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THINK.
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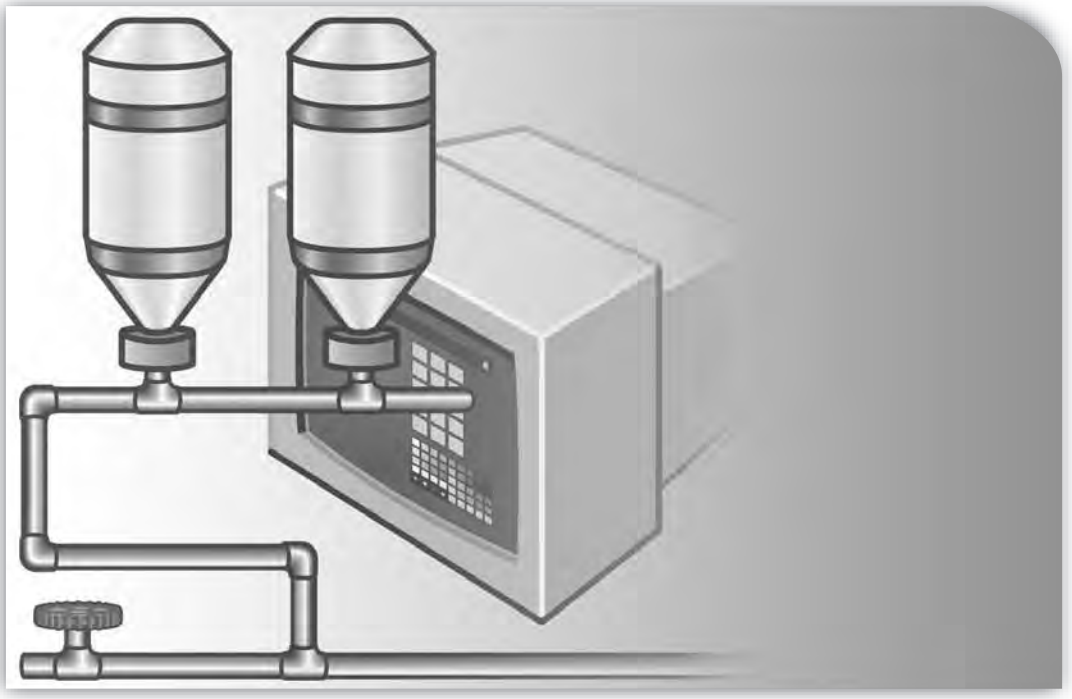
RSView®32



USER'S GUIDE

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ALLEN-BRADLEY • ROCKWELL SOFTWARE

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P Preface

Thank you for choosing RSView32™. RSView32 is an integrated package for developing and running automation applications.

Designed for use with Microsoft® Windows® Server 2003 R2 Standard Edition with Service Pack 2, Windows XP Professional with Service Pack 1 or later, Windows 2000 Server with Service Pack 4 or Windows 2000 Professional with Service Pack 4, and Windows Vista Business with Service Pack 1 or later (32-Bit) or Windows Vista Home Basic with Service Pack 1 or later (32-Bit), Windows 7 Professional and Windows Server 2008 Standard Edition, RSView32 gives you all the tools you need to create effective monitoring and supervisory control applications.

About the documentation

The RSView32 documentation set includes:

Getting Results with RSView32: A quick start guide to get you up and running with RSView32.

RSView32 User's Guide: Comprehensive information about RSView32, procedures for creating and running an automation application, and reference information.

RSView32 Runtime User's Guide: Information on how to install, start, and use RSView32 Runtime.

Help: Online procedures and reference information.

Release Notes Additional information about RSView32. Read this file before you begin working with the software.

Technical support services

If you have questions about RSView32, please consult the user's guides or the Help.

If you can't find the answer, contact Rockwell Software Technical Support at:

Telephone: 440–646–3434

Internet Support: www.rockwellsoftware.com **or** www.support.rockwellautomation.com

Support staff are available Monday to Friday from 8 A.M. to 5 P.M. Eastern Standard Time, except during holidays.

When you call

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

- the product serial number

  You'll find this number on the Activation disk label and in the help About dialog box that you access from the RSView32 Project Manager.

- 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

- how you tried to solve the problem

Chapter

1 Working with projects

This chapter describes:

- files and components
- adding, renaming, removing, and deleting components
- printing from editors
- using the Project Documentor and Project Transport Wizard as you develop your project

What is a project?

A project consists of a folder on your hard disk that contains, at a minimum, the following items:

- project file (.rsv)
- tag folder
- comprf (communications profile) folder
- cache folder

The .rsv file contains general project information such as a list of project components and their directory locations and version numbers. By default, all project components are located locally in folders under the project folder, but they can also be located in other directories or on other computers.

Project files

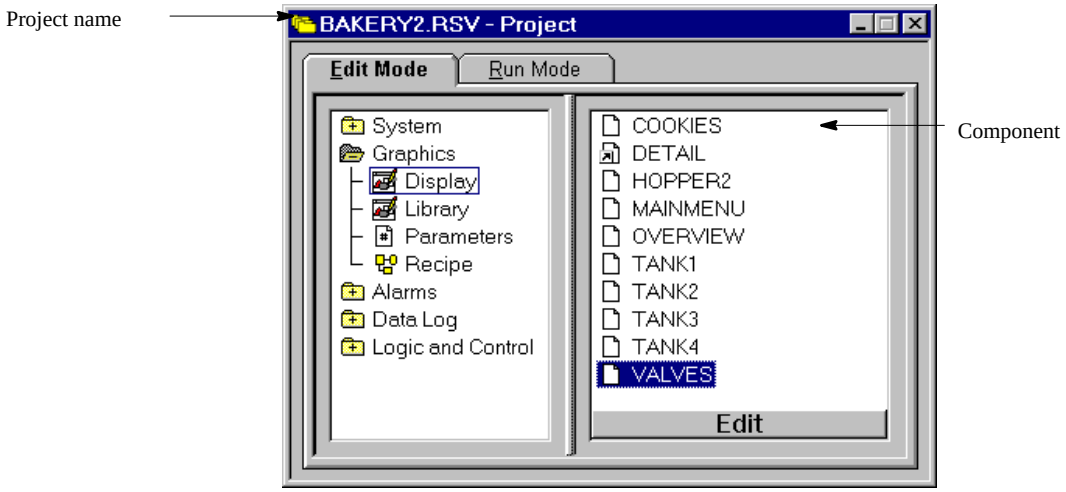
The following table lists the RSView32™ folders and the types of files they contain.

Folder	Contents	File extensions
Project name	RSView32 project file, system files, and the folders described below	.rsv
	System files: User accounts	.act
	Security command list	.sec
Actlog	Activity log files	.dbf
Almlog	Alarm log files	.dbf
Als	Alarm summary files	.als
Cab	ActiveX® control setup files	.cab
Cache	RSView32 internal files	.ctl, .dat, .idx
Comprf	Internal information on channels, nodes, and scan classes	.csv, .ctl
Dlglog	Data log models	.mdf
	Data log files	.dbf
	Information for current file set	.dns
	Information for historical file sets	.dlg
Dts	Derived tag files	.dts
Eds	Events files	.eds
Gfx	Graphic display files	.gfx
Key	Global key files	.key
Mcr	Macro files	.mcr
Par	Parameter files	.par
Rcp	Recipe files	.rcp
Tag	Tag database files	.db, .ctl, .dat
	Tag cache file	.cac

Folder	Contents	File extensions
Tgs	Tag monitor files	.tgs
Vba	VBA program files	.vba

Working in the Project Manager

The Project Manager is the main tool for working with RSView32. Each time you create a project, a Project Manager appears showing the project name.



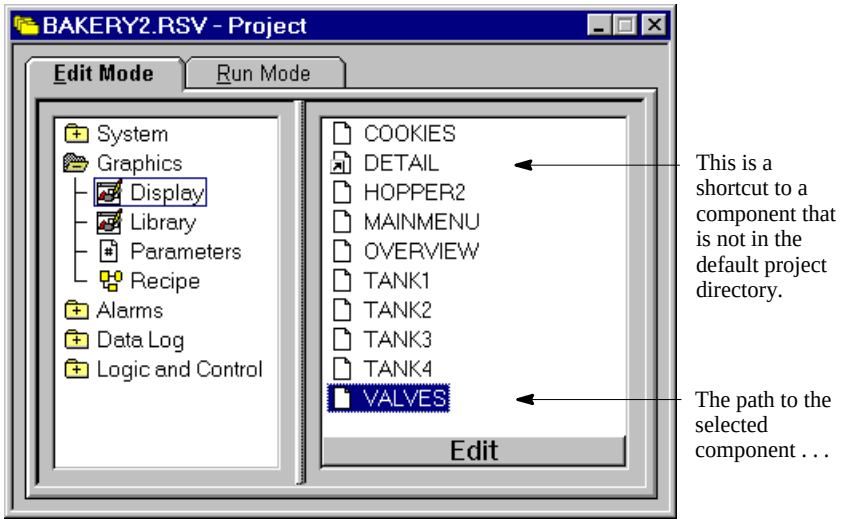
The Project Manager window is divided into two panes. When you first create a project, the left pane appears with a series of folders and the right pane is empty. As you create project components, they are displayed in the right pane.

Component

The Project Manager manages components, not files. A component is a file reference that is associated with the physical file's name and path. The file can be located in a folder under the project directory, outside the project directory, or on another computer.

Viewing component locations

To view the location of the component's file, select the component in the Project Manager and then check the location displayed in the status bar.



. . . is displayed in the status bar.

Adding components to a project

You can use the same files in more than one project by adding components to a project. You can do this using two different methods.

When you add a component in the Project Manager using the Copy Existing Component into Project option, you are creating a copy of the file in the project.

When you add a component using the second option, Create Shortcut to Existing Component, you are not creating a copy of the file in the project. Instead, you are creating a link to the file's location outside of the project. The advantage of using this option is that there is only one copy of the file, and changes made to it are available to all projects using the file. The disadvantage of using this option is that it is more difficult to copy or move projects, because the files are not all located in the same place.

If you copy a component into a project using My Computer, Windows® Explorer, or File Manager, you cannot add the component to the project using the Copy Existing Component into Project option. Instead, use the Create Shortcut to Existing Component option to add the component to the Project Manager.

When you highlight the component in the right pane of the Project Manager, the path to the file is displayed in the status bar. Files that are located outside of the project have an arrow symbol on the component icon, as shown above for the Detail component.

If you move or delete a file using My Computer, Windows Explorer, or File Manager, the file reference is broken and the component name is greyed out in the Project Manager until the file reference is updated. To update the file reference, use either the Copy Existing Component into Project option or the Create Shortcut to Existing Component option.

To add a component to a project or update its file reference:

1. Select the editor that was used to create the desired component. For example, to add a graphic display component, highlight the Graphic Display editor.

2. Right–click to display the context menu, and then click Copy Existing Component into Project or click Create Shortcut to Existing Component.

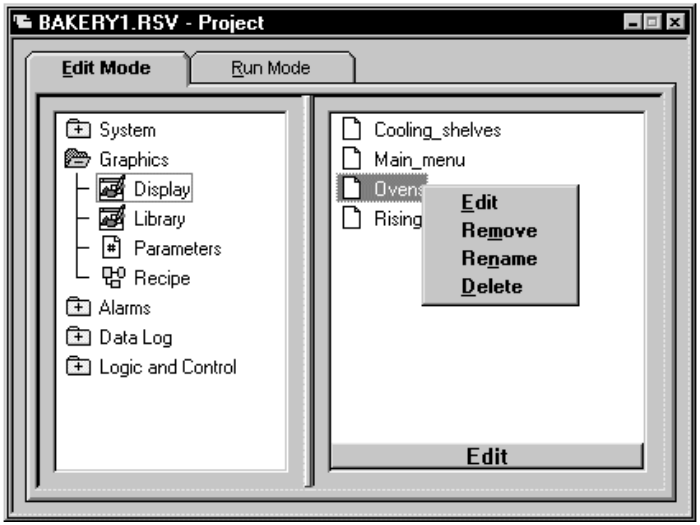
3. In the dialog box, locate the component you want to add or update, and click it.

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

4. Click Open. The components appear in the right pane of the Project Manager.

Renaming, removing, and deleting components

Use the items on the context menu to rename, remove, and delete components. The Remove item removes a component from the Project Manager. The Delete item deletes a component and its associated file from disk.



Renaming a component

Renaming a component changes the physical file name. If you change the name of a file that is referenced by another project, the component (file reference) will be greyed out in the other project. To update the file reference, select the component in the Project Manager, click Rename, and then type the new file name.

To rename a component:

1. Select the component in the right pane of the Project Manager.
2. Right–click and then click Rename.

3. In the To field, type the new name.

4. Click OK.

Removing a component

If you no longer want to use a particular file in a project, you can remove the component (file reference) from the project using the Remove item on the context menu.

Removing a component removes the component from the Project Manager. It does not affect the physical file.

To remove a component:

1. Select the component in the right pane of the Project Manager.
2. Right–click and then click Remove.

Deleting a component and file

If you no longer want to use a particular file in any project, you can delete the component and its associated file using the Delete item on the context menu. Deleting a component deletes both the file reference and the physical file from disk.

To delete a component and file:

1. Select the component in the right pane of the Project Manager.
2. Right–click and then click Delete.

Naming files

RSView32 supports long file names. File names, including the path, can be up to 200 characters long. For example, the following path and file name contains 30 characters:

C:\Bakery1\Gfx\Bakery Overview

Some file servers do not support file names longer than eight characters. If your server does not accept long file names and you type a name longer than eight characters, you will receive a message.

To avoid problems when issuing commands, do not use command names to name component files. For example, suppose you want to call an alarm summary file Summary 5. To avoid confusion with the Summary command, call the file Summary5.

File names can contain spaces. When using file names with spaces in commands, you do not need to enclose the file names in double quotes (“ ”) except when using the /P parameter with the Display command. For details about commands, see Appendix A, *RSView32 commands*.

Printing

Each RSView32 editor has a Print item on its File menu.

To print selections:

1. Select the item you want to print. The item can be a record in an editor’s spreadsheet or it can be an object in a graphic display.
2. On the File menu, click Print.
3. Under Print Range, click Selection.
4. Click OK.

To print the entire contents of the window:

1. On the File menu, click Print.
2. Under Print Range, click All.
3. Click OK.

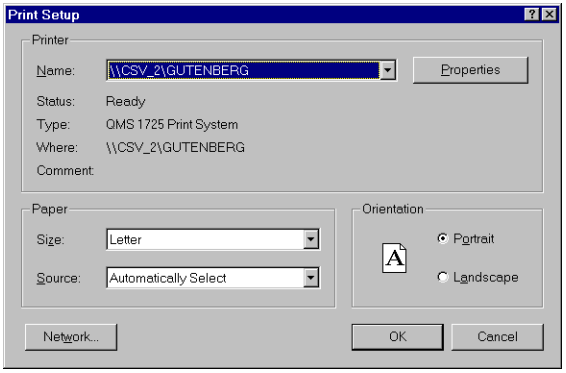
Selecting a printer

You can select only a printer that has been installed on your system. For information on installing a printer, see your Windows documentation.

IMPORTANT The settings in the Print Setup dialog box do not affect runtime log printing set up in the Activity Log Setup and Alarm Setup editors.

To select a printer:

1. On the File menu in any RSView32 editor, click Print Setup.



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

Selecting printer setup options

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

Selecting a network printer

RSView32 can print to a network printer. For detailed information about setting up network printers, refer to your Windows documentation.

Printing at runtime

You can also print graphic displays at runtime using the PrintDisplay command. You must provide the operator with a way to issue the command when you create the display. For example, create a button object, display key, or global key with the PrintDisplay command as the press action, or provide a command line in the graphic display. For more information about creating graphic displays, see Chapter 11, *Creating graphic displays*.

When you use the PrintDisplay command RSView32 prints the entire display, even if parts are covered by other displays. You can also use the ScreenPrint command to print an image of whatever shows on the monitor. For more information about these commands see Appendix A, *RSView32 commands*.

Using the Project Documentor

The Project Documentor is a utility that provides you with detailed information on RSView32 projects. This utility is a browser that allows you to view the contents of the project's components and the tags used in these components. You can also print and export the information.

For more information, see the Project Documentor Help, included on the RSView32 Resources CD-ROM, and also available from the RSView32 Tools menu on the Windows Start menu.

Using the Project Transport Wizard

The Project Transport wizard lets you:

- rename a project
- copy a project
- delete a project
- back a project up to a .zip file
- restore a project that has been backed up to a .zip file.

For more information, see the Transport Help, included on the RSView32 Resources CD-ROM, and also available from the RSView32 Tools menu on the Windows Start menu.

Chapter

2 Setting up direct driver communications

RSView32™ uses a direct connection to the drivers in RSLinx® to communicate with most Allen–Bradley® devices, as well as SoftLogix™ 5 devices. This chapter describes how to set up direct driver communications.

You can also use DDE (Dynamic Data Exchange) or OPC® (OLE for Process Control) to connect to third-party devices or servers, as described in Chapter 3, *Setting up OPC and DDE communications*.

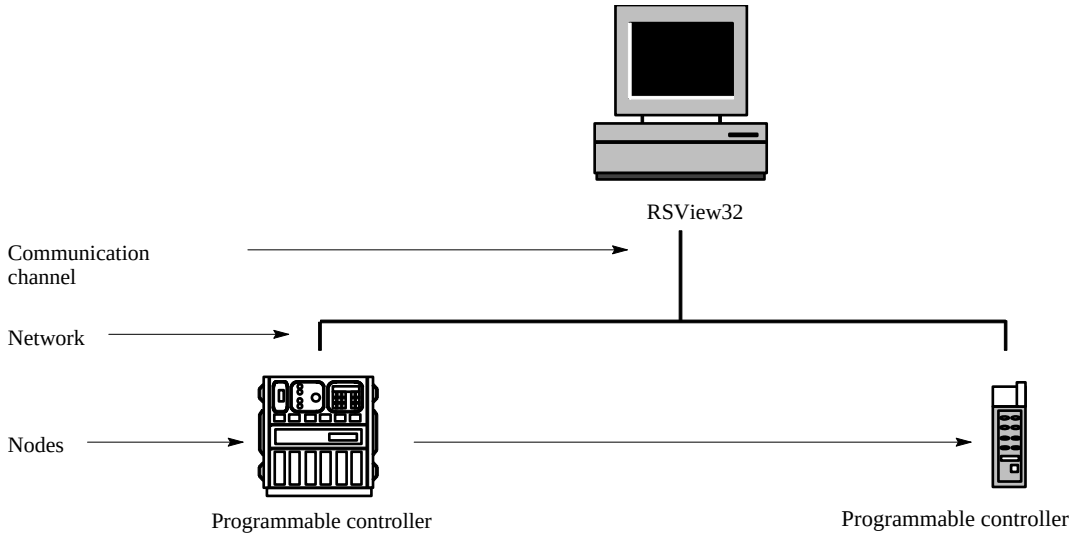
You must use an OPC or DDE connection to handle unsolicited messages and to communicate with the PLC–5®/250 or ControlLogix® 5550 device. For instructions on using unsolicited messages see RSView32 Technical Notes on the RSView32 Tools menu.

Overview of direct driver communications

Communication through direct drivers involves:

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

The following illustration shows an RSView32 station and its channel and nodes.



Communication channel

The communication channel is the connection from the RSView32 station to the network the programmable controllers are attached to.

Communication device

The communication device connects the communication channel to the computer. You can use internal devices, such as the 1784–KT/KTX, or you can use external devices connected through the serial port.

Communication driver

The communication driver is the software that permits the computer to communicate with the communication device. For communication with most Allen–Bradley programmable controllers, use RSLinx.

For communication with SoftLogix 5 programmable controllers, you must use an RSLinx driver.

Node (control device)

The node is a programmable controller attached to a data highway or network. Once the RSView32 station is set up, it must periodically update its value table. This is done by scanning its nodes.

Setting up direct driver communication to programmable controllers

The instructions below summarize the steps for connecting to Allen–Bradley or SoftLogix 5 devices.

IMPORTANT You cannot connect to an Allen–Bradley PLC–5/250 or ControlLogix 5550 using direct drivers. To connect to these types of programmable controllers, use OPC- or DDE–based communications as described in Chapter 3, *Setting up OPC and DDE communications*.

