this procedure to switch data log models.

To run a different data log model:

1. Shut down the project.
2. Open RSView Studio and open the project.
3. In the Startup editor, specify the new data log model.
4. Create the runtime project. See Chapter 20.
5. Transfer the runtime project to the runtime platform.

   For information about transferring projects to a Windows CE platform, see Chapter 21.

   For information about transferring projects to a Windows 2000 platform, see Chapter 22.
6. Run the new project.

Problems with data logging

Problems with data logging occur under these circumstances:

- If logging to a folder on a networked computer, and the runtime computer is not logged in to the Windows domain of the network computer, the log folder cannot be created. An error message is sent to the activity log.
- If logging to an invalid path, the log folder cannot be created. An error message is sent to the activity log.
- If the storage device becomes full due to lack of disk space, data logging stops and an error message is sent to the activity log. When sufficient disk space becomes available, data logging continues, but the data that would have been logged during the intervening time cannot be retrieved.
- If there is not enough disk space at project startup, the data log model does not start when the project starts. An error message is sent to the activity log.

Chapter

17 Configuring trends

This chapter describes:

- what trends are
- the parts of the trend graphic object
- the different chart types
- choosing colors, fonts, lines and markers for the trend
- testing the trend
- steps for creating trends
- creating and configuring trend graphic objects
- using objects from the Trends graphic library
- using buttons to control the trend at runtime
- printing trend data
- runtime errors for trends

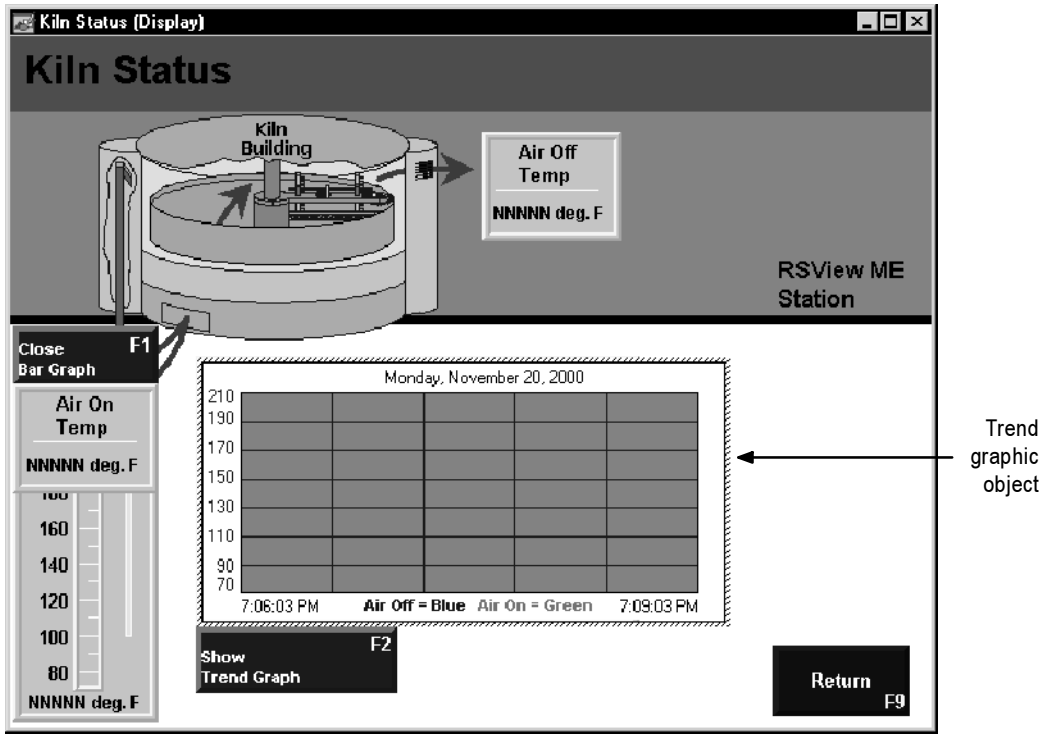
About trends

A trend is a visual representation of real-time or historical tag values. The trend provides operators with a way of tracking plant activity as it is happening.

You can:

- plot data for as many as eight tags on one trend
- create a trend that is part of a graphic display or acts as the entire graphic display
- plot data over time, or plot one variable against another in an XY Plot chart to show the relationship between them
- display isolated or non-isolated graphs. Isolated graphing places each pen in a separate band of the chart. With non-isolated graphing, pen values can overlap.
- create buttons to allow the operator to pause, scroll, and print the trend data

The illustration below shows a trend that has been added to a graphic display. You can view the Kiln Status display by opening the Malthouse sample project.



Current versus historical data

The data displayed in a trend can come from two sources. For current values, data comes from the value table as it is collected. The value table is a record of the most recent values collected from the data source, and is stored in temporary memory while the project is running.

For historical values, data comes from a data log model's log file, if a model is assigned to the trend. You can display both current and historical data in the same trend.

For information about data log models, see Chapter 16.

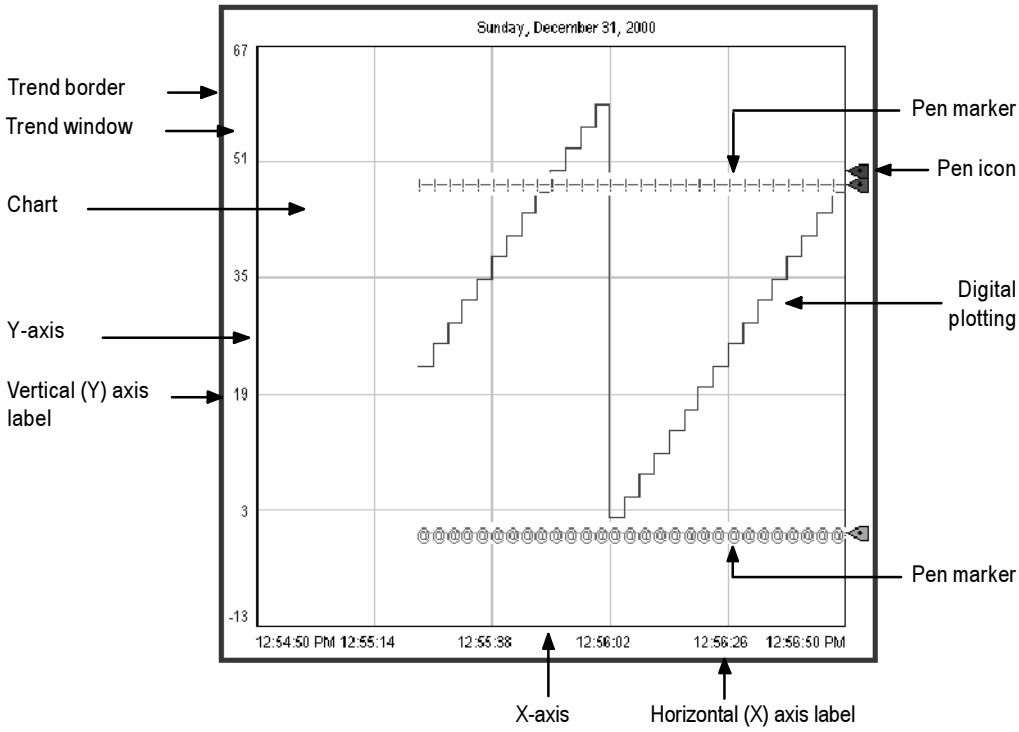
Time, date, and number formats

The trend is displayed using the time, date, and number formats you set up on the runtime computer.

For information about specifying time, date, and number formats on the RAC6182, see page 21-3. For information about specifying time, date, and number formats in Windows 2000, see page 22-3.

The parts of a trend

The illustration below shows a standard trend chart, with three pens and a two-minute time span. Two of the pens have markers. The third uses digital plotting. For more information about plot types, see page 17-22.



Trend border

The border appears around the trend object at runtime when the trend is selected. The border uses the highlight color for the graphic display, specified in the Behavior tab of the Display Settings dialog box.

Trend window

The area around the chart, between the border and the chart, is the trend window. You can use the Property Panel to specify whether the window is transparent or opaque. If it is opaque, you can specify its color.

Chart

The chart is the area of the trend in which values are plotted. It is bounded by the Y-axis on the left and the X-axis on the bottom. It contains the plotted trend data (shown using pen lines and pen markers), as well as grid lines (if you choose to display them).

Y-axis

The Y-axis is the left vertical edge of the chart. It is also known as the vertical axis.

Vertical axis labels

The vertical axis labels show the scale (range) of values for the pens. If desired, you can configure the trend to omit the vertical axis labels.

The minimum and maximum values for the scale can be determined automatically (using the best fit for the current data), derived from a pen's minimum and maximum values, use a constant value, or be controlled by tags.

You can configure the trend so all pens use the same scale, or use individual ranges for each pen. If you choose the latter method, create a Next Pen button in the graphic display, to allow operators to view the range for each pen. When the operator presses the button, the vertical axis changes to the new pen's range.

For example, if Pen 1 has a minimum value of 10 and a maximum value of 100, the range on the vertical axis is 10 to 100 when the pen is selected. If Pen 2 has a minimum of -10 and a maximum of 50, the range on the vertical axis changes to -10 to 50 when the operator presses the Next Pen button.

X-axis

The X-axis is the bottom horizontal edge of the chart. It is also known as the horizontal axis.

Horizontal axis labels

For standard charts, the horizontal axis labels indicate the time span covered by the trend. For XY Plot charts, the horizontal axis labels show the scale (range) of values for the pen selected to serve as the X-axis pen.

If desired, you can configure the trend to omit the horizontal axis labels. The number of labels depends on the size of the trend object and the number of vertical grid lines.

Pens

Pens are the lines and/or symbols used to represent values. The values can be tags you are monitoring, expressions that manipulate tag values, or constants. For details, see page 17-20.

If there is no data for a pen, or if the data is outside the vertical axis range, the pen does not appear in the chart.

Pen icons

Pen icons appear at the right edge of the chart at runtime, if you choose to display them. The icon's position indicates the pen's most recent recorded value (from the value table), even if the trend is paused or if the most recent value has not been plotted yet.

Pen markers

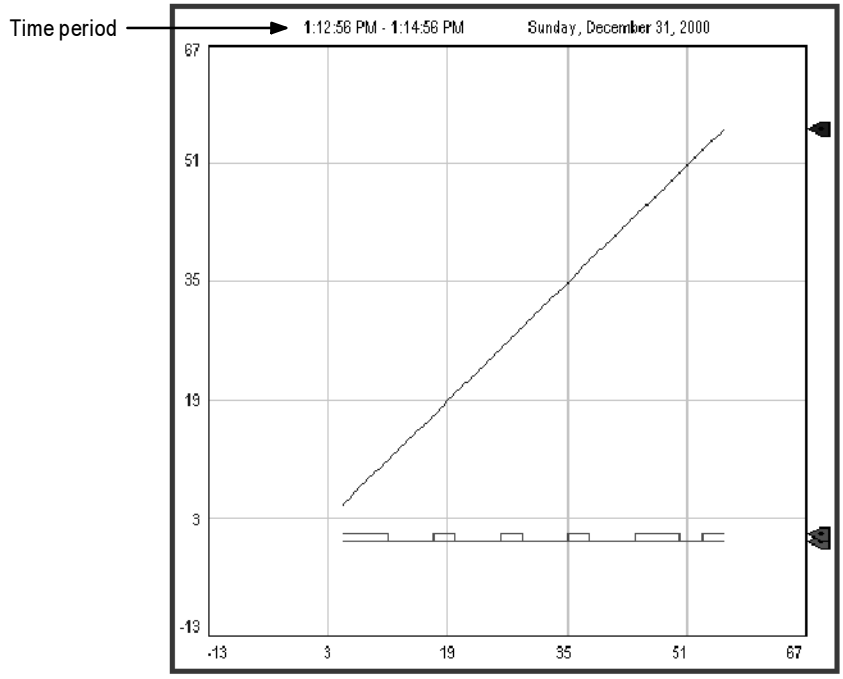
Pen markers are symbols that indicate data points. If data is plotted frequently, the markers might not appear as distinct, separate symbols. For example, see the lowest pen in the illustration on page 17-3.

Chart types

Standard vs. XY Plots

You can create a standard chart, which plots tag values against time, or an XY Plot chart, which plots one (or more) tag's values against another's.

This illustration shows what an XY Plot chart might look like:

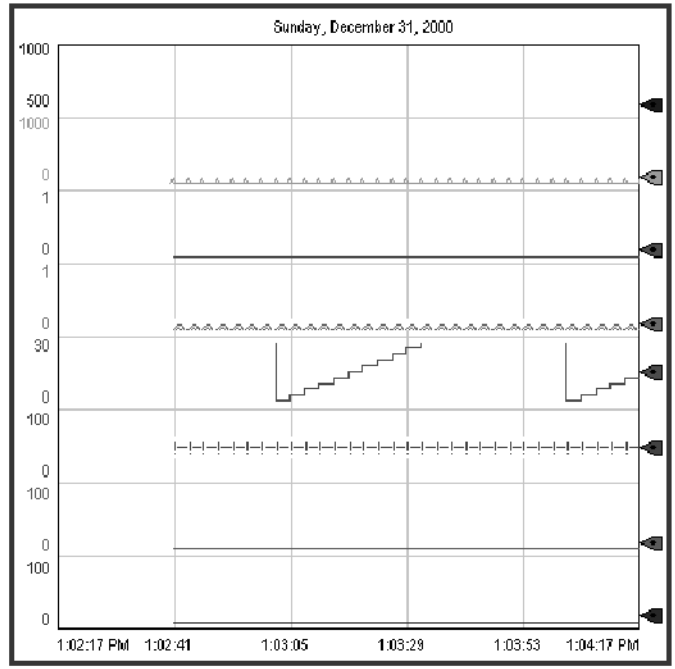


Notice that the horizontal axis labels display the range for the specified X-axis pen. The time period covered by the chart is at the upper left.

Isolated graphing

For charts with multiple pens, you can allow the pen values to overlap, or you can isolate each pen in its own horizontal band on the chart.

This is an example of isolated graphing, with a 10% buffer between each pen's band:



Notice that in this illustration each pen uses its own scale. If desired, you can use the same scale for all pens.

With isolated graphing, a grid line is automatically placed above each pen's band.

Plotting a value across the full width of the chart

Use horizontal lines to provide a frame of reference for your tag data. For example, if you define values that are the limits within which a tag should operate, and display horizontal lines in your trend to indicate the limits, when a tag crosses one of these limits the tag's alarm condition is obvious on the trend.

There are two ways to plot a value across the full width of the chart:

- In the Connections tab, assign a constant value to a pen.

  When values for the pen have been plotted across the full width of the chart, the pen appears as a solid line.

- In the Connections tab, assign to a pen the tag, expression, or constant whose value will be used to determine the position of the line, and then in the Pens tab, choose the pen type Full Width.

  As soon as the trend is displayed, the pen appears as a horizontal line across the full width of the chart. Its vertical position is determined by the tag, expression, or constant's value. If the value changes, the position changes.

Choosing colors, fonts, lines, and markers

The following table summarizes where in the Trend Object Properties dialog box to specify colors, fonts, lines, and markers for a trend.

You can also specify these settings in the Properties tab of the Property Panel.

To specify this	Use this box or column	In this tab
Chart background color	Background color	Display
Horizontal label color	Text color	Display
Text font, style, and size	Font (button)	Display
Pen line, pen marker, pen icon, and vertical label color	Color	Pens
Pen line width	Width	Pens
Pen line style	Style	Pens
Pen marker	Marker	Pens
Vertical grid line color	Grid color	X-Axis
Horizontal grid line color	Grid color	Y-Axis

The trend border color

The trend border uses the highlight color for the graphic display, specified in the Behavior tab of the Display Settings dialog box.

The trend window color

By default, the trend window uses the background color of the display, specified in the General tab of the Display Settings dialog box.

To use a different window color:

- In the Property Panel, select the opaque WindowStyle, and then specify the WindowColor property.

For information about using the Property Panel, see page 9-24.

Testing the trend

You can quickly test the trend by switching to test display mode. If communications are active and there is data for the tags, the pens plot values in the trend. When you are finished testing, switch back to edit display mode to continue editing.

To switch between test display and edit display modes:


Test Display tool


Edit Display tool

- On the View menu, click Test Display or Edit Display, or click the Test Display and Edit Display tools.

IMPORTANT Test display mode is not the same as running the display. Test display mode does not change the appearance or position of the display as set up in the Display Settings dialog box. Also, data logging is not enabled in test display mode.

Summary of steps

These are the steps for creating a trend:

1. To plot historical data, create a data log model in the Data Log Model editor. For information, see Chapter 16.
2. Create a trend graphic object in the Graphics Display editor.
3. Configure the trend in the Trend Object Properties dialog box.
4. If desired, create a Next Pen button, a Pause button, or Key buttons in the same graphic display, to allow the operator to switch between pens, pause the trend, or scroll the trend.

For information about the buttons you can use with trends, see page 17-24.

5. To have a printed record of the trend data, provide a way for the operator to print the graphic display. For information see page 17-26.

Creating trend objects

To create a trend object:

1. In the Graphics Display editor, create or open a graphic display.
2. Select the Trend drawing tool by doing one of the following:
   - In the Objects toolbox, click the Trend tool.
   - On the Objects menu, select Trending, and then click Trend.
3. Drag the mouse to create a box approximately the size you want for the trend.
4. Double-click the trend to open the Trend Object Properties dialog box.
5. Configure the trend as described in the next section.
6. When you're finished configuring the trend, click OK to save your changes.
7. To name the trend, open the Property Panel and then type a name in the (Name) row.

   The name can contain letters, numbers, and the underscore character (_), but the first character must be a letter. Do not use spaces in the name.

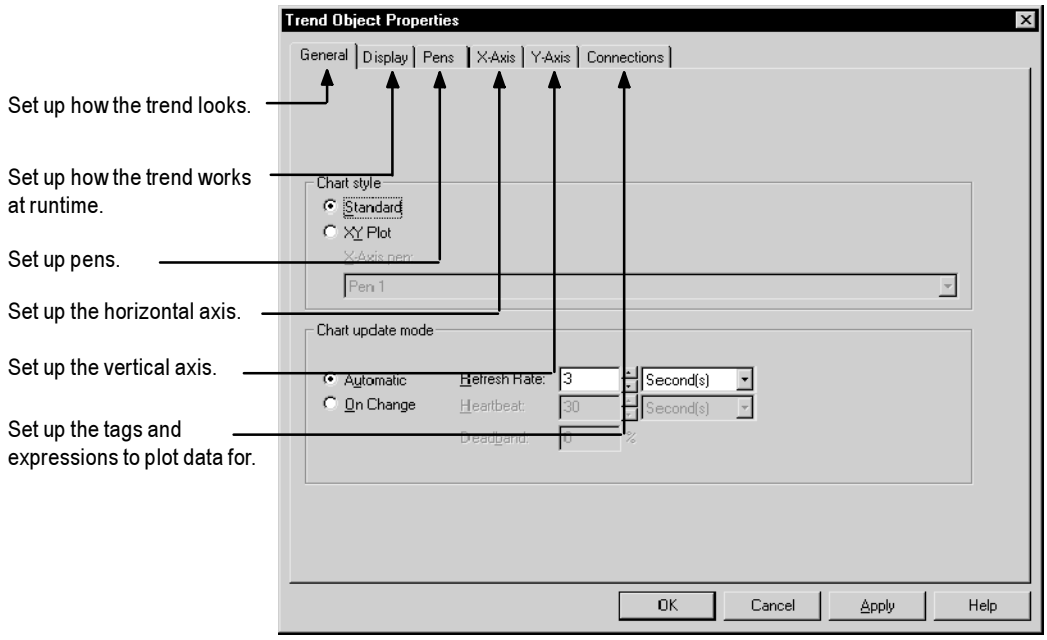
   The name is used in the status bar, activity bar, Property Panel, Object Explorer, and activity log messages.

Once you have configured the trend, you can edit it as you would any other graphic object. You can move it, resize it, attach animation to it, and so on. You can also use this object in other graphic displays by dragging it from one display and dropping it into another.

For more information about graphic objects, see Chapter 9.

Configuring trends

When you double-click a trend object, the Trend Object Properties dialog box opens. Use the dialog box to configure the trend.



Before you configure the pens in the Pens tab, use the Connections tab to specify the tags and expressions for which to plot data.

Specifying chart style and update mode

To specify the chart style and update mode:

▶ In the General tab, specify these settings:

Chart style
Specify the plotting style of the trend:

- Standard—plots each pen against time (with time on the horizontal axis).
- XY Plot—plots each pen against a pen that serves as the X-axis. In the X-Axis pen box, select the pen to use for the X-axis.

Chart update mode
Specify how often the trend updates with new data:

- Automatic—updates data at regular time intervals. In the Refresh Rate box, type a time and click a time unit to specify how often the trend acquires data.

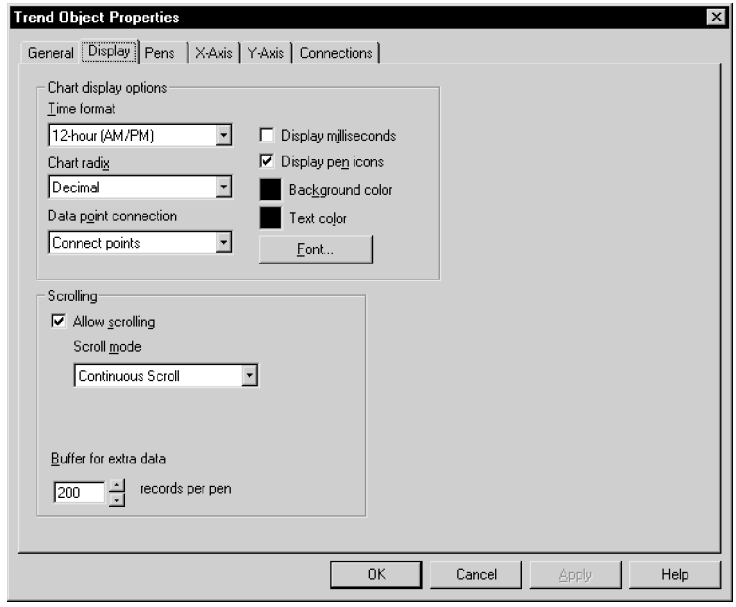
The refresh rate range is 50 milliseconds to 596 hours.

