ROCKWELL
SOFTWARE

RSView®
Machine Edition™

ENTERPRISE SERIES

Machine-Level HMI for Open and Embedded Solutions

User's Guide
Volume 1

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Automation

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Contents

Preface

1 • Getting Started

2 • Exploring RSView Studio

3 • Planning applications

4 • Working with applications

5 • Setting up communications

6 • Working with tags

9 • Setting up alarms

10 • Setting up FactoryTalk Diagnostics

11 • Setting up data logging

12 • Using information messages

13 • Setting up security

14 • Using graphic displays

17 • Animating graphic objects

18 • Setting up trends

19 • Setting up RecipePlus

20 • Using expressions

21 • Using embedded variables

22 • Using macros

23 • Setting up language switching

24 • Setting up display navigation

25 • Specifying startup settings, testing applications, and creating runtime applications

26 • Running applications in Windows 2000 or Windows XP

27 • Transferring applications to a PanelView Plus or VersaView CE terminal

28 • Using your application

APPENDICES

A • Converting PanelBuilder 1400e applications

B • Converting PanelBuilder and PanelBuilder32 applications

C • System tags

D • ODBC database schema

E • Importing and exporting XML files

F • RFC1766 names

G • Features supported in different versions of RSView

Preface

RSView$^{®}$ Machine Edition™ is a member of the RSView Enterprise Series family of products. It is an integrated package for developing and running automation applications.

Designed for use with Microsoft® Windows® 2000 and Windows XP, PanelView Plus™ terminals, and VersaView<Superscript>® CE terminals running Microsoft Windows CE 4.1, RSView Machine Edition gives you all the tools you need to create effective machine-level monitoring and control applications.

About the documentation

The RSView Machine Edition documentation set includes:

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

  The Release Notes are available on the RSView Machine Edition CD, as well as from the Help menu in RSView Studio™.

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

  The Installation Guide is available on the RSView Machine Edition CD, as well as from the Help menu in RSView Studio.

- *RSView Machine Edition User's Guide, Volume 1* and *RSView Machine Edition User's Guide, Volume 2:* Comprehensive information about RSView Machine Edition, procedures for creating and running an automation application, and reference information.

  For ease of printing, the User's Guide is divided into two parts, available from the Help menu in RSView Studio. For detailed information about the contents of each guide, see the Bookmarks tab in the online guides.

- *Help:* Online procedures and reference information.

  Help is available from the Help menu in RSView Studio.

The RSView Machine Edition CD also includes these manuals:

- *PanelView Plus Terminals User Manual*
- VersaView CE Terminals User Manual

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 User's Guide. For information about using Help, see Chapter 6, "Getting the information you need," in the *RSView Machine Edition Installation Guide*.

For information about performing searches on the User's Guide, see Adobe® Reader® Help.

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 find information on the World Wide Web.

You can connect to the Rockwell Software® and Rockwell Automation® web sites 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 connect to web sites from RSView Studio

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

For information about the Rockwell Automation Knowledgebase and the Rockwell Software Discussion Forums, see the next sections.

The Rockwell Automation Knowledgebase

The Knowledgebase web page contains a comprehensive, searchable database of support information for all Rockwell Automation and Rockwell Software products.

Rockwell Software Discussion Forums

The Rockwell Software Discussion Forums are web pages for users of Rockwell Software products. The forums offer discussion groups for exchanging tips and questions with other RSView users.

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.rockwellsoftware.com

Support staff are available Monday to Friday from 8 AM to 5 PM local time (North America only), except on statutory holidays.

When you call

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

- the product serial number.

  You'll find this number on the Activation disk label and in the About RSView Studio dialog box available 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.

You may also be required to provide information about the RSView add-ons and updates that are installed on your computer.

To view the list of installed add-ons and updates

1. In RSView Studio, click Help, and then click About RSView Studio.
2. To view the list of installed add-ons, click Add-Ons.
3. To view the list of installed updates, click Updates.

1 Getting Started

RSView® Machine Edition™ is software for developing and running human-machine interface applications. 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 applications. This software runs on the Windows® 2000 and Windows XP operating systems.

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

You can run machine-level applications on PanelView Plus™ terminals and VersaView® CE terminals with the Windows CE 4.1 operating system, and on computers that use the Windows 2000 or Windows XP operating system.

Additional software

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

RSLinx® Enterprise™ is a new communication server built around FactoryTalk® technology to assist in developing and running your RSView ME applications. It is an OPC® 2.05 compliant server and will run on multiple platforms, ranging from PanelView Plus dedicated terminals to desktop computers.

RSLinx® Classic is software that provides communications to a wide range of communication drivers. RSLinx Classic is an OPC-compliant data server. RSLinx Classic is available for Windows 2000 and Windows XP platforms only.

Adobe® Reader® 6.0 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.

FactoryTalk Administration Console

The FactoryTalk Automation Platform includes software called the FactoryTalk Administration Console. This software allows you to set up RSAssetSecurity™. RSAssetSecurity is a method for setting up security for users and computers for multiple Rockwell Software products in one place.

RSAssetSecurity is intended to improve the security of your automation system by limiting access to those with a legitimate need. RSAssetSecurity authenticates user identities and authorizes user requests to access a FactoryTalk-enabled system. These security services are fully integrated into the FactoryTalk Directory and are included as part of the FactoryTalk Automation Platform that installs with many products.

You can also set up RSAssetSecurity in RSView® Studio™. For more information, see Chapter 13.

To open the FactoryTalk Administration Console

1. On the Windows Start menu, select Programs, Rockwell Software, and then click FactoryTalk Administration Console.

   For information about using the FactoryTalk Administration Console, see FactoryTalk Help.

The RSView Machine Edition tools

RSView Studio tools

These tools are installed with RSView Studio:

- **Application Manager** is software for renaming, copying, deleting, backing up, and restoring applications.
- **DeskLock** is software that prevents Windows 2000 and Windows XP users from exiting the RSView application at runtime. You cannot use DeskLock if you are running your application on a PanelView Plus or VersaView CE terminal.
- **ME Firmware Upgrade Wizard** is software for installing new firmware releases on an ME terminal.
- **ME Transfer Utility** is software for moving a runtime machine-level application (.mer file) from the development computer to PanelView Plus or VersaView CE terminals.
- **Tag Import and Export Wizard** is software for importing or exporting the RSView tag database.
- **Diagnostics Viewer** allows you to view FactoryTalk Diagnostics messages using the Windows Event Viewer.

To start the tools

1. On the Windows Start menu, select Programs, Rockwell Software, RSView Enterprise, Tools, and then click the tool to start.

To start the Diagnostics Viewer

1. On the Windows Start menu, select Programs, Rockwell Software, FactoryTalk Tools, and then click Diagnostics Viewer.

These tools are also available from the Tools menu in RSView Studio.

FactoryTalk tools

FactoryTalk tools are installed when you install FactoryTalk Automation Platform. They are available from the Windows Start menu.

To start FactoryTalk tools

1. On the Windows Start menu, select Programs, Rockwell Software, FactoryTalk Tools, and then click the tool to start.

■

2 Exploring RSView Studio

This chapter describes:

- starting and exiting RSView® Studio™.
- opening sample applications.
- exploring the RSView Studio main window.
- using the Explorer window.
- working with editors.
- entering information in spreadsheets.
- working with components.
- printing information in editors and components.

Starting and exiting RSView Studio

RSView Studio is configuration software for developing machine-level applications. This software runs on the Microsoft® Windows® 2000 and Windows XP operating systems.

Starting RSView Studio

To start RSView Studio

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

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

Exiting RSView Studio

To exit RSViewStudio

1. 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 exiting the program.

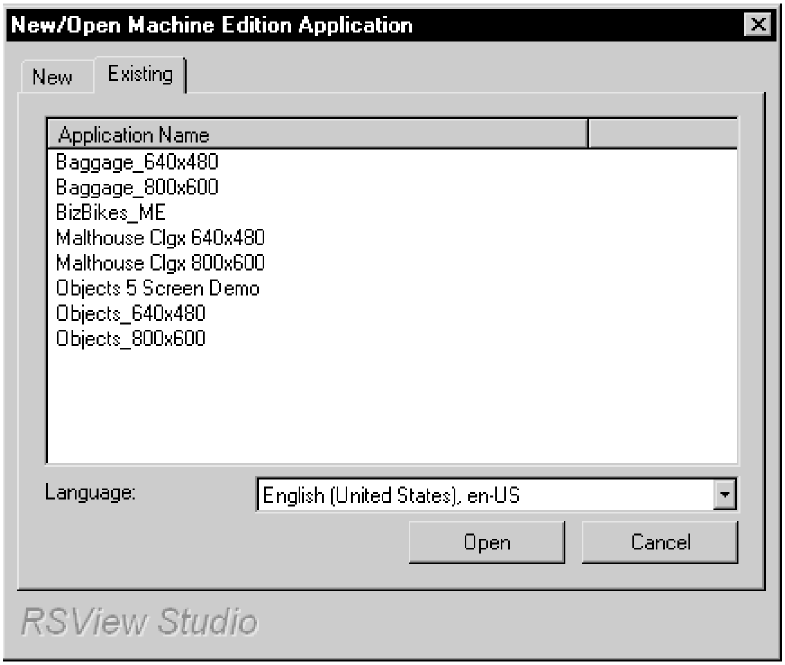
Opening sample applications

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

When you first install RSView, sample applications are accessible to all users. For information about setting up users and granting them access to applications, see Chapter 13.

To open the Malthouse sample application

1. Start RSView Studio.
2. Click the Existing tab.



New/Open Machine Edition Application

Application Name

- Baggage_640x480
- Baggage_800x600
- BizBikes_ME
- Malthouse Clgx 640x480
- Malthouse Clgx 800x600
- Objects 5 Screen Demo
- Objects_640x480
- Objects_800x600

Language: English (United States), en-US

3. Click Malthouse Clgx 640x480 or Malthouse Clgx 800x600.
4. Specify a language for the graphic display strings in the application.
5. Click Open.

   RSView Studio displays the sample application in the Explorer window.

Problems opening applications

If you have trouble opening an application in RSView Studio, the problem could be a Microsoft Windows security setting. You must have read and write access to the folder that contains the HMI projects. For example, if you belong to the Windows user group called Power Users, and the group does not have write access to the HMI projects folder, you won't be able to open applications in RSView.

The default location for the HMI projects folder is:

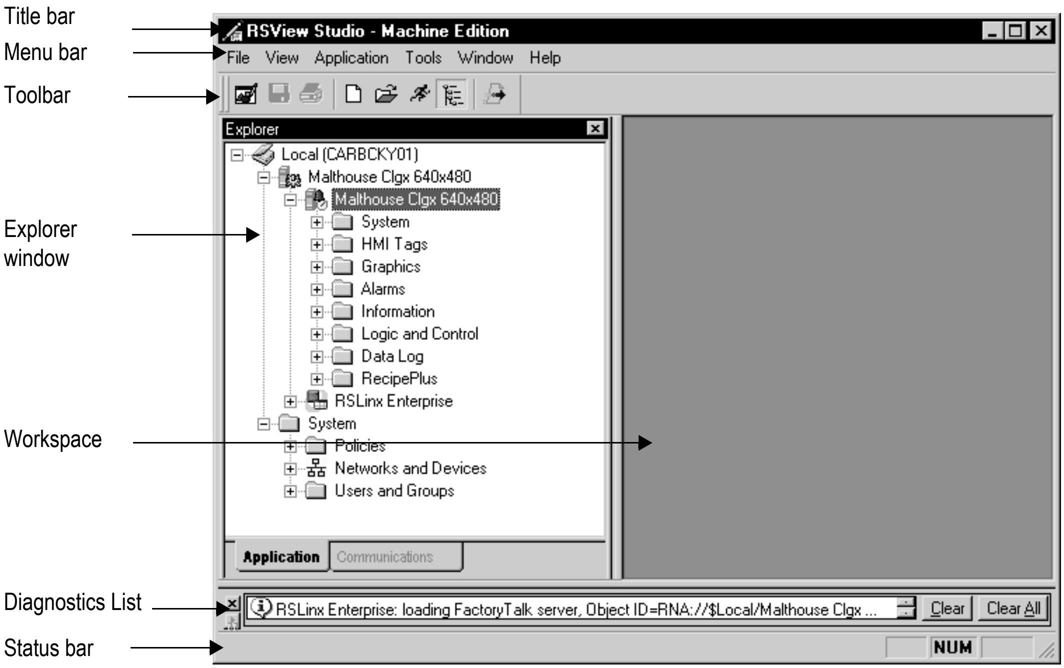
> C:\Documents and Settings\All Users\Documents\RSView Enterprise\ME (Windows 2000)
>
> or
>
> C:\Documents and Settings\All Users\Shared Documents\RSView Enterprise\ME (Windows XP)

For more information about security, see Chapter 13.

To set up write access for Power Users

1. Right-click the HMI projects folder, and then click Properties.
2. In the Security tab of the Properties dialog box, select Power Users from the list of groups and user names.
3. In the Permissions box below the list, select Full Control, and then select Allow.

Exploring the RSView Studio main window



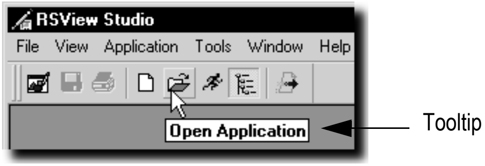
RSLinx Enterprise: loading FactoryTalk server, Object ID=RNA://$Local/Malthouse Clgx ...

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 have quick access to 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 Graphic Displays, Graphic Libraries, User Accounts, and Tags editors have additional toolbars.

The Explorer window

The Explorer window has two tabs: the Application tab, and the Communications tab.

The Application tab contains the editors for creating and editing your application. It also contains the System folder for setting up RSAssetSecurity™.

The Communications tab contains the communications tree for the development computer. For more information about using the communications tree, see Help for RSLinx Enterprise.

For more information about the Explorer window, see page 2-8. For information about setting up security, see Chapter 13.

The workspace

The workspace is the blank area of the RSView Studio window. You can drag icons from the Explorer window to the workspace to open editors and components. For more information, see page 2-8.

The Diagnostics List

The Diagnostics List shows messages about system activities. You can specify the types of messages to display in the Diagnostics List, move the list, resize it, and clear the messages in it.

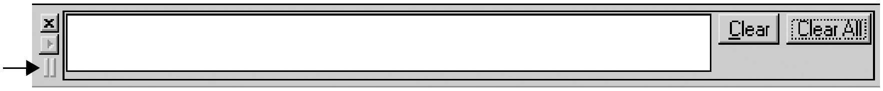
For information about testing graphic displays, see page 14-10.

Moving the Diagnostics List

You can detach (undock) the Diagnostics List from the main window, and then move the list anywhere on the screen.

To undock the Diagnostics List, drag the grab bars at the bottom left of the Diagnostics List. If you can't see the grab bars, drag the top edge of the Diagnostics List to make it a bit larger.

To detach the Diagnostics List, drag the grab bars.



To prevent the Diagnostics List from docking automatically while you move it across the screen, hold down the Ctrl key on the keyboard while you move the Diagnostics List.

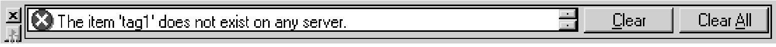
When the Diagnostics List is undocked, you can make it any size you want, for example to view more than one message at a time. To resize the bar, drag an edge or corner until the bar is the size you want.

To re-attach the Diagnostics List, double-click its title bar.

To clear the selected message in the Diagnostics List, click Clear. To clear all the messages in the Diagnostics List, click Clear All.

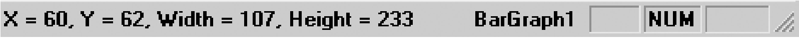
Messages in the Diagnostics List

The types of messages that appear in the Diagnostics List depend on how you set up FactoryTalk Diagnostics™ on the development system. For information about specifying the types of messages to display, see page 10-3.


The item 'tag1' does not exist on any server.

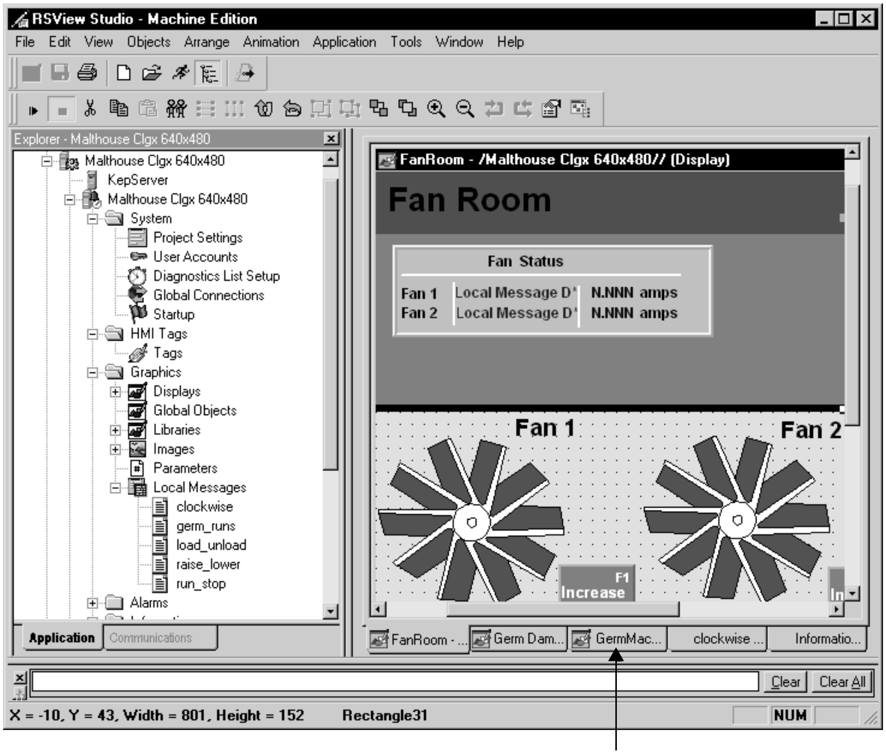
The status bar

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 editor, the status bar displays information about the selected object.


X = 60, Y = 62, Width = 107, Height = 233 BarGraph1 NUM

Workbook tabs

If you select Workbook Mode on the View menu, the workspace 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.

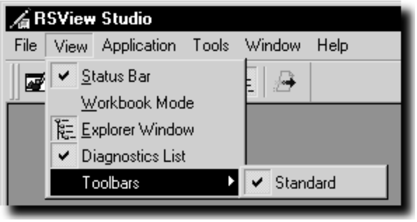


Workbook tabs

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, Explorer window, Diagnostics List, and Standard toolbar are visible. Workbook Mode is turned off.



To hide or display the Explorer window

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

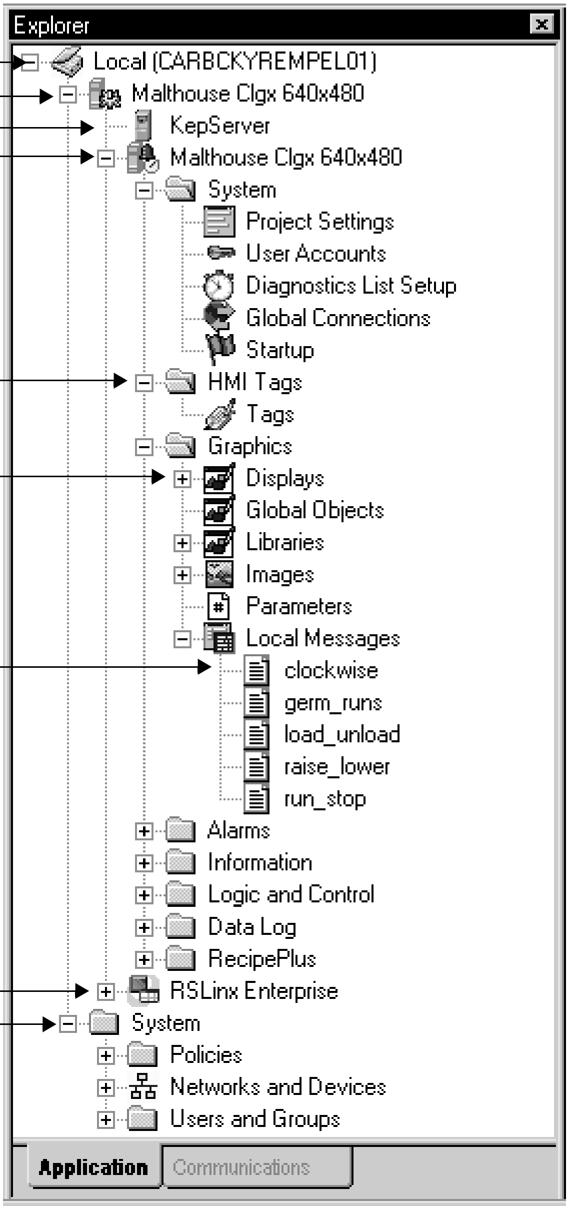
Using the Explorer window

The Explorer window is the main tool for working with RSView Studio. It lists the editors you use to develop your application, as well as the components, such as graphic displays, you've created.

The Explorer window also allows you to set up security for your application. You can use the window to set up users and user groups, and to assign security access to FactoryTalk® Directory™ to the application, and to networks and devices. For information about setting up security, see Chapter 13.

An application consists of one or more data servers and an HMI project (also known as an HMI server). The data servers provide communications for the project. The project consists of graphic displays, alarm information, user information, and other settings.

This manual generally uses the term application to refer to both application-level and project-level procedures.



The top icon is FactoryTalk Local Directory

This application contains three servers

1. OPC® data server

2. The application's HMI server contains editors for setting up your application and the components you create.

Click the - symbol to close a folder

Click the + symbol to see the list of components for an editor.

Components are listed below the editor's icon when you open the folder.

3. RSLinx Enterprise data server

This folder contains RSAssetSecurity™ policies and users

When you create a data server it is added to the Explorer window tree. For example, see the KepServer data server in the previous illustration.

You can resize the Explorer window by dragging its edges.

Viewing the Explorer window

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

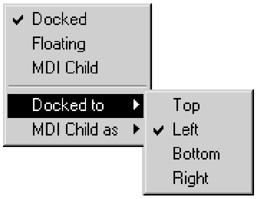
- As a docked window. When docked, the explorer is always on top of other windows that it overlaps. You can dock the explorer to any edge of the main window.
- As a floating window. When floating, the explorer is always on top of other windows that it overlaps, but you can move it to different locations 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 Explorer window title bar, and then click MDI Child.

Moving the Explorer window

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

- Click the title bar and drag.
- Right-click the title bar, then select a new docking location, floating, or child mode.



Working with editors

When developing an application, 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 Explorer window (see the illustration on page 2-10). Each editor is displayed with an icon to the left of the editor name.

To open a folder in the Explorer window

1. 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 (components include graphic displays, global object displays, and graphic libraries, each in their own folder)
- Parameters
- Local Messages
- Information Messages
- Data Log Models
- Macros
- RecipePlus

The Explorer window 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 application (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

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

Opening editors

To open an editor

1. 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

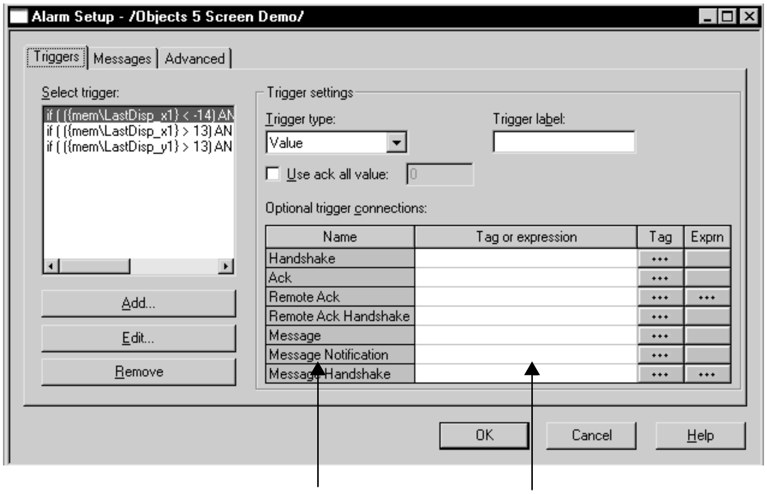
To close an editor

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

   Some editors have an OK, Cancel, 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.



Alarm Setup - /Objects 5 Screen Demo/

Select trigger:

```
if ( ({mem\LastDisp_x1} < -14) AN
if ( ({mem\LastDisp_x1} > 13) AN
if ( ({mem\LastDisp_y1} > 13) AN
```

Trigger settings

Trigger type: Value

Trigger label:

☐ Use ack all value: 0

Optional trigger connections:

Name	Tag or expression	Tag	Exprn
Handshake		...	
Ack		...	
Remote Ack		...	...
Remote Ack Handshake		...	
Message		...	
Message Notification		...	
Message Handshake		...	...

This column is for display purposes only.

Enter information in this column.

These editors contain spreadsheets:

- Tags*
- User Accounts**
- Global Connections
- Local Messages
- Alarm Setup
- Information Setup
- Information Messages
- Macros
- RecipePlus Editor

* You cannot make changes in the spreadsheet section of the Tags editor. In this editor, you must use the Form section of the editor to create and edit tags.

** The User Accounts editor has two tabs. You can use the spreadsheet in the RSView 3.x Accounts tab, but not in the RSView 4.0 Accounts tab.

In the Graphics editor, many of the Properties dialog boxes for setting up graphic objects contain spreadsheets for assigning tags or expressions to the objects.

To enter information in a cell in a spreadsheet

1. 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

1. 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

1. Press Enter or Down Arrow.

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

To delete a cell's contents

1. 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.

To delete rows

1. Select one or more rows, right-click the selection, and then click Delete Rows.

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, do one of the following

- Drag the component icon into the workspace.
- Right-click the editor, and then click New.
- On the File menu, select New, and then click the type of component to create.

Opening components

To open a component, do one of the following

- Double-click the component.
- Right-click the component, and then click Open.
- Drag the component from the Explorer window to the workspace.

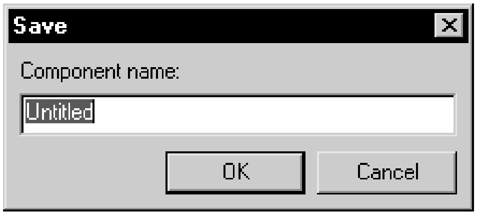
Saving components

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

To save a component

Save tool

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



Component name: Untitled

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 the title bar

Close

Close button in component

1. 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 an application

You can use the same components in more than one application by adding components into an application.

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

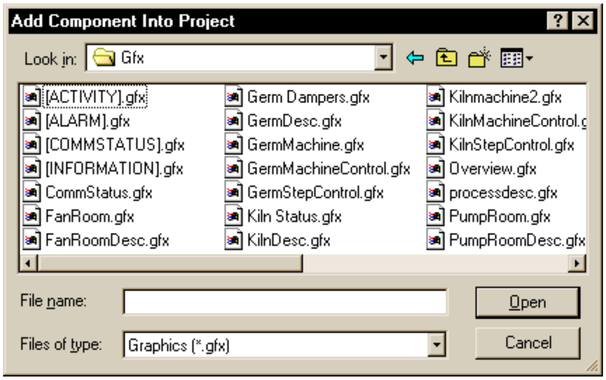
When you add the component into Application B, changes you make to the component in Application B are not reflected in the component in Application A.

To add a component from Application A into Application B

1. In Application 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 Application.



Look in: Gfx

[ACTIVITY].gfx
[ALARM].gfx
[COMMSTATUS].gfx
[INFORMATION].gfx
CommStatus.gfx
FanRoom.gfx
FanRoomDesc.gfx
Germ Dampers.gfx
GermDesc.gfx
GermMachine.gfx
GermMachineControl.gfx
GermStepControl.gfx
Kiln Status.gfx
KilnDesc.gfx
Kilnmachine2.gfx
KilnMachineControl.g
KilnStepControl.gfx
Overview.gfx
processdesc.gfx
PumpRoom.gfx
PumpRoomDesc.gfx

File name:

Files of type: Graphics (*.gfx)

3. In the dialog box, navigate to the component to add (in Application 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 application folders and files, see Chapter 4, <italics>Working with applications.

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

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

Using Add Component Into Application with graphic displays, graphic libraries, and global object displays

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

- adding graphic displays to your application's Libraries folder.
- using libraries as graphic displays in your application.
- moving libraries into the Displays folder so you can export their strings for translation.
- creating global object displays.

For information about graphic libraries, see page 14-15. For information about global object displays, see page 14-14.

Deleting components

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

To delete a component

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

Removing components

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

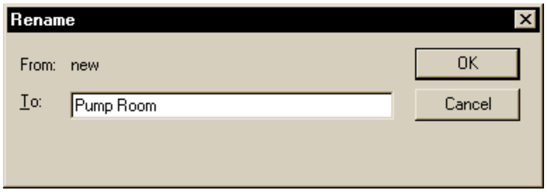
To remove a component

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

Renaming components

To rename a component

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



From: new

To: Pump Room

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 and component 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

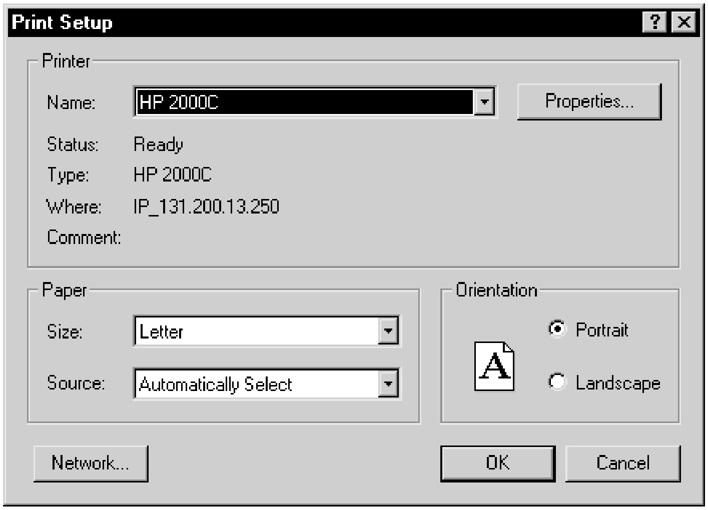
You must install a printer before you can select it. For information about installing a printer, see your Windows documentation.

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 application. For more information about printing at runtime, see page 2-18.

To select a printer

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



Name: HP 2000C

Status: Ready

Type: HP 2000C

Where: IP_131.200.13.250

Comment:

Size: Letter

Source: Automatically Select

● Portrait

○ Landscape

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 or using a remote display print. You can also send diagnostics and alarm messages to a printer at runtime.

For information about	**See**
Display print buttons	page 14-34
Printing graphic displays	page 14-34
Printing displays remotely	page 8-2
Printing alarm messages	page 9-9

For information about	See
Printing diagnostics messages	page 10-8
Specifying the printers to use at runtime for Windows 2000 or Windows XP applications	page 26-10
The type of printer to use with a PanelView Plus™ or VersaView CE terminal	page 27-1

3 Planning applications

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

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

RSView® comes with several sample applications that can give you guidance when planning your application. For instructions on opening the sample applications, 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 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—which network types, data servers, and devices.
- Determine which process variables you need to have access to and identify their locations in the programmable controllers.

For information about setting up communications, see Chapter 5.

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 network.

Keep data collection requirements in mind when designing the layout of the programmable controller data tables and the HMI tag database. Ideally, tag addresses 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 an HMI tag database

Take the time to plan your HMI 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 HMI tags, see Chapter 7.

If you are going to use direct referencing for all your tags, you don't need to create HMI tags in RSView. For information about creating direct references to data server tags, see Chapter 6.

Collecting information

Before you begin creating the tag database, collect:

- flowcharts of your processes (or process and instrument diagrams).
- a list of programmable controller data table or register addresses your application will have access to.
- machinery systems documentation.
- alarm requirements (for more information, see page 3-5).

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 the most sense for your application. 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 application 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 14.

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 8.

Creating a template to ensure consistency

It is possible to keep a consistent appearance among all the displays in an application 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:

- your company logo.
- a title.
- the date and time.
- navigational buttons.

Use global object displays to create template objects. You can copy the objects into your graphic displays, and update all the objects at once by updating the original object in the global object display. For information about creating global object displays, see page 14-14.

Designing displays

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.
- Keep the intended user in mind and design displays so they are easy to understand and use. Ask the users to test the displays.

Planning languages

Before setting up languages, plan:

- what languages you need to use.
- what Windows fonts support these languages.
- how different languages will affect design elements in your graphic displays, such as object size and message length.
- whether operators need to switch languages at runtime, and if so, under what conditions. This will help you determine where to locate language switch buttons in your application.
- how to show operators which button to press to switch to their languages. For example, by using a text label in French, or a French flag, to alert a French operator.

For information about setting up language switching, see Chapter 23.

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 9.

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 14-29. For information about setting up information messages, see Chapter 12.

Diagnostics messages

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

For information about setting up diagnostics messages, see Chapter 10.

Planning 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 11. For information about creating trend graphic objects, see Chapter 18.

Planning recipes

When planning recipes, consider how they will be used. For example, will recipes be used to:

- compare tag values to pre-set data values?
- upload tag values to existing or new data sets?
- download values from data sets to tags?
- archive tag values to ensure compliance with government regulations?

Based on such considerations, you can determine:

- which tag sets and data sets to pair together in a recipe file.
- which RecipePlus button actions to use with the RecipePlus selector and RecipePlus table.

For information about using recipes and creating RecipePlus graphic objects, see Chapter 19.

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 passwords, and if so, whether to have a minimum length, and whether to require that the passwords are changed periodically.
- allow only authorized users to shut down the application.
- use the DeskLock tool to prevent users from switching to another application at runtime (Windows® 2000 and Windows XP runtime applications 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 13.

4 Working with applications

This chapter describes:

- application files.
- creating, importing, opening, and closing applications.
- renaming, copying, deleting, backing up, and restoring applications.
- specifying project settings.
- viewing application properties.
- viewing HMI server properties.

What is an application?

An application is the software application you create in RSView® Studio™ to monitor and control your plant processes. An application consists of one or more data servers and an HMI project (also known as an HMI server). The data servers provide communications for the project. The project or HMI server consists of graphic displays, alarm information, user information, and other settings.

For information about viewing the application properties, see page 4-17. For information about viewing the HMI server properties, see page 4-17.

Application versus project

This manual generally uses the term application to refer to both application-level and project-level procedures. An exception is the section on using the Project Settings editor, which begins on page 4-10. In that section, the term project is used.

When you create an application, RSView creates folders and files in various locations on the development computer. Some of the folders are empty until you start setting up your application. When you finish developing the application, RSView uses the information in the various folders and files to create the runtime application.

HMI project file

The HMI project file has the extension .med. The HMI project file is located in this directory:

> C:\Documents and Settings\All Users\Documents\RSView Enterprise\ME\HMI projects (Windows® 2000)
>
> or

C:\Documents and Settings\All Users\Shared Documents
\RSView Enterprise\ME\HMI projects (Windows XP)

Runtime application file

The runtime application consists of a file with the extension .mer. For information about creating the runtime application, see Chapter 25.

Component files

Component files are located in folders in the HMI project folder, as described in the following table. For example, graphic display component files (with the extension .gfx) are stored in the Gfx folder. You might need to navigate to the location of these files, for example if you are adding a component from one application into another application.

This folder	Contains	File extensions
Application name	HMI project file and the folders described below	.med
DLG	Data log models (component files)	.mdf
Gfx	Graphic display component files	.gfx
Global Objects	Global object display component files	.ggfx
Images	Image files	.bmp or .jpg
Information	Information message component files	.ifm
Local	Local message component files	.loc
Macros	Macro component files	.mcr
PAR	Parameter component files	.par
RecipePlus	RecipePlus component files	.rpp

External folders

The following table lists some RSView folders that are external to the HMI 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 (Windows 2000)

or

C:\Documents and Settings\All Users\Shared Documents\
RSView Enterprise (Windows XP)

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 Application Name\Dlg\Data Log Model Name	Data log files for applications that have run on the development computer	.log, .tag
ME\Logs\Runtime Application Name\M_Alarms	Alarm log file for applications that have run on the development computer	.alm
ME\Runtime	Runtime application files	.mer
ME\HMI projects	Sample application 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 14-19.

Default log file locations for PanelView Plus or VersaView CE applications

On the PanelView Plus™ or VersaView® CE terminal, 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 PC card. For more information, see Chapter 11.

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 Clgx 640x480\Gfx\Steeping.gfx

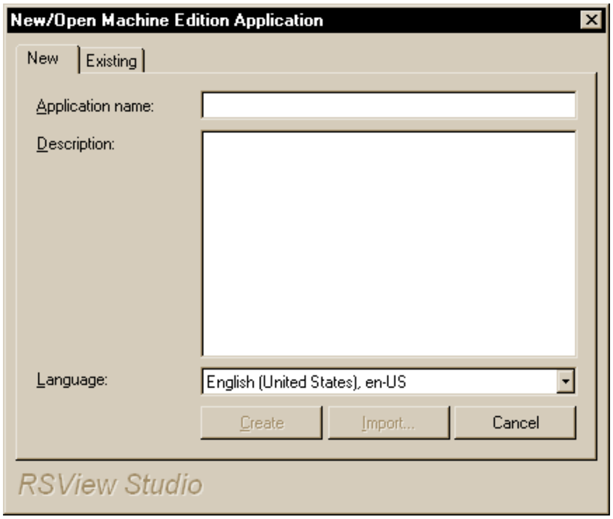
Creating, importing, opening, and closing applications

Creating applications

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

To create a new application when you start RSView Studio

1. Start RSView Studio.



New/Open Machine Edition Application

Language: English (United States), en-US

2. In the New tab, in the Application name box, type a name for your application, up to 32 characters long.

3. If desired, type a description of the application. If you don't type a description now, you can add one later, as described on page 4-17.

4. Specify a language for the graphic display strings in the application. For information about using different languages, see Chapter 23.

5. Click Create.

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

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

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

C:\Documents and Settings\All Users\Documents\RSView Enterprise\ME\HMI projects (Windows 2000)

or

C:\Documents and Settings\All Users\Shared Documents\
RSView Enterprise\ME\HMI projects (Windows XP)

Once you create the application, specify the project settings. These settings determine the general appearance of your runtime application, and affect how your graphic displays look. For more information, see page 4-16.

To create a new application when RSView Studio is already open

New Application

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

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

2. Follow steps 2 through 5 in the previous procedure.

Importing applications

You can import PanelBuilder™, PanelBuilder32, PanelBuilder 1400e, and RSView Machine Edition applications into RSView Studio.

PanelBuilder and PanelBuilder32 files can be in either development format (*.pba) or runtime terminal format (*.pva). PanelBuilder 1400e files have the file extension *.pvc.

When you import older application files, RSView creates a copy of the application for the current version of RSView. The older version is not altered.

You can use current version application files to create previous version runtime files. For more information, see page 4-9.

If the application you are importing contains any direct driver nodes, the import wizard will create one RSLinx® topic for each direct driver node it finds. All topics are then converted into device shortcuts, to run with RSLinx Enterprise. You must have both RSLinx® Classic and RSLinx Enterprise installed to make this two-step conversion.

To create RSLinx topics after import, follow these steps in RSLinx before importing the application.

To validate direct driver nodes in RSLinx

1. Create the appropriate RSLinx Classic drivers if not already created (for example, AB_ETH-1).

   For more information about creating RSLinx Classic drivers, see the RSLinx Classic Help.

2. If it is an Ethernet® driver (AB_ETH-1), add the IP address of each direct driver node to the Ethernet driver setup.
3. Start RSWho and select each device associated with each direct driver node (for example, 131.200.13.128).

   If these steps are not followed in this order, the topics generated by the import code will be invalid and will need to be fixed using the Topic Editor in RSLinx.

To import an application

1. Start RSView Studio
2. In the New tab, in the Application name box, type a name for the imported application, up to 32 characters long.
3. If desired, type a description of the application. If you don't type a description now, you can add one later, as described on page 4-17.
4. Specify a language for the graphic display strings in the application. For information about using multiple languages, see Chapter 23.
5. Click Import. The Machine Edition Import Wizard opens.

   For more information about importing PanelBuilder 1400e applications, see Appendix A. For more information about importing PanelBuilder and PanelBuilder32 applications, see Appendix B.

Opening applications

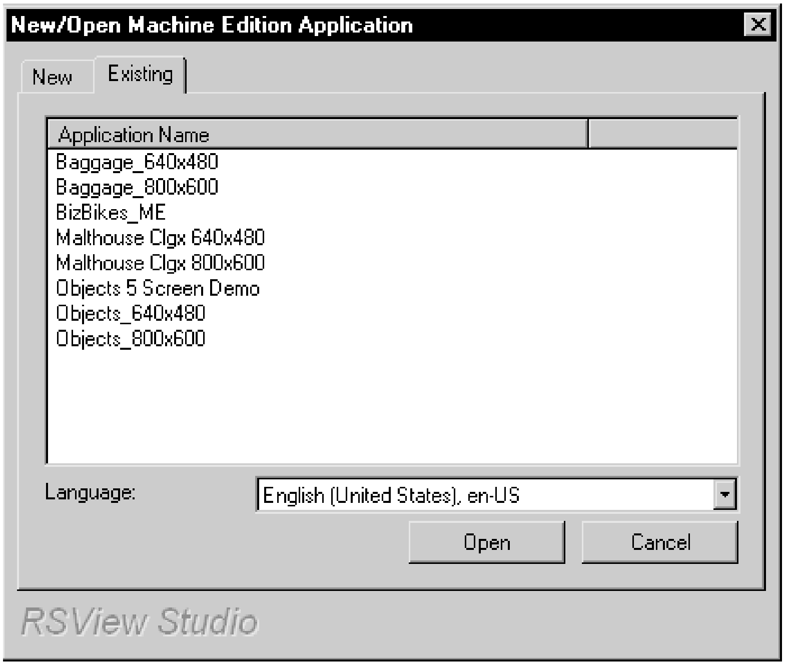
You can open an application when you start RSView Studio, or once RSView Studio is already open.

Older RSView Machine Edition application files are converted to the current version of RSView when you open them. However, you can still use the current version of RSView Studio to create older version runtime files. For information about the features supported in different versions of RSView, see Appendix G.

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

To open an existing application when you start RSView Studio

1. Start RSView Studio.



Baggage_640x480
Baggage_800x600
BizBikes_ME
Malthouse Clgx 640x480
Malthouse Clgx 800x600
Objects 5 Screen Demo
Objects_640x480
Objects_800x600

Language: English (United States), en-US

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

3. Select a language:

   - If you haven't opened the application in RSView 4.0 before, specify a language for the application.

   - If the application uses multiple languages, specify the language to open.

   The selected language determines the language of the graphic display strings that are displayed when the application opens. For information about using different languages, see Chapter 23.

4. Click Open.

   RSView Studio displays the application in the Explorer window.

To open an existing application when RSView Studio is already open

Open Application

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

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

2. Follow steps 2 through 4 in the previous procedure.

To open an application you used recently

1. On the File menu, select Recent Applications, and then click the name of the application to open.
2. If an application is already open, RSView Studio asks you whether to close the application that is currently open. Click Yes.

   The application opens. For applications with multiple languages, the language you used most recently opens. For information about using different languages, see Chapter 23.

Problems opening applications

If you have trouble opening an application in RSView Studio, the problem could be a Microsoft® Windows security setting. You must have read and write access to the folder that contains the HMI projects. For example, if you belong to the Windows user group called Power Users, and the group does not have write access to the HMI projects folder, you won't be able to open applications in RSView.

The default location for the HMI projects folder is:

C:\Documents and Settings\All Users\Documents\RSView Enterprise\ME (Windows 2000)

or

C:\Documents and Settings\All Users\Shared Documents\RSView Enterprise\ME (Windows XP)

For more information about security, see Chapter 13.

To set up write access for Power Users

1. Right-click the HMI projects folder, and then click Properties.
2. In the Security tab of the Properties dialog box, select Power Users from the list of groups and user names.
3. In the Permissions box below the list, select Full Control, and then select Allow.

Opening multiple applications

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

To view a graphic display in different languages at the same time, open the application multiple times, selecting a different language each time you open it.

Opening and editing applications from earlier versions of RSView

You can open and edit applications from RSView 3.0, 3.1, and 3.2. When you are finished editing, you can create runtime application files for RSView ME Station version 3.0, 3.1, or 3.2. This allows you to continue running your applications on existing terminals, without upgrading all your software.

The application is converted to RSView 4.0 when you import it, but when you create the runtime application file you can save it back to the earlier version.

You can even use RSView 4.0 global objects, and create multiple language versions of your older applications. When you create the runtime application file, it uses the application's current language. You can create as many different runtime application files, in as many different languages, as you want. However, the language switch feature is not available at runtime for earlier version applications. Global objects are converted to regular objects in the runtime application file.

For information about importing applications, see page 4-5. For information about the features supported in different versions of RSView, see Appendix G. For information about using multiple languages, see Chapter 23. For information about using global objects, see Chapter 14.

Closing applications

To close an application

1. On the File menu, click Close Application.

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

To close an application and exit RSView Studio at the same time

☒

Close button

1. 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.

Renaming, copying, deleting, backing up, and restoring applications

Use the Application Manager tool to:

- rename applications.
- copy applications.
- delete applications.
- create a compressed backup copy of an application, with the file extension .apa.
- restore an application from the backup file, with the file extension .apa.
- restore a legacy project backup file (with the file extension .mea) from an earlier release of RSView Studio, and convert it to Version 4.0.

To start the Application Manager tool, do one of the following

- In RSView Studio, on the Tools menu, click Application Manager.
- On the Windows Start menu, select Programs, Rockwell Software, RSView Enterprise, Tools, and then click Application Manager.

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

About project settings

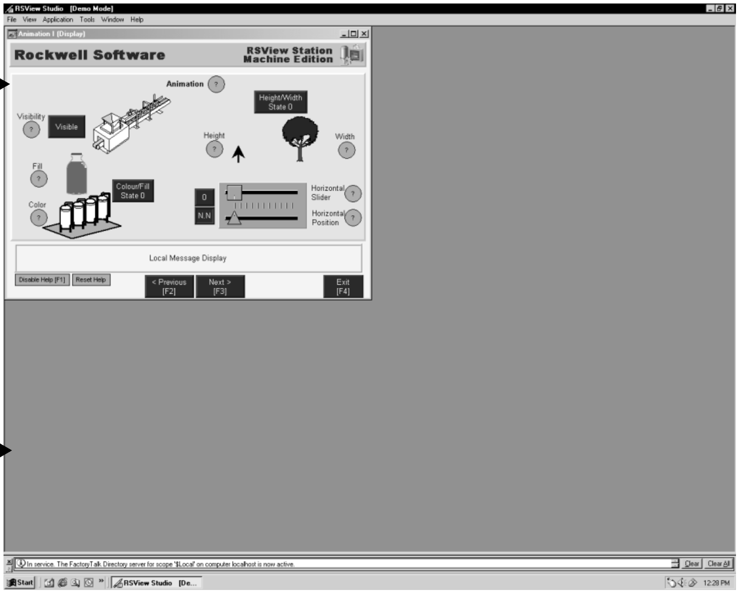
Project settings determine the general appearance of your runtime application, such as the size of the project window and whether a title bar appears in the project window.

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 application at runtime.

The project window size is the amount of room your application 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.



In service. The FactoryTalk Directory server for scope '$Local' on computer localhost is now active.

Project window size (640 x 480 pixels)

Screen resolution (1024 x 728 pixels)

Usually, an application is designed to completely fill the runtime terminal or computer screen. If you want your application 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 4-16.

Screen resolution for PanelView Plus and VersaView CE terminals

If you are going to run your application on a PanelView Plus or VersaView CE terminal, select one of these project window sizes:

For this terminal or monitor	Select this project window size
PanelView Plus 400 or 600	320x240
PanelView Plus 700 or 1000 VersaView CE 700H or 1000H	640x480

For this terminal or monitor	Select this project window size
PanelView Plus 1250 VersaView CE 1250H VersaView 1200P, 1200M, or 1200W	800x600
PanelView Plus 1500 VersaView CE 1500H VersaView 1500P, 1500M, or 1500W	1024x768
VersaView 1700M	1280x1024
VersaView 2000M	1600x1200 (Custom size)

If you are creating an application for a PanelView Plus 400 or 600 terminal:

- Resize the default message displays so that the entire message is visible.
- Reposition the [ALARM] display from the default position (0, 0), as this position is below the viewing area of the terminals.

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 change the window size after you have already created graphic displays, you have the option of scaling graphic displays.

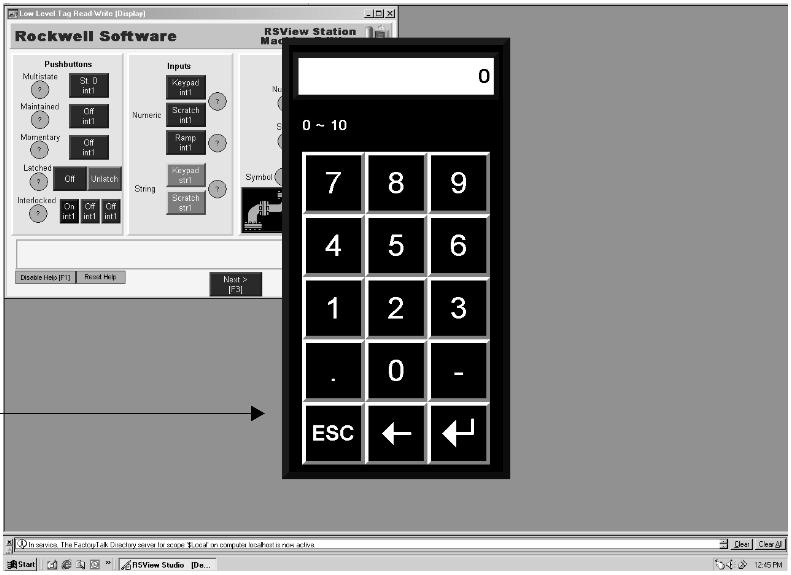
If you choose to scale graphic displays, all Replace and On Top displays are resized and the objects in them are scaled to fit the new size. You can also specify whether to scale the font size and border size of the graphic objects, and the size of graphic images in the Images folder.

If you choose not to scale displays when you change the project window size, 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 14-12. For more information about scaling displays, see Help.

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-up windows for runtime data entry, and a Change Password window for changing user passwords at runtime.



In service. The FactoryTalk Directory server for scope '$Local' on computer localhost is now active.

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

How the project window size affects the default message displays

Your application comes with preconfigured, default graphic displays for diagnostics, 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.

These are the sizes of the default displays:

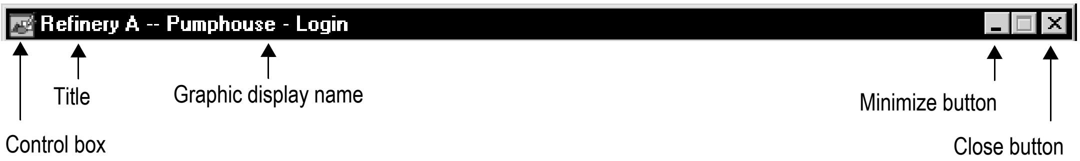
Graphic Display	Width in pixels	Height in pixels
[DIAGNOSTICS]	640	160
[ALARM]	640	210
[INFORMATION]	640	80

If your project window size is smaller than the default message display sizes, you can resize the default 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 14-12.

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 application and want to prevent unauthorized users from stopping the application, do not use a title bar.

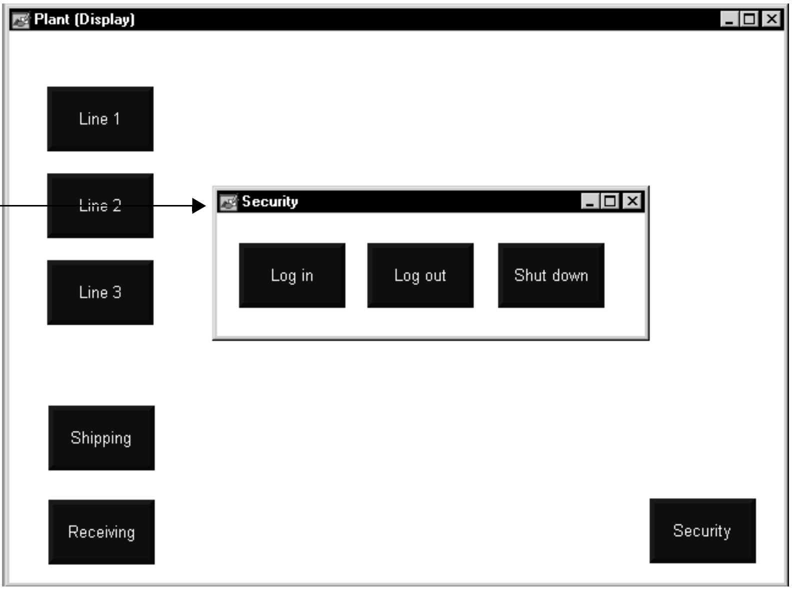
For information about setting up security, see Chapter 13.

Changing the Title bar or Border setting

If you change the Title bar or Border setting, you have the option of scaling graphic displays to accommodate the new display size. For details, see Help.

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 Help).