Setting up communications without hardware or software

You can set up communications in RSView32, even if you do not have one or both of the following:

- RSLinx drivers installed
- the appropriate communications hardware installed

To do so, follow the steps in the next section, but skip step 1 and start with step 2.

To test your project without the appropriate hardware installed, see "Developing your project without a communication network" on page 2-22.

Summary of steps

Follow the steps below to set up direct driver communication with Allen–Bradley or SoftLogix 5 programmable controllers.

1. Start RSLinx. Configure and load the appropriate communication driver.
2. Start RSView32 and create or open a project.
3. In the Channel editor, select a channel and assign the appropriate network type to it.

   In the Primary Communication driver field, assign a driver to the channel. If you do not have drivers loaded, click None Loaded.

   For details, see "Configuring channels" on page 2-7.
4. In the Node editor, create nodes for each programmable controller you wish to communicate with.

   For details, see "Creating a node" on page 2-13.

5. If you want to change the default rate at which nodes are scanned, open the Scan Class editor and edit the scan classes.

   For details, see "Scanning for new tag values" on page 2-17.

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

   For details, see Chapter 4, *Creating tags*.

7. Monitor communications.

   For details, see "Monitoring communications" on page 2-20.

Configuring RSLinx drivers

RSLinx drivers provide a direct connection between RSView32 tags and Allen–Bradley or SoftLogix 5 programmable controllers. For details about configuring any of the RSLinx drivers, see your driver documentation.

You can also use RSLinx with OPC and DDE communications, as described in Chapter 3, *Setting up OPC and DDE communications*. You must use an OPC or DDE connection to handle unsolicited messages and to communicate with the PLC-5/250 or ControlLogix 5550 device. For instructions on using unsolicited messages see RSView32 Technical Notes on the RSView32 Tools menu.

Using the drivers

To configure and use the RSLinx drivers with a direct connection, the drivers must be installed on the same computer as RSView32. Once the drivers are configured, RSView32 automatically starts the driver software whenever communication with a programmable controller is required—for example, to test run a graphic display or to run a project.

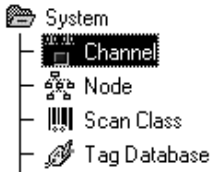
IMPORTANT You must use the version of RSLinx that came with your RSView32 software. This version has been tested for compatibility with RSView32. Other versions may not function correctly.

Selecting a driver in RSView32

To select a driver in RSView32, the driver must first be configured in RSLinx. All configured drivers appear in the RSView32 Channel editor Primary or Secondary Communication Driver fields.

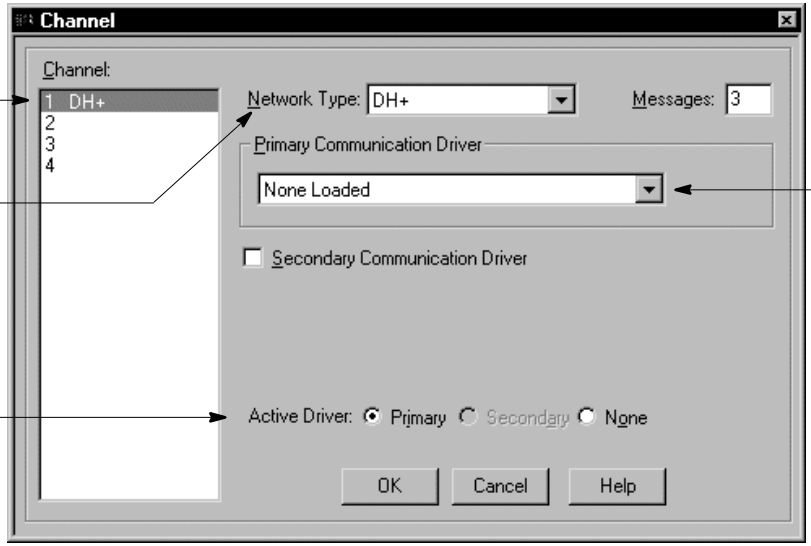
If the Channel editor is open when you add a driver in RSLinx, close the Driver list by clicking another part of the editor, and then re–open the list.

Configuring channels



To configure a channel:

1. In the Project Manager, open the System folder.
2. Open the Channel editor by doing one of the following:
   - double–click the Channel icon
   - right–click the Channel icon and then click Show



Define up to four different communication channels.

Specify the type of network you are using.

When you select a network type, these fields become active.

Click here to display the list of drivers for the selected network type.

3. Select a channel and fill in the following information:

Network Type

Using the following table as a guide, select a network type:

To	Select
Communicate with programmable controllers on a ControlNet network	ControlNet
Communicate with programmable controllers on local or remote DH networks	DH
Communicate with programmable controllers on local or remote DH+™ networks or Communicate with SLC™ controllers on remote DH–485 networks or Connect to Channel 0 of an Enhanced PLC	DH+
Communicate with SLC controllers on local DH–485 networks or Connect to an SLC with an RS–232 port	DH–485
Communicate with Ethernet® programmable controllers directly connected to the TCP/IP network or Communicate with SoftLogix 5 controllers or Communicate with SLC 5/05 controllers	TCP/IP

To	Select
Communicate with programmable controllers through the Ethernet interface of a Pyramid Integrator™, or RSLinx Gateway	TCP/IP Bridge
Not use a channel or Clear a channel configuration	None Loaded

To set a configured channel's network type to None Loaded, first issue the ComStatusOff command. Because setting a configured channel's network type to None Loaded deletes all the comstatus system tags from the tag database, you cannot set a configured channel's network type to None Loaded if the ComStatusOn command has been issued.

IMPORTANT Of the four communication channels you can configure, only one can be configured for TCP/IP. For example, you cannot configure one channel for TCP/IP and another for a TCP/IP bridge.

To run a SoftLogix 5 controller with RSLinx and RSView32, configure the TCP/IP channel and use the SOFT5 driver or the AB_ETH driver.

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

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

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

Messages

Type a number between 1 and 10. This is the number of messages RSView32 will send on a channel before requiring a reply. These messages are stored in the buffers of the programmable controllers on the channel (each controller has its own buffer). If a buffer overflows at runtime, a communication error is generated. If this happens, reduce the number of messages.

The Messages field applies to both the primary and secondary communication drivers.

Primary and Secondary Communication Drivers

The primary driver is the one your system will use most of the time. By default, this driver is the active driver. The secondary driver is a backup. Primary and secondary drivers must use the same network type.

IMPORTANT Do not select a secondary communication driver for TCP/IP or TCP/IP Bridge channels. To create communications redundancy, use a second Ethernet card and configure each card uniquely in Windows. Then use the NodeSwitch command at runtime to change the IP number if communication errors are detected.

To specify a driver, select the appropriate driver from the list. This list contains the drivers installed and running in RSLinx that are valid for the selected network type.

To configure communications without the appropriate hardware or software installed, select None Loaded as the driver.

To test your project without the appropriate hardware installed, see "Developing your project without a communication network" on page 2-22.

For details about configuring drivers, see "Configuring RSLinx drivers" on page 2-5.

Active Driver

The active driver can be Primary, Secondary, or None. By default, the Primary driver is active.

To disable a channel temporarily without removing its configuration, click None.

At runtime, users can switch between drivers if necessary. For details, see "Switching communication drivers at runtime" on page 2-11.

4. When you finish configuring channels, click OK.

Changing the channel configuration

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

Switching communication drivers at runtime

If the primary network fails at runtime, your system can switch to a driver on a pre–defined secondary network. You can set up your project so drivers switch automatically, or so operators manually switch the drivers.

Commands for switching drivers

Use the following commands to switch drivers:

`DriverPrimary` <*channel*>

Switches from the secondary driver to the primary driver on the specified channel.

<*channel*>	The number of the channel (1 through 4) that is being switched from its secondary to primary driver.

`DriverSecondary` <*channel*>

Switches from the primary driver to the secondary driver on the specified channel.

<*channel*>	The number of the channel (1 through 4) that is being switched from its primary to secondary driver.

`DriverToggle` <*channel*>

Switches from the current driver to the one not being used on the specified channel.

<*channel*>	The number of the channel (1 through 4) that is being switched from one driver to another.

Switching drivers automatically

To switch drivers automatically, create an event in the Events editor. In the Action field of the Events editor, type a driver command as the action that will be triggered when an expression results to true. In the Expression field, create an expression that will trigger the action.

Example: An event for switching drivers

In the Events editor, use the following:

Action	DriverToggle 1
Expression	comm_err(tag1)

where tag1 is a tag that is configured with a node on channel 1.

When the expression evaluates to true, the action is triggered.

Switching drivers manually

To switch drivers manually, operators must have a way to issue a driver command. Possible methods are:

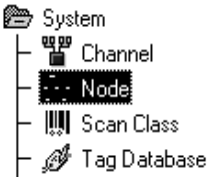
- creating a button and specifying one of the driver commands as the press action. When the operator activates the button, the driver on the specified channel is switched.
- displaying a command line. When the operator enters a driver command on the command line, the driver on the specified channel is switched.

Creating a node

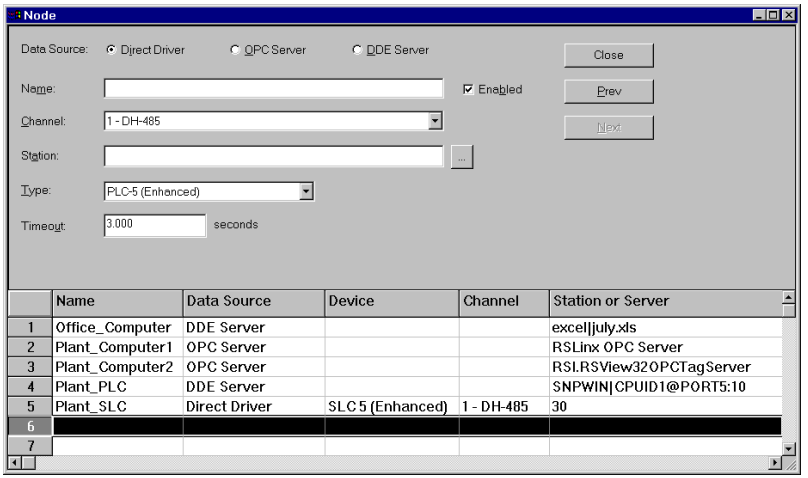
A node allows you to assign a logical name and an address to each programmable controller that RSView32 will communicate with. Each programmable controller is then referred to throughout RSView32 by this name. The node name carries all its configuration information, so attributes such as type of programmable controller, station number, and network type need not be repeated.

Before you can configure a device node, you must set up communication channels. For details, see “Configuring channels” on page 2-7.

To create a node:



1. In the Project Manager, open the System folder.
2. Open the Node editor by doing one of the following:
   - double–click the Node icon
   - right–click the Node icon and then click Show



3. Fill in the following information for each node:

   Data Source

   Select Direct Driver.

   For details about the OPC Server and DDE Server data sources, see Chapter 3, *Setting up OPC and DDE communications*.

   Name

   Type a name of your choice up to 40 characters long. This name represents the programmable controller. The name can have upper

and lower case letters, numbers, dashes, and underscores. Spaces are not permitted.

Enabled

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

When a tag uses a disabled node at runtime, the tag's state will change from valid to disabled. A tag's state can be seen by viewing the tag in the tag monitor.

To disable nodes, clear the Enabled check box.

You can also enable and disable nodes at runtime, using the NodeEnable and NodeDisable commands. For more information see Appendix A, *RSView32 commands*.

Channel

Select the channel number on which this node resides.

Station

Type the station address of the programmable controller. For addressing syntax, see Appendix E, *Station addressing for nodes connecting to Allen–Bradley devices*.

If RSLinx 2.0 or later is installed and running on your computer, click the ... button next to the Station field to open the RSWho window that displays all active PLC stations for the selected channel. When you select a station from the RSWho window, the Station and Type fields are filled in automatically. RSView32 substitutes PLC-5 (Enhanced) for all PLC-5 series device types. Change the entry in the Type field to PLC-5 if you are using the PLC-5/10, 5/12, 5/15, or 5/25.

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

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

Type

Select the type of device you are using.

For this device type	Select
PLC–2	PLC–2
PLC–3	PLC–3
PLC–5/10, PLC–5/12, PLC–5/15, PLC–5/25	PLC–5
PLC–5/11, PLC–5/20, PLC–5/30, PLC–5/40, PLC–5/60, PLC–5/80	PLC–5 (Enhanced)
SLC 5, SLC 5/01, SLC 5/02, SLC 5/03 (OS 300)	SLC 5
SLC 5/03 (OS 301), SLC 5/04, SLC 5/05	SLC 5 (Enhanced)
SoftLogix 5	SoftLogix 5

To communicate with a SoftLogix 5 device you must use an RSLinx driver and a TCP/IP channel.

Timeout

Type the number of seconds you want RSView32 to wait before reporting a communication error. A timeout period of three seconds is usually enough.

4. Click Accept to save the node configuration.
5. When you finish configuring nodes, click Close.

Changing node information at runtime

To permanently change a node's station number at runtime, use the NodeSwitch command. This command allows you to set up node–level redundancy. That is, if the programmable controller that a node is pointing to fails, you can immediately switch to another programmable controller.

`NodeSwitch` <*node name*> <*station*>

<*node name*>	The name of the node that you want to change to another programmable controller address.
<*station*>	For device nodes, the physical address for the programmable controller you want to change to.

When you use the NodeSwitch command to change a node's address, the change appears in the Node editor's spreadsheet. If the Node editor is open when you use the command, the change will not appear until you have refreshed the display by closing and re–opening the editor.

You can also enable and disable nodes at runtime, using the NodeEnable and NodeDisable commands. For more information see Appendix A, *RSView32 commands*.

Scanning for new tag values

When your RSView32 project is running, it must periodically update its tag values in the value table. This is done by scanning.

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

RSView32 scan classes

Any tag that communicates with Allen–Bradley or SoftLogix 5 programmable controllers through direct drivers must be assigned to an RSView32 scan class. Each tag can then be assigned different foreground and background scanning periods. In this way, you determine how often a tag value is updated.

A scan class has two scan periods: the foreground period and the background period. The foreground period applies to graphic displays and the tag monitor. The background period applies to any component that performs a continual background activity, such as derived tags, events, alarms, and data log.

If the same tag is used by both a foreground and background component, the tag is scanned at the faster period. If a value is not required by a foreground or background component, its address is not scanned, greatly reducing system overhead.

Guidelines for configuring scan classes

- Set foreground scan periods to be shorter than or equal to background scan periods.

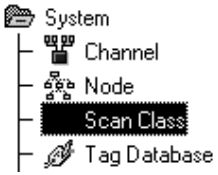
- A scan period of zero means scan as quickly as possible. You can set foreground scan periods to zero, but never set background scan periods to zero. For foreground periods, using zero is not recommended because this setting can result in so much traffic that overall system communication slows down.

- Set scan periods for optimal efficiency. Specify a frequent scan rate for tags representing fast–moving devices and a less frequent scan rate for tags representing devices that change less often.

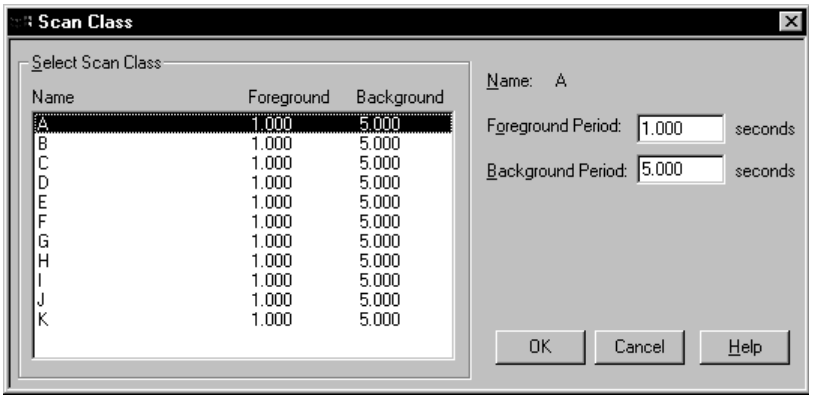
  This approach optimizes system performance, providing high–speed scanning where required and using less frequent scanning, which saves system resources, where acceptable.

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

To configure a scan class:



1. In the Project Manager, open the System folder.
2. Open the Scan Class editor by doing one of the following:
   - double–click the Scan Class icon
   - right–click the Scan Class icon and then click Show



3. Select a scan class and fill in a foreground and background period.

   The period specifies, in seconds, how often the programmable controller address is scanned when its value is required by a foreground or background component. The foreground period applies to graphic displays and the tag monitor. The background period applies to any component that performs a continual background activity, such as derived tags, events, alarms, and data log.

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

4. To save the configuration for a scan class without closing the editor, select another scan class.

5. When you finish configuring scan classes, click OK.

Monitoring communications

Use any of the following methods to monitor communications:

- Activities—In the Activity Log Setup editor, ensure communication errors, warnings, and remarks are enabled and are set up to log to the log file and activity bar. At runtime, information appears in the log file and activity bar, indicating any problems.

- Communication status—Ensure communication status is turned on, otherwise communication errors will not be logged to the activity log file or activity bar (even if they have been configured to do so in the Activity Log Setup editor). By default, communication status is turned off until you run the project. To turn communication status on, use the ComStatusOn command.

- Tag monitor—Use the tag monitor to check the communication status for a device tag. The states are:
  - Disabled if the node has been disabled in the Node editor or disabled using the NodeDisable command
  - Error if RSView32 has tried to acquire a value but could not because of some kind of communication error, such as a node not being available or a DDE server not running
  - Stale if the tag value has been acquired before but does not have an updated value
  - Uninitialized if the value has never been acquired
  - Valid if RSView32 has a valid value for the tag
  - None if there is a problem with the tag definition such as it is not a valid tag type or if the tag database has been accessed with a third–party tool such as Microsoft® Access. If the underlying tag type is valid, editing and saving the tag and then redisplaying the tag monitor will fix the problem.
- System\com tags—Use the system\com tags to receive a more detailed error message. If the tag monitor reports an error, move to an empty cell in the tag monitor, type system\com* and, when the dialog box appears, click Select All. For a complete list of system\com tags, see Appendix B, *System tags*.

Developing your project without a communication network

You can develop your RSView32 project to use direct drivers without having an Allen–Bradley network or programmable controller. To do so, use the None Loaded driver type.

1. Open the Channel editor.
2. Select a channel and, in the Network Type field, select a network for the channel.
3. In the Primary Communication Driver field, click None Loaded.

   Using the None Loaded driver type allows you to add or change tags without causing communication errors.

   To set a configured channel's network type to None Loaded, first issue the ComStatusOff command. Because setting a configured channel's network type to None Loaded deletes all the comstatus system tags from the tag database, you cannot set a configured channel's network type to None Loaded if the ComStatusOn command has been issued.
4. Disable the node by clicking the Enabled check box to deselect it.

Chapter

3 Setting up OPC and DDE communications

OPC® and DDE connections allow you to communicate with a wide range of local and remote devices.

OPC is OLE for Process Control, used to connect RSView32™ to communication devices via vendor-specific OPC servers. DDE is Dynamic Data Exchange, used with external DDE servers such as third–party servers, to connect RSView32 to communication devices. RSView32 supports the OPC 1.0a and OPC 2.0 specifications.

If you will be connecting to communication devices using direct drivers, see Chapter 2, *Setting up direct driver communications*.

OPC servers provide a way to connect an RSView32 station (the OPC client) to:

- communication devices, using RSLinx® as an OPC server

  For details, see the topics in this chapter.

- third-party communication devices, using vendor-specific or third-party OPC servers (such as KEPServerEnterprise™, Siemens, or Modicon®)

  For details, see the topics in this chapter.

- another RSView32 station acting as a remote OPC server on a network. By connecting an RSView32 station set up as an OPC client to another RSView32 station set up as an OPC server, you achieve peer-to-peer communication of tag values across a network.

  For information about setting up RSView32 OPC peer-to-peer communication on a network, see"Using OPC for peer–to–peer network communications" on page 17-5.

- a third–party application with OPC server support, either on the same computer or on a network

  For details about connecting to third–party applications on the same computer, see "Sharing tag values locally" on page 16-26. For information about connecting to third-party applications on a network, see "Connecting to RSLinx Gateway as a remote OPC server" on page 17-9.