- On Change—updates the data as values change. This mode is useful for data that changes rapidly.

  To specify how often data is updated even if no change has occurred, in the Heartbeat box type a time, and then click a time unit. If you do not want to use the heartbeat, type 0.

  To specify a percentage by which a value must change before the trend displays the new value, in the Deadband box type a number.

Setting up how the trend works at runtime



To set up how the trend works at runtime:

▶ In the Display tab, specify these settings:

Time format
Select how the trend displays time:

- Use system time format—displays time using the format specified in the Windows Control Panel, in the Regional Options dialog box.

- 24-hour format
- AM/PM format

Chart radix

Specify the number base to use for displaying numeric values in the trend labels. If you select the XY Plot chart style, this setting affects the labels on the Y-axis and the X-axis.

However, if the number of decimal places specified in the Y-Axis tab is set to anything other than 0, that setting overrides the radix selection and all numbers are displayed as decimals.

Data point connection

Specify how data points on the trend are connected:

- Connect points—data points are connected with a line.
- Show discontinuity—plot lines are disconnected between the start and end of a discontinuity in data. A discontinuity in data indicates a communication error, or a break in a model's data logging (for example, when the operator stops and then restarts the project).
- Show only markers—a marker is displayed for each data point. Lines do not connect the data points, so if a pen doesn't have a marker assigned to it (in the Pens tab), then the pen does not appear in the trend.

Display milliseconds

If you select the standard chart style, select this box to display milliseconds in the time labels on the X-axis. (To display time labels, in the X-Axis tab select the Display Scale check box.)

Display pen icons

Select this box to display an icon for each pen at the right side of the trend chart. The pen icon moves vertically to indicate the current value of the pen, even if the chart is not scrolling, so some pen icons might not be at the end of a line.

Background color

Click this box to select a background color for the chart.

The chart border is always black. For information about specifying the background color for the other areas in the trend, see page 17-9.

Text color

Click this box to select the text color for the labels above and below the chart.

The labels on the vertical axis use the color of the first pen, unless you select the "Each pen on independent scale" option (in the Y-Axis tab), in which case the label's color matches the pen whose range is currently displayed on the vertical axis.

If you use isolated graphing, each pen is shown in a separate section of the chart, with its own color labels.

Font

Click this button to select the font to use for the text in the trend.

Allow scrolling

Check this box to continually update the trend with new data at runtime. If you deselect this option, once the trend has filled with data up to the buffer limit the chart does not update until the operator manually toggles the scroll mode (using the Pause button).

If you allow scrolling, select a scroll mode:

- Continuous Scroll—chart scrolls from right to left for each new data reading.
- Half Screen Scroll—chart scrolls half a screen at a time. Pens scroll from the middle of the chart to the right. When the pens reach the right side of the screen, the screen scrolls left and the pens continue at the middle of the chart.
- Full Screen Scroll—chart scrolls a full screen at a time. Pens scroll from the left to the right, starting at the left of the chart. When the pens reach the right side of the screen, the entire screen scrolls and the pens begin again at the left side.

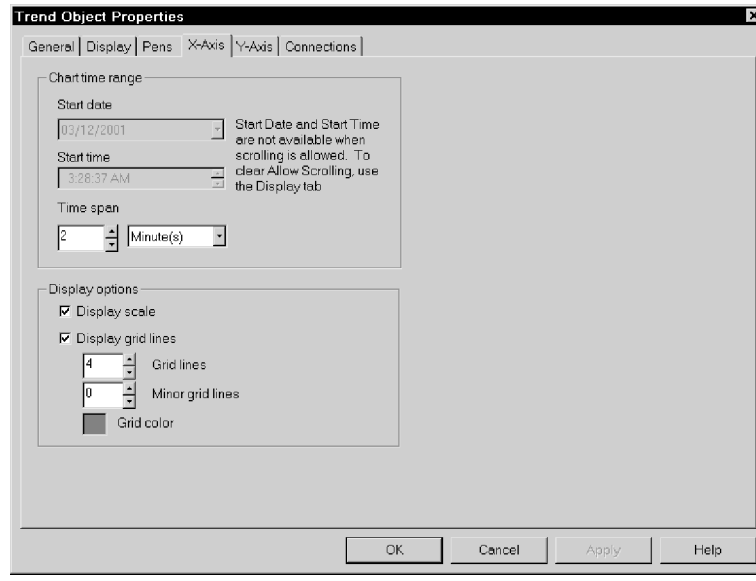
Buffer for extra data

Specify the number of extra data points (outside of the display area) to store for each pen. The operator can view these data records by manually scrolling (using the Key buttons).

The maximum buffer size is 32,767 data points. Divide this number by the number of pens in the trend to determine the maximum data records per pen.

The more data points held in the buffer, the faster it is to scroll. However, a larger buffer size also requires more system resources.

Setting up the horizontal axis



For a standard chart, the horizontal axis represents time; for an XY Plot chart, the horizontal axis represents the selected pen's values. The settings in this tab apply to both types of chart.

To set up the horizontal axis:

▶ In the X-Axis tab, specify these settings:

Start date and Start time
These settings are not available if you select "Allow scrolling," on the Display tab.

If you want to specify a starting date and time for the trend, clear the Allow scrolling check box, on the Display tab. To select a date from the calendar, click the Down Arrow beside the Start date box.

These settings determine when to begin displaying data for the trend. As the operator manually scrolls, the chart updates with the latest data for the specified time span.

If the trend is plotting current values only, and it is first displayed after the specified time, the current time is used as the starting point.

If the trend is plotting historical data, and the data log model is running at the specified start time, data is displayed from this time onwards. Otherwise, the earliest available data (after the start time) is displayed. Once the operator scrolls to the current time, values are taken from the value table, not the data log file.

Time span
In this box type a time, and then click a time unit, to specify the amount of data the trend displays at runtime.

For a standard chart, the time span controls the horizontal scale. For an XY Plot chart, the Min and Max values (specified in the Pens tab) of the selected pen control the horizontal scale, and the time span controls the number of data points plotted.

Display scale
Check this box to display X-axis labels at the bottom of the trend.

For a standard chart, the labels show the start and end times. If there's room, intermediate times are shown below each vertical grid line.

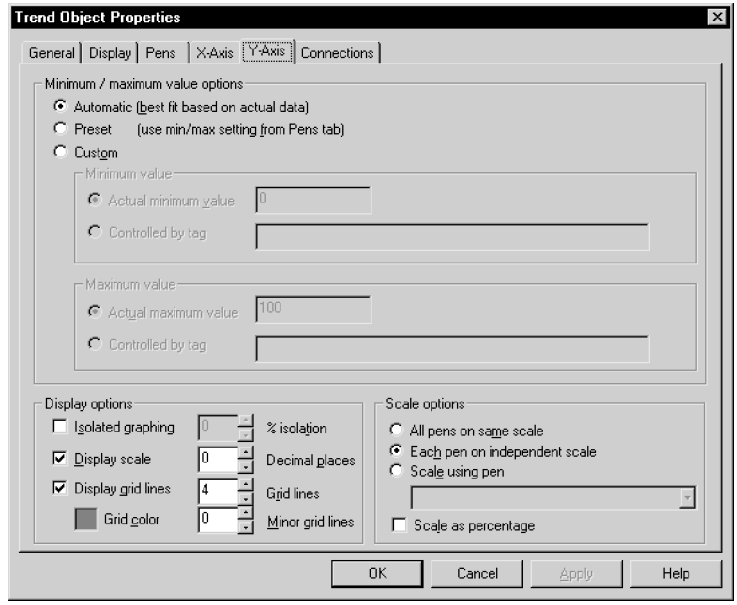
For an XY Plot chart, the labels show the minimum and maximum value range of the pen selected as the X-axis. If there's room, intermediate values are shown as well.

Display grid lines
Check this box to display vertical grid lines on the chart, and then type the number of major and minor lines to display.

You can display up to 30 major lines, and up to 10 minor lines between each major line. The major lines are solid, and the minor lines are dashed.

Grid color
If you display grid lines, click this box to select the color for the lines.

Setting up the vertical axis



To set up the vertical axis:

▶ In the Y-Axis tab, specify these settings:

Minimum / maximum value options
Select the method for determining the minimum and maximum values for the vertical axis:

- Automatic—the lowest data reading serves as the minimum value and the highest data reading serves as the maximum. As the trend acquires new data, the Y-axis may rescale to fit the new values.
- Preset—the minimum and maximum pen values, configured in the Pens tab, serve as the Y-axis scale. The scale does not change. Which pen's minimum and maximum values are used depends on the scale options you select in this tab.
- Custom—allows you to specify constant minimum and maximum values, or to assign tags or expressions whose values are used to determine the minimum and maximum values.

  To use constant minimum and maximum values, click "Actual minimum value" and type the value in the box. Repeat for the maximum value.

To use tags or expressions to determine the values, you must first assign the tags or expressions in the Connections tab. Then return to this tab and click "Controlled by tag."

Isolated graphing
Check this box to place each pen in a separate band of the chart, and then, in the "% isolation" box, type the distance between bands. The distance is a percentage of the chart height, between 0 and 10%.

To allow pens to overlap, clear the check box.

If you select isolated graphing, you cannot display horizontal grid lines. Instead, a horizontal line appears above each band.

Display scale
Check this box to display Y-axis labels at the left of the trend.

To display decimals in the labels, type a number in the Decimal places box. If you type a number other than 0, this setting overrides the Chart Radix setting in the Display tab, and all numbers are displayed as decimals.

Display grid lines
Check this box to display horizontal grid lines on the chart, and then type the number of major and minor lines to display.

You can display up to 30 major lines, and up to 10 minor lines between each major line. The major lines are solid, and the minor lines are dashed.

Grid color
If you display grid lines, click this box to select the color for the lines.

If you use isolated graphing, this color is used for the horizontal lines between bands.

Scale options
Specify how multiple pens with different minimum and maximum ranges scale together on the chart (this option is not available if you use the Custom minimum/maximum value option):

- All pens on same scale—displays all pens relative to the same scale, determined by the lowest minimum and highest maximum values of all pens.

- Each pen on independent scale—scales each pen independently using the pen's minimum and maximum values as the range. Only one pen's range is used in the labels on the vertical axis, which can be misleading if other pens use a different range.

  To allow the operator to view each pen's vertical axis labels, create a Next Pen button. When the operator presses the button, the vertical axis changes to the new pen's range. The color for the labels changes to the color of the selected pen.

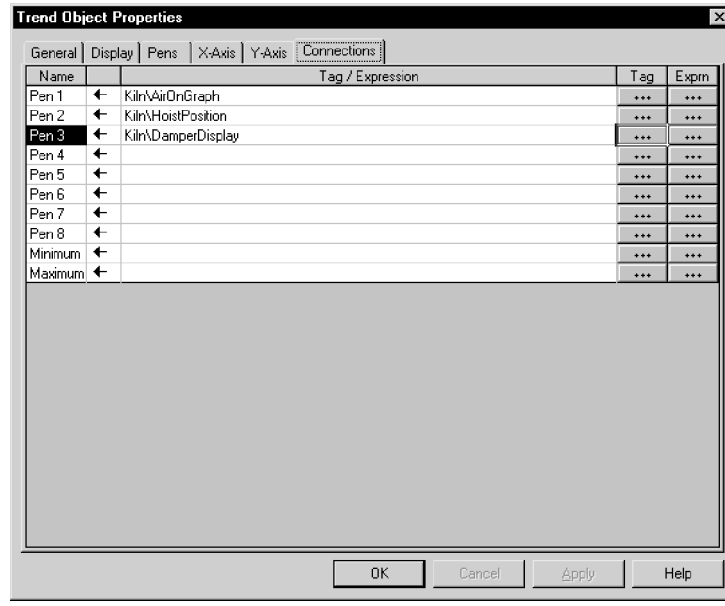
- Scale using pen—uses the same scale for all pens, based on the minimum and maximum values for the specified pen, or based on the best fit for the pen's actual data. Select the pen to use.

  If you use the Preset minimum/maximum value option, configure the minimum and maximum values in the Pens tab, as described on page 17-21.

  This option does not apply if you use the Custom minimum/maximum value option.

Scale as percentage
Check this box to display the Y-axis values as a percentage of the minimum and maximum range. The Y-axis labels display the percentage range, from 0 to 100%.

Specifying the tags and expressions to plot data for



To specify the tags and expressions to plot data for:

1. In the Connections tab, specify up to 8 tags or expressions to plot values for. Do not use string tags or block tags.

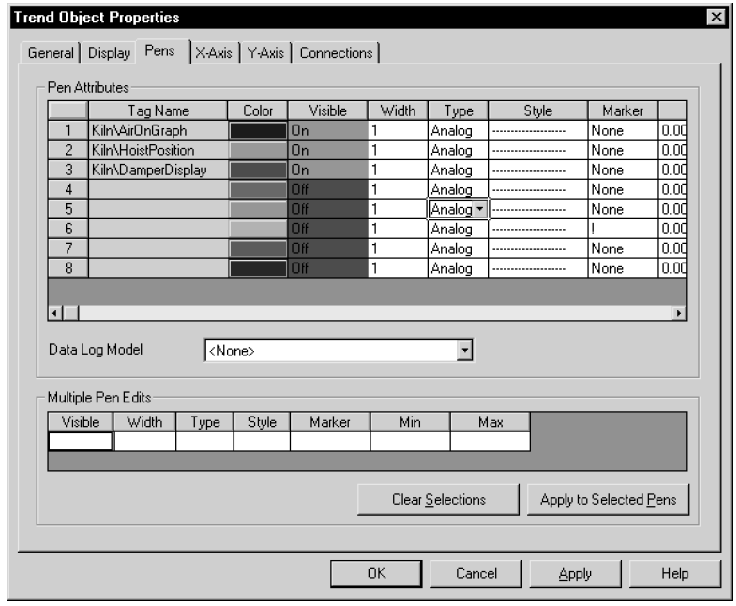
   To plot historical values, specify tags from the data log model you'll be using at runtime. (Specify the data log model in the Pens tab.)

   If desired, you can specify both tags that are in a data log model and tags that are not. You cannot use expressions to plot historical values.

   For information about specifying tags and expressions, see page 7-28.

2. To control the vertical axis minimum and maximum values using tags or expressions (using the Custom setting in the Y-axis tab), assign tags or expressions to the Minimum and Maximum controls.

Configuring pens



Before you configure pens, assign tags or expressions to the pens in the Connections tab.

To configure pens:

▶ In the Pens tab, configure each pen as follows:

Tag Name
This column is for display purposes only. Assign a tag or expression to the pen in the Connections tab.

Color
Click this box to select the color for the pen's lines, markers, and icon.

At runtime, the selected pen's color is also used for the labels on the vertical axis.

If you use isolated graphing, each pen is shown in a separate section of the chart, with its own color labels.

Visible
Click in this column to toggle between on and off. When visibility is off, the pen is not displayed on the trend.

Width
Type the number of pixels for the width of the pen's line. If you use a width other than 1, you cannot change the line style setting.

Type
Specify how to plot the pen lines:

- Analog—plots pen lines using diagonals from one point to the next.
- Digital—plots pen lines using only horizontal and vertical lines between points.
- Full-Width—plots a tag's value as a horizontal line that extends across the full width of the chart. The line moves up and down in the chart as the tag or expression value changes.

Style
Click in the column to select a line style. If you select a style other than solid, the line width must be 1 pixel.

Marker
Click in the column to select a plot symbol for each data point. If you use the "Show only markers" option (specified in the Display tab), only pens that you select a plot symbol for are displayed in the trend.

If a pen displays new data frequently, for example every few seconds, the markers might appear to form a solid line.

Min and Max
If you specify the "Preset minimum/maximum value" option (in the Y-Axis tab), type the minimum and maximum values for the pens.

The minimum and maximum values, together with the scaling options you select in the Y-Axis tab, determine the range of the trend's vertical axis. Tag values outside this range do not appear on the chart.

Link Data
Check this box to use the assigned tag's minimum and maximum values. Checking this box disables the Min and Max columns. If the tag's minimum and maximum values are not available, `???` appears in the columns.

For digital tags, the minimum is `0` and the maximum is 1. For analog tags, specify the minimum and maximum values in the Tag Database editor.

Data Log Model
For historical data, select the data log model to use to supply the data when the trend is first displayed or you scroll back in time (using the Key buttons). If buffered data is available, that data is used instead of the data from the model.

If the trend plots current values only, accept the default of None.

Make sure you add the tags to the data log model.

To configure multiple pens at the same time:

1. Select the pens to configure by Shift-clicking or Ctrl-clicking in the Tag Name column.
2. In the Multiple Pen Edits columns, specify the attributes to use.

   To clear the Multiple Pen Edits columns, click Clear Selections.
3. To apply the attributes, click Apply to Selected Pens.

What to do next

Now that you've created the trend:

- If desired, create a Next Pen button, a Pause button, or Key buttons in the same graphic display, to allow the operator to switch between pens, pause the trend, or scroll the trend.

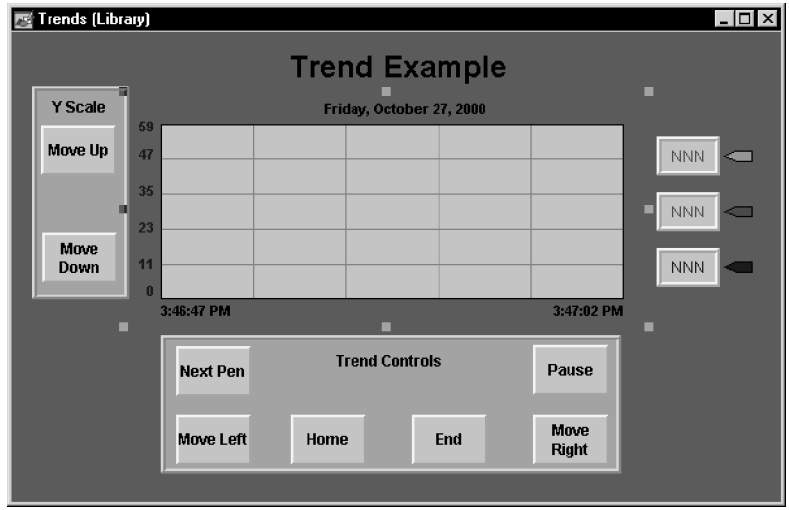
  For information about the buttons you can use with trends, see page 17-24.
- To have a printed record of the trend data, provide a way for the operator to print the graphic display. For information see page 17-26.

Using the Trends graphic library

The Trends graphic library contains a trend graphic object and buttons for controlling the trend. It also contains Numeric display objects that display the value of each tag used in the trend.

You can use the trend and objects as they are, or you can edit them to suit your needs. To use the objects, drag and drop (or copy and paste) them into your graphic display.

For information about copying and pasting objects from the graphic libraries, see page 9-38.



To use the Trends graphic library:

1. Open the Graphics folder, and then open the Libraries folder.
2. Double-click the Trends library.
3. Drag and drop or copy and paste objects into your display.

Using buttons to control the trend at runtime

You can place buttons in the same graphic display as the trend, to allow the operator to pause the trend, switch between pens, or scroll the trend.

You can link the buttons to a specific trend object, or configure the button to work with whichever object is selected in the graphic display. For information about linking buttons, see page 10-9.

Use these buttons with trends:

This button	Does this
Pause	Toggles between pausing and automatic scrolling. When the trend is paused, the pen icons continue to move vertically to indicate the pens' current values. When the trend resumes scrolling, values that occurred while the trend was paused are filled in, bringing the trend up to the current time (unless you are scrolling historical data).
Next Pen	Changes the vertical axis labels to the scale for the next pen. The color of the labels matches the color of the selected pen.
Move Up	Scrolls up to display higher values on the vertical scale. For example, if the visible scale range is 0 to 100, pressing Move Up changes the visible range to 10 to 110. The incremental amount the axis scrolls depends on the pen's range and the number of horizontal grid lines. This button does not work if the Y-Axis "Minimum / maximum value option" is set to Automatic.
Move Down	Scrolls down to display lower values on the vertical scale. This button does not work if the Y-Axis "Minimum / maximum value option" is set to Automatic.
Move Left	Pauses the trend and scrolls to the left.
Move Right	Pauses the trend and scrolls to the right.

This button	Does this
Home	Pauses the trend and moves to the earliest data in the trend.
End	Resumes trend scrolling and moves to the current (latest) data in the trend.

To see how the buttons work with the trend, open the Trends graphic library (see page 17-23), and start test mode (see page 17-9).

For information about creating buttons, see Chapter 9. For details about configuring the buttons, see Chapter 10.

Printing trend data

To print trend data at runtime, provide the operator with a method for printing the graphic display.

You can use these methods to print graphic displays at runtime:

- Create a Display Print button.
- Assign a tag or expression to the Remote Display Print control (in the Global Connections editor). When the value of the tag or expression changes from 0 to a non-zero value, the current display is automatically printed.

  Program the data source to trigger the change as often as you want the data printed.

  For more information about setting up remote display printing, see Chapter 19.

Everything on the screen is printed, including the current display, pop-up windows, and any visible background applications.

For information about specifying the printer to use at runtime, see Chapter 23.

Improving clarity of the trend printout

Depending on what type of printer you use, pen lines with a width of 1 pixel might not appear in the printout. Choose high-contrast colors and wider line widths to ensure that the trend data prints clearly.

Runtime errors for the trend

If data for the trend is not available at runtime due to communication errors, a message is sent to the activity log.

See the Help for information on solving common trend problems.

Chapter

18 Setting up security

This chapter describes:

- what security is
- how user accounts and security codes work
- steps for setting up security
- assigning security to graphic displays
- using the User Accounts editor
- setting up user accounts
- changing passwords
- providing a way for users to log in and log out
- preventing unauthorized users from stopping the project
- summary of security features in a sample startup display

About security

You can use security features to:

- prevent users from opening graphic displays that you don't want them to have access to
- prevent unauthorized users from running the project
- prevent unauthorized users from stopping the project
- prevent users from seeing and using certain parts of a graphic display
- prevent users from switching to other applications or accessing the desktop on the runtime computer. This feature uses the DeskLock tool, and is available for Windows 2000 runtime projects only. For more information about the DeskLock tool, see Chapter 22.

To limit the users who have access to the project or parts of the project, you must set up user accounts and passwords.

If you don't set up security, anyone can use the project without logging on, and view all the graphic displays.

IMPORTANT If you configure the data source to open graphic displays remotely (using global connections), remote display changes occur whether or not the logged-in user has security access to a given display.