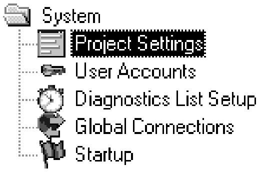


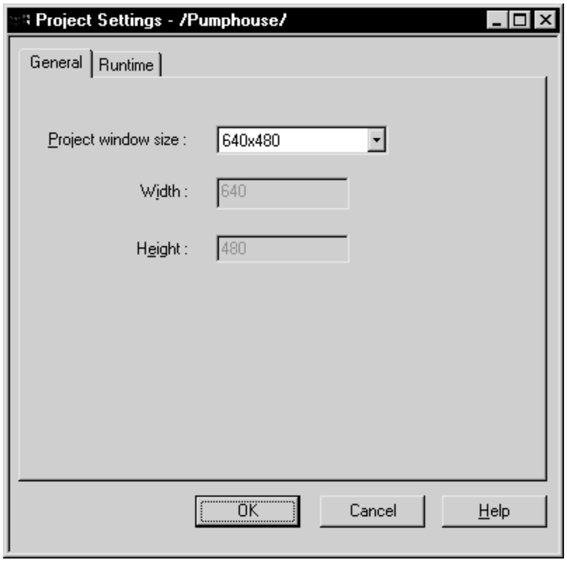
The title you specify in the Project Settings editor applies to all replace displays.

You can specify a different title for each On Top display (using the Display Settings dialog box in the Graphics editor).

Specifying project settings

To specify project settings, use the Project Settings editor. For details about selecting options in the editor, see Help.





Project window size : 640x480

Width : 640

Height : 480

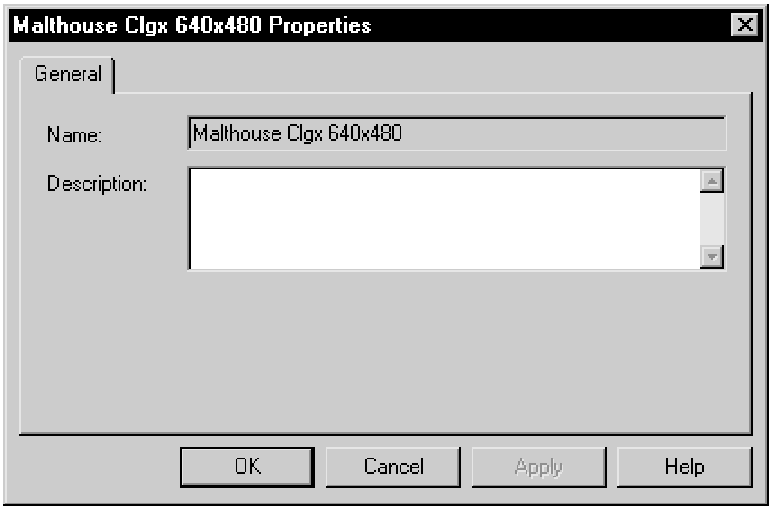
Viewing application properties

You can view this information about your application:

- application name
- application description, if any

To view application properties

1. On the Application menu, click Application Properties.



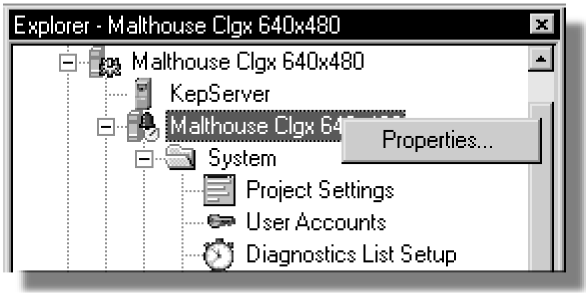
Name: Malthouse Clgx 640x480

Description:

Viewing HMI server properties

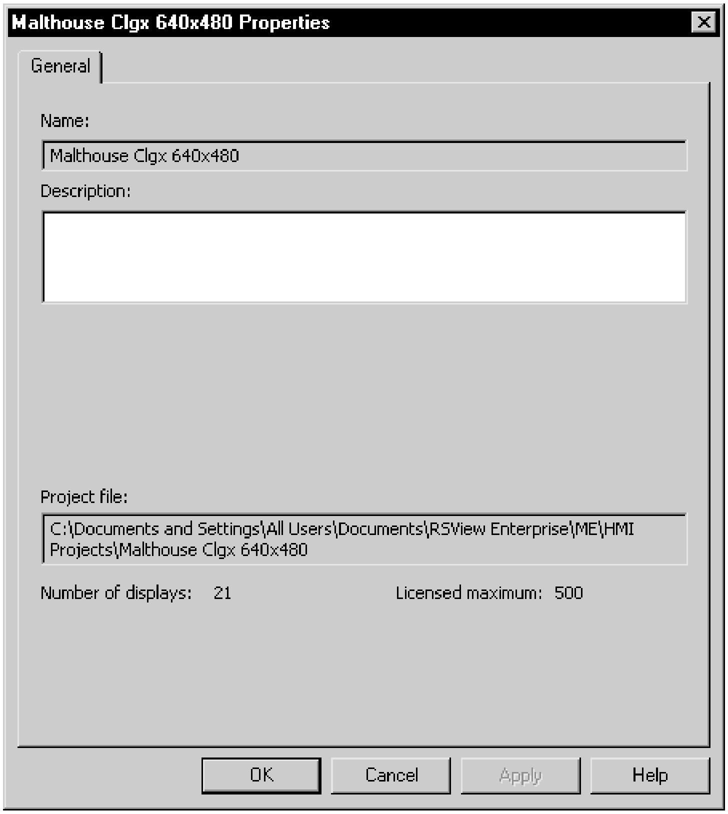
You can use the Explorer window to view this information about your project or HMI server:

- application name
- application description, if any
- location of the project file
- number of graphic displays in the application
- maximum number of displays you're licensed to use



To view HMI server properties

1. In the Explorer window, right-click the HMI server name, and then click Properties.



Malthouse Clgx 640x480 Properties

General

Name: Malthouse Clgx 640x480

Description:

Project file: C:\Documents and Settings\All Users\Documents\RSView Enterprise\ME\HMI Projects\Malthouse Clgx 640x480

Number of displays: 21

Licensed maximum: 500

5 Setting up communications

This chapter describes:

- OPC® communications.
- what data servers are.
- creating data servers in your application.
- updating data server caches.

About OPC communications

OPC® is OLE for Process Control, used to connect RSView® to communication devices via vendor-specific OPC servers. RSView supports the OPC Data Access (DA) 2.0 specification.

OPC servers provide a way for RSView to retrieve tag values from:

- Allen-Bradley® controller devices, using RSLinx® Classic or RSLinx Enterprise™ as an OPC server.
- third-party controller devices, such as Siemens or Modicon®, using third-party OPC servers such as KEPServerEnterprise™.

ControlNet Scheduled, DeviceNet I/O and Remote I/O are supported on PanelView Plus and Windows CE terminals. They are not supported on Windows 2000/XP.

Summary of steps

To set up communications, follow these steps:

1. Gather information about your network, and the devices that are connected to it. You will need this information to set up RSLinx Enterprise, RSLinx Classic, or another OPC server.
2. If you want to use RSLinx Enterprise for communications, install it on the development computer.

   For information about installing RSLinx Enterprise, see the *RSView Machine Edition Installation Guide*.
3. If you want to use RSLinx Classic as the OPC server that enables communications on your network, set up RSLinx Classic on the development computer. RSLinx Classic is included on the RSView Machine Edition™ CD-ROM. For details, see *Getting Results with RSLinx*, or see Help for RSLinx.

RSLinx Classic is available for Windows® 2000 and Windows XP platforms only.

4. If you want to use an OPC server other than RSLinx Classic for communications on your network, set up the OPC server on the development computer. For details, see the documentation supplied with your OPC server.

5. In RSView Studio™, create a data server that points to the OPC server you set up in step 3 or step 4.

   For details, see page 5-3.

   If you are using RSLinx Enterprise for communications, you don't need to create a data server because it is created automatically when you create your application.

6. If you want to use HMI tags in your application, open the Tags editor, and then create device tags that point to addresses in devices. For details about creating HMI tags, see Chapter 7.

   If you do not want to use HMI tags, but instead want to reference addresses in devices directly, skip this step.

7. In objects in graphic displays, or anywhere else you want access to values in tags, type the tag name using the syntax for your OPC server, or use the Tag Browser to select tags. For details about using tags, see Chapter 6.

8. Create the runtime application file. For details, see Chapter 25.

   All the necessary tag information is compiled with the runtime application file.

9. If you are using an OPC server other than RSLinx Enterprise or RSLinx Classic, install the OPC server software on the runtime computer.

   For Windows 2000 and Windows XP applications, the OPC server can be on a different (remote) computer than the runtime computer, but the remote computer must be on the same network as the runtime computer.

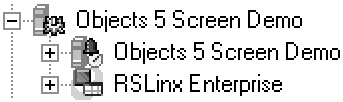
About data servers

A data server provides a route to the physical devices on your network, so you can see the values in those devices, for example:

- programmable controller values.
- OPC tags, and their value or status information.
- named variables in a ControlLogix® processor.

Creating data servers

An RSLinx Enterprise data server is created automatically with a new application. It is located under the application's HMI server in the Explorer window, just above the FactoryTalk System folder.



Objects 5 Screen Demo
Objects 5 Screen Demo
RSLinx Enterprise

You can create additional OPC data servers for your application. For example, you might want to use an RSLinx Enterprise data server and a KEPServerEnterprise data server.

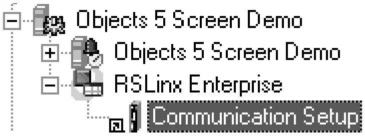
Setting up RSLinx Enterprise data servers

Use an RSLinx Enterprise data server when you want to use RSLinx Enterprise communications.

You can use the Communication Setup editor to add drivers, add devices, set up driver and device properties, and set up device shortcuts.

To set up communications in RSLinx Enterprise

1. In the Explorer window, open the RSLinx Enterprise data server.



Objects 5 Screen Demo
Objects 5 Screen Demo
RSLinx Enterprise
Communication Setup

2. Double-click the Communication Setup editor.
3. In a new application, the RSLinx Configuration Wizard appears. Follow the instructions to create a new configuration or use an existing device configuration. Once you make a choice and click Finish, the Communication Setup editor opens.

   In an existing application, double-clicking Communication Setup opens the Communication Setup editor, with its two tabs. The Local tab is for establishing the location of the tags/addresses for editing. The tags/addresses can be online with a controller or other data server, or an offline controller file. This will enable the Tag Browser to find the tags/addresses.

   The Target tab is for identifying the connection from the run-time computer or terminal to the controller or other data server. If the paths are the same, use the Copy button to copy the Local configuration to the Target tab.

   For more information, see Help for RSLinx Enterprise.

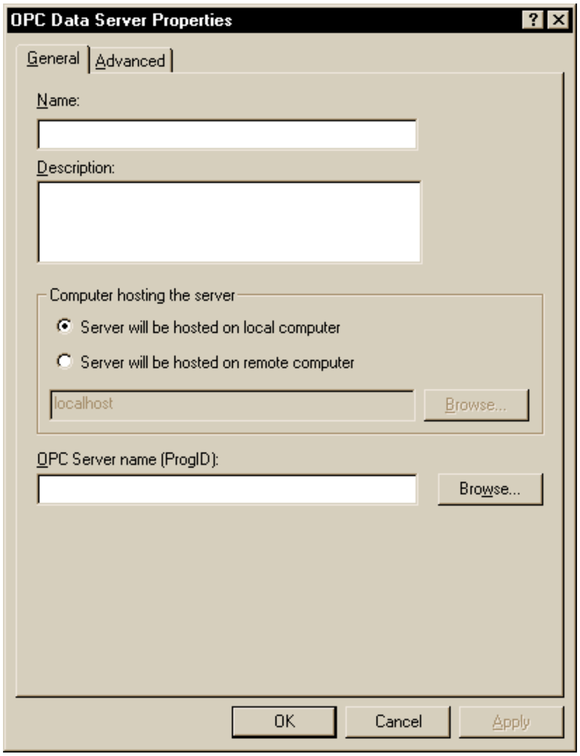
Setting up an OPC data server

Use an OPC data server if you want to use RSLinx Classic instead of RSLinx Enterprise, or if you want to use a third party OPC data server.

You can set up a cache for tags on the data server. A cache allows you to view tag names when you are not connected to the data server.

To create an OPC data server

1. In the Explorer window, right-click the application, select New Data Server, and then click OPC Data Server.


OPC Data Server Properties
?
General
Advanced
Name:
Description:
Computer hosting the server
OPC Server name (ProgID):
Browse...
Browse...
OK
Cancel
Apply

● Server will be hosted on local computer
○ Server will be hosted on remote computer
localhost

For details about selecting options in the OPC Data Server Properties dialog box, see Help.

For information about editing and removing data servers, see Help.

Updating data server caches

If tags are added, modified, or deleted on the data server, you must update (synchronize) the cache manually.

For information about updating the data server cache periodically after you create it, see Help.

6 Working with tags

This chapter provides general information about working with all kinds of tags. This chapter describes:

- types of tags.
- when to use data server tags.
- steps for using data server tags.
- when to use HMI tags.
- steps for using HMI tags.
- browsing for tags and offline tags.
- using the Tag Browser.
- using tags and expressions in your application.
- logging tag values.
- using macros to assign values to tags.

For information about creating HMI tags, see Chapter 7.

Types of tags

A tag is a logical name for a variable in a device or in local memory (RAM). For example, a tag can represent a process variable in a programmable controller.

Data server tags

RSView® conforms to the OPC® Data Access (DA) 2.0 specification for information exchange among automation or control applications, field systems or devices, and business or office applications.

In RSView, data servers such as RSLinx® Enterprise™, RSLinx® Classic, and KEPServerEnterprise™ provide access to OPC-DA-compliant tags. In the RSView documentation, the tags you use through a data server are called data server tags. For more information about data servers, see Chapter 5.

Data server tags include tags found in ControlLogix® processors and tags from other OPC-compliant devices. You use data server tags by providing a direct reference to the tag's location, wherever you want your application to use the data.

HMI tags

In addition to direct referencing tags from data servers, RSView allows you to create tags with additional properties such as minimum and maximum values, scale, and offset. These tags can reference values at an external data source, or store values in the runtime computer's memory. Tags you create in RSView are called HMI tags.

The data source

The RSView documentation uses the term data source as a generic term that includes all possible sources of tag data, for both data server tags and HMI tags. 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 set up to exchange information (in the form of numeric or string values) between the RSView value table and the machine that your application is controlling.

Basic steps for using tags

To use tags, follow these basic steps:

1. If the tag does not already exist, create the tag.

   To use a data server tag, you can use an existing tag in the processor (for example, a programmable controller), or you can create a new one in the processor or OPC server. For example, in a ControlLogix processor, you could create the tag using your RSLogix™ 5000 programming software.

   To use an HMI tag, you must first create it in the Tags editor. For details, see Chapter 7.

2. Browse for, or type, the name of the tag anywhere you want to connect an object to data at runtime.

   For example, to make a push button change a tag value when it is pressed, connect the push button to a tag by typing the tag name in the Connections tab of the push button's Properties dialog box.

Browsing for tags

If you don't know the names of tags, you can browse for them. You can browse while online and connected to a device, or you can browse for tags from an offline file, for example a ControlLogix program file.

To browse for tags, use the Tag Browser. For details, see page 6-5.

Using tag names that don’t exist

You can type the name of a tag that doesn’t yet exist. If you do this, ensure that you spell every instance of the tag name consistently, and that when you do create the tag, you spell it the same way you did when you referred to it.

When to use data server tags

For some of the things you might need to do in your application, you might not need to create HMI tags. Use direct references to tags located in devices instead, for example, tags located in an OPC server’s database.

Eliminating duplication

Using data server tags allows you to add, modify, or delete tags in a device without having to duplicate the changes in the RSView HMI tag database.

Using complex data

Some devices, for example ControlLogix processors, support complex data types such as arrays and structures. Your controller might have structures that contain hundreds of member elements.

Referencing tag values directly eliminates the need for creating an HMI tag for each member.

Steps for using data server tags

To use data server tags, complete three basic steps:

1. Create the tag in the OPC server or processor, or use an existing tag in the processor.

   The server must understand the syntax of the device it is connected to. You need only create a tag if you want to browse the server.

   Examples of OPC servers include RSLinx Enterprise, RSLinx Classic, and KEPServerEnterprise. For information about creating tags in OPC servers that have their own tag database, see the documentation provided with the server.

   For information about creating tags in a ControlLogix processor, see the documentation for your device programming software.

2. Create a data server in RSView, if your application doesn’t already have one.

   For more information, see Chapter 5.

3. In graphic displays, data log models, or anywhere else you want to use a tag’s value, create a direct reference to the tag. At runtime, the tag’s value is passed to the graphic display or data log model.

When to use HMI tags

Use HMI tags to manipulate tag data and to store tag values in the runtime computer's memory.

Scaling, offsetting, or providing a range for data

Use HMI tags if the data server you are using does not provide for:

- scaling or offsetting a value.
- setting minimum or maximum limits on a value (that is, providing a range of values).

Scale and offset

The scale and offset modify the "raw data" that comes from and goes to the programmable controller before the data is saved in the computer's memory (called 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 programmable controller is multiplied by the scale.

The offset is a fixed value—after the value from the programmable controller is multiplied by the scale, the offset amount is added.

Minimum and maximum

HMI tags allow you to set a minimum and maximum value 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 programmable controller and store it in the value table, but would not be able to write this value to the programmable controller.

For more information about minimum and maximum, and scale and offset, see Help.

Storing values in RSView memory

A memory tag can be used to store values without the need for an attached or accessible device.

For example, you might need to store a value in memory:

- to store the result of a calculation.
- temporarily, for example, a counter or index.

- to maintain information about the system's current state, for example which graphic display was last displayed.

For information about creating HMI memory tags, see Chapter 7.

Steps for using HMI tags

To use HMI tags, complete two basic steps:

1. In the Tags editor in RSView, create a tag and map the tag name to an OPC tag or device address.

   For more information, see Chapter 7.

2. In graphic displays, alarm triggers, or anywhere else you want to use a tag's value, assign the tag. At runtime, the tag's value is passed to the graphic display or alarm system.

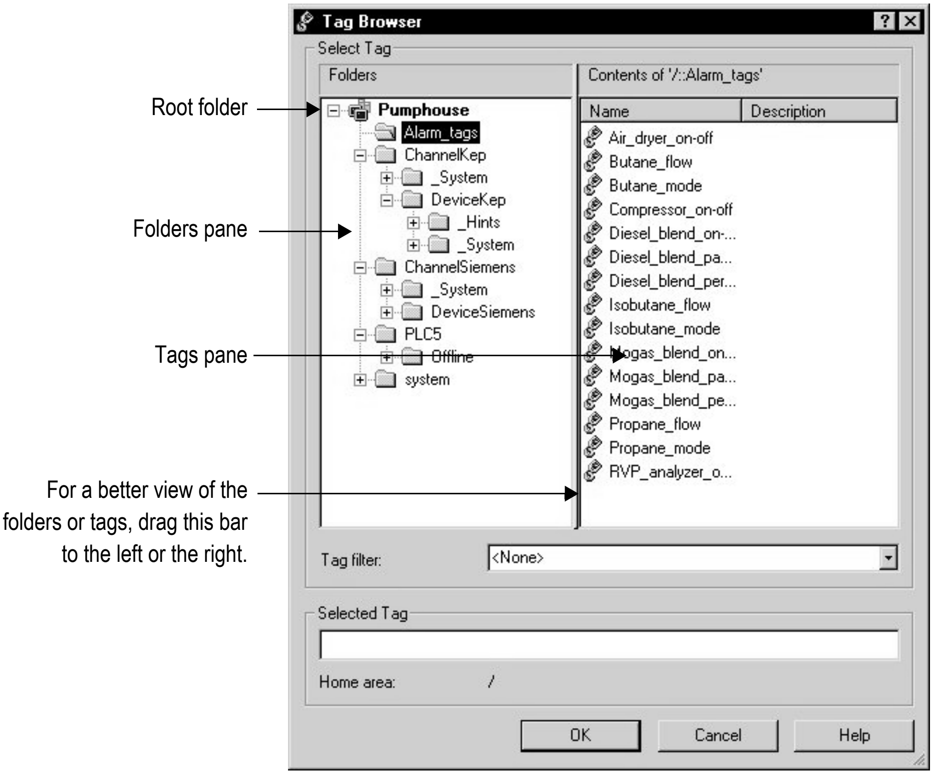
Browsing for tags

You don't have to remember the path and name of a tag to use it in your application. Whenever you need to use a tag, you can open the Tag Browser and select the tag to use.

To open the Tag Browser

- In most editors, click the Browse button in the Tags column.
- In the Expression editor, position the cursor where you want to insert a tag name, and then click Tags.
- In the Parameters editor, double-click where you want to insert a tag name.

Using the Tag Browser



Tag filter: <None>

Home area: /

In the Tag Browser, you can:

- select a single tag or multiple tags. The ability to select multiple tags depends on which Tag Browser you have opened. In the figure above, only a single tag could be selected.
- select data server tags and HMI tags.
- create and edit HMI tags.
- create new folders for HMI tags.
- import tags from a PLC or SLC™ database.

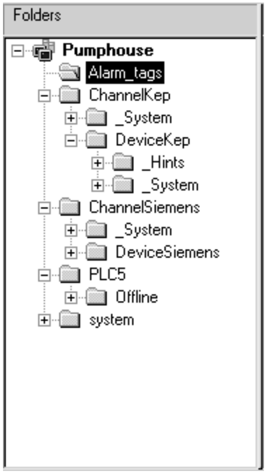
For more information about using the Tag Browser, see Help.

Showing server names

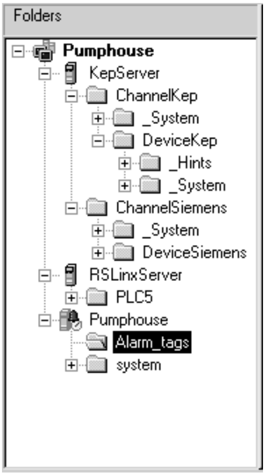
By default, the folder pane in the Tag Browser shows folders, but not the servers they belong to. You can show the names of servers that have been set up in the application.

To display server names

1. Right-click a blank area of the folders pane and then click Show Server Names.



The folders list with server names hidden.



The folders list with server names shown.

In the example on the left, folders are listed alphabetically by name.

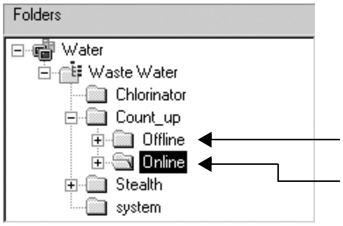
In the example on the right, there are two data servers, named KepServer and RSLinxServer. Folders of data server tags are listed under the data server to which they belong. Below the data servers, the application is listed as an HMI server, with folders of HMI tags under the application name.

Browsing for off-line tags

For each RSLinx Enterprise device shortcut, or each RSLinx Classic OPC topic in your application, an Offline and an Online folder is displayed in the Tag Browser.

In RSLinx Enterprise, you can use the Offline folder to browse tags in an RSLogix.acd file. For details about making the .acd file available to browse offline, see RSLinx Enterprise Help.

In RSLinx Classic, you can use the Offline folder to browse tags in a PLC program stored on disk. If the OPC topic in RSLinx Classic has access to symbols, you can browse for them in the Offline folder. For details about adding symbols to the OPC topic in RSLinx Classic, see RSLinx Classic Help.



Tags that are available when you are not connected to the controller are located in the Offline folder.

Tags that are available when you are connected to the controller are located in the Online folder.

Using tags and expressions in your application

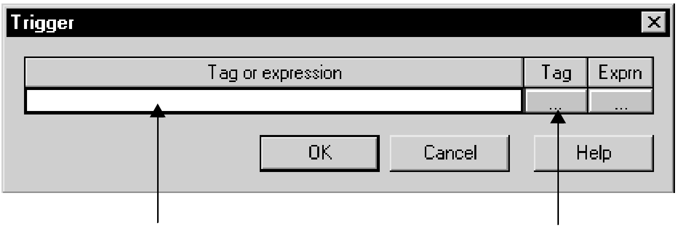
Once you've created tags (either in data servers or in RSView), assign them to connections in your application to allow the application to interact with the data source and perform actions based on the tag values.

You can assign tags in these editors:

- Expressions
- Global Connections
- Graphic Displays
- Global Object Displays
- Graphic Libraries
- Parameters
- Alarm Setup
- Information Setup
- Macros
- Data Log Models
- RecipePlus Editor

Assigning tags

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



Type the tag name here...

...or click the Browse button to open the Tag Browser.

To assign 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 Tag Browser.

For information about using the Tag Browser, see Help.

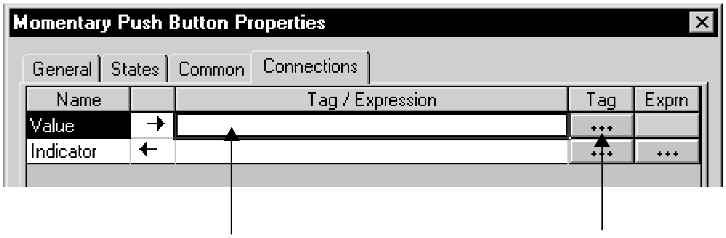
Assigning tags to graphic objects

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

You can use up to 1,000 tags per graphic display. This limit includes the tags contained in embedded variables and expressions. For example, if an expression references the same tag twice, this counts as two tag references.

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

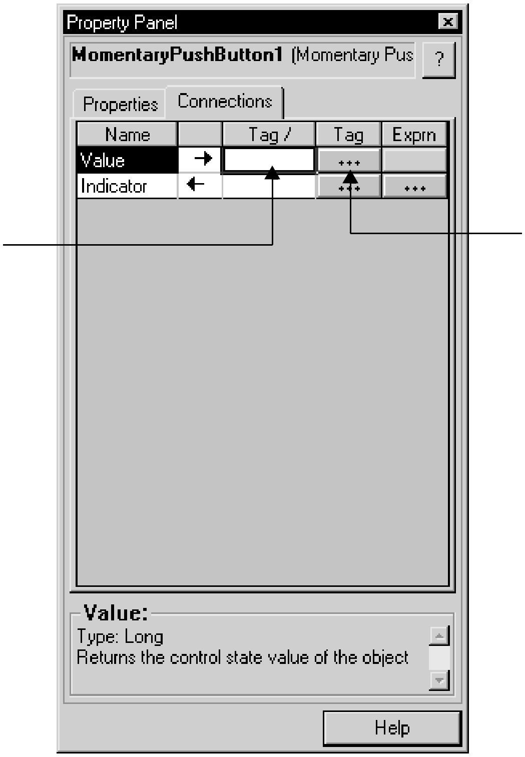
- Double-click the object to open the object's Properties dialog box, and then click the Connections tab.



Type the tag name here...

...or click the Browse button to open the Tag Browser.

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



Value:
Type: Long
Returns the control state value of the object

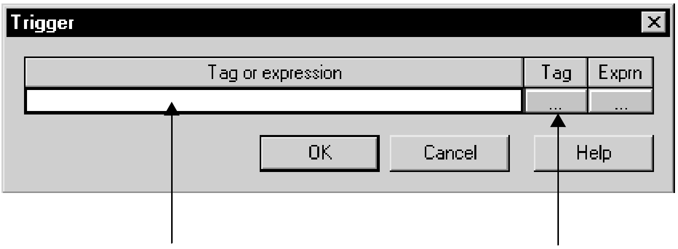
Type the tag name here...

...or click the Browse button to open the Tag Browser.

Using expressions to manipulate tag values

Many of the connections 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.



Type the expression here...

...or click the Browse button to open the Expression editor.

To assign 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 20.

Substituting tag names used in graphic objects

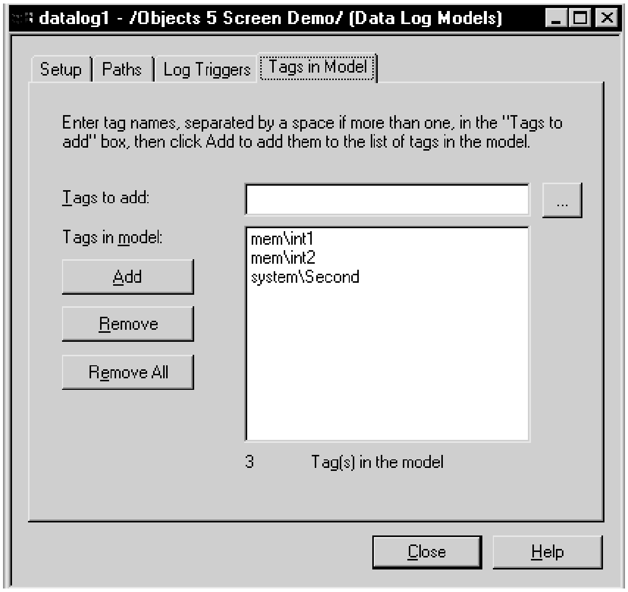
You can use tag substitution to replace tag names and expressions assigned to the connections for graphic objects. For example, if you assign a tag to multiple objects in a graphic display, and then decide to use a different name for the tag, you can create a new tag and then use tag substitution to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

You can also use tag substitution to replace the tags contained in embedded variables.

For more information about tag substitution, see page 15-40.

Logging tag values

Analog and digital tag values can be logged, including both HMI and data server tags. To set up data logging, use the Data Log Models editor. For more information, see Chapter 11.



Enter tag names, separated by a space if more than one, in the "Tags to add" box, then click Add to add them to the list of tags in the model.

Tags to add:

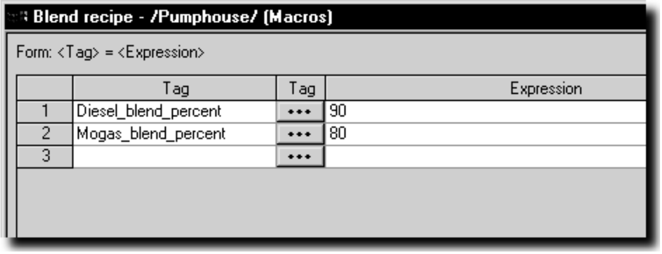
Tags in model:

mem\int1
mem\int2
system\Second

3 Tag(s) in the model

Using macros to assign values to tags

A macro is a list of tag assignments stored in a text file. Whenever you run the macro, the specified values are written to the tags. For more information about macros, see Chapter 22.



Form: <Tag> = <Expression>

	Tag	Tag	Expression
1	Diesel_blend_percent	•••	90
2	Mogas_blend_percent	•••	80
3		•••	

You can also use recipes to assign values to multiple tags with a button press. For information about using recipes to assign values to tags, see Chapter 19.

7 Using HMI tags

This chapter describes:

- HMI tag types.
- using the Tags editor.
- data sources.
- addressing syntax for device tags.
- organizing HMI tags.
- viewing tag statistics.
- other methods for creating HMI tags.
- importing HMI tags.

HMI tag types

HMI tags are tags you create in RSView®. For information about when to use HMI tags versus when to use data server tags, see Chapter 6.

You can create and use these types of HMI 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.

This tag type	Stores this type of data
System	Information generated while the system is running, such as the name of the logged-in user, system time and date, and so on. RSView creates system tags when you create an application. The system tags are stored in the folder called "system" in the HMI 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 C.

Analog tags that use floating-point values

You can assign analog tags to most of the connections in RSView, including both HMI and data server tags. If the analog tag uses a 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 Help.

How values are rounded

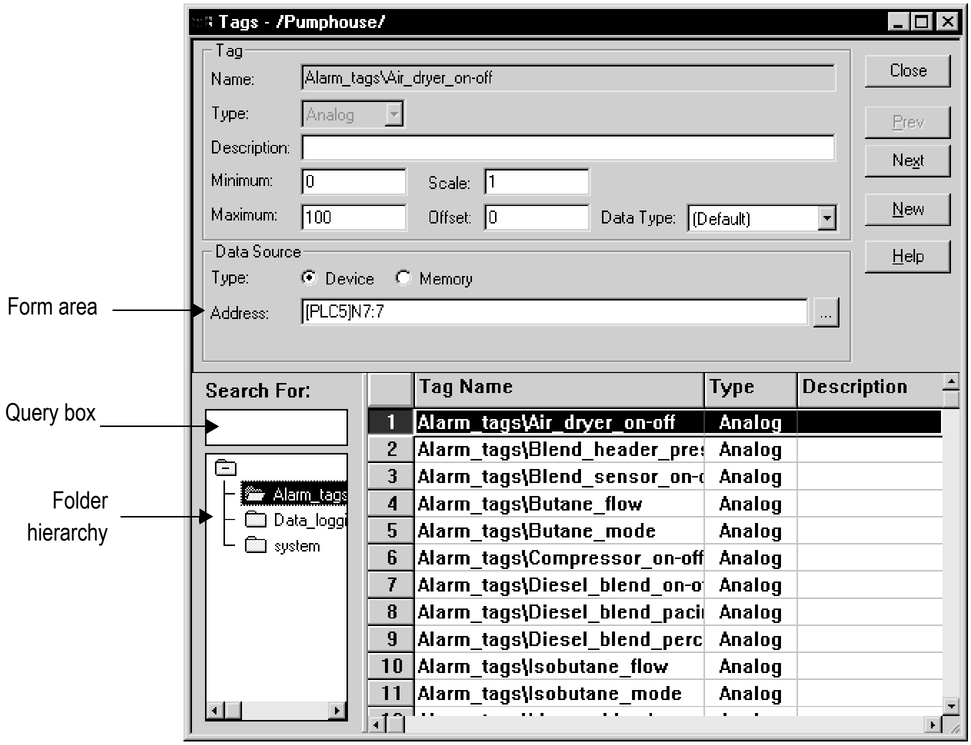
When a floating-point value must be rounded to an integer, this is how the value is rounded:

- 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 six digits. Therefore, using a floating-point data type and adding to it a value that exceeds the six significant digits will result in a rounding error. For example, adding any number to 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 connection. For more information about the numeric input enable button, see page 16-31.

Using the Tags editor

The Tags editor has these parts: form area, query box, folder hierarchy, and spreadsheet area.



Tag
Name: Alarm_tags\Air_dryer_on-off
Type: Analog
Description:
Minimum: 0 Scale: 1
Maximum: 100 Offset: 0 Data Type: (Default)

Data Source
Type: ● Device ○ Memory
Address: [PLC5]N7:7

	Tag Name	Type	Description
1	Alarm_tags\Air_dryer_on-off	Analog	
2	Alarm_tags\Blend_header_pre:	Analog	
3	Alarm_tags\Blend_sensor_on-c	Analog	
4	Alarm_tags\Butane_flow	Analog	
5	Alarm_tags\Butane_mode	Analog	
6	Alarm_tags\Compressor_on-off	Analog	
7	Alarm_tags\Diesel_blend_on-o	Analog	
8	Alarm_tags\Diesel_blend_paci	Analog	
9	Alarm_tags\Diesel_blend_perc	Analog	
10	Alarm_tags\Isobutane_flow	Analog	
11	Alarm_tags\Isobutane_mode	Analog	

The information you enter in the form area is displayed in the spreadsheet area. The folder hierarchy displays all the folders that you and RSView create.

The Tags editor has special items on the View menu to control the appearance of the editor, and extra tools on the toolbar.

Use the Tags editor to:

- create folders
- duplicate, nest, and delete folders

- create and view tags
- edit, duplicate, and delete tags

For details about using the Tags editor, see Help.

Updating the contents of the Tags editor

You can create tags in the Tags editor, but you can also create them as you work in other editors, and you can import them from an existing tag database. To see the result of changes to the database you make in other editors while the Tags editor is open, update the contents.

To update the contents of the editor

Refresh tool

1. 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 7-8.

Searching for HMI tags

Use the Tags editor's 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 wildcard characters.

These are the wildcard characters:

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

For example, to search for all the tags that contain the string "pump" in their name, type *pump* in the Search For box. When you press Enter, a list of tags containing the string "pump" appears in the spreadsheet.

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

Data sources

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

The data source

The RSView documentation uses the term data source as a generic term that includes all possible sources of tag data, for both data server tags and HMI tags. 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 set up to exchange information (in the form of numeric or string values) between the RSView value table and the machine that your application is controlling.

Device

A tag with device as its data source receives its data from a source external to RSView. The data can come from a programmable controller or other device via RSLinx Enterprise, or from another OPC server. You can use up to 5,000 device tags.

For analog tags with Device as the data source, the data type determines the format used when reading and writing tag data to the data server.

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.

For analog 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.

Addressing syntax for device tags

For device tags, you must provide the address and path to the OPC server that is connected to the data source. For example, the OPC server could be connected to a device such as a programmable controller.

The syntax for OPC tag addresses is:

[AccessPath]Address

or

::[AccessPath]Address

where :: indicates that the address resides in a data server in the application. (The two colons are necessary when the address contains a colon, for example, N7:0.)

The square brackets are part of the syntax. They do not indicate optional parameters.

The access path is one of the following:

- For communications with an RSLinx Enterprise data server, the access path is the name of the device shortcut in RSLinx Enterprise.
- For communications with an RSLinx® Classic OPC server, the access path is the name of an OPC topic in RSLinx Classic.
- For communications with other OPC servers, the access path might be optional. For information about the syntax for the access path, see your OPC server documentation.

Example: ControlLogix addressing

We recommend that you use the Tag Browser to select OPC items. When you use the Tag 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. If you use the Default data type, values are treated as floating-point values.

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:

[*Device shortcut*]*item name* for RSLinx Enterprise.

[*OPC topic name*]*item name* for RSLinx Classic.

In this example, the RSLinx Enterprise device shortcut 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 gain access to 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 you want access to.

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

[CLGX]Motor.0

Organizing HMI tags

Organizing tags makes finding and using tags faster and simpler. To organize your tags, try these tips:

- Establish naming conventions.

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

- Use folders to group related tags.

Naming tags

Tag names can be up to 255 characters long including folder name. If you create a folder, the folder name becomes part of the tag name. The backslash (\) after a folder name counts as a character.

The tag name can contain these 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 curly brackets { } when you use it in an expression, for example, {N33-0}. For more information about using tags in expressions, see Chapter 20.

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 HMI 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.

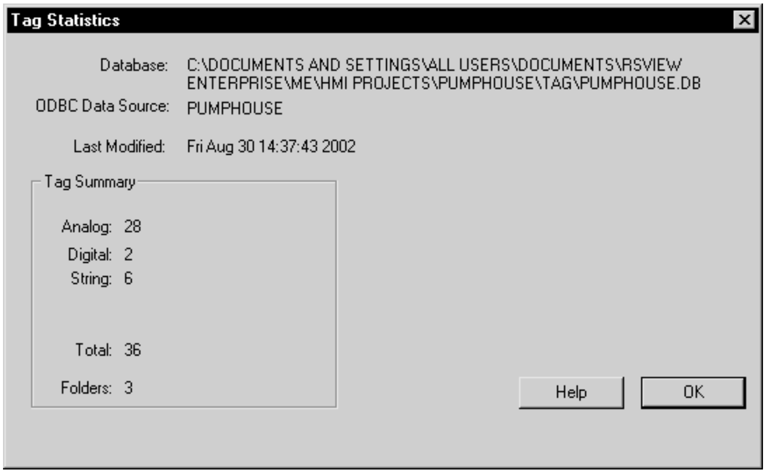
To create similar groups of tags quickly, create one folder with its tags and then duplicate the folder.

Viewing tag statistics

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

To view tag statistics

1. On the View menu, click Tag Statistics.



Tag Statistics

Database: C:\DOCUMENTS AND SETTINGS\ALL USERS\DOCUMENTS\RSVIEW ENTERPRISE\ME\HMI PROJECTS\PUMPHOUSE\TAG\PUMPHOUSE.DB

ODBC Data Source: PUMPHOUSE

Last Modified: Fri Aug 30 14:37:43 2002

Tag Summary

Analog: 28
Digital: 2
String: 6

Total: 36

Folders: 3

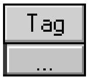
Other methods for creating HMI tags

In addition to creating tags in the Tags editor, you can:

- create tags as needed in other editors (using the Tag Browser).
- import tags from a PLC or SLC™ database. For details see page 7-9.

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 Tag Browser and create the tag. For information about using the Tag Browser, see page 6-5.
- Type a new tag name in the "Tag or expression" column. Keep track of the tag name, and add the tag in the Tags editor when convenient.

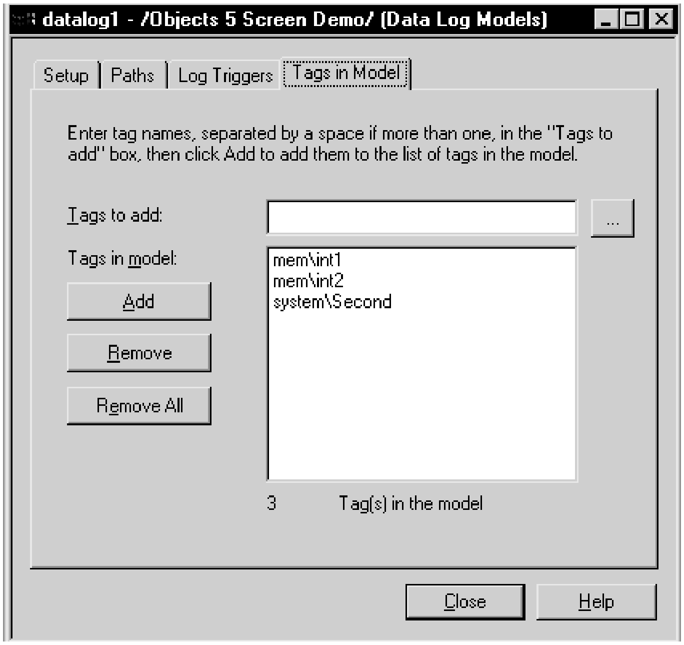
Creating tags as needed in the Data Log Models editor

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 Tag Browser and create the tag. For information about using the Tag Browser, see page 6-5.
- 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 Tags editor when convenient.

For more information about the Data Log Models editor, see Chapter 11.



Enter tag names, separated by a space if more than one, in the "Tags to add" box, then click Add to add them to the list of tags in the model.

Tags to add:

Tags in model:

mem\int1
mem\int2
system\Second

3 Tag(s) in the model

Importing tags from a PLC database

Use the Import PLC Tags dialog box to selectively import tags from a PLC or other database into your application’s HMI 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 application do not affect the database from which they have been imported, and vice versa.

You can import tags from any of these databases:

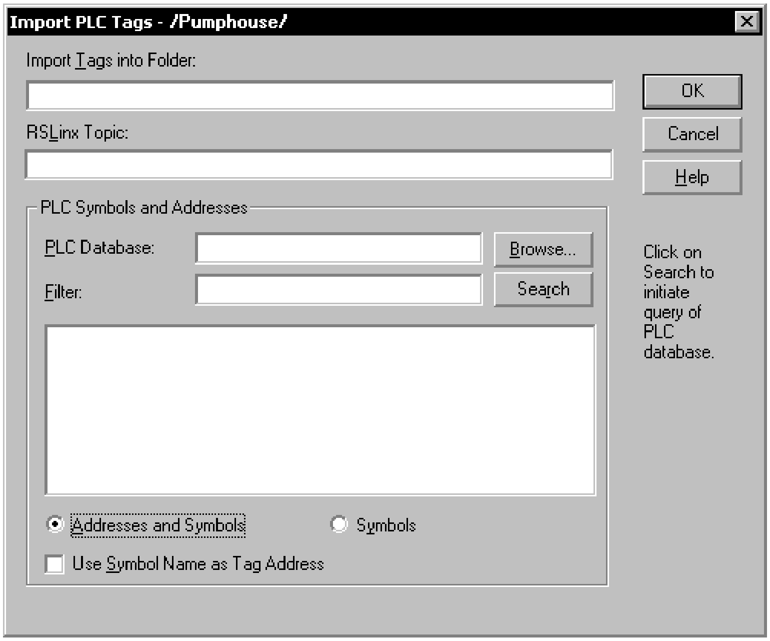
- legacy PLC databases, created using WINtelligent™ LOGIC 5 or A.I.™ 5, with file extension .dsc
- RSLogix™ 5 or RSLogix 500, saved as an external database, with file extension .ctd (before importing, explicitly export to the .ctd format to be sure of including the latest changes)
- RSLogix 5 internal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

For PLC and SLC addresses, the Import PLC Tags dialog box shows only addresses that are used in the symbol or address list of the PLC programming software.

DB Browser tool in the Tags editor

To open the Import PLC Tags dialog box, do one of the following

- In the Tag Browser, right-click the right pane, and then click Import PLC Tags. For information about using the Tag Browser, see page 6-5.
- In the Tags editor, on the Edit menu click Other Databases, or click the DB Browser tool.



● Addresses and Symbols ○ Symbols

□ Use Symbol Name as Tag Address

Click on Search to initiate query of PLC database.

For more information about using the Import PLC Tags dialog box, see Help.

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:

- export your application's tags to a .csv file.
- import tags from another RSView application's tag .csv file.
- merge tags from another RSView application (that is, import them directly from the application, without first creating a tag .csv file).
- 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).

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.

8 Setting up global connections

This chapter describes:

- what global connections are.
- changing displays.
- printing displays.
- updating the date and time.
- setting up the backlight intensity remotely.
- running macros.
- controlling display changes remotely.
- setting up remote display changes.

About global connections

Global connections are connections that apply to your entire runtime application. Global connections allow the data source to control or interact with your application at runtime.

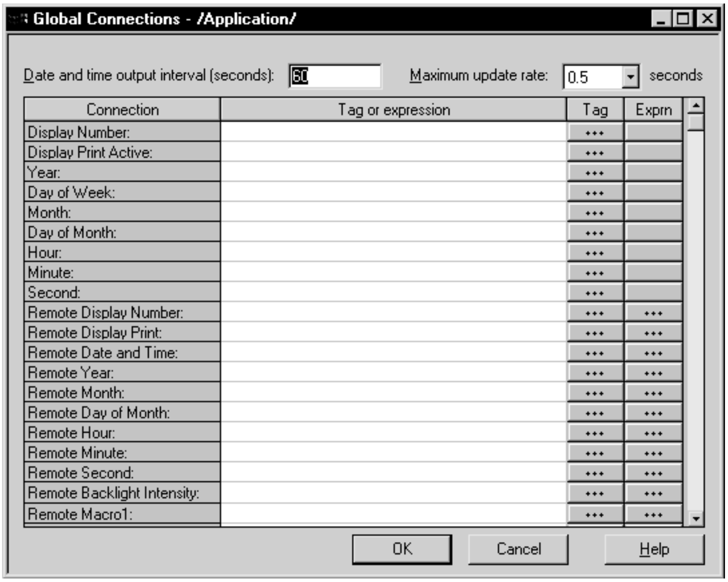
You can use global connections to:

- 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.
- set the intensity of the backlight on a PanelView Plus™ terminal.
- run up to five macros from the data source, when a tag or expression result changes.

The use of each global connection is optional.

Setting up global connections

Use the Global Connections editor to set up global connections.



Date and time output interval (seconds): 60

Maximum update rate: 0.5 seconds

Connection	Tag or expression	Tag	Exprn
Display Number:		...	
Display Print Active:		...	
Year:		...	
Day of Week:		...	
Month:		...	
Day of Month:		...	
Hour:		...	
Minute:		...	
Second:		...	
Remote Display Number:		...	...
Remote Display Print:		...	...
Remote Date and Time:		...	...
Remote Year:		...	...
Remote Month:		...	...
Remote Day of Month:		...	...
Remote Hour:		...	...
Remote Minute:		...	...
Remote Second:		...	...
Remote Backlight Intensity:		...	...
Remote Macro1:		...	...

For detailed information about the options in the Global Connections editor, see Help.

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 8-5.

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 setting up this button, see Help.

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.

If you plan to print graphic displays remotely, turn off 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 abut turning off the screen saver, see your Windows® documentation.

Updating the date and time

Use the date and time connections to update the date and time. You can assign any or all of the date and time connections, or leave them unassigned.

Normally you would assign only one set of date and time connections, 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 connections are updated in the order in which the connections 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 a tag to one or more of these connections:

This connection	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	0-23
Minute	0-59
Second	0-59

Specify how frequently to update the values of the assigned connections 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 a tag or an expression to the Remote Date and Time connection. Also assign a tag or an expression to one or more of these connections:

This connection	Contains this range of values
Remote Year	00-99 or 0000-9999
Remote Month	1-12
Remote Day of Month	1-31
Remote Hour	0-23
Remote Minute	0-59
Remote Second	0-59

When the Remote Date and Time connection 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 connections.

The date and time are updated at the rate specified in the "Maximum update rate" box.

Setting up backlight intensity remotely

Use the Remote Backlight Intensity connection to set the backlight intensity of a runtime terminal remotely from a data source.

To update the backlight intensity of the runtime terminal from the data source, assign a tag or an expression to this read-only connection.

This connection	Contains this range of values
Remote Backlight Intensity	0-100

At runtime, the application reads the value at the data source and sets the backlight to the percentage of its maximum intensity corresponding to the value. For instance, if the value of the connection is 25, the backlight will be set to 25% of its maximum intensity. This value will override the terminal's own backlight intensity setting.

If the value of the connection is greater than 100, the backlight will be set to its maximum intensity. If the value is less than 0, the backlight is set to its minimum value, that is, it will be turned off.

Running macros

Use these global connections to run macros:

This connection	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 connections changes to a new non-zero value, RSView® runs the associated macro.

For information about creating macros, see Chapter 22.

Controlling display changes remotely

To control display changes remotely, you can set up the data source to open graphic displays.

The data source can control display changes for Replace displays only. You can set up 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 a unique display number to each Replace display, and assign a tag or expression to the Remote Display Number connection. When the data source sends a display's number to the connection, the specified display opens. When the connection's value is 0, the operator has control of display changes (using display navigation objects).

For information about assigning numbers to displays, see Help.

Remote display changes and security

If you set up 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 set up the Remote Display Number connection to prevent access to the application unless an authorized user is logged in. To do this, assign an expression to the connection to monitor the ID of the logged-in user, as described in the following example.

For more information about setting up security for your application, see Chapter 13.

Example: Using the Remote Display Number connection to prevent unauthorized users from using the application

This example shows how to set up 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 number 3 to the display.
2. In the Global Connections editor, assign this expression to the Remote Display Number connection:

   if CurrentUserName( ) == “DEFAULT” then 3 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 application. However, if you use the Remote Display Number connection 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 connection. For more information about creating a startup display, see page 13-22.

Setting up remote display changes

This section outlines the steps for setting up remote display changes. For more information about the Global Connections editor, see Help.

To set up remote display changes

1. In the Graphics 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 more information about graphic displays, see Chapter 14.

2. In the Global Connections editor, assign a tag or an expression to the Remote Display Number connection.

3. If you assign a tag to the Remote Display Number connection, set up the data source to send a display's number to the connection when you want the display to open.

   If you assign an expression to the Remote Display Number connection, RSView monitors the values of the tags used in the expression, and uses the expression result to determine which display to open.

9 Setting up alarms

This chapter describes:

- steps for setting up alarms.
- preparing to set up alarms.
- how alarms work.
- alarm trigger data types.
- tips for using array tags.
- optional alarm connections.
- creating alarm messages in multiple languages.
- the [ALARM], [ALARM BANNER], [ALARM MULTI-LINE], [STATUS], and [HISTORY] displays.
- using displays from the library in your application.
- creating your own alarm display.
- opening and closing the alarm display.
- how the alarm list, alarm banner, and alarm status list graphic objects work.
- using buttons to acknowledge, silence, clear, and delete alarms.
- using buttons to sort alarms and reset alarm status.

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.

Multiple language alarm messages

A key component of any alarm system is the messages that appear when alarms occur. RSView supports alarm messages in multiple languages. For information about setting up alarm messages in multiple languages, see page 9-16.

Other multiple language alarm features

RSView supports using multiple languages for all captions on alarm objects. In addition, these alarm features can be translated into multiple languages:

- title of the alarm history report
- title of the alarm status report

Alarm objects and reports use the time formats for the current application language. For more information about using multiple languages, see Chapter 23.

Summary of steps

Follow these steps to set up 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 types, “Acknowledge all” values, the maximum alarm log file size, the hold time, and optional connections.

2. In the Startup editor, ensure that the Alarms box is checked (it is checked by default). See Help.

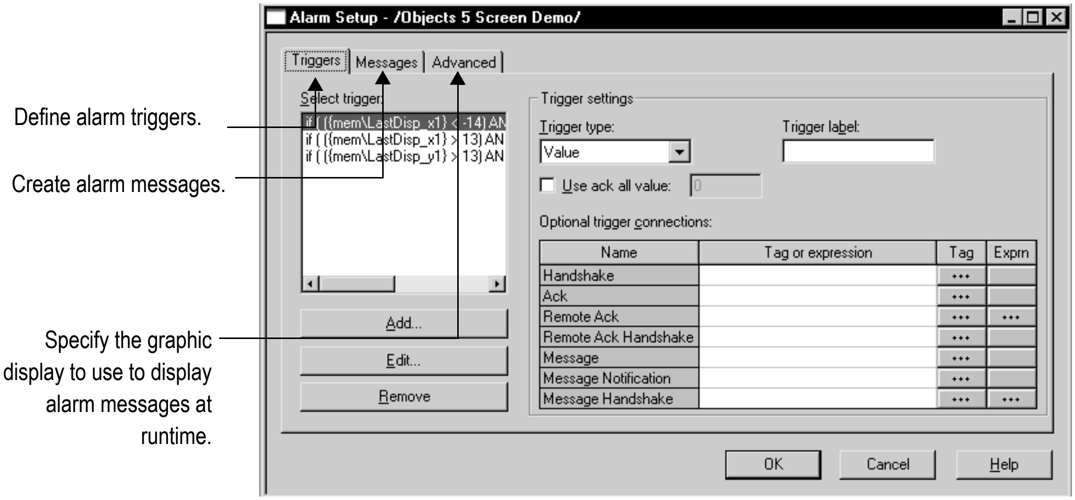
3. If desired, in the Graphics editor modify the default [ALARM] display, or create your own graphic display to use for alarms. For example, if you won’t be using audible alarm signals, edit the default display to remove the silence alarms button.

   For information about graphic displays, see Chapter 14.

4. Test alarms on the runtime system.

Setting up alarms

Use the Alarm Setup editor to set up alarms.



Define alarm triggers.

Create alarm messages.

Specify the graphic display to use to display alarm messages at runtime.