DDE servers provide a way to connect an RSView32 station (the DDE client) to:

- communication devices such as Siemens or Modicon

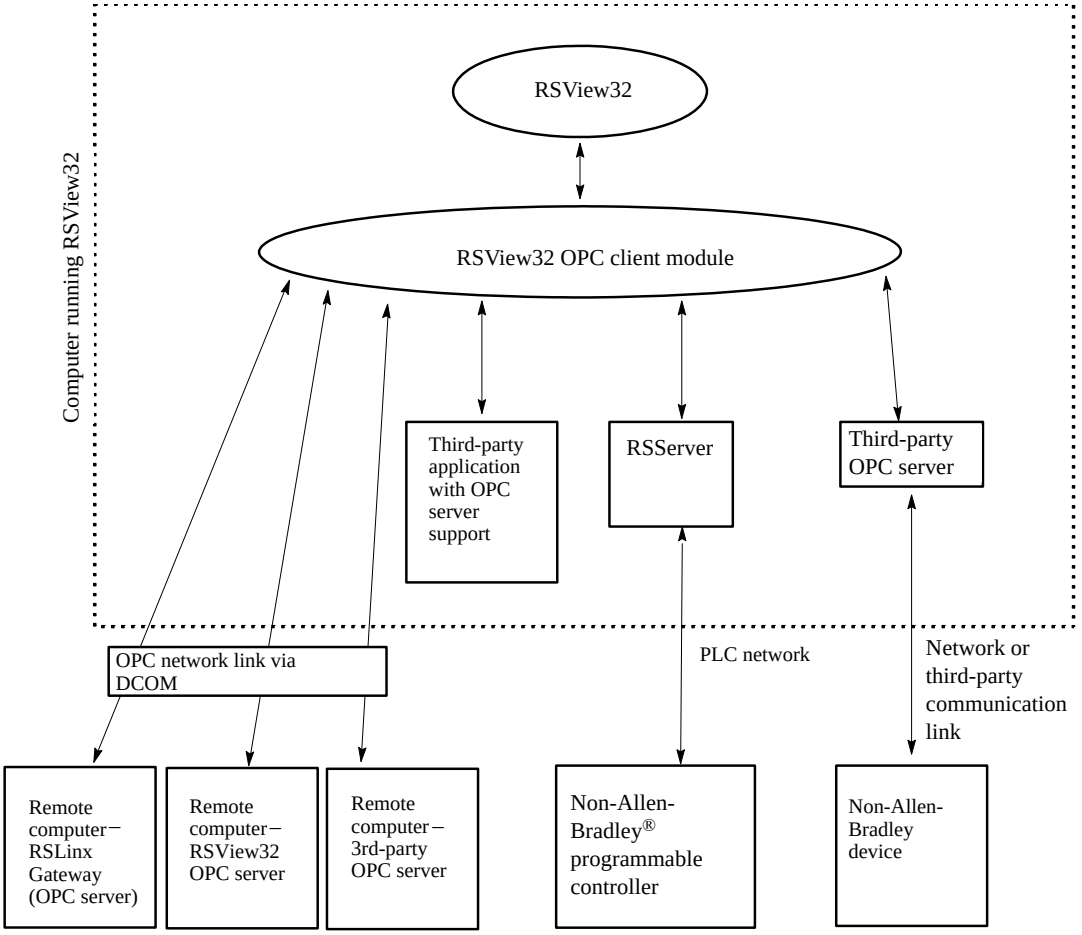
  For details, see the topics in this chapter.

- a third–party DDE server such as Microsoft® Excel or Visual Basic®

  For details about connecting to third–party applications on the same computer, see "Sharing tag values locally" on page 16-26.

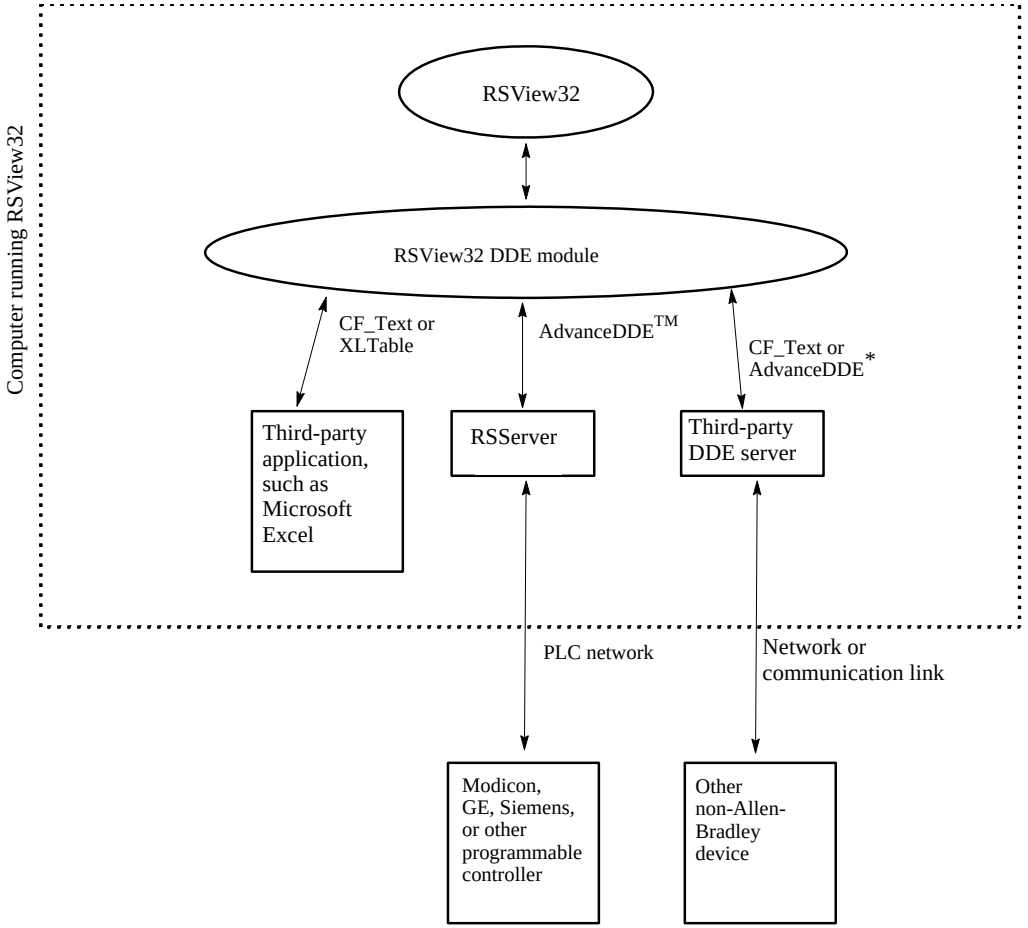
Overview of OPC communications

The following illustration shows the different ways RSView32 can use OPC for communications.



Overview of DDE communications

The following illustration shows the different ways RSView32 can use DDE for communications.



* The third-party server can use AdvanceDDE format if the server uses the Rockwell Software server toolkit.

Summary of steps

The instructions below summarize the steps for setting up RSView32 as an OPC or DDE client.

1. Start the OPC or DDE server.
2. Start RSView32 and create or open a project (the client).
3. In the Node editor, create nodes for each OPC or DDE server and/or topic you wish to communicate with. In the node's Data Source field, select OPC Server or DDE Server.

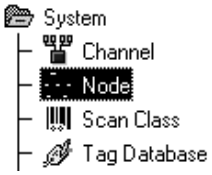
   For details, see "Creating an OPC node," next, or "Creating a DDE node" on page 3-12.
4. In the Tag Database editor, create tags and select Device as the data source and assign the nodes that you have created.

   For details, see Chapter 4, *Creating tags*.

Creating an OPC node

An OPC node allows you to assign a logical name, server name, and update rate for each OPC server you want to communicate with. The OPC node name can then be used throughout RSView32.

To create an OPC node:

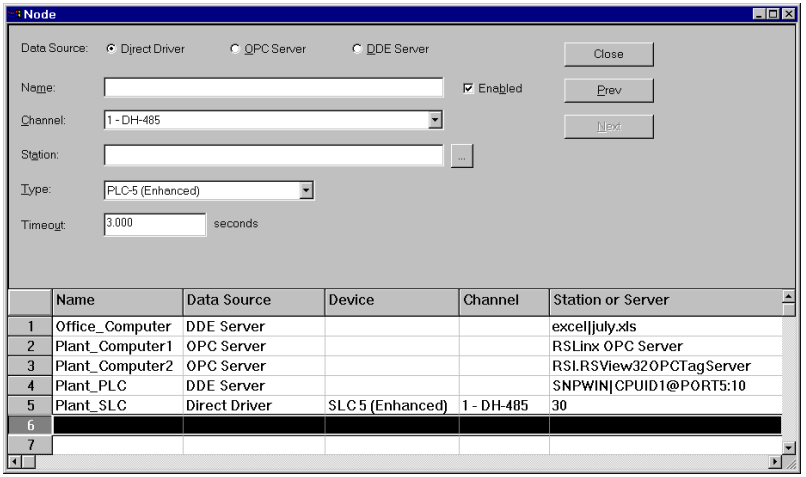


1. In the Project Manager, open the System folder.

2. Open the Node editor by doing one of the following:

   - double–click the Node icon

   - right–click the Node icon and then click Show



3. Create a node by filling in the following information:

   #### Data Source

   Select OPC Server.

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

   For details about the DDE Server data source, see "Creating a DDE node" on page 3-12. For details about the Direct Driver data source, see Chapter 2, *Setting up direct driver communications*.

Name

Type a name of your choice to represent the OPC node. The name can be up to 40 characters long and can have upper and lower case letters, numbers, dashes, and underscores. Spaces are not permitted.

Enabled

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

When a tag uses a disabled node at runtime, the tag's state will change from valid to disabled. A tag's state can be seen by viewing the tag in the tag monitor.

To disable nodes, clear the Enabled check box.

You can also enable and disable nodes at runtime, using the NodeEnable and NodeDisable commands. For more information see Appendix A, *RSView32 commands*.

Server

Do one of the following:

- Click ... beside the Name field and select a server from the list of registered servers. RSView32 fills in the remaining Server fields.

  To use another RSView32 station as your OPC server, select RSI.RSView32OPCTagServer. Select Remote as the Type, and specify the Server Computer Name or Address as described next.

- Fill in the Server fields manually. You can fill in the fields for an OPC server that has not been installed yet and install the server later.

  Name

  Type the name of the OPC server that RSView32 will communicate with, typically in this format:

  <Vendor>.<DriverName>.<Version>

  If the OPC server is RSView32 or RSLinx, you don't need to specify a version number. For RSLinx, you don't need to specify the vendor name, either.

  Type

  Select the OPC server type:

  - **In-Process** if the server is a .dll file.
  - **Local** if the server is an .exe file running on the same computer as the OPC client.
  - **Remote** if the server is an .exe file running on a different computer connected to the OPC client computer via a network.

Server Computer Name or Address

If the OPC server is remote, type the server computer's name or address, or click ... and select a server computer from the list that appears.

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

Use this syntax	For this format	Example
ComputerName	UNC (Universal Naming Convention)	\\DTB1
ComputerName.Domain.com	DNS (Domain Name System)	DTB1.NET2.COM
XXX.XX.XXX.XXX	Raw TCP/IP address	134.87.167.148

You set up the computer's name or address in the Windows® Control Panel, as described in "Identifying the RSView32 server computer" on page 17-6.

For more information about IP (Internet Protocol) addresses, see page E-10.

Access Path

Use of this field is optional.

Use the access path field in the Node editor when:

- you want to be able to switch between PLCs using the NodeSwitch command for node redundancy
- you want all tags in RSView32 to have the same update rate

You must leave the access path blank if you want to use different update rates for different tags in the tag database. If you leave the access path blank in the Node editor, specify the access path in the Tag Database editor's tag address field.

For information about the syntax for the access path, see your OPC server documentation.

If you use this field, and you are communicating with RSView32 using OPC, the access path is the name of the current project on the server.

If you use this field, and you are communicating with an RSLinx OPC server, the access path is the name of a DDE/OPC topic on the server. If you leave the access path blank, you must specify the DDE/OPC topic as part of the tag's address when you create the tag using the Tag Database editor.

Update Rate

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

The rate that the OPC server uses may be slower than the rate you specify. Type 0 to specify that the server use the fastest possible rate.

If the OPC server's access path is a DDE/OPC topic, the update rate should not be faster than the topic poll rate.

4. Click Accept to save the node configuration.

5. When you finish configuring nodes, click Close.

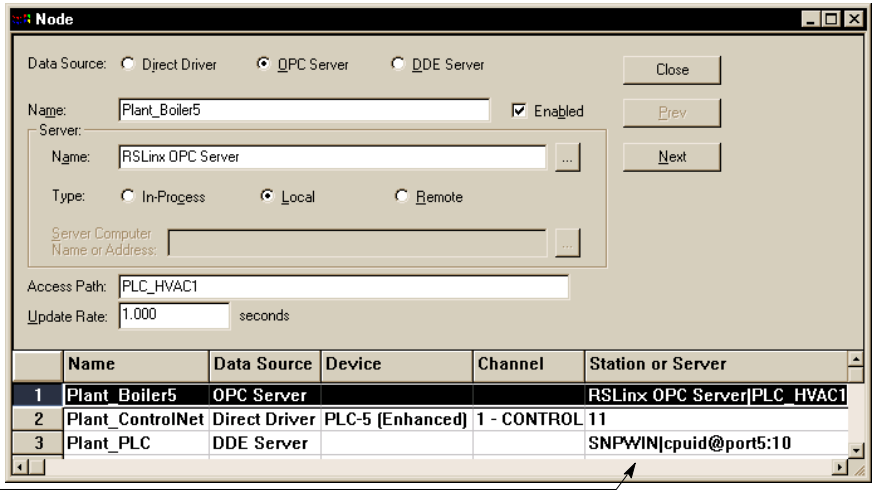
Example: Configuring an OPC node

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

Server Name: RSLinx OPC Server or
RSLinx Remote OPC Server.
If you are using RSLinx 2.0, the driver name is RSLinx OPC Server. If you are using RSLinx 2.1, the driver name is RSLinx Remote OPC Server. You don't need to specify a vendor or version number.

Access Path: PLC_HVAC1
The access path is the DDE/OPC topic name in RSLinx.

The figure below shows how the node looks in the Node editor.



The server name appears in the spreadsheet's Station or Server column.

Some columns do not apply to OPC nodes and are left blank.

Once you have created the node, assign it to a tag in the Tag Database editor. The address tells RSView32 where in the node to get the data.

Address: N7:12
The PLC-5® programmable controller called PLC_HVAC1 has been previously set up as a DDE/OPC topic in RSLinx; N7:12 is the address in the PLC-5/250.

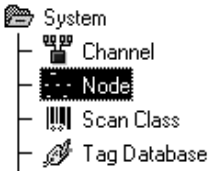
If you don't include the Access Path when configuring the node, you can enter the tag's address as [PLC_HVAC1]N7:12.

The figure below shows how the tag looks in the Tag editor.

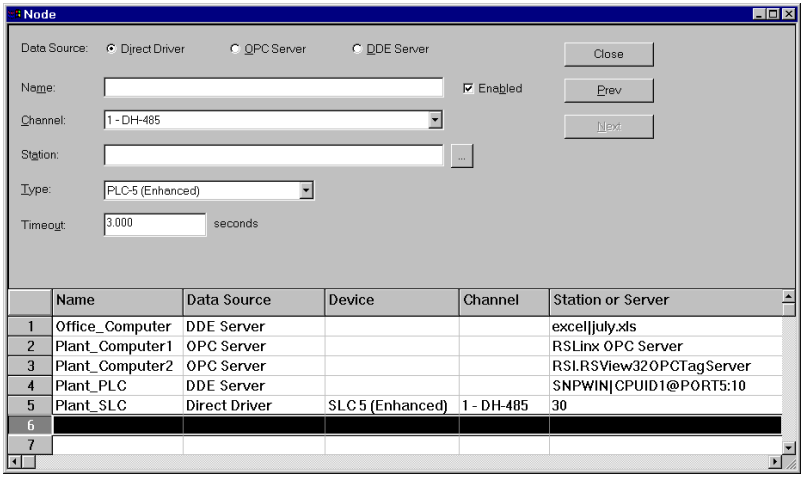
Creating a DDE node

A DDE node allows you to assign a logical name for each DDE application and topic you wish to communicate with. The DDE node name can then be used throughout RSView32.

To create a DDE node:



1. In the Project Manager, open the System folder.
2. Open the Node editor by doing one of the following:
   - double–click the Node icon
   - right–click the Node icon and then click Show



3. Create a node by filling in the following information:

   #### Data Source

   Select DDE Server.

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

   For details about the OPC Server data source, see "Creating an OPC node" on page 3-5. For details about the Direct Driver data source, see Chapter 2, *Setting up direct driver communications*.

Name

Type a name of your choice to represent the DDE node. The name can be up to 40 characters long and can have upper and lower case letters, numbers, dashes, and underscores. Spaces are not permitted.

Enabled

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

When a tag uses a disabled node at runtime, the tag's state will change from valid to disabled. A tag's state can be seen by viewing the tag in the tag monitor.

To disable nodes, clear the Enabled check box.

You can also enable and disable nodes at runtime, using the NodeEnable and NodeDisable commands. For more information see Appendix A, *RSView32 commands*.

Application

Type the name of the DDE server or other Windows application that RSView32 will communicate with. For example, if Microsoft Excel is the server, type Excel.

Topic

Type the subject of the DDE communication. For example, if Excel is the application, the topic is a particular Excel spreadsheet.

4. Click Accept to save the node configuration.
5. When you finish configuring nodes, click Close.

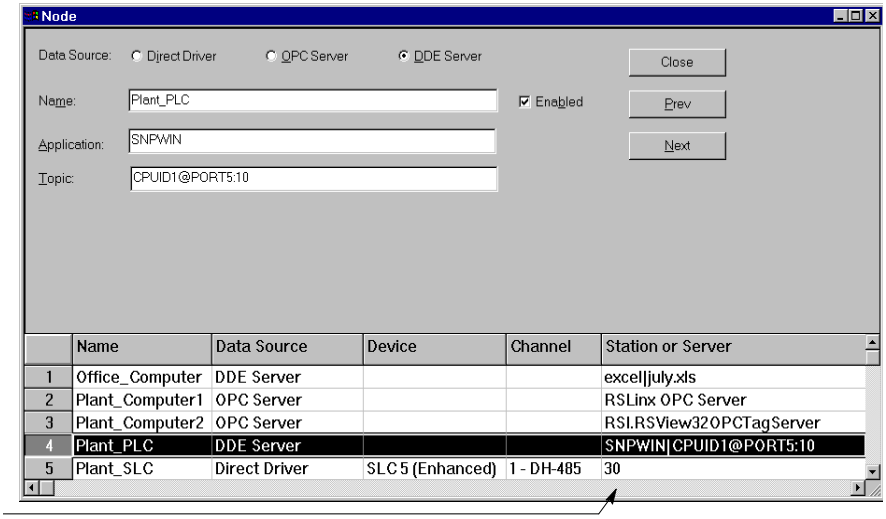
Example: Configuring a DDE node

The following example describes how to create a node to connect to a GE programmable controller using the RSServer for GE Series 90 protocol.

Application: SNPWIN
The application name is the server's name.

Topic: cpuid[@connection_ID][:poll_rate]
The topic name is made up of a CPU ID string, an optional connection ID string (preceded by the @ character) and an optional poll rate (preceded by the : character).

The figure below shows how the node looks in the Node editor. The CPU ID is CPUID1, the connection ID is PORT5, and the poll rate is 10.



The application and topic appear in the spreadsheet's Station or Server column, separated by a vertical bar.

Some columns do not apply to DDE nodes and are left blank.

Changing node information at runtime

To change an OPC node's server name and access path or a DDE node's application and topic at runtime, use the NodeSwitch command. This command allows you to set up node–level redundancy. That is, if the server that a node is pointing to fails, you can immediately switch to another server.