For details about controlling display changes remotely, see page 19-7.

How user accounts and security codes work

By default, all users have unrestricted access to all graphic displays. When you assign a security code to a graphic display, only the users who are assigned that security code have access to the display.

There are 16 security codes, A through P, and the asterisk symbol (*). The * represents unlimited access. You can assign combinations of security codes to users, to allow each user access to a different set of displays.

Example: Assigning security codes to prevent access to graphic displays

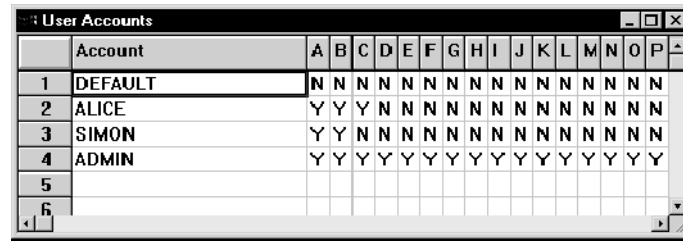
This example shows how to set up users with access to different graphic displays.

1. Assign security codes to graphic displays as follows:

To this display	Assign this security code
Alarm History	A
Boiler	B
Furnace	C
Top Secret	D

2. In the User Accounts editor, assign security codes to users:

To this user	Assign these security codes
ALICE	A, B, C
SIMON	A, B
ADMIN	All
DEFAULT	None



The users have access to these graphic displays:

- ALICE has access to the first three graphic displays.
- SIMON has access to the Alarm History and Boiler displays, but not to the Furnace or Top Secret displays.
- The ADMIN user has access to every graphic display.
- The DEFAULT user has access only to graphic displays to which no security has been assigned (that is, graphic displays with the security code *). In this example, the DEFAULT user does not have access to any of the graphic displays.

In this example, you could have assigned the same security code to the Alarm History and Boiler displays, since all users except the DEFAULT user have access to these displays.

Example: Using security codes to control the visibility of input objects

This example shows how to set up users so that only authorized users can use input objects to enter data.

This example uses the CurrentUserHasCode( ) expression security function to determine whether a user is authorized to input data using a Numeric Input Enable button.

The security code E is assigned to users who are authorized to enter data.

1. In the User Accounts editor, assign security codes to users.

To this user	Assign these security codes
OPERATOR	A, B, C
SUPERVISOR	All
ADMIN	All
DEFAULT	None

2. Create a Numeric Input Enable button.
3. Assign visibility animation to the button using this expression:

   CurrentUserHasCode(E)

   For the Expression True State, click Visible.

When the graphic display containing the Numeric Input Enable button is open, the SUPERVISOR and ADMIN user can see the button. If the OPERATOR or DEFAULT user is logged in, the button is not visible.

Summary of steps

Follow these steps to set up security:

1. In the Graphics Display editor, assign security codes to graphic displays that will have limited access.
2. In the User Accounts editor, set up users and passwords, and assign security codes to users.
3. Provide users with a method for logging in and out.
4. If desired, prevent unauthorized users from stopping the project.
5. If desired, assign visibility animation to graphic objects that only certain users are authorized to use.

Assigning security to graphic displays

Assign security to graphic displays in the Graphic Display editor. You can:

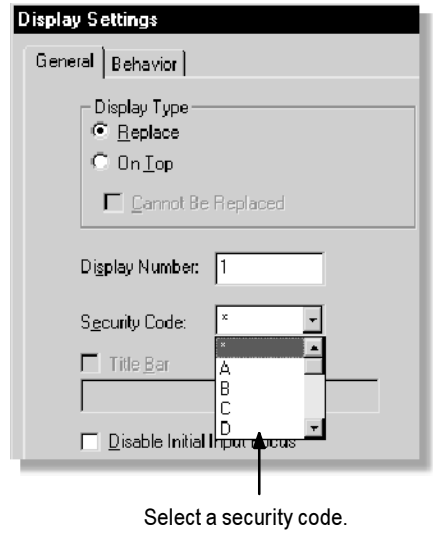
- assign security when you create the graphic display, or at any time after creating the display

- assign the same security code to more than one display
- assign whichever codes you want, in any order. For example, you can choose to use only the codes D and P and you can assign P before you assign D.

For more information about graphic displays, see Chapter 8.

To assign security to a graphic display:

1. In the Graphic Display editor, right-click an empty area of the display, and then click Display Settings.



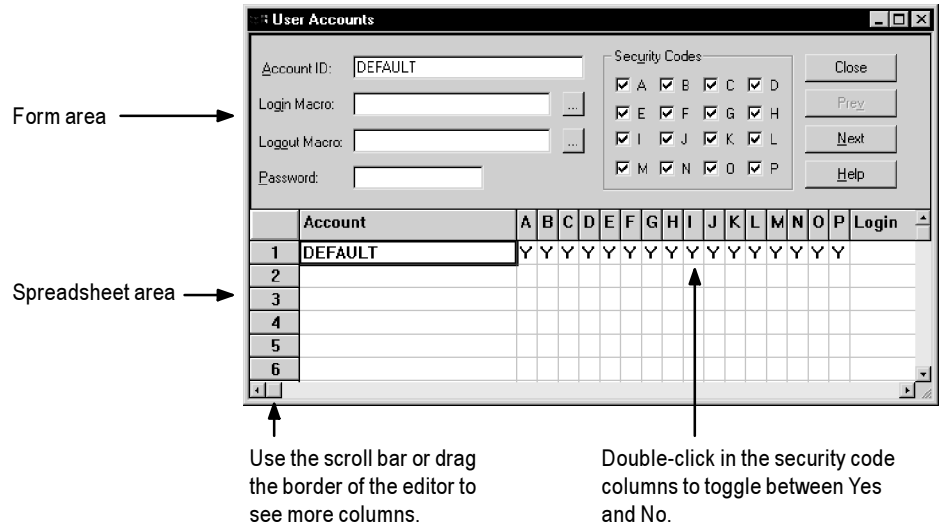
2. In the General tab, select a security code.

   To allow unlimited access to the display, select the asterisk (*).

3. Click OK to close the dialog box.

Using the User Accounts editor

Use the User Accounts editor to set up accounts for each user or group of users that will have access to the project at runtime.



You can use the form or spreadsheet section of the editor to enter all user information except passwords. You must use the form area to enter passwords.

Using the View menu

Use the items on the View menu to control the appearance of the User Accounts editor.

To do this	On the View menu, click this
Show or hide the spreadsheet area	Spreadsheet
Show or hide the form area	Form
Change the font used in the spreadsheet area	Spreadsheet Font. In the Font dialog box, specify the font, style, and size to use.
Restore the default font	Restore Default Settings

Using the Accept and Discard buttons

When you enter information, the Prev and Next buttons change to Accept and Discard buttons. Click Accept to save user account information. Click Discard to cancel changes to a user account.

Using the tools

The User Accounts editor has these tools for working in the editor:

Use this tool	To do this
Cut	Cut the selected text and place it on the clipboard. Cutting a No security code setting changes it to a Yes. You cannot cut Yes security code settings.
Copy	Copy the selected text.
Paste	Paste the cut or copied text from the clipboard.
Delete	Delete the selected text. Deleting a No security code setting changes it to a Yes. You cannot delete Yes security code settings.
Duplicate	Create a duplicate of the selected user, with all the same settings, including name.
Insert Row	Insert a blank row above the row in which the cursor is located.
Fill Forward	With multiple rows selected, copy the settings from the first row into the other selected rows.
Sort	With multiple cells in a column selected, sort the user accounts alphanumerically by the selected cells' contents.
Undo	Undo the previous operation or sequence of operations.
Redo	Redo the previously undone operation or sequence of operations.

The DEFAULT user

The first account in the editor is the DEFAULT user account. The DEFAULT account is used when no one is logged in. The DEFAULT user initially has access to each security code. Unless you want everyone to have access to all parts of the project without logging on, disable the DEFAULT user's access to the security codes you plan to use.

You cannot delete the DEFAULT user account.

Setting up user accounts

To set up user accounts:

1. Open the User Accounts editor.
2. If the editor already contains user account definitions, click the first blank row in the spreadsheet, or click Next to scroll to a blank row.
3. Specify these settings:

Account ID
Type a user name or ID for the account, up to 20 characters including spaces. The name is not case sensitive.


Browse button

Login Macro
To run a macro when this user logs in, type the name of the macro, or click the Browse button to select from a list of macros in the project.

Logout Macro
To run a macro when this user logs out, type the name of the macro, or click the Browse button to select from a list of macros in the project.

Password
Type a password for the account, up to 14 characters including spaces, and then press Enter. The password is not case sensitive.

The Password Confirmation dialog box opens. Retype the password, and then click OK.

Security Codes
To prevent the user from having access to a security code, clear the check box for the code, or double-click in the code's column in the spreadsheet to change the setting to N.

4. Click Accept.
5. Repeat steps 2 through 4 to set up additional user accounts.
6. Click Close. When prompted to save your changes, click Yes.

Deleting user accounts

To delete a user account:

▶ In the spreadsheet area, click the number at the left end of the row for the user to delete, and then press Delete on your keyboard.

Changing passwords

Users cannot change passwords at runtime. The only way to change a password is by using the User Accounts editor.

To change a user's password:

1. In the spreadsheet area, click the row for the user's account.
2. In the form area, in the Password box, type the new password.
3. In the Password Confirmation box, type the new password again, and then click OK.

Providing a way for users to log in and log out

Use Login and Logout buttons to provide a way for users to log in and log out. Make sure you place these buttons in graphic displays that all users have access to.

Logging in

When the project starts, the DEFAULT user is automatically logged in until a new user logs in.

To provide a way for users to log in:

- Create a Login button in the startup graphic display (the graphic display that opens when your project starts running).

  For information about creating graphic objects, see Chapter 9. For information about configuring graphic objects, see Chapter 10.

- Specify the startup display in the Startup editor, in the Initial graphic box.

  For information about using the Startup editor, see Chapter 20.

For more information about logging in, see Chapter 24.

Logging out

To best maintain your security system, users who log in should also log out.

When a user logs out, the DEFAULT user is automatically logged in until a new user logs in. Disable the DEFAULT user's access to the security codes you plan to use.

To provide a way for users to log out:

- ▶ Create a Logout button in a graphic display that all logged-in users have access to.

For more information about logging out, see Chapter 24.

Preventing unauthorized users from stopping the project

To prevent unauthorized users from stopping the project:

- Do not use a title bar on the project window. To disable the title bar for the project window, in the Project Settings editor, in the Runtime tab, deselect the Title bar check box.

  For more information about using the Project Settings editor, see Chapter 4.
- Assign visibility animation to the Shutdown button, so that the button is only visible when a user who is authorized to stop the project is logged in. For an example, see page 18-13.

  Or, set up security for the graphic display in which the Shutdown button is located, so only users who are authorized to stop the project can open the display.

Additional step for Windows 2000 projects:

- Use the DeskLock tool to prevent users from accessing the desktop, to prevent access to operating system functions such as restarting Windows or shutting down tasks. For more information, see page 22-4.

Additional steps for RAC6182 projects:

- Use the Keypad Configuration Utility that ships on CD with the RAC6182 to disable the Win key and the Alt-Tab key combinations. Otherwise, the user can press the Win key or press Alt-Tab to open the Windows Taskbar.

  For information about using the Keypad Configuration Utility, see the utility's Help.
- Hide the Windows Taskbar to make it inaccessible. To hide the Taskbar, on the Windows Start menu select Settings, and then select Taskbar. Clear the "Always on top" check box and select Auto hide.

For more information about stopping the project, see Chapter 23.

Summary of security features in a sample startup display

This section provides a summary of how to use all the security features in a startup graphic display called Log In.

To create a startup display that uses all the security features in RSView:

1. Set up user accounts and passwords.
2. In the Project Settings editor, clear the Title bar check box.
3. Create a graphic display called Main Menu that contains navigation buttons that give the operator access to the different displays in the project. Assign a security code to the display so that only authorized users can open it.
4. Create a graphic display called Log In containing these button objects:

This button	Does this
Login	Opens the Login dialog box.
Logout	Logs the current user out and logs in the DEFAULT user.
Goto Display	Opens the Main Menu graphic display.
Shutdown	Shuts down the project.

5. Configure the Goto Display button to open the Main Menu display. If desired, attach visibility animation to the Goto Display button, so that only authorized users can see the button.

For more information, see Example 1 on page 18-13.

6. Attach visibility animation to the Shutdown button, so that only authorized users can see (and therefore use) the button.

   For more information, see Example 2 on page 18-13.

7. Specify captions for the buttons, and add explanatory text to the graphic display. If desired, attach visibility animation to the text as well.

8. In the Display Settings dialog box, assign the security code * to the Log In display, so that all users have access to it.

9. In the Startup Settings editor, in the Initial graphic box, select the Log In display.

Until an authorized user is logged in, further access to the project is denied. In addition, only authorized users can stop the project.

Users who have access to the project can use the project and log out. Make sure you provide a way for users to navigate back to this display to log out.

IMPORTANT	When a user logs out, the DEFAULT user is automatically logged in. Do not give the DEFAULT user access to the Goto Display button or Shutdown button.

To see what the startup Log In display looks like when different users are logged in, see Example 3 on page 18-14.

You can also use the Remote Display Number control to open the startup Log In display when a user logs out. This might be useful if users can log out from various locations (graphic displays) within the project. For an example, see page 19-8.

For more information about	See
Using the Project Settings editor	Chapter 4
Attaching animation to graphic objects	Chapter 11
Setting up display navigation	Chapter 19
Using the Startup editor	Chapter 20
Logging in, logging out, and stopping projects	Chapter 24

Example 1: Assigning visibility animation to the Goto Display button

This example shows how to assign visibility animation to the Goto Display button so that a user must log in before seeing the button.

This example uses the security function CurrentUserName( ). The function returns the string value of the Account ID (user name) for the user who is currently logged in.

The CurrentUserName( ) function is case sensitive. All user names use upper case letters, so make sure that you use upper case letters in your expression.

The DEFAULT user is the current user when the project starts, and when a user logs out.

To assign visibility animation to the Goto Display button:

1. Right-click the Goto Display button, select Animation, and then click Visibility.
2. In the Animation dialog box, in the Expression box, type this:

   CurrentUserName( ) <> "DEFAULT"
3. For the Expression True State, click Visible.
4. Click Apply.

Example 2: Assigning visibility animation to the Shutdown button

This example shows how to assign visibility animation to the Shutdown button so that only the ADMIN user can stop the project.

To assign visibility animation to the Shutdown button:

1. Right-click the Shutdown button, select Animation, and then click Visibility.
2. In the Animation dialog box, in the Expression box, type this:

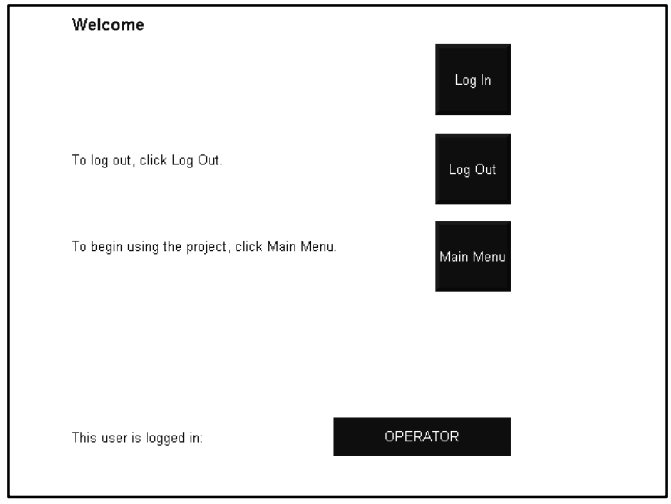
   CurrentUserName( ) == "ADMIN"

3. For the Expression True State, click Visible.
4. Click Apply.

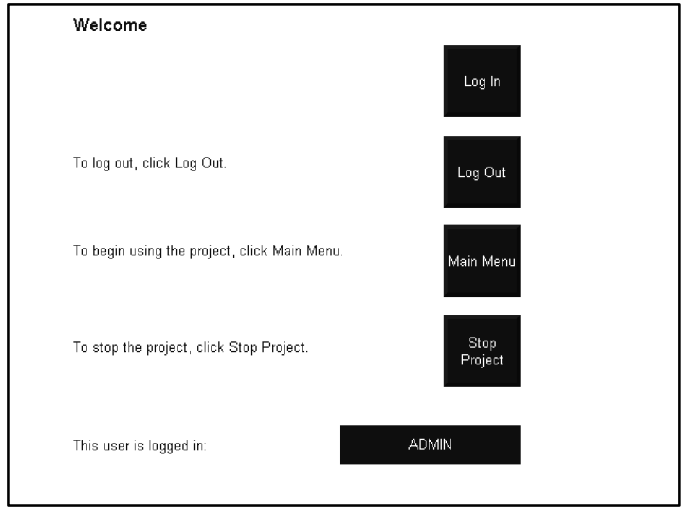
Example 3: The sample Log In startup display

At runtime, this is what the display looks like when no one has logged in:

This is what the display looks like when a user who is authorized to use the project but not to stop the project has logged in:



This is what the display looks like when the ADMIN user (who has authority to stop the project) has logged in:



Chapter

19 Setting up display navigation and controlling projects at runtime

This chapter describes:

- what display navigation is
- developing a hierarchy of displays
- testing display navigation
- using graphic objects to navigate
- controlling display changes remotely
- configuring remote display changes
- what global connections are
- setting up global connections

This chapter describes methods for navigating between graphic displays. For information about navigating between objects in a graphic display, see Chapter 9.

About display navigation

The way the operator moves between the graphic displays that make up a project is referred to as display navigation.

Use these methods to set up display navigation for your project:

- Develop a hierarchy of graphic displays, to chart how users will navigate the project.
- Determine which users will have access to which parts of the project.

- Create graphic objects that the operator can use to navigate the project.
- If desired, automatically control display changes using the Remote Display Number control. The use of this control is optional.
- In the Startup editor, specify the graphic display to open when the project starts.

  For information about specifying the startup display, see Chapter 20.
- Set up security so that only authorized users have access to the project or parts of the project.

  For information about setting up security, see Chapter 18.

About global connections

Global connections are controls that apply to your entire runtime project. Many of the global connections allow the data source to control or interact with your project at runtime.

For example, the Remote Display Number control is a global connection that you can use to control display changes from the data source. You can also use global connections to print graphic displays from the data source, to run macros from the data source, and to control the date and time displayed on the runtime terminal. For more information about global connections, see page 19-9.

The use of each global connection is optional.

Developing a hierarchy of displays

A display hierarchy is a series of graphic displays that provide progressively more detail as users move through them. Design your display hierarchy to meet the needs of the various users, including managers, supervisors, and operators.

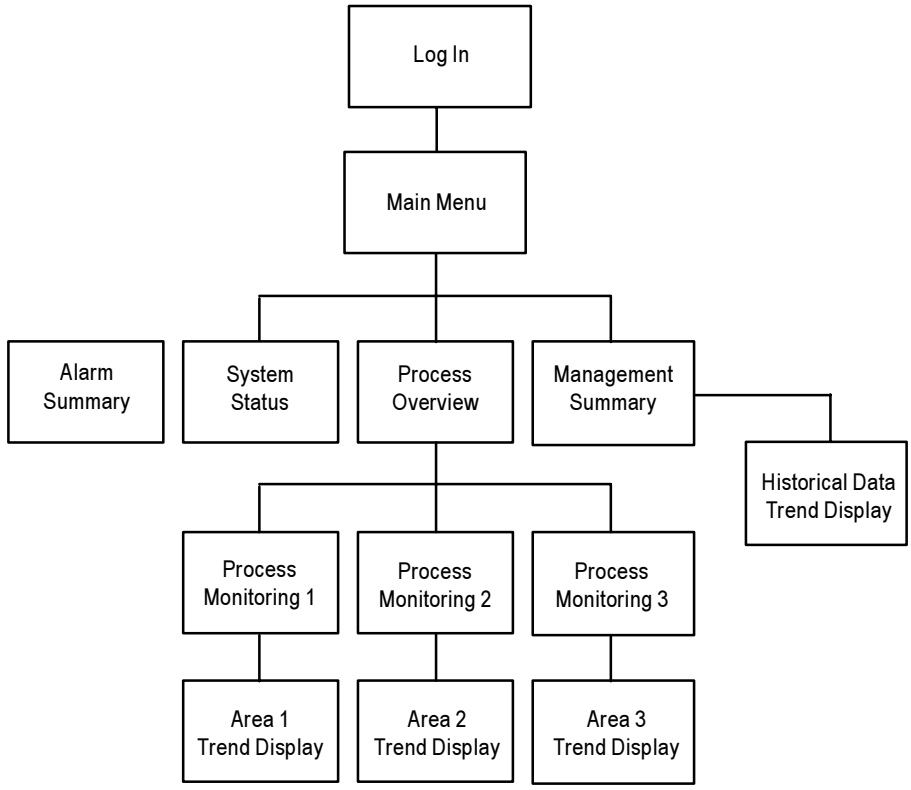
If you plan to use security, determine which groups of users need access to which displays, and decide where in the hierarchy to locate Login, Logout, and Shutdown buttons. For information about setting up security, see Chapter 18.

A display hierarchy could include:

- an initial graphic display for logging in
- a graphic display that serves as a menu
- an overview of the plant

- a comprehensive display of each process being monitored
- process-specific displays that provide more detail
- management summary displays
- trend displays of historical and real-time data

The following illustration shows a sample display hierarchy.



Testing display navigation

Once you set up display navigation for your project, test the project to make sure that navigation flows smoothly and that you have avoided problems like these:

- A graphic display contains no buttons for moving forward or back.
- When a graphic display closes, no other display is open and there is no way to continue using the project.

For information on testing your project, see page 20-3.

Using graphic objects to navigate

Use these graphic objects to navigate through the displays in the project:

Use this object	To
Goto Display button	Open the specified graphic display.
Return to Display button	Close the current display and open the previous display.
Close Display button	Close the current display.
Display List selector	Provide a list of graphic displays so the operator can select which display to open.
Shutdown button	Stop the project and close RSView ME Station.

The behavior of these graphic objects depends on which types of graphic displays are used. See the following sections for details.

For detailed information about configuring graphic objects, see Chapter 10.

Display type

The display type you use gives you additional control over how the operator navigates between displays. For example, use the On Top type to keep a graphic display on top at all times, even when another display has focus. Or use the Replace type if you want a display to replace all other open displays when it opens.