Alarm Setup - /Objects 5 Screen Demo/

Triggers | Messages | Advanced

Select trigger:

- if (({mem\LastDisp_x1} < -14) AN
- if (({mem\LastDisp_x1} > 13) AN
- if (({mem\LastDisp_y1} > 13) AN

Trigger settings

Trigger type: Value

Trigger label:

□ Use ack all value: 0

Optional trigger connections:

Name	Tag or expression	Tag	Exprn
Handshake		...	
Ack		...	
Remote Ack		...	...
Remote Ack Handshake		...	
Message		...	
Message Notification		...	
Message Handshake		...	...

For detailed information about the options in the Alarm Setup editor, see Help.

Preparing to set up alarms

As your application is running, information is continually sent to the data source about the state of the various processes. For example, your application 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 first step in setting up alarms is determining which processes to monitor for alarm conditions.

The data source

The RSView® documentation uses the term data source as a generic term that includes all possible sources of tag data, for both data server tags and HMI tags. 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 set up to exchange information (in the form of numeric or string values) between RSView and the machine that your application is controlling.

Tags and expressions

Before setting up alarms, you must set up data server or HMI 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 and digital tags for alarm conditions, including both HMI and data server tags. You cannot monitor string tags.

For information about setting up data server tags, see your OPC data server documentation. For information about creating HMI tags, see Chapter 7.

You can also use expressions to perform logical or mathematical calculations on tag values, and then 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 > 90 then 1 else 2.

For information about creating expressions, see Chapter 20.

Identifying alarm conditions

Once you have identified the processes you want to monitor for alarms, and the tags 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.

Importing and exporting alarm setup files

The Alarm Import Export Wizard in RSView Studio™ allows you to export alarm information to an XML file, and to import an alarm setup XML file.

For example, you can export an application's alarm setup information, import the setup to another RSView application, and then modify it in the new application to suit your requirements. Or, you can modify the file before importing it into the new application.

You can use the Alarm Import Export Wizard to import alarm setup information that has been created using an external programming tool or editor, or you can import an RSView XML file.

For more information about importing and exporting alarm setup files, see Appendix E.

How alarms work

This section provides an overview of the key components of your application'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 connections) to monitor for alarm conditions by creating an alarm trigger for each connection.

Each alarm trigger can generate one or more alarm messages, associated with different trigger connection 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 9-10.

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 application is running in Windows® 2000 or Windows XP).
- Send a message to a printer.
- Send a message to the data source.

To use these methods, select the Display, Audio, Print, and Message to Tag options when you create your messages.

Be sure to select the Print option if you need to keep a permanent record of alarms. You can also print the contents of the alarm log file periodically, as described on page 9-9. (The alarm log file is also referred to as the alarm history.)

Displaying alarm information

RSView comes with these alarm displays:

- [ALARM], in the Displays folder, contains an alarm banner graphic object that is set up to display the newest active alarm in the alarm log file.
- [ALARM BANNER], a display in the Libraries folder, contains an alarm banner graphic object that is set up to display the newest active alarm in the alarm log file.
- [ALARM MULTI-LINE], a display in the Libraries folder, contains an alarm list graphic object that is set up to display all the alarms in the alarm log file: active, inactive, acknowledged, and unacknowledged.
- [STATUS], a display in the Libraries folder, contains an alarm status list graphic object that is set up to display active alarms. It contains a goto display button for opening the [HISTORY] display. This display is available in two sizes.
- [HISTORY], a display in the Libraries folder, contains an alarm list graphic object and a goto display button for opening the [STATUS] display. The alarm list is set up to display all the alarms in the alarm log file: active, inactive, acknowledged, and unacknowledged. This display is available in two sizes.

By default, the [ALARM] graphic display opens automatically at runtime when an alarm is generated.

You can accept the default, edit the [ALARM] display, use one of the other alarm displays, or create your own display. If you elect not to automatically open a graphic display for alarm notification, an alternative is to provide the operator with a way to open an alarm display when desired.

For more information about	See
The [ALARM] display	page 9-25
The [ALARM BANNER] display	page 9-26
The [ALARM MULTI-LINE] display	page 9-26
The [STATUS] display	page 9-27
The [HISTORY] display	page 9-28
Creating your own alarm display	page 9-30
The alarm list graphic object	page 9-31
The alarm banner graphic object	page 9-33
The alarm status list graphic object	page 9-34

Interacting with alarms

Depending on which alarm objects you set up, the operator can:

- acknowledge one or all alarms, or the alarms for a specific alarm trigger.
- clear and delete alarms.
- silence alarms (if the application is running in Windows 2000 or Windows XP).
- sort alarms.
- reset the status of all alarms.
- print alarms.

For information about the alarm button graphic objects the operator can use to work with alarms, see page 9-35.

Using the data source to interact with alarms

You can also set up remote acknowledgement, silencing, and resetting of alarms, to allow the data source to perform these functions. And you can set up the data source to determine which types of alarms to display (active, inactive, acknowledged, and unacknowledged), and to close the alarm display. These topics are discussed later in the chapter.

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, an enter button object, or the Enter key on an external keyboard or keypad.
- the alarm banner has focus and the operator presses the acknowledge alarm button.

A single alarm for a particular trigger is acknowledged when:

- the trigger's Remote Ack connection value changes to the alarm's trigger value (or bit position, for bit triggers).

All alarms for a particular trigger are acknowledged when:

- the trigger's Remote Ack connection 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.
- the operator presses an acknowledge all alarms button that is set up to acknowledge the alarms for a specific alarm trigger.

All alarms in the alarm log file are acknowledged when:

- the operator presses an acknowledge all alarms button that is set up to acknowledge all alarms.
- the Remote Ack All connection's value changes to a new non-zero value.

For more information about acknowledging alarms, see page 9-37.

The operator can send button presses to objects that do not have focus. For information about linking buttons to objects, see page 16-10.

Methods for clearing and deleting alarms

Alarms are deleted from the alarm log file and cleared from all alarm lists and alarm banners when the operator presses the clear alarm history button. You can set up the button to clear alarms for all alarms, or for a specific alarm trigger.

The alarm in the alarm banner is cleared when the operator presses the clear alarm banner button. It is not deleted from the alarm log file.

For more information about clearing and deleting alarms, see page 9-39.

Methods for silencing alarms

The audio alarm indicator is available for applications running in Windows 2000 or Windows XP only.

All alarms are silenced when:

- the operator presses the silence alarms button.
- an alarm whose Audio property is turned on is acknowledged.
- the Remote Silence connection's value changes to a new non-zero value.
- the operator presses the clear alarm history button.

Method for sorting alarms

When the operator presses the sort alarms button, the sort order toggles from time to trigger value or from trigger value to time. The sort order applies to all alarms in all alarm lists and in the alarm log file.

Methods for resetting alarms

Resetting alarms affects how alarms are displayed in the alarm status list. When alarms are reset:

- the accumulated time an alarm has been in alarm is reset to 0. If the alarm is still active, the time begins accumulating again.
- the number of times the alarm has been triggered is reset to 0. If the alarm is still active, the number changes to 1.
- the date and time are sent to the system tag AlarmResetDateAndTimeString.

The alarms for a specific alarm trigger are reset when:

- the operator presses a clear alarm history button that has been set up to clear and reset alarms for a specific alarm trigger.

All alarms are reset when:

- the operator presses a reset alarm status button.
- the operator presses a clear alarm history button, if the button has been set up to clear and reset all alarms.
- the Remote Status Reset connection's value changes to a new non-zero value.

For more information about resetting alarms, see page 9-39.

Methods for printing alarm information

In addition to automatically printing each alarm message as it occurs, you can keep a printed record of alarms:

- using the print alarm history button. When the operator presses the button, a report is printed of the contents of the alarm log file. The report can include the time alarms occurred and were acknowledged.

  You can set up this button to print the alarm history for a selected alarm trigger, or for all alarms.

- using the print alarm status button. When the operator presses the button, a report is printed of the status of alarms. The report can include active alarms, past alarms, or all alarms that have been set up in the Alarm Setup editor. The report can include how many times each alarm was triggered, and the accumulated time in alarm.

  You can set up this button to print the alarm status for a selected alarm trigger, or for all alarms.

For information about specifying which printer to use at runtime for Windows 2000 or Windows XP applications, see page 26-10. For information about the type of printer to use with a PanelView Plus™ or VersaView® CE terminal, see page 27-1.

The alarm log file

As soon as the application starts running, RSView begins monitoring trigger connections 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.

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 application is shut down.

The alarm log file is also referred to as the alarm history. For example, the operator presses the clear alarm history button to remove all alarms from the log file.

The alarm log file is retained when you restart an application after a shutdown or power loss. You can delete the log file from the runtime computer at application startup.

For information about deleting the log file, see page 26-15.

If you download a newer version of an application to the runtime computer, the alarm log file for the older version is deleted automatically.

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

To trigger alarms based on integer or floating-point values, use the Value trigger type. When the value of the trigger connection equals the trigger value of a message, an alarm is generated.

If you use an analog tag (either an HMI tag or a data server 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 7-2.

Trigger values cannot be 0. Digital tags have two possible values, 0 and 1. Therefore, if you use a digital tag (either an HMI tag or a data server 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 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 level in the acid tank is too high.

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 in step 1 allows a range of values to trigger each alarm. This is useful in case the tag is not being read at the exact moment it reaches a threshold level.

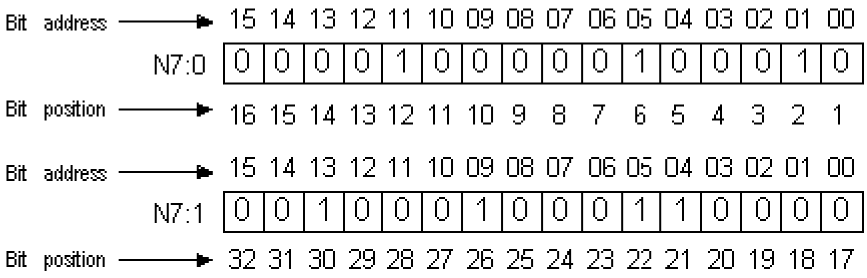
The Bit trigger type

Use the Bit trigger type to generate multiple simultaneous alarm messages. You can assign an array tag (consisting of up to 1,024 bits) to the trigger connection. Each bit in the array whose value changes from 0 to 1 triggers an alarm (if a message is set up for the bit position).

Example: Trigger values using bit positions

This example shows how to use bit positions to generate multiple simultaneous alarms. The array tag uses 32 bits, from N7:0/00 to N7:1/15.

This diagram shows the bit addresses and bit positions for the array tag:



Bit address →	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
N7:0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	1	0
Bit position →	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
Bit address →	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
N7:1	0	0	1	0	0	0	1	0	0	0	1	1	0	0	0	0
Bit position →	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17

The tag is currently generating alarms at bit positions 2, 6, 12, 21, 22, 26, and 30.

To set up alarms for this array tag:

1. Create an alarm trigger for the array tag. Use the Bit trigger type.

You must use a direct reference for the array tag. The tag uses the Integer data type (16 bits per element). Append L2 to the tag's starting address to indicate that the trigger will monitor 2 tag elements (32 bits), as follows:

{::[PLC5]N7:0,L2}

PLC5 is the RSLinx Enterprise device shortcut name. The two colons at the beginning are necessary when the tag reference contains a colon.

2. Specify trigger values and alarm messages for the alarm trigger. Each trigger value corresponds to a bit position (not a bit address).

Bit in the array (bit address)	Bit position	Trigger value	Message
00	1	1	Line 1: Conveyor has stopped.
01	2	2	Line 1: Power failure.
02	3	3	Line 2: Conveyor has stopped.
03	4	4	Line 2: Power failure.
..	..	..	..
31	32	32	Oven door open.

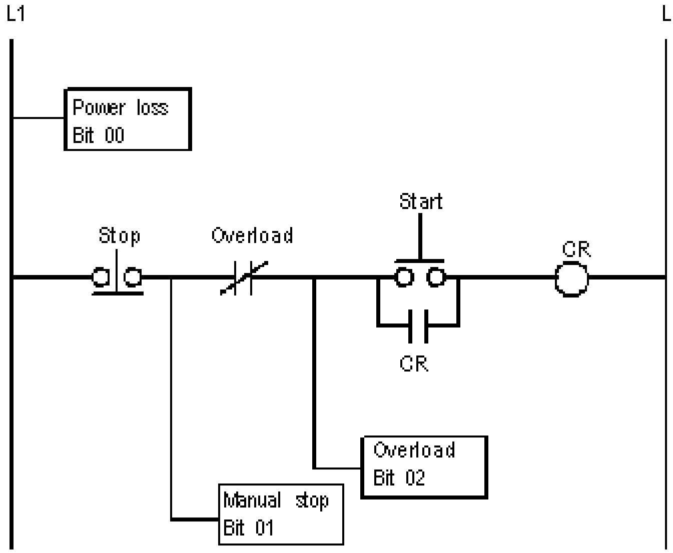
The Least Significant Bit (LSBit) trigger type

Use the Least Significant Bit trigger type to generate alarm messages based on a priority sequence that is determined by bit position. You can assign an array tag (consisting of up to 1,024 bits) to the trigger connection. 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 an array 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 motor parts. 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 motor parts.

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 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.

   Because you are using only the first three bits in a single tag element, there is no need to specify a length for the array tag in this example. You can use a simple tag type.

   However, if you were also monitoring bits in N7:62, you would need to add L2 to the address, as follows:

   {::[PLC5]N7:61,L2}

2. Specify these trigger values and alarm messages for the alarm trigger:

Bit in the array (bit address)	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.

Tips for using array tags

You can use these tag data types for array tags:

Data type	Number of bits
Byte	8
Integer	16
Word	16
Long Integer	32
Double Word	32

The right column shows the number of bits for each data type. This is useful for helping to determine how many data elements to address to achieve the required number of bits. To create an array tag, specify how many elements to use, beginning with the first element at the tag's address.

For example, if you want to monitor 128 bit positions for an alarm trigger, and you are using the Long Integer data type, you would append the modifier [4] to the tag name (because 4 x 32 = 128). For detailed information about tag syntax, see page 9-15.

You cannot use HMI tags for array tags. You must use data server tags for array tags.

Equivalent data types

Different processors and OPC servers use different terminology for tag data types. This section provides information about equivalent data types that you can use for array tags, with the associated number of bits for each.

PLC and SLC tags

When creating array tags, you can use PLC and SLC tags with this data type:

Data type	Number of bits
Short Integer	16

Data server tags with the Short Integer data type are displayed in the Tag Browser with the Item Canonical Data Type of Integer.

To view a tag's Item Canonical Data Type

1. In the Tag Browser, right-click the tag, and then click Properties.

ControlLogix tags

When creating array tags, you can use ControlLogix® tags with these data types:

Data type	Number of bits
SINT	8
INT	16
DINT	32

Data server tags with the data types described in the previous table are displayed in the Tag Browser with the Item Canonical Data Types of Character, Short Integer, and Long Integer, respectively.

RSLinx Enterprise tag syntax

To create an RSLinx Enterprise array tag, use this syntax to specify the length of the array:

*{tagname,***L***arraylength}*

For example, {::[PLC5]N7:0,L5}

The tag N7:0 uses the Short Integer data type (16 bits), so the array tag consists of 80 bits (16 x 5).

When the tag name contains a colon (:), put two colons before the RSLinx Enterprise device shortcut name.

KEPServerEnterprise tag syntax

To create a KEPServerEnterprise array tag, use this syntax to specify the length of the array:

tagname [*arraylength*]

For example, Chan1.Dev1.Tag1 [3]

The tag Tag1 uses the Long Integer data type (32 bits), so the array tag consists of 96 bits (32 x 3).

Alternatively, you can define the tag length in KEPServerEnterprise when you create the tag, and then just select the tag name in RSView Studio. For more information, see KEPServerEnterprise Help.

Creating alarm messages in multiple languages

RSView supports alarm messages in multiple languages. Use the CurrentLanguage( ) expression function to specify offsets for each trigger's messages in the Alarm Setup editor. In the editor, divide the messages for each trigger into sections for each language. For information about the CurrentLanguage( ) function, see page 20-14. Also see the following example.

You can export the text strings in your alarm messages for translation. Then paste the translated strings into the Alarm Setup editor. RSView does not support direct importing of the translated message text. For information about exporting text for translation, see Chapter 23.

Example: Setting up alarm messages in multiple languages

This example shows how to generate English, French, or German alarm messages at runtime, depending on which language the application is using. The alarm trigger uses the Value trigger type.

1. Create an alarm trigger with this expression:

   ```
   If CurrentLanguage( )="en-US" then Alarm_messages
   Else If CurrentLanguage( )="fr-FR" then Alarm_messages + 10
   Else Alarm_messages + 20
   ```

2. In the Messages tab, select the trigger and then create English messages for trigger values 1 to 10.

3. Create French messages for trigger values 11 to 20.

4. Create German messages for trigger values 21 to 30.

Optional alarm connections

When an operator acknowledges an alarm, 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 connections in the Alarm Setup editor to set up more sophisticated interactions with the data source when alarms are triggered, acknowledged, silenced, and reset. For example, you can set up the data source to acknowledge, silence, and reset alarms. You can also use optional alarm connections to close the alarm display or to allow the data source to close the alarm display.

There are two sets of optional alarm connections:

- connections that work with a specific alarm trigger. You can assign a different set of connections to each alarm trigger.
- connections that apply to all alarms

You can also assign connections to alarm lists, to allow the data source to determine which types of alarms to display in the lists. For more information, see page 9-31.

Connections that work with a specific alarm trigger

You can assign a different set of these connections to each alarm trigger, or to only one or some alarm triggers:

- Handshake—Assign a tag to this connection to notify the data source when the trigger’s value changes.
- Ack—Assign a tag to this connection to notify the data source when the operator acknowledges an alarm (or all alarms).
- Remote Ack—Assign a tag or an expression to this connection to allow the data source to acknowledge alarms.
- Remote Ack Handshake—Assign a tag to this connection to notify the data source when a remote acknowledgement occurs.
- Message—Assign a tag to this connection to send alarm messages to the connection. Make sure the tag supports the type of data sent in the alarm message. For example, if the message is a string of text, assign a string tag to the Message connection.

- Message Notification—Assign a tag to this connection to notify RSView that an alarm message has been sent to the connection and RSView must wait before sending a new message.
- Message Handshake—Assign a tag to this connection if you want the data source to notify RSView when it has read the message.

Assign tags or expressions to these connections when you create your alarm triggers. For more detailed information about how these connections work, see the next sections.

How the Handshake connection works

The Handshake connection 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 connection 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 application starts, the Handshake connection has a value of 1. When the trigger connection's value changes, the Handshake connection's value toggles from 1 to 0. The next time the trigger value changes, the Handshake connection's value toggles from 0 to 1.

A change in the trigger connection's value does not necessarily indicate an alarm—the value might still be within acceptable limits.

How the Ack connection works

When the application starts, this connection has a value of 0.

How the value changes

- 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 connection, and holds the value as long as the operator presses the button, or for the duration of the hold time, whichever is longer. Then the connection's value is reset to 0.
- When the operator acknowledges all alarms, or the alarms for this trigger only, by pressing the acknowledge all alarms button, RSView sends the trigger's "Acknowledge all" value to this connection, and holds the value as long as the operator presses the button, or for the duration of the hold time, whichever is longer. Then the connection's value is reset to 0.
- When the Remote Ack connection changes to a new non-zero value that matches the trigger value of an unacknowledged alarm, RSView sends the trigger's value (or bit position, for bit triggers) to this connection, and holds the value for the duration of the hold time. Then the connection's value is reset to 0.

To avoid confusion about whether a specific trigger's alarm individual alarm has been acknowledged or all alarms for the trigger have been acknowledged, make sure the "Acknowledge all" value is not the same as one of the trigger values.

How the Remote Ack connection works

The Remote Ack connection allows for the remote acknowledgement of alarms. The data source writes the alarm's trigger value (or bit position, for bit triggers) to this connection, and the unacknowledged alarm with this trigger value is acknowledged.

If you assign this connection and specify an "Acknowledge all" value for the trigger, when the data source sends the "Acknowledge all" value to this connection, 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.

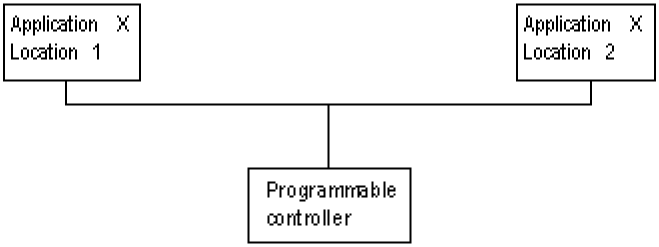
Set up the data source to send the correct value to the Remote Ack connection when you want a remote acknowledgement to take place.

Remote acknowledgement does not take place if the hold time is in effect for the Ack connection.

Example: Using the Remote Ack connection

This example shows how to use the Remote Ack connection to acknowledge an alarm.

In this example, the same application 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 a tag called Alarm. Use the Value trigger type.
2. Assign a tag called Ack to the Ack connection.
3. Assign a tag called Remote_ack to the Remote Ack connection.
4. Create an alarm message for the alarm trigger, with the trigger value 1.

5. Set up the data source to write the value at the Ack connection to the Remote Ack connection whenever the value of the Ack connection changes from 0 to a non-zero value.

At runtime, when an alarm with the trigger value 1 is generated, the alarm message appears at both locations simultaneously. If the operator acknowledges the alarm at Location 1, RSView writes the value 1 to the Ack connection.

Since the Ack connection is write-only (not read), the acknowledgement doesn't appear at Location 2. However, the programmable controller writes the value from the Ack connection (1) to the Remote Ack connection, and the alarm at Location 2 is acknowledged.

How the Remote Ack Handshake connection works

This connection is used to notify the data source that the remote acknowledgement has been detected by RSView.

When the application starts, the Remote Ack Handshake connection has a value of 1. When the Remote Ack connection value changes, the Remote Ack Handshake connection'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.

Ensuring alarm messages are read by the data source before sending new messages

This section explains how the Message, Message Notification, and Message Handshake connections work.

To ensure an alarm message is read by the data source before RSView sends a new message, use message handshaking. While message handshaking is in effect for an alarm message, RSView cannot send a new message to the alarm trigger's Message connection.

Methods of alarm message handshaking

Alarm handshaking works by setting the alarm trigger's Message Notification connection to 1. As long as the Message Notification connection is set to 1, new messages cannot be sent to the Messages connection. How the Message Notification connection is reset to 0 depends on how you set up alarm message handshaking.

There are two ways you can use alarm message handshaking:

- to hold the message at the data source for a specific period of time.
- to hold the message at the data source until the data source notifies RSView that the message has been read.

Choose the method that best suits your application needs and communication system.

Holding the message for a specific period of time

To set up an alarm trigger's alarm message handshaking so that the message at the Message connection is held for a specific period of time, assign a tag to the Message Notification connection and specify a hold time in the Advanced tab of the Alarm Setup editor.

How handshaking works

This method of alarm message handshaking works as follows:

1. When an alarm occurs, the alarm message is sent to the Message connection.
2. The Message Notification connection is set to 1.

   As long as the Message Notification connection is set to 1, RSView cannot send new messages to the data source.
3. The "hold time" timer begins timing.
4. When the hold time has expired, the Message Notification connection is reset to 0 and RSView can send a new message to the Message connection.

Holding the message until the data source acknowledges that it has read the message

To set up an alarm trigger's alarm message handshaking so that the message at the Message connection is held until the data source notifies RSView that it has read the message, use two connections: the Message Notification connection and the Message Handshake connection.

Set up the data source to send a new non-zero value to the Message Handshake connection when it has read the message at the Message connection.

How handshaking works

If you use the Message Handshake connection, handshaking works like this:

1. When an alarm occurs, the alarm message is sent to the Message connection.
2. The Message Notification connection is set to 1.

As long as the Message Notification connection is set to 1, RSView cannot send new messages to the data source.

3. When the data source has read the message, it sends a new non-zero value to the Message Handshake connection.
4. The Message Notification connection is reset to 0 and RSView can send a new message to the Message connection.

How messages are queued

RSView can queue up to 128 messages while it waits for the Message Notification connection to be reset to 0. Queued messages are sent to the data source on a first in, first out basis.

If the alarm message queue fills before the Message Notification connection is reset to 0, an error message is sent to FactoryTalk® Diagnostics™.

How the Message connection works

This connection is used to send the message associated with a trigger value to the data source.

The message is sent only if the alarm message's Message to Tag option is selected.

If you are going to generate text alarm messages in multiple languages, make sure the tag assigned to this connection can accommodate the string length of the messages in each language. For information about using multiple languages, see Chapter 23.

How the Message Notification connection works

This connection is used to notify RSView that an alarm message has been sent to the data source and RSView must wait to send another message.

When the application starts, the Message Notification connection is set to 0. When a message is written to the Message connection, the Message Notification connection value changes to 1. When the hold time expires, or the Message Handshake connection changes to a new non-zero value, the Message Notification connection value changes from 1 to 0.

Messages for an alarm trigger are queued if the Message Notification connection is set to 1.

How the Message Handshake connection works

Use the Message Handshake connection to reset the Message Notification connection when the data source has read the alarm message.

Set up the data source to send a new non-zero value to the Message Handshake connection when it has read the message at the Message connection.

Connections that apply to all alarms

These connections apply to all alarms:

- Silence—Assign a tag to this connection to notify the data source that all alarms have been silenced (Windows 2000 and Windows XP applications only).
- Remote Silence—Assign a tag or an expression to this connection to allow the data source to silence all alarms (Windows 2000 and Windows XP applications only).
- Remote Ack All—Assign a tag to this connection to allow the data source to acknowledge all alarms at once.
- Status Reset—Assign a tag to this connection to notify the data source that the alarm status has been reset.
- Remote Status Reset—Assign a tag or expression to this connection to allow the data source to reset the alarm status.
- Close Display—Assign a tag to this connection to notify the data source that the alarm display has closed.
- Remote Close Display—Assign a tag or expression to this connection to allow the data source to close the alarm display.

Assign tags or expressions to these connections in the Advanced tab of the Alarm Setup editor. For more detailed information about how these connections work, see the next sections.

How the Silence connection works

When the application starts, this connection has a value of 0. When alarms are silenced, this connection is set to 1 for the hold time and the internal beeper is turned off. At the end of the hold time, the connection is reset to 0.

If the silence event is triggered by a button press, this connection is set to 1 for the hold time or for the duration of the button press, whichever is longer. At the end of this time, the connection 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 connection value or hold time status.

While the hold time is in effect, new alarms cannot be silenced.

How the Remote Silence connection works

When this connection changes to a new non-zero value, all alarms are silenced. Alarms can be silenced using other methods regardless of this connection’s value.

Set up the data source to send a new non-zero value to the Remote Silence connection each time you want a remote silencing of alarms to take place.

How the Remote Ack All connection works

When this connection changes to a new non-zero value, all unacknowledged alarms are acknowledged.

Set up the data source to send a new non-zero value to the Remote Ack All connection each time you want a remote acknowledgement of all alarms to take place.

How the Status Reset connection works

When the application starts, this connection has a value of 0. If a reset alarm status or clear alarm history button is pressed, this connection is set to 1 for the hold time or for the duration of the button press, whichever is longer. At the end of this time, the connection is reset to 0.

The Status Reset connection is also set to 1 if the Remote Status Reset connection changes to a new non-zero value, and remains set for the hold time.

While the hold time is in effect, the alarm status cannot be reset again. The status of alarms keeps updating during the hold time.

How the Remote Status Reset connection works

When this connection changes to a new non-zero value, the status of all alarms is reset, as described on page 9-8. Alarms can be reset using other methods regardless of this connection's value.

Set up the data source to send a new non-zero value to the Remote Status Reset connection each time you want a remote resetting of alarm status to take place.

How the Close Display connection works

When the application starts, this connection has a value of 0. If the alarm display (assigned in the Alarm Setup editor) closes, this connection is set to 1 for the hold time. At the end of the hold time, the connection is reset to 0.

If subsequent alarms are generated, the alarm display opens again regardless of the Close Display connection value or hold time status.

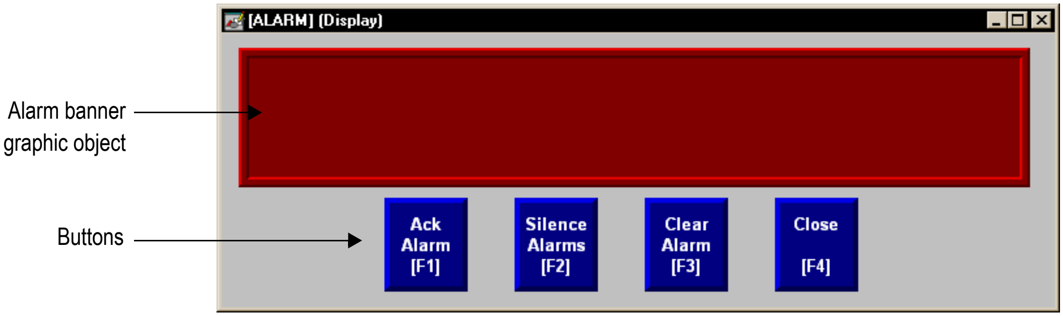
How the Remote Close Display connection works

When this connection changes to a new non-zero value, the alarm display closes. The alarm display can be closed using other methods regardless of this connection's value.

Set up the data source to send a new non-zero value to the Remote Close Display connection each time you want a remote closing of the alarm display to take place.

The [ALARM] display

When you create an application, it comes with a graphic display called [ALARM]. The [ALARM] display is the default display for showing alarm messages at runtime. It contains an alarm banner graphic object that is set up to display a single active alarm.



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, as described on page 9-30. Or, you can use one of the alarm displays in the graphic library. These displays are described in the next four sections.

A copy of the [ALARM] display is included in the graphic library, with the name [ALARM BANNER].

The alarm banner graphic object

The [ALARM] display contains an alarm banner graphic object, which lists the most recent alarm message. You can set up the alarm banner to queue new alarms until the displayed alarm has been acknowledged, or to show new alarms as they occur. The alarm banner in the [ALARM] display is set up to display new alarms as they occur and to display active alarms only (but you can edit it, if desired).

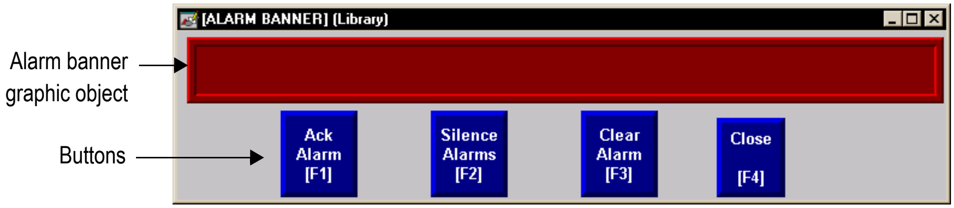
For more information about the alarm banner, see page 9-33.

Buttons in the [ALARM] display

The [ALARM] display contains alarm buttons for acknowledging, silencing, and clearing alarms, as well as a button for closing the display. For information about how the buttons work, see page 9-35.

The [ALARM BANNER] display

The Libraries folder contains a graphic display called [ALARM BANNER]. The [ALARM BANNER] display allows the operator to see a single alarm at a time.



The alarm banner graphic object

The [ALARM BANNER] display contains an alarm banner graphic object, which lists the most recent alarm message. You can set up the alarm banner to queue new alarms until the displayed alarm has been acknowledged, or to show new alarms as they occur. The alarm banner in the [ALARM BANNER] display is set up to display new alarms as they occur and to display active alarms only (but you can edit it, if desired).

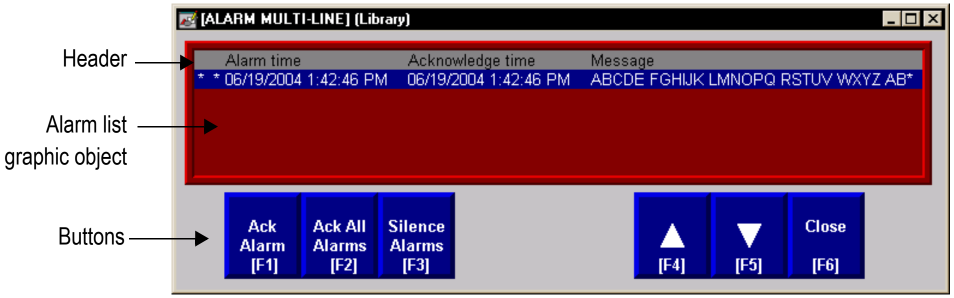
For more information about the alarm banner, see page 9-33.

Buttons in the [ALARM BANNER] display

The [ALARM BANNER] display contains alarm buttons for acknowledging, clearing, and silencing alarms, as well as a button for closing the display. For information about how the buttons work, see page 9-35.

The [ALARM MULTI-LINE] display

The Libraries folder contains a graphic display called [ALARM MULTI-LINE]. The [ALARM MULTI-LINE] display allows the operator to see multiple alarms at once.



	Alarm time	Acknowledge time	Message
* *	06/19/2004 1:42:46 PM	06/19/2004 1:42:46 PM	ABCDE FGHIJK LMNOPQ RSTUV WXYZ AB*

You can use the [ALARM MULTI-LINE] display as is, or modify the display. For example, you can select which alarm triggers' alarms to display in the list.

The alarm list graphic object

The [ALARM MULTI-LINE] display contains an alarm list graphic object, which lists the time the alarms occurred and were acknowledged, as well as the alarm messages. You can set up the alarm list to show any combination of active, inactive, acknowledged, and unacknowledged alarms. The alarm list in the [ALARM MULTI-LINE] display is set up to show all alarms (but you can edit it, if desired).

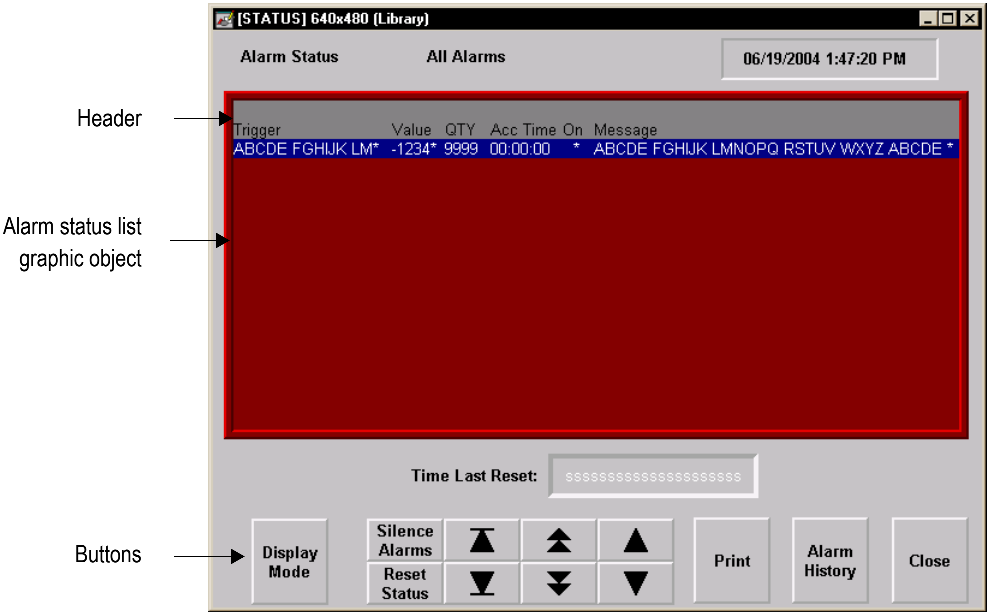
For more information about the alarm list, see page 9-31.

Buttons in the [ALARM MULTI-LINE] display

The [ALARM MULTI-LINE] display contains alarm buttons for acknowledging and silencing alarms, as well as buttons for scrolling the list and closing the display. For information about how the buttons work, see page 9-35.

The [STATUS] display

The Libraries folder contains a graphic display called [STATUS]. The [STATUS] display allows the operator to see the status of all the alarms that have been set up in the Alarm Setup editor. The [STATUS] display comes in two sizes, 640x480 and 800x600.


[STATUS] 640x480 (Library)

Alarm Status   All Alarms   06/19/2004 1:47:20 PM

```
Trigger           Value  QTY   Acc Time On  Message
ABCDE FGHIJK LM*  -1234* 9999  00:00:00  *  ABCDE FGHIJK LMNOPQ RSTUV WXYZ ABCDE *
```

Time Last Reset: SSSSSSSSSSSSSSSSSSSS

You can use the [STATUS] display as is, or modify the display. For example, you can select which alarm triggers' alarms to display in the list, or remove buttons that you don't want to use.

The alarm status list graphic object

The [STATUS] display contains an alarm status list graphic object, which lists the alarm messages. You can set up the alarm status list to show the status of all alarms that have been set up, active alarms only, or all alarms that have occurred since the alarm status was last reset. The alarm status list in the [STATUS] display is set up to show the status of active alarms (but you can edit it, if desired).

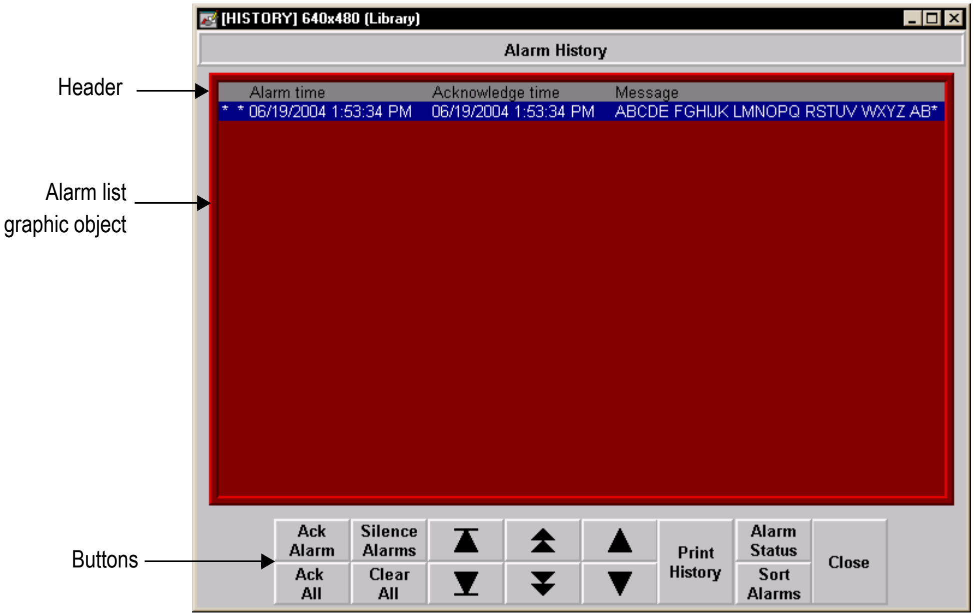
For more information about the alarm status list, see page 9-34.

Buttons in the [STATUS] display

The [STATUS] display contains alarm buttons for resetting and silencing alarms, changing the display mode, printing the status of alarms, and opening the [HISTORY] display, as well as buttons for scrolling the list and closing the display. For information about how the buttons work, see page 9-35.

The [HISTORY] display

The Libraries folder contains a graphic display called [HISTORY]. It is similar to the [ALARM MULTI-LINE] display, but the alarm list graphic object is larger (to display more alarm messages at once), and the [HISTORY] display contains more buttons. The [HISTORY] display comes in two sizes, 640x480 and 800x600.



	Alarm time	Acknowledge time	Message
*	* 06/19/2004 1:53:34 PM	06/19/2004 1:53:34 PM	ABCDE FGHIJK LMNOPQ RSTUV WXYZ AB*

You can use the [HISTORY] display as is, or modify the display. For example, you can select which alarm triggers' alarms to display in the list, or remove buttons that you don't want to use.

The alarm list graphic object

The [HISTORY] display contains an alarm list graphic object, which lists the time the alarms occurred and were acknowledged, as well as the alarm messages. You can set up the alarm list to show any combination of active, inactive, acknowledged, and unacknowledged alarms. The alarm list in the [HISTORY] display is set up to show all alarms (but you can edit it, if desired).

For more information about the alarm list, see page 9-31.

Buttons in the [HISTORY] display

The [HISTORY] display contains alarm buttons for acknowledging, silencing, and clearing alarms, sorting the list of alarms, printing the alarm history list, and opening the [STATUS] display, as well as buttons for scrolling the list and closing the display. For information about how the buttons work, see page 9-35.

Using displays from the library in your application

The previous four sections described the [ALARM BANNER], [ALARM MULTI-LINE], [STATUS], and [HISTORY] displays that are included in the Libraries folder. You can copy objects from the displays to your own display, or you can copy the entire displays into your application.

For information about copying objects from a library into your graphic display, see page 15-44.

The graphic libraries are available on the development computer, but do not appear at runtime. To use a display in the library as a graphic display at runtime, you must add the library display into your application's folder of graphic displays. For details, see page 14-17.

Example: Using the [ALARM] and [STATUS] displays together

To use the [ALARM] display to alert the operator about alarms as they occur, and the [STATUS] display to show how many times and for how long alarms have been active:

1. In the Alarm Setup editor, in the Advanced tab, select the [ALARM] display as the display to open when alarms are triggered, if it is not already selected. (It is selected by default.)
2. Add the [STATUS] display from the library.
3. Edit the [ALARM] display by adding a goto display button that opens the [STATUS] display when pressed.

Creating your own alarm display

You can create your own graphic display for displaying and responding to alarms. 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.

If you create your own graphic display, use an On Top display and select the Cannot Be Replaced option.

For information about the graphic objects you can use to display alarm information, see the information starting on page 9-31. For information about creating graphic displays and graphic objects, see Chapter 14 and Chapter 15.

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, a display you copy from the library, or your own display) is automatically opened whenever a trigger connection's value matches a trigger value (if you selected the Display option for the trigger value).

You can also create a goto display button that the operator can press to open the alarm display. For information about setting up a goto display button and specifying the display to open, see Help.

Closing the display

The operator can close the display by pressing a close display button.

The display closes automatically under these circumstances:

- when the operator presses an acknowledge all alarms button and causes the newest alarm in the alarm history to be acknowledged.
- when the operator presses a clear alarm history button and causes the newest alarm in the alarm history to be deleted.
- when the Remote Close Display connection changes to a new non-zero value.
- when the Remote Ack All connection changes to a new non-zero value.
- when the newest alarm is acknowledged.

If you don't want the display to close when the newest alarm is acknowledged, you can turn off this option in RSView ME Station.

To change how the display closes

1. In RSView ME Station, click Terminal Settings.
2. Double-click Alarms.
3. Specify how you want the display to close.

How the alarm list graphic object works

The alarm list graphic object displays the time an alarm was triggered, and the time it was acknowledged (if you set up the object to display acknowledged alarms).

At runtime, when a trigger connection 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 MULTI-

LINE] or [HISTORY] display, in an alarm display you have created, or can be placed on any display in your application.

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 set up different lists to display different information.

For information about setting up alarm lists, see Help.

What is displayed

- If you set up the list to show the alarms for specific alarm triggers, only alarms for those triggers are displayed.
- If the list is set up to show unacknowledged alarms only, the alarms displayed in the list are unacknowledged and the acknowledge time column, if any, is always blank.
- If the list is set up to show both acknowledged and unacknowledged alarms, acknowledged alarms can show a symbol (which you can specify) at the left end of the row, and the acknowledge time appears in the acknowledge time column, if displayed.
- If the list is set up to show both active and inactive alarms, active alarms can show a symbol (which you can specify) at the left end of the row. If both the acknowledge symbol and active symbol are displayed, the active symbol column is to the right of the acknowledge symbol column.
- If the message is too long to fit in the object, the last displayed character is replaced with an asterisk. Similarly, if a column heading is too long to fit in the column, the last displayed character is replaced with an asterisk. You can specify how many lines to allow for each alarm message, from 1 to 10.
- The number of alarm messages that fits in the display depends on the height of the alarm list, the list's font size, how many lines you have specified for each alarm message, and whether the column headings are displayed.
- If alarms are currently being sorted by time, alarms are listed with the newest alarms on top.
- If alarms are currently being sorted by trigger value, alarms from the first trigger in the Alarm Setup editor are listed first, with alarms from subsequent triggers listed after. Alarms in the list from the same trigger are grouped together and then sorted by trigger value, from lowest to highest.
- If there are multiple instances of the same alarm, these alarms are sorted by time with the newest on top.
- If you assign a tag or expression to any of the ActiveAcknowledged, ActiveUnacknowledged, InactiveAcknowledged, or InactiveUnacknowledged

connections, when a connection's value is a non-zero value, the related type of alarm is displayed in the alarm list. The connection value overrides the setting for the list in the Alarm List Properties dialog box.

How the list scrolls

- When a display containing an alarm list is opened, the highlight bar or cursor is at the top of the list: on the most recent alarm if sorted by time; or on the first alarm for the first trigger, if sorted by trigger value.
- If alarms are sorted by time, and the top alarm is selected, as new alarms occur, the old alarms scroll down, but the highlight bar or cursor remains at the top.
- If alarms are sorted by time, when the operator selects an alarm other than the top one in the list (by using the move down button), and new alarms occur, they are added above the visible area if the list is full. The currently selected alarm continues to be selected and maintains its position in the displayed portion of the list.
- If alarms are sorted by trigger value, as new alarms occur the currently selected alarm continues to be selected and maintains its position in the list.
- If the sort order changes, the selected alarm continues to be selected, but it might be displayed in a different position in the list.

How the alarm banner graphic object works

The alarm banner graphic object displays a single, unacknowledged alarm.

At runtime, when a trigger connection at the data source matches a message's trigger value, an alarm appears in the alarm banner. The alarm banner can be in the [ALARM] display or [ALARM BANNER] display, in an alarm display you have created, or can be placed on any display in your application.

You can use multiple alarm banners, in the same display or in different displays. You can set up different banners so that one displays the most recent alarm, and the other queues alarms until the displayed alarm is acknowledged.

For information about setting up alarm banners, see Help.

What is displayed

- If you set up the banner to show the alarms for specific alarm triggers, only alarms for those triggers are displayed.
- You can set up the banner to queue new alarms until the operator clears the current alarm, or to always display the most recent alarm.

- When a display containing an alarm banner is first opened, the alarm banner is blank, unless the display is the alarm display specified in the Alarm Setup editor and it was opened in response to an alarm.
- When the displayed alarm is acknowledged, it is removed from the alarm banner. If there are no newer alarms, the banner is blank.
- If the operator presses a clear alarm banner button, the banner is blank.
- If the operator presses a clear alarm history button or if all alarms are acknowledged, the banner is blank.
- If the banner is set up to show both active and inactive alarms, when an alarm is active, an asterisk (*) appears beside the message.

How the alarm status list graphic object works

The alarm status list graphic object displays the status of alarms, including whether an alarm has been triggered, how many times an alarm has been triggered, and for how long.

The alarm status list can be in the [STATUS] display, in an alarm display you have created, or can be placed on any display in your application.

You can use multiple alarm status lists, in the same display or in different displays. You can set up different lists to display different information.

For information about setting up alarm status lists, see Help.

What is displayed

- If you set up the list to show the alarms for specific alarm triggers, only alarms for those triggers are displayed.
- If an alarm is active, an asterisk (*) appears in the alarm state column, if displayed.
- If the message is too long to fit in the object, the last character that would fit is replaced with an asterisk. Similarly, if a column heading is too long to fit in the column, the last character that would fit is replaced with an asterisk. You can specify how many lines to allow for each alarm message, from 1 to 10.
- The number of alarm messages that fits in the display depends on the height of the alarm status list, the list's font size, how many lines you have specified for each alarm message, and whether the column headings are displayed.
- For value-triggered alarms, the accumulated time column shows how long the alarm has been set to the trigger value.
- For bit-triggered alarms, the accumulated time column shows how long the bit has been set to 1.

- For LSBit-triggered alarms, the accumulated time column shows how long the corresponding alarm's least significant bit has been set to 1.

What happens when the display is opened

- The first time a display containing the alarm status list is opened, the first page of alarms is displayed.
- If the list is set up to display active alarms only, and alarms that were visible when the display was closed are no longer active, the alarms are removed from the list.
- If alarms have been reset since the display was last opened, the first page of alarms is displayed.

Using buttons with the alarm history and alarm objects

Alarm buttons

You can use these alarm buttons to interact with the alarm list, alarm banner, or alarm status list, and to clear and sort the alarm history:

Use this button	With this graphic object	To do this
Acknowledge alarm	Alarm list Alarm banner	Acknowledge and silence the selected alarm.
Acknowledge all alarms		Acknowledge and silence all currently unacknowledged alarms, or the currently unacknowledged alarms for a specific alarm trigger.
Alarm status mode	Alarm status list	Change the type of alarms displayed in the alarm status list, from all alarms to active alarms to past alarms.
Clear alarm banner	Alarm banner	Clear the alarm in the alarm banner without removing the alarm from the alarm log file and alarm lists.

Use this button	With this graphic object	To do this
Clear alarm history		Remove alarms from the alarm log file and all alarm lists. If the Ack connection is assigned for any of the alarm triggers, the operator is prompted to acknowledge all alarms before clearing them. You can set up the button to remove all alarms, or just the alarms for a specific alarm trigger. You can also specify whether to reset the cleared alarms. If you choose to reset alarms, pressing this button resets the number of times an alarm has been triggered to 0, and the accumulated time in alarm to 0, for all alarms that are being cleared. If the alarm is still active, the number of times in alarm changes to 1 after the alarm is reset to 0.
Print alarm history		Print a report of the alarm messages in the alarm log file. You can include all alarms, or just the alarms for a specific alarm trigger. The report can include the time alarms occurred and were acknowledged.
Print alarm status		Print a report of the status of alarms. You can include all alarms, or just the alarms for a specific alarm trigger. The report can include how many times each alarm was triggered, and the accumulated time in alarm.
Reset alarm status		Reset the number of times an alarm has been triggered to 0, and the accumulated time in alarm to 0, for all alarms. If the alarm is still active, the number changes to 1.
Silence alarms		Silence the audio indictor for all alarms (Windows 2000 and Windows XP applications only).
Sort alarms		Toggle between sorting alarms in alarm lists and the alarm log file by time and by trigger value.

You can assign any caption you choose to the labels on the alarm buttons.

Linking buttons to objects

You can link the acknowledge alarm button to a specific alarm list or alarm banner, or set up the button to work with whichever alarm list or alarm banner is selected in the graphic display.

Similarly, you can link the clear alarm banner button to a specific alarm banner. This option is useful if you have multiple alarm banners in the same graphic display. And you can link the alarm status mode button to a specific alarm status list.

For more information about linking buttons to objects, see page 16-10.

Key buttons

You can also use these key button graphic objects to interact with the alarm list, alarm status list, or alarm banner:

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 highlight bar or cursor up one page in the list.
Page down	Moves the highlight bar or cursor down one page in the list.
Home	Moves the highlight bar or cursor to the top alarm in the list.
End	Moves the highlight bar or cursor to the bottom alarm in the list.
Enter	Acknowledges the currently selected alarm (in alarm lists and alarm banners).

You can link key buttons to a specific alarm object, or set up the buttons to work with whichever object is selected in the graphic display. For more information, see page 16-10.

For information about creating graphic objects, see Chapter 15. For information about setting up key buttons, see Help.

Using alarm buttons to acknowledge, silence, clear, 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 set up to show acknowledged alarms.

Acknowledging the selected alarm

When the operator presses the acknowledge alarm button, an enter button, or the Enter key on an external keyboard or keypad:

- the selected alarm in the alarm list is acknowledged and the audio indicator for the alarm, if any, is silenced.
- the displayed alarm in the alarm banner 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 connection 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 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 acknowledgement is ignored.
- If the alarm list is set up to display unacknowledged alarms only, the alarm is removed from the list. The highlight bar or cursor moves up to the next unacknowledged alarm, unless it is already on the top unacknowledged alarm.
- If the highlight bar or cursor is on an acknowledged alarm when the operator presses the acknowledge alarm button, the button press is ignored.
- The alarm is removed from the alarm banner.

Acknowledging all alarms

When the operator presses an acknowledge all alarms button, all unacknowledged alarms in the system (or, optionally, for a specific alarm trigger), are acknowledged.

This is what happens when the 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 connection. The value is held as long as the operator presses the button, or for the hold time, whichever is longer. Then the connection'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 connection.

  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 alarm list is set up to display unacknowledged alarms only, all acknowledged alarms are removed from the list.

- The alarm banner is cleared.

Silencing alarms

When the operator presses the silence alarms button, any audible signal triggered by an alarm is silenced and the Silence connection is set to 1 for the hold time or for the duration of the button press, whichever is longer. Then the connection'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 applications running in Windows 2000 and Windows XP only.

Clearing and deleting messages

From the alarm history

When the operator presses the clear alarm history button, all alarms in the system (or, optionally, for a specific alarm trigger) are deleted from the alarm log file and from all alarm lists. For information about the alarm log file, see page 9-9.

If the Ack connection is assigned for any of the alarm triggers being cleared, 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 connection before deleting the messages. If the Ack connection is not assigned, or if the operator chooses not to acknowledge alarms, all messages are deleted immediately.

From the alarm banner

When the operator presses the clear alarm banner button, the displayed alarm is cleared from the banner. The alarm remains in the alarm log file and in all alarm lists it appears in.

Using alarm buttons to sort alarms and reset alarm status

Sorting alarms

When the operator presses the sort alarms button, the sort order toggles from time to trigger value or from trigger value to time. The sort order applies to all alarms in all alarm lists and in the alarm log file.

Resetting alarm status

When the operator presses the reset alarm status button, the alarm status of each alarm is reset as follows:

- The accumulated time an alarm has been in alarm is reset to 0. If the alarm is still active, the time begins accumulating again.

- The number of times the alarm has been triggered is reset to 0. If the alarm is still active, the number changes to 1.