`NodeSwitch` <*node name*> <*parameter*>

<*node name*>	The name of the node that you want to change to another server.
<*parameter*>	One of the following:
<*computer name**server name*[|*access path*]>	For OPC servers, the computer name, server name, and access path (if in use) for the OPC server you want to switch to. Separate the access path from the server name with the | character.
<*application* |*topic*>	For DDE servers, the application and topic, separated by the | character, for the DDE server you want to switch to.

When you use the NodeSwitch command to change a node's server information, the change appears in the Node editor's spreadsheet. If the Node editor is open when you use the command, the change will not appear until you close and re–open the editor.

For more information about the NodeSwitch command, see Appendix A, *RSView32 commands*, or see Help.

You can also enable and disable nodes at runtime, using the NodeEnable and NodeDisable commands. For more information see Appendix A, *RSView32 commands*.

Scanning for new tag values

When your RSView32 project is running, it must periodically update its tag values in the value table.

For projects using OPC, values are updated by the OPC server at the rate specified in the server product. The update rate you specify in the Node editor is the requested data rate. The server uses this rate to determine the fastest rate at which to notify your RSView32 project (the OPC client) of tag value changes, if there are any changes. For more details about setting the poll rate, see your server documentation.

For projects using DDE, values are updated by the server at the rate specified in the server product. When the server detects a change, it provides the changed value to RSView32. For more details about setting the poll rate, see your server documentation.

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

Chapter

4 Creating tags

This chapter describes:

- tags and the tag database
- the importance of organizing tags
- how to create analog, digital, and string tags

Tags and the tag database

In the tag database, you define the data you want RSView32™ to monitor. Each entry in the database is called a tag. 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.

The current value of a tag, when required, is updated from the device it is connected to and stored in computer memory—referred to as the value table—so it is immediately accessible to all parts of RSView32. For example, graphic displays use tag values to control animation or update a trend, alarm monitoring compares current tag values to pre–defined limits, and data logging stores tag values to create a historical record.

Tag types

RSView32 uses the following types of tags:

Tag	Type of data stored
Analog	Range of values. These tags can represent variable states such as temperature or the position of rotary controls.
Digital	0 or 1. These tags can 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 255 characters). These tags can represent devices that use text, such as a bar code scanner which uses an alphanumeric product code.
System	Information generated while the system is running, including alarm information, communication status, system time and date, and so on. RSView32 creates system tags when it creates a project. The system tags are stored in the folder called "system" in the tag database. You cannot edit system tags. You can use system tags anywhere you would use any other type of tag.

Data sources

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

Device

A tag with Device as its data source receives its data from a source external to RSView32. The data can come from a direct programmable controller driver or from an OPC® or DDE server. Tags with Device as the data source count toward the total tag limit you purchased (150, 300, 1,500, and so on).

Memory

A tag with Memory as its data source receives its data from the RSView32 internal value table. A memory tag can be used to store values internally. Tags with Memory as the data source do not count toward the total tag limit.

Organizing tags

Organizing tags makes database creation faster and simpler. To organize tags:

- establish naming conventions

  Naming conventions enable you and operators to use the RSView32 wildcards most effectively when searching for and displaying tags during development and runtime.

- use folders to group related tags

Naming tags

Tag names can be up to 255 characters long. If you create a folder, the folder name becomes part of the tag name.

The tag name can contain the following characters:

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

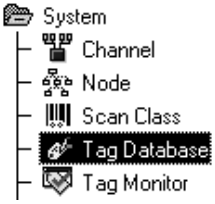
The tag name can be mixed case. Tag names preserve upper and lower case for readability but are not case sensitive. For example, the tag name MixerValve1 is the same as mixervalve1.

When a tag name starts with a number or contains a dash, enclose the name in braces { } when you use it in an expression, for example, {N33–0}. Also use braces when using wildcards to represent multiple tags in an expression, for example, {alarm*}. For more information about using tags in expressions see Chapter 14, *Creating expressions*.

Using folders to group tags

To organize tags, create a folder and include tags that are related to one another. To separate the folder name from the rest of the tag name, use a backslash (\). For example, tags in the folder called Pump would start with Pump\. For greater organization, you can nest folders. For example, you can organize the tag database first by area, then by machines in the area, and finally by devices in each machine. The result might be Area1\Machine1\Pump.

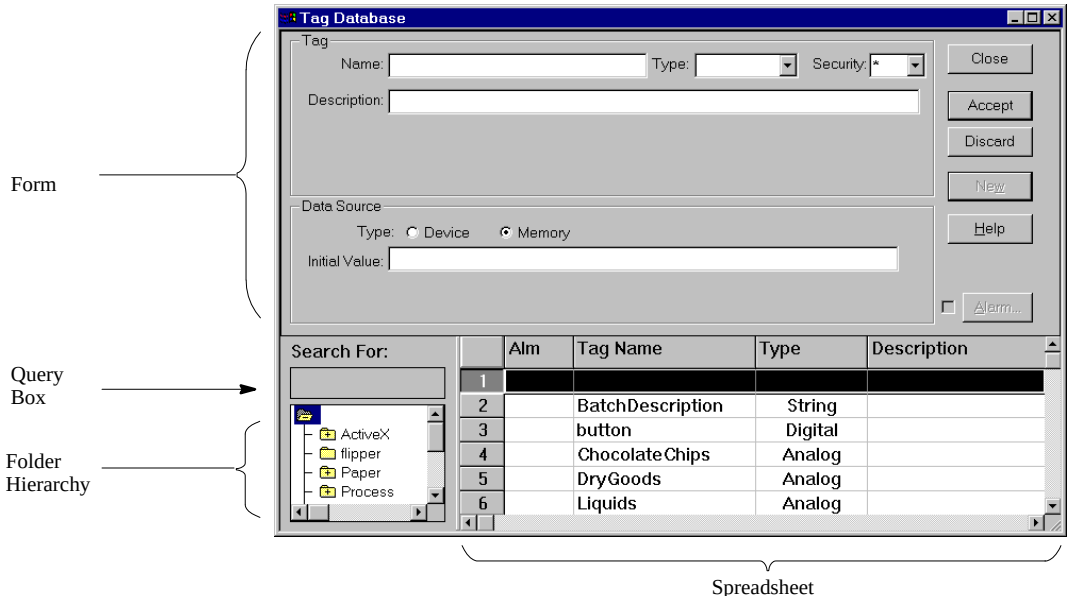
The tag database editor



To open the Tag Database editor:

1. In the Project Manager, open the System folder.
2. Open the Tag Database editor by doing one of the following:
   - double–click the Tag Database icon
   - right–click the Tag Database icon and then click Show

The Tag Database editor has the following parts: form, query box, folder hierarchy, and spreadsheet. Each part is described on the following pages.



Using the Accept and Discard buttons

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

Using the form

Use the form to create a tag. In the upper part of the form, define the basic characteristics of the tag, such as tag name, type, security, and specifics related to the tag type. In the lower part of the form, define the data source (where the tag's values will come from).

Select the Alarm check box to define alarm conditions for an analog or digital tag. To edit alarms once they have been defined, click the Alarm button.

RSView32 supports 40,000 tags with alarms. Of these, 5,000 can be analog tags.

Using the query box

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

- select a single tag by typing the tag name
- select multiple tags by typing wildcards. The wildcards are:

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

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

Using the folder hierarchy

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

A folder icon known as root is always present in the hierarchy window, at the top of the folder hierarchy. This folder contains all the tag folders you and RSView32 create. For example, the system folder holds the system tags that come with RSView32. For a complete list of the system tags, display the contents of the folder or see Appendix B, *System tags*.

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

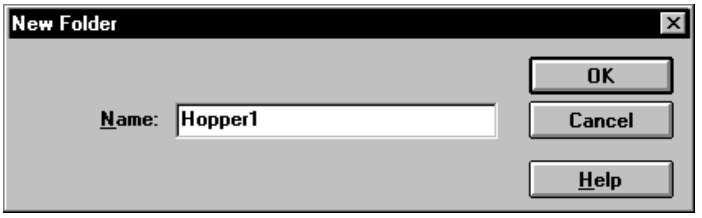

This folder contains one or more folders.


This folder does not contain another folder.

Creating a folder


Create Folder

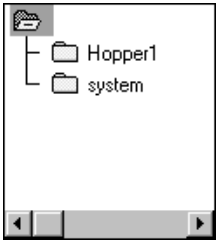
1. Click New Folder on the Edit menu or click the Create Folder button on the toolbar.



2. Type the folder name.

3. Click OK.

   The new folder appears in the hierarchy window.



Opening a folder

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

To open a folder, do one of the following:

- double–click the folder
- select the folder and press Enter

To open multiple folders:

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

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

Adding tags to a folder

Once you have created a folder, you can add tags to it.

1. Select a folder in the folder hierarchy.

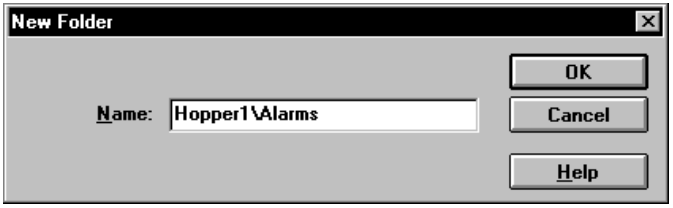
   The folder name is displayed in the Name field of the form.

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

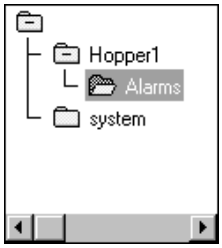
Nesting a folder

Create Folder

1. Select a folder in the folder hierarchy.
2. Click New Folder on the Edit menu or click the Create Folder button on the toolbar.
3. Type a backslash (\) followed by the new folder name.

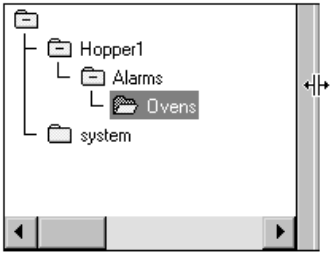


4. Click OK.



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

To view a series of nested folders, resize the hierarchy box. To resize it, place the cursor over the right border of the box until it changes to a double arrow. Drag the border to the required size.



Duplicating a folder

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

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

To duplicate a folder and its tags:

Duplicate Tag Folder

1. Select the folder in the hierarchy.
2. Click Duplicate Folder on the Edit menu or click the Duplicate Tag Folder button on the toolbar.

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

Deleting a folder

Delete Folder

1. Select one or more folders in the hierarchy.
2. Click Delete Folder on the Edit menu or click the Delete Folder button on the toolbar.

Using the spreadsheet

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

Moving through the spreadsheet

To scroll through the spreadsheet rows, do one of the following:

- use the Prev or Next buttons in the form area
- use the up arrow and down arrow keys
- use the scroll bars on the spreadsheet

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

Resizing columns and rows

To resize a column or row:

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

Adding a tag

To add a tag, do one of the following:

Insert Row

- click the New button in the forms area. This inserts a new row above the highlighted row.
- click Insert Row on the Edit menu or click the Insert Row button on the toolbar. This inserts a new row above the highlighted row.

Duplicating a tag

Duplicate

1. Select the tag you want to duplicate.
2. Click Duplicate on the Edit menu or click the Duplicate button on the toolbar.

   A new row is inserted below the highlighted row. The new row contains all the same information except the tag name.
3. In the Tag Name field, type the name for the new tag.
4. Click Accept.

Editing a tag

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

1. Select the tag you want to edit.

   The details of the tag appear in the form area.
2. Edit any details except the tag name or type.

Deleting a tag

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


Delete

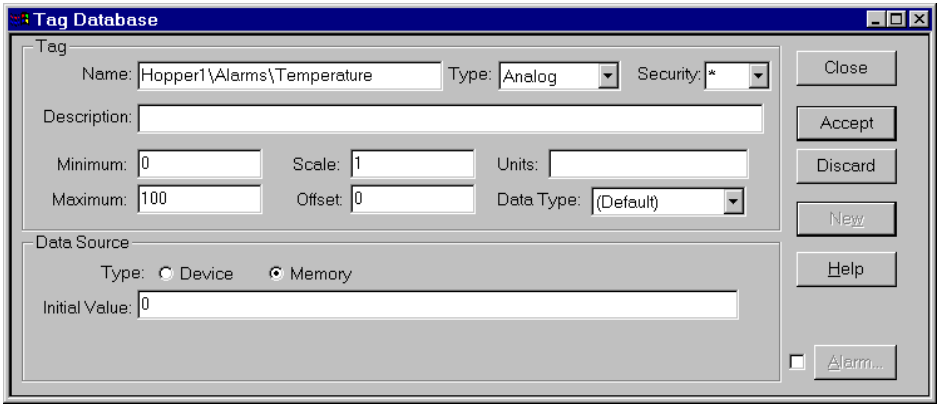
1. Select the tag you want to delete.
2. Click Delete on the Edit menu or click the Delete button on the toolbar.

Configuring tag type

The topics below describe how to complete the fields for analog, digital, and string tag types. For a description of how to complete the Data Source fields, see "Specifying a data source" on page 4-19.

Configuring an analog tag

1. If the tag is part of a folder, select that folder in the folder hierarchy. The folder name appears in the Name field and is the first part of the tag name.
2. Type a tag name. If the tag is part of a folder, type the name after the backslash (\).
3. For Type, select Analog.



4. Fill in the fields as outlined below:

   Security

   To restrict access to this tag, select a security code. If access is restricted, operators cannot change a tag value without the proper security code. For detailed information about security, see Chapter 10, *Adding security*.

   Description

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

   Minimum and Maximum

   Type the minimum and maximum values that can be written to the programmable controller or server. These values do not affect what is read from the programmable controller or server. For example, if you specify a minimum of 0 and a maximum of 100, RSView32 would be able to read a value of 200 from a PLC and store it in the value table, but would not be able to write this value to the PLC.

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

Scale and Offset

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

The scale and offset modify the "raw data" that comes from and goes to the programmable controller before it is saved in the value table. The scale and offset also modify the value specified in RSView32 before it is written to the programmable controller. The scale is a multiplication factor—the value from the PLC is multiplied by the scale. The offset is a fixed value—after the value from the PLC is multiplied by the scale, the offset amount is added. This formula shows the relationship between the PLC value and the amount stored in the RSView32 value table:

RSView32 value = (PLC value × scale) + offset

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

Units

Type a text label, for display only, up to 20 characters long. This specifies how the tag value is measured (for example, gallon, PSI, min, sec).

Data Type

The data types are:

Data type	Description	Range
Default	Depends on the data source and node type: If Device is the data source, for direct driver nodes RSView32 matches the data format specified by the address, for example, N7:0=Integer, F8:0=Floating Point. Do not use Default for OPC or DDE nodes, as this might produce unexpected results. If Memory is the data source, Default is Floating Point.	See below.
Unsigned Integer	Unsigned 16–bit integer	0 to 65,535
Integer	Signed 16–bit integer	-32,768 to 32,767
Long Integer	Signed 32–bit integer	-2,147,483,648 to 2,147,483,647
Floating Point	Single–precision (32–bit) floating point	$-3.402823E^{+38}$ to $-1.175494E^{-38}$, 0, $1.175494E^{-38}$ to $3.402823E^{+38}$
Byte	Unsigned 8–bit integer	0 to 255
3–Digit BCD	3–digit binary–coded decimal	0 to 999

Data type	Description	Range
4–Digit BCD	4–digit binary–coded decimal	0 to 9,999

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

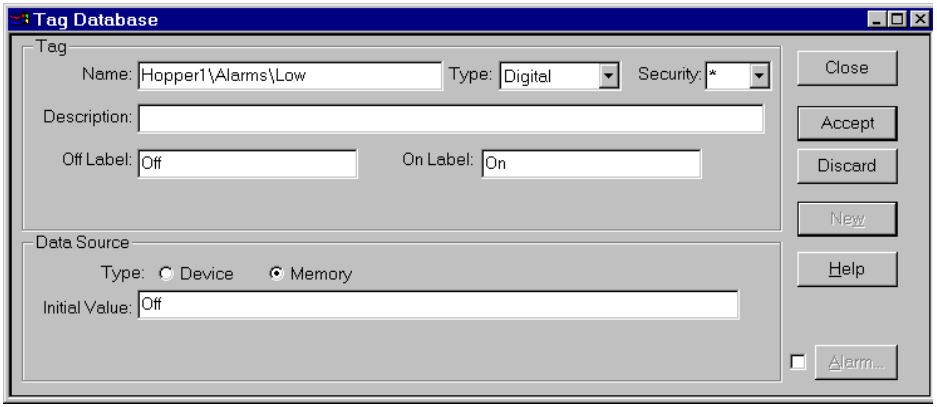
If you are using OPC or DDE nodes, do not use the Default data type because the default might not be as expected.

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

IMPORTANT For a tag with a Long Integer data type, if the minimum, maximum, scale, offset, or initial value is used with a decimal point, RSView32 stores the value in floating point format. This means that the maximum value for the tag is 16,777,216, which is the maximum integer value for single–precision floating point numbers.

Configuring a digital tag

1. If the tag is part of a folder, select the folder in the folder hierarchy. The folder name appears in the Name field and is the first part of the tag name.
2. Type a tag name. If the tag is part of a folder, type the name after the backslash (\).
3. For Type, select Digital.



4. Fill in the fields as outlined below:

   Security

   To restrict access to this tag, select a security code. If access is restricted, operators cannot change a tag value without the proper security code. For detailed information about security, see Chapter 10, *Adding security*.

   Description

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

   Off Label and On Label

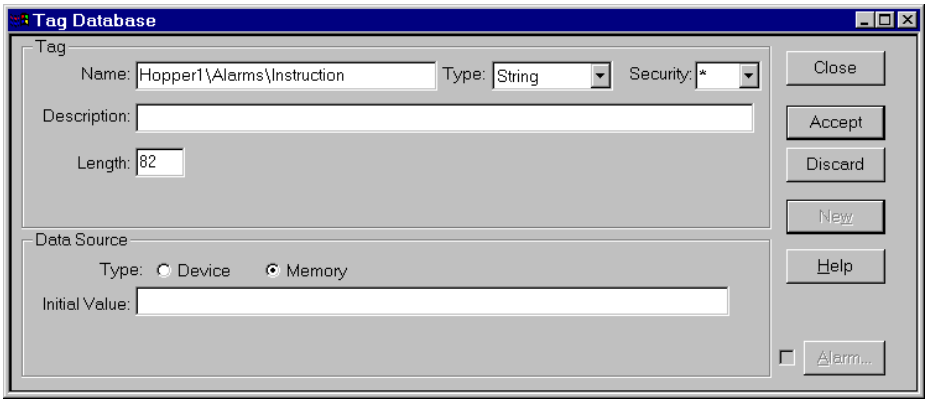
   Type text up to 20 characters long that describes the off state (value = 0) and on state (value = 1) of the tag. The off and on labels must be different. One or the other, but not both, can be blank.

Configuring a string tag

1. If the tag is part of a folder, select the folder in the folder hierarchy. The folder name appears in the Name field and is the first part of the tag name.

2. Type a tag name. If the tag is part of a folder, type the name after the backslash (\).

3. For Type, select String.



4. Fill in the fields as outlined below:

Security

To restrict access to this tag, select a security code. If access is restricted, operators cannot change a tag value without the proper security code. For details, see Chapter 10, *Adding security*.

Description

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

Length

Type a number between 1 and 255 to specify the length of the string tag in characters. RSView32 will accept only a length that is a multiple of the size of the Allen–Bradley® programmable controller data element you are addressing.

Specifying a data source

The following topics describe how to complete the Data Source fields. For details about configuring analog, digital, and string tag types, see "Configuring tag type" on page 4-13.

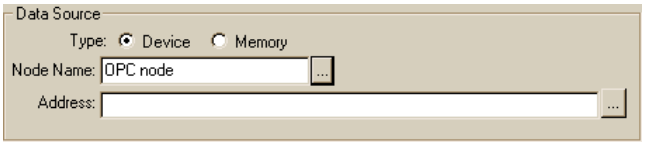
Specifying device as the data source

A tag with device as its data source receives its data from a source external to RSView32. The data can come from:

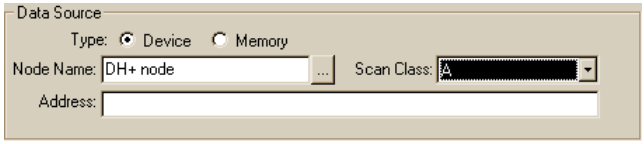
- Allen–Bradley or SoftLogix™ 5 programmable controllers through RSLinx® direct drivers
- programmable controllers through an OPC or DDE server
- another Windows program through an OPC or DDE server

To specify device as the data source:

1. Click Device.



2. Supply a node name by doing one of the following:
   - type a node name
   - double–click in the Node Name field to add a new node
   - click ... to open a selection list and select a node name
3. If you are connecting to Allen–Bradley or SoftLogix 5 devices through direct drivers, select a scan class.