For information about specifying the display type, see page 8-10.

Goto Display buttons

When you configure a Goto Display button, specify the graphic display to open when the operator presses the button at runtime.

The specified display doesn't open if the operator does not have security access for the display.

You can also assign a parameter file that assigns tags to tag placeholders in the display when the display opens. For more information about parameter files, see page 8-25.

How display types affect the button's behavior

The Goto Display button's behavior at runtime also depends on which types of graphic displays are already open and which type of display it is opening:

- If the graphic display assigned to the button is a Replace display, it closes any open On Top or Replace displays. It does not close any On Top displays that use the Cannot Be Replaced option.
- If the display assigned to the button is already open, but does not have focus, pressing the button gives the display focus.

The operator cannot use the Goto Display button to open Replace displays if display change is currently controlled remotely (using global connections). But the operator can still open On Top displays.

Return to Display buttons

When the operator presses a Return to Display button at runtime, the graphic display that the button is on closes and the display that was previously open reopens.

The current display does not close if:

- the display change is currently controlled remotely
- there were no previously opened Replace displays
- the operator does not have security access for the previous display. This can only occur if a new user logs in using a Login button in the current display.

The Return to Display button only goes back to the most recent display. It doesn't go back through a series of displays.

How display types affect the button's behavior

Both the current display and the previous display must be Replace displays. When the operator presses the Return to Display button:

- If the graphic display that is closing is a Replace display, the display closes and the previously opened Replace display opens. Any On Top displays that were previously open with the Replace display are not reopened.
- If the graphic display that is closing is an On Top display, the display closes but no display is reopened.

We therefore recommend that you use Return to Display buttons in Replace displays only.

Example: Navigating through displays

This example uses the display hierarchy illustrated on page 19-3, and shows what happens as the operator navigates through the hierarchy. The graphic displays are all Replace displays.

1. In the Main Menu display, the operator uses a Display List selector to open the Process Overview display.
2. In the Process Overview display, the operator presses a Goto Display button to open the Process Monitoring 1 display.
3. After viewing the state of the process, the operator presses a Return to Display button to close the current display and reopen the Process Overview display.
4. In the Process Overview display, the operator presses a Return to Display button. Which display opens? The Process Monitoring 1 display (because this was the previously opened display).

   To return to the Main Menu display from the Process Overview display, the operator would have to press a Goto Display button that is configured to open the Main Menu display.

Close Display buttons

When the operator presses a Close Display button at runtime, the graphic display that the button is on closes.

If the graphic display that is closing is a Replace display, and the display change is controlled remotely, the display does not close.

If the display change is controlled by the operator and the graphic display that is closing is a Replace display, if there are no On Top displays open, an empty window is displayed. The operator will not be able to use the project again (unless a remote display change occurs or an alarm, activity, or information message display opens).

We therefore recommend that you use Close Display buttons in On Top displays only.

Display List selectors

Use the Display List selector to show a list of graphic displays that the operator can choose from. The operator can scroll through the list and select the graphic display to open.

The specified display doesn't open if the operator does not have security access for the display.

How display types affect the selector's behavior

The Display List selector's behavior at runtime also depends on which types of graphic displays are already open and which type of display it is opening:

- If the selected graphic display is a Replace display, it closes any open On Top and Replace displays. It does not close On Top displays that use the Cannot Be Replaced option.
- If the selected display is an On Top display, it opens on top of the current display. The current display does not close.
- The operator cannot use the Display List selector to open Replace displays if display change is currently controlled remotely. But the operator can still open On Top displays (with or without the Cannot Be Replaced option).

Selecting the display to open

The operator can scroll through the list and select displays using the Key button graphic objects, or, if the list has the input focus, by using the arrow keys and Enter key on a keypad or external keyboard.

You can link Key buttons to a specific Display List selector, or configure the buttons to work with whichever object is selected in the graphic display.

For information about input focus, see page 10-8. For information about linking buttons to the Display List selector, see page 10-9.

Shutdown button

When the operator presses the Shutdown button at runtime, the project stops and RSView ME Station closes.

To prevent an unauthorized user from stopping the project, assign visibility animation to the Shutdown button. For details, see page 18-13.

Controlling display changes remotely

To control display changes remotely, you can configure the data source to open graphic displays.

The data source can control display changes for Replace displays only. You can configure the data source to control all Replace display changes, or to open displays under set conditions, allowing the operator to change displays the rest of the time.

To use remote display changes, assign display numbers to the Replace displays you want to open, and assign a tag or expression to the Remote Display Number control. When the data source sends a display's number to the control, the specified display opens. When the control's value is 0, the operator has control of display changes.

Remote display changes and security

If you configure the data source to open graphic displays remotely, remote display changes occur whether or not the logged-in user has security access to a given display.

However, you can configure the Remote Display Number control to prevent access to the project unless an authorized user is logged in. To do this, assign an expression to the control to monitor the value of the system\User tag, as described in the following example.

For more information about setting up security for your project, see Chapter 18.

Example: Using the Remote Display Number control to prevent unauthorized users from using the project

This example shows how to configure the data source to open a Log In display when a user logs out. The Log In display remains open until an authorized user logs in. Then control of display changes reverts to the operator.

1. Create a graphic display called Log In, containing a Login button. In the Display Settings dialog box, assign the display the number 1.
2. In the Global Connections editor, assign this expression to the Remote Display Number control:

   if CurrentUserName( ) == "DEFAULT" then 1 else 0

If an authorized user is logged in, the value of the expression is 0, and the operator has control of display changes. When the user logs out, the DEFAULT user is logged in, and the Log In display remains open until another authorized user logs in.

This method is useful if you want to allow users to log out from multiple locations (graphic displays) in the project. However, if you use the Remote Display Number control for this purpose, you cannot use it to control other display changes remotely.

If you only permit users to log out from a startup Log In display, you can achieve the same result as in this example, but without using the Remote Display Number control. For more information about creating a startup display, see page 18-11.

Configuring remote display changes

This section outlines the steps for configuring remote display changes. For detailed information about using the Global Connections editor, see the next section.

To configure remote display changes:

1. In the Graphics Display editor, in the Display Settings dialog box, assign a unique display number to each Replace display.

   By default, every Replace display is assigned the number 1. Therefore, to use remote display changes you must assign a unique display number to every Replace display, even if you don't plan to open a particular Replace display remotely.

   Another option is to avoid using the display number 1 for remote display changes. Then you only need to assign display numbers to the displays you want to change remotely.

   For information about graphic displays, see Chapter 8.
2. In the Global Connections editor, assign an analog tag or expression to the Remote Display Number control.
3. If you assign an analog tag to the Remote Display Number control, configure the data source to send a display's number to the control when you want the display to open.

   If you assign an expression to the Remote Display Number control, RSView monitors the values of the tags used in the expression, and uses the expression result to determine the display to open.

About global connections

Global connections are controls that apply to your entire runtime project. The use of each global connection is optional.

You can use global connections to:

- notify the data source of the current display number
- notify the data source when a display is printed
- update the date and time at the data source using the runtime terminal's date and time
- change the display on the runtime terminal remotely (from the data source)
- print the current display from the data source
- update the date and time on the runtime terminal using the data source date and time
- run up to five macros from the data source

Changing displays

Use these global connections to monitor and control display changes:

- Display Number—notifies the data source of the number of the display that's currently open.
- Remote Display Number—allows the data source to change the display on the runtime computer.

For detailed information about using the data source to control display changes, see page 19-7.

Printing displays

Use these global connections to monitor and control display printing:

- Display Print Active—notifies the data source that a display print is in progress.
- Remote Display Print—allows the data source to trigger a display print.

The operator can also print the current display by pressing the Display Print button. For information about configuring this button, see Chapter 10.

When the data source or the operator prints a display, everything on the screen is printed, including the current display, pop-up windows, and any visible background applications. The display is printed in gray-scale, even if you use a color printer.

IMPORTANT If you plan to print graphic displays remotely, disable the screen saver. If the screen saver is on when a remote display print is triggered, only the screen saver image is printed.

For information about disabling the screen saver, see your Windows documentation.

Updating the date and time

Use the date and time controls to update the date and time. You can assign any or all of the date and time controls, or leave them unassigned.

Normally you would assign only one set of date and time controls, either to update the date and time at the data source from the terminal, or to update the terminal's internal clock from the data source.

The values of assigned date and time controls are updated in the order in which the controls are listed in the Global Connections editor.

Updating the date and time at the data source from the terminal

To update the date or time at the data source from the terminal's internal clock, assign an analog tag to one or more of these controls:

This control	Contains this range of values
Year	00-99
Day of Week	1-7, with 1 being Sunday
Month	1-12
Day of Month	1-31
Hour	1-23
Minute	0-59
Second	0-59

Specify how frequently to update the values of the assigned controls at the data source (from the terminal's internal clock) by typing a time in the "Date and time output interval" box.

Updating the date and time at the terminal from the data source

This option is especially useful if you have several terminals connected to the same data source. Instead of the operator resetting the date and time manually on each terminal, the data source can reset all internal clocks at once.

To update the date or time in the terminal's internal clock from the data source, assign an analog or digital tag or an expression to the Remote Date and Time control. Assign an analog tag or an expression to one or more of these controls:

This control	Contains this range of values
Remote Year	00-99 or 0000-9999
Remote Month	1-12
Remote Day of Month	1-31
Remote Hour	1-23
Remote Minute	0-59
Remote Second	0-59

When the Remote Date and Time control value changes from 0 to a non-zero value, the terminal resets its internal time and date to the time and date read from the individual remote date and time controls.

Running macros

Use these global connections to run macros:

This control	Runs this macro
Remote Macro1	Macro1
Remote Macro2	Macro2
Remote Macro3	Macro3
Remote Macro4	Macro4
Remote Macro5	Macro5

Create the macros in the Macros editor. Make sure you name them exactly as shown in the table above (with no space in the name).

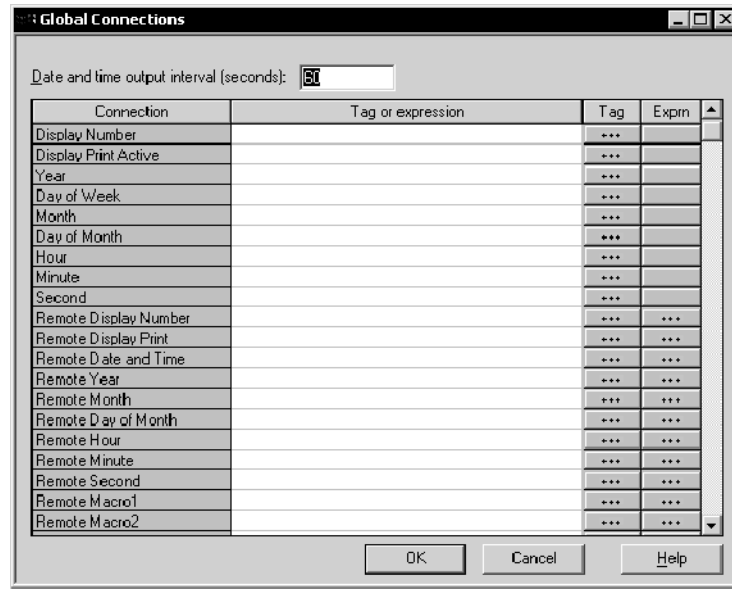
When the tag or expression assigned to one of these controls changes to a new non-zero value, RSView runs the associated macro.

For information about creating macros, see page 7-32.

Setting up global connections

To set up global connections:

1. Open the Global Connections editor.



2. In the "Date and time output interval" box, type the frequency with which to update date and time values from the terminal to the data source.
3. To send values from the project to the data source, assign tags to the following controls.

   For information about assigning tags, see page 7-28.

   Display Number
   RSView sends the number of the current graphic display to this control. Assign an analog tag.

   This option applies to Replace displays only. Make sure that each display has its own unique number.

   Display Print Active
   Assign a digital tag to this control to notify the data source when a display is printing. RSView writes a 1 to this control when printing begins, and a 0 when RSView is finished printing. When the value changes to 0 the printer could still be printing buffered data.

Year
RSView sends the value corresponding to the year in the terminal's internal clock to this control.

Day of Week
RSView sends the value corresponding to the day of the week to this control.

Month
RSView sends the value corresponding to the month to this control.

Day of Month
RSView sends the value corresponding to the day of the month to this control.

Hour
RSView sends the value corresponding to the hour to this control.

Minute
RSView sends the value corresponding to the minute to this control.

Second
RSView sends the value corresponding to the second to this control.

4. To allow the data source to control the project remotely, assign analog tags or expressions to the following controls.

   For information about assigning tags and expressions, see page 7-28.

   Remote Display Number
   RSView reads the value of this control and opens the graphic display whose display number matches the value. If the value is 0, the operator has control of display changes. If the value does not match any display's number, the application logs an error to the activity log.

   If you assign this control, remote display changes occur whether or not the logged-in user has security access to a given display.

   This option applies to Replace displays only. Make sure that each display has its own unique number.

   Do not assign an expression consisting of a constant to this control. If you do, the display whose number matches the constant opens and can never be closed or changed.

For more information about remote display changes, see page 19-7.

Remote Display Print
Assign this control to allow the data source to trigger the printing of graphic displays. When the value of the control changes from 0 to a non-zero value, RSView prints the currently visible display.

You can assign an analog or digital tag or an expression to this control.

Disable the screen saver on the runtime terminal if you assign this control.

If a display print is currently in progress, subsequent print requests from the data source are ignored until the display print is finished.

Remote Date and Time
RSView monitors this control and, when the value changes from 0 to a non-zero value, updates the terminal's internal clock with the values in the remote date and time controls (listed next).

You can assign an analog or digital tag or an expression to this control.

Remote Year
Assign this control to send the value corresponding to the year from the data source to the runtime terminal.

Remote Month
Assign this control to send the value corresponding to the month from the data source to the runtime terminal.

Remote Day of Month
Assign this control to send the value corresponding to the day of the month from the data source to the runtime terminal.

Remote Hour
Assign this control to send the value corresponding to the hour from the data source to the runtime terminal.

Remote Minute
Assign this control to send the value corresponding to the minute from the data source to the runtime terminal.

Remote Second
Assign this control to send the value corresponding to the second from the data source to the runtime terminal.

Remote Macro1
Assign this control to allow the data source to control when Macro1 is run.

Remote Macro2
Assign this control to allow the data source to control when Macro2 is run.

Remote Macro3
Assign this control to allow the data source to control when Macro3 is run.

Remote Macro4
Assign this control to allow the data source to control when Macro4 is run.

Remote Macro5
Assign this control to allow the data source to control when Macro5 is run.

5. Click OK to save your settings and close the editor.

Chapter

20

Specifying startup settings, testing projects, and creating runtime projects

This chapter describes:

- specifying startup settings
- testing your project
- creating runtime project files

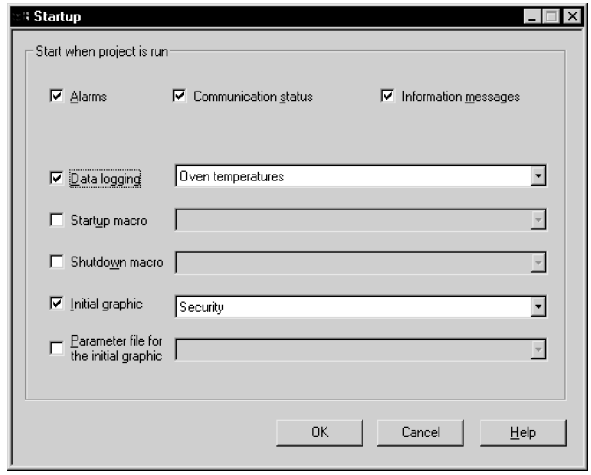
Specifying startup settings

Use the Startup editor to specify which project components to start when the project starts at runtime.

You can specify startup settings once you've set up all the components of the project, or you can select components in the Startup editor as you create them.

To specify startup settings:

1. Open the Startup editor.



2. Select the project components to use when the project starts:

Alarms
Check this box to monitor tag values for alarm conditions at runtime.

For information about configuring alarms, see Chapter 13.

Communication status
Check this box to display information about communication errors at runtime. When communication errors occur a communication error banner opens to inform the operator.

If you check this box, communication information, warnings, and errors are also sent to the activity log, if you set up activity logging to record this information.

To disable the communication error banner, clear the box. Clearing the box also means that runtime communication information, warnings, and errors are not logged in the activity log.

For information about setting up activity logging, see Chapter 15. For more information about the communication error banner, see page 24-15.

Information messages
Check this box to display information messages at runtime.

For information about setting up information messages, see Chapter 14.

Data logging
Check this box to start data logging when the project starts. Select the data log model to use from the list of models in the project.

For information about setting up data logging, see Chapter 16.

Startup macro
Check this box to use a startup macro. The startup macro assigns values to tags when the project starts. Select the macro to use from the list of macros in the project.

For information about creating macros, see page 7-32.

Shutdown macro
Check this box to use a shutdown macro. The shutdown macro assigns values to tags when the project stops. Select the macro to use from the list of macros in the project.

Initial graphic
Check this box to specify the graphic display to open when the project starts. Select the display to open from the list of displays in the project.

If you do not select a display, an empty window is displayed at runtime.

For information about creating graphic displays, see Chapter 8.

Parameter file for the initial graphic
Check this box to use a parameter file to replace tag placeholders in the graphic display that opens when the project starts. Select the parameter file from the list of parameter files in the project.

For information about creating parameter files, see page 8-29.

3. Click OK.

Once you specify the startup settings, test your project.

Testing your project

You can test your project in RSView Studio at any time during the development process, to make sure that everything works the way you intend.

If the development computer is connected to the data source, you can test all functions of the project, including communications and alarm monitoring.

An RSView ME Station emulator opens on the development computer and runs the project. This runtime version of the project is a temporary version for testing use only. You cannot run it on another computer.

There is a two-hour time limit for test running the project in RSView Studio.

The procedure in this section shows you how to test your entire project. For information about testing a single graphic display, see page 8-9.

To test your project in RSView Studio:


Test Project tool

1. On the Project menu, click Test Project, or click the Test Project tool.
2. Test your project.
3. To stop your project, press a Shutdown button, or type X.

   Make sure you provide the operator with a method for stopping the project at runtime. For more information about methods for stopping projects, see page 23-6.

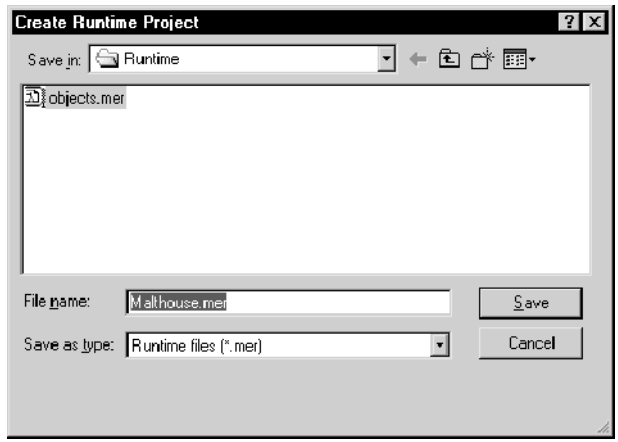
Once you've tested your project to make sure everything works the way you intend, create the runtime project file and transfer the file to the runtime computer.

Creating runtime project files

Before you can run your project, you must create a runtime version. When you create the runtime version, RSView Studio compiles all of the necessary project information into a single file with the extension .mer.

To create a runtime project:

1. In RSView Studio, with the project open, on the Project menu click Create Runtime Project.



2. If desired, specify a different directory in which to save the runtime project file.

   The default directory is \Documents and Settings\All Users\Documents\RSView Enterprise\ME\Runtime.

3. If desired, in the File name box, type a different name for the runtime project file.

   The default is to use the same name as the development project.

4. Click Save.

   RSView creates a runtime version of the project in the directory you specify. If any editors are open, you are first prompted to save any unsaved changes.

For information about transferring the runtime project to a Windows CE platform, see Chapter 21. For information about transferring the runtime project to a Windows 2000 platform, see Chapter 22.

Chapter

21

Preparing to run projects on a RAC6182

This chapter describes:

- steps for preparing to run your project on a RAC6182
- specifying the time, date, and number formats to use at runtime
- starting RSView ME Station
- configuring the communication driver to use to transfer the project to the RAC6182
- transferring projects to the RAC6182
- configuring the direct driver to use at runtime
- specifying print options for graphic displays
- opening and running projects on the RAC6182
- other methods for starting RSView ME Station, including using startup parameters and starting RSView ME Station automatically when Windows starts

Summary of steps

Follow these steps to:

- install the necessary hardware and software on the RAC6182
- transfer your project to the RAC6182
- prepare to run your project

For information about installing RSView ME Station, see the *RSView Machine Edition Installation Guide*.

Installing hardware and software on the RAC6182

1. If you will be printing displays, alarms, or activity messages, connect a printer to the RAC6182's parallel port.

The RAC6182 supports printing using the Microsoft Windows CE PCL3 printer driver, which is already installed on the RAC6182. Printing is supported for most laser and ink-jet printers. If you have problems printing, check that your printer is compatible with the PCL3 printer driver.

2. If you will be transferring the project from the development computer to the RAC6182 over a DH+ network, install a PKTX card on the RAC6182, in the PCI slot.

   For installation information, see the documentation that comes with the card.

3. If your project uses OPC communications, set up the OPC server on the RAC6182.

   For installation information, see the documentation supplied by your OPC server vendor. For information about OPC, see Chapter 6.

4. If your project uses third-party ActiveX objects, install and register the RAC6182 version of the objects on the runtime computer.

   For information about ActiveX objects, see page 9-17.

5. If the runtime computer uses different time, date, or number formats than the development computer, specify the time, date, and number formats to use at runtime.

   For more information, see page 21-3.

6. If you want to store temporary files on an external PCMCIA card to preserve internal storage space on the RAC6182, insert the PCMCIA card.

   For more information, see page 23-2.

Transferring the project

1. On the RAC6182, start RSView ME Station.

   For more information, see page 21-4.

2. In RSView ME Station, specify the driver to use for the transfer. If you are using Ethernet for the transfer, you can skip this step.

   For more information, see page 21-5.

3. On the development computer, configure the RSLinx driver to use for the transfer.

For more information, see page 21-5.

4. Move the project to the RAC6182 using the Transfer Utility tool.

   For more information, see page 21-6.