If the Status Reset connection is assigned (in the Alarm Setup editor), it is set to 1 for the hold time or for the duration of the button press, whichever is longer. If a hold time from a previous reset alarm status button press is still in effect, the button press is ignored.

Pressing the clear alarm history button can also reset the status of alarms, if you select the Reset alarm status option for the button. You can set the button up to clear and reset the status of all alarms, or just the alarms for a specific alarm trigger.

Retaining alarm status

The status of alarms is retained when the application is shut down. When the application is restarted:

- if an alarm is still active, the time begins accumulating again.
- if an alarm is still active, the number of times the alarm has been triggered is increased by 1.

Changing the alarm status displayed in the alarm status list

When the operator presses the alarm status mode button, the type of alarms displayed in the alarm status list changes as follows:

- If the current type displayed is all alarms, the list changes to display active alarms only.
- If the current type displayed is active alarms, the list changes to display past alarms only.
- If the current type displayed is past alarms, the list changes to display all alarms.

The change affects the linked or selected alarm status list only, not all alarm status lists.

10 Setting up FactoryTalk Diagnostics

This chapter describes:

- FactoryTalk® Diagnostics™.
- displaying diagnostics messages during application development.
- viewing FactoryTalk Diagnostics log files.
- using the Diagnostics Setup tool.
- displaying and printing diagnostics messages at runtime.
- the [DIAGNOSTICS] display.
- creating your own diagnostics display.
- opening and closing the diagnostics display.
- how the diagnostics list graphic object works.

About FactoryTalk Diagnostics

FactoryTalk Diagnostics records information about various types of system activity, including:

- macro usage.
- operator comments.
- system messages and errors.
- errors from the communication network.
- tag read and write activity.

Browsing diagnostics messages

You can view diagnostics messages about system activity during application development and at runtime. For example, while you develop your application, use diagnostics messages to track what the system is doing and to ensure you've set things up the way you intend. At runtime, use diagnostics messages to show the operator messages about system activity. You can also save information in a log file for future processing or analysis.

How to set up FactoryTalk Diagnostics

You must set up FactoryTalk Diagnostics on both the development computer and the runtime computer. The settings for FactoryTalk Diagnostics apply to all Rockwell Software® products installed on the computer.

Setting up FactoryTalk Diagnostics involves:

- setting up destinations, where logged information is received for storage or display.
- setting up which destinations receive which categories of messages. This is called message routing.
- setting up how messages are displayed and printed at runtime.

This chapter describes how to set up FactoryTalk Diagnostics on computers running Windows® 2000 and Windows XP. For information about setting up FactoryTalk Diagnostics on the PanelView Plus™ or VersaView® CE terminal, see the *PanelView Plus Terminals User Manual* or the *VersaView CE Terminals User Manual*. These manuals are available on the RSView Machine Edition™ CD.

Destinations

FactoryTalk Diagnostics allows you to send diagnostics messages to multiple destinations.

During application development

During application development, you can send diagnostics messages to:

- the Diagnostics List at the bottom of the RSView Studio™ window.
- a local log, which is viewable using the FactoryTalk Diagnostics Viewer tool.
- an ODBC database.

At runtime

At runtime, you can send diagnostics messages to:

- diagnostics list graphic objects, either in the default [DIAGNOSTICS] display, or in a display you create.
- a printer
- a local log (Windows 2000 and Windows XP applications only), which is viewable using the FactoryTalk Diagnostics Viewer.
- a remote log (PanelView Plus or VersaView CE terminals only).
- an ODBC database.

The FactoryTalk Diagnostics Viewer is available on computers running Windows 2000 and Windows XP only. However, if you send diagnostics messages from a PanelView

Plus or VersaView CE terminal to a computer running Windows 2000 or Windows XP, you can view the messages in the FactoryTalk Diagnostics Viewer.

The destinations available on your computer might vary, depending on which Rockwell Software products you have installed.

Message routing

You can decide which destinations receive which kinds of messages. This allows you to make the right information available to the right person, in the right place.

For example:

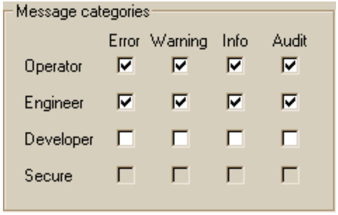
- You can send messages that contain information about what the system is doing to the local log file. You can also send warnings about things that might go wrong if left unattended to the local log file.

  This allows a control systems engineer to analyze system activity and performance, and make corrections during scheduled maintenance times.

- You can send errors that require immediate action to the diagnostics list object in the [DIAGNOSTICS] display, as well as the log file.
- You can set up the [DIAGNOSTICS] display to open automatically when system activity occurs, to allow the operator to respond to problems that might stop production if they are not solved immediately.

Categories

FactoryTalk Diagnostics categorizes messages by severity, and by audience. For each destination, you can specify the message severity and audience.



Message categories

	Error	Warning	Info	Audit
Operator	☑	☑	☑	☑
Engineer	☑	☑	☑	☑
Developer	□	□	□	□
Secure	□	□	□	□

Choosing not to log messages

If messages of a particular category are not routed to any destination, the messages for that category are not logged. For example, you might not want to log information messages, or you might not want to send any messages to the Operator.

Message severities

RSView categorizes messages in four severities:

- Errors indicate that a process or action has failed. For example, a tag's value could not be written, or a user typed the wrong password while logging on to the system.
- Warnings indicate that a process or action might not function correctly, or might eventually fail if preventive action isn't taken. For example, if an ActiveX® control used in a graphic display is a different version than the one installed on the runtime computer, a warning is logged to indicate the mismatch. Mismatched ActiveX controls might not behave as expected at runtime.
- Information indicates that a process or action has completed successfully. For example, a user logged on to the system or a tag value has been written to the data source.
- Audit indicates that the system configuration has been changed. RSView records the creation, modification, and deletion of components (such as graphic displays) as audit messages.

  Other Rockwell Software products also use audit messages. For example, if you set up an audit log in RSMACC, RSView's audit messages will be sent there, as well as to FactoryTalk Diagnostics.

In the FactoryTalk Diagnostics Viewer, the message severity is shown in the Severity column, indicated by the ! symbol.

The content of the messages is provided by the system—you don't need to do anything to set up message content.

Audiences

FactoryTalk Diagnostics allows messages to be categorized differently for the various people for whom the messages are relevant. You can sort the messages in the FactoryTalk Diagnostics Viewer, so that those relevant to a particular person are grouped together.

Who receives which messages?

You can specify which types of messages are sent to the Operator, Engineer, and Developer audiences.

RSView automatically sends audit messages to the Engineer and Secure audiences. Audit messages allow auditing tools, such as those required for US Government 21CFR Part 11 compliance, to track system activity.

Displaying diagnostics messages during application development

During application development, diagnostics messages are displayed as you create, modify, and delete components, and when you test your graphic displays. The messages are displayed in the Diagnostics List at the bottom of the RSView Studio window. You can also view the messages in the FactoryTalk Diagnostics Viewer, as described in the next section.

By default, all warning and error messages are displayed in the Diagnostics List. To change what is displayed in the Diagnostics List, use the Diagnostics Setup tool, as described on page 10-6.

For information about testing graphic displays, see page 14-10.

To display the Diagnostics List

1. On the View menu, click Diagnostics List. A check mark beside the menu item indicates the Diagnostics List is displayed.

For information about moving, resizing, and clearing messages in the Diagnostics List, see page 2-5.

If you don’t want to display diagnostics messages

1. On the View menu, click Diagnostics List. The option is turned off when no check mark appears.

Viewing FactoryTalk Diagnostics log files

Use the FactoryTalk Diagnostics Viewer tool to view the contents of FactoryTalk Diagnostics local log files. You can open the FactoryTalk Diagnostics Viewer from within RSView Studio, or from the Windows Start menu.

The FactoryTalk Diagnostics Viewer is available on computers running Windows 2000 and Windows XP.

You can also set up Windows 2000 or Windows XP computers to accept messages from PanelView Plus or VersaView CE terminals, and then display the messages in the FactoryTalk Diagnostics Viewer or in the Diagnostics List. For information about sending messages from PanelView Plus or VersaView CE terminals to computers running Windows 2000 or Windows XP, see page 10-8.

To open the FactoryTalk Diagnostics Viewer, do one of the following

- In RSView Studio, on the Tools menu, click Diagnostics Viewer.
- On the Windows Start menu, select Programs, Rockwell Software, FactoryTalk Tools, and then click Diagnostics Viewer.

For information about setting up FactoryTalk Diagnostics to send messages to the local log, see Help for the Diagnostics Setup tool. For additional information about setting up and using the FactoryTalk Diagnostics Viewer, see the FactoryTalk Diagnostics Viewer Help.

Using the Diagnostics Setup tool

Use the Diagnostics Setup tool to set up:

- destinations and message routing on the development computer, including logging to the local log or to an ODBC database.
- destinations and message routing on runtime computers that use Windows 2000 or Windows XP, including logging to the local log or to an ODBC database.
- the Windows CE runtime destination to receive logged messages from.

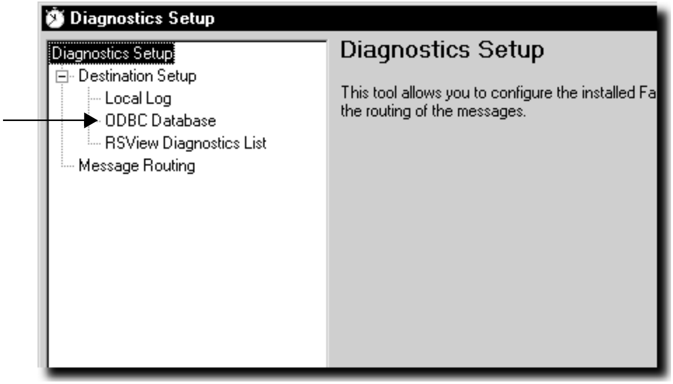
You can also use the Diagnostics Setup tool to clear the local log file.

To open the FactoryTalk Diagnostics Setup tool, do one of the following

- In RSView Studio, on the Tools menu, click Diagnostics Setup.
- In the RSView ME Station™ dialog box, click Terminal Settings, and then double-click Diagnostics Setup.

  For information about opening the RSView ME Station dialog box:

  - in Windows 2000 or Windows XP, see page 26-4.
  - on a PanelView Plus or VersaView CE terminal, see page 27-3.
- On the Windows Start menu, select Programs, Rockwell Software, Utilities, and then click Diagnostics Setup.



Diagnostics Setup

This tool allows you to configure the installed Fa
the routing of the messages.

Specify which destinations receive what categories of messages.

For details about using the Diagnostics Setup tool, see Help for the tool.

Logging to an ODBC database

The option of logging FactoryTalk Diagnostics messages to an ODBC database is available for computers running Windows 2000 and Windows XP only.

ODBC logging works by periodically exporting the contents of the local log file to an ODBC-compliant database. RSView supports these ODBC-compliant databases:

- Microsoft® Access
- Sybase SQL Server
- Oracle
- Microsoft SQL Server

If you have set up FactoryTalk Diagnostics to overwrite events in the local log file, make sure messages are logged to the ODBC-compliant database before the oldest events are deleted.

For information about the contents of the FactoryTalk Diagnostics ODBC tables, see Appendix D.

Setting up message buffering

FactoryTalk Diagnostics messages are stored in the computer's local log file, and are exported to the ODBC-compliant database at the interval you specify.

You can also specify that messages remain in the local log file for a period of time after they have been exported to the ODBC-compliant database. This is useful in the event of a network failure, or any other reason that causes the database to be unavailable. In this case, the messages remain in the local log file until the buffer time expires. If the ODBC-compliant database becomes available during that time, the buffered messages are then exported to the database.

Routing messages

For each destination you set up, you can specify how messages are routed.

To route messages, specify:

- the types of messages to log.
- the audiences to send the messages to.
- whether to accept messages from Windows CE devices.

For information about who receives which types of messages, see page 10-4.

Receiving messages from a PanelView Plus or VersaView CE terminal

You can set up FactoryTalk Diagnostics to receive messages that are generated on the PanelView Plus or VersaView CE terminal at runtime. The terminal must be on the same network as the computer running FactoryTalk Diagnostics.

To receive messages:

- enable the Windows 2000 or Windows XP computer to receive the messages. For details see Help for the Diagnostics Setup tool.
- set up the PanelView Plus or VersaView CE terminal to send the messages.

For information about setting up a PanelView Plus terminal to log to the Windows 2000 or Windows XP computer, see the *PanelView Plus Terminals User Manual*.

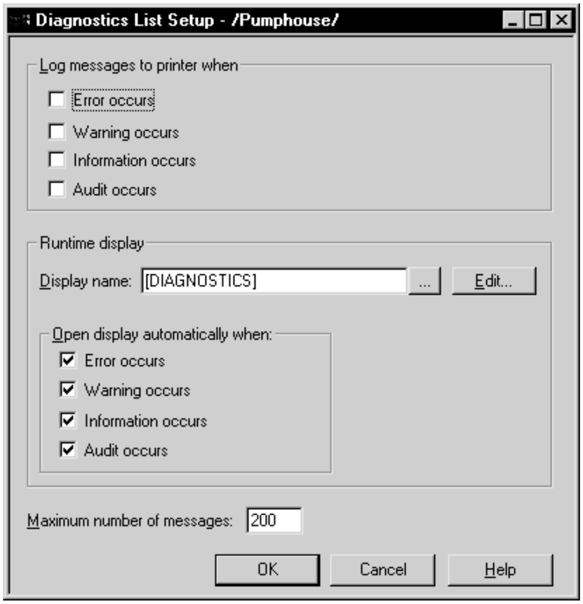
For information about setting up a VersaView CE terminal to log to the Windows 2000 or Windows XP computer, see the *VersaView CE Terminals User Manual*.

Displaying and printing diagnostics messages at runtime

At runtime, you can display diagnostics messages in a graphic display. You can also print the messages.

Using the Diagnostics List Setup editor

Use the Diagnostics List Setup editor to set up when to print and display messages at runtime in RSView ME Station.



Diagnostics List Setup - /Pumphouse/

Log messages to printer when

□ Error occurs
□ Warning occurs
□ Information occurs
□ Audit occurs

Runtime display

Display name: [DIAGNOSTICS]

Open display automatically when:

☑ Error occurs
☑ Warning occurs
☑ Information occurs
☑ Audit occurs

Maximum number of messages: 200

For details about using the Diagnostics List Setup editor, see Help.

Printed messages list the date and time, the category of system activity, and the message text. By default, messages are not printed at runtime.

By default, your application is set up to display diagnostics messages automatically at runtime. If you want to use the default settings, you don't need to do anything further to set up diagnostics messages for print and display in RSView ME Station.

The messages that are printed and displayed depend on how you set up FactoryTalk Diagnostics on the runtime computer:

- For applications running on Windows 2000 or Windows XP, use the Diagnostics Setup tool to set up diagnostics message logging. For information about using the Diagnostics Setup tool, see Help.
- For information about setting up FactoryTalk Diagnostics on the PanelView Plus or VersaView CE terminal, see the *PanelView Plus Terminals User Manual* or the *VersaView CE Terminals User Manual*.

For applications running on Windows 2000 or Windows XP, you can also view the runtime messages in the FactoryTalk Diagnostics Viewer, as described on page 10-5.

If you don't want to display diagnostics messages in RSView ME Station

1. In RSView Studio, in the Diagnostics List Setup editor, clear the Display name box, or clear the four "Open display automatically when" boxes.

Setting up how messages are displayed and printed at runtime

Follow these steps to set up how diagnostics messages are displayed at runtime:

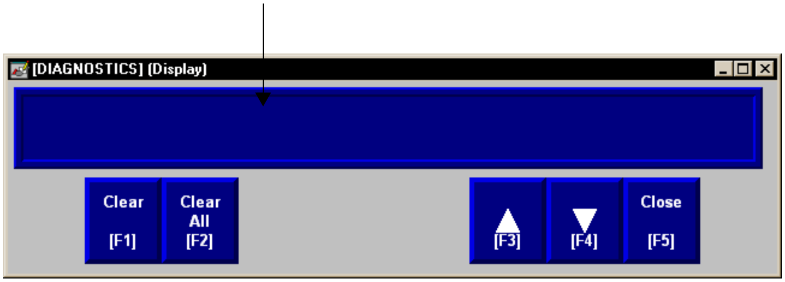
1. In RSView Studio, in the Diagnostics List Setup editor, specify which messages to print, the graphic display to use, when to open the graphic display, and the maximum number of messages to store.
2. If desired, modify the default [DIAGNOSTICS] display, or create your own graphic display to use for diagnostics 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 14.

The [DIAGNOSTICS] display

When you create an application, it comes with a graphic display called [DIAGNOSTICS]. The [DIAGNOSTICS] display is the default display for showing diagnostics messages at runtime.

Diagnostics list graphic object.



You can use the [DIAGNOSTICS] 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 diagnostics messages. In the Diagnostics List Setup editor, specify the display to use.

The diagnostics list graphic object

The [DIAGNOSTICS] display contains a diagnostics list graphic object, which lists the diagnostics messages. For more information about the diagnostics list, see page 10-11.

Buttons in the [DIAGNOSTICS] display

The [DIAGNOSTICS] display contains diagnostics list 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 10-12.

Creating your own diagnostics display

You can create your own graphic display for displaying diagnostics messages, containing a diagnostics 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 diagnostics list, see page 10-11. For information about the buttons you can use with the list, see page 10-12. For information about creating graphic displays and graphic objects, see Chapter 14 and Chapter 15.

Opening and closing the diagnostics display

Opening the display

The diagnostics display you specify in the Diagnostics List Setup editor (either the default [DIAGNOSTICS] display or a display you create) is automatically opened whenever a diagnostics message of the specified severity occurs.

The display remains open until the operator closes the display.

If you decide not to open the diagnostics display automatically, you can create a goto display button that the operator can press to open the diagnostics display. For information about setting up a goto display button and specifying the display to open, see Help.

Closing the display

The operator can close the display by pressing a close display button.

How the diagnostics list graphic object works

At runtime, when a severity of system activity occurs that you’ve set up to log, a message about the activity is added to the diagnostics list. The diagnostics list can be in the [DIAGNOSTICS] display, in a diagnostics display you have created, or can be placed on any display in your application.

You can use multiple diagnostics lists, in the same display or in different displays. Each diagnostics list displays the same information.

For information about setting up diagnostics lists, see Help.

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 diagnostics messages that is visible at one time depends on the height of the diagnostics list and the list's font size.
- Messages are listed with the newest diagnostics message on top.

Using buttons with the diagnostics list

Diagnostics buttons

You can use these diagnostics buttons to interact with the diagnostics list:

This button	Does this
Diagnostics clear	Clears the selected message from all diagnostics lists in the application.
Diagnostics clear all	Clears all diagnostics messages from all diagnostics lists in the application.

You can assign any captions you choose to the labels on the diagnostics buttons.

You can link the diagnostics clear button to a specific diagnostics list. When the operator presses the button, the selected message is deleted from the linked diagnostics list, and also from any other diagnostics lists in the application. For information about linking buttons to objects, see page 16-10.

Key buttons

You can also use these key button graphic objects to interact with the diagnostics 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 highlight up one page in the list.
Page down	Moves the highlight down one page in the list.
Home	Moves the highlight to the top message in the list.
End	Moves the highlight to the bottom message in the list.

You can set up the key buttons to work only with the specified diagnostics list, or to work with whichever object is selected in the graphic display. For information about linking buttons to objects, see page 16-10.

For information about creating graphic objects, see Chapter 15. For information about setting up specific buttons, see Help.

11 Setting up data logging

This chapter describes:

- steps for setting up data logging.
- data log files.
- data log models.
- changing the data log model used at runtime.
- displaying data logs using the trend graphic object.
- problems with data logging.

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 25.
3. In the Graphics 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.

Data log files

As soon as the application 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 an application after a shutdown or power loss. You can delete the log files from the runtime computer at application startup.

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).

For information about deleting the log files, see page 26-15.

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.

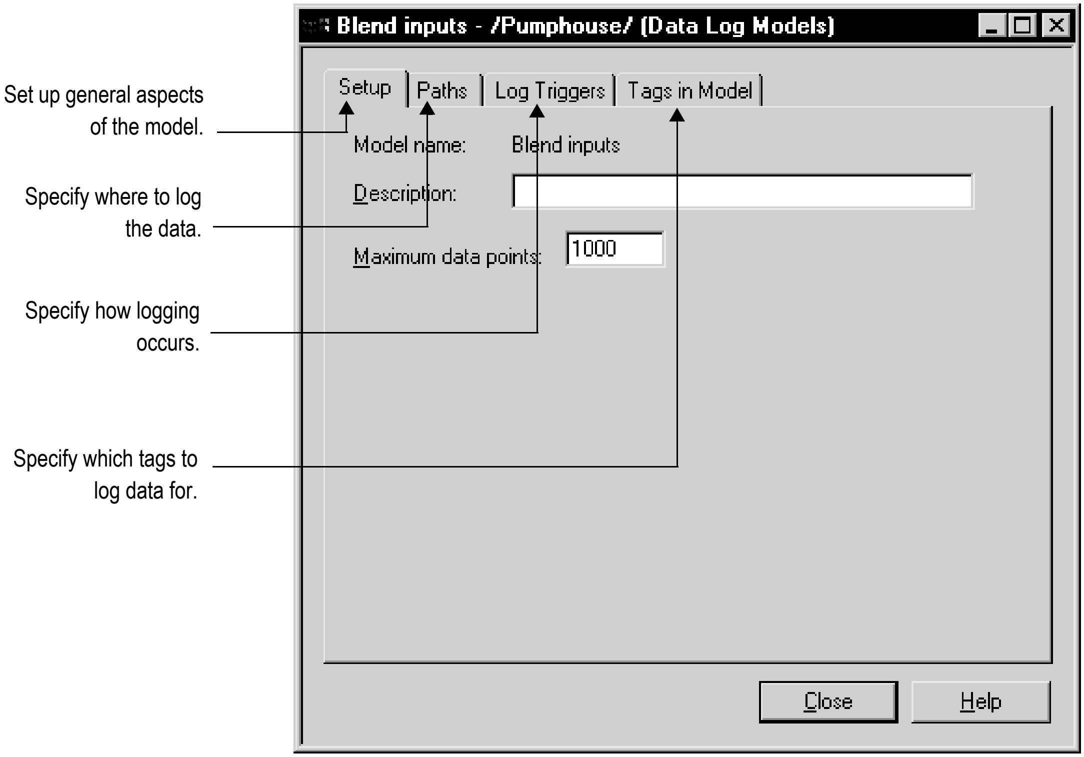
Data Log Models

A data log model defines which tags to log data for, as well as how and where the data is logged.

You can set up 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 11-5.

Creating Data Log Models

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.



Set up general aspects of the model.

Specify where to log the data.

Specify how logging occurs.

Specify which tags to log data for.

Blend inputs - /Pumphouse/ (Data Log Models)

Model name: Blend inputs

Description:

Maximum data points: 1000

For detailed information about the options in the Data Log Models editor, see Help.

Each data log model has a unique name, and an optional description.

You can log a maximum of 300,000 points. When the maximum number of data points have been logged, the oldest data is deleted to make room for the new data.

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 compact Flash Card (for PanelView Plus™ or VersaView® CE terminals only)

Logging to a network location

To log data to a network location, the network drive must be shared, and 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.

The PanelView Plus or VersaView CE terminal cannot be part of a domain. However, you can verify that the user who is logged into the PanelView Plus or VersaView CE terminal is on a user list that is part of a domain.

For more information about logging in to a Windows® domain or authenticating users, see page 28-1.

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.

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.

For HMI tags, before logging occurs, the change must equal a specified percentage of change in the tag value. The percentage is based on HMI tags' minimum and maximum values as set up in the Tags editor. Only the tags that change by the specified percentage are logged. If you specify a percentage of 0, all changes are logged.

If a tag does not have a minimum or maximum attribute (for example a data server tag in ControlLogix®), when you specify on-change logging, all changes are logged for that tag. You don't need to specify a percentage.

Using a heartbeat rate

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.

The heartbeat cannot be less than the maximum update rate, which is the rate at which data servers send tag values to RSView.

If you specify a heartbeat of 0, the heartbeat is not used.

Tags in the data log model

The data log model can contain up to 100 analog or digital tags, including both HMI and data server tags.

You cannot use string tags, array tags, tag placeholders, parameters, 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.

Changing the data log model used at runtime

Your application 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 application.
2. Start RSView Studio™ and open the application.
3. In the Startup editor, specify the new data log model.
4. Create the runtime application. See Chapter 25.
5. Transfer the runtime application to the runtime platform.

   For information about transferring applications to:

   - a computer running the Windows 2000 or Windows XP operating system, see Chapter 26.
   - a PanelView Plus or VersaView CE terminal, see Chapter 27.
6. Run the new application.

Displaying data logs using the trend graphic object

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 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 18.

Problems with data logging

Problems with data logging occur under these circumstances:

- When your application starts at runtime, if any of the tags specified in the current data log model do not exist, an error message is sent to FactoryTalk® Diagnostics™.
- If the data log file is corrupted or invalid, the file is deleted and recreated, and an error message is sent to FactoryTalk Diagnostics.
- 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 FactoryTalk Diagnostics.
- If logging to an invalid path, the log folder cannot be created. An error message is sent to FactoryTalk Diagnostics. One of the reasons that the path might be invalid is that the top-level folder of the path is not shared.
- When the application starts, RSView checks whether there is disk space to store the data log model's data. If there is not enough space, an error message is sent to FactoryTalk Diagnostics and data logging does not start.

12 Using information messages

This chapter describes:

- steps for setting up information messages.
- using the Information Messages and Information Setup editors.
- preparing to set up information messages.
- how information messages work.
- creating information messages in multiple languages.
- 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.

Information messages versus local 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 14-29.

Summary of steps

Follow these steps to set up 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 connection. If you want the operator to acknowledge messages, assign the Ack connection and specify the acknowledge hold time.

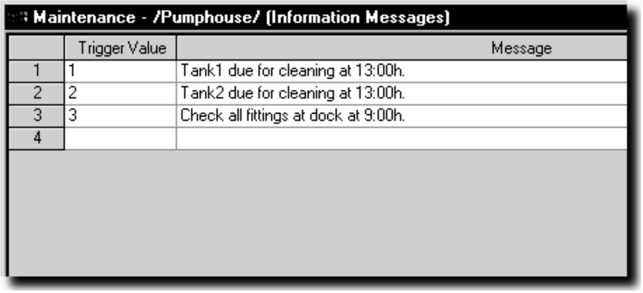
3. In the Startup editor, ensure that the Information messages box is checked (it is checked by default). See Chapter 25.

4. If desired, in the Graphics 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 14.

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.



Maintenance - /Pumphouse/ (Information Messages)

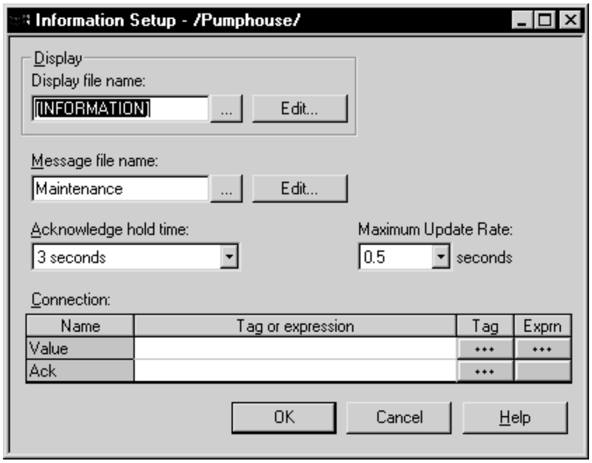
	Trigger Value	Message
1	1	Tank1 due for cleaning at 13:00h.
2	2	Tank2 due for cleaning at 13:00h.
3	3	Check all fittings at dock at 9:00h.
4		

You can define up to 10,000 messages in each message file.

For detailed information about the options in the Information Messages editor, see Help.

Setting up how information messages are displayed

Use the Information Setup editor to set up how information messages are displayed.



Display file name: [INFORMATION]

Message file name: Maintenance

Acknowledge hold time: 3 seconds

Maximum Update Rate: 0.5 seconds

Name	Tag or expression	Tag	Exprn
Value		•••	•••
Ack		•••	

For detailed information about the options in the Information Setup editor, see Help.

Preparing to set up information messages

As your application is running, information is continually sent to the data source about the state of various processes. For example, your application 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 RSView® documentation uses the term data source as a generic term that includes all possible sources of tag data, for both data server tags and HMI tags. 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 set up to exchange information (in the form of numeric or string values) between RSView and the machine that your application 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 connection—a tag or expression. When the value of this connection 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: Setting up the data source to display information messages

This example shows how to set up the data source to notify the operator that a conveyor belt has stopped. In this example, the status of two conveyor belts is being monitored. You can use both HMI and data server tags.

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. This tag points to an address in a 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. Set up the data source to send a value of 1 to this tag when Conveyor_1_status has a value of 1, and to send a value of 2 to this 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 connection, 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 set up the data source to send the trigger value to the Value connection. You can use both HMI and data server tags.

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 7-2.

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 12-8.

Creating information messages in multiple languages

RSView supports information messages in multiple languages. Use the CurrentLanguage( ) expression function to specify message offsets in the information message file. In the file, divide your messages into sections for each language. For information about the CurrentLanguage( ) function, see page 20-14. Also see the following example.

You can export the text strings in your information message files for translation. Then paste the translated strings into the original file. RSView does not support direct importing of the translated message text. For information about exporting text for translation, see Chapter 23.

Example: Setting up information messages in multiple languages

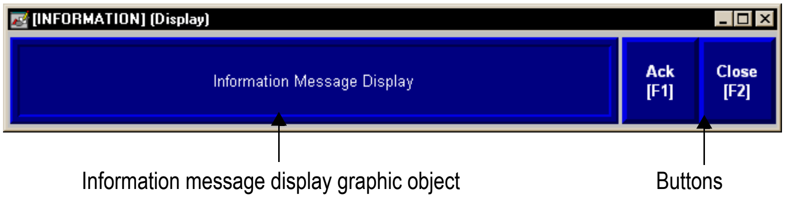
This example shows how to generate English, French, or German information messages at runtime, depending on which language the application is using.

1. Create English messages for trigger values 1 to 10.
2. Create French messages for trigger values 11 to 20.
3. Create German messages for trigger values 21 to 30.
4. Assign this expression to the Value connection in the Information Setup editor:

```
If CurrentLanguage( )=”en-US” then Information_messages
Else If CurrentLanguage( )=”fr-FR” then Information_messages + 10
Else Information_messages + 20
```

The [INFORMATION] display

RSView comes with an 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.


[INFORMATION] (Display)
Information Message Display
Ack
[F1]
Close
[F2]
Information message display graphic object
Buttons

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.

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 information about creating your own information message display, see page 12-7.

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 12-8.

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 connection is assigned, the connection 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 connection 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 12-8. For information about creating graphic displays and graphic objects, see Chapter 14 and Chapter 15.

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 connection’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 setting up a goto display button and specifying the display to open, see Help.

Closing the display

The information message display closes when the Value connection's value changes to 0.

To automatically close the display when the operator acknowledges a message, set up the data source to set the Value connection to 0 when the Ack connection 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 connection 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 application.

For information about setting up the information message display graphic object, see page 16-64.

What is displayed

- If the Value connection 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 connection 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 question marks (?).

  For information about how values are rounded, see page 7-2.
- 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 connection's value is 0, the information message graphic display is closed.

Changing the message file used at runtime

Your application 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 application.
2. Start RSView Studio™ and open the application.

3. In the Information Setup editor, specify the new information message file.
4. Create the runtime application. See Chapter 25.
5. Transfer the runtime application to the runtime platform.

   For information about transferring applications to:

   - a computer running the Windows® 2000 or Windows XP operating system, see Chapter 26.
   - a PanelView Plus™ or VersaView® CE terminal, see Chapter 27.
6. Run the new application.

13 Setting up security

This chapter describes:

- using RSAssetSecurity.
- steps for setting up security without RSAssetSecurity.
- using the User Accounts editor.
- how user accounts and security codes work.
- assigning security to graphic displays.
- providing a way for users to log in and log out.
- preventing unauthorized users from stopping the application.
- setting up RSAssetSecurity™ in RSView® Studio™, including:
  - adding RSAssetSecurity user groups and users, and setting up passwords.
  - assigning user access to the computer's FactoryTalk® Directory™. RSView Machine Edition uses the local FactoryTalk Directory.
  - setting up security access to the application, networks and devices, policies, user groups, and users.
  - setting up policies for passwords and user accounts, for backing up and restoring FactoryTalk Directory, and for tracking activities for audit purposes.
- a sample startup display that uses all the RSView security features.

Using security with your application

RSAssetSecurity works together with RSView security features to provide secure access to applications during development and at runtime. RSAssetSecurity is installed as part of the FactoryTalk Automation Platform™, and uses FactoryTalk Directory to manage user accounts and policies.

RSAssetSecurity applies to all applications and all Rockwell Software® products installed on the development or runtime computer. For example, when you add an RSAssetSecurity user, the user is then available to add to any RSView application.

You can use RSAssetSecurity features on the development computer to:

- determine which users can view, edit, create, and delete applications.
- determine which users can manage users and set up security.

- determine which users can back up and restore applications.

You can use a combination of RSAssetSecurity and RSView security features at runtime to:

- prevent unauthorized users from running the application.
- prevent users from opening graphic displays.
- prevent unauthorized users from stopping the application.
- prevent users from seeing and using certain parts of a graphic display.
- prevent users from switching to other applications or having access to the desktop on the runtime computer. This feature uses the DeskLock tool, and is available for Windows® 2000 and Windows XP runtime applications only. For more information about the DeskLock tool, see Chapter 26. The DeskLock tool does not use RSAssetSecurity.

To limit the users who have access to the application or parts of the application, you must set up user accounts and passwords.

If you set up 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 8-5.

If you don't want to use RSAssetSecurity

If you don't plan to use security for your application, you can turn off or minimize the use of RSAssetSecurity.

By accepting the default values in the FactoryTalk Directory Configuration Wizard during installation, an administrative user named Administrator is created, All Users are granted initial access permissions, and a Windows-linked user group named Authenticated Users is created and added to the User Groups folder in the FactoryTalk Directory. This means that any user who is authenticated by Windows, that is, has a password that allows access to the design-time computer, does not need to provide a user name or password to open RSView Studio.

Authenticated users are not supported on Windows CE. On Windows CE terminal, Windows-linked users must be added to FactoryTalk Directory before they can be logged in.

If you don't use RSView user accounts

RSView creates a user named DEFAULT, and this user is automatically logged in when you start applications at runtime. You don't need to set up any other users, and users don't need to log in to use the applications you create.

If you use RSView user accounts

If you want to use RSView user accounts, for example, to run login and logout macros, but you don’t want to use RSAssetSecurity, follow these steps.

1. Add users or user groups to RSAssetSecurity. For details, see page 13-17.
2. Add the RSAssetSecurity users or user groups to the RSView User Accounts editor. For details, see page 13-4.
3. In the RSView User Accounts editor, if desired, assign login and logout macros and security codes to users or users groups. For details, see Help for the editor.
4. In the Graphics editor, assign security codes to graphic displays that will have limited access.
5. Provide users with a method for logging in and out.
6. If desired, prevent unauthorized users from stopping the application.

These steps are described in detail in this chapter.

Working with the User Accounts editor

Use the User Accounts editor to:

- add RSAssetSecurity users and assign security codes and login and logout macros, for each user or group of users that will have access to the application at runtime.
- migrate users from earlier versions of RSView to version 4.0.
- assign user passwords (version 3.x applications only).
- add Windows users or groups (version 3.x applications only).

The method for adding users and assigning security codes to them depends on whether you are setting up users for RSView 4.0 applications or for RSView 3.x applications. There is a separate tab for each.

The User Accounts editor has special items on the View menu to control the appearance of the editor. It also has items on the Setup menu, and extra tools on the toolbar.

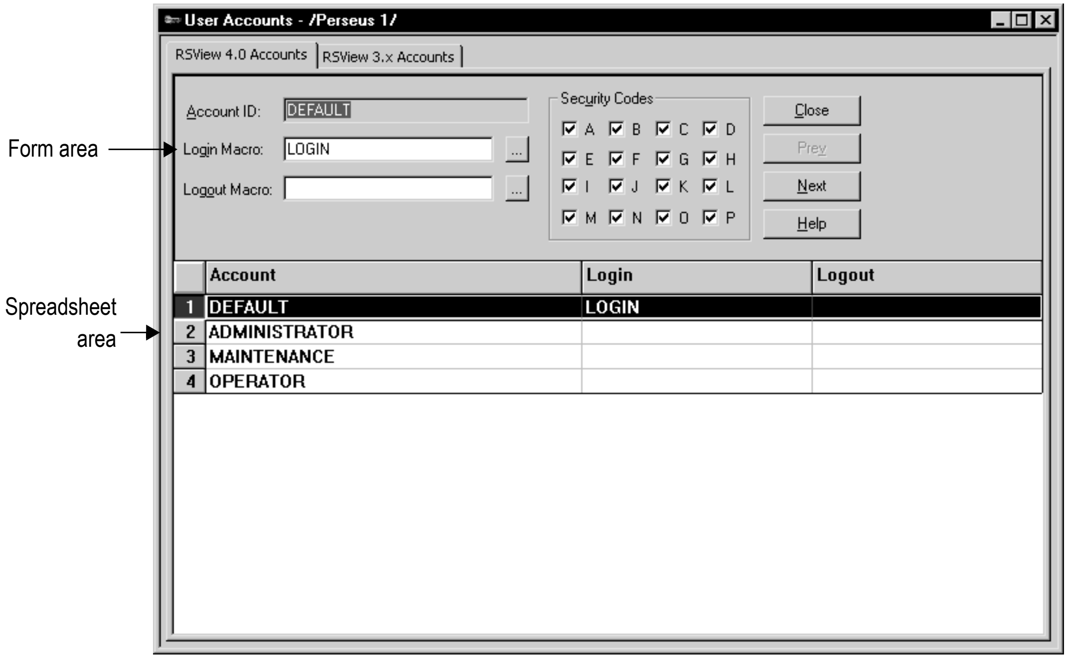
The DEFAULT user

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 application at runtime without logging in, turn off the DEFAULT user’s access to the security codes you plan to use.

You cannot delete the DEFAULT user account.

Assign the security code for the startup display to the DEFAULT user, or else the startup display won't open. If the startup display uses the * security code, you can assign any code from A to P to open the display. For more information, see page 13-9.

Setting up users for 4.0 applications



Account ID: DEFAULT

Login Macro: LOGIN

Logout Macro:

Security Codes

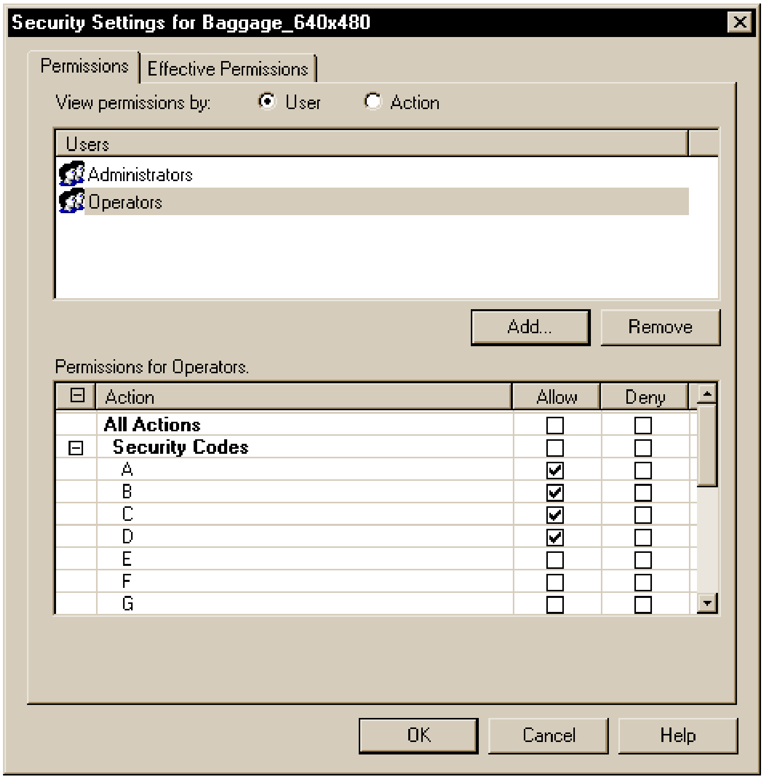
☑ A ☑ B ☑ C ☑ D
☑ E ☑ F ☑ G ☑ H
☑ I ☑ J ☑ K ☑ L
☑ M ☑ N ☑ O ☑ P

	Account	Login	Logout
1	DEFAULT	LOGIN	
2	ADMINISTRATOR		
3	MAINTENANCE		
4	OPERATOR		

Use the form area to assign security codes to the DEFAULT user only. For other users and groups, the codes are not visible. Assign security codes to them in the Security Settings dialog box, as described next.

To add RSAssetSecurity users and groups to RSView and assign security codes to them

1. Open the User Accounts editor and select the RSView 4.0 Accounts tab.
2. On the Setup menu, click Add Users/Groups.



View permissions by: ● User ○ Action

Users
Administrators
Operators

Permissions for Operators.

Action	Allow	Deny
All Actions	□	□
Security Codes	□	□
A	☑	□
B	☑	□
C	☑	□
D	☑	□
E	□	□
F	□	□
G	□	□

3. In the Security Settings dialog box, add users and groups, and assign security codes to them. For details, click the Help button.

4. In the User Accounts editor, assign login and logout macros to the users and groups.

   For details about using the User Accounts editor, see Help.

To migrate RSView 3.x users to RSView 4.0

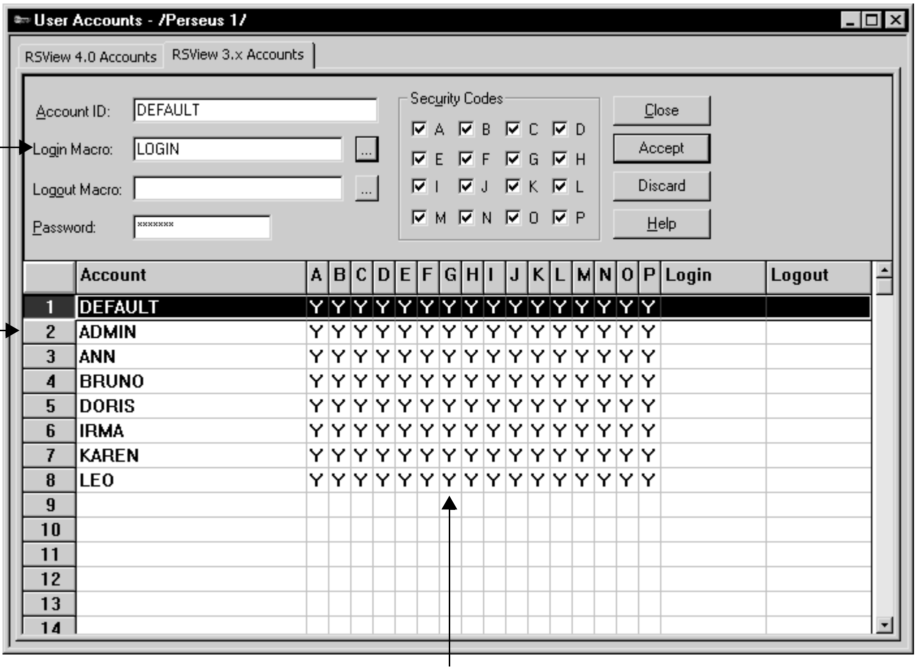
1. With the User Accounts editor and the RSView 4.0 Accounts tab selected, on the Setup menu, click Migrate 3.x User Accounts.

   Users from the RSView 3.x Accounts tab are added to the RSAssetSecurity Users folder and to the RSView 4.0 Accounts tab.

   Users are not migrated if they already exist in the RSView 4.0 account list.

2. If desired, edit the users' security codes and login and logout macros, as described in the previous section.
3. To edit the users' passwords, see page 13-18.

Setting up users for 3.x applications



Account ID: DEFAULT

Login Macro: LOGIN

Logout Macro:

Password: *******

Security Codes

☑ A ☑ B ☑ C ☑ D
☑ E ☑ F ☑ G ☑ H
☑ I ☑ J ☑ K ☑ L
☑ M ☑ N ☑ O ☑ P

	Account	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Login	Logout
1	DEFAULT	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		
2	ADMIN	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		
3	ANN	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		
4	BRUNO	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		
5	DORIS	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		
6	IRMA	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		
7	KAREN	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		
8	LEO	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		
9																			
10																			
11																			
12																			
13																			
14																			

Form area

Spreadsheet area

Double-click in the security code columns to toggle between Yes and No.

To add users to RSView 3.x applications and assign security codes to them

1. Open the User Accounts editor and click the RSView 3.x Accounts tab.
2. Add users, and then assign macros, passwords, and security codes to them.

   For details about using the User Accounts editor, see Help.

Changing RSView 3.x user passwords

For RSView 3.x applications, users cannot change passwords at runtime. You can only change passwords in the User Accounts editor. After changing passwords, recreate the application and download the .mer file.

Adding 3.x users or groups from a Windows domain

In RSView 3.x applications, there are two possible types of user accounts:

- users or groups from a Windows domain
- users you create in RSView.

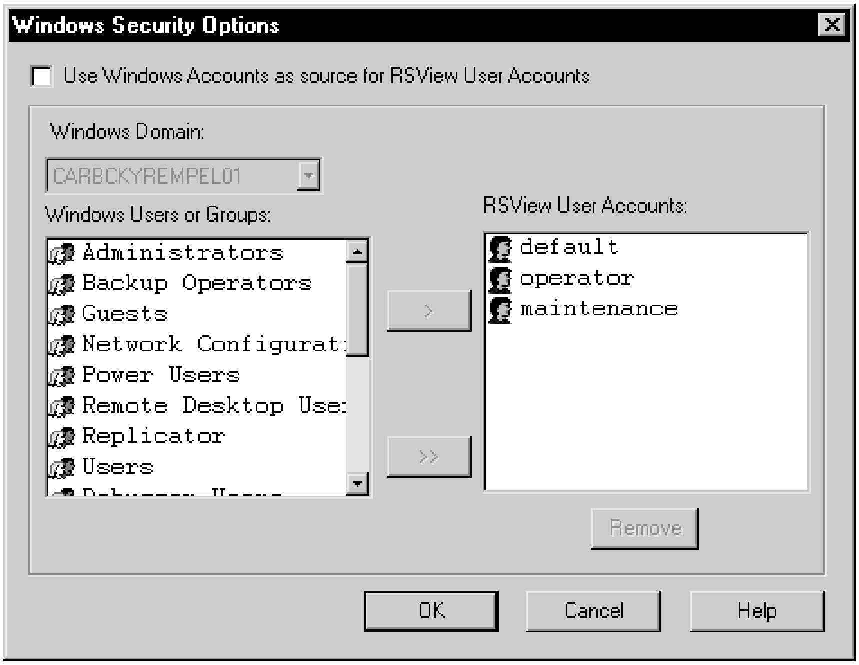
You cannot use both user account types in the application at the same time.

Before you can make use of Windows user accounts in RSView, you must first create the user accounts in your Windows domain. To do this in a Windows network domain, your network must have at least one Windows server acting as a domain controller. You cannot use Windows Workgroups.

When you use Windows users or groups, the user password is the Windows domain password.

To add users from a Windows domain to RSView

1. Open the User Accounts editor and click the RSView 3.x Accounts tab.
2. On the Setup menu, click Windows Security Options.



Windows Security Options

☐ Use Windows Accounts as source for RSView User Accounts

Windows Domain: CARBCKYREMPEL01

Windows Users or Groups:

- Administrators
- Backup Operators
- Guests
- Network Configurat
- Power Users
- Remote Desktop Use
- Replicator
- Users

RSView User Accounts:

- default
- operator
- maintenance

3. In the Windows Security Options dialog box, specify the users and groups to use. For details, see Help.

4. In the User Accounts editor, specify login and logout macros and assign security codes to the users. For details, see Help.

   You cannot change the user or group name (Account ID) and password. To change the password, use the Windows Control Panel.

Removing 3.x users or groups

You can also use the Windows Security Options dialog box to remove users or groups. When you remove a user or group from the RSView User Accounts list, the user or group's name is deleted from the RSView User Accounts editor. The user or group is not deleted from the Windows domain.

If you remove users from the Windows domain, they are not removed automatically from the RSView User Accounts editor. You must remove the users from the User Accounts editor manually, using the Windows Security Options dialog box.

How user accounts and security codes work

When you assign a security code to a graphic display, only the users and groups who are assigned that security code have access to the display. There are 16 security codes, A through P.

The asterisk symbol (*) is used in displays and represents any code. Users must have at least one code assigned to open displays that use the * code.

You can assign combinations of security codes to users and groups, to allow each user or group access to a different set of displays or graphic objects.

To use security codes to restrict user access to graphic objects, assign visibility animation to the objects using expressions containing the security functions. For an example, see page 13-13.

Assigning security to graphic displays

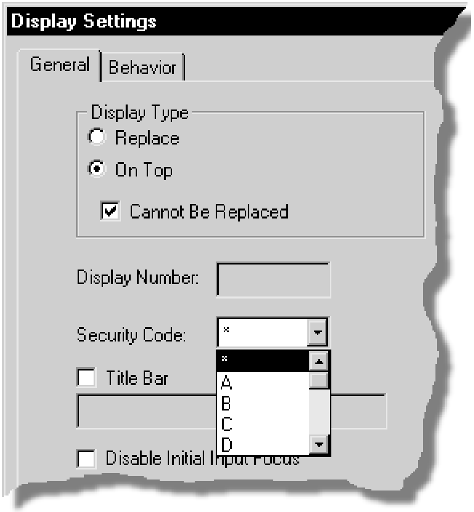
Assign security to graphic displays in the Graphics editor. You can:

- 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 14.

To assign security to a graphic display

1. In the Graphics editor, right-click an empty area of the display, and then click Display Settings.



Display Type
○ Replace
● On Top
☑ Cannot Be Replaced

Display Number:

Security Code: *

□ Title Bar

□ Disable Initial Input Focus

2. In the General tab, select a security code.

   To give every security code access to the display, select the asterisk (*). The * is selected by default.

Example: Assigning security codes to prevent access to graphic displays

This example shows how to set up users with access to different graphic displays.

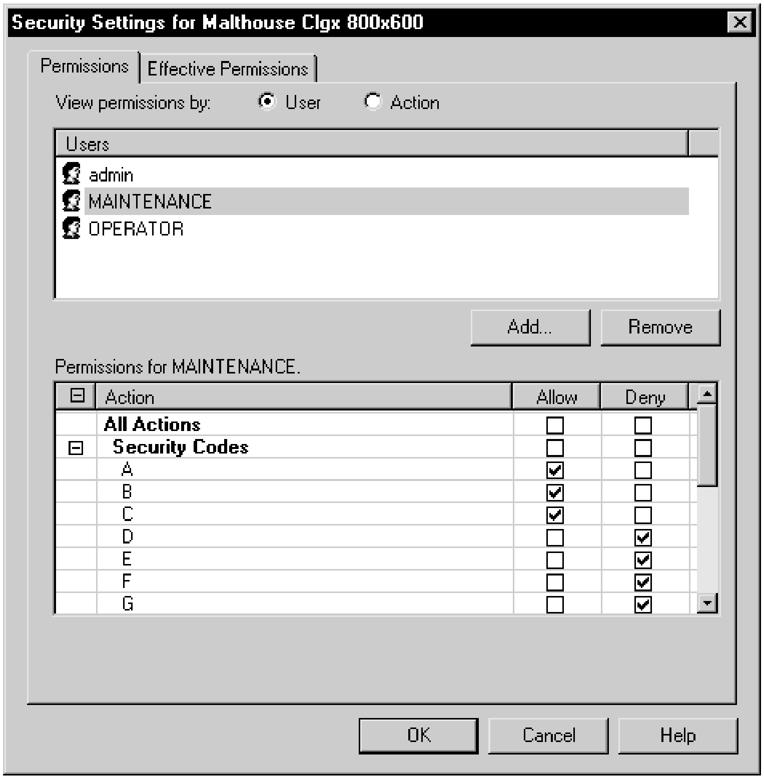
1. Assign security codes to graphic displays as follows:

To this display	Assign this security code
Alarm History	A
Boiler	B
Furnace	C
Top Secret	D

2. In the User Accounts editor, assign the security code P to the DEFAULT user.

3. In the Security Settings dialog box, assign security codes to the other users:

To this user	Assign these security codes
MAINTENANCE	A, B, C
OPERATOR	A, B
ADMIN	All



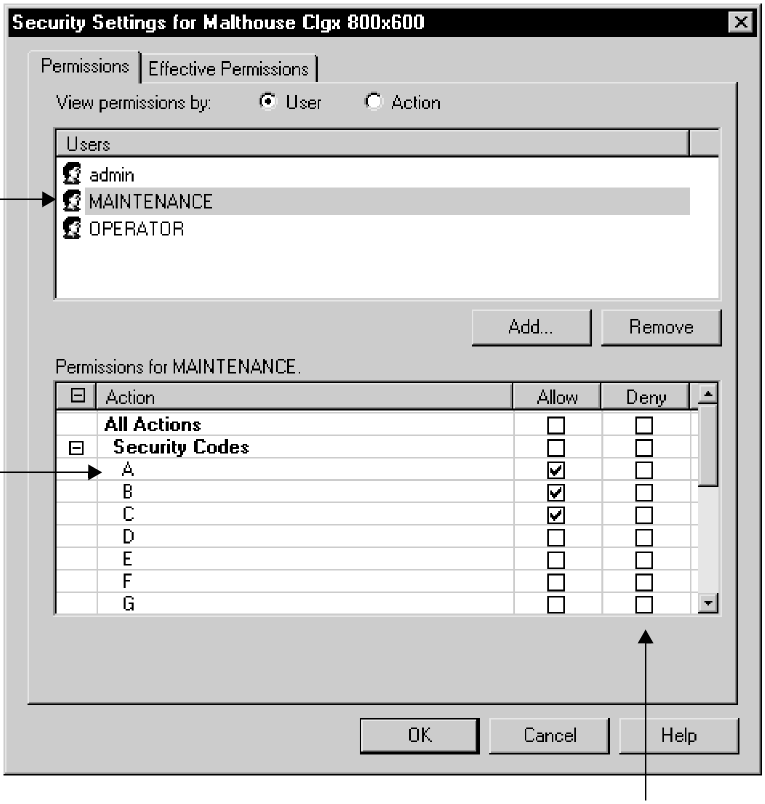
View permissions by: ● User ○ Action

Users
- admin
- MAINTENANCE
- OPERATOR

Permissions for MAINTENANCE.