For more information about scan classes, see page 2-18.

4. In the Address field, do one of the following:

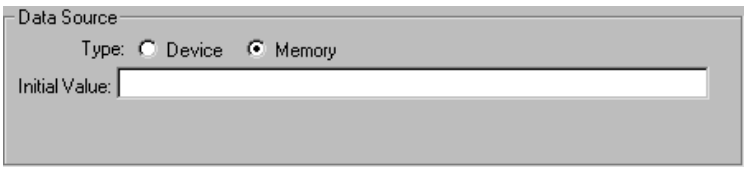
   - to connect to Allen–Bradley and SoftLogix 5 devices, specify the physical memory location in the programmable controller. The address syntax depends on the programmable controller. For addressing syntax, see Appendix D, *Addressing syntax for Allen–Bradley programmable controllers*.

   - to connect to other devices, specify the name of the tag in the OPC server or specify the DDE item. If you are using an OPC node, click the Browse button to select the OPC tag address. If you are using a DDE node, the DDE item name and format depend on the DDE server and are not validated by RSView32. For more information, see your OPC or DDE server documentation.

   For more information about OPC or DDE see Chapter 3, *Setting up OPC and DDE communications*. Also see "Sharing tag values locally" on page 16-26 and "Using OPC for peer–to–peer network communications" on page 17-5.

Specifying memory as the data source

1. Click Memory.



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

   When you first run a project, a memory tag has the value defined in the Initial Value field. All subsequent runs of the project use the tag's last value before the project stopped. To ensure a memory tag uses a particular value when the project starts, use the Set or = (Equal) commands in a startup macro to specify the tag's value. The value of a memory tag can also be set using derived tags, events, or graphic objects.

Other methods for creating tags

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

- create tags in a third–party application and import them into RSView32
- create tags as needed in other RSView32 editors
- import tags from a PLC or SLC™ database
- create tags using the RSView32 Object Model and VBA

Creating tags in a third–party application

You can use a third–party spreadsheet editor such as Microsoft® Excel to create your tags, and then import the tags into RSView32 using the Database Import & Export Wizard in the RSView32 Tools folder. When you import tags, they are merged with tags already in the tag database and any tags with the same name are updated with the new information.

For more information about the Wizard, see "Using the Database Import & Export Wizard" on page 4-27.

Creating tags as needed in other RSView32 editors

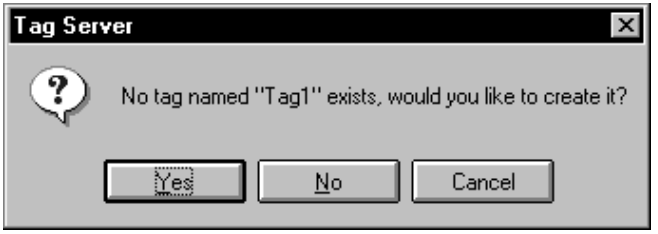
Any editor that uses tags has access to the tag database. You can access the database by doing one of the following:

- click the Browse button or the Tags button, whichever is available, to open the Tag Browser

Browse button

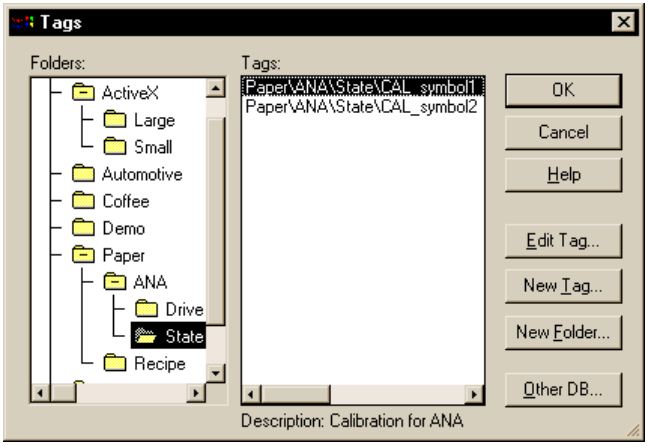
Tags button

- type a new tag name. When you try to save or close, a message appears prompting you to create the tag. For example, if you typed "Tag1" and it did not exist in the tag database, the following message would appear:



Using the Tag Browser

When you click a Browse or Tags button, the Tag Browser opens.



In the Tag Browser, you can:

- select a tag by double–clicking it, or by highlighting it and then clicking OK
- view the tag's description by highlighting it
- edit a tag by highlighting it and then clicking Edit Tag. The Tag Editor dialog box opens so you can edit the tag's definition.
- create a new tag by opening the desired folder and clicking New Tag. The Tag Editor dialog box opens so you can define the tag.
- create a new folder by clicking New Folder. The New Folder dialog box opens so you can create the folder.
- import tags from a PLC or SLC database and copy them into the RSView32 tag database by clicking Other DB. The PLC Database Browser opens so you can specify the tags to import.

Importing tags from a PLC database

Button in Tag Browser

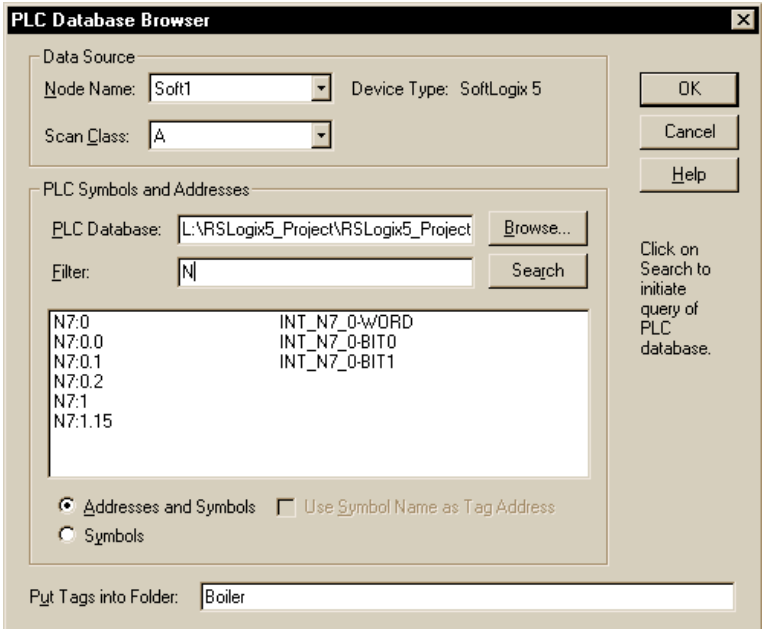
DB Browser Button in Tag Database editor

To open the PLC Database Browser, click the Other DB button in the Tag Browser or click the DB Browser button on the toolbar in the Tag Database editor.

Use the PLC Database Browser to selectively import tags from an Allen–Bradley PLC database into the RSView32 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 RSView32 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™ and RSLogix 500™, saved as an external database, with file extension .ctd
- RSLogix 5 internal database, with file extension .rsp
- RSLogix 500 internal database, with file extension .rss
- RSLogix Frameworks database, with file extension .fma or .fmb



For PLC and SLC addresses, the PLC Database Browser shows only addresses that are used in the symbol or address list of the PLC programming software. For RSLogix Frameworks symbols, you can import Frameworks global symbols for use with DDE nodes.

To import tags from a PLC database:

1. Specify the data source for the tag by typing the node name and scan class if the node type is direct driver.
2. In the PLC Database field, type the name and path for the database you want to import tags from, or click the Browse button to locate and select the database you want to import tags from.

   The addresses and symbols from the selected database are displayed in the box below the Filter data entry field.

3. To filter the tag list so that only certain addresses or symbols are displayed, type a character string, then click Search. If you want to search on names only, check the Symbols button so that only symbol names are displayed. If an address does not have a symbol name it will not be displayed.

   Use the filter if the address or symbol list is too big to display entirely.

4. Highlight the symbol, or symbols you want to import.
5. In the Put Tags into Folder field, type a folder name if you want the tags to be in a folder. If the folder does not already exist in the RSView32 tag database it will be created.
6. Click OK.

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

Importing ControlLogix tags

To import ControlLogix® tags, use the Logix 5000 Tag Import utility.

To use the utility:

1. Click the Windows Start button, point to Programs, Rockwell Software, RSView32 Tools, and then click Logix 5000 Tag Import.
2. Read the utility's Help for details about how to use the utility.

Using the Database Import & Export Wizard

You can also import PLC or SLC databases into RSView32 using the Database Import & Export Wizard.

To use the wizard:

1. Click the Windows Start button, point to Programs, Rockwell Software, RSView32 Tools, and then click Database Import & Export Wizard.
2. Read the wizard's Help for details about how to use the wizard.

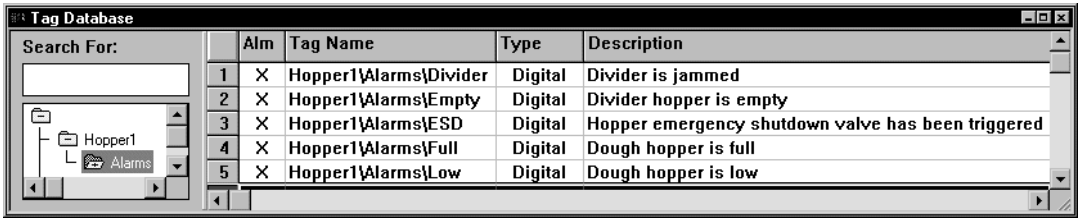
Creating tags using the RSView32 Object Model and VBA

You can use the RSView32 Object Model with programming languages like Visual Basic® or VBA to create tags. For more information about using the RSView32 Object Model, see Help.

Adding alarms to tags

Analog and digital tags can have alarms associated with them. At runtime, RSView32 scans the tag values in the tag database and compares them to the limits you set for the tags. If a tag value crosses a limit, an alarm is triggered.

When a tag has an alarm configured for it, an X appears in the Alm column of the Tag Database editor's spreadsheet and the Alarm button in the editor's form is highlighted (enabled).

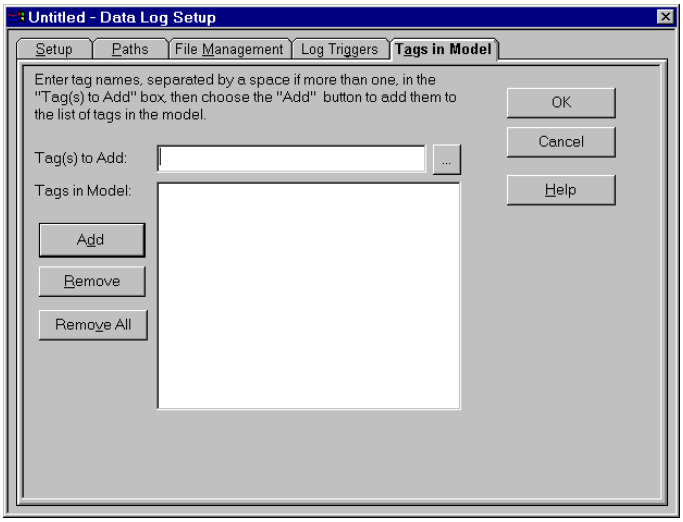


	Alm	Tag Name	Type	Description
1	X	Hopper1\Alarms\Divider	Digital	Divider is jammed
2	X	Hopper1\Alarms\Empty	Digital	Divider hopper is empty
3	X	Hopper1\Alarms\ESD	Digital	Hopper emergency shutdown valve has been triggered
4	X	Hopper1\Alarms\Full	Digital	Dough hopper is full
5	X	Hopper1\Alarms\Low	Digital	Dough hopper is low

For details about alarms, see Chapter 6, *Configuring alarms*.

Logging tag values

Any tag value can be logged. To set up logging, use the Data Log Setup editor. For details, see Chapter 7, *Configuring data logging*.



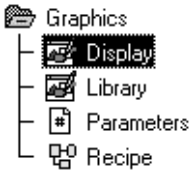
Using the tag monitor

Use the tag monitor to view information about tags, such as changing tag values and tag status information.

To create a tag monitor, you can:

- create a tag monitor object in the Graphic Display editor
- create a tag monitor file through the Project Manager

Creating a tag monitor object



1. Open the Graphic Display editor.
2. Open the Tag Monitor editor by doing one of the following:
   - on the Objects menu, click Advanced Objects, and then click Tag Monitor
   - click  on the Drawing Tools toolbox

   The cursor changes to the tag monitor drawing tool: 
3. Drag the mouse to create a box the size you want for the tag monitor.

   When you release the mouse, a tag monitor appears. The Graphic Display editor's menu bar changes to the menu bar for the tag monitor. Select the tags you want to use in the display as described in "Selecting tags" on page 4-31.
4. Edit the tag monitor object as you would any other graphic object. You can move it, resize it, and so on. You can also use this object in other graphic displays by dragging it from one display and dropping it into another.

   For detailed information about graphic objects, see Chapter 11, *Creating graphic displays*.
5. When you are finished, save the graphic display.

Creating a tag monitor file

1. In the Project Manager, open the System folder.
2. Open the Tag Monitor editor by doing one of the following:
   - double–click the Tag Monitor icon
   - right–click the Tag Monitor icon and then click New
3. On the View menu, click Form to display both the form and the spreadsheet.
4. Select the tags you want to display as described below.
5. On the File menu, click Save, and then type a name for the file.

Selecting tags

To select tags, the form part of the tag monitor must be visible. If it is not visible, click Form on the View menu.

To select the tags you want to display, do one of the following:

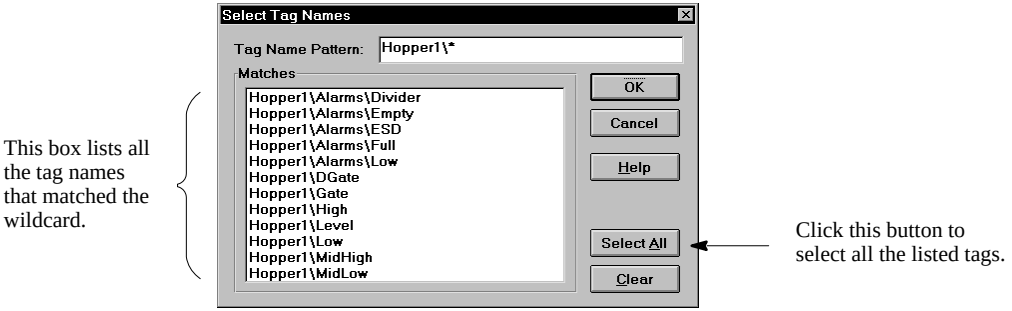
- type a tag name in the Tag Name field
- click  to open a list and then select a tag
- type a wildcard in the Name field, and then press Enter or click OK. The wildcards are:

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

If you use a wildcard, the Select Tag Names dialog box opens.

Using the Select Tag Names dialog box

The Select Tag Names dialog box lists all the tags that matched a wildcard. You can use some or all of the listed tags. A tag monitor can contain up to 100 tag names.

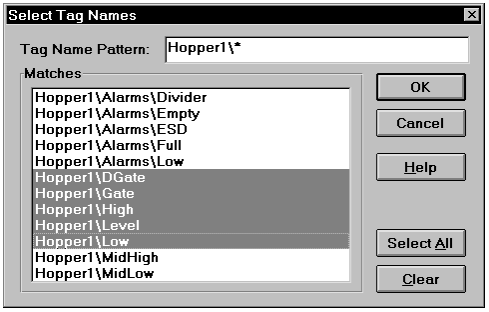


To select all tags:

1. Click Select All.
2. Click OK.

To select a range of tags:

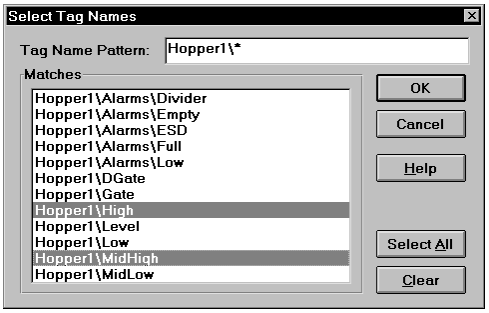
1. Click the first tag name you want to select.
2. Press and hold down Shift while you click the last tag name you want to include.



3. Click OK.

To select individual tags:

1. Click the first tag name you want to select.
2. Press and hold down Ctrl while you click one or more tag names.



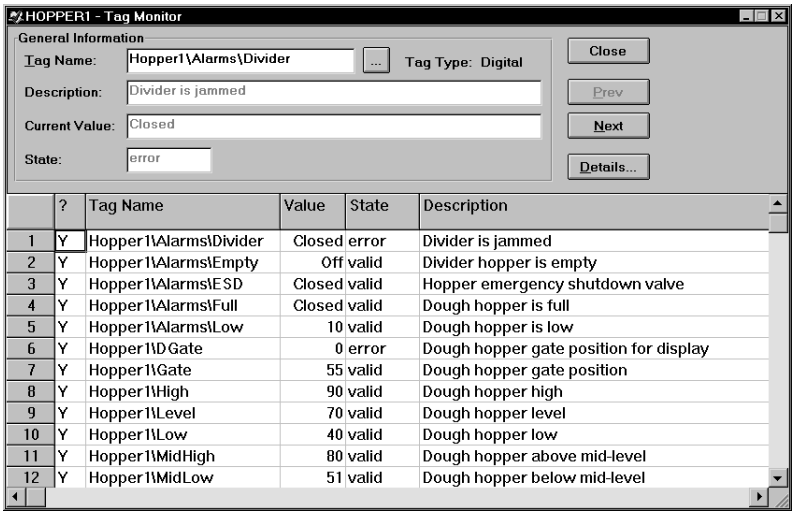
3. Click OK.

Understanding what you see

The following illustration shows the tag monitor file called Hopper1.

A single tag is displayed in the form.

All selected tags are displayed in the spreadsheet.



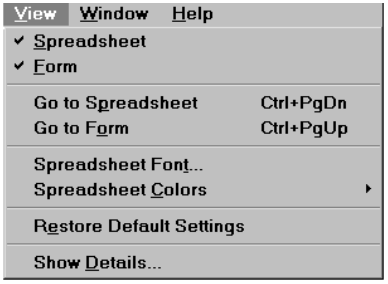
The following table describes the columns in the spreadsheet:

This column	Displays
?	Y if the tag name is valid. N if the tag name is not valid (in other words, the tag has not been created in the tag database).
Tag Name	The tag name, whether valid or not, as entered in the tag database.
Value	The current value of the tag.

This column	Displays
State	Disabled if the node has been disabled in the Node editor or by using the NodeDisable command. Error if RSView32 has tried to acquire a value but could not because of some kind of communication error, such as a node not being available or a DDE server not running. Stale if the tag value has been acquired before but does not have an updated value. Uninitialized if the value has never been acquired. Valid if RSView32 has a valid value for the tag. None if there is a problem with the tag definition.
Description	The description of the tag, as entered in the tag database.

Changing what you see

Use the commands on the View menu to change what you see in the tag monitor.

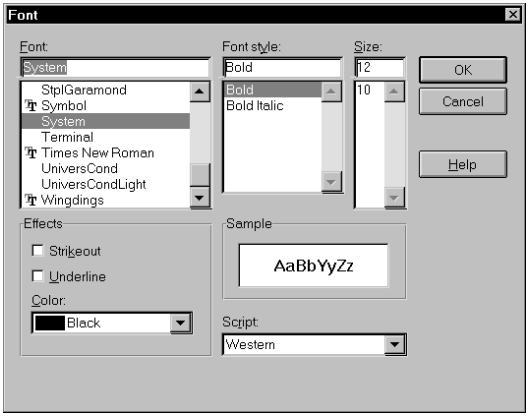


To show or hide the form and spreadsheet:

On the View menu, click Spreadsheet or Form. A check mark means the form or spreadsheet is visible.