Preparing to run the project

1. In RSView ME Station, if you are using direct driver communications, configure the driver to use at runtime.

   For more information, see page 21-8.

2. If desired, in RSView ME Station, specify the print options to use for printing graphic displays.

   For more information, see page 21-12.

3. In RSView ME Station, open the project you just transferred.

   For more information, see page 21-12.

4. If desired, in RSView ME Station, specify the PCMCIA card on which to store temporary files.

   For more information, see page 23-2.

Once you've completed these steps, you're ready to run the project. For information about running your project, see Chapter 24.

Specifying time, date, and number formats

Time, date, and number formats are used by these graphic objects:

- Numeric display
- Time and Date display
- Trend

If the runtime computer uses different time, date, or number formats than the development computer, specify the time, date, and number formats to use at runtime.

You can also change these formats after the project is running, but you must stop and restart the project for the changes to take effect.

To specify time, date, and number formats:

1. On the Windows Start menu, select Settings, and then click Control Panel.

2. Double-click Regional Settings.
3. Specify the region to use, and then select the number, time, and date settings to use.
4. Click OK, and then close the Control Panel.

For more information, see your Windows CE documentation.

Starting RSView ME Station

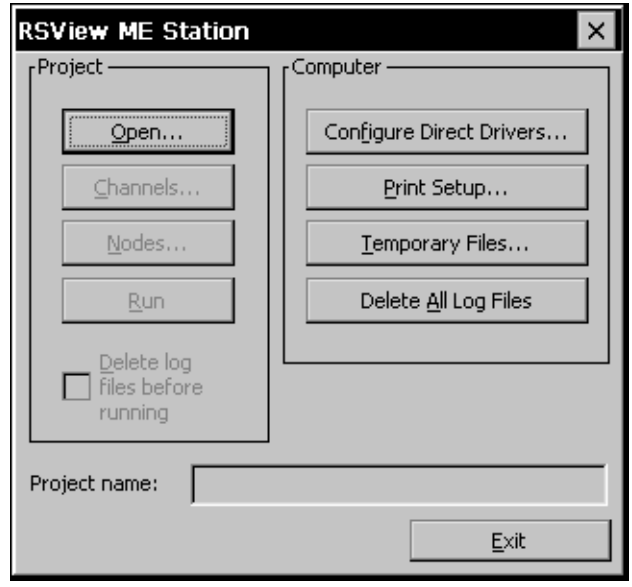
Before running your project for the first time, use the RSView ME Station dialog box to:

- specify the driver to use for the transfer
- select the project to run
- configure the direct driver to use at runtime
- configure the printer for printing graphic displays
- specify the PCMCIA card on which to store temporary files

To start RSView ME Station:

▶ On the Windows Start menu, select Programs, Rockwell Software, RSView Enterprise, and then click RSView ME Station.

The RSView ME Station dialog box opens.



For information about other methods of starting RSView ME Station, see page 21-13.

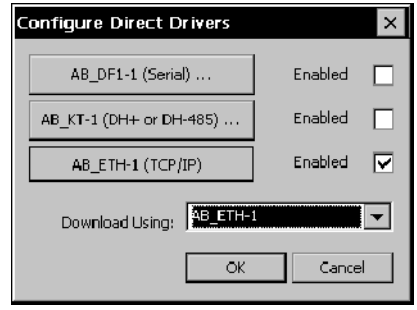
Specifying the driver to use for the transfer on the RAC6182

On the RAC6182, if you will be using a serial transfer (via DF1) or transferring over a DH+ or DH-485 network, you must specify the driver to use for the transfer before you begin the transfer. If you don't, the transfer will not work!

If you are using an Ethernet connection for the transfer, you can skip this step, since the Ethernet driver is already selected by default.

To specify the driver on the RAC6182:

1. In the RSView ME Station dialog box, click Configure Direct Drivers.



2. In the Configure Direct Drivers dialog box, check the Enabled box beside the driver to use:
   - AB_DF1-1—use for a serial transfer.
   - AB_KT-1—use to transfer over a DH+ network.
   - AB_ETH-1—use with an ethernet connection.
3. In the Download Using box, select the driver to use.

Configuring an RSLinx driver for the transfer on the development computer

On the development computer, configure the RSLinx driver that you will use to download your project to the RAC6182. You can configure the driver directly in RSLinx, or when you set up the download in the Transfer Utility.

Use one of these drivers for the transfer:

- AB_DF1-1—use for a serial transfer.
- AB_ETH-1—use with an ethernet connection.
- AB_KT-1—use to transfer over a DH+ network.

For information about configuring drivers in RSLinx, see the documentation that comes with RSLinx.

For information about using the Transfer Utility, see the next section.

Transferring projects to the RAC6182

Use the Transfer Utility to download your runtime project from the development computer to the RAC6182. Runtime projects have the extension .mer.

For information about creating the runtime project file, see Chapter 20.

IMPORTANT Install RSView ME Station on the RAC6182 before you begin the transfer. If you don't, the transfer will not work!

About the download

You can use a serial or Ethernet connection between the development computer and the RAC6182 destination. Or, you can use a DH+ network for the transfer, if the runtime computer has a PKTX card installed in the PCI slot. You must use one of the drivers listed on page 21-6 for the download.

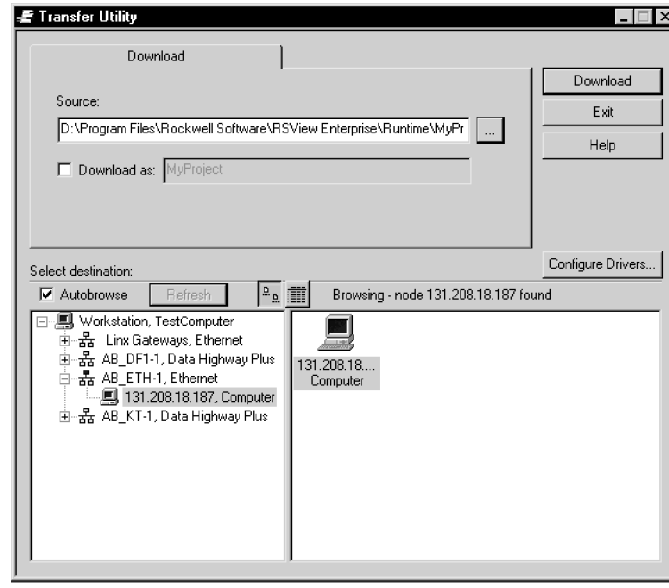
You can download while a project is running on the runtime computer.

You can download:

- multiple projects (one at a time) to the same runtime computer
- a new copy of the project currently running on the runtime computer, for use the next time the project is started

To transfer a project to the RAC6182:

1. On the development computer, do one of the following:
   - In RSView Studio, on the Tools menu click Transfer Utility.
   - On the Windows Start menu, select Programs, Rockwell Software, RSView Enterprise, Tools, and then click ME Transfer Utility.



Browse button

2. In the Source box, type the location of the runtime project file (with the extension .mer) on the development computer.

   To search for the file, click the Browse button, navigate to the folder containing the project's .mer file, click the file name, and then click Open.

   The default location for the runtime file is \Documents and Settings\All Users\Documents\RSView Enterprise\ME\ Runtime.

3. To use a different name for the project file at runtime, check the "Download as" box and then type the new name.

4. To configure the RSLinx driver to use for the transfer, click Configure Drivers.

   RSLinx opens. Configure the driver that's appropriate for the transfer method you're using. If you're using an Ethernet connection, specify the IP address of the RAC6182.

   When you're finished configuring the driver, close RSLinx. You are returned to the Transfer Utility dialog box.

   For information about configuring RSLinx drivers, see the RSLinx documentation.

5. In the left-hand pane, click the + beside the driver to use for the download, and then click the RAC6182 computer to download the project file to. Information about the selected computer is displayed in the right-hand pane.

   To update the list of destinations, click Refresh or check the Autobrowse box.

   To change the format of the list, click the icon and list buttons.

6. To begin the transfer, click Download.

   If you selected a destination that is not a valid RAC6182 computer, you are prompted to select a new destination.

   If the project file already exists at the destination, you are given the opportunity to overwrite it.

   If the terminal doesn't respond within the timeout interval, a message is displayed and the download is cancelled. Check that the drivers on the RAC6182 are enabled and configured properly, and then repeat step 6.

Configuring direct drivers on the RAC6182

If you are going to use direct driver communications, you must configure a RAC6182-compatible communication driver before you run the project for the first time.

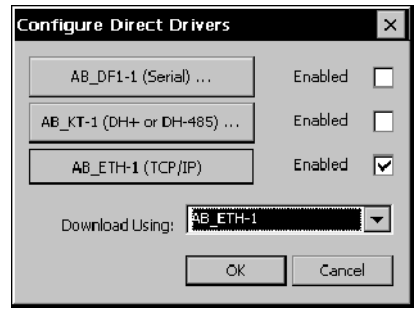
You also need to configure the communication driver if you change the type of communication network.

For more information about direct driver communications, see Chapter 5.

If you're connecting to a ControlLogix processor via Ethernet, set up an OPC node. For more information, see page 6-4.

To configure the RAC6182 driver to use at runtime:

1. In the RSView ME Station dialog box, click Configure Direct Drivers.



2. In the Configure Direct Drivers dialog box, select the driver to use:

   AB_DF1-1
   Click this driver if you are using a serial data link to a DH+ network, or to connect directly to a controller's serial port. Specify the driver's settings in the dialog box that opens. For details, see the next section.

   AB_KT-1
   Click this driver if you are using a DH+ or DH-485 network. Specify the driver's settings in the dialog box that opens. For details, see page 21-11.

   AB_ETH-1
   Click this driver if you are using TCP/IP (with an Ethernet connection).

   If you specified the IP address to use when you set up the node to communicate with, no further configuration is required.

   To specify or change the IP address, use the runtime Nodes editor. For information about using the Nodes editor, see page 23-4.

3. Check the Enabled box beside the driver to use.
4. Click OK to confirm your changes and return to the RSView ME Station dialog box.

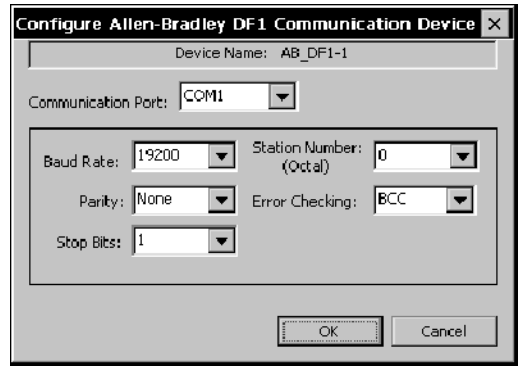
   The enabled driver is started the next time you restart the runtime computer. When you click OK, you are given the option of restarting the computer now.

Configuring the AB_DF1-1 driver

Use the AB_DF1-1 communication driver for serial network connections to DH+, or to connect directly to a controller's serial port.

To configure the AB_DF1-1 driver:

1. In the Configure Direct Drivers dialog box, click AB_DF1-1.



2. Specify these settings in the dialog box that opens:

Communication Port
Select the COM port to which the serial cable is attached on the runtime computer.

Baud Rate
Select the baud rate (speed) to use for serial communications.

Parity
Select the type of error checking to perform for serial communications.

Stop Bits
Select the amount of time between data transmissions.

Station Number (Octal)
Select the station number setting for the source DF1 device, from 0 to 77 (octal).

Error Checking
Select the type of error checking the controller uses to verify that the data it sends is complete and correct. RSView will use the same type of error checking when it receives the data.

Newer controllers generally use the CRC (Cyclical Redundancy Check) method. Older controllers could use CRC or BCC (Block Character Check).

If you're not sure which type to select, consult the controller's documentation.

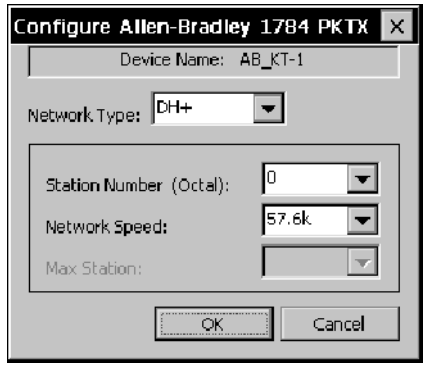
3. To save your changes and return to the Configure Direct Drivers dialog box, click OK.

Configuring the AB_KT-1 driver

Use the AB_KT-1 communication driver for DH+ and DH-485 network connections. These network connections also require the Allen-Bradley 1784-PKTX communication device.

To configure the AB_KT-1 driver:

1. In the Configure Direct Drivers dialog box, click AB_KT-1.



2. Specify these settings in the dialog box that opens:

Network Type
Select the communication network type to use.

Station Number
Select the station number of the node the 1784-PKTX card occupies on the network.

For DH+, select a number in the range 0 to 77 (octal). For DH-485, select a number in the range 0 to 31 (decimal).

Network Speed
Select the network baud rate.

Max Station
For DH-485 networks, select a Max Station number (1-31). This setting may speed up communications. Refer to your network documentation for more information.

3. To save your changes and return to the Configure Direct Drivers dialog box, click OK.

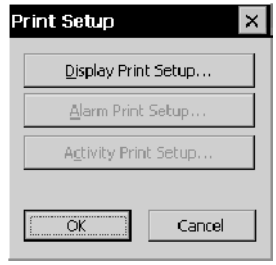
Specifying print options on the RAC6182

If you set up your project to print activity or alarm messages, or to print graphic displays, RSView automatically uses the printer connected to the runtime computer's parallel port. You don't need to do anything in RSView ME Station to set up the printer.

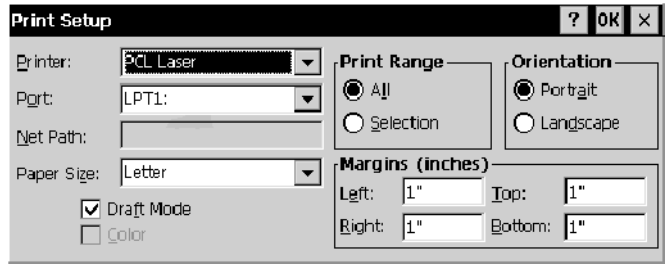
However, if desired, you can specify print options for printing graphic displays.

To set print options for graphic displays:

1. In the RSView ME Station dialog box, click Print Setup.



2. Click Display Print Setup.



3. Modify the print options as required.

   For example, if you will be printing on legal size paper, change the Paper Size option to Legal.

   For detailed information about printer options, refer to your Windows documentation.

4. Click OK to confirm the printer settings.
5. Click OK to return to the RSView ME Station dialog box.

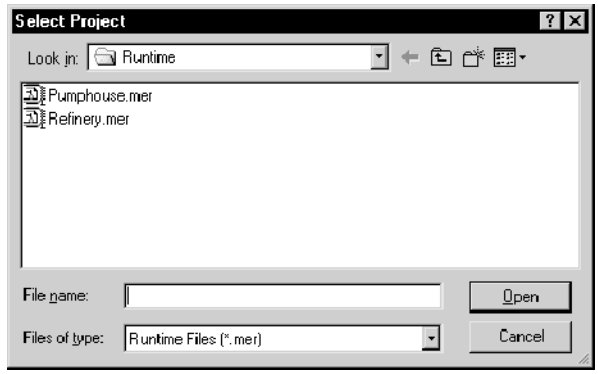
Opening and running projects on the RAC6182

You can run any runtime project that is on the runtime computer. Runtime projects have the extension .mer.

Before opening your project, you can specify an external PCMCIA card to store temporary files on. For more information, see page 23-2.

To open the project:

1. In the RSView ME Station dialog box, click Open.



2. Navigate to the folder containing the project's .mer file, and then click the file name.

   If you used the Transfer Utility to transfer the project to the RAC6182, the path is \Storage Card\Rockwell Software\RSViewME\Runtime.

3. Click Open.

   The project name is displayed in the Project name box in the RSView ME Station dialog box.

4. To run the project, click Run.

Other methods for starting RSView ME Station

This section describes the various methods you can use to start RSView ME Station.

When you start RSView ME Station, you can use startup parameters to:

- start running a project
- automatically delete a project's log files before running the project

You can also configure RSView ME Station to start automatically when Windows starts.

To start RSView ME Station, do one of the following:

- On the Windows Start menu, select Programs, Rockwell Software, RSView Enterprise, and then click RSView ME Station.
- On the desktop, double-click the shortcut icon RSView ME Station.
- In the Windows Explorer, double-click MERuntime.exe.

  This file is located in \Storage Card\Rockwell Software\RSViewME.
- On the Windows Start menu, click Run. In the Open box, type this:

  "\Storage Card\Rockwell Software\RSViewME\MERuntime.exe"

  To search for the file, click Browse. When you've specified the file to open, click OK.

  A keyboard is required to use this method.

The RSView ME Station dialog box opens.

Use the dialog box to specify the project to run, configure direct drivers, configure the printer for graphic displays, edit channels and nodes, and delete log files. For information about editing channels, editing nodes, and deleting log files, see Chapter 23.

To start RSView ME Station and start a project at the same time:

- ▶ In Windows Explorer, double-click the project's .mer file.

  The file is located in \Storage Card\Rockwell Software\RSViewME\Runtime.

The RSView ME Station dialog box opens, with the project selected.

Using startup parameters

When you start RSView ME Station, you can use startup parameters to start running a project at the same time, and to automatically delete a project's log files before running the project.

If you use startup parameters, the RSView ME Station dialog box is bypassed.

To set up startup parameters, a keyboard must be attached to the runtime computer.

You can use these startup parameters:

- /r—runs the project
- /d—deletes the project's alarm and data log files before running the project.

  For more information about deleting data log files, see page 23-5.

You can use the /r parameter alone, or with the /d parameter. You cannot use the /d parameter alone.

To use the startup parameters, you must specify both the path to the MERuntime.exe file and the path to the project's .mer file.

To use startup parameters:

1. On the Windows Start menu, click Run.
2. In the Open box, type this:

   "\Storage Card\Rockwell Software\RSViewME\MERuntime.exe" "\Storage Card\Rockwell Software\RSViewME\Runtime*ProjectName*.mer" /r /d

   If you don't want to delete the project's log files, omit the /d parameter.
3. Click OK.

   The project starts running.

Starting RSView ME Station when Windows starts

If desired, you can set up RSView ME Station to start automatically when Windows starts. You can also run a project automatically when Windows starts.

The Storage Card directory

Storage Card is the only permanent directory on the runtime computer. All other directories are stored in volatile memory, and are wiped out when Windows shuts down. When you restart Windows, the terminal recreates the other directories using information stored in the Storage Card directory.

This means that changes you make to the Windows desktop are not permanent unless you store the changes in the Storage Card directory.

The instructions below show you how to create a permanent shortcut in the \Storage Card\Windows\Startup directory, so that RSView ME Station starts automatically each time Windows starts.

To create the shortcut, a keyboard must be attached to the runtime computer.

To start RSView ME Station automatically:

1. In the Windows Explorer, open the folder \Storage Card\Windows\Desktop.
2. Right-click RSView ME Station, and then click Copy.
3. Open the folder \Storage Card\Windows\Startup.
4. Right-click Startup, and then click Paste.

   From now on, RSView ME Station starts automatically when you start Windows.

To start RSView ME Station and run a project automatically:

1. Follow steps 1 through 4 in the previous procedure.
2. In the Startup folder, right-click RSView ME Station, and then click Properties.
3. In the Target box, type a space at the end of the existing text, and then type this:

   "\Storage Card\Rockwell Software\RSViewME\Runtime*ProjectName*.mer" /r /d

   If you don't want to delete the project's log files, omit the /d parameter.
4. Click OK.

   From now on, RSView ME Station starts automatically when you start Windows, and the specified project starts running.

For more information about configuring settings in Windows CE, see your Windows documentation.

Chapter

22 Preparing to run projects in Windows 2000

This chapter describes:

- steps for preparing to run your project on the runtime computer
- specifying the time, date, and number formats to use at runtime
- using the DeskLock tool to prevent users from switching to another application or accessing the desktop at runtime
- moving the project to another Windows 2000 computer
- starting RSView ME Station
- configuring direct drivers in Windows 2000
- specifying the printers to use at runtime
- opening and running projects in Windows 2000
- other methods for starting RSView ME Station, including using startup parameters and starting RSView ME Station automatically when Windows starts

Summary of steps

Follow these steps to:

- install the necessary hardware and software on the runtime computer
- transfer your Windows 2000 project to the runtime computer
- prepare to run your project

For information about installing RSView ME Station, see the *RSView Machine Edition Installation Guide*.

Installing hardware and software on the runtime computer

1. If you will be printing displays, alarms, or activity messages, set up printer connections on the runtime computer.

   For more information, see page 22-6.

2. If your project uses direct driver communications, install RSLinx on the runtime computer.

   For installation information, see the documentation supplied with RSLinx.

3. If your project uses OPC communications, set up the OPC server on the runtime computer or on another computer on the network.

   For installation information, see the documentation supplied by your OPC server vendor. For information about OPC, see Chapter 6.

4. If your project uses third-party ActiveX objects, install and register the Windows 2000 version of the objects on the runtime computer.

   For information about ActiveX objects, see page 9-17.

5. If the runtime computer uses different time, date, or number formats than the development computer, specify the time, date, and number formats to use at runtime.

   For more information, see page 22-3.

6. If desired, use the DeskLock tool to prevent users from switching to another software application or the desktop at runtime.

   For more information, see page 22-4.

Transferring the project

- Move the project to the Windows 2000 runtime computer.

  For more information, see page 22-4.

Preparing to run the project

1. On the runtime computer, start RSView ME Station.

   For more information, see page 22-5.

2. In RSView ME Station, if you are using direct driver communications, configure the driver (if you have not already done so).

For more information, see page 22-5.

3. In RSView ME Station, specify the printers to use.

   For more information, see page 22-6.

4. In RSView ME Station, open the project you just transferred.

   For more information, see page 22-8.

Once you've completed these steps, you're ready to run the project. For information about running your project, see Chapter 24.

Specifying time, date, and number formats

Time, date, and number formats are used by these graphic objects:

- Numeric display
- Time and Date display
- Trend

If the runtime computer uses different time, date, or number formats than the development computer, specify the time, date, and number formats to use at runtime.

You can also change these formats after the project is running, but you must stop and restart the project for the changes to take effect.