Action	Allow	Deny
All Actions	□	□
Security Codes	□	□
A	☑	□
B	☑	□
C	☑	□
D	□	☑
E	□	☑
F	□	☑
G	□	☑

If you deny permission for an action to a user, this overrides permission the user is granted as a member of a group. If you deny permission for an action to a group, allowing the action to a member of the group does not override the denial. The denial always takes precedence.



Select the user or group to set up.

Assign security codes.

If you don't want the user or group to have a code, leave both columns blank.

Security Settings for Malthouse Clgx 800x600

Permissions | Effective Permissions

View permissions by: ● User ○ Action

Users
admin
MAINTENANCE
OPERATOR

Permissions for MAINTENANCE.

Action	Allow	Deny
All Actions	□	□
Security Codes	□	□
A	☑	□
B	☑	□
C	☑	□
D	□	□
E	□	□
F	□	□
G	□	□

The users have access to these graphic displays:

- MAINTENANCE has access to the first three graphic displays.
- OPERATOR 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 * or P has been assigned. In this example, the DEFAULT user does not have access to any of the four 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 the shutdown button

This example shows how to set up users so that only authorized users can use the shutdown button to stop the application.

This example uses the CurrentUserHasCode security function to determine whether a user is authorized to view and use the shutdown button.

The security code E is assigned to users who are authorized to use the button.

1. In the User Accounts editor, clear all the security codes for the DEFAULT user.
2. In the Security Settings dialog box, assign security codes to users.

To this user	Assign these security codes
OPERATOR	A, B
MAINTENANCE	A, B, C, E
ADMIN	All

3. Create a shutdown button.
4. Assign visibility animation to the button using this expression:

   CurrentUserHasCode(E)

   For the Expression True State, click Visible.

When the graphic display containing the shutdown button is open, the MAINTENANCE and ADMIN user can see the button. If the OPERATOR or DEFAULT user is logged in, the button is not visible.

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 application starts, the DEFAULT user is logged in. If a macro is assigned to the DEFAULT user, the macro runs.

For example, you could create a macro to set the remote display number to open a login display when the DEFAULT user logs in. For information about controlling display changes remotely, see page 8-5. Remote display changes are not checked for security.

To provide a way for users to log in

1. Specify the startup display in the Startup editor, in the Initial graphic box. The startup display is the graphic display that opens when your application starts running.

   The startup display must have the * code or a security code that is assigned to the DEFAULT user, or it will not open.

   For information about the Startup editor, see Chapter 25.

2. Create a login button in the startup display.

   For information about creating graphic objects, see Chapter 15. For information about setting up login buttons, see Help.

For more information about logging in, see Chapter 28.

Logging out

To best maintain your security system, users who log in are also required to log out.

When the current user logs out, if a logout macro is assigned to the user, the macro runs. If the user belongs to a group, and a logout macro is set up for the group, the logout macro runs.

After the current user is logged out, the DEFAULT user is logged in. If a login macro is assigned to the DEFAULT user, the macro runs. Turn off the DEFAULT user's access to the security codes you plan to use.

To provide a way for users to log out

1. Create a logout button in a graphic display that all logged-in users have access to.

Logging out automatically

You can set up your runtime terminal so that the current user will be logged out automatically after the terminal has been inactive for a specified period of time. The automatic logout is independent of RSAssetSecurity settings or Windows security settings. The logout will take place regardless of what you set up in RSAssetSecurity or Windows.

To set up automatic logout

1. In the Explorer window, double-click Project Settings, and then click the Runtime tab.
2. Select Enable auto logout.
3. Specify how many minutes the terminal must be inactive before the automatic logout occurs.

At runtime, when the inactivity period expires, the current user is logged out. Logout macros assigned to the current user run. The DEFAULT user is logged in. The DEFAULT user's login macros run.

Preventing unauthorized users from stopping the application

To prevent unauthorized users from stopping the application

- Do not use a title bar on the application window, because the title bar contains a Close button. To turn off the title bar for the application window, in the Project Settings editor, in the Runtime tab, clear 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 application is logged in. For an example, see page 13-13.

  Or, set up security for the graphic display in which the shutdown button is located, so only users who are authorized to stop the application can open the display.

Additional step for Windows 2000 and Windows XP applications

- Use the DeskLock tool to prevent users from having access to the desktop, to prevent access to operating system functions such as restarting Windows or shutting down tasks. For more information, see page 26-16.

Additional step for VersaView® CE applications

- Hide the Windows Taskbar to make it inaccessible.

To hide the Windows Taskbar

1. On the Windows Start menu select Settings, and then select Taskbar.
2. Clear the "Always on top" check box.
3. Select Auto hide.
4. When you are finished, click OK.

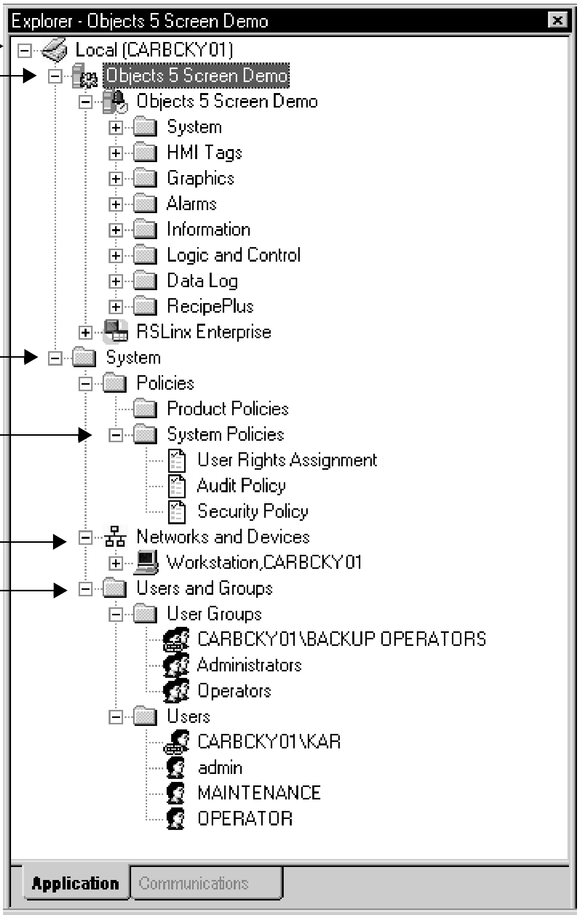
5. At the Command prompt or in the Run box, run Regflush.exe to save your changes to persistent internal flash memory. Otherwise, the changes will be lost when you reboot.

Setting up RSAssetSecurity for your application

In the Explorer window of RSView Studio you can:

- create RSAssetSecurity users and groups of users, and assign passwords to users.
- set up access to the FactoryTalk Directory.
- set up access to the application.
- assign security access to policies, groups, and users.
- set up access to network devices.
- specify which users can backup and restore FactoryTalk Directory.
- specify the types of activities to track for audit purposes.
- specify policies for passwords and user accounts, such as how often passwords must be changed.

Depending on what other products are installed on the computer, you can also assign security access for those products to your users. For example, you can specify which users are allowed to browse the network for RSLinx® Enterprise™ devices.



Set up access to the FactoryTalk Directory.

Set up access to the application.

You can assign security to all the folders in the System folder.

Set up policies.

Set up access to devices.

Add users and groups, and assign passwords. The link symbol indicates Windows-linked groups and users.

Explorer - Objects 5 Screen Demo

- Local (CARBCKY01)
  - Objects 5 Screen Demo
    - Objects 5 Screen Demo
      - System
      - HMI Tags
      - Graphics
      - Alarms
      - Information
      - Logic and Control
      - Data Log
      - RecipePlus
    - RSLinx Enterprise
  - System
    - Policies
      - Product Policies
      - System Policies
        - User Rights Assignment
        - Audit Policy
        - Security Policy
    - Networks and Devices
      - Workstation,CARBCKY01
    - Users and Groups
      - User Groups
        - CARBCKY01\BACKUP OPERATORS
        - Administrators
        - Operators
      - Users
        - CARBCKY01\KAR
        - admin
        - MAINTENANCE
        - OPERATOR

Creating RSAssetSecurity users

You must set up users in RSAssetSecurity before you can add them to the RSView User Accounts editor.

RSAssetSecurity allows you to reference user accounts that have already been set up in Windows. These are called Windows-linked users. The link symbol in the Explorer window indicates that a user is a Windows-linked user.

The RSAssetSecurity access you give to users determines what actions they can perform in RSView, both on the development computer and at runtime.

To do this	Allow these Common actions
Open applications	Read and List Children
Add and edit applications or components	Write and Create Children
Delete applications or components	Delete
Assign security and create users	Create Children and Configure Security

You can assign different permissions to users at different levels of the application.

Inheriting permissions

The security you set up at the top level, the FactoryTalk Directory, is inherited by the application and users below it, unless you select "Do not inherit permissions." One way to set up security is to assign the Read and List Children permissions to the All Users group at the FactoryTalk Directory level, and then assign permissions for writing, creating children, configuring security, and deleting to users and groups at the application level.

If you deny permission for an action to a user, this overrides permission the user is granted as a member of a group. If you deny permission for an action to a group, allowing the action to a member of the group does not override the denial. The denial always takes precedence.

To set up users

1. In the System folder, right-click Users, and then click New User or New Windows-Linked User.
2. Specify the user name, password, and password options. For details, see Help.
3. Right-click Users, and then click Security.
4. Specify what actions the users can perform. For details, see Help.
5. To add users to a group, right-click the group and then click Properties. For details, see Help.

To change user passwords

1. In the Users folder, right-click the user name, and then click Properties.
2. Click Reset Password. For details, see Help.

Users can change their password at runtime using the Password button. For more information, see page 28-4.

Creating RSAssetSecurity user groups

The use of user groups is optional but recommended. Groups allow you to set up security access once for the entire group, rather than individually for members of the group. You can still set up separate permissions for individual members of the group.

Setting up groups saves time. You can add all the users of an application to a single group in RSAssetSecurity, then add the group to the RSView User Accounts editor in one step, which is much quicker than adding the users one by one.

RSAssetSecurity allows you to use groups that have already been set up in Windows. These are called Windows-linked groups. The link symbol in the Explorer window indicates that a group is a Windows-linked group.

RSAssetSecurity comes with an Administrators group already set up. To start with, members of this group have full security access to RSAssetSecurity, and therefore have full access to your applications. The user you set up for FactoryTalk Local Directory when you installed FactoryTalk Automation Platform is a member of the Administrators group.

To ensure that you are never locked out of FactoryTalk Directory we recommend that you assign more than one user to the Administrators group. That way if one user is locked out, you can use the other one to log in.

To set up user groups

1. In the System folder, right-click User Groups, and then click New User Group or New Windows-Linked User Group.
2. Add user groups. You can add members to the groups now or later. For details, see Help.
3. Right-click User Groups, and then click Security.
4. Specify what actions members of the group can perform. For details, see Help.
5. To add members to the group later, right-click the group and then click Properties. For details, see Help.

Setting up security access to the FactoryTalk Directory

The RSAssetSecurity access that you set up for the FactoryTalk Directory applies to all RSView applications and all Rockwell Software products installed on the development computer.

By default, applications and the System folder inherit the security permissions assigned to the FactoryTalk Directory. This means that you only need to assign permissions to user groups or users once. If desired, you can override the permissions that you set up at this level by assigning different permissions to applications and to the items in the System folder.

You can assign permissions for actions related to RSView applications and tags here or at the application level. If you assign them here, they are inherited by all applications.

To set security permissions for the FactoryTalk Directory

1. At the top of the tree in the Explorer window, right-click Local, and then click Security.
2. Specify which users and groups have access to FactoryTalk Directory, and assign permissions to users and groups for the actions listed in the dialog box. For details, see Help.

Setting up security access to the application

Assign RSAssetSecurity at the application level to specify which users or groups can open the application and add, edit, and delete components. You can also specify which users or groups can write to tags and set up, view, and respond to alarms.

To set security permissions for the application

1. Right-click the application name, and then click Security.
2. Specify which users and groups have access to the application, and assign permissions to users and groups for the actions listed in the dialog box. For details, see Help.

Setting up security access to System policies, groups, and users

You can assign security access to the System folder and to all the folders in the System folder, including policies, groups, and users. You do this by specifying which groups and users have access to the folder, and what actions they can perform.

To set up security access to policies, groups, and users

1. Right-click the System folder, or a folder in the System folder, and then click Security.
2. Specify which groups and users have access to the folder, and what actions they can perform. For details, see Help.

Setting up security access to networks and devices

You can assign security access to networks and devices in general, to the development computer, and to specific devices. Set up security for networks and devices if you are using RSLinx® Classic devices.

To set up security access to networks and devices

1. In the System folder, right-click Networks and Devices, the development computer workstation, or a specific device, and then click Security.

2. Specify which groups and users have access to the item, and what actions they can perform. For details, see Help.

Specifying which users can back up and restore FactoryTalk Directory and RSView applications

You can allow users or groups of users to back up and restore the contents of the local FactoryTalk Directory, including applications, users, groups, and all security settings.

Users must have permission to back up and restore FactoryTalk Directory to use the Application Manager tool to back up and restore applications. For information about using the Application Manager, see page 4-10.

To specify which users can back up and restore FactoryTalk Directory and RSView applications

1. In the System Policies folder, double-click User Rights Assignment.
2. Set permissions for users. For details, see Help.

Specifying activities to track for audit purposes

You can keep an audit trail of activities such as changing the setup of the FactoryTalk Directory and whether security access is denied or granted to users.

To specify which activities to track for audit purposes

1. In the System Policies folder, double-click Audit Policy.
2. Set up audit policies. For details, see Help.

Specifying policies for passwords, accounts, and FactoryTalk sign-on

You can use the FactoryTalk Directory Security Policy to specify how to manage passwords and user accounts, including how long passwords must be, how often they must be changed (if ever), and whether to keep a record of deleted user accounts.

⚠ Remember that any changes that you make to system security policies will be included as part of the run-time application. It is therefore very strongly recommended that you do not alter the default settings in the Security Policy Properties dialog unless absolutely necessary, and unless the implications of the changes are fully understood.

Single sign-on

You can also use the Security Policy to turn off FactoryTalk single sign-on. If you turn this feature off, users must log into FactoryTalk each time is RSView Studio restarted. When the feature is on, if you shut down RSView Studio and restart it without restarting your computer, you remain logged in to FactoryTalk and are not prompted to log in again.

To specify how to manage passwords, user accounts, and FactoryTalk sign-on

1. In the System Policies folder, double-click Security Policy.
2. Set up options for accounts, passwords, and single sign-on. For details, see Help.

Summary of steps

Follow these steps to set up security:

1. In the Explorer window, in the System folder underneath the HMI server, add RSAssetSecurity user groups and users, and set up passwords.
2. Assign user access to the computer's FactoryTalk Directory.
3. If desired, restrict access to the application and to networks and devices. You can also restrict security access to policies, user groups, and users.
4. Set up policies for:
   - backing up and restoring FactoryTalk Directory.
   - tracking activities for audit purposes.
   - passwords and user accounts.
5. In the User Accounts editor, add RSAssetSecurity users or user groups to RSView, and assign login and logout macros and security codes to them.
6. In the Graphics editor, assign security codes to graphic displays that will have limited access.
7. Provide users with a method for logging in and out.
8. If desired, prevent unauthorized users from stopping the application.

These steps are described in detail in this chapter.

Summary of security features in a sample startup display

This section provides an example of how to use RSAssetSecurity and RSView security features in a startup graphic display called Log In.

To create a startup display that uses security

1. Set up RSAssetSecurity user accounts and passwords.
2. Assign Common\Read and Common\List Children security permissions to all users that are allowed to run the application, at the FactoryTalk Directory or application level.

3. Assign Tag\Write Value permission to all users that are allowed to write values to tags.
4. In the User Accounts editor, assign at least one security code to each user who you want to log in, including the DEFAULT user.
5. In the Project Settings editor, clear the Title bar check box.
6. Create a graphic display called Main Menu. In the display create navigation buttons that give the operator access to the different displays in the application. Assign a security code to the display so that only authorized users can open it.
7. 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.
Password	Opens the Change Password dialog box so the user can specify a new password.
Goto display	Opens the Main Menu graphic display.
Shutdown	Shuts down the application.

8. Set up the goto display button in the Log In display to open the Main Menu display. If desired, attach visibility animation to the goto display button, so that only logged-in users can see the button.

   For more information, see the example on page 13-24.
9. Attach visibility animation to the shutdown button, so that only authorized users can see (and therefore use) the button.

   For more information, see the example on page 13-25.
10. Specify captions for the buttons, and add explanatory text to the graphic display. If desired, attach visibility animation to the text as well.
11. In the Display Settings dialog box, assign the security code * to the Log In display.
12. In the Startup editor, in the Initial graphic box, select the Log In display.

Until an authorized user is logged in, further access to the application is denied. In addition, only authorized users can stop the application.

Users who have access to the application can use the application and log out. Make sure you provide a way for users to navigate back to the Log In display to log out.

ℹ 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.

You can also use the Remote Display Number connection 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 application. For an example, see page 8-6.

For more information about	See
Using the Project Settings editor	Chapter 4
Attaching animation to graphic objects	Chapter 17
Setting up display navigation	Chapter 24
Using the Startup editor	Chapter 25
Logging in, logging out, and changing passwords	Chapter 28
Stopping applications	Chapter 26

Example: 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 RSView 3.x user names use uppercase letters.

When the application starts, the DEFAULT user is logged in. The DEFAULT user is also logged in 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: 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 application.

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: Assigning visibility animation to the shutdown button

This example shows how to assign visibility animation to the shutdown button so that only users assigned code G or code H can stop the application.

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:

   CurrentUserHasCode(GH)
3. For the Expression True State, click Visible.
4. Click Apply.

14 Using graphic displays

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

- use the Graphics editor.
- set up graphic displays.
- create a background for your displays.
- use global objects.
- 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.

Before creating graphic displays, specify project settings. Project settings determine important aspects of your graphic display such as size and position. For more information, see page 4-10.

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 editor, or copy them from a global object display, from a graphic library, or from another application.

For information about creating and copying graphic objects, see Chapter 15.

You can use up to 1,000 tags per graphic display. This limit includes the tags contained in embedded variables.

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 need to limit access to certain types of information?

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

- 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 application?
- Will the application be available in multiple languages?

Review the chapters on planning, security, and navigation before you begin creating displays. Browse through the sample applications 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 application 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 application security to control access to displays	Chapter 13
Setting up display navigation and creating a display hierarchy	Chapter 24
Setting up how objects are used at runtime	Chapter 16

Using the Graphics editor

The Graphics editor opens when you create or open a graphic display, global object display, or graphic library. 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 workspace.

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 14-11.

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

   For information about creating graphic objects, see Chapter 15.

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.

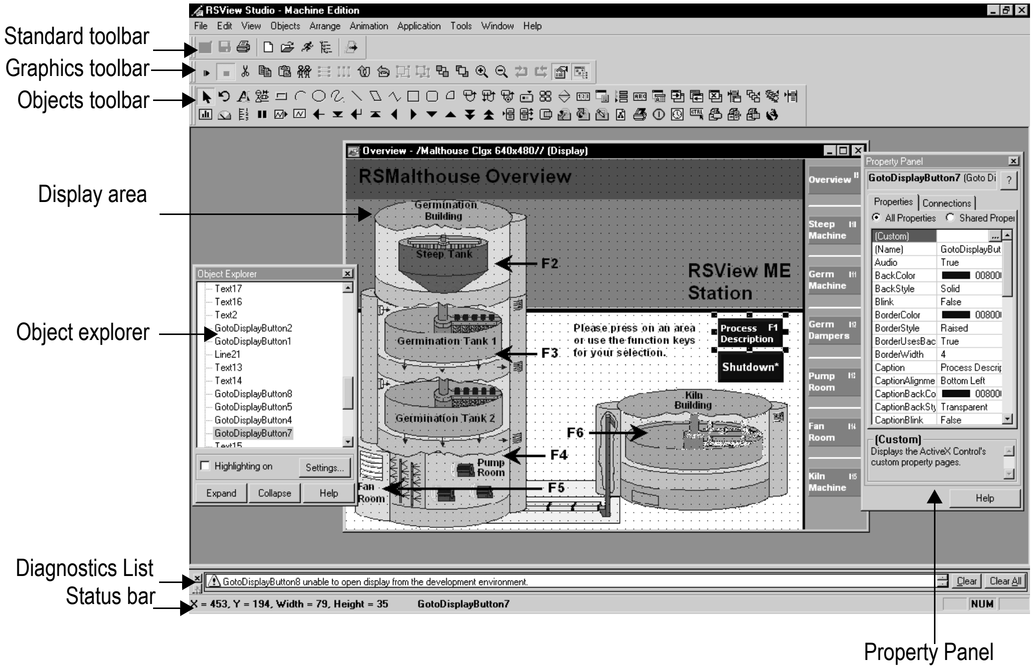
   The display is created as a Replace display by default, but you can change it to an On Top display in the Display Settings dialog box. For more information about display types, see page 14-12.

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 Explorer window to an empty area in the RSView® Studio™ workspace.

This example shows a graphic display from the Malthouse sample application, with the Explorer window closed.



Please press on an area or use the function keys for your selection.

GotoDisplayButton7 (Goto Di

(Custom)	...
(Name)	GotoDisplayBut
Audio	True
BackColor	■ 00800
BackStyle	Solid
Blink	False
BorderColor	■ 00800
BorderStyle	Raised
BorderUsesBac	True
BorderWidth	4
Caption	Process Descrip
CaptionAlignme	Bottom Left
CaptionBackCo	■ 00800
CaptionBackSty	Transparent
CaptionBlink	False

(Custom)
Displays the ActiveX Control's custom property pages.

GotoDisplayButton8 unable to open display from the development environment.

X = 453, Y = 194, Width = 79, Height = 35 GotoDisplayButton7

The Graphics editor has special items on the View and Edit menus, and extra toolbars.

For details about using the Graphics editor, see Help.

Importing and exporting graphic displays

Each graphic display's information is contained in a file called *Displayname*.gfx.

The Graphics Import Export Wizard in RSView Studio allows you to export this information to an XML file, or to import a graphic display XML file.

You can export the display information, import the graphic display XML file to another RSView application, and then modify it to suit your requirements. Or, you can modify the file before importing it.

You can use the Graphics Import Export Wizard to import graphic display information that has been created using an external programming tool or editor, or you can import an RSView XML file.

For more information about importing and exporting graphic display files, see Appendix E.

Tools and tips for working in the Graphics editor

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

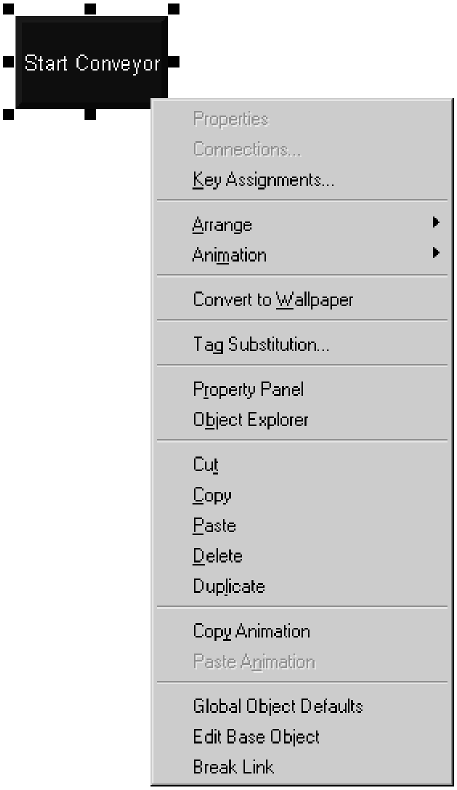
- use context menus and toolbars to perform actions quickly.
- view displays in grayscale to emulate the appearance of a PanelView Plus™ terminal.
- set up a grid that you can use to position and size objects precisely.
- zoom in when you need to look at details closely.
- correct mistakes.
- test your displays as you work.

Using context menus

No matter where you are in the Graphics 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.

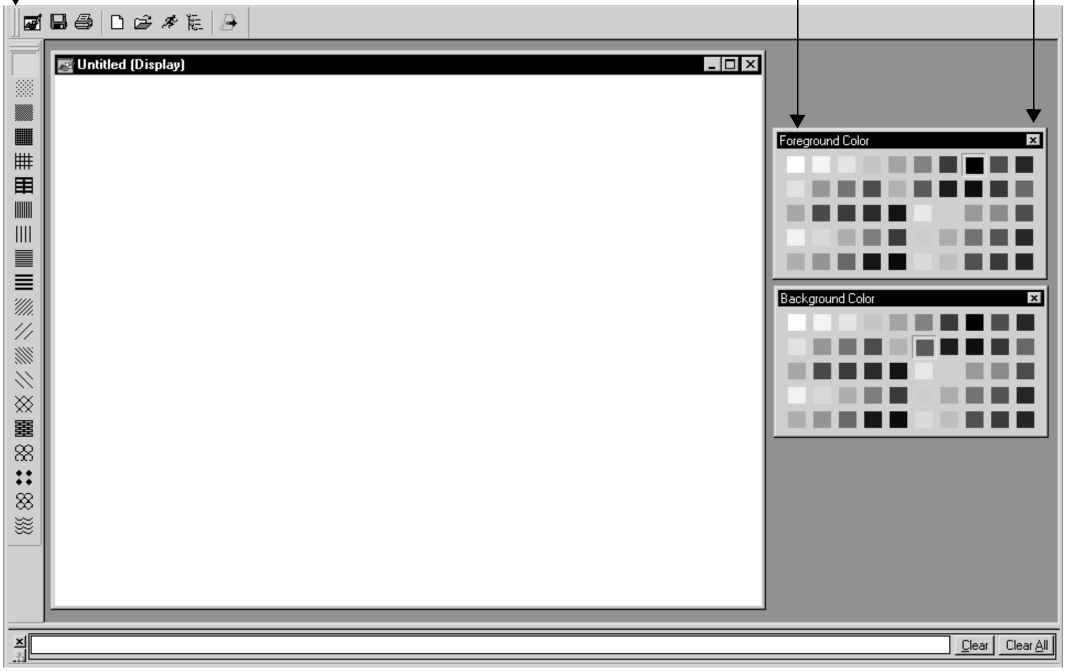
When you right-click an object...



...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 workspace by dragging the toolbars to any location on the screen. You can also dock them to the inside edges of the RSView Studio workspace.



Click the grab bars and drag to undock a docked toolbar.

Click the title bar and drag to move a floating (undocked) toolbar.

Click the Close button to close the toolbar.

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 workspace.

To close a toolbar

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

Showing displays in grayscale

You can set displays to appear in grayscale, especially for developing applications that will run on the PanelView Plus grayscale terminals. When Show Displays in Grayscale is checked (on the View menu), all open displays will change from full color to grayscale. When Show Displays in Grayscale is cleared, all open displays will appear in color.

Show Displays in Grayscale does not work in Test Application mode.

Third party ActiveX® objects will not appear in grayscale if Show Displays in Grayscale is checked.

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.

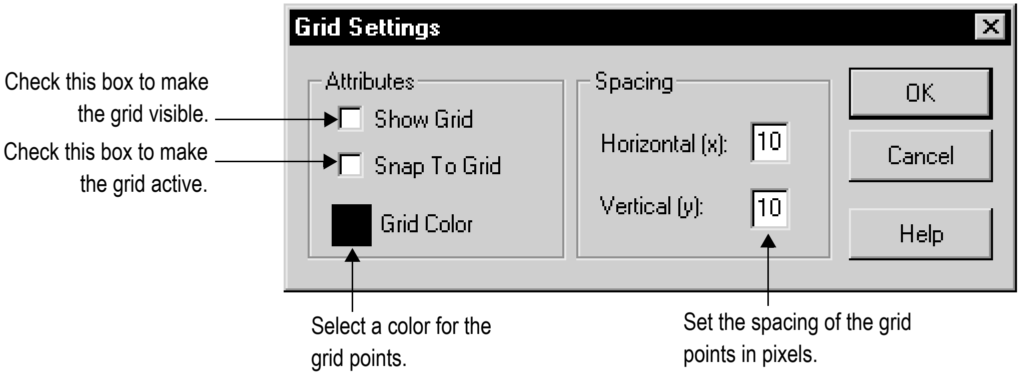
The grid can be active or passive. When the grid is active, all the objects you draw or position are pulled to the closest grid point. This makes it easy to align and size objects. When the grid is passive, it is visible but does not affect the position of your objects.

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 application 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.



Horizontal (x): 10

Vertical (y): 10

Check this box to make the grid visible.

Check this box to make the grid active.

Select a color for the grid points.

Set the spacing of the grid points in pixels.

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 click Snap On to toggle the option off.

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

To turn off the grid

- In the Grid Setting dialog box, clear the Show Grid check box, or on the View menu, click Show Grid to toggle the option off.

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 mode. When you are finished testing, switch back to edit mode to continue editing.

Test 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 application as described on page 25-2.

Using the Diagnostics List when in test mode

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

For information about using the Diagnostics List, see page 2-5. For information about specifying the types of messages to show in the Diagnostics List, see page 10-5.

Test Display tool

Edit Display tool

To use test mode

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

To return to edit 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.

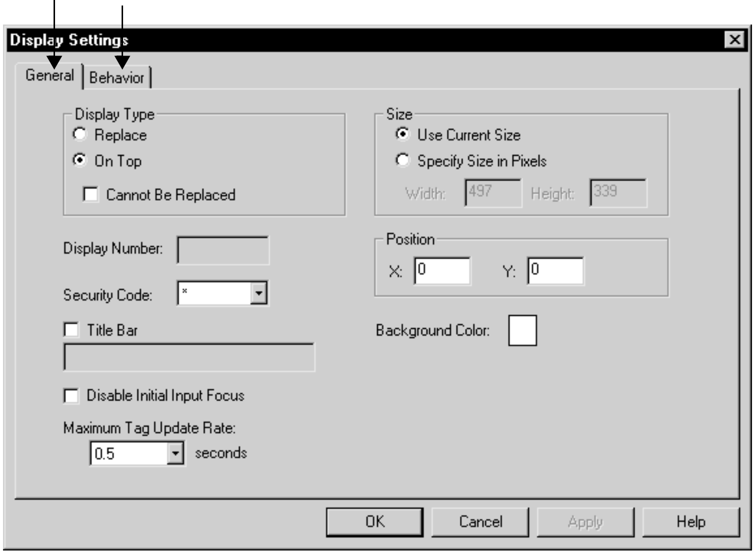
Specifying display settings

To specify display settings

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

Set up how the display looks.

Set up how the display works at runtime.



Display Settings

General | Behavior

Display Type
○ Replace
● On Top
□ Cannot Be Replaced

Size
● Use Current Size
○ Specify Size in Pixels
Width: 497 Height: 339

Display Number:

Position
X: 0 Y: 0

Security Code: *

□ Title Bar

Background Color: □

□ Disable Initial Input Focus

Maximum Tag Update Rate:
0.5 seconds

For details about the options in the Display Settings dialog box, see Help.

About display types

Replace displays

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 4-10.

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 FactoryTalk® Diagnostics™.

On Top displays

Use the On Top 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.

When an On Top display closes, the display that 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).

You can specify unique titles for On Top displays. The title text can switch languages at runtime.

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, you have the option of scaling graphic displays.

If you choose to scale graphic displays, all Replace and On Top displays are resized and the objects in them are scaled to fit the new size. You can also specify whether to scale the font size and border size of the graphic objects, and the size of graphic images in the Images folder.

If you choose not to scale displays when you change the project window size, 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 information about specifying the project window size, see page 4-10.

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.

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 15-25.

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

1. 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 global object displays

RSView global objects allow you to link the appearance and behavior of a graphic object to multiple copies of that object. When the original object is updated, the changes are automatically applied to all the copies of the object.

Global objects are created in global object displays, in the Global Objects folder of the Explorer window. The objects you create in a global object display are called base objects.

You can copy or drag base objects into standard graphic displays. The copied object is called a reference object. You can copy a global object into any number of graphic displays, and multiple times into the same graphic display. For more information about creating reference objects, see page 15-24.

Global object displays have the file extension .ggfx. They are stored in this default location.

\Documents and Settings\All Users\Documents\RSView Enterprise\ME\HMI projects*Application Name*\Global Objects (Windows® 2000)

or

\Documents and Settings\All Users\Shared Documents\RSView Enterprise\ME\HMI projects*Application Name*\Global Objects (Windows XP)

where *Application Name* is the name of your application.

Creating global object displays

You can create a global object display in the Global Objects folder, or create a graphic display in the Displays folder and then add the display to the Global Objects folder. You can also add library displays to the Global Objects folder.

To create a global object display

1. In the Graphics folder, right-click Global Objects, and then click New.
2. Create the objects you want to put in the display. These are called base objects.

   ℹ You can not use ActiveX objects as base objects. You cannot convert objects to wallpaper in the global object display.

   For information about creating graphic objects, see Chapter 15.

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 display, and then click OK.

   The display is added to the list in the Global Objects folder.

To add a display or library to the Global Objects folder

1. In the Explorer window, in the Graphics folder, right-click the Global Objects icon.
2. Click Add Component Into Application.
3. Browse to and select the display or library to add, and then click Open.

   The display is copied into the Global Objects folder, and given the file extension .ggfx.

   Any ActiveX objects are deleted. All other objects are converted to base objects.

ℹ If you delete, remove, or rename a global object display, you break the links between the base objects in the display and their reference objects. For more information about breaking links, see Help.

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 application. 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 application.
- 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 15-44.

- use the objects as they are or change them to suit your needs.
- create your own libraries of objects.
- create libraries of displays that are translated into multiple languages.
- use libraries as displays in your application.

To open a graphic library

1. In the Explorer window, 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 15.

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 library, and then click OK.

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

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

To add a graphic display to the library

1. Create the graphic display.
2. In the Explorer window, in the Graphics folder, right-click the Libraries icon.
3. Click Add Component Into Application.
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*Application Name* (Windows 2000)

or

\Documents and Settings\All Users\Shared Documents\RSView Enterprise\ME\HMI projects*Application Name* (Windows XP)

where *Application Name* is the name of your application.

5. Click Open. The display is copied into the Libraries folder.

Using libraries as displays in your application

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 application's folder of graphic displays.

If the library doesn't contain strings for languages supported by the current application, the undefined strings are displayed with question marks (?).

To use a library as a display in your application

1. In the Explorer window, in the Graphics folder, right-click the Displays icon.
2. Click Add Component Into Application.
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 (Windows 2000)

   or

   \Documents and Settings\All Users\Shared Documents\RSView Enterprise\ME (Windows XP)
4. Click Open. The library is copied into the Displays folder.

Using libraries to store displays with multiple languages

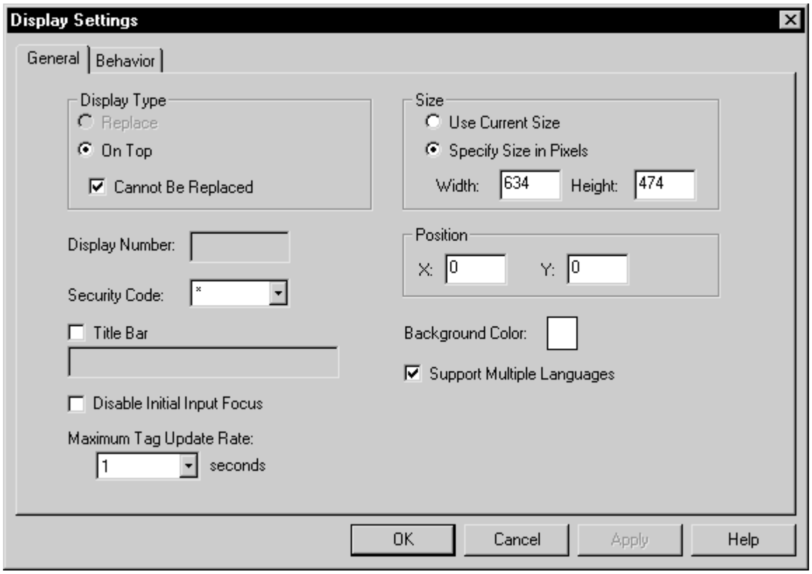
The maximum number of languages an application can use is 20. Since the libraries are stored outside of the HMI project folder and are available to all applications, they do not have this limit. However, since they are not stored in the HMI project folder, you cannot export the strings in library displays for translation. Instead, export a graphic display for translation, import the translated strings, then add the display into the library.

When you use a library display in your application, make sure you add to your application the languages that you plan to use from the library.

To save a library display with multiple languages

1. Create a graphic display.
2. Export the text for your application, which will include the text used in the graphic display.
3. Translate the text strings into each desired language, saving the file with a new name for each language.
4. Import the files for all the new languages.
5. Add the graphic display to the Libraries folder.

   The library is created with the option Support Multiple Languages selected (in the Display Settings dialog box).



Display Type: ○ Replace ● On Top

☑ Cannot Be Replaced

Size: ○ Use Current Size ● Specify Size in Pixels

Width: 634 Height: 474

Position: X: 0 Y: 0

Display Number:

Security Code: *

□ Title Bar

Background Color: □

☑ Support Multiple Languages

□ Disable Initial Input Focus

Maximum Tag Update Rate: 1 seconds

For detailed information about importing and exporting to use multiple languages, see Chapter 23.

To save a library display with more than 20 languages

1. Create a display in one application, with up to 20 languages, and add it to the library, as described in the previous section.
2. Add the display into a new application, with up to 20 different languages in the new application.
3. Export the text for your application, which will include the text used in the graphic display.
4. Translate the text strings into each desired language, saving the file with a new name for each language.
5. Import the files for the new languages.
6. Add the graphic display (with the same name as the display in step 1) to the Libraries folder.

   The new languages are added to the library. Make sure the display contains the same objects as the original display. Otherwise the new display will overwrite the previous display, and all the original language strings will be undefined.

What is displayed

When you open a library that supports multiple languages, the strings are displayed using the current application language, if available. If the library does not contain the current language, the strings are displayed as single question marks. Similarly, if the library contains the language but not all the strings are defined for the language, undefined strings are displayed as single question marks.

For more information about using multiple languages with graphic libraries, see Chapter 23.

Location of library components

The Libraries folder is located in:

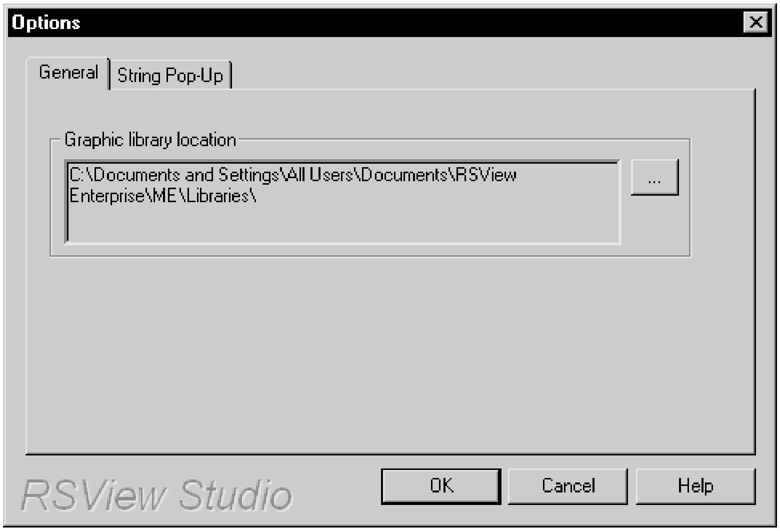
> \Documents and Settings\All Users\Documents\RSView Enterprise\ME (Windows 2000)
>
> or
>
> \Documents and Settings\All Users\Shared Documents\RSView Enterprise\ME (Windows XP)

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.



Graphic library location: C:\Documents and Settings\All Users\Documents\RSView Enterprise\ME\Libraries\

For details about using the Options dialog box, see Help.

Importing images into your application

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

- .bmp—bitmap images
- .jpg—JPEG images
- .dxf—AutoCAD® files
- .wmf—Windows metafiles

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 15-21.

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 set up the foreground and background colors for the monochrome images that you use for your objects.

For color images, including JPEG 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 setting up objects, see Help.

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 (Windows 2000)

or

\Documents and Settings\All Users\Shared Documents\RSView Enterprise\Images (Windows XP)

The images are in folders called Arrows, DIN, ISA, ListKey, and Parts.

Importing bitmap and JPEG images

To use bitmap and JPEG images, you can:

- import the images first, and then place them in your displays as needed. This method is useful for images that you use to illustrate your displays.

  For information about placing images in your display once you’ve imported them, see page 15-16.

- use the Image Browser to import images as needed while setting up your graphic objects. This method is useful for images that you use as labels on your graphic objects.

  For information about using the Image Browser, see page 14-23.

- copy and paste images from the graphic libraries.

  For information about copying and pasting objects, see page 15-44.

- copy and paste images from one application to another.

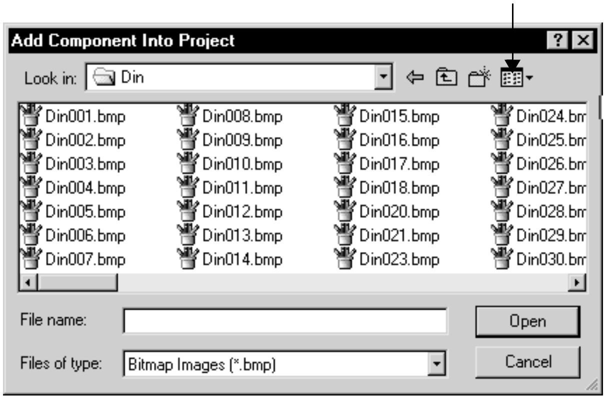
  For information about opening two applications at once, see page 4-9.

If you will be using images that have more than 256 colors, before importing the images set up 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 images, see page 14-24.

To import bitmap and JPEG images

1. In the Graphics folder, right-click Images and then click Add Component Into Application.

To view the images, click this button, and then click Thumbnails.



2. In the Files of type box, select the type of image to add.

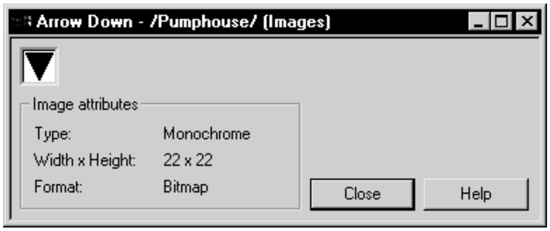
3. Navigate to the directory where the .bmp or .jpg file is stored, and then click the file name.

   Shift-click or Ctrl-click to select additional files.

4. Click Open to add the selected files to the list in the Images folder.

To view an image that you've already imported

1. In the Images folder, double-click the image name, or right-click it and then click Open.



Arrow Down - /Pumphouse/ (Images)

Image attributes

Type: Monochrome

Width x Height: 22 x 22

Format: Bitmap

Using the Image Browser to import images

Use the Image Browser to import images as needed while you set up graphic objects.

In the Image Browser you can:

- import images into the application.
- select the image to use on a graphic object.
- delete images from the application.

To open the Image Browser, use one of these methods

...

Browse button

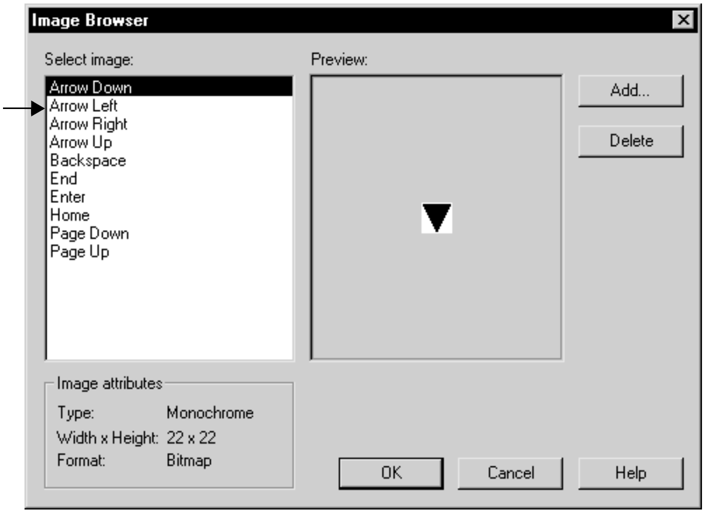
- In an object's Properties dialog box, click the Browse button next to the Image box.

  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 15-30.

- 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 15-31.



Click an image to select it.

Image Browser

Select image:

- Arrow Down
- Arrow Left
- Arrow Right
- Arrow Up
- Backspace
- End
- Enter
- Home
- Page Down
- Page Up

Image attributes

Type:	Monochrome
Width x Height:	22 x 22
Format:	Bitmap

For details about using the Image Browser to import, select, and delete images, see Help.

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 2-16.

Tips for using images

Using bitmaps versus JPEG images

When deciding whether to use a bitmap image or a JPEG image, consider these points:

- RSView supports 256 color (grayscale) and 16 million color JPEG images only. For all other color types, use bitmaps.
- For large color images (16 million color, 320 x 240 pixels or larger), JPEG images load faster than bitmaps. In all other cases, bitmaps load faster than JPEGs.
- Color JPEG images have a much smaller file size than the equivalent bitmap image, and therefore require less disk space at runtime.

Guidelines for using images

Images consume Windows resources, so when using graphic images use the lowest color depth possible.

The more colors you use, the more memory is consumed, and the longer the image takes to load and display.

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 bitmap 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.

Use images with a similar pixel size to the size of the RSView object on which the image will be placed. RSView resizes the image to fit the object, but if you use an image that is much larger than the object, the display will be slow to open at runtime, due to the time required to resize the image.

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 setting up 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 application 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.

Parameters can replace any portion of a tag address. For example, you can use parameters to replace folder names.

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 15-41.

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 editor, create graphic objects and assign tag placeholders to the objects.

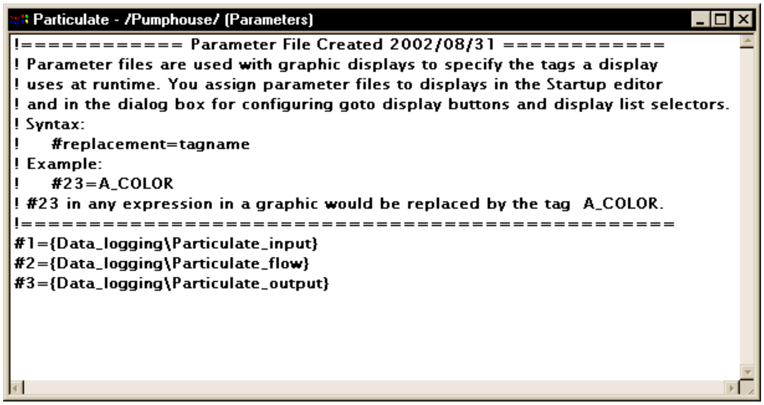
   For information about creating graphic objects and assigning tag placeholders, see Chapter 15.
3. In the Graphics editor, create goto display buttons or display list selectors for opening the display containing tag placeholders. Specify the appropriate parameter files in the Goto Display Button Properties dialog box or Display List Selector Properties dialog box.

   For information about setting up goto display buttons, see page 16-36. For information about setting up display list selectors, see page 16-38.
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 25.

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.



```
!============ Parameter File Created 2002/08/31 ============
! Parameter files are used with graphic displays to specify the tags a display
! uses at runtime. You assign parameter files to displays in the Startup editor
! and in the dialog box for configuring goto display buttons and display list selectors.
! Syntax:
!     #replacement=tagname
! Example:
!     #23=A_COLOR
! #23 in any expression in a graphic would be replaced by the tag  A_COLOR.
!==============================================
#1={Data_logging\Particulate_input}
#2={Data_logging\Particulate_flow}
#3={Data_logging\Particulate_output}
```

For details about using the Parameters editor, see Help. To open the Help, press F1 on your keyboard.

Assigning parameter files to graphic displays

You can use parameter files with:

- the graphic display that opens when the application 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.
- graphic displays that are opened using display list selectors. Specify the graphic displays to open, and the parameter files to use with them, when you set up the display list selector.

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. You can use both HMI and data server 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

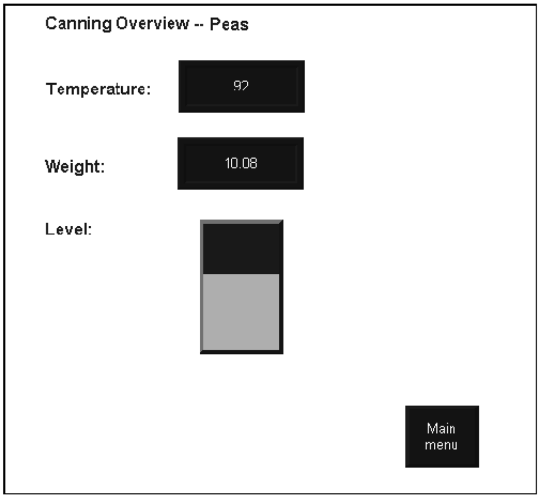
3. In the Canning Overview display, assign tag placeholders to the Value connections for these graphic objects:

This graphic object	Uses this tag placeholder
String display	#1
Numeric display 1	#2
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 a display list selector for opening the Canning display, with two states.
6. Assign the Corn parameter file to one state, and the Peas parameter file to the other.
7. Call the captions for the states Corn and Peas, respectively.

At runtime, when the operator selects the Peas state on the display list selector in the Main Menu, and presses the Enter key, the Canning Overview display opens and shows the values of the Pea_ tags. When the operator selects the Corn state, the values of the Corn_ tags are displayed.

The Canning Overview display looks like this when the operator selects the Peas state:



Canning Overview -- Peas

Temperature: 92

Weight: 10.08

Level:

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 application, 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.

Local messages versus information 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 12.

Summary of steps

Follow these steps to set up local messages:

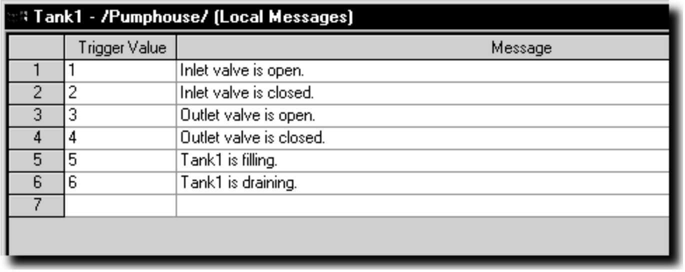
1. In the Local Messages editor, set up the messages and their trigger values.

2. In the Graphics editor, create local message display objects in the graphic displays in which you want the messages to appear at runtime. For each local message display, assign a tag or expression to the Value connection and specify the file of messages to display.

   For information about creating graphic objects, see Chapter 15. For information about setting up local message display objects, see page 16-54.

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.



Tank1 - /Pumphouse/ (Local Messages)

	Trigger Value	Message
1	1	Inlet valve is open.
2	2	Inlet valve is closed.
3	3	Outlet valve is open.
4	4	Outlet valve is closed.
5	5	Tank1 is filling.
6	6	Tank1 is draining.
7		

You can define up to 10,000 messages in each message file.

For details about using the Local Messages editor, see Help.

Preparing to set up local messages

As your application is running, information is continually sent to the data source about the state of various processes. For example, your application 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 RSView documentation uses the term data source as a generic term that includes all possible sources of tag data, for both data server tags and HMI tags. The data source can be memory or a device such as a programmable controller or OPC server. RSView writes values to and reads values from the data source. The data source is set up to exchange information (in the form of numeric or string values) between RSView and the machine that your application 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 HMI 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 connection assigned to the object matches a message's trigger value
- Value connection—a tag or expression. When the value of this connection 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 a 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 editor, create a local message display object. In the object's Properties dialog box, assign the Hoist_Status tag to the Value connection, 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 set up the data source to send the trigger value to the Value connection. You can use both HMI and data server tags

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 7-2.

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 connection's value is 0, the local message display object is cleared.

Creating local messages in multiple languages

RSView supports local messages in multiple languages. Use the CurrentLanguage( ) expression function to specify message offsets in the local message file. In the file, divide your messages into sections for each language. For information about the CurrentLanguage( ) function, see page 20-14. Also see the following example.

You can export the text strings in your local message files for translation. Then paste the translated strings into the original file. RSView does not support direct importing of the translated message text. For information about exporting text for translation, see Chapter 23.

Example: Setting up local messages in multiple languages

This example shows how to generate English, French, or German local messages at runtime, depending on which language the application is using.

1. Create a local message file, with English messages for trigger values 1 to 10.
2. Create French messages for trigger values 11 to 20.
3. Create German messages for trigger values 21 to 30.
4. Assign the local message file to a local message display graphic object.
5. Assign this expression to the Value connection for the local message display graphic object:

```
If CurrentLanguage( )=”en-US” then Local_messages
Else If CurrentLanguage( )=”fr-FR” then Local_messages + 10
Else Local_messages + 20
```

How the local message display graphic object works

When you open a graphic display at runtime, RSView reads the value of the Value connection and updates the local message display object based on the value.