To change the spreadsheet font:

1. On the View menu, click Spreadsheet Font.



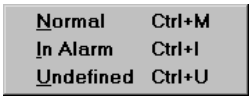
2. Select the font, style, and size you want.

   To change the color of the font, click Spreadsheet Colors on the View menu, as described next.

3. Click OK.

To change the color of text in the tag monitor spreadsheet:

1. On the View menu, click Spreadsheet Colors.



2. Select the item for which you want to specify a color. The items are:

   - Normal for all tags in the spreadsheet
   - In Alarm for tags that are in alarm
   - Undefined for tags that have not been defined in the tag database

3. In the Color dialog box, click the desired color.

4. Click OK.

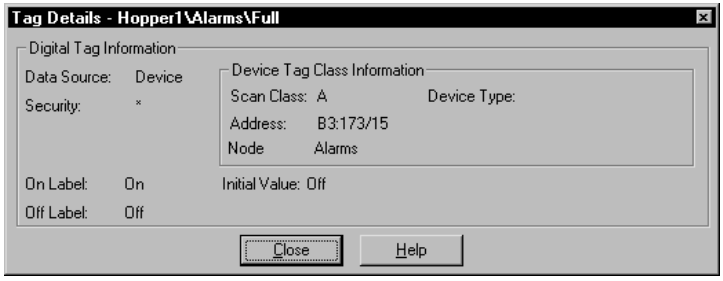
Viewing details

To see more detailed information about a tag:

1. Select a tag by clicking it in the spreadsheet or by clicking the Next and Prev buttons until the tag is displayed in the form section of the tag monitor.

2. Click Show Details on the View menu or click the Details button in the form section of the tag monitor.

   The Tag Details dialog box opens.



   To see the details for another tag, select the tag. You do not have to close the Tag Details dialog box.

Chapter

5 Creating derived tags

A derived tag is a tag whose value is the result of an expression. The expression can be made up of mathematical operations, tag values from the value table, if–then–else logic, and other special functions.

You should not write to derived tags, because the derived tag is only evaluated when the expression changes. For example, if the derived tag tag3 has the expression of tag1 + tag2, and if you set tag3 = 0, the value of tag3 becomes zero, and will only be updated when the value of tag2 or tag3 changes.

The value table is the part of memory that stores current tag values when RSView32™ is running. The current value of the derived tag is stored in an analog, digital, or string tag in the value table. Derived tags can be device tags or memory tags.

How to use derived tags

Here is an example of how a derived tag can be used. Suppose there are five weight sensors on a conveyor belt. The tag database contains one tag for each sensor, so the weight at each point on the conveyor belt is monitored. If the weight at any point is excessive, RSView32 triggers an alarm.

However, what happens if no individual sensor detects an excessive weight, but the total of all five sensors is too high? In this case, you could set up a derived tag to sum the weights of all five sensors and store the result in the value table. Then, if this total is too high, RSView32 can trigger an alarm.

How to use multiple derived tag files

You can create multiple derived tag files. At runtime, up to 20 derived tag files containing a maximum of 1,000 tags can run simultaneously.

Use multiple derived tag files to:

- group derived tags that need to be evaluated at different rates
- group derived tags that are active only when a particular graphic display is active

Summary of steps

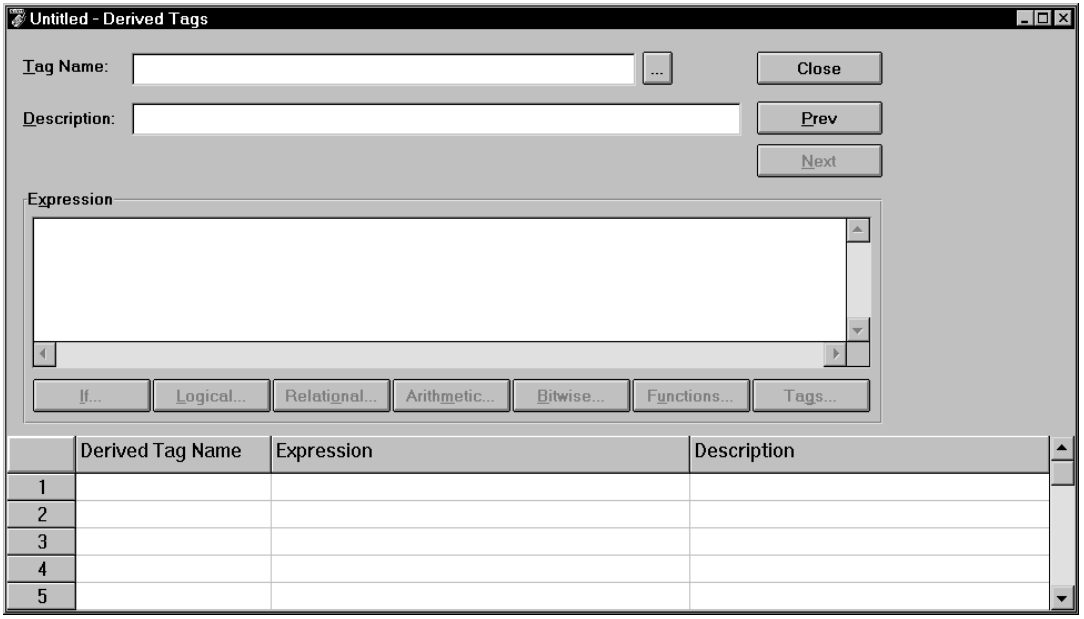
The main steps for configuring derived tags are:

- set up the evaluation interval for the derived tag file in the Derived Tag Setup dialog box
- create the derived tags in the Derived Tags editor

The Derived Tags editor

To open the Derived Tags editor:

1. In the Project Manager, open the Logic and Control folder.
2. Open the Derived Tags editor by doing one of the following:
   - double–click the Derived Tags icon
   - right–click the Derived Tags icon and then click New



Using the Accept and Discard buttons

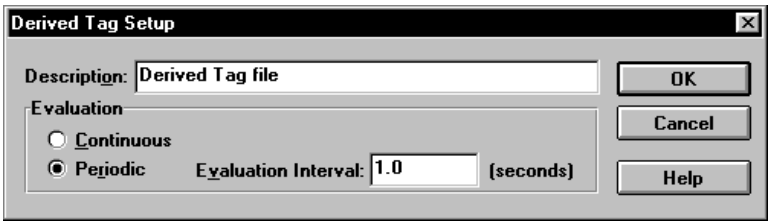
When you enter information in the editor, the Prev and Next buttons change to Accept and Discard. Click Accept to save information. Click Discard to discard information.

Setting up the evaluation interval

To set up the evaluation interval for the derived tag file:

1. On the menu bar, click Setup, and then click Derived Tag Setup.

2. In the Derived Tag Setup dialog box, type a brief description of the derived tag file. This description is for your information only—it does not appear anywhere else.



   For example, if you were creating a derived tag file for a certain area of your plant, you might type "West Wing Assembly Line" to identify the area.

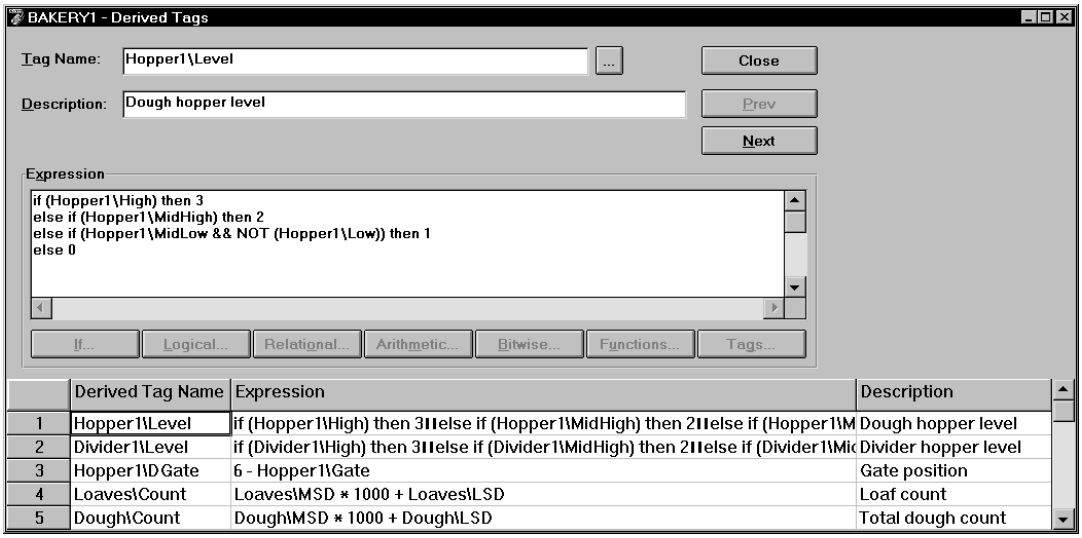
3. Choose a type of evaluation to specify how often to evaluate expressions at runtime. When the evaluation interval expires, RSView32 evaluates the expressions that contain tags with values that have changed.

   To have expressions evaluated as quickly as possible, click Continuous. To have expressions evaluated at a particular interval, click Periodic, and then type a number in the Evaluation Interval field. You can use fractional seconds. For example, if you type .6, the expression will be evaluated every six tenths of a second. Do not specify an evaluation interval faster than the scan class background period, DDE server polling rate, or OPC® server update rate.

4. Click OK.

Creating derived tags

Derived tags are created in the Derived Tags editor. The following illustration shows a derived tag file.



IMPORTANT Do not create derived tags that depend on the results of other derived tags. At runtime, tags are not processed sequentially and the time it takes to process a tag can vary.

To create a derived tag:

1. In the Tag Name field, specify the name of the tag that will hold the derived tag value. This tag can be analog, digital, or string and can have device or memory as the data source. The tag name is also the name of the derived tag file.

IMPORTANT	Limit the use of tags with device as their data source. If the system is continuously writing the derived value to the device, it can flood the communication channel with traffic. Also, if writing occurs too often the buffer for the communication channel can overflow and generate communication errors.

2. In the Description field, type a brief description of the derived tag's function. This description is for your information only—it does not appear anywhere else.

3. In the Expression area, create the expression that will determine the derived tag value.

   For more information on expressions, see Chapter 14, *Creating expressions*.

4. Click Accept.

5. Repeat Steps 1 through 4 to create more derived tags.

   Use the Next button to move to a new record in the spreadsheet.

Editing derived tags

You can edit derived tags during development or runtime.

1. Open the derived tag file you want to edit.

2. Use the Prev and Next buttons to move among derived tags. Make the required changes.

3. Click Accept to save the changes.

If you change the derived tag file at runtime, the changes do not take effect until you stop running the file and then start it again.

Starting and stopping derived tag processing

There are many ways to start and stop derived tag processing. Choose the way that works best for your project.

For a complete list of RSView32 commands and their command syntax, see Appendix A, *RSView32 commands*, or see Help.

Ways to start derived tag processing

- In the Startup editor, select the Derived Tags check box and specify a derived tag file.
- In the Macro editor, create a startup or login macro that includes the DerivedOn <*file*> command.
- In the Graphic Display editor, specify the DerivedOn <*file*> command in the Startup field in the Display Settings dialog box.
- In the Graphic Display editor, create a button object and specify the DerivedOn <*file*> command as the press action. When the button is pressed, derived tag processing starts.
- In the Graphic Display editor, create a graphic object and attach touch animation with the DerivedOn <*file*> command as the action. When the object is touched, derived tag processing starts.
- In the Events editor, specify the DerivedOn <*file*> command as the action for an event.
- On the command line, type **DerivedOn <*file*>** and then press Enter.

Ways to stop derived tag processing

When a project stops, derived tag processing stops as well. To stop derived tag processing without stopping the project, use any of the methods below.

- In the Graphic Display editor, specify the DerivedOff <*file*> command in the Shutdown field in the Display Settings dialog box. When the display closes derived tag processing stops.

  Note that if the display is cached using the Always Updating option, the DerivedOff command won't be executed until the display is removed from the cache (for example, by using the FlushCache command).

- In the Graphic Display editor, create a button object and specify the DerivedOff <*file*> command as the press action. When the button is pressed, derived tag processing stops.

- In the Graphic Display editor, create a graphic object and attach touch animation with the DerivedOff <*file*> command as the action. When the object is touched, derived tag processing stops.

- In the Events editor, specify the DerivedOff <*file*> command as the action for an event.

- On the command line, type **DerivedOff <*file*>** and then press Enter.

Chapter

6 Configuring alarms

In RSView32™, you can set up a complete alarm system. 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.

Summary of features

With the RSView32 alarm system, you can:

- monitor any analog and digital tag for alarms (to a maximum of 40,000 tags)
- display the last 1000 alarms in an alarm summary
- define up to eight different severity levels to distinguish alarms visually
- use system default messages or create unique messages to describe an alarm
- log messages to a file, to a printer, or to both
- suppress alarms for maintenance and tuning purposes
- associate a macro with an alarm to provide custom handling of the alarm
- share alarm information with other RSView32 components
- set up global alarm monitoring

- use the AlarmEvent command to respond to your own alarm detection algorithms for annunciation, logging, printing, and for display in alarm summaries

Key concepts

An alarm occurs when something goes wrong. It can signal that a device or process has ceased operating within acceptable, predefined limits or it can indicate breakdown, wear, or a process malfunction.

Set up a system of alarms in the Tag Database editor by linking alarms to tags you want monitored. When the tag values are updated in the value table, they are compared to the limits you assigned when you configured the alarm. If a tag value exceeds the configured limits, an alarm of a preset severity is triggered.

Alarms for analog tags

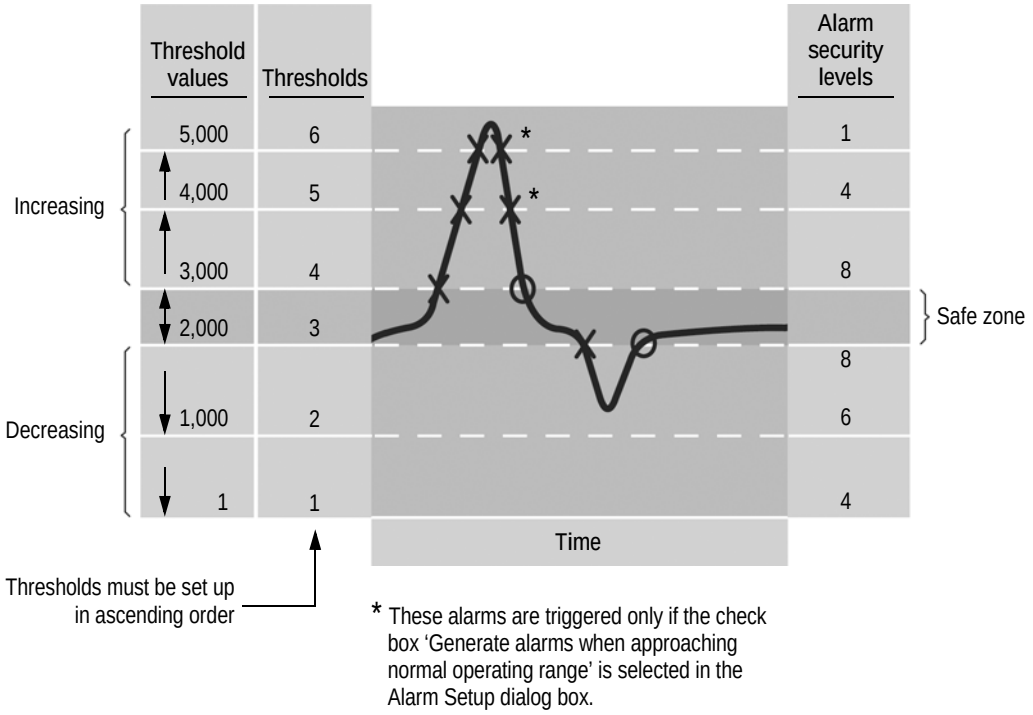
An analog tag can trigger a number of alarms when it crosses various predefined threshold levels (unlike a digital tag, which is either on or off).

Thresholds

When defining an analog tag, you can assign up to eight alarm thresholds with different levels of alarm severity to indicate the alarm's importance. The lowest threshold is one and the highest is eight. You do not have to use all eight thresholds for a tag, but the ones you use must be configured in ascending order. For example, you can assign thresholds one, two, and eight as long as you assign them in that order.

Thresholds can be increasing—monitoring for a rising value that crosses the threshold, or decreasing—monitoring for a falling value that crosses the threshold. The following illustration shows a tag with both increasing and decreasing thresholds. In this example, the deadband setting is zero.

Example: Alarm thresholds



The illustration shows the changing values of a tag monitoring a motor's revolutions per minute (rpm). With the threshold settings illustrated, the motor must run between 2,000 rpm and 3,000 rpm, or an alarm is triggered. In the illustration, an X shows when the tag goes into alarm and an O shows when the tag goes out of alarm.

If the motor speed	It triggers an alarm of this severity
exceeds 3,000 rpm	8
exceeds 4,000 rpm	4
exceeds 5,000 rpm	1
falls below 5,000 rpm *	4
falls below 4,000 rpm *	8

If the motor speed	It triggers an alarm of this severity
falls below 2,000 rpm	8
falls below 1,000 rpm	6
falls below 1 rpm	4

* These alarms are triggered only if "Generate alarms when approaching normal operating range" is selected in the Alarm Setup dialog box.

You can specify whether or not to generate alarms when an analog tag value is moving back to normal operating range and recrosses the alarm trigger threshold. If you choose to generate alarms when the motor is moving back towards normal operating range, an alarm would be triggered when the motor speed falls below 5,000 rpm and 4,000 rpm, and when it rises above 1 rpm and 1,000 rpm. If you don't want to generate these alarms, make sure "Generate alarms when approaching normal operating range" is deselected, in the Setup tab of the Alarm Setup editor.

Variable thresholds

Threshold values can be constant or variable. The above example uses constant thresholds. A variable threshold can change, because its value is taken from another tag value, not a constant number. You define a variable threshold by naming a tag in the appropriate field in the editor. That tag's value is the threshold for the alarm; as the tag changes, the threshold changes.

Variable thresholds require more system resources than constant thresholds. This is due to the continuous scanning of threshold values and to the processing necessary to detect alarm faults.

Alarm faults

A variable threshold must not become higher than the threshold above it or lower than the threshold below it. If this happens, an alarm fault is generated for the monitored tag. To correct an alarm fault, you must reconfigure the variable threshold so it does not overlap either of its neighbors. This can become complex when the neighboring thresholds are themselves variable, because these boundaries are determined dynamically at runtime.

When an alarm fault is generated, the following actions occur:

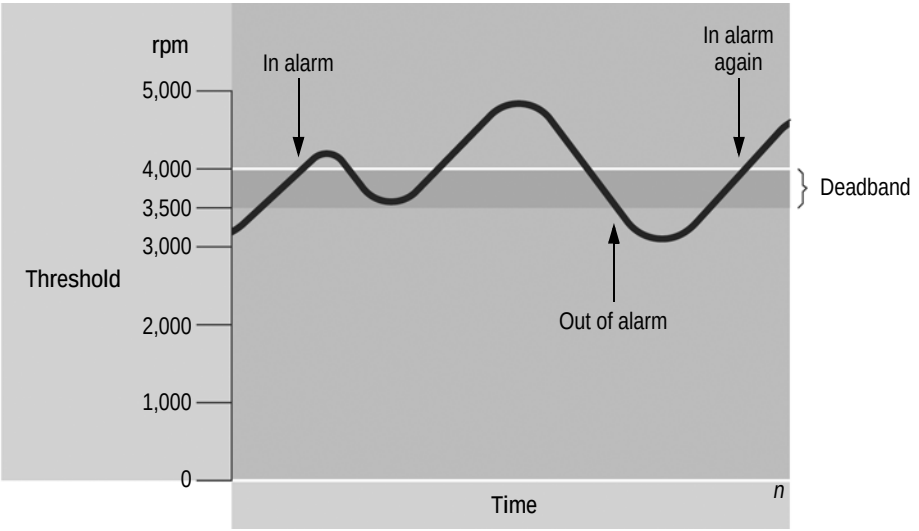
- the tag's alarm status stays where it was before the alarm fault
- an alarm fault is reported to all configured alarm reporting devices, such as the alarm log file and printer
- the alarm fault status bit for the tag is set in the value table, which notifies other applications that an alarm fault has been generated
- the Alarm Type column in the alarm summary states that the tag is in "Alarm Fault"

When the faulty thresholds are returned to their normal operating range, the alarm fault condition is cleared. The out–of–alarm–fault status is generated and logged, and alarms for that tag resume normal operation.