To specify time, date, and number formats:

1. On the Windows Start menu, select Settings, and then click Control Panel.
2. Double-click Regional Options.
3. Specify the locale to use, and then select the number, time, and date settings to use.
4. Click OK, and then close the Control Panel.

For more information, see your Windows documentation.

Using the DeskLock tool

Use the DeskLock tool to prevent users from switching to another software application or accessing the desktop at runtime.

This tool can have far-reaching effects on your operating system. The DeskLock tool replaces the standard Windows 2000 non-configured desktop with a customized desktop. The customized desktop is intended to prevent operators from accessing other applications and operating system functions such as restarting Windows or shutting down tasks.

IMPORTANT Before using the tool, read the DeskLock Help file completely.

To open the DeskLock tool:

- On the runtime computer, on the Windows Start menu, select Programs, Rockwell Software, RSView Enterprise, Tools, and then click DeskLock.

For details about using the tool, see the tool's Help.

Moving the project to the runtime computer

The runtime project file has the extension .mer. You can use any standard file transfer method to copy your runtime project from the development computer to the runtime computer.

You can:

- copy the project file from the development computer to a floppy disk, and then from the floppy disk to the runtime computer
- if the project file is too large to fit on a floppy disk, use a larger storage device such as a Zip™ disk
- if the development and runtime computers are on the same network, use Windows Explorer or My Computer to move the file

For information about creating the runtime project file, see Chapter 20.

Starting RSView ME Station

Before running your project for the first time, use the RSView ME Station dialog box to:

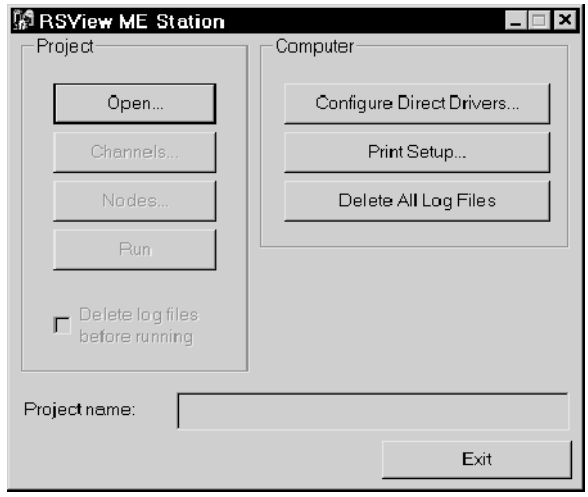
- select the project to run

- configure the direct driver to use at runtime (if you have not already done so)
- specify the printers to use at runtime

To start RSView ME Station:

▶ On the Windows Start menu, select Programs, Rockwell Software, RSView Enterprise, and then click RSView ME Station.

The RSView ME Station dialog box opens.



For information about other methods of starting RSView ME Station, see page 22-8.

Configuring direct drivers in Windows 2000

Use RSLinx to configure direct drivers for your Windows 2000 runtime project. You can configure the drivers directly in RSLinx, or open RSLinx via the RSView ME Station dialog box.

To configure the Windows 2000 driver to use at runtime:

1. In the RSView ME Station dialog box, click Configure Direct Drivers.
2. RSLinx opens. Configure the driver.

   For information about configuring RSLinx drivers, see the RSLinx documentation.

3. When you're finished configuring the driver, close RSLinx.

   You are returned to the RSView ME Station dialog box.

Once the driver is configured, RSView ME Station automatically starts the driver software when you run the project.

Specifying the printers to use at runtime

You can use local or network printers to print activity messages, alarm messages, and graphic displays at runtime. If desired, you can use a different printer for each type of printing.

Printing alarm and activity messages

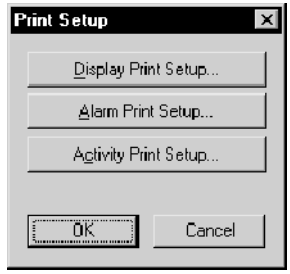
To print activity and alarm messages at runtime, you can use any printer that has an FX-80-compatible mode, but a line printer is recommended. Configure the printer to use this mode.

Printing graphic displays

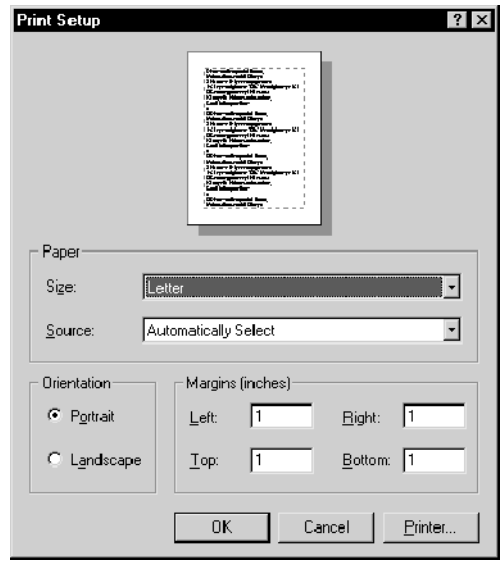
To print graphic displays, use a page printer. Displays are printed in gray-scale, even if you use a color printer.

To specify the printers to use at runtime:

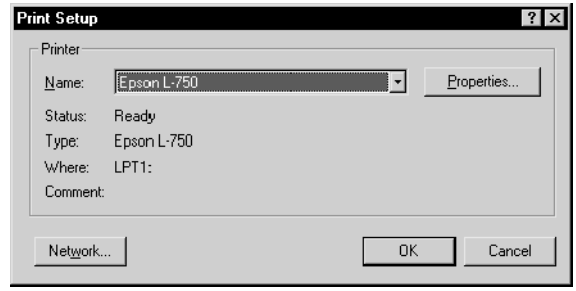
1. In the RSView ME Station dialog box, click Print Setup.



2. Click the button for the type of printing to set up.



3. To select the printer to use, click Printer.



4. In the Name box, select the local or network printer to use.

   For detailed information about setting up network printers, refer to your Windows documentation.

5. Click OK.

6. Modify the print options as required.

   For detailed information about printer options, refer to your Windows documentation.

7. Click OK.

8. Repeat steps 2 through 7 to set up additional printers.

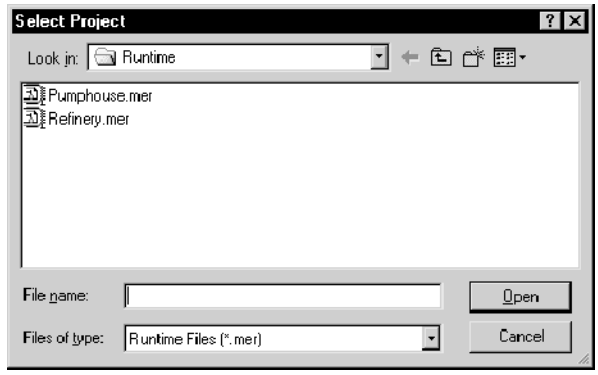
9. Click OK to confirm the printer settings and return to the RSView ME Station dialog box.

Opening and running projects in Windows 2000

You can run any runtime project that is on the runtime computer. Runtime projects have the extension .mer.

To open the project:

1. In the RSView ME Station dialog box, click Open.



2. Navigate to the folder containing the project's .mer file, and then click the file name.
3. Click Open.

   The project name is displayed in the Project name box in the RSView ME Station dialog box.
4. To run the project, click Run.

Other methods for starting RSView ME Station

This section describes the various methods you can use to start RSView ME Station.

When you start RSView ME Station, you can use startup parameters to:

- start running a project
- automatically delete a project's log files before running the project

You can also configure RSView ME Station to start automatically when Windows starts.

To start RSView ME Station, do one of the following:

- On the Windows Start menu, select Programs, Rockwell Software, RSView Enterprise, and then click RSView ME Station.
- On the desktop, double-click the shortcut icon RSView ME Station.
- In the Windows Explorer, double-click MERuntime.exe.

  This file is located in C:\Program Files\Rockwell Software\RSView Enterprise.
- On the Windows Start menu, click Run. In the Open box, type the path to the MERuntime.exe file.

  To search for the file, click Browse. When you've specified the file to open, click OK.

The RSView ME Station dialog box opens.

Use the dialog box to configure direct drivers, edit channels and nodes, specify printers, delete log files, and specify the project to run. For information about editing channels, editing nodes, and deleting log files, see Chapter 23.

To start RSView ME Station and start a project at the same time:

▶ In Windows Explorer, double-click the project's .mer file.

By default, this file is located in C:\Documents and Settings\All Users\Documents\RSView Enterprise\ME\Runtime.

The RSView ME Station dialog box opens, with the project selected.

Using startup parameters

When you start RSView ME Station, you can use startup parameters to start running a project at the same time, and to automatically delete a project's log files before running the project.

If you use startup parameters, the RSView ME Station dialog box is bypassed.

You can use these startup parameters:

- /r—runs the project
- /d—deletes the project's alarm and data log files before running the project.

For more information about deleting data log files, see page 23-5.

You can use the /r parameter alone, or with the /d parameter. You cannot use the /d parameter alone.

To use the startup parameters, you must specify both the path to the MERuntime.exe file and the path to the project's .mer file.

To use startup parameters:

1. On the Windows Start menu, click Run.
2. In the Open box, type the path to the MERuntime.exe file, then a space, then the path to the project's .mer file, followed by the startup parameters to use. If the paths contain spaces, enclose them in double quotes.

   If you accepted the default file locations, you would type this:

   "C:\Program Files\Rockwell Software\RSView Enterprise\MERuntime.exe" "C:\Documents and Settings\All Users\Documents\RSView Enterprise\ME\Runtime*ProjectName*.mer" /r /d

   If you don't want to delete the project's log files, omit the /d parameter.
3. Click OK.

   The project starts running.

Starting RSView ME Station when Windows starts

If desired, you can set up RSView ME Station to start automatically when Windows starts. You can also run a project automatically when Windows starts.

To start RSView ME Station automatically:

1. On the Windows Start menu, select Settings, and then click Taskbar & Start Menu.
2. Click the Advanced tab, and then click Add.
3. Browse to the location of the MERuntime.exe file.

   This file is located in C:\Program Files\Rockwell Software\RSView Enterprise.
4. Click Next.

5. Click the Startup folder (in the Start menu\Programs folder), and then click Next.
6. Type a name for the shortcut, such as RSView ME Station, and then click Finish.
7. Click OK.

   From now on, RSView ME Station starts automatically when you start Windows.

To start RSView ME Station and run a project automatically:

1. On the Windows Start menu, select Settings, and then click Taskbar & Start Menu.
2. Click the Advanced tab, and then click Add.
3. In the "Type the location of the item" box, type the path to the MERuntime.exe file, then a space, then the path to the project's .mer file, followed by the startup parameters to use. If the paths contain spaces, enclose them in double quotes.

   If you accepted the default file locations, you would type this:

   "C:\Program Files\Rockwell Software\RSView Enterprise\MERuntime.exe" "C:\Documents and Settings\All Users\Documents\RSView Enterprise\ME\Runtime*ProjectName*.mer" /r /d

   If you don't want to delete the project's log files, omit the /d parameter.
4. Click Next.
5. Click the Startup folder (in the Start menu\Programs folder), and then click Next.
6. Type a name for the shortcut, such as the project name, and then click Finish.
7. Click OK.

   From now on, RSView ME Station starts automatically when you start Windows, and the specified project starts running.

For more information about configuring settings in Windows 2000, see your Windows documentation.

Chapter

23

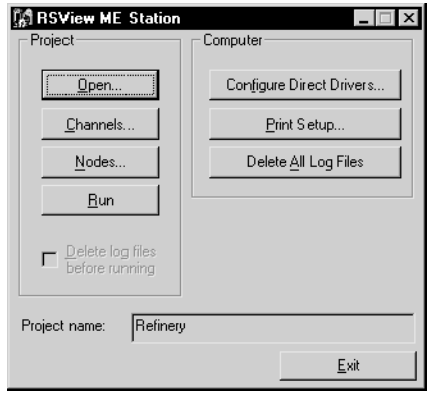
Starting, stopping, and configuring projects at runtime

This chapter describes:

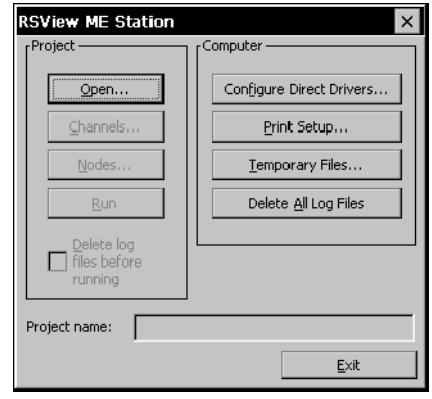
- storing temporary files on an external card (RAC6182 projects only)
- selecting the project to configure or run
- editing channels
- editing nodes
- deleting log files
- running projects
- stopping projects

Using the RSView ME Station dialog box

Use the RSView ME Station dialog box to perform the tasks described in this chapter. The dialog box opens when you start RSView ME Station.



Windows 2000



RAC6182

If you configure a project to open directly when Windows starts, this dialog box is bypassed. To open the dialog box, stop the project and restart RSView ME Station.

For information about starting RSView ME Station in Windows 2000, see page 22-8. For information about starting RSView ME Station on a RAC6182, see page 21-13.

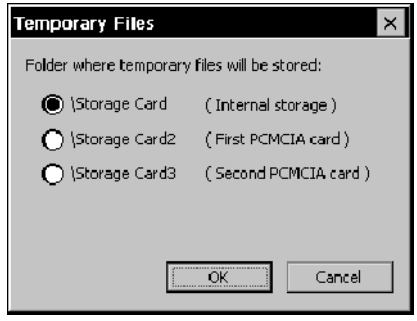
Storing temporary files on an external card (RAC6182 projects only)

RSView ME Station creates temporary files when you open your project. If the project contains many bitmap images, the RAC6182 might run out of disk space because of the size of the temporary files. If desired, you can store temporary files on an external PCMCIA card while your project is running.

Performance using external PCMCIA storage might be slightly slower than when using the RAC6182's internal disk space for storage.

To store temporary files on an external card:

1. In the RSView ME Station dialog box, click Temporary Files.



2. Click the storage card to use.

   If only one PCMCIA card is inserted in the RAC6182, use Storage Card2. If two cards are inserted, you can use either Storage Card2 or Storage Card3.

3. Click OK.

Selecting the project to configure or run

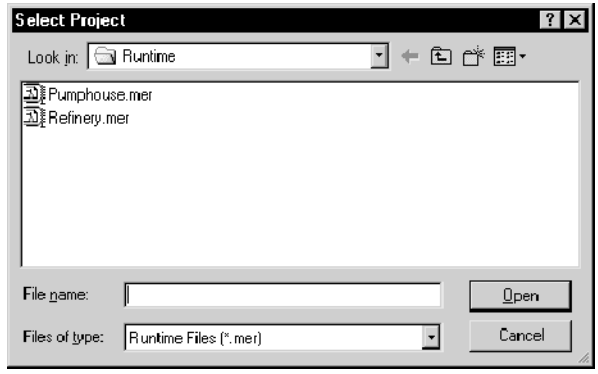
You can run any runtime project that is on the runtime computer. Runtime projects have the extension .mer.

For information about:

- creating the runtime project, see Chapter 20
- transferring a RAC6182 project to the runtime computer, see Chapter 21
- transferring a Windows 2000 project to the runtime computer, see Chapter 22

To select the project to configure or run:

1. In the RSView ME Station dialog box, click Open.



2. Navigate to the folder containing the project's .mer file, and then click the file name.
3. Click Open.

   The project name is displayed in the Project name box in the RSView ME Station dialog box.
4. To run the project now, click Run.

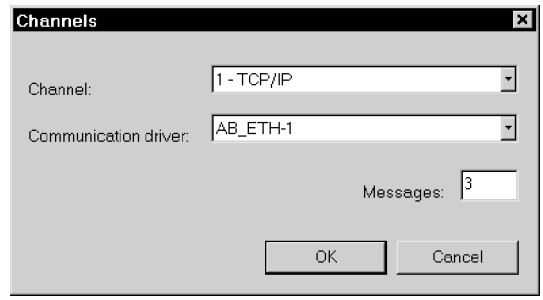
   For information about editing channels, editing nodes, or deleting log files before running the project, see the topics in the remainder of this chapter.

Editing channels on the runtime computer

To change a channel's configuration at runtime, use the Channels editor in RSView ME Station. For example, if you set up a channel without specifying a communication driver, you must specify the driver before you start the project at runtime.

To edit a channel on the runtime computer:

1. In the RSView ME Station dialog box, click Channels.



2. In the Channel box, select the channel to edit.
3. Modify the settings as required.

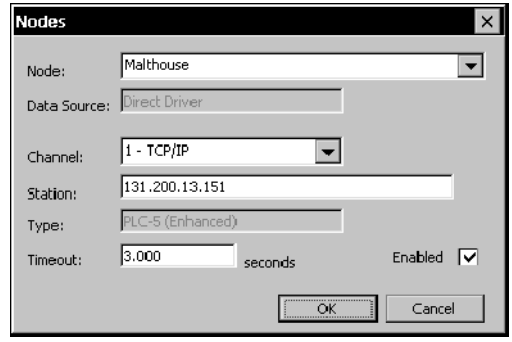
   For information about configuring channels, see page 5-11.
4. Click OK to confirm your changes and return to the RSView ME Station dialog box.

Editing nodes on the runtime computer

To change a node's configuration at runtime, use the Nodes editor in RSView ME Station. For example, you can change the node's IP address to use the project with a different processor than was specified during project development. To do this, stop the project and then use the Nodes editor to specify another IP address.

To edit a node on the runtime computer:

1. In the RSView ME Station dialog box, click Nodes.



2. In the Node box, select the node to edit.
3. Modify the settings as required.

The settings that appear depend on whether the selected node uses the Direct Driver or OPC Server data source. Settings that you cannot change at runtime are dimmed.

For information about configuring direct driver nodes, see page 5-15.

For information about configuring OPC nodes, see page 6-10.

4. Click OK to confirm your changes and return to the RSView ME Station dialog box.

Deleting log files on the runtime computer

When you run your project, RSView ME Station stores log files for alarms and data logging (if you use these features). When you start RSView ME Station, you can delete the alarm and data log files for the selected project, or for all the projects on the runtime computer.

Running a newer version of the project

If you run a newer version of a project, the alarm log file for the older version is deleted automatically. The data log file for the older version is retained, to allow the display of historical data in trends.

For more information about the alarm log file, see page 13-5. For more information about data log files, see page 16-2.

Deleting log files at project startup

To delete log files for the selected project:

▶ In the RSView ME Station dialog box, check the "Delete log files before running" box.

All alarm and data log files for the selected project are deleted.

To delete log files for all projects on the runtime computer:

▶ In the RSView ME Station dialog box, click Delete All Log Files.

Only log files for data log models that use the default path are deleted when you use this option. All alarm log files are deleted

If you log to a different location than the default path, use "Delete log files before running," or else use standard Windows file management methods to delete unwanted data log files.

For more information about data log files, see page 16-2.

Running projects

To run the selected project:

▶ In the RSView ME Station dialog box, click Run.

For information about other methods of running a RAC6182 project, see page 21-13. For information about other methods of running a Windows 2000 project, see page 22-8.

Stopping projects

To stop a project, use one of these methods:

- Press a Shutdown button in a graphic display.
- If the project is set up to use a title bar with a Control box, click the Close button at the right end of the title bar.
- If the project is set up to use a title bar with a Control box, on the Control menu at the left end of the title bar, click Close.

For information about using a title bar in graphic displays, see page 4-10. For information about preventing unauthorized users from stopping projects, see page 18-10.

What happens when the project stops

When the project stops:

- If you assigned a shutdown macro (in the Startup editor), the macro runs, assigning values to tags, and then the project stops.

  For information about the Startup editor, see Chapter 20.
- RSView ME Station closes.

Chapter

24 Running your project

This chapter describes:

- logging in and logging out
- entering numeric and string values
- changing tag values
- viewing tag data
- viewing alarms and messages
- viewing information about runtime communication errors

For information about navigating between displays, see Chapter 19. For information about navigating between and using the graphic objects in a display, see page 10-4.

Logging in to a Windows domain

To log data to a network location, the runtime computer must be logged in to the same domain as the computer on the network. To do this, the user must have access rights for the domain.

To log in to a domain from Windows 2000:

▶ When Windows starts, type a user name, password, and domain name.

To log in to a domain from the RAC6182:

1. On the Windows Start menu, select Settings, and then click Control Panel.
2. Double-click Network.
3. Click the Identification tab.
4. Type a user name, password, and domain name.

Logging in to the project

To log in, the user must have an account in the User Accounts editor. If security is set up, the user must also have a password.

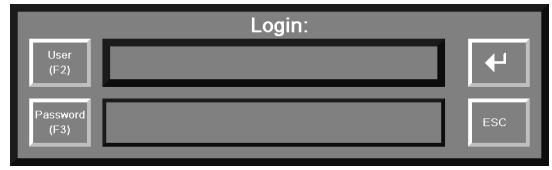
For information about setting up user accounts and passwords, see Chapter 18.

You cannot change passwords at runtime. To change a password, use the User Accounts editor in RSView Studio. For more information, see page 18-9.

To log in:

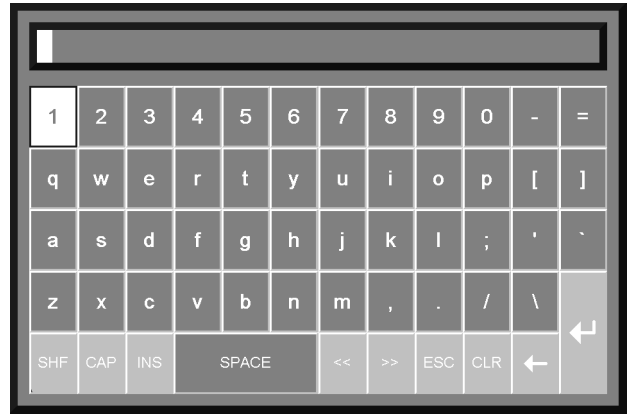
1. Press the Login button.

   The Login window opens.



2. Press the User button, or press F2 on an external keyboard.

   The string pop-up keyboard opens. For information about using the keyboard, see page 24-7.



3. Type your user name in the string pop-up keyboard, or on an external keyboard, and then press Enter.

   The name is not case sensitive.