What is displayed

- If the Value connection is unassigned, the display is filled with question marks (?).
- The Value connection 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 question marks.

  For information about how values are rounded, see page 7-2.

- If the message is too long to fit in the object, the last displayed character is replaced with an asterisk (*).
- When the Value connection'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 application, 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 2-17.

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 about specifying which printer to use at runtime for Windows 2000 or Windows XP applications, see page 26-10.

For information about specifying printer options for applications that will run on a PanelView Plus terminal, see the *PanelView Plus Terminals User Manual*.

For information about specifying printer options for applications that will run on a VersaView® CE terminal, see the *VersaView CE Terminals User Manual*.

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 15.

- Assign a tag or expression to the Remote Display Print connection (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 8-2.

15 Using graphic objects

This chapter describes the types of graphic objects and outlines how to:

- create graphic objects, including drawing and ActiveX® objects.
- create reference objects
- select and deselect objects and use the Object Explorer.
- use the Properties dialog box and Property Panel to set up objects.
- color and 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 setting up graphic objects once you've created them, see Chapter 16.

For examples of how to set up objects, see the sample applications that come with RSView® Studio™. The Help also provides examples of how to use objects.

Types of graphic objects

The elements that make up a graphic display are called graphic objects. Use objects to control your process, machines, and application.

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 application. 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 application, machines, 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 connections

Many of the objects use connections to interact with the data source. A connection is the link between the object and the data source. Depending on an object's function, the object may have more than one connection. For example, a momentary push button has a Value connection and an Indicator connection. The Value connection is used to set a value at the data source, and the Indicator connection is used to display the data source value in your graphic display.

By assigning tags or expressions to an object's connections, you control the flow of data between the application and the data source, which in turn controls your process or machines. Assign tags or expressions to an object's connections in the Connections tab of the object's Properties dialog box (see page 15-28) or in the Connections tab of the Property Panel (see page 15-31).

Illustrating your displays

Use this graphic object	To do this
Text	Create text for labels or instructions in the display. See page 15-14.
Image	Place images in your display. For more information, see page 15-15.
Panel	Draw rectangles that have borders. See page 15-17.
Arc	Draw an arc (a segment of an ellipse or circle's perimeter). See page 15-17.
Ellipse	Draw ellipses and circles. See page 15-18.
Freehand	Draw freehand shapes as you would with a pen on paper. See page 15-18.
Line	Draw straight diagonal, horizontal, and vertical lines. See page 15-19.
Polygon	Draw a series of connected straight lines forming a closed shape. See page 15-19.
Polyline	Draw a series of connected straight lines. See page 15-19.
Rectangle	Draw rectangles and squares. See page 15-20.
Rounded rectangle	Draw rectangles and squares with rounded corners. See page 15-21.
Wedge	Draw a filled segment of an ellipse or circle. See page 15-17.

Controlling the application

Use this graphic object	To do this
Goto display button	Open a graphic display. For details, see page 24-4.
Return to display button	Close a display and return to the previous display. For details, see page 24-5.
Close display button	Close a display. Can also send a value to a tag. For details, see page 24-6.
Display list selector	Select a display to open from a list of displays. For details, see page 24-6.
Display print button	Print the current display. For details, see page 14-34.
Language switch button	Switch the application language. For details, see .
Login button	Open the Login dialog box and then log in. For details, see page 13-13.
Logout button	Log out of the application. For details, see page 13-14.
Password button	Change the current user's password. For details, see page 28-4.
Shutdown button	Stop the application and shut down RSView ME Station™. For details, see page 24-7.
Goto configure mode button	Stop the application and open the RSView ME Station dialog box. For details, see page 24-4.

Use this graphic object	To do this
Print alarm history button	Print a report of alarm messages in the alarm log file. You can print a report for all alarms, or for a specified alarm trigger. For details, see page 16-57.
Print alarm status button	Print a report of the status of alarms, including how many times each alarm was triggered and the time in alarm. You can print a report for all alarms, or for a specified alarm trigger. For details, see page 16-57.

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 16-21.
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 16-22.
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 connection. For details, see page 16-24.
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 an operation by showing a different color, caption, or image to reflect the different states. For details, see page 16-25.
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 16-27. You can also use a single interlocked push button to send a value to a tag.
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 16-28.
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 16-48.
Piloted 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 or a remote device such as a programmable controller can scroll through the list to select a different state. For details, see page 16-51.

Use this graphic object	To do this
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 17.
ActiveX object	Change tag values using a third-party object connected to an analog, digital, or string tag, including both HMI and data server tags. When the object's property value changes, the new value is written to the associated tag. For details, see page 15-22.

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 16-46.
Gauge	Numeric values in dial format. The gauge's needle moves around the dial to show the changing value. For details, see page 16-47.
Scale	A static indication of the range of values for a bar graph. For details, see page 16-48.
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 set up to correspond to a numeric tag value. For details, see page 16-40.
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 16-41.
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 16-43.
Trend	Historical or current 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 18.
Time and date display	Display the current time and date. For details, see page 16-56.

Use this graphic object	To display this
ActiveX object	Data using a third-party object connected to an analog, digital, or string tag, including both HMI and data server tags. The format of the data displayed depends on the object. For details, see page 15-22.
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 17.

Working with lists, trends, alarm banners, and numeric input objects

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 Piloted 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 in the list. Trend—resume trend scrolling and move to the current (latest) data in the trend.
Enter button	Lists Alarm list and alarm banner	Select the item the cursor is pointing to. Acknowledge the currently selected alarm.
Home button	Lists and trends	List—move to the top item 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, trends, and numeric input objects	List—move up or down one item in the list. Trend—scroll up or down to display higher or lower values on the vertical scale. Numeric input cursor point and numeric input enable button—ramp the value up or down.
Page up / down buttons	Lists	Move up or down one page in the list.
Acknowledge alarm button	Alarm list Alarm banner	Acknowledge and silence the selected alarm.
Alarm status mode button	Alarm status list	Change the type of alarms displayed in the alarm status list, from all alarms to active alarms to past alarms.
Clear alarm banner button	Alarm banner	Clear the alarm in the alarm banner without removing the alarm from the alarm log file and alarm lists.
Diagnostics clear button	Diagnostics list	Remove the selected message from all diagnostics 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, alarm banner, or trend object	Page 10
Using buttons with alarm lists, alarm banners, and alarm status lists	Page 35
Using buttons with information message displays	Page 7
Using buttons with diagnostics lists	Page 12
Using buttons with trends	Page 11

Unlike the buttons in the previous table, the following buttons do not work with specific graphic objects. You can use them to work directly with alarms in the alarm history and with the application's diagnostics messages.

Use this button	To do this
Acknowledge all alarms button	Acknowledge and silence all currently unacknowledged alarms, or the alarms for a specific alarm trigger.
Clear alarm history button	Remove alarms from the alarm log file and all alarm lists. You can remove all alarms, or just the alarms for a specific alarm trigger. You can also reset the cleared alarms. This resets the number of times an alarm has been triggered to 0, and the accumulated time in alarm to 0.
Reset alarm status button	Reset the number of times an alarm has been triggered to 0, and the accumulated time in alarm to 0, for all alarms.
Silence alarms button	Silence the audio indicator for all current alarms (Windows® 2000 and Windows XP applications only).
Sort alarms button	Toggle between sorting alarms in alarm lists and the alarm log file by time and by trigger value.
Diagnostics clear all button	Remove all diagnostics messages from all diagnostic lists.

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, or ramp a value at the data source. For details, see page 28-6.
Numeric input cursor point	Enter a numeric value and then write the value to a tag or an expression, or ramp a value at the data source. For details, see page 28-6.
String input enable button	Enter a string value and then write the value to a tag. For details, see page 28-10.
Numeric display	Display numeric tag values. For example, display the current temperature of an oven. For details, see page 16-29.
String display	Display string tag values. For example, set up the data source to generate strings that report on the state of a process of operation, or that provide the operator with instructions about what to do next. For details, see page 16-34.
RecipePlus button	Display data set and tag values for ingredients in the RecipePlus table. Write tag values from the selected data set to the data source. Write tag values from the data source to the selected data set or to a new data set. Save data set values from the table to a recipe file. For details, see page 19-3.
RecipePlus selector	Select the recipe and unit to display, download from, or write to. For details, see page 19-2.
RecipePlus table	Display and compare recipe data set values and tag values. Edit data set values. For details, see page 19-2.
ActiveX object	Enter or display data using a third-party object connected to an analog, digital, or string tag, including both HMI and data server tags. The format of the data entered or displayed depends on the object. For details, see page 15-22.

Displaying alarms and messages

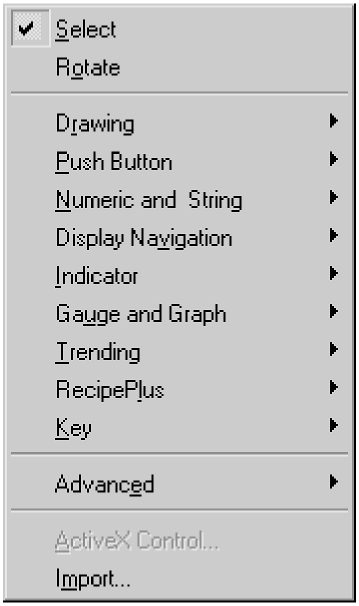
Use this graphic object	To display this
Alarm list	Multiple alarm messages, including the time the alarms are triggered and acknowledged. For details, see page 9-31.

Use this graphic object	To display this
Alarm banner	A single unacknowledged alarm message. For details, see page 9-33.
Alarm status list	The status of alarms, including how many times an alarm has been triggered and how long it has been active. For details, see page 9-34.
Diagnostics list	Messages about system activity such as tag reads, tag writes, and communications errors. For details, see page 10-11.
Information message display	Messages about the process, prompts or instructions, and information about current states. For details, see page 12-6.
Local message display	Ongoing information about the status of devices or processes. For details, see page 14-33.

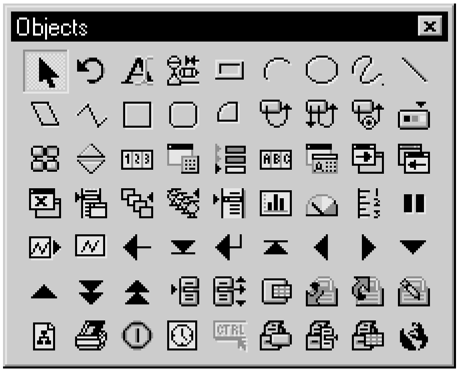
Selecting tools for creating graphic objects

The Objects menu in the Graphics 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



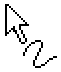
Objects toolbar



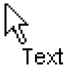
Before you can create an object, you must select the object's tool, either by clicking a menu item or by clicking the tool on the toolbar. When you position a cursor over a tool on the toolbar, the name of the tool is displayed in a tooltip and in the status bar.

To select a tool

1. 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.

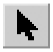


Freehand tool



Text tool

To deselect a tool, do one of the following



Select tool

- Double-click an empty area in the display.
- 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 15-13.

Before you begin creating objects

To size and position objects precisely as you create them, use the grid.

To use the grid

1. On the View menu, click Show Grid, and then click Snap On.

   For information about setting up the grid, see page 14-8.

The next sections describe how to create graphic objects. For information about setting up graphic objects once you've created them, see Chapter 16. For information about attaching animation to the objects you create, see Chapter 17.

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 15-22.

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 connections. For more information about the Properties dialog box, see page 15-28.

   You can also use the Property Panel to set up objects. For information about using the Property Panel, see page 15-31.

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 set up how the objects look. For information about using the Properties dialog box, see page 15-28.

You can also use the Property Panel to set up objects. For information about using the Property Panel, see page 15-31.

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.

For PanelView Plus™ and VersaView® CE terminals, you must use TrueType fonts.

If you run an application on a computer that does not have the fonts you used when setting up the application, Windows substitutes with the fonts that most closely match the fonts you specified.

Choosing fonts for language switching

If you are going to use the application with multiple languages, we recommend using Microsoft Sans Serif or Tahoma. These fonts allow for font linking to support the character sets of other languages. PanelView Plus and VersaView CE terminals are shipped with font linking turned on.

For more information about font linking, see Help. For more information about setting up languages for your application, see Chapter 23.

Using the Size to fit option

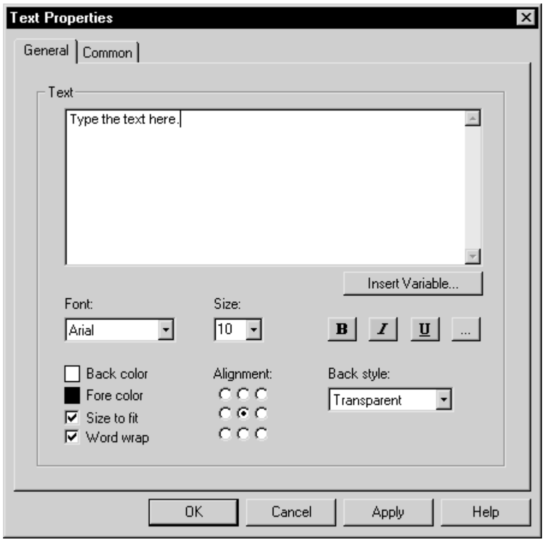
If you use the Size to fit option, the size of the text object will likely change for different languages. Make sure you check all displays containing translated language strings.

To create a text object

Text tool

1. Select the Text tool.
2. Click the mouse where you want to position the text, and then drag to draw a rectangle.

The Text Properties dialog box opens.



Text Properties

General | Common

Text: Type the text here.

Font: Arial

Size: 10

□ Back color
■ Fore color
☑ Size to fit
☑ Word wrap

Alignment:
○ ○ ○
○ ● ○
○ ○ ○

Back style: Transparent

3. Select text options.

   For information about the options in the dialog box, see Help.

4. To close the dialog box, click OK.

   The text is positioned where you drew the rectangle.

5. To create another text object, move to a new area in the display, and then repeat steps 2 through 4.

After you've set up 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. Double-click the text.

   The Text Properties dialog box opens.

2. In the Text box, click where you want to make the change. To delete text characters, use the Backspace and Delete keys.

Creating images

Use the image graphic object to place bitmap and JPEG images in your graphic displays.

Images support visibility animation only.

Using bitmaps and JPEG images

Before you can place a bitmap or JPEG image in a display, you must import the image into your application. For more information, see page 14-21.

To place a bitmap or JPEG image in a display

Image tool

1. Select the Image tool.
2. Click the mouse where you want to position the image, and then drag to draw a rectangle.

   The Image Browser opens.

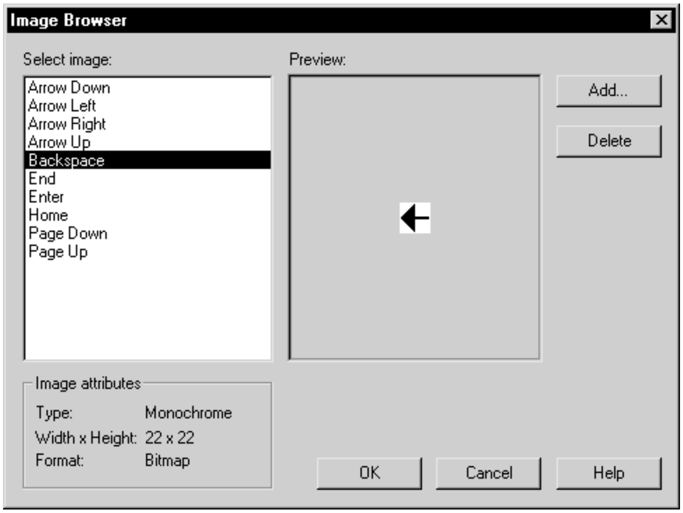


Image Browser

Select image:

- Arrow Down
- Arrow Left
- Arrow Right
- Arrow Up
- Backspace
- End
- Enter
- Home
- Page Down
- Page Up

Image attributes

Type:	Monochrome
Width x Height:	22 x 22
Format:	Bitmap

3. In the Select image list, click the image to place, and then click OK.

   For more information about using the Image Browser, see page 14-23.

   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.
4. To change the image's attributes, double-click the image to open the Image Properties dialog box.
5. Select image options.

   For information about the options in the dialog box, see Help.
6. Click OK to close the dialog box.

Creating panels

Panels support visibility animation only.

To create a panel

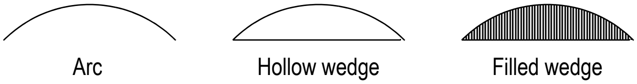
Panel tool

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. Select panel options.

   For information about the options in the dialog box, see Help.
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.



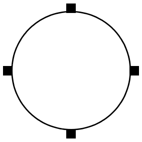
To create an arc or wedge

Arc tool

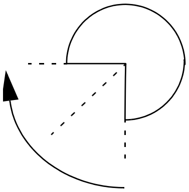
1. Select the Arc or Wedge tool.
2. Click the mouse where you want to position the object, and then drag to draw an ellipse or circle.

   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, 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. Select arc or wedge options.

   For information about the options in the dialog box, see Help.

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 15-47.

Creating ellipses and circles

Use the Ellipse tool to draw an ellipse or circle.

To create an ellipse or circle

Ellipse tool

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. Select circle or ellipse options.

   For information about the options in the dialog box, see Help.

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.

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. Select freehand options.

   For information about the options in the dialog box, see Help.
5. To close the dialog box, click OK.

Creating lines

To create a line

Line tool

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.

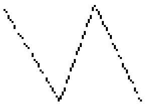
   To draw horizontal or vertical lines, hold down Ctrl while you drag the mouse.
3. To change how the line looks, right-click the line and then click Properties on the context menu. The Line Properties dialog box opens.
4. Select line options.

   For information about the options in the dialog box, see Help.
5. To close the dialog box, click OK.

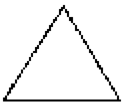
You can use the Polyline tool to convert the line into a polyline. For more information, see page 15-47.

Creating polygons and polylines

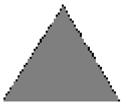
A polyline is a series of connected line segments. A polygon is a multi-sided object (with three or more sides). For example, use the polygon shape if you want to create triangles.



Polyline



Transparent · polygon



Solid · polygon

To create a polygon or polyline

1. Select the Polygon or Polyline tool.

Polygon tool

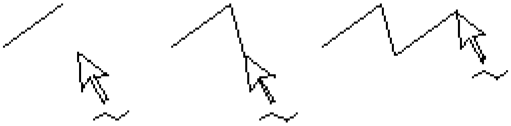
Polyline tool

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. Select polygon or polyline options.

   For information about the options in the dialog box, see Help.
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 15-47.

Creating rectangles and squares

To create a rectangle or square

Rectangle tool

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. Select rectangle or square options.

   For information about the options in the dialog box, see Help.

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 15-47.

Creating rounded rectangles and squares

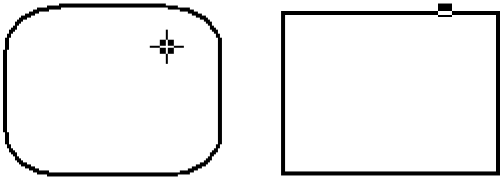
Due to a Windows limitation, you cannot rotate rounded rectangles and rounded squares.

To create a rounded rectangle or square

Rounded rectangle tool

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.
3. 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.



4. To finish drawing, 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. Select rounded rectangle or square options.

   For information about the options in the dialog box, see Help.
7. To close the dialog box, click OK.

For information about using the Rounded Rectangle tool to reshape the rounded rectangle, see page 15-48.

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.

Depending on the complexity of the metafile or AutoCAD file, the converted image could consist of 500 or more drawing objects. This would lead to long display load times. In this case, it would be better to covert the .wmf or .dxf file to a bitmap, and then display the bitmap in an image object.

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.
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 connections available for a particular ActiveX object depend on the third-party vendor’s implementation.

ActiveX objects support visibility animation only.

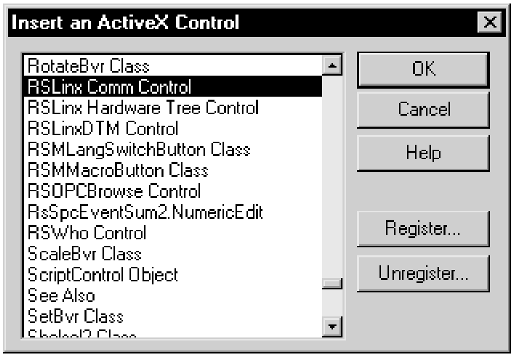
If your application will run on a VersaView CE terminal, the ActiveX object must be available for both the development system (Windows 2000 or Windows XP) and the VersaView CE terminal platform. Make sure you install and register the Windows CE version of the ActiveX object on the VersaView CE.

PanelView Plus terminals do not support ActiveX objects.

To create an ActiveX object

ActiveX Control tool

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 that opens, select the object to add to your graphic display.

   For information about the options in the dialog box, see Help.

4. Click OK.

   The object is placed in the display. Depending on how the third party implemented the object, it might be a different size than the rectangle you drew.

5. To specify the object's properties and assign tags or expressions to its connections, 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 might 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. If desired, set up the properties in the Common tab, as described on page 16-1.

8. In the Connections tab, assign tags or expressions to the object's connections.

9. 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 15-28. For information about using the Property Panel, see page 15-31.

Creating reference objects

RSView global objects allow you to link the appearance and behavior of a graphic object to multiple copies of that object. When the original base object is updated, the changes are automatically applied to all the copies of the object.

You can copy or drag base objects into standard graphic displays. Each copied object becomes a reference object. You can also copy, drag, and duplicate reference objects that you have already created to create more copies of the base object.

Base objects can be group objects. This provides powerful template capabilities. When you add or remove objects from the group, all the reference objects are automatically updated.

If desired, you can assign unique connections, animation, and size to the reference object.

For information about creating global object displays, see page 14-14.

To create a reference object

1. Copy an object from a global object display to a standard graphic display.
2. To assign unique connections, animation, or size to the object, double-click the object to open the Property Panel.

   For information about using the Property Panel, see page 15-31. For more information about working with reference objects, see page 16-3.

You can also create reference objects by adding a global object display to the Displays folder. All the objects in the new display are reference objects.

To add a global object display to the Displays folder

1. In the Explorer window, in the Graphics folder, right-click the Displays icon.
2. Click Add Component Into Application.
3. Browse to and select the global object display to add, and then click Open.

   The display is copied into the Displays folder, and given the file extension .gfx. All the objects are converted to reference objects.

To edit a reference object's base object

1. Right-click the reference object, and then click Edit Base Object.
2. The global object display containing the base object opens, with the object selected.
3. Make your changes to the base object.

All reference objects linked to the base object are updated.

To view the changes to the reference object, close the display containing the reference object, and then reopen it. Or, toggle the object's LinkSize property on and off.

Tools and tips for working with objects

This section describes features of the Graphics 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 set up the object's properties and assign tags and expressions to its connections.
- use the Property Panel to set up individual and group object properties, and to assign tags and expressions to individual objects' connections.
- 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 15-26.

To select the Select tool

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.

Selecting objects

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.

Deselecting objects

To deselect	Do this
An object	Ctrl-click the object.
Several objects	Press and hold Ctrl, and then 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 the object to the front. Objects are listed in front-to-back order. The object you created most recently is at the front, unless you move it back using the Send to Back option. For more information about layering objects, see page 15-51.

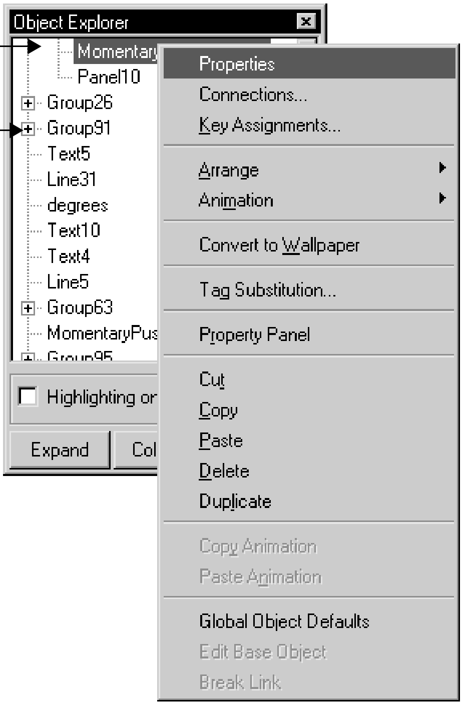
You can also use the Object Explorer to highlight objects by object type, highlight objects that have animation attached, and to highlight objects with specific tag or expression assignments. For more information, see page 15-27.

The Object Explorer does not show wallpaper objects, nor objects within ActiveX composite objects.

Show/Hide 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.



Right-click an object to open its context menu.

Click the + icon to view the objects and groups within a group.

You can keep the Object Explorer open as you work in the Graphics editor. For more information about using the Object Explorer, see Help.

Highlighting objects in the Object Explorer

You can use the Object Explorer to highlight:

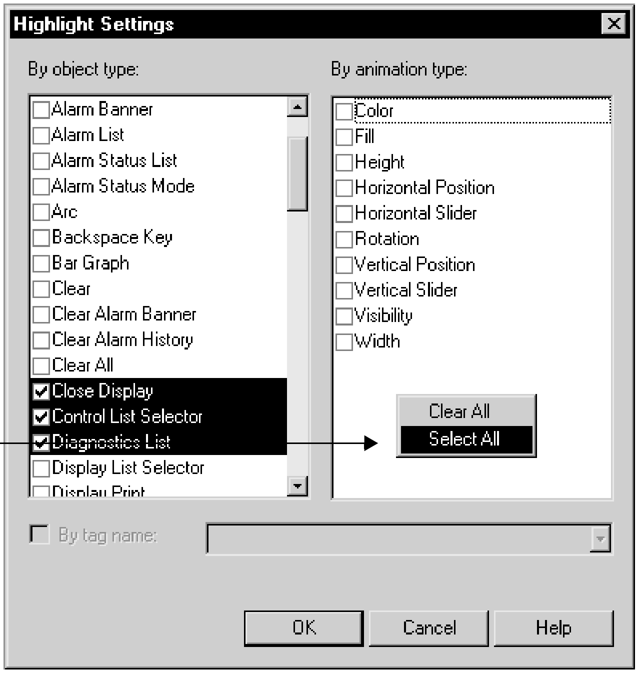
- specific types of objects
- objects that have animation attached

- objects that have a specific tag or expression assigned to them

The objects are highlighted in red in the Object Explorer and in the graphic display. If your graphic display uses a red background, the highlighting is not visible in the graphic display.

To highlight objects in the Object Explorer

1. In the Object Explorer, click Highlighting on, and then click Settings.



To clear all the check boxes, right-click the list and then click Clear All.

To select all the check boxes, right-click the list and then click Select All.

For details about the options in the Highlight Settings dialog box, see Help.

Using the Properties dialog box

Every graphic object has a Properties dialog box that you can use to set up 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 set up the object's properties and connections:

In this tab	Do this
General	Set up 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 16-6. For information about key navigation, see page 16-10. For information about linking buttons to objects, see page 16-10.
States	Set up 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 set up the way you intended, see page 15-37.
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 14-23.
Timing	Set up the object's auto repeat (see page 16-13) or Enter key handshaking (see page 16-14) settings.
Common	Set up the object's spatial properties, name and visibility. For details, see page 16-1.
Connections	Assign tags and expressions to the object's connections. For information about assigning tags and expressions, see page 15-38.

The tabs that are available depend on the object:

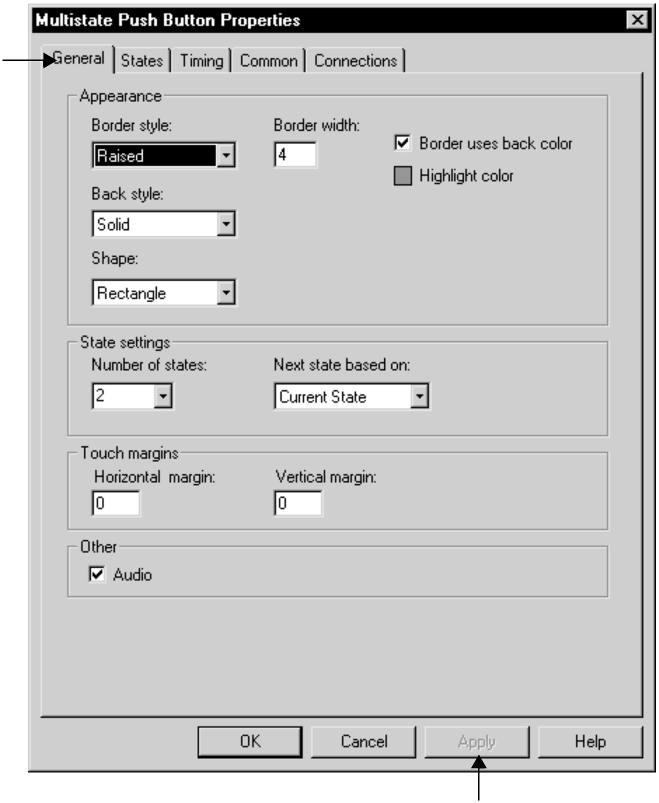
- Some objects have only General and Common tabs.
- If an object can have more than one state, the object's Properties dialog box contains a States tab.
- Some objects have unique tabs that are not listed in the table above.
- The tabs that an ActiveX object has depends on the vendor's implementation, 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.
- In the Property Panel, with the object selected, click the (Custom) property and then click the Browse button.

Browse button

- In the Property Panel, with the object selected, double-click the (Custom) property.
- In the Object Explorer, double-click the object.



Appearance

Border style: Raised

Border width: 4

☑ Border uses back color

□ Highlight color

Back style: Solid

Shape: Rectangle

State settings

Number of states: 2

Next state based on: Current State

Touch margins

Horizontal margin: 0

Vertical margin: 0

Other

☑ Audio

Click a tab to select it.

This button is available once you make changes in the dialog box. Click it to apply your changes without closing the dialog box. When you click a different tab, the changes in the current tab are applied automatically.

You can also use the Property Panel to set up an object’s properties, as described next.

For details about setting up a particular object, see Help.

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

Show/Hide 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.

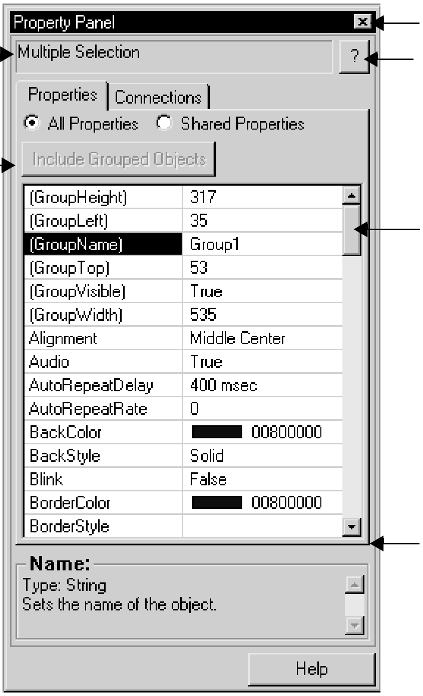
You can keep the Property Panel open as you work in the Graphics editor. You can drag the panel's borders to make the Property Panel larger or smaller.

Setting up properties

Use the Property Panel's Properties tab to set up the properties of the selected object or objects.

If only one object is selected, this box shows the object's name and type.

If a group object is selected, click this button to edit the properties of the objects within the group.



Multiple Selection

● All Properties ○ Shared Properties

(GroupHeight)	317
(GroupLeft)	35
(GroupName)	Group1
(GroupTop)	53
(GroupVisible)	True
(GroupWidth)	535
Alignment	Middle Center
Audio	True
AutoRepeatDelay	400 msec
AutoRepeatRate	0
BackColor	■ 00800000
BackStyle	Solid
Blink	False
BorderColor	■ 00800000
BorderStyle	

Name:
Type: String
Sets the name of the object.

Click to close.

Click for help on the selected property.

Scroll to see more properties...

...Or drag the splitter bar to see more properties.

For more information about using the Property Panel to set up an object's properties, see Help.

Assigning tags and expressions to an object’s connections

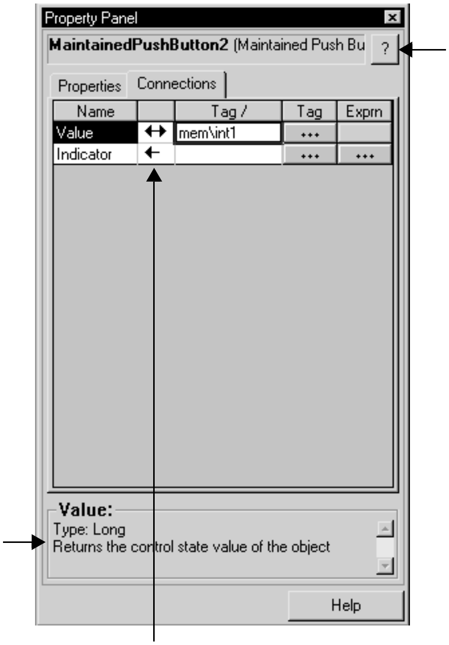
Use the Property Panel’s Connections tab to assign tags or expressions to the selected object’s connections. If multiple objects are selected the tab is blank, because you can assign tags or expressions to only one object at a time.

How values are updated

The arrows indicate the direction in which the data flows between the connection and the data source:

- A right arrow indicates that the connection sends values to the data source. The connection is a write connection.
- A left arrow indicates that the data source sends values to the connection. The connection is a read connection.

- A double arrow indicates that the data flows in both directions. The connection is a read-write connection.



MaintainedPushButton2 (Maintained Push Bu

Name		Tag /	Tag	Exprn
Value	↔	mem\int1	...	
Indicator	←		...	...

Value:
Type: Long
Returns the control state value of the object

Click for help on the selected connection.

This box describes the selected connection and indicates the type of data the connection uses.

The arrows show the direction in which data flows between the connection and the data source. If the connection is a read connection (arrow points left), data flows from the data source to the object. If the connection is a write connection (arrow points right), data flows from the object to the data source. If the connection is a read and write connection (double-headed arrow), data flows in both directions.

For more information about using the Property Panel to assign tags and expressions to an object's connections, see Help.

For more information about assigning tags and expressions to objects, see page 15-38.

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 set it up. 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	No	Yes
Background color	No	Yes
Border color	Yes	No
Caption color	Yes	No
Caption back color	No	Yes
Fore color	Yes	No
Foreground color	Yes	No
Image color	Yes	No
Image back color	No	Yes
Legend color	Yes	No
Needle color	Yes	No
Pattern color	Yes	No

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

1. On the View menu, select Toolbars, and then click Foreground Colors or Background Colors.

To close a color toolbar

1. 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. Each object in a display must have a unique name.

The object name appears in the status bar, Diagnostics List, Property Panel, and Object Explorer in RSView Studio, and in diagnostics log messages at runtime.

To name an object in the Property Panel

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 an object in its Properties dialog box

1. Double-click the object to open its Properties dialog box.
2. Click the Common tab.
3. In the Name box, 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.

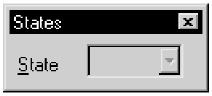
The name must start with a letter, and cannot contain spaces. You can use the underscore character (_).

Testing how objects look in different states

To make sure the different states for an object are set up correctly, you can view them using the States toolbar or the Property Panel.

To open the States toolbar

1. 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

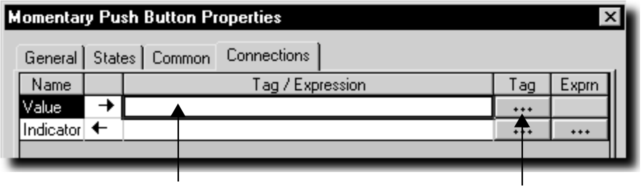
You can assign tags and expressions to many graphic objects, including ActiveX objects (depending, of course, on how the vendor implemented the object). This section describes how to:

- 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

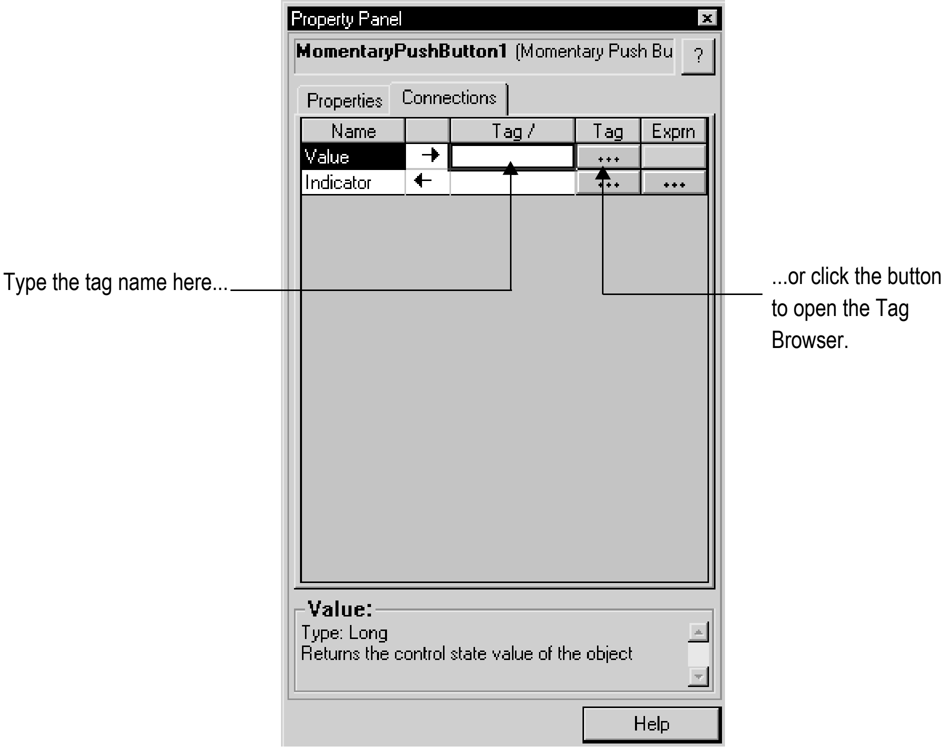
To assign tags to a graphic object, use one of these methods:

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



Type the tag name here... ...or click the button to open the Tag Browser.

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



Name		Tag /	Tag	Exprn
Value	→		...	
Indicator	←		...	...

Value:
Type: Long
Returns the control state value of the object

Type the tag name here...

...or click the button to open the Tag Browser.

- 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.

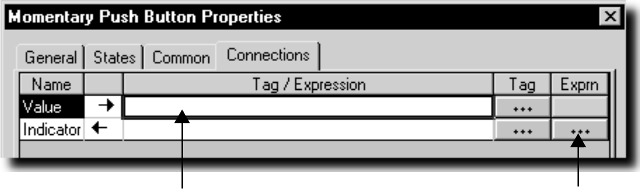
For information about:

- using the Tag Browser, see page 6-6.
- using the Properties dialog box, see page 15-28.
- using the Property Panel, see page 15-31.

Using expressions to manipulate tag values

Many of the connections 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.



Type the expression here...

...or click the button to open the Expression editor..

To specify an expression, do one of the following

- In the "Tag / 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 20.

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.
- tags contained in embedded variables.

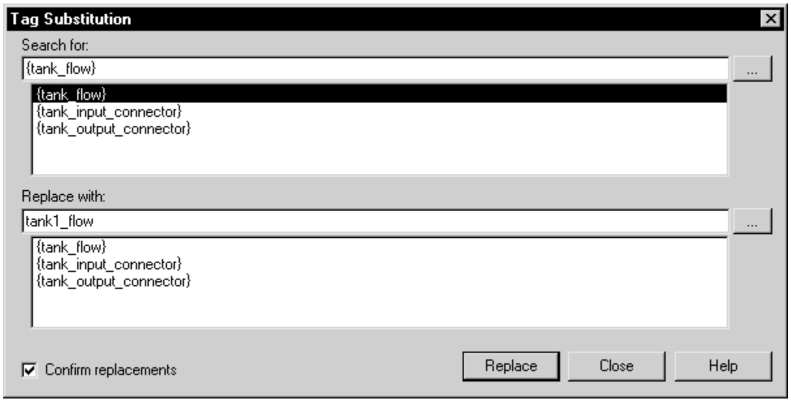
To replace tags

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, you can right-click it and then click Tag Substitution.



Tag Substitution

Search for: {tank_flow}

{tank_flow}
{tank_input_connector}
{tank_output_connector}

Replace with: tank1_flow

{tank_flow}
{tank_input_connector}
{tank_output_connector}

☑ Confirm replacements

For details about the options in the Tag Substitution dialog box, see Help.

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 and embedded variables. You can also use tag placeholders in the expressions you create to animate objects.

You can also assign tag placeholders to the connections for base objects, and to connections for reference objects with the LinkConnections property set to False.

You can use tag placeholders in:

- the graphic display that opens when the application is first run.

- graphic displays that are opened using a goto display button.
- graphic displays that are opened using a display list selector.

Use parameter files to specify which tags to substitute for which placeholders. For information about using parameter files, see page 14-25.

Creating tag placeholders

A tag placeholder is the cross-hatch character (#) followed by a number from 1 to 500.

The tag placeholder can replace any part of a tag name, including folder names. For example, you could create a parameter file specifying that the tag placeholder #1=Folder1. You could assign the folder and a tag name to a graphic object's connection: #1\Tag1.

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.
- anywhere that you can insert an embedded variable. For information about embedded variables, see Chapter 21.

To create a tag placeholder

1. 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 15-31.

You can also specify an object's position using the Common tab in the object's Properties dialog box. For more information, see page page 16-1.

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 15-52. For information about locking objects into position, see page 15-58.

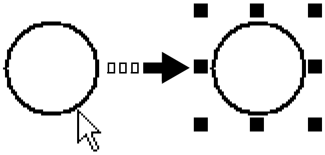
To automatically align objects to the grid as you move them

1. 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 14-8.

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.



Select the object.

Drag the object 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.

Copying objects with multiple languages

If an object has multiple language strings set up, copying the object copies all the languages. If the object is pasted into an application with different languages, only the strings for languages that are used by the application are pasted. If the new application has languages that are not set up for the object, those language strings are undefined and will be displayed with single question marks.

For more information about setting up multiple languages, see Chapter 23.

To copy 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 14-13.

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 application.
- a graphic library in the same or a different application.

To cut or copy objects

Cut tool

Copy tool

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

Paste tool

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.

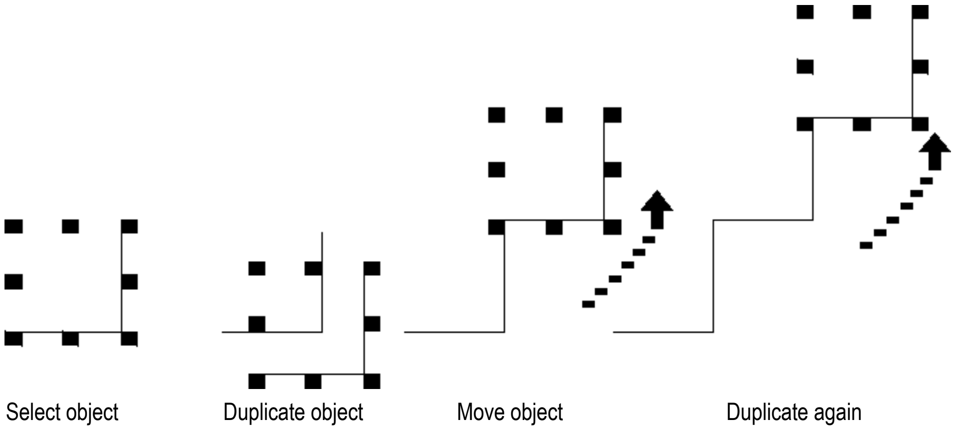
To duplicate objects

Duplicate tool

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 15-31.

You can also specify an object's size using the Common tab in the object's Properties dialog box. For more information, see page 16-1.

When you resize text objects, if you have selected the Size to fit option, 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

1. 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 14-8.

To resize an object using the mouse

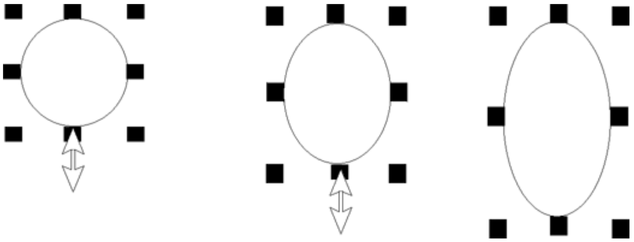
1. Select the object.

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.

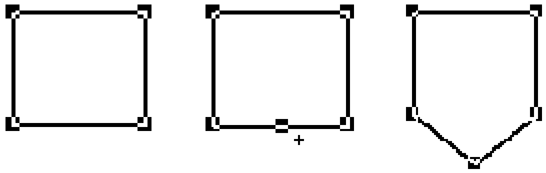
   The cursor changes to the Polygon tool, and handles appear on the object.

Polygon tool

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.

Arc tool

3. Place the pointer on one of the handles.

   A cross-hair appears.

Wedge tool

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.

Rounded rectangle tool

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.

Undo tool

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

1. 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 17-14.

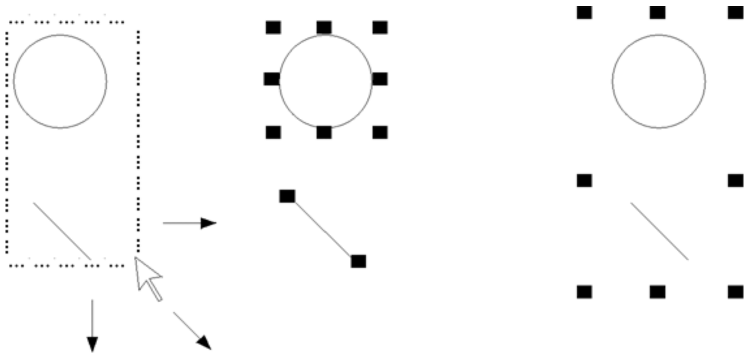
Deleting a group deletes all individual objects in the group.

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.

Group tool



Drag the mouse to select the objects.

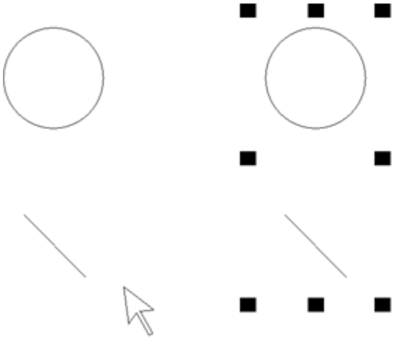
Group them.

To ungroup objects

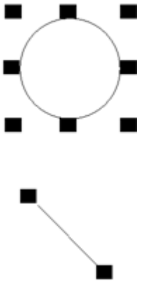
1. Select the group of objects to ungroup.
2. On the Arrange menu, click Ungroup, or on the Graphics toolbar click the Ungroup tool.

Ungroup tool

The handles around the group are replaced with handles around each object.



Select the group.



Ungroup it.

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, see page 15-31.

- 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 more information about using the States toolbar, see page 15-37.

Editing objects within a group

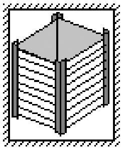
You can also edit individual objects within the group without breaking the group, which is particularly useful when you have animation attached to the group.

To edit objects within a group

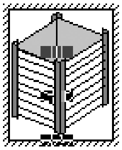
1. Double-click the grouped object, or right-click it and then click Edit. A hatched border appears around the group.

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.



Double-click to edit the group. A hatched border appears. This border indicates that this is a group.



Click again. Handles appear. The handles show the individual object selected within 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.

   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

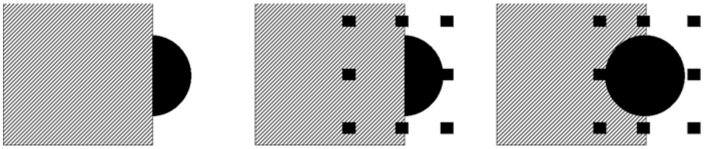
1. Select the object.

   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.

Bring to Front tool

2. On the Arrange menu, click Bring to Front, or click the Bring to Front tool.



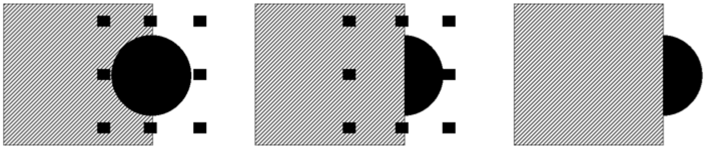
Select the object from behind. Bring the object to front.

To send an object to the back

1. Select an object.

Send to Back tool

2. On the Arrange menu, click Send to Back, or click the Send to Back tool.



Select the object. Send the object to back.

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:

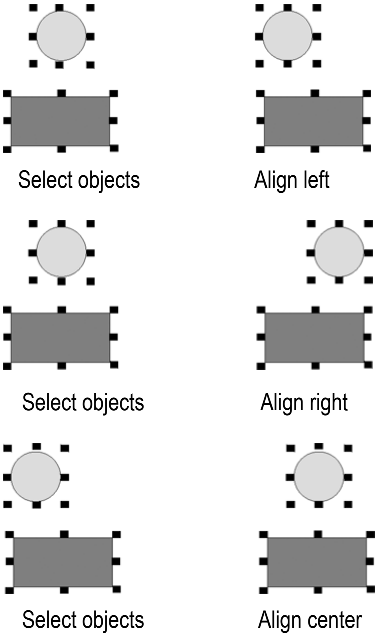
This button or menu item	Aligns selected objects with the
Align Left	Left-most selected object
Align Center	Horizontal center of all selected objects
Align Right	Right-most selected object
Align Top	Top-most selected object
Align Middle	Vertical center of all selected objects
Align Bottom	Bottom-most 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

1. 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 14-8.

Examples: Aligning objects left, right, and center



Select objects

Align left

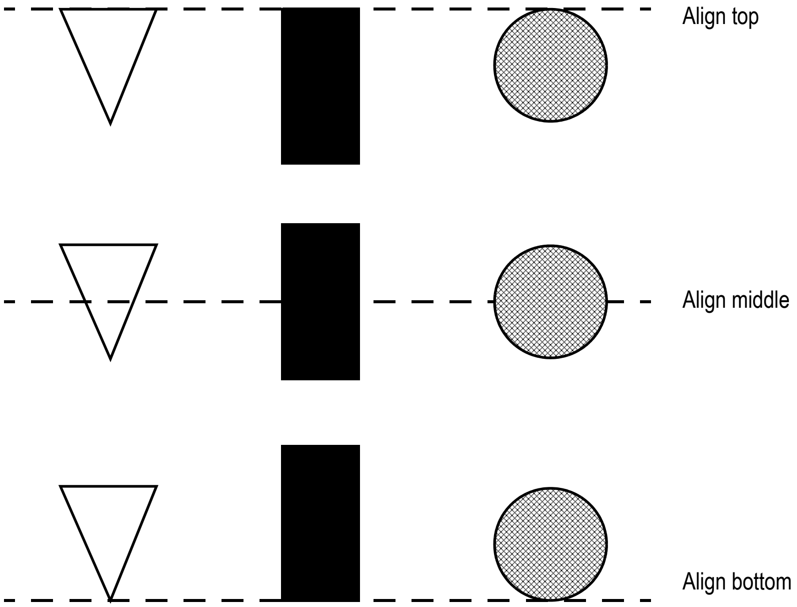
Select objects

Align right

Select objects

Align 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 a Space menu item, or click a tool on the Graphics toolbar:

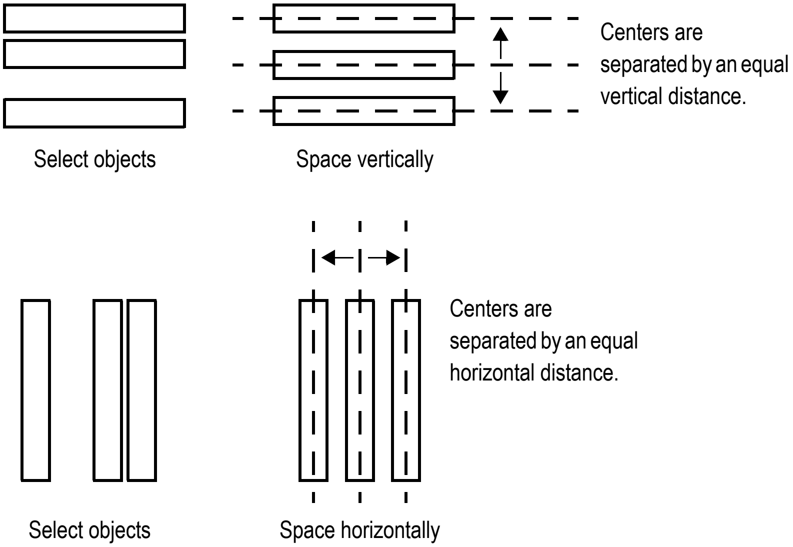
Space Horizontal tool

Space Vertical tool

This tool or menu item	Does this
Space Horizontal	Places the centers of the selected objects an equal distance apart horizontally.

This tool or menu item	Does this
Space Vertical	Places the centers of the selected objects an equal distance apart vertically.

Examples: Spacing objects vertically and horizontally


Centers are separated by an equal vertical distance.
Select objects
Space vertically
Centers are separated by an equal horizontal distance.
Select objects
Space 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

Flip Vertical

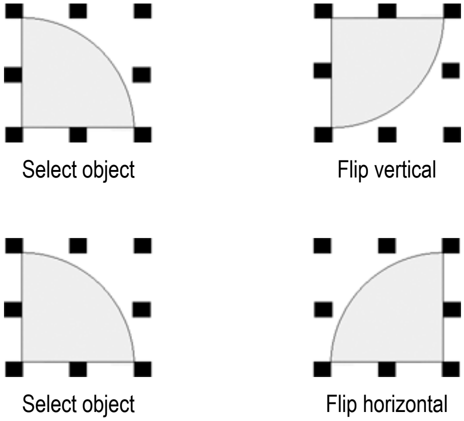
Flip Horizontal

1. Click the object.
2. On the Arrange menu, click a Flip 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)

This tool or menu item	Flips selected objects
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.