Deadband

With certain kinds of measured values, such as line pressure, tag values can fluctuate rapidly above and below a critical threshold. Where such conditions exist, you can create a deadband as a buffer to prevent the fluctuations from triggering and retriggering unnecessary alarms. If the threshold is increasing—monitoring rising values—the deadband range lies below the threshold. If the threshold is decreasing—monitoring falling values—the deadband lies above the threshold.

The following illustration shows an increasing threshold of 4,000 rpm with a deadband value of 500 rpm. In this example, the rpm would have to fall to 3,500, and then rise above 4,000 rpm before it would retrigger the alarm.



IMPORTANT Use the deadband carefully in safety–critical applications. In the above example, the variable would have to fluctuate by more than 500 rpm before retriggering an alarm.

A deadband range may be absolute, as illustrated, or it may be a percentage of the minimum/maximum range for a tag. If the deadband in the illustration was two percent, its range would be two percent of 5,000 rpm, or 100 rpm.

If a buffer is not required, the deadband must be configured to zero. With a deadband of zero, alarms will be triggered as soon as the tag value crosses any of its thresholds.

Alarms for digital tags

Digital tags are either on or off. Therefore, alarms for digital tags do not have thresholds. They have alarm states.

The alarm states are:

On	Triggers an alarm when a tag has a value of 1.
Off	Triggers an alarm when a tag has a value of 0.
Any Change*	Triggers an alarm when a tag value changes from 0 to 1 or from 1 to 0.
Changes to On*	Triggers an alarm only when a tag value changes from 0 to 1.
Changes to Off*	Triggers an alarm only when a tag value changes from 1 to 0.

IMPORTANT The * indicates change–of–state types. These types are considered out of alarm immediately after the change of state.

Alarm severity

Alarms can range in severity from one to eight to indicate different levels of importance. One is most severe, eight is least severe. For example, a level–four alarm might warn that a vat is half full of liquid while a level–one alarm indicates that the vat is about to overflow. Both alarms monitor the same tag but have different severity levels.

When you configure alarm severity, you specify what severity levels mean and what actions they will trigger. Severity determines the destination of alarm messages. It also determines the color of the text in the alarm summary and the order in which alarms are displayed in an alarm banner.

Alarm messages

Alarm messages report information about alarms. There are three types of messages:

- In Alarm message: generated when a tag goes into alarm
- Out of Alarm message: generated when a tag goes out of alarm
- Acknowledged message: generated when an operator acknowledges an alarm

For each message, you can use the default message or create your own message, and you can selectively route alarm messages to a log file and/or printer.

Alarm log file

The alarm log file records alarm incidents that occur. You can configure how often, if ever, you want log files created and deleted. The log file stores data in standard dBASE IV® (.dbf) format.

Optionally, using the AlarmLogSendToODBC command, you can export the alarm log file to an ODBC database while online. For more information, see page 6-32.

In RSView32, you can view the alarm log file with the Alarm Log Viewer. You can also use third–party applications to view the log file. The application must be able to read the dBASE IV file format or be ODBC compliant. For example, you can use Microsoft® Excel, Microsoft Access, or Microsoft Visual Basic®.

Alarm displays

Alarm information can be displayed in:

- alarm log viewer
- alarm summary
- graphic objects and displays
- tag monitor

When alarms are generated, they are recorded in two places: the alarm log file and the computer's memory. The alarm log viewer displays the records in the alarm log file. The alarm summary displays the records in the computer's memory.

Alarm log viewer

The alarm log viewer displays the contents of the alarm log file. The contents of this file depend on how you configured severities in the Alarm Setup editor. By default, the log file will have a record for each of the following alarm incidents:

- when a tag goes into alarm
- when a tag goes out of alarm
- when an alarm is acknowledged
- when a tag with an alarm is suppressed
- when an alarm fault is generated

The viewer can display up to 32,767 records. Set up your project so only essential alarm information is logged. Alarm logging uses system resources and can slow overall system performance.

Alarm summary

The alarm summary displays the alarm information recorded in the computer's memory. The summary is configurable, so you can determine what and how alarm information is viewed.

The summary can list up to 1,000 alarms. As new alarms occur, they appear at the top of the list. When the alarm summary becomes full, one alarm is dropped from the bottom of the list for each new alarm that appears at the top. Alarms are also dropped when they are out–of–alarm and acknowledged. When alarms are dropped, they are removed from memory. When the AlarmOff command is issued, the contents of the alarm summary are erased.

AlarmOff is just one of the RSView32 commands used with alarms. For details about this command and others, see Appendix A, *RSView32 commands*, or see Help.

In the summary, you can configure each alarm incident to be a different color. For example, you might choose to configure low severity alarms as blue, medium severity as yellow, and high severity as red. When the alarm is displayed, operators can tell an alarm's severity at a glance.

Create an alarm summary in the Graphic Display editor or create an alarm summary file through the Project Manager.

Graphic objects and displays

You can customize graphic displays to show specific information about alarms. RSView32 makes all alarm status information available to graphic displays through a set of system tags (see below). Use these tags with numeric and string display objects. Attach visibility and color animation to affect the appearance of the objects.

The Alarm Information graphic library contains graphic objects you can drag and drop into your display. For example, to include an alarm banner in a display, drag and drop the banner from the Alarm Information graphic library. Use the graphic objects as they are or edit them to suit your needs.

Alarm system tags

System tags are created and updated by RSView32. You can use these tags anywhere a tag name is required. The system tags for alarms are:

This tag	Type	Displays this information
system\AlarmBanner	String	The most recent, most severe alarm. If an alarm of an equal or higher severity occurs, it replaces the first alarm, whether or not the previous alarm has been acknowledged.
system\AlarmMostRecentDate	String	The date of the most recent, most severe alarm.
system\AlarmMostRecentLabel	String	The threshold label of the tag of the most recent, most severe alarm.
system\AlarmMostRecentSeverity	Analog	The severity of the most recent, most severe alarm (1 to 8).
system\AlarmMostRecentTagDesc	String	The description of the tag of the most recent, most severe alarm.
system\AlarmMostRecentTagname	String	The name of the tag of the most recent, most severe alarm.

This tag	Type	Displays this information
system\AlarmMostRecentTime	String	The time of the most recent, most severe alarm.
system\AlarmMostRecentUnits	String	The units of the most recent, most severe alarm.
system\AlarmStatus	String	The number of unacknowledged and suppressed alarms.
system\AlarmSummaryItems	Analog	The number of alarm transactions in an unfiltered alarm summary.
system\AlarmSummaryItemsUnacked	Analog	The number of unacknowledged alarms in an unfiltered alarm summary.
system\AlarmSuppressedCount	Analog	The number of tags with alarm suppression turned on.

Alarm acknowledgment

If an alarm appears in the alarm summary or some other alarm display, an operator can acknowledge the alarm. Acknowledging an alarm does not correct the condition causing the alarm, but indicates that an operator is aware of the alarm.

A *tag*, not an alarm, is acknowledged. A single tag might have caused several alarms. For example, a tag representing temperature might have triggered Warm, Hot, and Overheat alarms by the time it is acknowledged. The tag could also have gone in and out of alarm several times before being acknowledged.

One acknowledgment is all that is required for all previous and current alarms for a tag, so alarm log files often show fewer acknowledgments than alarms.

To acknowledge alarms, operators can:

- click the Acknowledge or Acknowledge All button in the alarm summary
- use the RSView32 Acknowledge command by itself, or with parameters to name a tag or group of tags
- use the RSView32 AcknowledgeAll command

Unless an alarm is acknowledged, it remains outstanding until the system is shut down, the alarm summary is full, or alarm monitoring is turned off.

Alarm suppression

You can suppress alarm monitoring for tags. This is useful for testing or for performing repairs or maintenance on a piece of equipment.

To suppress alarm monitoring for tags, use the RSView32 SuppressOn command. To view a list of the tags *not* being monitored, use the Suppressed List. You can also turn monitoring back on from this list.

Running commands, macros, or VBA programs in response to alarms

Using the Execute and Identify buttons in an alarm summary, you can run a command, macro, or VBA program to respond to tags' alarm conditions.

Use the Execute button to run a command, macro, or VBA program that applies to all alarms in the summary, for example to create a custom alarm report for analyzing plant maintenance efficiency.

Use the Identify button to run a command, macro, or VBA program that applies only to the highlighted alarm. The Identify button can run

a different command, macro, or VBA program for each tag, for example to run a different help file for each tag's alarm conditions.

About the Execute button

With the Execute button, you can specify a command or macro that operators can run with reference to the highlighted alarm in an alarm summary. The Execute command can be appended with data items derived from the highlighted alarm, for example the tag name, alarm type, severity, value, date and time, and the tag type.

Use the execute feature to apply a common command, macro, or VBA program to alarms in the alarm summary. For example, you can run a VBA program to add entries to a custom alarm report for selected alarms in an alarm summary, and you can pass arguments from the highlighted alarm to the VBA program.

To set up the Execute button, double-click the alarm summary to edit it, and then open the Execute Command dialog box by clicking Execute on the Data menu. Type a command or macro in the Execute Command Text box, and then select one or more parameters to append to the command or macro. For details about using alarm data with commands, see page 6-68.

By default, the Execute button is not included on an alarm summary. The Execute button will be added when a command is assigned to the button. For information about adding buttons to an alarm summary, see "Formatting buttons" on page 6-61.

To run the command, macro, or VBA program associated with the Execute button, either highlight an alarm in the list and then click Execute, or double–click an alarm in the list.

For more information about using the Execute button in an alarm summary, and for an example, see "Using alarm data with commands" on page 6-68.

About the Identify button

With the Identify button, you can specify a command or macro that operators can run when a tag is in alarm. Use this button to provide information about an alarm. For example, use the Display command to open a display that contains instructions on how to handle a motor that is running too fast.

To set up the Identify button, specify a command or macro in the Alarm Identification field in the Advanced tab of the Analog Alarm editor or Digital Alarm editor. For details about setting up Identify for analog tags, see "Advanced" on page 6-46. For details about setting up Identify for digital tags, see "Advanced" on page 6-51.

To run the Identify command, you can highlight the alarm in the alarm summary and then click the Identify button, or type the Identify command on a command line. When you use the Identify command, the command or macro runs whether or not the tag is in alarm.

For detailed information about the Identify command and other RSView32 commands, see Appendix A, *RSView32 commands*, or see Help.

For detailed information about macros, see Chapter 15, *Setting up navigation*.

Alarm expressions

When a tag goes into alarm, certain information about the alarm is recorded in the value table along with the tag's value. Using expressions, information about alarms can be retrieved on a tag–by–tag basis.

For example, if the system detects that a tag is in alarm, it sets an internal alarm bit, and resets the bit when the tag is out of alarm. The following expression checks if a tag is in alarm:

ALM_IN_ALARM (*tag*)

where *tag* is the name of the tag you want to check for alarms. When a tag is in alarm, the expression result is 1. When a tag is out of alarm, the expression result is 0.

One way to use this expression is to animate the visibility of a graphic object in a display. When the tag goes into alarm, the ALM_IN_ALARM expression is set to 1, making the object visible. This is an effective way to draw the operator's attention to the alarm.

The following expression checks if an alarm has ever been acknowledged:

ALM_ACK (*tag*)

The ALM_ACK expression returns 1 if an alarm has been acknowledged. If a tag goes out of alarm without being acknowledged, the expression returns 0.

When alarm monitoring starts and a tag has never been in alarm, the ALM_ACK expression returns 1 by default. To reverse this default behavior, use the Registry Configuration tool in the RSView32 Resource Kit.™ For a copy of the Resource Kit, contact Rockwell Software Technical Support.

ALM_ALLACKED (*tag)**

The ALM_ALLACKED (*tag**) expression returns 1 if all tags that match the pattern have been acknowledged. If any of the tags have not been acknowledged, the expression returns 0.

Other functions are also used with expressions to monitor alarms. For more information, see Chapter 14, *Creating expressions*.

Using wildcards in alarm expressions

For built-in alarm functions, you can use wildcards in the expression to retrieve information about multiple tags at once.

This wildcard	Does this
*	Matches any number of characters, including the backslash (\) character.
?	Matches any single character.

For example, the following expression checks if any of a group of tags is in alarm:

ALM_IN_ALARM (alarm*)

where *alarm** represents all tags whose names begin with "alarm." If one or more of these tags are in alarm, the expression result is 1. If all of the tags are out of alarm, the expression result is 0.

Note that using wildcards in alarm expressions may have an impact on performance if the pattern matches a large number of tags. See "Tag functions" on page 14-15 for a list of the alarm functions.

Acknowledge bit (globally acknowledging alarms)

When you set up an acknowledge bit for a tag, all RSView32 stations can be set up to monitor that bit automatically at runtime. When an operator acknowledges an alarm for that tag, the acknowledge bit is set. If an alarm is acknowledged on one machine, all other machines log a RmAck (Remote Acknowledge) transaction in the alarm log file. All other RSView32 stations then acknowledge the alarms associated with that bit. In this way, operators can acknowledge alarms globally.

Set up acknowledge bits in any of the following ways:

- one acknowledge bit for each tag

  When an alarm is acknowledged on one RSView32 station, that alarm is automatically acknowledged on all other RSView32 stations. Keep in mind, however, that RSView32 will be monitoring each bit so using many acknowledge bits can result in substantial system overhead.

- one acknowledge bit for a group of tags

  When an alarm is acknowledged on one RSView32 station, all alarms associated with the acknowledge bit are automatically acknowledged on all RSView32 stations. Keep in mind, however, that RSView32 will be monitoring each bit so using many acknowledge bits can result in substantial system overhead.

- one acknowledge bit for all tags

  When any alarm is acknowledged on one RSView32 station, all alarms are automatically acknowledged on all RSView32 stations. This means alarms cannot be acknowledged individually. Therefore, the Acknowledge command and the alarm summary's Acknowledge button have the same effect as the AcknowledgeAll command and the Acknowledge All button.

To set up acknowledgment, use the Acknowledge Bit field in the Advanced tab of the Analog Alarm and Digital Alarm editors. Or, to set up global alarm acknowledgment without using acknowledge bits, use the global alarm acknowledgment features in the RSView32 Active Display System, available separately from Rockwell Software.

Handshake bit

When a tag goes into alarm, RSView32 can set a handshake bit to notify a programmable controller that the tag is in alarm. To set up handshaking, use the Handshake Bit field in the Advanced tab of the Analog Alarm and Digital Alarm editors.

By default, handshaking is off. To turn on handshaking, do one of the following:

- use the /H parameter with the AlarmOn command
- use the HandshakeOn command

For detailed information about commands, see Appendix A, *RSView32 commands*, or see Help.

Alarm events

You can customize and extend the RSView32 alarm monitoring system by writing your own alarm detection algorithms using PLC ladder logic, VBA programs, or any other appropriate tools. You can then add alarm events to the RSView32 alarm subsystem, to respond to your alarm detection algorithms for annunciation, logging, printing, and for display in alarm summaries.

By using a tag name for an alarm event, you can customize the alarm features of the tag. For example, you can use alarm events to specify an alarm's time stamp. Because alarms are scanned in the background, alarms that are generated rapidly may appear out of sequence in RSView32, because they may all be scanned at the same time, and therefore given the same time stamp. If the sequence in which alarms are generated is important, you may want to record accurate time stamps for the alarms by buffering the alarms in the PLC, and then using alarm events to record them with accurate time stamps in RSView32.

You can also use alarm events to provide a tag with more than 8 thresholds.

To create an alarm event, use the AlarmEvent command.

How event–based alarms work

Alarm events let you create alarms, even without setting up tags in the tag database. Event–based alarms work just like tag–based alarms. They appear in alarm summaries, they can be used with alarm system tags, and they can be logged to disk or printer.

You can filter event–based alarms the same way you filter tag–based alarms in alarm summaries. You can acknowledge event–based alarms, either individually, or with wildcards, using the Acknowledge command. You cannot suppress event–based alarms.

You can time–stamp event–based alarms with the current time, or by specifying a date and time, either in RSView32 or in your own alarm detection algorithms.

Alarm events are not processed until the AlarmOn command is issued, and alarm events are no longer processed after the AlarmOff command is issued.

Differences between event–based alarms and tag–based alarms

You cannot specify thresholds for analog alarm events. All analog alarm events have a value of zero.

You cannot specify alarm labels for event–based alarms. That is, you cannot use the IntoAlarm and OutOfAlarm labels for digital tag–based alarms, or the threshold labels for analog tag–based alarms.

Alarm events have no acknowledge and handshake bits.

The Identify feature is not available to event–based alarms, to run a command, macro, or VBA program.

Event–based alarms are not retentive across project starts or stops.

Naming alarm events

A name must be associated with each alarm event. The event name can, but need not be, a tag defined in the tag database. An alarm event name *cannot* be an alarm tag in the database.

Alarm event names can be up to 255 characters long. The alarm event name can contain the following characters:

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

The alarm event name can be mixed case. Alarm event names preserve upper and lower case for readability but are not case sensitive. For example, the alarm event name HopperOverflow is the same as hopperoverflow.

When an alarm event name starts with a number or contains a dash, enclose the name in braces { } when you use it in an expression, for example, {N33–0}. Also use braces when using wildcards to represent multiple alarm events in an expression, for example, {alarm*}.

Using event types

Use the AlarmEvent command to create into–alarm and out–of–alarm events. Multiple into–alarm events can be processed for the same event name before an out–of–alarm event is received. Use the InAndOutOfAlarm event type for change–of–state alarms. An out–of–alarm event is ignored if no into-alarm events preceded it.

How event–based alarms are logged

Event–based alarms appear in the alarm log file in the order in which the alarm transactions were logged. If you specify a time stamp for alarm events, alarm transactions could appear out of order in the alarm log.

For detailed information about the AlarmEvent command, see Appendix A, *RSView32 commands*, or see Help.

Summary of steps

The main steps involved in setting up alarms are described below. You do not have to complete the steps in this order.

1. Set up the general features of all alarms in the Alarm Setup editor. To do this:

   - configure the alarm log file. The alarm log file is a record of alarm incidents. You can specify where you want the alarm log file stored and when, if ever, you want log files created and deleted. You can also specify whether to generate alarms when an analog tag value is moving back to normal operating range and recrosses the alarm trigger threshold. If you don't want to generate these alarms, ensure that the checkbox for the option is deselected, in the Setup tab of the Alarm Setup editor.

   - configure alarm severities. For each severity, you can specify the destination of alarm messages. You can also specify how to annunciate the alarm.

   - configure user messages. When alarms occur, messages are sent to the file and/or the printer. If you want to create a message that will become the default message instead of using the system default message, you can do that here.

2. For each tag you want to monitor, specify the alarm conditions in the Tag Database editor. You can define alarms for analog and digital tags, but not string tags.

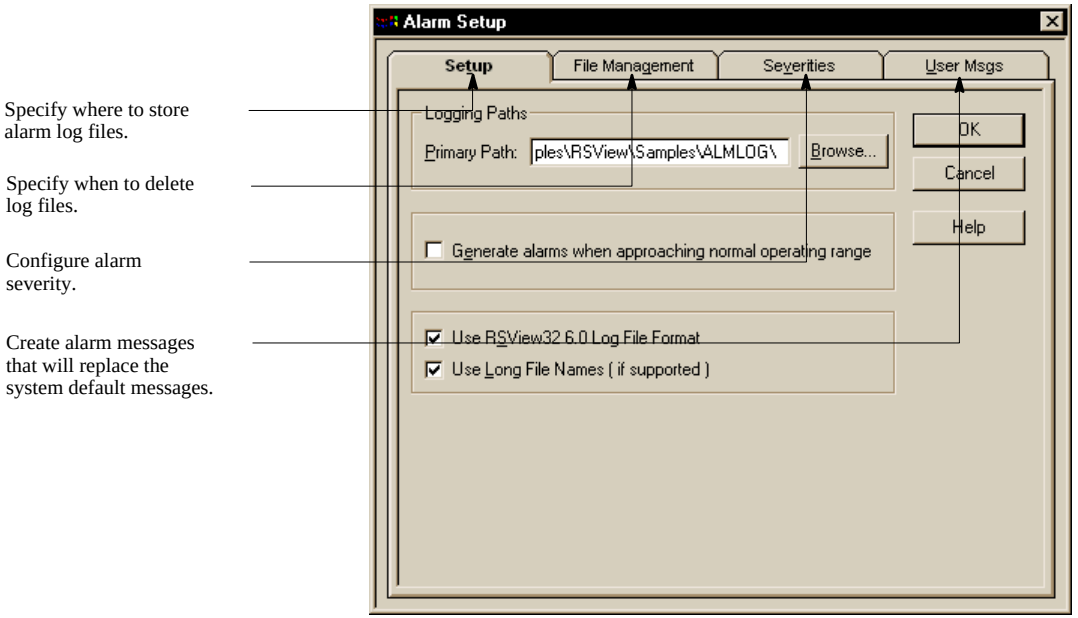
3. Set up ways to display alarm information. You can configure alarm summaries or create graphic objects.