4. To enter a password, press the Password button, or press F3 on an external keyboard.

5. Type the password in the string pop-up keyboard, or on an external keyboard, and then press Enter.

The password is not case sensitive.

6. To close the Login window and complete the login, press Enter.

What happens when a user logs in

When a user logs in:

- If the previous user did not log out, the previous user is logged out now. If a logout macro is set up for the previous user, the logout macro runs, assigning values to tags.
- The new user is logged in.
- If a login macro is set up for the new user, the macro runs, assigning values to tags.

Problems with logging in

Login is unsuccessful under these circumstances:

- If the graphic display changes remotely before the user has finished logging in, the login is cancelled.
- If the user name or password doesn't match the settings in the User Accounts editor, the user is not logged in.
- If the screen resolution is smaller than 280 pixels wide by 84 pixels high, the Login window cannot open.
- If the screen resolution is smaller than 236 pixels wide by 208 pixels high, the string pop-up keyboard cannot open.

Logging out

When the current user logs out, the DEFAULT user is logged in.

To log out:

▶ Press the Logout button.

Entering numeric values

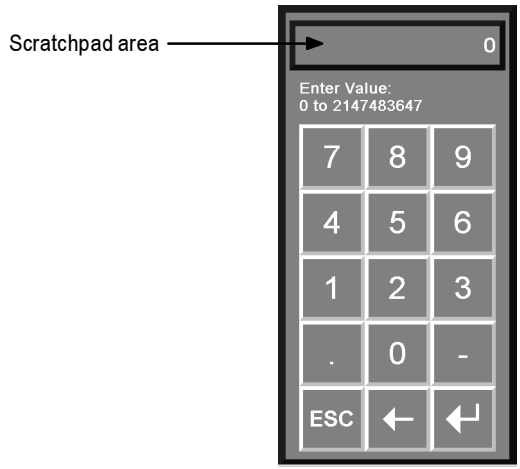
The operator can enter numeric values at runtime using the Numeric Input Enable button.

When the operator presses the button, the numeric pop-up keypad or scratchpad opens, depending on how you configured the button. To use the scratchpad, a keyboard must be attached to the runtime computer, or the terminal must be a keypad terminal.

For information about configuring the Numeric Input Enable button, see Chapter 10.

Using the numeric pop-up keypad

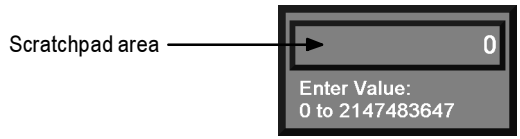
The keypad can accept up to 17 digits, including the decimal point, leading zero, and minus sign.



When the keypad is open, no other objects in the graphic display can accept input.

Using the numeric pop-up scratchpad

The scratchpad can accept up to 17 digits, including the decimal point, leading zero, and minus sign.



The scratchpad does not contain any buttons. If the runtime computer does not have an external keyboard or keypad attached, the operator will be unable to enter values or close the scratchpad.

When the scratchpad is open, no other objects in the graphic display can accept input.

Using buttons and keys with the numeric pop-ups

You can use the following buttons and their keyboard or keypad equivalents with the numeric pop-up keypad. For the pop-up scratchpad, you can use the keys on an external keyboard or keypad only.

Use this button or key	To do this
Decimal (.)	Type a decimal point. This button is visible only if the decimal point type for the Numeric Input Enable button is Implicit.
Minus (-)	Toggle the value between positive and negative.
ESC	Close the pop-up without writing the value to the button's Value control.
Backspace (←)	Delete the right-most digit in the scratchpad. If no digits are left, the minus sign, if any, is removed.
Enter (↵)	Close the pop-up and write the value to the button's Value control. If the Optional Expression control is assigned to the Numeric Input Enable button, RSView calculates the value of the expression and writes the result to the Value control. For details, see page 12-20. If Enter key handshaking is set up for the Numeric Input Enable button, the button's Enter control is set to 1 and the handshaking timer begins timing. For details, see page 10-12.
Delete	Clear the scratchpad. There is no Delete button in the pop-up keypad, but you can use the Delete key on an external keyboard or keypad.

How values are calculated

When the operator presses the Enter button in the pop-up keypad or scratchpad, the value that is sent to the Value control depends on how the Numeric Input Enable button is configured.

- The value the operator enters is compared to the minimum and maximum range for the button. If the value is within the range, the value is written to the Value control.

If the Optional Expression control is assigned, and the original value is within the range but the expression result is a value outside the range, the value is still written to the Value control.

- If the decimal point type is Fixed Position, with a "Digits after decimal" value that is greater than 0, the decimal point is stripped from the value before comparing it to the minimum and maximum range.

  For example, if the entered value is 9.25, the stripped value is 925.

  If the stripped value is within the range, the stripped value is sent to the Value control (or substituted for the ? in the Optional Expression).

- If the decimal point type is Implicit, and the tag assigned to the Value control uses an integer data type, floating point values are rounded.

  If the Optional Expression control is assigned, the floating point value is substituted for the ? in the expression, and the expression result is rounded.

For information about how values are rounded, see page 7-3.

Problems with the numeric pop-ups

Problems with the numeric pop-up keypad and scratchpad occur under these circumstances:

- If the graphic display changes remotely before the user has pressed the Enter button, the pop-up closes without writing out a value.
- If the screen resolution is smaller than 124 pixels wide by 240 pixels high, the pop-up keypad cannot open.
- If the screen resolution is smaller than 124 pixels wide by 68 pixels high, the pop-up scratchpad cannot open.
- If the value is too large for the data type of the tag assigned to the Value control, the pop-up remains open and the value is not written to the control. The scratchpad area changes to red to alert the operator of the error.
- If the value is outside the minimum and maximum range specified for the Numeric Input Enable button, the pop-up remains open and the value is not written to the control. The scratchpad area changes to red to alert the operator of the error.

- If Enter key handshaking is still in effect, the pop-up closes but the value is not written to the control.

Entering string values

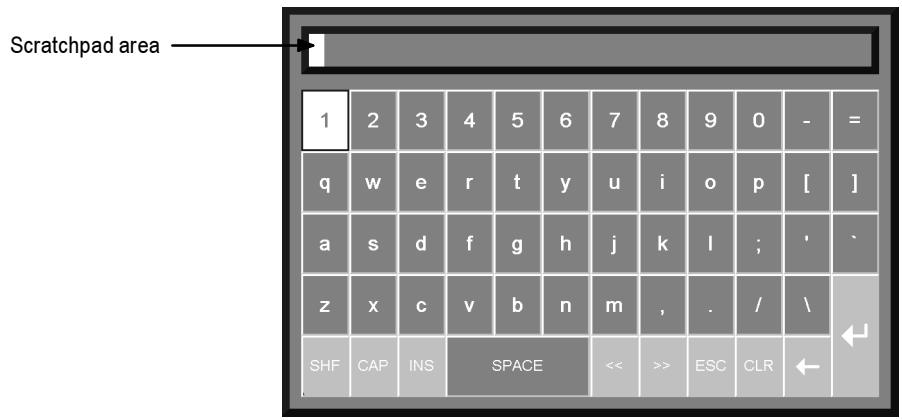
The operator can enter string values at runtime using the String Input Enable button.

When the operator presses the button, the string pop-up keyboard or scratchpad opens, depending on how you configured the button. To use the scratchpad, a keyboard must be attached to the runtime computer.

For information about configuring the String Input Enable button, see Chapter 10.

Using the string pop-up keyboard

The string pop-up keyboard opens when the operator presses a String Input Enable button or the User or Password button in the Login dialog box.



If the operator opens the pop-up keyboard by pressing a String Input Enable button, the number of characters the keyboard accepts depends on how you configure the button.

When the keyboard is open, no other objects in the graphic display can accept input.

Using the string pop-up scratchpad

The number of characters the scratchpad accepts depends on how you configure the String Input Enable button.

The scratchpad does not contain any buttons. If the runtime computer does not have an external keyboard attached, the operator will be unable to enter characters or close the scratchpad (unless the runtime terminal is a keypad terminal). If the runtime terminal is a keypad terminal, the operator can enter numbers (not letters) in the scratchpad, and close the scratchpad.

When the scratchpad is open, no other objects in the graphic display can accept input.

Using buttons and keys with the string pop-ups

You can use the following buttons and their keyboard equivalents with the string pop-up keyboard. For the pop-up scratchpad, you can use the keys on an external keyboard only.

Use this pop-up keyboard button	Or this keyboard equivalent	To do this
SHF	none	Capitalize a single letter, or type a shifted character such as #.
CAP	none	Capitalize multiple letters.
INS	Insert	Toggle between insert and overstrike modes.
SPACE	Spacebar	Insert a space.
<<	Left Arrow (←)	Move the cursor to the left.
>>	Right Arrow (→)	Move the cursor to the right.
ESC	Esc	Close the pop-up without writing the string to the Login dialog box or the String Input Enable button's Value control.
CLR	Delete	Clear the scratchpad.

Use this pop-up keyboard button	Or this keyboard equivalent	To do this
Backspace (←)	Backspace	Delete the character in front of the cursor.
Enter (↵)	Enter	Close the pop-up and write the string to the Login dialog box or the String Input Enable button's Value control. If Enter key handshaking is set up for the String Input Enable button, the button's Enter control is set to 1 and the handshaking timer begins timing. For details, see page 10-12.

What is written to the Value control

When the operator presses the Enter button in the pop-up keyboard or scratchpad, the string that is sent to the Value control depends on how the String Input Enable button is configured.

- If a fill character is configured for the button, and the operator enters fewer than the maximum number of input characters, the fill characters are placed after the string the operator enters.
  - Spaces have a hex value of 20.
  - Zeroes have a hex value of 30.
  - FF characters have a hex value of FF.
  - Null characters have a hex value of 0. The null character indicates the end of string input. It does not add to the actual string length.
- If the number of input characters is fewer than the number of characters in the length of the string tag assigned to the Value control, the remaining spaces are padded with the null character.

When the string is written to the Value control, the first character is placed in the high order byte of the first word at the tag address, the second character is placed in the low order byte of the first word, and so on.

Problems with the string pop-ups

Problems with the string pop-up keyboard and scratchpad occur under these circumstances:

- If the graphic display changes remotely before the user has pressed the Enter button, the pop-up closes without writing out a string.
- If the screen resolution is smaller than 236 pixels wide by 208 pixels high, the pop-up keyboard cannot open.
- If the screen resolution is smaller than 236 pixels wide by 64 pixels high, the pop-up scratchpad cannot open.
- If the string pop-up is configured to accept more characters than the Value control tag length, the pop-up remains open and the string is not written to the control. The scratchpad area changes to red to alert the operator of the error.
- If Enter key handshaking is still in effect, the pop-up closes but the value is not written to the control.

Changing tag values

This section gives an overview of the graphic objects you can use to change tag values. For information about configuring the objects, see Chapter 10.

The operator uses these objects to start and stop plant operations, and to control machines and processes. Choose the objects that best suit your process. Configure the data source to carry out the desired actions in response to the changes in tag values.

The operator can use function keys with all of these objects except Control List selectors, third-party ActiveX objects, and drawing objects with slider animation.

For information about assigning function keys to graphic objects, see page 10-5.

IMPORTANT Do not use push buttons for emergency stops. Emergency stop buttons must be hard-wired.

You can also use macros to assign values to tags. For more information, see page 7-32.

The operator can change tag values at runtime using these graphic objects:

Use this graphic object	To do this
Momentary Push button	Start a process or action by sending one value to the tag when pressed, and another value when released.
Maintained Push button	Toggle between two values, by sending one value to the tag when pressed, and a second value the next time the button is pressed and released. This button is useful for changing a setting within a machine or process, but not for starting the machine or process.
Latched Push button	Start a machine or process and remain set (latched) until the process is completed, by sending a value to the tag when pressed, and retaining this value until reset (unlatched) by the Handshake control.
Multistate Push button	Cycle through a series of values. Each time the operator presses the button, the value for the next state is sent to the tag. When the button is in its last state, pressing it causes the button to change to its first state and write out the first state value. This button is useful when you want the operator to see and select multiple options in sequence, using a single button. The button displays the current state of a process or operation by showing a different color, caption, or image to reflect the different states.
Interlocked Push button	Use a group of buttons to send values to the same tag. When the operator presses a button in the group, the button's value is sent to the tag, and the button remains highlighted as long as the tag value is the same as the button's value. Pressing a new button in the group releases the other button and sends a new value to the tag.

Use this graphic object	To do this
Ramp button	Increase or decrease the value of a tag by a specified integer or floating point value. Use two ramp buttons together to create a raise/lower control.
Numeric Input Enable button	Enter a numeric value and write the value to a tag.
String Input Enable button	Enter a string value and write the value to a tag.
Drawing object with horizontal or vertical slider animation	Control the value of a tag by dragging the slider object with a mouse. The pixel position of the slider is translated into a value that is written to the tag. If the value of the tag is changed externally, the position of the slider changes to reflect this.
Control List selector	Select from a list of states for a process or operation. The list is highlighted to show the current state, and the operator can scroll through the list to select a different state. The value assigned to the selected state is written to the tag. If the value of the tag is changed externally, the position of the highlight changes to reflect this.
ActiveX object	A third-party object, connected to an analog, digital, or string tag. When the object's property value changes, the new value is written to the associated tag.

You can attach visibility animation to these graphic objects, to display or hide the objects based on changes in tag or expression values. For information about visibility animation, see page 11-10.

For information about creating graphic objects, see Chapter 9. For information about configuring graphic objects, see Chapter 10.

Viewing tag data

This section gives an overview of the graphic objects you can use to display tag data. For information about configuring the objects, see Chapter 10.

The operator can view tag data at runtime using these graphic objects:

Use this graphic object	To display this
Numeric display	Numeric tag values. For example, display the current temperature of an oven.
String display	String tag values. For example, configure the data source to generate strings that report on the state of a process or operation, or that provide the operator with instructions about what to do next.
Bar Graph	Numeric values in bar graph format. The bar graph increases or decreases in size to show the changing value.
Gauge	Numeric values in dial format. The gauge's needle moves around the dial to show the changing value.
Multistate indicator	The state of a process, on a panel that changes its color, image, or caption to indicate the current state. Each state is configured to correspond to a numeric tag value.
Symbol	The state of a process, using a monochrome image that changes color to indicate the current state. Each state is configured to correspond to a numeric tag value. This object is useful for showing the state of a process or operation at a glance.
List indicator	The state of a process, using a list of possible states with the current state highlighted. Each state is represented by a caption in the list, and is configured to correspond to a numeric tag value. This indicator is useful if you want to view the current state but also want to see the other possible states. For sequential processes, the list can alert the operator about what happens next in the process.

Use this graphic object	To display this
Trend	Historical or real-time numeric tag values, plotted against time or displayed in an XY plot where one or more tags' values are plotted against another tag's values to show the relationship between them.
Drawing object with rotation, width, height, fill, color, or horizontal or vertical position animation	Display the value of a tag using a pictorial representation that shows the current value in relation to a range of possible values. For example, use rotation animation to show the tag value as a needle's position on a dial. For color animation, assign different colors to represent different values.
ActiveX object	A third-party object, connected to an analog, digital, or string tag. The data displayed depends on the object.

Any of these objects can be configured to manipulate tag values using expressions, and display the expression result rather than the original tag value. For information about expressions, see Chapter 12.

You can also attach visibility animation to these graphic objects, to display or hide the objects based on changes in tag or expression values. For information about visibility animation, see page 11-10.

For information about creating graphic objects, see Chapter 9. For information about configuring graphic objects, see Chapter 10.

Displaying the date and time

To display the current date and time, create a Time and Date display. This object uses the operating system's date and time and therefore does not use tags or expressions.

Viewing alarms and messages

The operator can view alarms and other messages at runtime using these graphic objects and graphic displays:

This information	Appears in this object	In this default graphic display	For details see
Alarm messages	Alarm list	[ALARM]	Page 13-27
System activity	Activity list	[ACTIVITY]	Page 15-8

This information	Appears in this object	In this default graphic display	For details see
Information messages	Information Message display	[INFORMATION]	Page 14-12
Local messages	Local Message display	No default	Page 8-29

The default alarm, information, and activity displays open automatically when the assigned tags match messages' trigger values. If desired, you can configure your own graphic displays to open automatically, instead of the default displays. You can also configure any of the displays to open when an operator presses a Goto Display button.

The operator can acknowledge alarm and information messages. The operator can clear alarm and activity messages.

Viewing information about runtime communication errors

RSView automatically notifies the operator about runtime communication errors, unless you disable this feature.

The communication error banner

When a communication error occurs, a single-line banner opens at the top of the project window, containing a message about the communication error.

The message remains until the error has been resolved. If a new communication error occurs, the newer message is displayed. The operator can continue to change graphic displays and perform other operations while the communication error banner is open.

To disable the communication error banner:

▶ In the Startup editor, clear the Communication status check box.

For information about the Startup editor, see Chapter 20.

Direct driver communication error messages

For direct driver communications, messages about communication errors are displayed in this format:

Channel #: (*StationNumber*) *ErrorMessage*

Examples: Direct driver communication error messages

Channel 1: (02) Cannot guarantee delivery: link layer.

Channel 1: (10.0.0.1) Unable to communicate with remote station.

OPC communication error messages

For OPC communications, messages about communication errors are displayed in this format:

OPC: '(*ServerName*) *ErrorMessage.*'

Examples: OPC communication error messages

OPC: '(RSLinx.data.1) OPC Server not registered properly.'

OPC: '(RSLinx.data.1) Client: Could not connect to the OPC server.'

Displaying communication errors in the Activity list

To display communication errors in the Activity list, configure activity logging to log errors for the Communications category of system activity.

For more information about activity logging, see Chapter 15.

Displaying communication information using system tags

RSView uses system communication tags to monitor communications. These tags are created automatically when you create channels and OPC nodes.

To view the tag information at runtime, create Numeric display or String display objects in a graphic display. For information about methods of displaying tag data, see page 24-12.

For more information about the system tags, see Appendix A. For information about creating graphic objects, see Chapter 9.

Appendix

A

System tags

This appendix describes the system tags.

System tags are preconfigured tags created by RSView. System tags are read-only. Display them as needed in your application.

Communications

The following tags record direct driver communication information. These tags are added to the system folder when you configure a channel in the Channels editor. Each channel you configure will have these four tags. The number on the end identifies the tags for each channel. For example, system\ComErrorString1 is for channel 1.

Tag Name	Type	Displays information about
system\ComErrorString1	String	Most recent device error message.
system\ComErrorValue1	Analog	Internal number of most recent device error.
system\ComStatusString1	String	Current status of device communications. Will be the same as system\ ComErrorString1 if the error condition still exists.
system\ComStatusValue1	Analog	Internal number indicating current status of device communications. Will be the same as system\ ComErrorValue1 if the error condition still exists.

The following tags record OPC communication information. These tags are added to the system folder when you configure an OPC node in the Nodes editor.

Tag Name	Type	Displays information about
system\ComErrorStringOPC	String	Most recent OPC error message.
system\ComErrorValueOPC	Analog	Internal number of most recent OPC error.

Tag Name	Type	Displays information about
system\ComStatusStringOPC	String	Current status of OPC communications. Will be the same as system\ ComErrorStringOPC if the error condition still exists.
system\ComStatusValueOPC	Analog	Internal number indicating current status of OPC communications. Will be the same as system\ ComErrorValueOPC if the error condition still exists.

Graphics

The following tags can be used to make graphic objects appear as though they are blinking on and off:

Tag Name	Type	Function
system\BlinkFast	Digital	Toggles on and off every 100 ms (10 times per second).
system\BlinkSlow	Digital	Toggles on and off every 500 ms (twice per second).

A more efficient way to make graphic objects blink is to use the blinking color option in color animation. For details, see page 11-12.

Time

The following tags record time and date information in various formats:

Tag Name	Type	Provides this data	Read or write
system\Date	String	System date.	Read only
system\DateAndTime Integer	Analog	Number of seconds elapsed since midnight (00:00:00) January 1, 1970, coordinated universal time (UTC).	Read only
system\DateAndTime String	String	Complete date and time display. For example: Monday, December 12 2001 10:47:50 AM	Read only
system\DayOfMonth	Analog	Day of the month (1 – 31).	Read only
system\DayOfWeek	Analog	Day of the week (1 – 7); Sunday = 1.	Read only
system\DayOfYear	Analog	Day of the year (1 – 366).	Read only
system\Hour	Analog	Hour of the day (0 – 23).	Read and write
system\Minute	Analog	Minutes (0 – 59).	Read and write
system\Month	Analog	Number for month (1 - 12).	Read only
system\MonthString	String	Name of the month.	Read only
system\Second	Analog	Seconds (0 – 59).	Read and write
system\Time	String	System time.	Read only
system\Year	Analog	The year (1980 – 2099).	Read only

User

The following tag contains the name of the current user:

Tag Name	Type	Function
system\User	String	Contains name of logged-in user.

We recommend that you use the expression security function CurrentUserName( ) instead of the system\User tag, especially if you intend to convert the project to RSView Enterprise Supervisory Edition. In distributed applications, system\User returns the name of the user logged into the HMI server, not the user logged into the display client.

For more information about the security functions, see page 12-17.

Appendix

B

Addressing syntax for Allen-Bradley programmable controllers

This appendix contains:

- addressing syntax for Allen-Bradley PLCs
- addressing syntax for Allen-Bradley SLCs
- addressing syntax for SoftLogix 5 controllers (Windows 2000 projects only)
- mnemonic tables

The information here is applicable only to tags that have device as their data source. For detailed information about creating tags, see Chapter 7.

PLC addressing syntax

The following section provides addressing syntax for these types of programmable controllers:

- PLC-5, which includes the PLC-5/10, PLC-5/12, PLC-5/15, and PLC-5/25
- PLC-5 (Enhanced), which includes the PLC-5/11, PLC-5/20, PLC-5/20C, PLC-5/20E, PLC-5/30, PLC-5/40, PLC-5/40C, PLC-5/40E, PLC-5/60, PLC-5/60C, PLC-5/80, PLC-5/80C, and PLC-5/80E

PLC-5 data files

Fnnn:eee/bb

F	File type: B = Binary N = Integer D = Decimal (BCD) F = Floating point A = ASCII
nnn	File number: 3 – 999 decimal For direct driver communication, binary, integer, and floating point file types use the default file number if the file number is absent. The default numbers are 3 (binary), 7 (integer), and 8 (floating point).
eee	Element number: 0 – 999 decimal
bb *(optional)*	Bit offset within word: 0 – 15 decimal Not applicable to floating point file types.