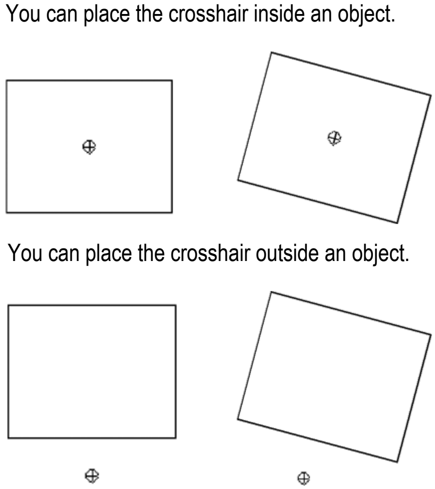
You can attach rotation animation to the same drawing objects. With rotation animation, the object rotates around an anchor point to indicate a tag’s value at runtime. For details about rotation animation, see page 17-13.

When you rotate text, it rotates around the anchor point but the text itself remains upright.

To rotate a drawing object

Rotate tool

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.


You can place the crosshair inside an object.
You can place the crosshair outside an object.

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 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 14-13.

16 Setting up graphic objects

This chapter describes how to set up graphic objects. It describes how to:

- set up objects' spatial properties, names, and visibility.
- work with objects that have states.
- set up the linked properties of reference objects.
- position objects for touch screens.
- assign function keys to buttons.
- use the keyboard to navigate to and select objects at runtime.
- 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.
- set up 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 15.

For information about creating and setting up the trend graphic object, see Chapter 18.

For information about creating and setting up the RecipePlus graphic objects, see Chapter 19.

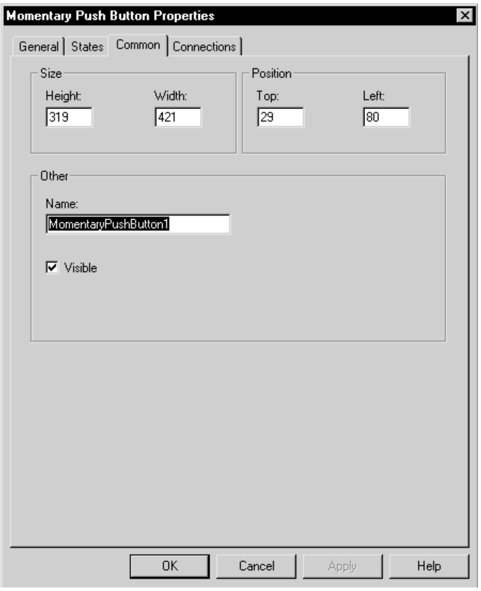
Setting up objects' spatial properties, names, and visibility

Every graphic object has a Common tab in its Properties dialog box. Use the Common tab to set up the following properties for the object:

- height and width
- top and left position
- name
- visibility

For ActiveX® and trend objects, you can also set up these properties:

- focus highlight
- key navigation

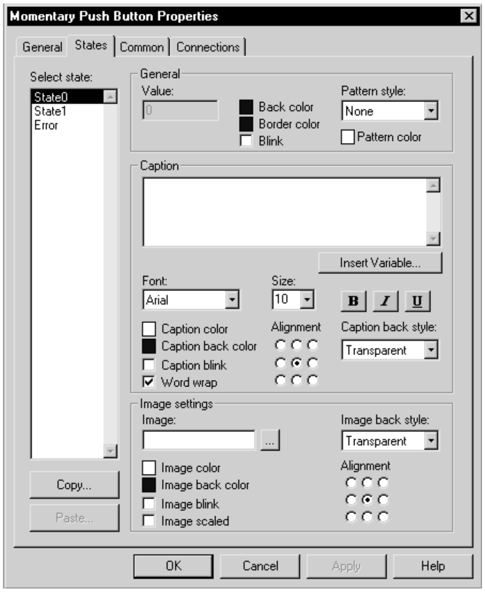


Height: 319
Width: 421
Top: 29
Left: 80
Name: MomentaryPushButton1
☑ Visible

For details about the options in the Common tab, see Help.

Tips for setting up objects with states

The graphic objects that have states have a States tab in their Properties dialog box.



Select state: State0, State1, Error

General
Value: 0
■ Back color
■ Border color
□ Blink
Pattern style: None
□ Pattern color

Caption
Font: Arial
Size: 10
□ Caption color
■ Caption back color
□ Caption blink
☑ Word wrap
Alignment
○ ○ ○
○ ● ○
○ ○ ○
Caption back style: Transparent

Image settings
Image:
Image back style: Transparent
□ Image color
■ Image back color
□ Image blink
□ Image scaled
Alignment
○ ○ ○
○ ● ○
○ ○ ○

For details about the options in the States tab, see Help.

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. For details, see Help.

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.

For more information about the Insert State and Delete State buttons, see Help.

Setting up reference objects' link properties

RSView global objects allow you to link the appearance and behavior of a graphic object to multiple copies of that object. When the original base object is updated, the changes are automatically applied to all the copies of the object.

The copies of the object are called reference objects, and they have the same properties as the original base object. If desired, you can assign unique size, connections, and animation to the reference object.

To assign unique properties to the reference object, use the Property Panel to edit the following properties for the reference object:

- LinkSize—select False to set up the height and width separately for the reference object. If LinkSize is set to true, when you try to resize the reference object, it will snap back to its linked size.
- LinkConnections—select False to set up connections separately for the reference object. Whether you use the base object's connections, or set up separate connections, the tags used count towards the tag limit for the display.

  You can assign tag placeholders to the connections for base objects, and to connections for reference objects with the LinkConnections property set to False.
- LinkAnimation—select Do not link to set up separate animation for the reference object. To use the animation set up for the base object but assign different expressions to the reference object, select Link without expressions.

  If you select Link with expressions, the reference object uses the animation and expressions assigned to the base object.

Reference objects also have a property called LinkBaseObject, which specifies the name and location of the base object to which the reference object is linked. You cannot edit the LinkBaseObject property.

For information about creating reference objects, see page 15-24. For information about editing a reference object's base object, see page 15-24.

To change a reference object's link properties

1. Double-click the object to open the Property Panel.
2. Make your changes to the link properties.
3. Specify the new size, connections, and animation for the object.

   For information about resizing objects, see page 15-46. For information about assigning connections to objects, see page 15-33. For information about assigning animation to objects, see Chapter 17.

To specify default link properties for reference objects

1. On the Edit menu, select Global Object Defaults.
2. Specify the new default values.

3. Click OK.

   The defaults are used for any new reference objects you create. You can still edit the properties for individual objects separately.

To break the link to a base object

1. Right-click the reference object, and then click Break Link.

   The reference object becomes a regular object. You can edit all of its properties. However, you cannot restore the connection to the base object.

Deleting the base object

If you delete a base object or a global object display containing base objects, any reference objects that are linked to the deleted base objects are broken. A broken reference object is displayed as a red square with an X through it. You cannot edit broken reference objects.

To repair a broken reference object

1. Recreate the base object with the same object type and name as before, on the same display as before.

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:

- press 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:

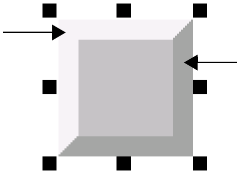
- Don't place important buttons where they'll be blocked by an On Top display. The user can't press a covered button.
- Ensure buttons are large enough for users to touch easily.
- Use touch margins for buttons that are positioned close together, to ensure that the adjacent button is not pressed by mistake.

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 square in the middle of the button is pressed.

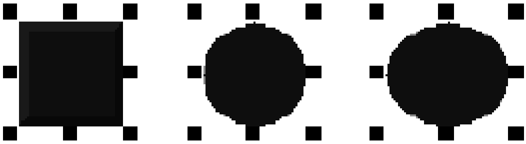


The margins at the top and bottom edges are called vertical touch margins.

The margins at the left and right edges are called horizontal touch margins.

The bounding box

If the object's shape is a circle or ellipse, the touch margin applies to the object's bounding box, not the object's border. The bounding box is an invisible square or rectangle that surrounds the object. When you select the object, the selection handles show the location of the bounding box.



The invisible bounding box is just inside the selection handles.

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 also assign a function key to the numeric input cursor point.

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 set up the caption for each state), and then group the text and button together.
- If your application will run on a PanelView Plus™ or VersaView® CE terminal, assign keys that are supported by the runtime terminal. Different sizes of terminals have different function keys.

Function key equivalents

If your application will run in Windows® 2000 or Windows XP, the keyboard contains the function keys F1 to F12 only. The remaining function keys are associated with these key combinations:

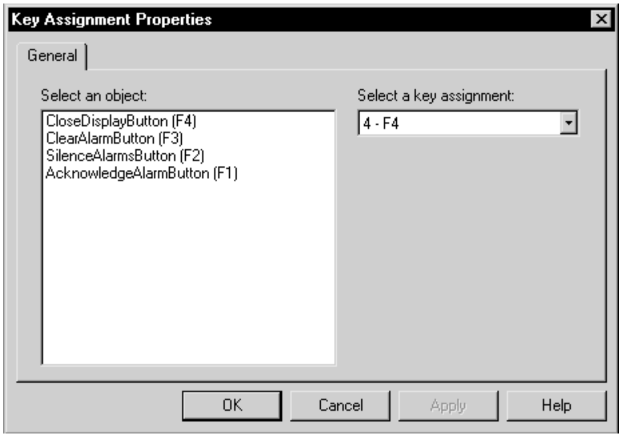
For this function key	Use this key combination
F13	Left Shift-F1
F14	Left Shift-F2
F15	Left Shift-F3
F16	Left Shift-F4
F17	Left Shift-F5
F18	Left Shift-F6

For this function key	Use this key combination
F19	Left Shift-F7
F20	Left Shift-F8
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.



Key Assignment Properties

Select an object:

CloseDisplayButton (F4)
ClearAlarmButton (F3)
SilenceAlarmsButton (F2)
AcknowledgeAlarmButton (F1)

Select a key assignment: 4 - F4

For details about using the Key Assignment Properties dialog box to assign function keys and change function key assignments, see Help.

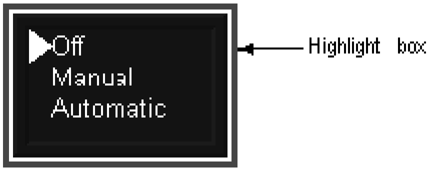
Using the keyboard to navigate to and select objects

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 focus to) these objects:

- lists: control list selector, piloted control list selector, display list selector, diagnostics list, alarm list, and alarm status list
- alarm banners
- trends
- numeric input enable buttons and string input enable buttons
- numeric input cursor points
- RecipePlus table and selector
- 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 Help.



Focus highlight for ActiveX and trend objects

For ActiveX and trend objects, use the Common tab in the object's Properties dialog box to specify whether or not to display a highlight box. For more information about setting up options on the Common tab, see page 16-1.

If the Disable Highlight When Object has Focus box is checked (in the Display Settings dialog box), that setting overrides the setting you specify in the Common tab.

Using the keys on the keyboard or keypad

When a graphic display opens, the keyboard-navigable 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 and adding objects to the tab sequence

By default, you can use the keys to navigate to all lists, alarm banners, numeric input cursor points, trends, and ActiveX input objects in a display. However, you can turn off key navigation for these objects if desired.

When an object's key navigation is turned off, the operator can still select the object using a mouse or touch screen, if available.

By default, key navigation is turned off for the numeric input enable buttons and string input enable buttons. You can turn on keyboard navigation if you want the operator to use the keyboard to navigate to these objects.

To turn key navigation on or off, use one of these methods

- In the Properties tab of the Property Panel, set the KeyNavigation property to False for off or True for on.
- For list objects, alarm banners, numeric input cursor points, numeric input enable buttons, and string input enable buttons, in the General tab of the object's Properties dialog box, clear the Key navigation box for off. Check the box for on.
- For ActiveX and trend objects, in the Common tab of the object's Properties dialog box, clear the Key navigation box for off. Check the box for on.

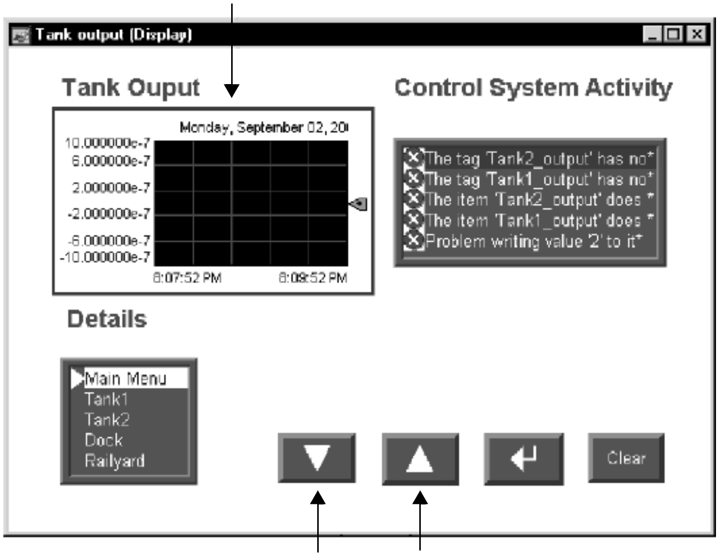
Linking buttons to objects

Some RSView® buttons can be linked to specific trend, list, recipe, and alarm banner objects, or you can set them up to work with whichever object has focus 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 graphic objects (that accept input focus) in the display.

By default, the buttons are set up to work with whichever object has input focus (is selected) in the display.

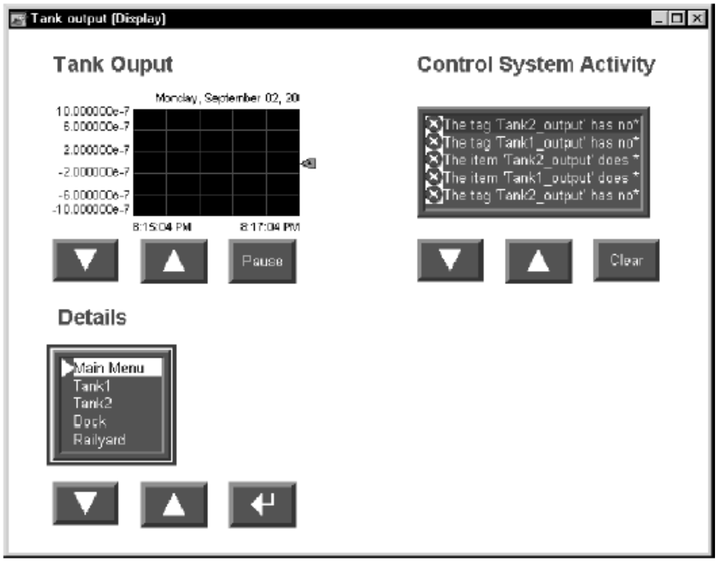
This trend object has focus.



☒ The tag 'Tank2_output' has no"
☒ The tag 'Tank1_output' has no"
☒ The item 'Tank2_output' does "
☒ The item 'Tank1_output' does "
☒ Problem writing value '2' to it"

These move up and move down buttons work with the object that has focus.

However, if space isn't a concern, you can create multiple copies of the buttons you want to use and link them to specific objects. One benefit of linking a button to a specific object is that the operator doesn't have to select the object 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.



The tag 'Tank2_output' has no*
The tag 'Tank1_output' has no*
The item 'Tank2_output' does *
The item 'Tank1_output' does *
The tag 'Tank2_output' has no*

Main Menu
Tank1
Tank2
Dock
Railyard

Each object has its own set of buttons.

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.
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

1. In the Properties tab, specify the SendPressTo and LinkedObject properties.

Once you have linked buttons to an object, you might want to turn off the object's key navigation, since this option is no longer needed. For details, see page 16-10.

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 connection 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 connection are not recognized when the button is in auto repeat mode.
Move up	Moves the highlight up an item in the list, recipe selector, or recipe table, scrolls up in the trend, or ramps the numeric input cursor point or numeric input enable button value.
Move down	Moves the highlight down an item in the list, recipe selector, or recipe table, scrolls down in the trend, or ramps the numeric input cursor point or numeric input enable button value.
Page up	Moves the highlight up a page in the list, recipe selector, or recipe table.
Page down	Moves the highlight down a page in the list, recipe selector, or recipe table.
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 these properties:

- 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 turned off.
- 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 connection.

You can use Enter key handshaking with these graphic objects:

- control list selector
- piloted control list selector
- numeric input enable button
- string input enable button
- numeric input cursor point

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 connection to 1. As long as the Enter connection is set to 1, new values cannot be sent to the Value connection. How the Enter connection 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 application needs and communication system.

Holding the value for a specific period of time

To set up an object’s Enter key handshaking so that the value at the Value connection is held for a specific period of time, assign a tag to the Enter connection 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 connection 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 connection is set to 1. If you don’t use the delay, the Enter connection is set to 1 as soon as the operator presses Enter.

   As long as the Enter connection is set to 1, the operator cannot send new values to the data source.
3. When the Enter connection is set to 1, the “Enter key hold time” timer begins timing.
4. When the Enter key hold time has expired, the Enter connection is reset to 0 and the operator can send a new value to the Value connection.

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 connection. A digital tag is recommended (either an HMI tag or a data server tag).

You can also use the Property Panel to specify the properties and assign a tag to the Enter connection.

Holding the value until the data source acknowledges that it has read the value

To set up an object’s Enter key handshaking so that the value at the Value connection is held until the data source notifies RSView that it has read the value, use two connections: the Enter connection and the Enter handshake connection.

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 connection resets the Enter connection depends on which Handshake reset type you select:

With this handshake reset type	The Enter connection is set to 0 when
Non-zero Value	The Enter handshake connection has a non-zero value. If the Enter handshake connection already has a non-zero value when the value is sent to the Value connection (or when the Enter key control delay has expired, if the delay is used), then the Enter connection is not set to 1, and Enter key handshaking does not take place.
Zero to Non-zero transition	The Enter handshake connection changes from 0 to a non-zero value.

Set up the data source to send a non-zero value to the Enter handshake connection when it has read the new value at the Value connection, and then to reset the Enter handshake connection to 0.

If the Enter key handshake time expires before the Enter handshake connection resets the Enter connection, an error message is sent to FactoryTalk® Diagnostics™.

How handshaking works

If you use the Enter handshake connection, handshaking works like this:

1. When the operator presses the Enter button, the value is sent to the Value connection 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 connection is set to 1. If you don't use the delay, the Enter connection is set to 1 as soon as the operator presses Enter.

   As long as the Enter connection 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 connection must be 0 when the delay expires in order to set the Enter connection to 1.
3. When the Enter connection is set to 1, the "Enter key handshake time" timer begins timing.
4. The Enter connection remains set until the Enter key handshake time expires or until reset by the Enter handshake connection, whichever happens first.

5. The Enter connection is reset to 0 and the operator can send a new value to the Value connection.

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 connections:
   - Enter—assign a tag. A digital tag is recommended (either an HMI tag or a data server tag).
   - Enter handshake—assign a tag or expression.
3. Set up the data source to send a non-zero value to the Enter handshake connection when it has read the new value at the Value connection, and then to reset the Enter handshake connection to 0.

You can also use the Property Panel to specify the properties and assign tags to the connections.

Time, date, and number formats for graphic objects

Graphic objects use the time, date, and number format of the current application language. For example, if the application language uses a comma for the decimal symbol, floating-point values displayed in graphic objects uses a comma for the decimal symbol.

For information about using multiple languages, see Chapter 23.

Setting up buttons

Many of the button graphic objects are set up the same way. The instructions in this section apply to these buttons:

Acknowledge alarm	Logout
Acknowledge all alarms	Move down
Alarm status mode	Move left
Backspace	Move right
Clear alarm banner	Move up

Clear alarm history	Next pen
Diagnostics clear	Page down
Diagnostics clear all	Page up
Display print	Password
End	Pause
Enter	RecipePlus
Goto configure mode	Reset alarm status
Home	Return to display
Information acknowledge	Shutdown
Language switch	Silence alarms
Login	Sort alarms

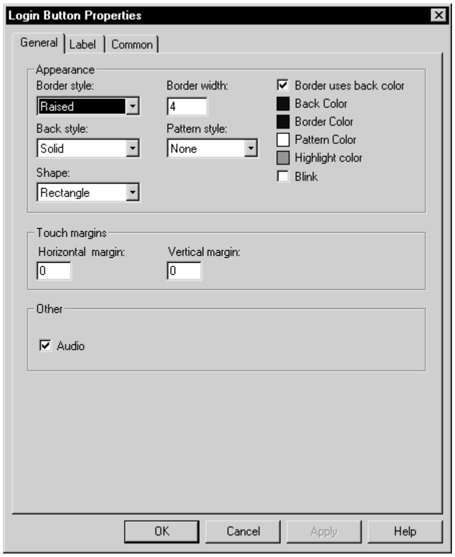
You can set up any combination of these buttons in a graphic display. For example, you might want to put a login, logout, and shutdown button in the same graphic display.

Create and then set up each button separately.

The illustration shows the login button. Some buttons have different properties on the General tab, but you can use these instructions to set up any of the buttons in the list.

To set up a button

1. Double-click the button.



Login Button Properties

Appearance

Border style: Raised

Border width: 4

☑ Border uses back color

■ Back Color

■ Border Color

□ Pattern Color

▨ Highlight color

□ Blink

Back style: Solid

Pattern style: None

Shape: Rectangle

Touch margins

Horizontal margin: 0

Vertical margin: 0

Other

☑ Audio

2. In the button’s Properties dialog box, fill in the options on each tab:

   - In the General tab, specify what the button looks like at runtime. For some buttons, you can specify whether to link the button to a specific object.

   - In the Label tab, specify what text or image to display on the button.

   - 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 16-14.

     The Timing tab is available only for the move up, move down, move left, move right, page up, and page down buttons.

   - In the Common tab, specify the button’s spacial properties, name, and visibility.

   For details about the options in the tabs, see Help.

3. When you are finished, click OK.

Buttons described later in the chapter

Information about setting up these buttons is described later in the chapter:

Close display	Multistate push

Goto display	Numeric input enable
Interlocked push	Print alarm history
Latched push	Print alarm status
Macro	Ramp
Maintained push	String input enable
Momentary push	

How to use push buttons

Push buttons start or stop processes or actions by changing tag values.

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. 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. 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 increment/decrement control, for example for the speed of a motor. Or, you can use a numeric input enable button or numeric input cursor point.

For information about the numeric input enable button, see page 16-31. For information about the numeric input cursor point, see page 16-33.

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 connection to 1 when the button is pressed, and to 0 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 connection to 0 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 connection 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.

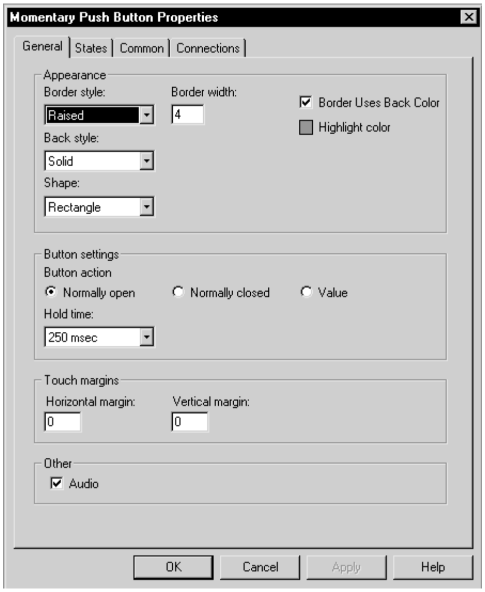
The error state

The button's error state is displayed at runtime when:

- the Value connection is unassigned.
- the Indicator connection's value does not match one of the state values you set up.

To set up a momentary push button

1. Double-click the momentary push button.



Border style: Raised

Border width: 4

☑ Border Uses Back Color

□ Highlight color

Back style: Solid

Shape: Rectangle

Button action: ● Normally open ○ Normally closed ○ Value

Hold time: 250 msec

Horizontal margin: 0

Vertical margin: 0

☑ Audio

2. In the button's Properties dialog box, fill in the options on each tab:

   - In the General tab, specify what the momentary push button looks like at runtime, and what type of action the button performs.
   - In the States tab, specify what the button does when it is pressed and released. For tips about setting up states, see page 16-2.
   - In the Common tab, specify the button's spacial properties, name, and visibility.
   - In the Connections tab, specify the tags or expression with which the button exchanges data. For information about assigning tags and expressions, see page 15-38.

   For details about the options in the tabs, see Help.

3. When you are finished, click OK.

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.

The error state

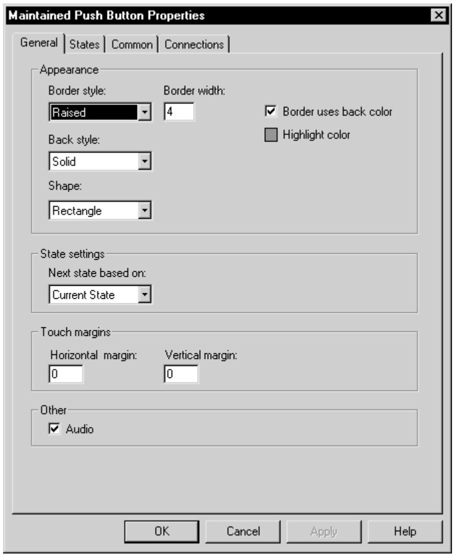
The button’s error state is displayed at runtime when:

- the Value connection is unassigned.
- the Indicator connection’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 connection’s value does not match one of the state values you set up.

To set up a maintained push button

1. Double-click the maintained push button.



Maintained Push Button Properties

Appearance
Border style: Raised
Border width: 4
☑ Border uses back color
☐ Highlight color
Back style: Solid
Shape: Rectangle

State settings
Next state based on: Current State

Touch margins
Horizontal margin: 0
Vertical margin: 0

Other
☑ Audio

2. In the button’s Properties dialog box, fill in the options on each tab:
   - In the General tab, specify what the button looks like at runtime, and how the button changes state.
   - In the States tab, specify what the button does when it is pressed and released. For tips about setting up states, see page 16-2.
   - In the Common tab, specify the button’s spacial properties, name, and visibility.
   - In the Connections tab, specify the tags or expression with which the button exchanges data. For information about assigning tags and expressions, see page 15-38.

For details about the options in the tabs, see Help.

3. When you are finished, click OK.

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. This type of button is useful for starting a machine or process.

For example, use the latched push button when you want the Value connection to start a process within a programmable controller and remain set until the process is completed. You can also use a latched push button when you have a controller with a long program or long update times.

When the operator presses a latched push button, it changes the Value connection to one value, and remains at that value until the Handshake connection gives the signal to unlatch the button.

The error state

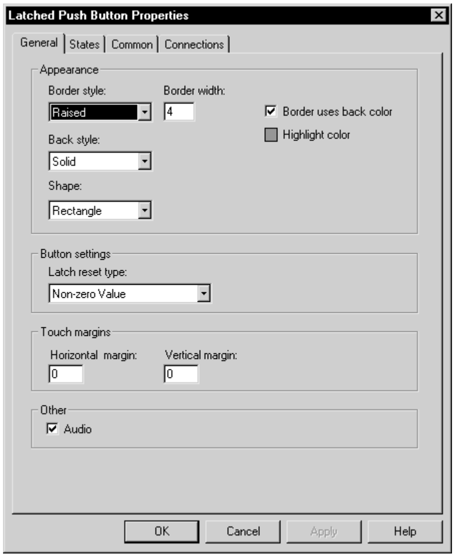
The button's error state is displayed at runtime when:

- the Value connection is unassigned.
- the Indicator connection's value does not match one of the state values you set up.
- The Handshake connection is unassigned.

The error state is also displayed when the display containing the latched push button first opens, if the Value connection's value does not match one of the state values you set up.

To set up a latched push button

1. Double-click the latched push button.



Appearance

Border style: Raised

Border width: 4

☑ Border uses back color

□ Highlight color

Back style: Solid

Shape: Rectangle

Button settings

Latch reset type: Non-zero Value

Touch margins

Horizontal margin: 0

Vertical margin: 0

Other

☑ Audio

2. In the button’s Properties dialog box, fill in the options on each tab:

   - In the General tab, specify what the button looks like at runtime, and how to unlatch it.
   - In the States tab, specify what the button does when it is latched and unlatched. For tips about setting up states, see page 16-2.
   - In the Common tab, specify the button’s spacial properties, name, and visibility.
   - In the Connections tab, specify the tags or expression with which the button exchanges data. For information about assigning tags and expressions, see page 15-38.

   For details about the options in the tabs, see Help.

3. When you are finished, click OK.

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.

The error state

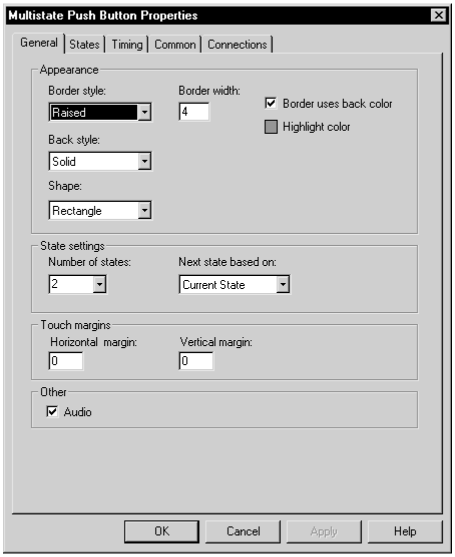
The button's error state is displayed at runtime when:

- the Value connection is unassigned.
- the Indicator connection'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 connection's value does not match one of the state values you set up.

To set up a multistate push button

1. Double-click the multistate push button.



Appearance

Border style: Raised

Border width: 4

☑ Border uses back color

□ Highlight color

Back style: Solid

Shape: Rectangle

State settings

Number of states: 2

Next state based on: Current State

Touch margins

Horizontal margin: 0

Vertical margin: 0

Other

☑ Audio

2. In the button's Properties dialog box, fill in the options on each tab:
   - In the General tab, specify what the button looks like, and how the button changes state.
   - In the States tab, specify what the button does when it is pressed and released. For tips about setting up states, see page 16-2.
   - 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 16-13.

- In the Common tab, specify the button's spacial properties, name, and visibility.
- In the Connections tab, specify the tags or expression with which the button exchanges data. For information about assigning tags and expressions, see page 15-38.

For details about the options in the tabs, see Help.

3. When you are finished, click OK.

Setting up interlocked push buttons

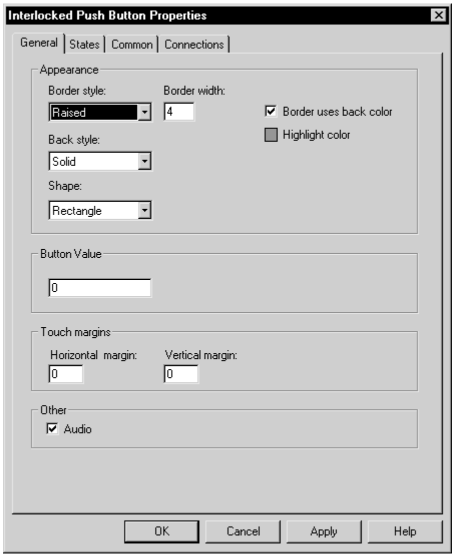
Multiple interlocked push buttons work together and share the same tag. Pressing one button cancels another. Although interlocked push buttons work as a group, you add them to the display one at a time.

When the operator presses one of the interlocked push buttons, the tag assigned to its Value connection 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 connection.

You can also use a single interlocked push button to send a value to a tag.

To set up an interlocked push button

1. Double-click the interlocked push button.



Border style: Raised

Border width: 4

☑ Border uses back color

□ Highlight color

Back style: Solid

Shape: Rectangle

Button Value: 0

Horizontal margin: 0

Vertical margin: 0

☑ Audio

2. In the button's Properties dialog box, fill in the options on each tab:
   - In the General tab, specify the button's appearance, and the value it sends to the Value connection.
   - In the States tab, specify what the button looks like when it is pressed and released at runtime. For tips about setting up states, see page 16-2.
   - In the Common tab, specify the button's spacial properties, name, and visibility.
   - In the Connections tab, specify the tag with which the button exchanges data. Interlocked push buttons have no Indicator connection. For information about assigning tags, see page 15-38.

   For details about the options in the tabs, see Help.
3. When you are finished, click OK.

Setting up ramp buttons

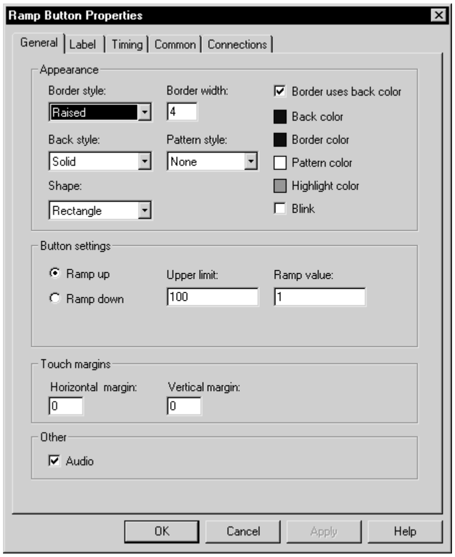
Use the ramp button to increase or decrease the value of a tag.

Ramp buttons can change a tag by either an integer or floating-point value. You can use two ramp buttons together to create an increment/decrement control.

Each time the operator presses the button, the tag value increases or decreases, depending on how you set up the button.

To set up a ramp button

1. Double-click the ramp button.



Appearance

Border style: Raised

Border width: 4

☑ Border uses back color

■ Back color

■ Border color

□ Pattern color

▨ Highlight color

Back style: Solid

Pattern style: None

Shape: Rectangle

□ Blink

Button settings

● Ramp up

○ Ramp down

Upper limit: 100

Ramp value: 1

Touch margins

Horizontal margin: 0

Vertical margin: 0

Other

☑ Audio

2. In the button's Properties dialog box, fill in the options on each tab:
   - In the General tab, specify what the button looks like, and whether the button ramps a value up or down.
   - In the Label tab, specify what text or image to display on the button.
   - 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 16-13.
   - In the Common tab, specify the button's spacial properties, name, and visibility.
   - In the Connections tab, specify the tag with which the button exchanges data. Ramp buttons have no Indicator connection. For information about assigning tags, see page 15-38.

   For details about the options in the tabs, see Help.
3. When you are finished, click OK.

Setting up 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 connection at the data source. The value shown depends on whether the Value connection value is a floating-point number or an integer. Integer values are displayed as is. Floating-point values are rounded to fit the display. The decimal places option also affects how floating point numbers are displayed.

For example, if the numeric display is set up to show 6 digits, with one decimal place, 1234.56 is rounded to 1234.6. 1234.44 is rounded to 1234.4. The decimal counts as one of the digits.

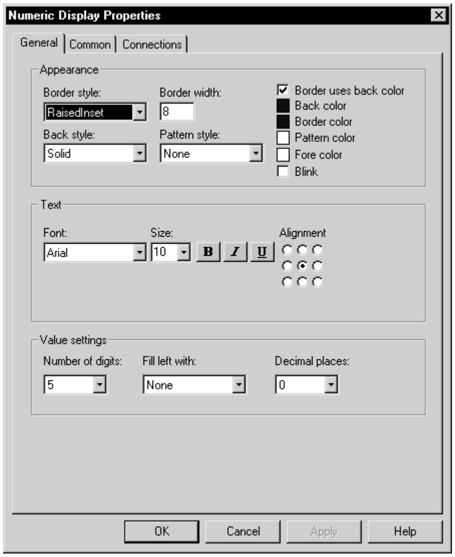
For more information about how values are rounded, see page 7-2.

Problems with displaying values

- If the Value connection is unassigned, the numeric display is filled with asterisks (*).
- If the integer portion of 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.

To set up a numeric display

1. Double-click the numeric display.



Border style: RaisedInset

Border width: 8

Back style: Solid

Pattern style: None

☑ Border uses back color

■ Back color

■ Border color

□ Pattern color

□ Fore color

□ Blink

Font: Arial

Size: 10

B I U

Alignment

○ ○ ○
○ ● ○
○ ○ ○

Number of digits: 5

Fill left with: None

Decimal places: 0

2. In the object’s Properties dialog box, fill in the options on each tab:

   - In the General tab, specify what the numeric display looks like at runtime.
   - In the Common tab, specify the object’s spacial properties, name, and visibility.
   - In the Connections tab, specify the tags or expression whose data is displayed. For information about assigning tags and expressions, see page 15-38.

   For details about the options in the tabs, see Help.

3. When you are finished, click OK.

Setting up numeric input enable buttons

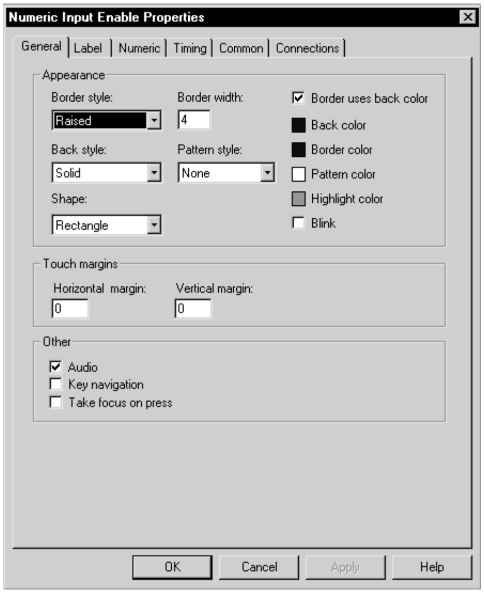
The operator can press the numeric input enable button to open a numeric pop-up keypad or scratchpad. The operator can enter a number in the keypad or scratchpad, and then send the number to the data source.

For more information about using the numeric input enable button at runtime, see page 28-6.

You can also set up the numeric input enable button to work as a ramp button. In this case, when the button has focus, the operator can press a move up or move down button to change a tag by either an integer or floating-point value. The operator can also press the Up Arrow or Down Arrow on the keyboard or keypad to ramp the value.

To set up a numeric input enable button

1. Double-click the numeric input enable button.



Numeric Input Enable Properties

Appearance

Border style: Raised

Border width: 4

☑ Border uses back color

■ Back color

■ Border color

□ Pattern color

▨ Highlight color

□ Blink

Back style: Solid

Pattern style: None

Shape: Rectangle

Touch margins

Horizontal margin: 0

Vertical margin: 0

Other

☑ Audio

□ Key navigation

□ Take focus on press

2. In the button's Properties dialog box, fill in the options on each tab:

   - In the General tab, specify what the button looks like at runtime, whether the operator can navigate to the button using the keys on the keyboard or keypad, and whether the operator can press the button to give it focus.
   - In the Label tab, specify what text or image to display on the button.
   - In the Numeric tab, set up which pop-up window opens (if any), the ramp value (if any), minimum and maximum values to send to the data source, and decimal point settings.
   - In the Timing tab, set up the timing and handshake settings for the Enter key. These settings do not apply when you ramp a value. For information about using Enter key handshaking, see page 16-14.
   - In the Common tab, specify the button's spacial properties, name, and visibility.
   - In the Connections tab, specify the tags or expressions with which the button exchanges data. For information about assigning tags and expressions, see page 15-38.

For details about the options in the tabs, see Help.

3. When you are finished, click OK.

Setting up numeric input cursor points

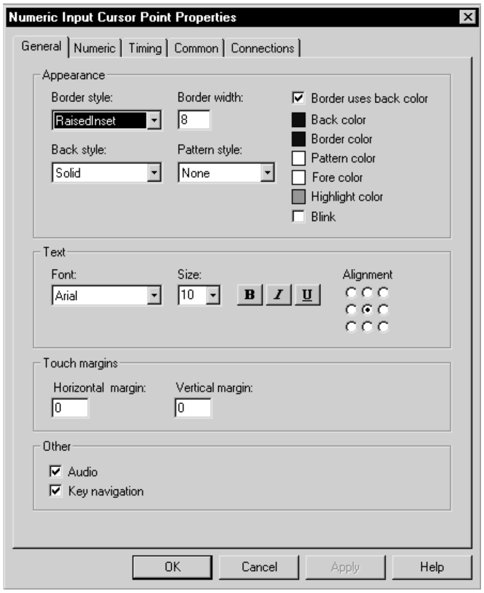
The operator can activate the numeric input cursor point to open a numeric pop-up keypad or scratchpad. The operator can enter a number in the keypad or scratchpad, and then send the number to the data source. The cursor point displays the current value at the data source (if you assign a tag to the Indicator connection).

For more information about using the numeric input cursor point at runtime, see page 28-6.

You can also set up the numeric input cursor point to work as a ramp button. In this case, when the cursor point has focus, the operator can press a move up or move down button to change a tag by either an integer or floating-point value. The operator can also press the Up Arrow or Down Arrow on the keyboard or keypad to ramp the value.

To set up a numeric input cursor point

1. Double-click the numeric input cursor point.



Appearance

Border style: RaisedInset

Border width: 8

Back style: Solid

Pattern style: None

☑ Border uses back color

■ Back color

■ Border color

□ Pattern color

□ Fore color

▨ Highlight color

☐ Blink

Text

Font: Arial

Size: 10

B I U

Alignment
○ ○ ○
○ ● ○
○ ○ ○

Touch margins

Horizontal margin: 0

Vertical margin: 0

Other

☑ Audio

☑ Key navigation

2. In the object’s Properties dialog box, fill in the options on each tab:

- In the General tab, specify what the cursor point looks like at runtime, and whether the operator can navigate to the cursor point using the keys on the keyboard or keypad.

- In the Numeric tab, set up which pop-up window opens (if any), the ramp value (if any), minimum and maximum values to send to the data source, decimal point settings, and display settings.
- In the Timing tab, set up the timing and handshake settings for the Enter key. These settings do not apply when you ramp values. For information about using Enter key handshaking, see page 16-14.
- In the Common tab, specify the object's spacial properties, name, and visibility.
- In the Connections tab, specify the tags or expression with which the numeric input cursor point exchanges data. For information about assigning tags and expressions, see page 15-38.

For details about the options in the tabs, see Help.

3. When you are finished, click OK.

Setting up string displays

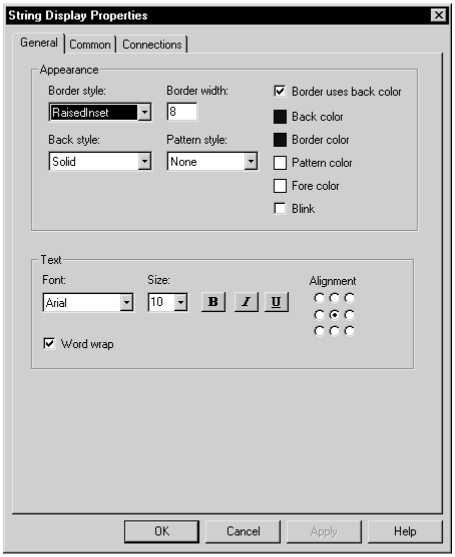
Use the string display object to show the operator messages from the data source. For example, you might set up the data source to generate strings that report on the state of a process or operation, or that provide instructions about what the operator needs to do next. At runtime the display shows the operator the string value of the Value connection at the data source.

How values are displayed

- If the Value connection is unassigned, the string display is blank.
- RSView displays the number of characters (bytes) specified for the tag assigned to the Value connection.

To set up a string display

1. Double-click the string display.



Border style: RaisedInset

Border width: 8

Back style: Solid

Pattern style: None

☑ Border uses back color

■ Back color

■ Border color

□ Pattern color

□ Fore color

□ Blink

Font: Arial

Size: 10

☑ Word wrap

2. In the object's Properties dialog box, fill in the options on each tab:

   - In the General tab, specify what the string display looks like at runtime.
   - In the Common tab, specify the string display's spacial properties, name, and visibility.
   - In the Connections tab, specify the tag or expression whose data is displayed. For information about assigning tags and expressions, see page 15-38.

   For details about the options in the tabs, see Help.

3. When you are finished, click OK.

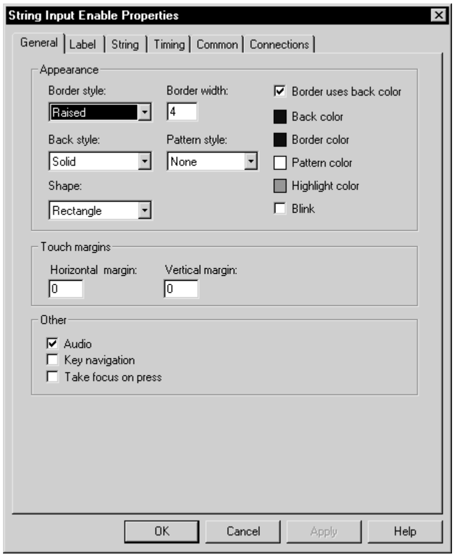
Setting up string input enable buttons

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 at runtime, see page 28-6.

To set up a string input enable button

1. Double-click the string input enable button.



Appearance

Border style: Raised

Border width: 4

☑ Border uses back color

■ Back color

■ Border color

□ Pattern color

▨ Highlight color

□ Blink

Back style: Solid

Pattern style: None

Shape: Rectangle

Touch margins

Horizontal margin: 0

Vertical margin: 0

Other

☑ Audio

□ Key navigation

□ Take focus on press

2. In the button's Properties dialog box, fill in the options on each tab:

   - In the General tab, specify what the button looks like at runtime, whether the operator can navigate to the button using the keys on the keyboard or keypad, and whether the operator can press the button to give it focus.
   - In the Label tab, specify what text or image to display on the button.
   - In the String tab, specify the pop-up to open and the number of characters to accept.
   - In the Timing tab, set up the timing and handshake settings for the Enter key. For information about using Enter key handshaking, see page 16-14.
   - In the Common tab, specify the button's spacial properties, name, and visibility.
   - In the Connections tab, specify the tags or expression with which the button exchanges data. For information about assigning tags and expressions, see page 15-38.

   For details about the options in the tabs, see Help.

3. When you are finished, click OK.

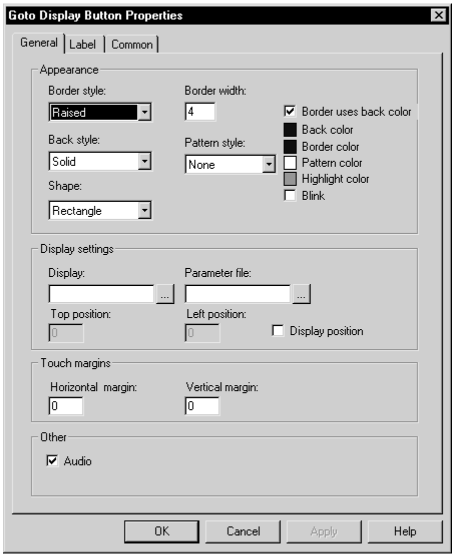
Setting up goto display buttons

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 24-4.

To set up a goto display button

1. Double-click the goto display button.



Goto Display Button Properties

Appearance

Border style: Raised

Border width: 4

☑ Border uses back color

■ Back color

■ Border color

□ Pattern color

▨ Highlight color

☐ Blink

Back style: Solid

Pattern style: None

Shape: Rectangle

Display settings

Display:

Parameter file:

Top position: 0

Left position: 0

☐ Display position

Touch margins

Horizontal margin: 0

Vertical margin: 0

Other

☑ Audio

2. In the button's Properties dialog box, fill in the options on each tab:

   - In the General tab, specify what the button looks like at runtime, the display to open, and the parameter file to use, if any.
   - In the Label tab, specify what text or image to display on the button.
   - In the Common tab, specify the button's spacial properties, name, and visibility.

   For details about the options in the tabs, see Help.

3. When you are finished, click OK.

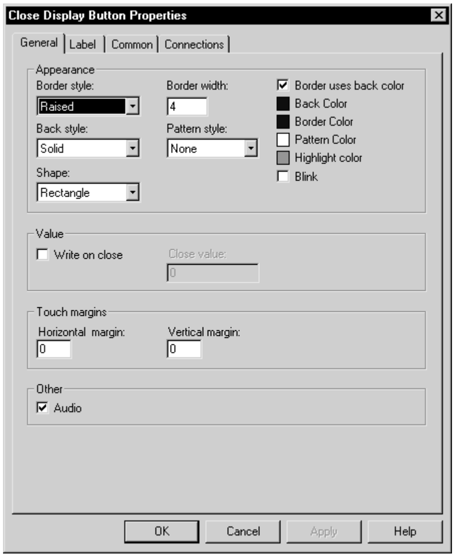
Setting up close display buttons

When the operator presses a close display button at runtime, the graphic display that the button is on closes. You can set up the button to write out a value when the display closes.

For more information about using close display buttons, see page 24-6.

To set up a close display button

1. Double-click the button.



Appearance

Border style: Raised

Border width: 4

☑ Border uses back color

■ Back Color

■ Border Color

□ Pattern Color

▨ Highlight color

□ Blink

Back style: Solid

Pattern style: None

Shape: Rectangle

Value

□ Write on close

Close value: 0

Touch margins

Horizontal margin: 0

Vertical margin: 0

Other

☑ Audio

2. In the button's Properties dialog box, fill in the options on each tab:

   - In the General tab, specify what the button looks like at runtime, and whether to write out a value when the display closes.
   - In the Label tab, specify what text or image to display on the button.
   - In the Common tab, specify the button's spacial properties, name, and visibility.
   - In the Connections tab, specify the tag with which the button exchanges data. For information about assigning tags, see page 15-38.

   For details about the options in the tabs, see Help.

3. When you are finished, click OK.

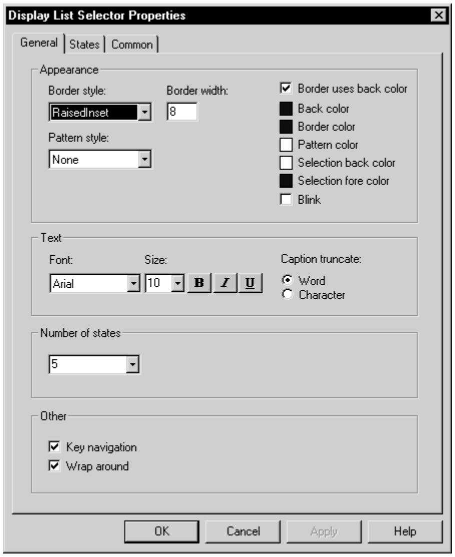
Setting up display list selectors

The display list selector is a list of graphic displays in the application. 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 by pressing an enter button or Enter key.

For more information about using display list selectors, see page 24-6.

To set up a display list selector

1. Double-click the display list selector.



Appearance

Border style: RaisedInset

Border width: 8

Pattern style: None

☑ Border uses back color
■ Back color
■ Border color
□ Pattern color
□ Selection back color
■ Selection fore color
□ Blink

Text

Font: Arial

Size: 10

Caption truncate:
● Word
○ Character

Number of states

5

Other

☑ Key navigation
☑ Wrap around

2. In the object's Properties dialog box, fill in the options on each tab:

   - In the General tab, specify what the selector looks like at runtime, its number of states, whether the operator can navigate to the selector using the keys on the keyboard or keypad, and whether the cursor wraps from the bottom of the list back to the top.

   - 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 setting up states, see page 16-2.

   - In the Common tab, specify the display list selector's spacial properties, name, and visibility.

   For details about the options in the tabs, see Help.

3. When you are finished, click OK.

How to use indicators

Indicators display the status of processes or operations by showing different colors, captions, or images to reflect different states.

You can create different kinds of indicators to suit 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 color to indicate 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.

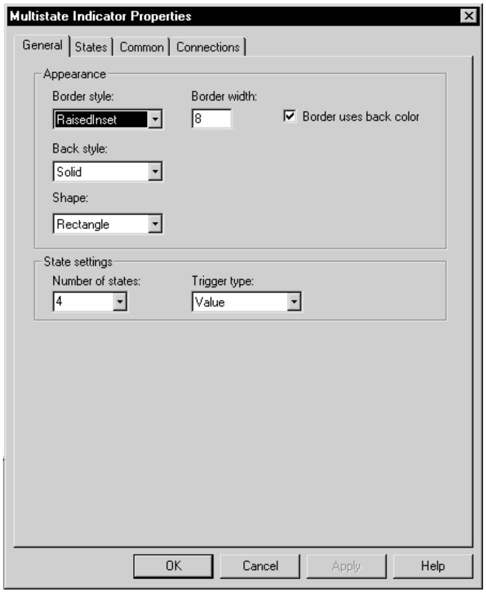
The error state

The multistate indicator's error state is displayed at runtime when:

- the Indicator connection is unassigned.
- the Indicator connection's value does not match one of the state values you set up.
- the Trigger type is set to Value and the Indicator connection value does not match one of the state values you set up.
- the Trigger type is set to LSB and the position of the least significant bit set in the Value connection does not match one of the state values you set up.
- the Trigger type is set to Value and an array tag has been assigned to the object's Value connection.

To set up a multistate indicator

1. Double-click the multistate indicator.



Multistate Indicator Properties

General | States | Common | Connections

Appearance

Border style: RaisedInset

Border width: 8

☑ Border uses back color

Back style: Solid

Shape: Rectangle

State settings

Number of states: 4

Trigger type: Value

2. In the object's Properties dialog box, fill in the options on each tab:

   - In the General tab, specify what the indicator looks like, and the number of states for the indicator.
   - In the States tab, specify how the indicator's appearance changes when its tag or expression's value changes. For tips about setting up states, see page 16-2.
   - In the Common tab, specify the indicator's spacial properties, name, and visibility.
   - In the Connections tab, specify the tag or expression from which the indicator receives data. For information about assigning tags and expressions, see page 15-38.

   For details about the options in the tabs, see Help.

3. When you are finished, click OK.

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.