Example of bit address: B3:173/15

Example of word address: N7:12

PLC-5 binary files: optional syntax

Fnnn/bbbbb

F	File type: B = Binary
nnn	File number: 3 – 999 decimal For direct driver communication, the default file number 3 is used if the file number is absent.
bbbbb	Bit offset from start of file: 0 – 15999 decimal

Example: B3/1024

PLC-5 I/O and status files

F:ee/bb

F	File type: O = Output I = Input S = Status
ee	Element number: For I/O files: PLC-5/10: 0 – 037 octal PLC-5/12: 0 – 037 octal PLC-5/15: 0 – 037 octal PLC-5/25: 0 – 077 octal For status files: 0 – 31 decimal
bb *(optional)*	Bit offset within word: For I/O files: 0 – 17 octal For status files: 0 – 15 decimal

Example: O:64/17

PLC-5 timers, counters, and control files

Fnnn:eee.MNE/bb

F	File type: C = Counter T = Timer R = Control
nnn	File number: 3 – 999 decimal For direct driver communication, timer, counter and control file types use the default file number if the file number is absent. The default numbers are 4 (timer), 5 (counter), and 6 (control).
eee	Element number: 0 – 999 decimal
MNE	Member mnemonic (see mnemonic tables starting on page B-22)
bb *(optional)*	Bit number: 0 – 15 decimal Only applies to analog word members.

Example: T57:38.ACC

PLC-5 (Enhanced) I/O and status files

F:eee/bb

F	File type: I = Input O = Output S = Status
eee	Element number: For I/O files: PLC-5/11: 0 – 037 octal PLC-5/20: 0 – 037 octal PLC-5/30: 0 – 077 octal PLC-5/40: 0 – 177 octal PLC-5/60: 0 – 277 octal PLC-5/80: 0 – 277 octal For status files: 0 – 127 decimal
bb *(optional)*	Bit offset within word: For I/O files: 0 – 17 octal For status files: 0 – 15 decimal

Example: O:167/11

PLC-5 (Enhanced) binary, BCD, integer, ASCII, float, and string files

Fnnn:eee/bb
or
Fnnn:eeee/bb

F	File type: B = Binary D = Decimal (BCD) N = Integer F = Floating point A = ASCII ST = String
nnn	File number: 3 – 999 decimal For direct driver communication, binary, integer, and floating point file types use the default file number if the file number is absent. The default numbers are 3 (binary), 7 (integer), and 8 (floating point).
eee	Element number: 0 – 999 decimal
or	
eeee	Element number: 0 – 1999 decimal for PLC-5/80 Series E firmware
bb *(optional)*	Bit offset within word: 0 – 15 decimal Bit offset is not supported for floating point and string file types.

Example: B84:113/13

PLC-5 (Enhanced) binary files: optional syntax

Fnnn/bbbbb

F	File type: B = Binary
nnn *(optional)*	File number: 3 – 999 decimal For direct driver communication, the default file number 3 is used if the file number is absent.
bbbbb	Bit offset from start of file: 0 – 15999 decimal

Example: B27/248

PLC-5 (Enhanced) timer, counter, control, SFC status, message, PID, block transfer, and token data files

FFnnn:eee.MNE[ss]/bb

FF	File type: T = Timer C = Counter R = Control SC = SFC status MG = Message PD = PID control BT = Block transfer TD = Token data
nnn	File number: 3 – 999 decimal For direct driver communication, timer, counter, and control file types use the default file number if the file number is absent. The default numbers are 4 (timer), 5 (counter), and 6 (control).
eee	Element number: 0 – 999 decimal
MNE	Member mnemonic (see mnemonic tables starting on page B-22)
ss	Submember Only applies to .ADDR and .DATA members of PID structure and .DATA member of MSG structure.
bb *(optional)*	Bit number: 0 – 15 decimal Only applies to analog word members.

Example: MG59:33.DATA[0]/15

SLC addressing syntax

The following section provides addressing syntax for these types of programmable controllers:

- SLC 5, which includes the fixed I/O SLC 5, SLC 5/01, SLC 5/02, and SLC 5/03 (OS300)
- SLC 5 (Enhanced), which includes the SLC 5/03 (OS 301), SLC 5/04, and SLC 5/05

SLC 5 I/O files

F:ss.www/bb

F	File type: I = Input O = Output
ss	I/O slot number: 0 – 30 decimal
www *(optional)*	I/O word number expansion: 0 – 255 decimal
bb *(optional)*	Bit offset within word: 0 – 15 decimal When input slot is 0: 0 – 23 decimal

Example: I:22.254/13

IMPORTANT Writing to the output files of an SLC 5 is not recommended. However, if you do, be sure the SLC is not in RUN mode. If it is in RUN mode, the write fails and an error message is sent to the activity log.

Important information for addressing SLC 5 I/O modules

The RSView I/O module addressing system differs from the corresponding ControlView™, APS, A.I. 500, and RSLogix 5 or RSLogix 500 addressing systems. The RSView I/O data section addressing does not match the physical slot of the I/O module.

In RSView, the first physical module of each type (input or output) is address slot number 0. The next module of the same type in the next higher-numbered rack slot is address slot number 1, and so on.

Example: SLC 5 I/O module addressing

SLC Type	Rack Configuration	CV for MS-DOS® Address or APS Address	RSView Address
Fixed L40	I/O module slot 0 (fixed)	I:0.0 or I:0 I:0.1 O:0	I:0.0 or I:0 I:0.1 or I:1 O:0
	I module slot 2	I:2	I:2
Fixed L30	I/O module slot 0 (fixed)	I:0.0 or I:0 I:0.1 O:0	I:0.0 or I:0 I:0.1 or I:1 O:0
	I module slot 1	I:1	I:2
	O module slot 2	O:2	O:1
Fixed L20	I/O module slot 0 (fixed)	I:0.0 or I:0 O:0	I:0.0 or I:0 O:0
	I module slot 1	I:1	I:1
	I module slot 2	I:2	I:2
Modular	CPU slot 0	N/A	N/A
	O module slot 1	O:1	O:0
	I module slot 2	I:2	I:0
	O module slot 3	O:3	O:1

SLC 5 status files

F:ww/bb

F	File type: S = Status
ww	Word address: SLC 500: 0 – 15 decimal SLC 5/01: 0 – 15 decimal SLC 5/02: 0 – 32 decimal SLC 5/03: 0 – 68 decimal
bb *(optional)*	Bit offset within word: 0 – 15 decimal

Example: S:15/6

SLC 5 binary and integer files

Fnnn:www/bb

F	File type: B = Binary N = Integer
nnn *(optional)*	File number: Binary: 3, 9 – 255 decimal Integer: 7, 9 – 255 decimal For direct driver communication, binary and integer file types use the default file number if the file number is absent. The default numbers are 3 (binary) and 7 (integer).
www	Word address: 0 – 255 decimal
bb *(optional)*	Bit offset within word: 0 – 15 decimal

Example: N17:129/2

SLC 5 binary files: optional syntax

Fnnn/bbbb

F	File type B = Binary
nnn *(optional)*	File number: 3, 9 – 255 decimal For direct driver communication, the default file number 3 is used if the file number is absent.
bbbb	Bit offset from start of file: 0 – 4095 decimal

Example: B3/3999

SLC 5 timer, counter, and control files

Fnnn:eee.MNE/bb

F	File type: T = Timer C = Counter R = Control
nnn *(optional)*	File number: Timer: 4, 9 – 255 decimal Counter: 5, 9 – 255 decimal Control: 6, 9 – 255 decimal For direct driver communication, timer, counter, and control file types use the default file number if the file number is absent. The default numbers are 4 (timer), 5 (counter), and 6 (control).
eee	Element number: 0 – 255 decimal
MNE	Member mnemonic (see mnemonic tables starting on page B-22)
bb *(optional)*	Bit number: 0 – 15 decimal Applies to analog members only.

Example: R67:123.EN

SLC 5 timer, counter, and control files bit member addressing: optional syntax

Fnnn:eee/MNE

F	File type: T = Timer C = Counter R = Control
nnn *(optional)*	File number: Timer: 4, 9 – 255 decimal Counter: 5, 9 – 255 decimal Control: 6, 9 – 255 decimal For direct driver communication, timer, counter, and control file types use the default file number if the file number is absent. The default numbers are 4 (timer), 5 (counter), and 6 (control).
eee	Element number: 0 – 255 decimal
MNE	Bit member mnemonic (see mnemonic tables starting on page B-22)

Example: C77:99/OV

SLC 5 timer, counter, and control files bit member addressing by bit address: optional syntax

Fnnn:eee/bb

F	File type: T = Timer C = Counter R = Control
nnn *(optional)*	File number: Timer: 4, 9 – 255 decimal Counter: 5, 9 – 255 decimal Control: 6, 9 – 255 decimal For direct driver communication, timer, counter, and control file types use the default file number if the file number is absent. The default numbers are 4 (timer), 5 (counter), and 6 (control).
eee	Element number: 0 – 255 decimal
bb	Bit number: Timer: 13 – 15 Counter: 10 – 15 Control: 8 – 11, 13, 15

Example: T87:133/14

SLC 5 timer, counter, and control files analog member addressing: optional syntax

Fnnn:eee.o/bb

F	File type: T = Timer C = Counter R = Control
nnn *(optional)*	File number: Timer: 4, 9 – 255 decimal Counter: 5, 9 – 255 decimal Control: 6, 9 – 255 decimal For direct driver communication, timer, counter, and control file types use the default file number if the file number is absent. The default numbers are 4 (timer), 5 (counter), and 6 (control).
eee	Element number: 0 – 255 decimal
o	Word offset: 1 – 2 decimal
bb *(optional)*	Bit number: 0 – 15 decimal

Example: R44:72.1/14

SLC 5 (Enhanced) I/O files

F:ss.www/bb

F	File type: I = Input O = Output
ss	I/O slot number: 0 – 30 decimal
www *(optional)*	I/O word number expansion: 0 – 255 decimal
bb *(optional)*	Bit offset within word: 0 – 15 decimal When input slot is 0: 0 – 23 decimal

Example: I:22.254/13

IMPORTANT Writing to the output files of an SLC 5 is not recommended. However, if you do, be sure the SLC is not in RUN mode. If it is in RUN mode, the write fails and an error message is sent to the activity log.

SLC 5 (Enhanced) status files

F:ww/bb

F	File type: S = Status
ww	Word address: SLC 5/03: 0 – 68 decimal SLC 5/04: 0 – 96 decimal
bb *(optional)*	Bit offset within word: 0 – 15 decimal

Example: S:15/6

SLC 5 (Enhanced) binary, integer, float, ASCII, and string files

Fnnn:www/bb

F	File type: B = Binary N = Integer F = Floating Point A = ASCII ST = String
nnn *(optional)*	File number: Binary: 3, 9 – 255 decimal Integer: 7, 9 – 255 decimal Floating Point: 8, 9 – 255 decimal ASCII: 9 – 255 decimal String: 9 – 255 decimal For direct driver communication, binary, integer, and floating point file types use the default file number if the file number is absent. The default numbers are 3 (binary), 7 (integer), and 8 (floating point).
www	Word address: 0 – 255 decimal
bb *(optional)*	Bit offset within word: 0 – 15 decimal Bit offset is not supported for floating point and string file types.

Example: F8:129

SLC 5 (Enhanced) binary files: optional syntax

Fnnn/bbbb

F	File type B = Binary
nnn *(optional)*	File number: 3, 9 – 255 decimal For direct driver communication, the default file number 3 is used if the file number is absent.
bbbb	Bit offset from start of file: 0 – 4095 decimal

Example: B3/3999

SLC 5 (Enhanced) timer, counter, and control files

Fnnn:eee.MNE/bb

F	File type: T = Timer C = Counter R = Control
nnn *(optional)*	File number: Timer: 4, 9 – 255 decimal Counter: 5, 9 – 255 decimal Control: 6, 9 – 255 decimal For direct driver communication, timer, counter, and control file types use the default file number if the file number is absent. The default numbers are 4 (timer), 5 (counter), and 6 (control).
eee	Element number: 0 – 255 decimal
MNE	Member mnemonic (see mnemonic tables starting on page B-22)
bb *(optional)*	Bit number: 0 – 15 decimal Applies to analog members only.

Example: R67:123.EN

SLC 5 (Enhanced) timer, counter, and control files bit member addressing: optional syntax

Fnnn:eee/MNE

F	File type: T = Timer C = Counter R = Control
nnn *(optional)*	File number: Timer: 4, 9 – 255 decimal Counter: 5, 9 – 255 decimal Control: 6, 9 – 255 decimal For direct driver communication, timer, counter, and control file types use the default file number if the file number is absent. The default numbers are 4 (timer), 5 (counter), and 6 (control).
eee	Element number: 0 – 255 decimal
MNE	Bit member mnemonic (see mnemonic tables starting on page B-22)

Example: C77:99/OV

SLC 5 (Enhanced) timer, counter, and control files bit member addressing by bit address: optional syntax

Fnnn:eee/bb

F	File type: T = Timer C = Counter R = Control
nnn *(optional)*	File number: Timer: 4, 9 – 255 decimal Counter: 5, 9 – 255 decimal Control: 6, 9 – 255 decimal For direct driver communication, timer, counter, and control file types use the default file number if the file number is absent. The default numbers are 4 (timer), 5 (counter), and 6 (control).
eee	Element number: 0 – 255 decimal
bb *(optional)*	Bit number: Timer: 13 – 15 Counter: 10 – 15 Control: 8 – 11, 13, 15

Example: T87:133/14

SLC 5 (Enhanced) timer, counter, and control files analog member addressing: optional syntax

Fnnn:eee.o/bb

F	File type: T = Timer C = Counter R = Control
nnn *(optional)*	File number: Timer: 4, 9 – 255 decimal Counter: 5, 9 – 255 decimal Control: 6, 9 – 255 decimal For direct driver communication, timer, counter, and control file types use the default file number if the file number is absent. The default numbers are 4 (timer), 5 (counter), and 6 (control).
eee	Element number: 0 – 255 decimal
o	Word offset: 1 – 2 decimal
bb *(optional)*	Bit number: 0 – 15 decimal

Example: R44:72.1/14

SoftLogix 5 addressing syntax

The following section provides addressing syntax for SoftLogix 5 controllers. You can use SoftLogix 5 controllers with Windows 2000 projects only.

SoftLogix 5 I/O and status files

F:eee/bb

F	File type: I = Input O = Output S = Status
eee	Element number: For I/O files: 0 – 277 octal For status files: 0 – 511 decimal
bb *(optional)*	Bit offset within word: For I/O files: 0 – 17 octal For status files: 0 – 15 decimal

Example: O:167/11

SoftLogix 5 binary, BCD, integer, long integer, ASCII, float, and string files

Fnnnn:eeee/bb

F	File type: B = Binary D = Decimal (BCD) N = Integer L = Long integer A = ASCII F = Floating point ST = String
nnnn	File number: 3 – 4095 decimal For direct driver communication, binary, integer, long integer, and floating point file types use the default file number if the file number is absent. The default numbers are 3 (binary), 7 (integer), and 8 (floating point).
eeee	Element number: 0 – 4095 decimal
bb *(optional)*	Bit offset within word: 0 – 15 decimal Bit offset is not supported for long integer, floating point, and string file types.

Example: L4094:4090

SoftLogix 5 binary files: optional syntax

Fnnnn/bbbbb

F	File type: B = Binary
nnnn *(optional)*	File number: 3 – 4095 decimal For direct driver communication, the default file number 3 is used if the file number is absent.
bbbbb	Bit offset from start of file: 0 – 65535 decimal

Example: B4095/65308

SoftLogix 5 timer, counter, control, SFC status, message, PID, block transfer, and token data files

FFnnnn:eeee.MNE[ss]/bb

FF	File type: T = Timer C = Counter R = Control SC = SFC status MG = Message PD = PID control BT = Block transfer TD = Token data
nnnn	File number: 3 – 4095 decimal For direct driver communication, timer, counter, and control file types use the default file number if the file number is absent. The default numbers are 4 (timer), 5 (counter), and 6 (control).
eeee	Element number: 0 – 4095 decimal
MNE	Member mnemonic (see mnemonic tables starting on page B-22)
ss	Submember Only applies to .ADDR and .DATA members of PID structure and .DATA member of MSG structure.
bb *(optional)*	Bit number: 0 – 15 decimal Only applies to analog word members.

Example: MG4095:3000.DATA[0]/15

Mnemonic tables

Timer mnemonics

Mnemonic	Instruction	Type
ACC	Accumulator Value	Analog
DN	Done	Digital
EN	Enable	Digital
PRE	Preset Value	Analog
TT	Timing	Digital

Counter mnemonics

Mnemonic	Instruction	Type
ACC	Accumulated Value	Analog
CD	Count Down Enable	Digital
CU	Count Up Enable	Digital
DN	Done	Digital
OV	Overflow	Digital
PRE	Preset Value	Analog
UN	Underflow	Digital
For fixed I/O SLC only:		
UA	Update Accumulator Value	Digital

Control mnemonics

Mnemonic	Instruction	Type
DN	Done	Digital
EN	Enable	Digital
ER	Error	Digital
FD	Found	Digital
IN	Inhibit	Digital
LEN	Length	Analog
POS	Position	Analog
UL	Unload	Digital
For all programmable controllers except the fixed I/O SLC and the SLC 5/01:		
EM	Empty	Digital
EU	Enable Unloading	Digital

PID mnemonics

Mnemonic	Instruction	Type	Submember range
ADDR[]	Address of Master Loop %	Analog	0 – 3
BIAS	Output Bias %	Analog	
CA	Control Action	Digital	
CL	Cascaded Loop	Digital	
CT	Cascaded Type	Digital	
DATA[]	Reserved / Internal Use	Analog	0 – 13
DB	Deadband	Analog	
DO	Derivative Of	Digital	
DVDB	Deviation Alarm Deadband	Analog	
DVN	Deviation Alarm -	Analog	
DVNA	Deviation High Alarm	Digital	
DVP	Deviation Alarm +	Analog	
DVPA	Deviation Low Alarm	Digital	
EN	Enable	Digital	
ERR	Error	Analog	
EWD	Error Within Deadband	Digital	
INI	PID Initialized	Digital	
KD	Derivative Time	Analog	
KI	Integral Gain	Analog	
KP	Proportional Gain	Analog	
MAXI	Input Range Maximum	Analog	
MAXO	Output Limit High %	Analog	
MAXS	Setpoint Maximum	Analog	
MINI	Input Range Minimum	Analog	
MINO	Output Limit Low %	Analog	
MINS	Setpoint Minimum	Analog	

PID mnemonics (continued)

Mnemonic	Instruction	Type	Submember range
MO	Mode	Digital	
OLH	Output Limit High	Digital	
OLL	Output Limit Low	Digital	
OUT	Output	Analog	
PE	PID Equation	Digital	
PV	Process Variable	Analog	
PVDB	Process Variable Alarm Deadband	Analog	
PVH	Process Variable Alarm High	Analog	
PVHA	Process Variable High Alarm	Digital	
PVL	Process Variable Alarm Low	Analog	
PVLA	Process Variable Low Alarm	Digital	
PVT	Process Variable Tracking	Digital	
SO	Set Output %	Analog	
SP	Setpoint	Analog	
SPOR	Setpoint Out of Range	Digital	
SWM	Software A/M Mode	Digital	
TIE	Tieback %	Analog	
UPD	Update Time	Analog	

Message mnemonics

Mnemonic	Instruction	Type	Submember range
AD	Done	Digital	
AE	Error	Digital	
CO	Continuous	Digital	
DATA[]	Reserved / Internal Use	Analog	0 – 51
DLEN	Done Length	Analog	
DN	Synchronization Done	Digital	
EN	Enable	Digital	
ER	Synchronization Error	Digital	
ERR	Error Code	Analog	
EW	Enable Waiting	Digital	
NR	No Response	Digital	
RLEN	Request Length	Analog	
ST	Start Transmission	Digital	
TO	Time Out	Digital	

Block transfer mnemonics

Mnemonic	Instruction	Type
CO	Continue	Digital
DLEN	Done Length	Analog
DN	Done	Digital
ELEM	Element Number	Analog
EN	Enable	Digital
ER	Error	Digital
EW	Enable Waiting	Digital
FILE	File Number	Analog
NR	No Response	Digital
RGS	Rack Group Slot	Analog
RLEN	Requested Length	Analog
RW	Read Writes	Digital
ST	Start	Digital
TO	Time Out	Digital

Token data mnemonics

Mnemonic	Instruction	Type
LO	Low	Analog
HI	High	Analog

SFC status mnemonics

Mnemonic	Instruction	Type
DN	Done	Digital
ER	Step Error	Digital
FS	Forced Scan	Digital
LS	Last Scan	Digital
OV	Timer Overflow	Digital
PRE	Preset	Analog
SA	Scan Active	Digital
TIM	Active Time	Analog

Appendix

C

Station addressing for nodes connecting to Allen-Bradley devices

This appendix describes local station addressing.

Local station addressing

The following table lists valid address entries for a node connected to the same network as RSView ME Station:

Communication channel	Valid entries
DH+	0 – 77 (octal) physical station number
DH-485	0 – 31 (decimal) physical station number
TCP/IP	Host name (as described below)
ControlNet	2 – 99 (decimal) physical network address

Host name

When entering a host name, use one of the following:

- A direct IP (Internet Protocol) address in the form www.xxx.yyy.zzz where www, xxx, yyy, and zzz are numbers from 000 to 255.
- An alias for the address. An alias is an alphanumeric string from one to eight characters. The first character must be a letter and the name is case-sensitive.

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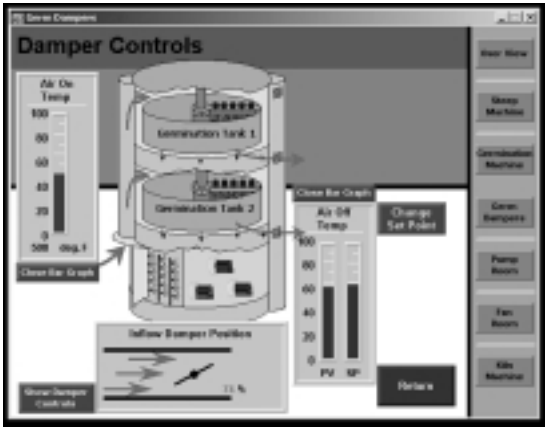

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