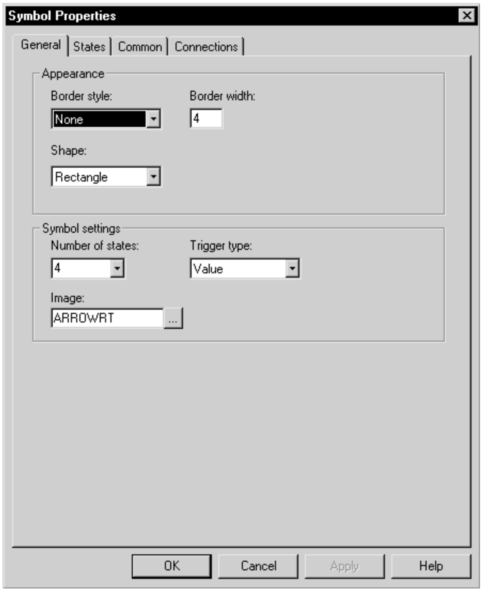
The error state

The symbol's error state is displayed at runtime when:

- the Indicator connection is unassigned.
- the Indicator connection's value does not match one of the state values you set up.
- the Trigger type is set to Value and the Indicator connection value does not match one of the state values you set up.
- the Trigger type is set to LSB and the position of the least significant bit set in the Value connection does not match one of the state values you set up.
- the Trigger type is set to Value and an array tag has been assigned to the object's Value connection.

To set up a symbol

1. Double-click the symbol.



Symbol Properties

Appearance

Border style: None

Border width: 4

Shape: Rectangle

Symbol settings

Number of states: 4

Trigger type: Value

Image: ARROWRT

2. In the object's Properties dialog box, fill in the options on each tab:
   - In the General tab, specify what the symbol looks like at runtime, and the number of states for the symbol.
   - In the States tab, specify how the symbol's appearance changes when its tag or expression's value changes. For tips about setting up states, see page 16-2.
   - In the Common tab, specify the symbol's spacial properties, name, and visibility.

- In the Connections tab, specify the tag or expression from which the symbol receives data. For information about assigning tags and expressions, see page 15-38.

For details about the options in the tabs, see Help.

3. When you are finished, click OK.

Setting up list indicators

The list indicator displays a list of states for a process or operation, and highlights the current state.

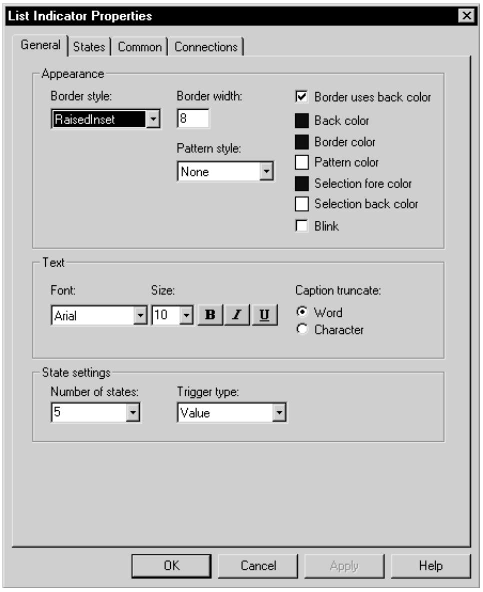
Each state is represented by a caption in the list. This type of indicator is useful if you want operators to view the current state, but also see the other possible states.

For sequential processes, the list can inform the operator about what happens next.

The list indicator has no error state. If the value of the Indicator connection 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.



Appearance

Border style: RaisedInset

Border width: 8

Pattern style: None

☑ Border uses back color

■ Back color

■ Border color

□ Pattern color

■ Selection fore color

□ Selection back color

□ Blink

Text

Font: Arial

Size: 10

B I U

Caption truncate:

● Word

○ Character

State settings

Number of states: 5

Trigger type: Value

2. In the object’s Properties dialog box, fill in the options on each tab:

- In the General tab, specify what the indicator looks like at runtime, and the number of states for the indicator.
- In the States tab, specify how the indicator's appearance changes when its tag or expression's value changes. For tips about setting up states, see page 16-2.
- In the Common tab, specify the indicator's spacial properties, name, and visibility.
- In the Connections tab, specify the tag or expression from which the indicator receives data. For information about assigning tags and expressions, see page 15-38.

For details about the options in the tabs, see Help.

3. When you are finished, click OK.

How to use bar graphs, gauges, and scales

Bar graphs and gauges display graphical representations of numeric values. The scale is used with bar graphs to indicate the range of values for the bar graph.

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 can change 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 temperature of an oven is lower than required for a recipe, the bar graph can show the temperature in blue.
- If the temperature is in the correct range for the recipe, the bar graph can show the temperature in green.

- If the temperature is higher than the recipe allows, the bar graph can show the temperature in red.

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.

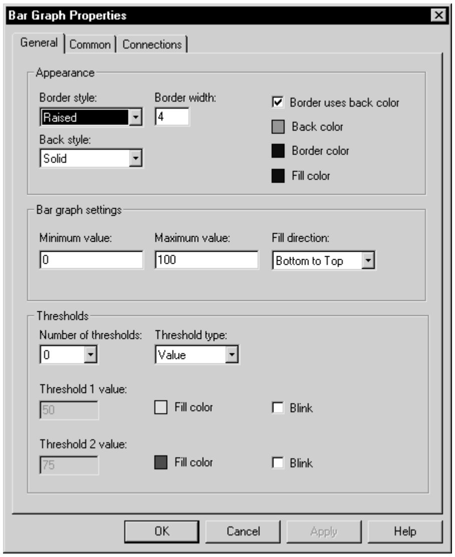
Some people are color blind to red and green, so don't rely on color alone to establish meaning.

Setting up bar graphs

Use bar graphs to represent numeric values by filling and emptying the object as the values rise and fall.

To set up a bar graph

1. Double-click the bar graph.



Bar Graph Properties

General | Common | Connections

Appearance

Border style: Raised

Border width: 4

☑ Border uses back color

Back style: Solid

▨ Back color

■ Border color

■ Fill color

Bar graph settings

Minimum value: 0

Maximum value: 100

Fill direction: Bottom to Top

Thresholds

Number of thresholds: 0

Threshold type: Value

Threshold 1 value: 50 □ Fill color □ Blink

Threshold 2 value: 75 ■ Fill color □ Blink

2. In the object's Properties dialog box, fill in the options on each tab:

   - In the General tab, specify what the bar graph looks like at runtime.
   - In the Common tab, specify the bar graph's spacial properties, name, and visibility.
   - 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 15-38.

   For details about the options in the tabs, see Help.

3. When you are finished, click OK.

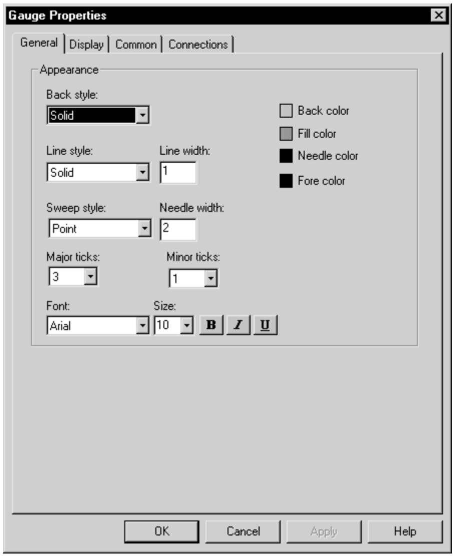
Setting up gauges

The gauge graphic object represents numeric values using a needle on a dial.

At runtime, the gauge indicates the value of a tag or expression in relation to the gauge’s minimum and maximum values.

To set up a gauge

1. Double-click the gauge.



Gauge Properties

Appearance

Back style: Solid

Line style: Solid

Line width: 1

Sweep style: Point

Needle width: 2

Major ticks: 3

Minor ticks: 1

Font: Arial

Size: 10

□ Back color

▨ Fill color

■ Needle color

■ Fore color

2. In the object’s Properties dialog box, fill in the options on each tab:

- In the General tab, specify what the gauge looks like at runtime.
- In the Display tab, specify how the gauge displays values at runtime.
- In the Common tab, specify the gauge’s spacial properties, name, and visibility.
- In the Connections tab, specify the tag or expression from which the gauge receives data. For information about assigning tags and expressions, see page 15-38.

For details about the options in the tabs, see Help.

3. When you are finished, click OK.

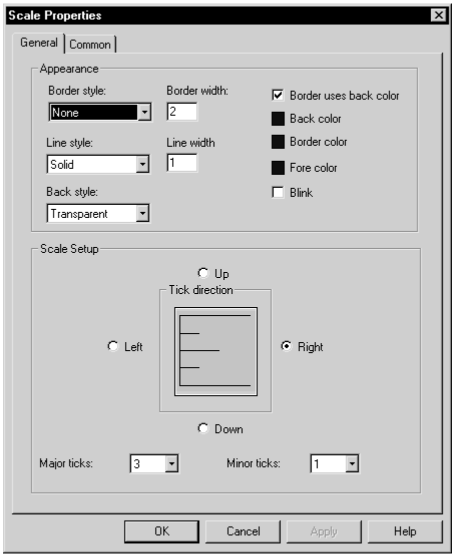
Setting up scales

Use the scale graphic object to show the possible range of values for a bar graph.

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. Group all the objects with the bar graph.

To set up a scale

1. Double-click the scale.



Scale Properties

Appearance

Border style: None

Border width: 2

☑ Border uses back color

■ Back color

■ Border color

■ Fore color

☐ Blink

Line style: Solid

Line width 1

Back style: Transparent

Scale Setup

Tick direction: ○ Up ○ Left ● Right ○ Down

Major ticks: 3

Minor ticks: 1

2. In the object's Properties dialog box, fill in the options on each tab:

   - In the General tab, specify what the scale looks like at runtime.
   - In the Common tab, specify the scale's spacial properties, name, and visibility.

   For details about the options in the tabs, see Help.

3. When you are finished, click OK.

Setting up 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:

- key button graphic objects. These are graphic objects that duplicate the functions of keyboard keys.
- the arrow keys and Enter key on a terminal's keypad.
- the arrow keys and Enter key on a keyboard.

Using buttons with the control list selector

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.

Use this button	**To do this**
Backspace	Move the cursor back to the highlighted item in the list.
End	Move to the bottom item in the list.
Enter	Select the item the cursor is pointing to.
Home	Move to the top item in the list.
Move down	Move down one item in the list.
Move up	Move up one item in the list.
Page down	Move down one page in the list.
Page up	Move up one page in the list.

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.

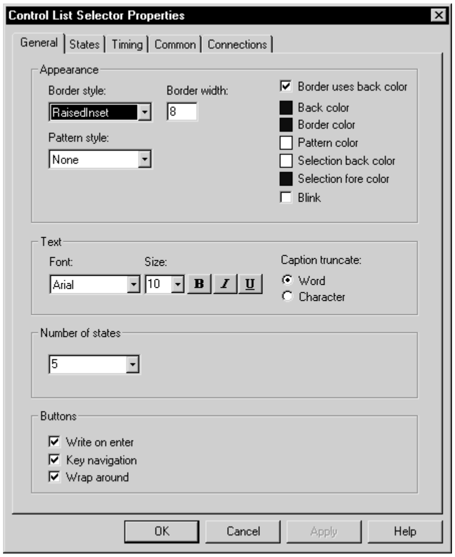
You can use Enter key handshaking to hold the value of the tag at the programmable controller or device for a specific period of time, to ensure the value is read before the control list selector overwrites the value with a new value.

Enter key handshaking only works if the Write on enter check box is selected (in the General tab).

For more information about using Enter key handshaking, see page 16-14.

To set up a control list selector

1. Double-click the control list selector.



Appearance

Border style: RaisedInset

Border width: 8

Pattern style: None

☑ Border uses back color

■ Back color

■ Border color

□ Pattern color

□ Selection back color

■ Selection fore color

☐ Blink

Text

Font: Arial

Size: 10 **B** *I* U

Caption truncate:

● Word

○ Character

Number of states

5

Buttons

☑ Write on enter

☑ Key navigation

☑ Wrap around

2. In the object's Properties dialog box, fill in the options on each tab:

- In the General tab, specify what the selector looks like at runtime, its number of states, whether to write out a value when the operator presses the Enter key, whether the operator can navigate to the selector using the keys on the keyboard or keypad, and whether the cursor wraps from the bottom of the list back to the top.
- 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 connection to the value you specify when the selected state is in effect. For tips about setting up states, see page 16-2.
- In the Timing tab, set up the timing and handshake settings for the Enter key. For information about using Enter key handshaking, see page 16-14.
- In the Common tab, specify the control list selector's spacial properties, name, and visibility.
- 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 15-38.

For details about the options in the tabs, see Help.

3. When you are finished, click OK.

Setting up piloted control list selectors

Piloted control list selectors allow an operator or remote device 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.

Choosing between piloted control list selectors and control list selectors

Piloted control list selectors include the following features that control list selectors do not:

- The states can be selected either by an operator, or remotely, for example by a programmable controller, or by both an operator and a remote device. Individual states can be turned off, to prevent them from being selected by either the operator or the remote device.

  Control list selectors do not allow states to be turned off.

- The state values of all of the items that are visible in the list can be written to the Visible States connection when the list scrolls. The Visible States connection must be a data-server tag that supports arrays. You cannot use an HMI tag.

  Control list selectors have no Visible States connection.

- The state value of the item at the top of the list can be written to the Top Position connection when the list scrolls.

  Control list selectors have no Top Position connection.

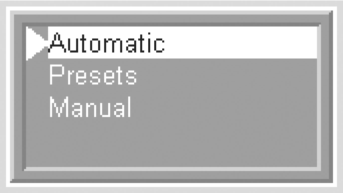
How piloted control list selectors work at runtime

A piloted control list selector can show several states at the same time, but only one state can be selected at a time.

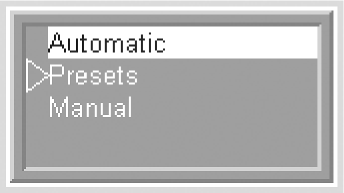
You can set up the piloted control list selector to be operator-controlled or remote-controlled by assigning tags or expressions in the Connections tab.

You can also set up individual states to be operator-controlled, remote-controlled, both, or none. If set to none, the state is turned off.

If the piloted control list selector is set up to be operator-controlled, and the operator selects a remote-controlled state, or one that is turned off, a hollow cursor is displayed.



The operator can select this state.



The operator cannot select this state.

Using buttons with the piloted control list selector

When a piloted control list selector is operator-controlled, it works with:

- key button graphic objects. These are graphic objects that duplicate the functions of keyboard keys.
- 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 piloted control list selector that has focus, or with a specific piloted control list selector. You can use the buttons listed in the table on page 16-49.

Selecting items in the list

Each state can be selected directly by an operator, or remotely by a device such as a programmable controller. The operator or the controller scrolls through the list to select a different state or a different group of visible states.

When an operator or remote device selects a state, the value assigned to the selected state is written to the piloted control list selector's Value connection. If the state is turned off, the state's value is not written to the Value connection.

If the operator attempts to select a state that is remote-controlled, the state's value is not written to the Value connection.

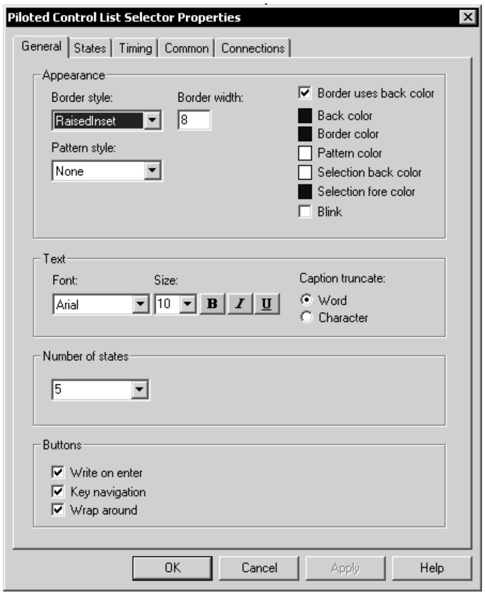
Scrolling through the list

If the piloted control list selector contains more states than can be displayed in the list simultaneously, the value of the Top Position connection (if assigned) changes whenever the item at the top of the list changes.

If the Visible States connection is assigned, the values assigned to all visible states are written to the Visible States connection whenever the list scrolls. To use this feature, the assigned tag must support arrays, and the array must be the same length as the number of visible states in the piloted control list selector. For information about using array tags, see page 9-14.

To set up a piloted control list selector

1. Double-click the piloted control list selector.



Border style: RaisedInset

Border width: 8

Pattern style: None

☑ Border uses back color

■ Back color

■ Border color

□ Pattern color

□ Selection back color

■ Selection fore color

□ Blink

Font: Arial

Size: 10 **B** *I* U

Caption truncate:
● Word
○ Character

Number of states: 5

☑ Write on enter

☑ Key navigation

☑ Wrap around

2. In the object’s Properties dialog box, fill in the options on each tab:

- In the General tab, specify what the selector looks like at runtime, its number of states, whether to write out a value when the operator presses the Enter key, whether the operator can navigate to the selector using the keys on the keyboard or keypad, and whether the cursor wraps from the bottom of the list back to the top.

- In the States tab, set up the value and caption for each state. Also specify whether each state can be selected, and by whom. For tips about setting up states, see page 16-2.

- In the Timing tab, set up the timing and handshake settings for the Enter key. For information about using Enter key handshaking, see page 16-14.

- In the Common tab, specify the piloted control list selector’s spacial properties, name, and visibility.

- In the Connections tab, specify the tags or expression with which the piloted control list selector exchanges data. For information about assigning tags and expressions, see page 15-38.

For details about the options in the tabs, see Help.

3. When you are finished, click OK.

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.

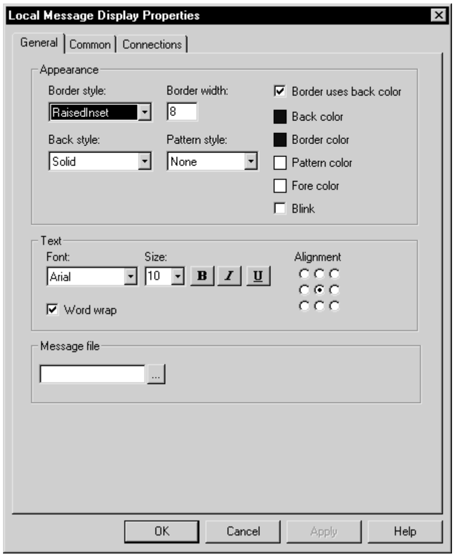
To use local messages, create a local message display object in a graphic display, and then assign a local message file to the local message display object.

For more information about local messages, see page 14-29.

If no message exists for the trigger value that matches the value of the Value connection, the display is filled with question marks (?).

To set up a local message display

1. Double-click the local message display.



Border style: RaisedInset

Border width: 8

Back style: Solid

Pattern style: None

☑ Border uses back color

■ Back color

■ Border color

□ Pattern color

□ Fore color

□ Blink

Font: Arial

Size: 10

☑ Word wrap

2. In the object's Properties dialog box, fill in the options on each tab:

- In the General tab, specify what the local message display looks like at runtime and which local message file to use.
- In the Common tab, specify the local message display's spacial properties, name, and visibility.
- In the Connections tab, specify the tag or expression with which the local message display exchanges data. For information about assigning tags and expressions, see page 15-38.

For details about the options in the tabs, see Help.

3. When you are finished, click OK.

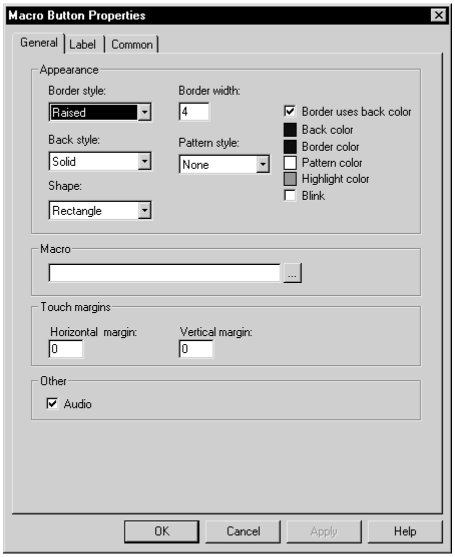
Setting up macro buttons

Macro buttons run macro files that assign values to tags when the button is pressed.

For information about creating macros, see Chapter 22.

To set up a macro button

1. Double-click the button.



Appearance

Border style: Raised

Border width: 4

☑ Border uses back color

■ Back color

■ Border color

□ Pattern color

▨ Highlight color

□ Blink

Back style: Solid

Pattern style: None

Shape: Rectangle

Macro

Touch margins

Horizontal margin: 0

Vertical margin: 0

Other

☑ Audio

2. In the button's Properties dialog box, fill in the options on each tab:

- In the General tab, specify what the button looks like at runtime, and the macro to run when the button is pressed.

- In the Label tab, specify what text or image to display on the button.
- In the Common tab, specify the button's spacial properties, name, and visibility.

For details about the options in the tabs, see Help.

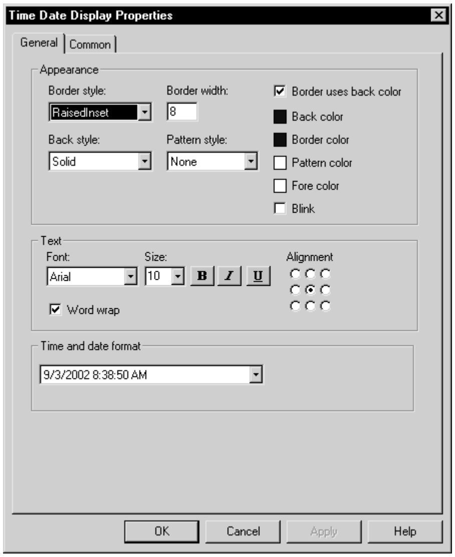
3. When you are finished, click OK.

Setting up time and date displays

A time and date display shows the current time and date in a graphic display.

To set up a time and date display

1. Double-click the time and date display.



Time Date Display Properties

General | Common

Appearance

Border style: RaisedInset

Border width: 8

Back style: Solid

Pattern style: None

☑ Border uses back color

■ Back color

■ Border color

□ Pattern color

□ Fore color

□ Blink

Text

Font: Arial

Size: 10

Alignment

○ ○ ○
○ ● ○
○ ○ ○

☑ Word wrap

Time and date format

9/3/2002 8:38:50 AM

2. In the object's Properties dialog box, fill in the options on each tab:

- In the General tab, specify what the time and date display looks like at runtime.
- In the Common tab, specify the time and date display's spacial properties, name, and visibility.

For details about the options in the tabs, see Help.

3. When you are finished, click OK.

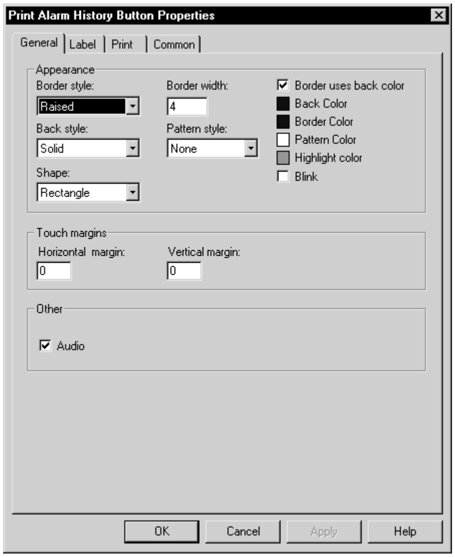
Setting up print alarm history buttons

The operator can press the print alarm history button to print a report of all the alarm messages in the alarm log file. The report can include the time alarms occurred and were acknowledged.

For information about the alarm log file, see page 9-9.

To set up a print alarm history button

1. Double-click the button.



Print Alarm History Button Properties

Appearance

Border style: Raised

Border width: 4

☑ Border uses back color

■ Back Color

■ Border Color

□ Pattern Color

▨ Highlight color

□ Blink

Back style: Solid

Pattern style: None

Shape: Rectangle

Touch margins

Horizontal margin: 0

Vertical margin: 0

Other

☑ Audio

2. In the button’s Properties dialog box, fill in the options on each tab:

   - In the General tab, specify what the button looks like at runtime.
   - In the Label tab, specify what text or image to display on the button.
   - In the Print tab, specify what information to print on the report.
   - In the Common tab, specify the button’s spacial properties, name, and visibility.

   For details about the options in the tabs, see Help.

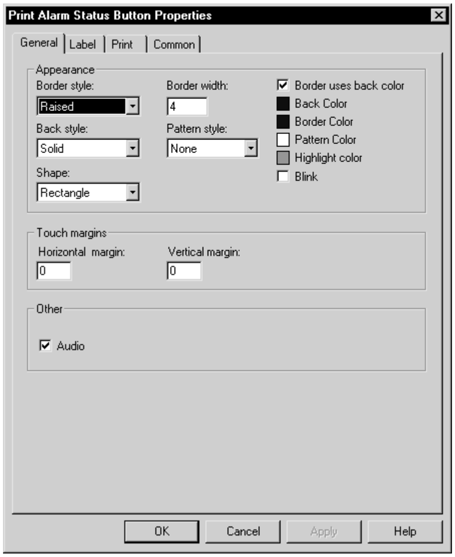
3. When you are finished, click OK.

Setting up print alarm status buttons

The operator can press the print alarm status button to print a report of the status of alarms that have been defined for the application (in the Alarm Setup editor). The report can include all alarms, active alarms only, or only alarms that have been active since the alarm status was last reset. The report can include how many times each alarm was triggered, and the accumulated time in alarm.

To set up a print alarm status button

1. Double-click the button.



Print Alarm Status Button Properties

General | Label | Print | Common

Appearance

Border style: Raised

Border width: 4

☑ Border uses back color

■ Back Color

■ Border Color

□ Pattern Color

▨ Highlight color

□ Blink

Back style: Solid

Pattern style: None

Shape: Rectangle

Touch margins

Horizontal margin: 0

Vertical margin: 0

Other

☑ Audio

2. In the button's Properties dialog box, fill in the options on each tab:

   - In the General tab, specify what the button looks like at runtime.
   - In the Label tab, specify what text or image to display on the button.
   - In the Print tab, specify what information to print on the report.
   - In the Common tab, specify the button's spacial properties, name, and visibility.

   For details about the options in the tabs, see Help.

3. When you are finished, click OK.

Setting up alarm lists

The alarm list graphic object displays a list of alarms from the alarm log file. It can show all the alarms in the alarm log file, or any combination of active, inactive, acknowledged, and unacknowledged alarms. It can also show the alarms for specific alarm triggers.

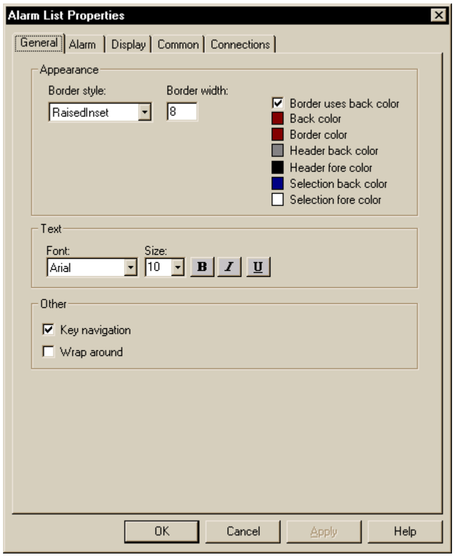
You can assign a tag or expression to the ActiveAcknowledged, ActiveUnacknowledged, InactiveAcknowledged, or InactiveUnacknowledged connections, to allow the data source to control the type of alarms to display in the list. When one of the connection's values is a non-zero value, the related type of alarm is displayed in the alarm list. The connection value overrides the setting for the list in the Alarm List Properties dialog box.

RSView comes with two graphic displays, [ALARM MULTI-LINE] and [HISTORY], that contain alarm list objects. The [HISTORY] display comes in two sizes. These displays are in the graphic library. You can copy the library displays into your application and use the displays and objects as is, customize them, or create your own.

For more information about using alarm lists, see page 9-31. For information about the alarm log file, see page 9-9.

To set up an alarm list

1. Double-click the alarm list.



Alarm List Properties

General | Alarm | Display | Common | Connections

Appearance

Border style: RaisedInset

Border width: 8

☑ Border uses back color

🟥 Back color

🟥 Border color

▨ Header back color

■ Header fore color

🟦 Selection back color

□ Selection fore color

Text

Font: Arial

Size: 10

B *I* U

Other

☑ Key navigation

□ Wrap around

2. In the object's Properties dialog box, fill in the options on each tab:

- In the General tab, specify what the alarm list looks like at runtime, whether the operator can navigate to the list using a keyboard, and how scrolling works for the list.
- In the Alarm tab, specify the columns to include in the list, the number of lines per alarm, and the triggers to filter by, if any.

- In the Display tab, specify the types of alarms to display in the list, and the appearance of the different alarm conditions.
- In the Common tab, specify the alarm list's spacial properties, name, and visibility.
- In the Connections tab, specify the tags or expressions to use to control the type of alarms to display in the list. The use of these connections is optional.

For details about the options in the tabs, see Help.

3. When you are finished, click OK.

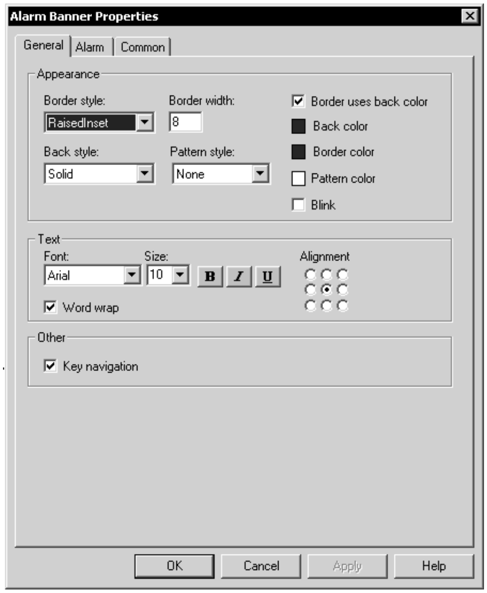
Setting up alarm banners

The alarm banner graphic object displays a single unacknowledged alarm message. For example, the banner could display a message that warns the operator that the pressure in a boiler is too high.

The [ALARM] display and the [ALARM BANNER] graphic library both contain an alarm banner object. You can use the displays and objects as is, customize them, or create your own. For more information about using alarm banners, see page 9-33.

To set up an alarm banner

1. Double-click the alarm banner.



Border style: RaisedInset
Border width: 8
☑ Border uses back color
■ Back color
■ Border color
□ Pattern color
□ Blink
Back style: Solid
Pattern style: None
Font: Arial
Size: 10
☑ Word wrap
☑ Key navigation

2. In the object's Properties dialog box, fill in the options on each tab:

- In the General tab, specify what the banner looks like at runtime and whether the operator can navigate to the banner using the keys on the keyboard or keypad.
- In the Alarm tab, set up whether to queue alarms, whether to display all alarms or active alarms only, and which alarms to include in a filtered trigger list.
- In the Common tab, specify the alarm banner's spacial properties, name, and visibility.

For details about the options in the tabs, see Help.

3. When you are finished, click OK.

Setting up alarm status lists

The alarm status list graphic object displays the status of alarms, including how many times an alarm has been triggered and how long it has been active. For example, the list could display an alarm that has been triggered 5 times for a total accumulated time in alarm of 10 minutes.

The operator can view the status list in three different modes:

- All alarms—displays the status of all alarms that have been defined in the Alarm Setup editor.
- Active alarms—displays the status of all the alarms that are currently active.
- Past alarms—displays the status of all the alarms that have been active since the alarm status has been reset.

The operator can press the alarm status mode button to cycle through the different modes.

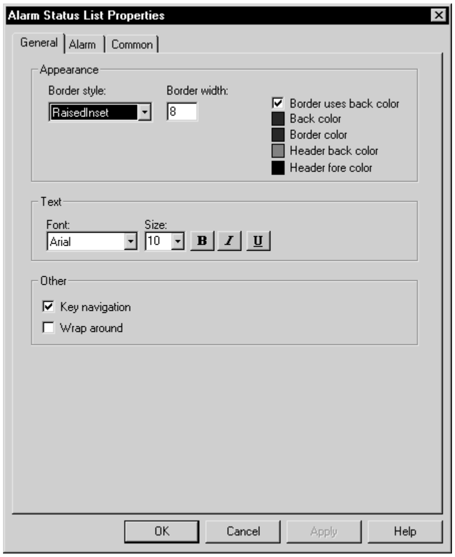
If desired, you can set up the alarm status list to show alarms for specific alarm triggers only.

RSView comes with a library graphic display called [STATUS] that contains an alarm status list object, alarm status mode button, and other buttons for working with the list. You can use the display and objects as is, customize them, or create your own.

For more information about using alarm status lists, see page 9-34.

To set up an alarm status list

1. Double-click the alarm status list.



Appearance

Border style: RaisedInset

Border width: 8

☑ Border uses back color

■ Back color

■ Border color

■ Header back color

■ Header fore color

Text

Font: Arial

Size: 10

B *I* U

Other

☑ Key navigation

□ Wrap around

2. In the object's Properties dialog box, fill in the options on each tab:

   - In the General tab, specify what the alarm status list looks like at runtime, whether the operator can navigate to the list using a keyboard, and how scrolling works for the list.

   - In the Alarm tab, specify the columns to include in the list, the number of lines per alarm, and the triggers to filter by, if any.

   - In the Common tab, specify the alarm status list's spacial properties, name, and visibility.

   For details about the options in the tabs, see Help.

3. When you are finished, click OK.

Setting up diagnostics lists

The diagnostics 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.

  These are system-generated information messages. They are not the same messages as the information messages you create and display in the information message display object.

- Warning messages.

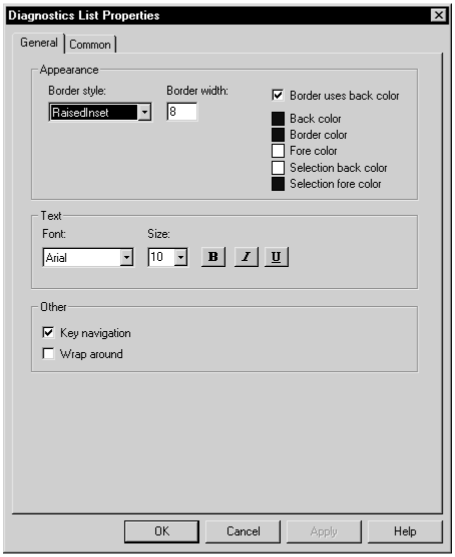
- Error messages, such as messages about communication errors, invalid values, and unassigned connections.
- Audit messages about tag writes and tag write failures.

RSView comes with a default graphic display called [DIAGNOSTICS] that contains a diagnostics list object. You can use the display and object as is, customize them, or create your own.

For more information about using diagnostics lists, see page 10-11.

To set up a diagnostics list

1. Double-click the diagnostics list.



Diagnostics List Properties

Appearance

Border style: RaisedInset

Border width: 8

☑ Border uses back color

■ Back color

■ Border color

□ Fore color

□ Selection back color

■ Selection fore color

Text

Font: Arial

Size: 10

Other

☑ Key navigation

□ Wrap around

2. In the object’s Properties dialog box, fill in the options on each tab:
   - In the General tab, specify what the list looks like at runtime, whether the operator can navigate to the list using the keys on the keyboard or keypad, and whether the cursor wraps from the bottom of the list back to the top.
   - In the Common tab, specify the diagnostics list’s spacial properties, name, and visibility.

   For details about the options in the tabs, see Help.
3. When you are finished, click OK.

Setting up information message displays

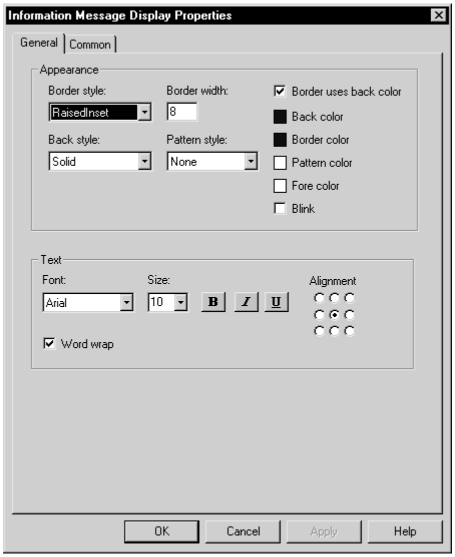
The information message display graphic object gives the operator runtime messages about information that requires immediate attention.

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 12-8.

To set up an information message display

1. Double-click the information message display.



Information Message Display Properties

General | Common

Appearance

Border style: RaisedInset

Border width: 8

☑ Border uses back color

■ Back color

■ Border color

□ Pattern color

□ Fore color

□ Blink

Back style: Solid

Pattern style: None

Text

Font: Arial

Size: 10

Alignment

○ ○ ○
○ ● ○
○ ○ ○

☑ Word wrap

2. In the object's Properties dialog box, fill in the options on each tab:

   - In the General tab, specify what the information message display looks like at runtime.
   - In the Common tab, specify the information message display's spacial properties, name, and visibility.

   For details about the options in the tabs, see Help.

3. When you are finished, click OK.

17 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.
- setting up each type of animation.
- applying animation to groups.
- checking what kind of animation is attached to an object.
- copying and pasting animation.
- setting up animation for global objects.

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, an 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 5 Screen Demo sample application 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 15-1.

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 animation to groups of drawing objects. For more information, see page 17-14.

You can attach as many types of animation to a drawing object (except images and panels) 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.

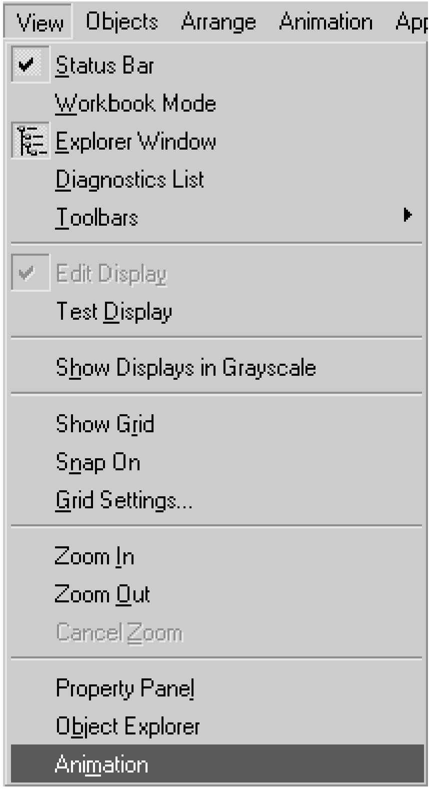
Using the Animation dialog box

To attach animation, use the Animation dialog box.

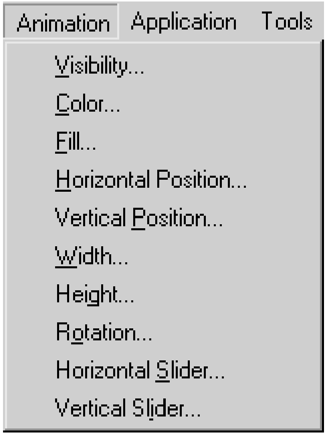
To open the Animation dialog box, do one of the following

- 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 unavailable.
- Right-click an object, select Animation, and then click an animation type. Animation types that are not supported for the selected object are unavailable.

View menu

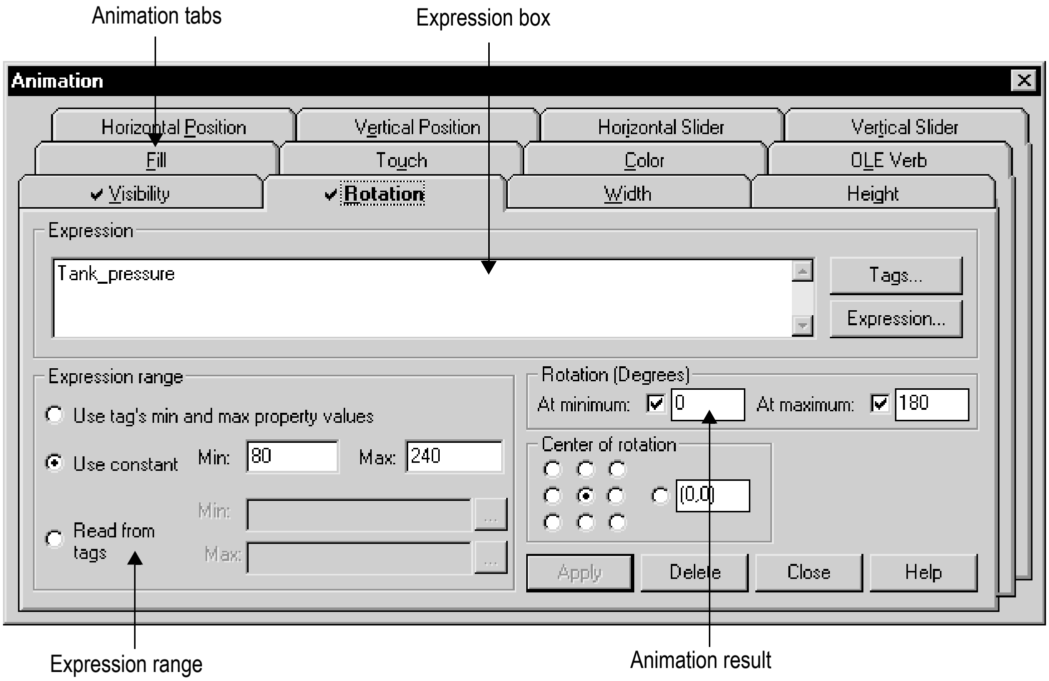


Animation menu



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 move it around the screen. While it's open you can select other objects and open other dialog boxes.



Expression: Tank_pressure

Expression range
○ Use tag's min and max property values
● Use constant Min: 80 Max: 240
○ Read from tags Min: Max:

Rotation (Degrees)
At minimum: ☑ 0 At maximum: ☑ 180

Center of rotation
○ ○ ○
○ ● ○ ○ (0,0)
○ ○ ○

For details about the parts of the Animation dialog box, see Help.

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, you can set the range of motion visually using the Object Smart Path feature. For details, see page 17-7.

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 mode. When you are finished testing, switch back to edit mode to continue editing.

To switch between test and edit modes

1. On the View menu, click Test Display or Edit Display, or click the Test Display and Edit Display tools.

Test mode is not the same as running the display. Test 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 setting up 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 HMI tags or data server tags that already exist, 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 application is first run.
- graphic displays that are opened using a goto display button.
- graphic displays that are opened using a display list selector.

Use parameter files to specify which tags to substitute for which placeholders. For information about using parameter files, see page 14-25.

The tag placeholder can replace any part of a tag name, including folder names. For example, you could create a parameter file specifying that the tag placeholder #1=Folder1. You could assign the folder and a tag name to a graphic object's connection: #1\Tag1.

To create a tag placeholder

1. 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 can be achieved using expressions. You can use expressions containing tag values, constants, mathematical equations, security functions, 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 20.

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 setting up 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 HMI tag in the expression. If more than one HMI tag is used in the expression, the first HMI tag's minimum and maximum values are used.

  For analog HMI tags, the values are taken from the Minimum and Maximum boxes in the Tags 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 Tag Browser 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.

Motion can be defined in pixels, percentages, or degrees.

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 of values.

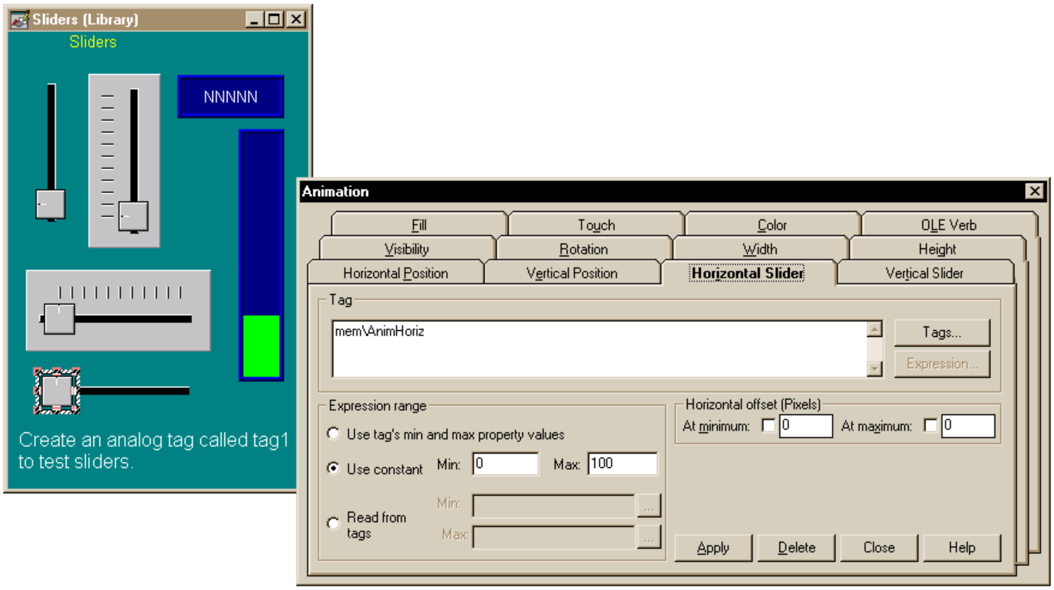
Using Object Smart Path

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 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.



Create an analog tag called tag1 to test sliders.

Tag: mem\AnimHoriz

Expression range

○ Use tag's min and max property values

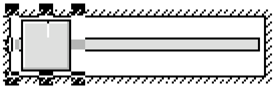
● Use constant Min: 0 Max: 100

○ Read from tags Min: Max:

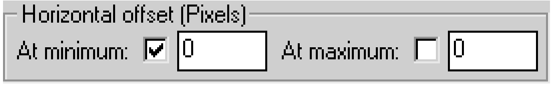
Horizontal offset (Pixels)

At minimum: □ 0 At maximum: □ 0

5. In the display, drag the rectangle to the position that will indicate the lowest number in the range.

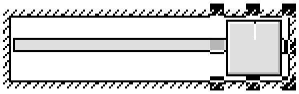


6. In the Animation dialog box, set this position by clicking the At minimum check box.

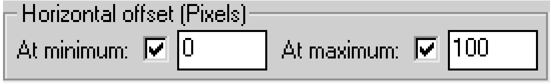


Horizontal offset (Pixels)
At minimum: ☑ 0 At maximum: □ 0

7. In the display, drag the rectangle to the position that will indicate the highest number in the range.



8. In the Animation dialog box, set this position by clicking the At maximum check box.



Horizontal offset (Pixels)
At minimum: ☑ 0 At maximum: ☑ 100

9. To save the settings, click Apply.

When you finish setting up the animation, the rectangle returns to its original position.

Setting up the different types of animation

This section describes the different types of animation and provides tips and examples for setting up animation.

Setting up 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 inactive.

Visibility animation is available for all objects. Visibility animation overrides an object's Visible property.

If you use a tag's value to control visibility animation as well as in an expression to control some other aspect of animation, when you set up visibility, set the Expression true state to "Invisible." If you do not do this, the object could appear briefly in its design-time location and orientation before animating properly.

For more information about setting up visibility animation, see Help.

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 have access to, 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 uppercase letters, so make sure that you use uppercase letters in your expression.

To specify which user can view an object in a display

1. Select the object to limit visibility to.
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 is visible only if the Admin user is logged in.

Setting up 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.

For more information about setting up color animation, see Help.

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 15-14.

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 the Polygon 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.

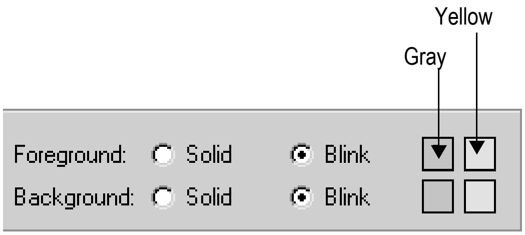
2. Click OK to close the Polygon Properties dialog box.
3. With the rectangle selected, open the Animation dialog box, and then click the Fill tab.
4. Attach fill animation as follows:
   - In the Expression box, type Hopper1\FlourLevel (this is the tag that monitors the fill level).
   - For Fill Direction, click Up.
5. 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).

   Set up 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).

   Set up 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.



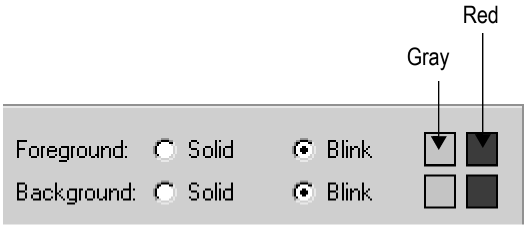
Foreground: ○ Solid ● Blink

Background: ○ Solid ● Blink

   - For the foreground colors, select gray for the first color and yellow for the second color. Repeat for the background colors.

   Set up 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.



Foreground: ○ Solid ● Blink

Background: ○ Solid ● Blink

- For the foreground colors, select gray for the first color and red for the second color. Repeat for the background colors.

6. Click Apply.

Setting up 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 objects' borders, line objects, or objects with transparent backgrounds.

For more information about setting up fill animation, see Help.

Setting up 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.

For more information about setting up horizontal position animation, see Help.

Setting up 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.

For more information about setting up vertical position animation, see Help.

Setting up 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's width will be halfway between its minimum and maximum percentage.

Width animation is available for all drawing objects except images and panels.

For more information about setting up width animation, see Help.

Setting up 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's height will be halfway between its minimum and maximum percentage.

Height animation is available for all drawing objects except images and panels.

For more information about setting up height animation, see Help.

Setting up 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.

For more information about setting up rotation animation, see Help.

Setting up 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.

For more information about setting up horizontal slider animation, see Help.

Tips

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.

Setting up 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 about creating slider objects, see the previous section.

For more information about setting up vertical slider animation, see Help.

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	Animation attached to individual objects within the group overrides group animation.
Fill	Animation results for both the individual objects and the group are applied.
Horizontal slider, vertical slider	Group animation overrides animation attached to individual objects within the group.

These types of animation	Are applied like this
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 15-50.

Checking the animation on objects

To see what type of animation has been set up for an object or group of objects, use the Object Explorer, the Animation menu, or the Animation dialog box.

For information about using the Object Explorer to highlight objects that have animation attached, see page 15-27.

To see what type of animation has been set up for objects within a group, use the group edit feature or the Object Explorer. For information about using the group edit feature, see page 15-50.

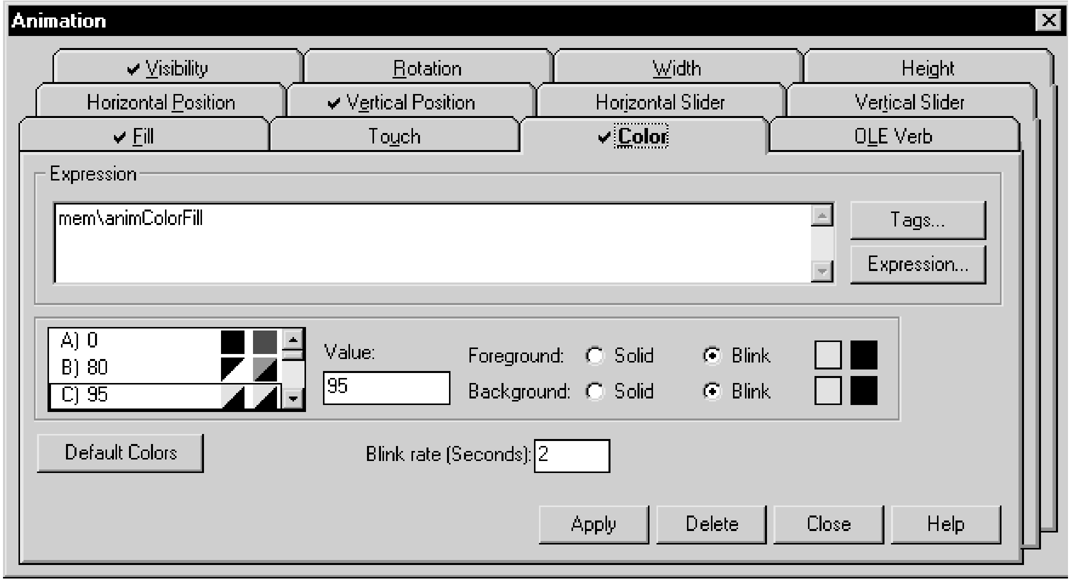
To view the animation on an object using the Animation menu

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.

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.



Expression: mem\animColorFill

A) 0
B) 80
C) 95

Value: 95

Foreground: ○ Solid ● Blink

Background: ○ Solid ● Blink

Blink rate (Seconds): 2

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 15-44 and 15-45.

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.

Setting up animation for global objects

RSView global objects allow you to link the appearance and behavior of a graphic object to multiple copies of that object. When the original base object is updated, the changes are automatically applied to all the copies of the object. For information about creating base objects, see page 14-14.

The copies of the object are called reference objects, and they have the same properties as the original base object. If desired, you can assign unique animation to the reference object. For information about creating reference objects, see page 15-24.

The LinkAnimation property determines whether the reference object uses the base object's animation.

To set up animation for a reference object

1. Double-click the reference object to open the Property Panel.
2. Select the LinkAnimation property setting to use:
   - **Do not link**—allows you to set up separate animation for the reference object.
   - **Link with expressions**—the reference object uses the animation and tags or expressions assigned to the base object.
   - **Link without expressions**—allows you to use only the types of animation set up for the base object, but assign different tags or expressions to the reference object.
3. If you selected Do not link or Link without expressions, set up animation for the object using the methods described in this chapter.

For more information about working with reference objects, see page 16-3.