4. Choose methods for starting and stopping alarm monitoring.

The Alarm Setup editor

To open the Alarm Setup editor:

1. In the Project Manager, open the Alarms folder.
2. Open the Alarm Setup editor by doing one of the following:
   - double–click the Alarm Setup icon
   - right–click the Alarm Setup icon and then click Show

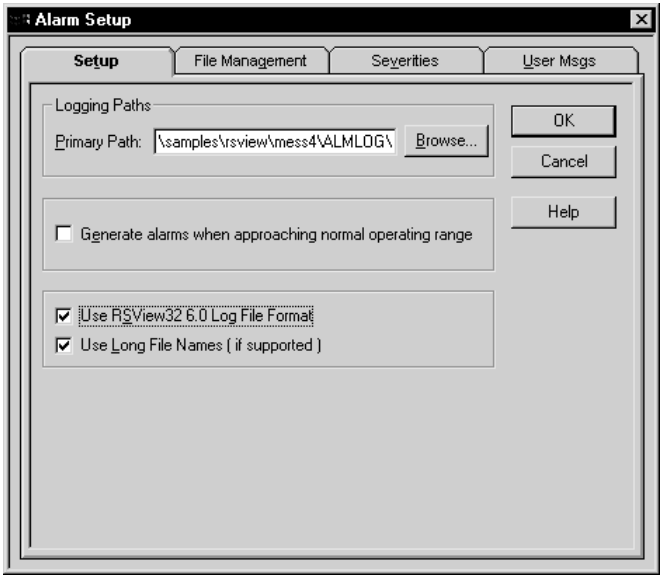


Specifying where to store alarm log files

To specify where to store log files:

1. In the Alarm Setup editor, click the Setup tab.

By default, alarm log files are stored in the ALMLOG subdirectory of your project.



2. If you want to change where the log files are stored, specify a new path.

   When log files are created, they will be stored in the directory specified here.

3. If you want RSView32 to generate alarms when an analog tag value is moving back to normal operating range and recrosses the alarm trigger threshold, check Generate alarms when approaching normal operating range. For an example, see page 6-3.

   This option applies to all analog alarm tags in the project.

4. If you want to log activities in a format that is compatible with projects running in RSView32 version 6.0 or earlier, click Use RSView32 6.0 Log File Format.

5. If you want your alarm log files to be named using the MS-DOS® eight–character file name and three–character extension format, click to deselect Use Long File Names. If the path where the log files are stored supports long file names, the date stamp part of the log file name includes a four–digit year.

6. Click OK.

Creating log files

You can set up your project to create new log files:

- periodically
- at specified times
- when a particular event occurs
- never

In each 24–hour period, up to 26 new files can be created. If you attempt to create a 27th file, RSView32 continues logging data to the 26th file. At midnight, the sequence starts again with the first new file for the new day.

Log files are saved in the directory you specified in the Setup tab.

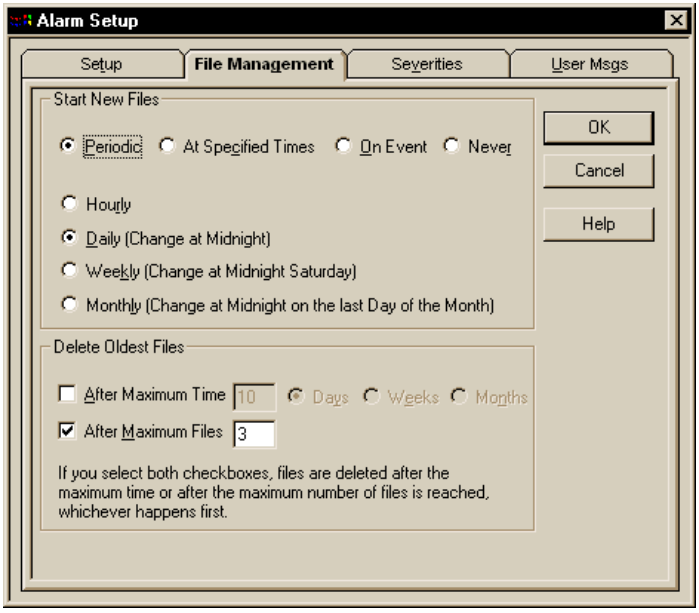
For more information about log files, also see "About alarm log files" on page 6-31, "Viewing the alarm log file" on page 6-53, "Bringing logged dBASE IV data into Microsoft Excel" on page 16-4, and "Alarm log files" on page 16-9.

Monitoring disk space

If your computer's hard disk is full, alarm logging stops and no more log files are created. To monitor disk space, see page 18-14.

To specify when to start new files:

1. In the Alarm Setup editor, click the File Management tab.



2. Under Start New Files, click a button to specify when you want to have new files created. See the topics below for information on the various times.

Creating files periodically

Click Periodic, and then click a time period. A new file is created after the specified interval has elapsed.

For this period	The new file is created
Hourly	Approximately on the hour
Daily	Each day approximately at midnight
Weekly	Each Sunday approximately at midnight
Monthly	On the first day of each month approximately at midnight

Creating files at specified times

Click At Specified Times, and then type a time or list of times when you want data to be logged to a new file. Start a new line for each new time and allow at least five minutes between start times.

Use any of the following to specify time:

Time	Format
Day	Sun, Mon, Tue, Wed, Thu, Fri, or Sat
Date	1 – 31 Specifying 31 means that months that do not have 31 days will not have new log files.
Hour	00: to 23:
Minute	:00 to :59

You can combine hours and minutes with a day or date.

Example: Creating a new file

To start a new file every Wednesday at 2:00 am and every Friday at 2:00 pm, type the following start times:

Creating files when a particular event occurs

1. Click On Event.
2. In the Expression field, create the expression that will trigger creation of a new file. For details on creating expressions, see Chapter 14, *Creating expressions*.

Example: Creating a new file for a new shift

You can set up your project so it creates a new log file at the end of a shift or batch process. For example, create a tag called NextShift. In the Alarm Setup editor, click On Event and then type NextShift as the expression.

When the tag evaluates to true, a new alarm log file is created to store the data from the new shift.

Never creating new files

Click Never. Logged data is added to a single file.

To manage disk space if a log file grows too large, stop alarm monitoring, delete the alarm log file, and then restart alarm monitoring. You cannot delete an alarm log file while RSView32 is monitoring alarms. For details about how to monitor disk space, see "Monitoring disk space" on page 18-14.

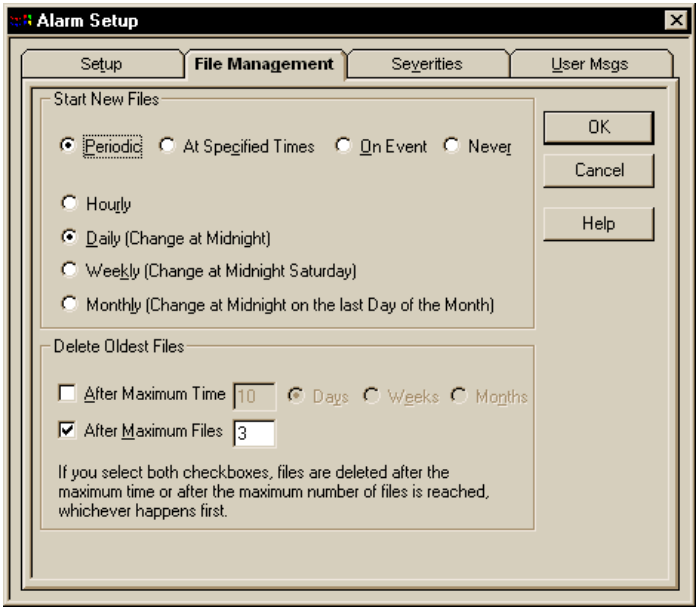
Deleting log files

You can delete log files after a specified period or once a specified number of files has been created. If you never want files deleted, leave the check boxes under Delete Oldest Files blank.

Alarm log files are deleted only when a new file is created. So, if your project creates a new file each day and deletes the oldest file every third day, your project will have files for the three previous days' data as well as a file for the current day.

To specify when to delete files:

1. In the Alarm Setup editor, click the File Management tab.



2. Under Delete Oldest Files, select one or both check boxes and type a number to specify when to delete the log files. If you select both check boxes, files are deleted after the maximum time or after the maximum number of files is reached, whichever happens first. If you do not want files deleted, leave the check boxes under Delete Oldest Files blank.

   After Maximum Time

   Files are deleted after the maximum time has expired. For example, if two days is the specified time, files are deleted at midnight of the third day so you always have data for the current day and the two previous days.

   After Maximum Files

   The oldest log file is deleted after the specified maximum has been reached. The files currently being logged to are not included in this

number. For example, if you specify 10, you will have a maximum of 11 alarm log files at any time—10 old ones and the current one. When a new set is started, the oldest file is deleted.

If you have set up File Management to delete the oldest files when a new one is started, and you are exporting data to an ODBC database, make sure you export the data before the oldest file is deleted.

About alarm log files

Alarm information is stored in dBASE IV (.dbf) format.

How log files are named

When a log file is created, it is automatically named. The name is based on the date the file was created and the type of data it contains. The format for the name is YYYYMMDDnz.dbf, where:

- YYYY are the four digits of the year
- MM is the month
- DD is the day
- n is the sequence letter (a, b, c, and so on). This letter indicates the sequence files were created in. You can have up to 26 files (a to z) per day. At midnight, the sequence starts at "a" again.
- z is the file type: l is for alarm

If you are using short file names, or if the path where the log files are stored does not support long file names, the format for the name is YYMMDDnz.dbf, where YY are the last two digits of the year.

Example: Log file name

The log file named 19971028bl.dbf was created in the year 1997, month 10, and day 28. The b indicates that this is the second file created that day. The l indicates that this is an alarm log file.

Exporting alarm log files to ODBC format

Using the command, AlarmLogSendToODBC, you can export logged alarms from their native dBASE IV (.dbf) format to an ODBC database.

If the table in the database to which you are attempting to export data is not ODBC–compliant, the export will fail. If an ODBC–compliant table does not exist, RSView32 will try to create it. RSView32 supports the following ODBC–compliant databases: Microsoft Access, Sybase® SQL Server™, Oracle®, and Microsoft SQL Server.

When you export data to an ODBC table, RSView32 keeps track of the data that was exported in a control file, Alarm.exp. This is located in the log path where the .dbf files are stored. The next time you export data, only the newest data will be exported. If the control file is deleted, all the alarm log data in the .dbf file will be exported when you issue the export command.

If you have set up file management to delete the oldest files when a new set is started, and you are exporting data to an ODBC database, make sure you export the data before the oldest files are deleted.

Example: Exporting alarm log files to ODBC once a day

To export the contents of the alarm log files to an ODBC database once every day, create an event file that specifies when and where to export the data. AlarmLogSendToODBC exports only the records added to the alarm log files since the last export.

1. If required, using the ODBC Administrator, set up an ODBC data source name. For an example, see page 7-16.
2. Double–click Events in the RSView32 Logic and Control folder.
3. In the Expression box, type: **time("01:00")**. This expression runs the command or macro you type in the Action box at 1:00 am every day.
4. If the ODBC data source is called RSView32AlarmLog, the target table name is AlarmTable, the user name is Derek, and the password is golf, in the Action box, type:

   AlarmLogSendToODBC RSView32AlarmLog AlarmTable / UDerek /Pgolf

5. Click Accept to save the event.
6. Click Close to save the event file.
7. At the command line, type **EventOn <*filename*>** where <*filename*> is the name of the event file you saved.

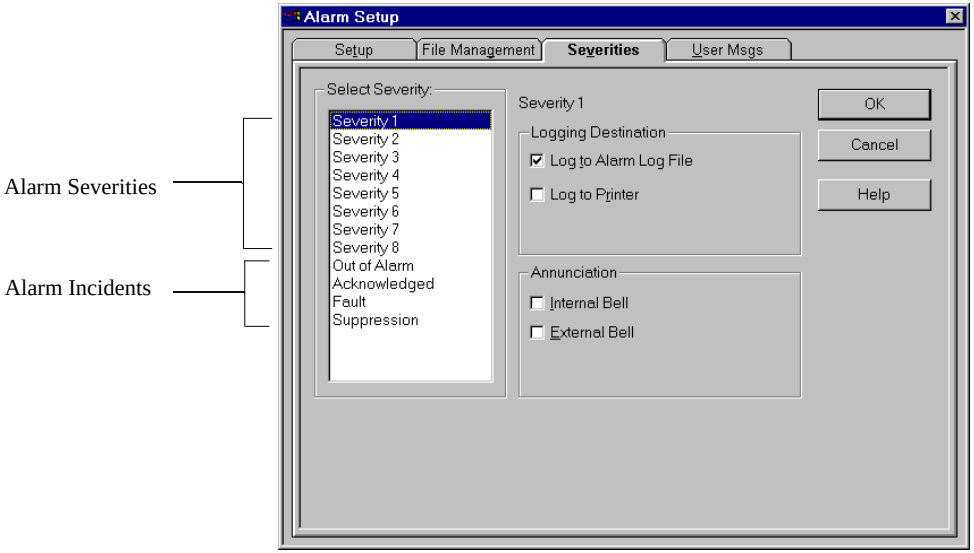
For information about the format of the alarm log ODBC tables, see page 16-11.

Configuring alarm severity

For each alarm severity and alarm incident, you can configure logging destinations. You can also specify how you want alarms of a particular severity to be annunciated.

To configure alarm severity:

1. In the Alarm Setup editor, click the Severities tab.



2. Select an alarm severity or an incident.

3. Specify the logging destination. You can log to the alarm log file, to a printer, or to both. Alarm severities and incidents are logged as follows:

Alarm	What is logged
Severity 1 through 8	In Alarm messages are logged
Out of Alarm	Out of Alarm messages are logged for any severity that has been set up to log In Alarm messages
Acknowledged	Acknowledged messages are logged for any severity that has been set up to log In Alarm messages
Fault	All Fault messages are logged
Suppression	All Suppression messages are logged

If you want alarms logged to a printer, click the Printers button to display a list of available printers. To select a printer, it must already be set up on your system. For information on installing a printer, see your Windows® documentation.

IMPORTANT Page printers, such as laser printers, are not supported.

4. For an alarm severity, specify how you want the alarm to be annunciated.

Internal Bell

The internal bell is a sound produced by the computer running RSView32. To use the internal bell, select the Internal Bell check box.

The sound for the internal bell can come from your computer's speaker or from a sound card. To set up the sound, open the Windows Control Panel and then double–click the Sounds icon to open the Sounds Properties dialog box. In the Events field, click Exclamation, and then assign a .wav file to the Exclamation event.

When an alarm occurs, the assigned sound is repeated once per second. When the alarm is acknowledged or silenced, the sound is stopped. Because the sound is played repeatedly, assign only short sounds to the Exclamation event.

You can choose from the sounds that come with Windows, or you can install additional sound files. For information on installing drivers and assigning sounds, see your Windows documentation.

External Bell

The external bell is a sound produced by a horn or some other audio device. To set up the external bell, select the check box and specify the name of a tag that is linked to an audio device.

The specified tag must refer to a bit in the programmable controller. When an alarm occurs, this bit is set and the logic in the programmable controller turns on the audio device. When the

alarm is acknowledged or silenced, the bit in the programmable controller is reset and the logic in the programmable controller turns off the audio device.

5. Click OK.

Configuring alarm messages

Alarm messages report information about alarms. There are several types of messages. You can define the content of each message or you can use the system defaults.

Alarm messages appear in the description field of the alarm log file only. You cannot display them in alarm summaries.

Types of messages

The types of messages are:

- In alarm message: generated when an analog tag's alarm threshold has been crossed or when a digital tag has changed state
- Out of alarm message: generated when a tag is no longer in alarm
- Acknowledged message: generated when an alarm has been acknowledged

Defining the content of the message

When defining the content of a message, use any combination of system default messages, user default messages, and custom messages.

System default messages

The system default messages are a series of placeholders. At runtime, these placeholders are replaced with information about the alarm that has been triggered.

To use the default messages for *all* alarms and alarm events, do not change anything. The default messages will be used automatically. Alarm events use system messages if you don't specify a log message string using the /L parameter with the AlarmEvent command.

These are the placeholders:

This placeholder	Is replaced with
\C	Current value of tag in alarm.
\D	Date when message is sent.
\L	Alarm label specified in the Alarm Label field of the Analog Alarm and Digital Alarm editors.
\N	Tag name of tag in alarm.
\S	Tag description of tag in alarm.
\T	Time when message is sent.
\U	Units specified in the Units field of the Tag Database editor.
\V	Threshold value that was crossed.

IMPORTANT \C, \U, and \V do not contain any information when used in alarm Acknowledged messages.

To specify the width of a column, type a number between the backslash and letter (see the following example). This allows you to create columns of equal width.

Example: Message placeholders

An out–of–alarm message like this:

\11D \8T Tag \10N is out of alarm.

is displayed like this:

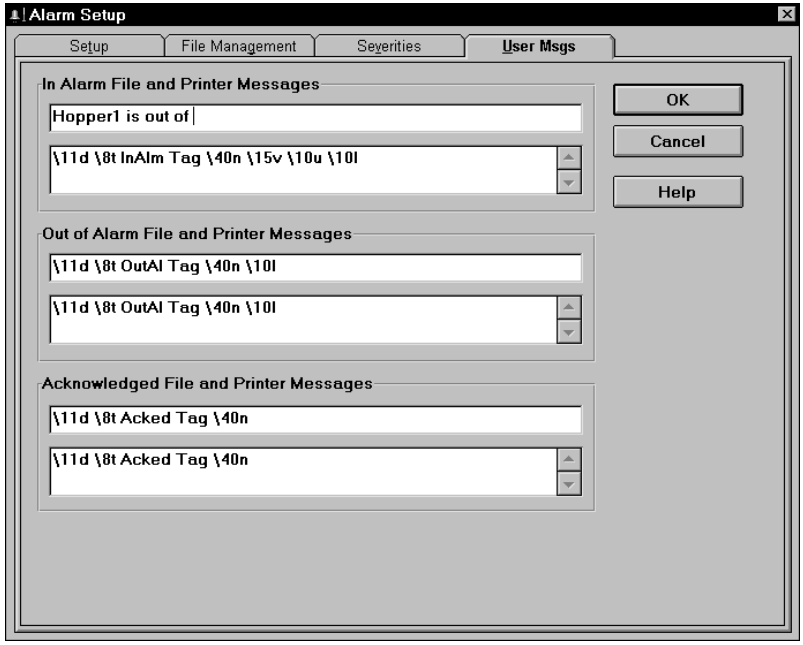
03/09/97 11:45:00 Tag PUMP3 is out of alarm.

Do not give placeholders too much space, or your messages might not fit in the alarm log. In the example above, the tag name has 10 spaces (\10N).

User default messages

The user default messages are messages you create to replace the system default messages. To create these messages, select the User Msgs tab in the Alarm Setup editor and type a message in some or all of the fields. Your message can say whatever you want, and can use both words and placeholders. For a list of placeholders, see page 6-37.

To create a user default message, type a message in the appropriate field.



To select the user message as the default message, click the User Defaults button when you are configuring analog and digital alarms.

Custom messages

Custom messages apply on a per–tag basis.

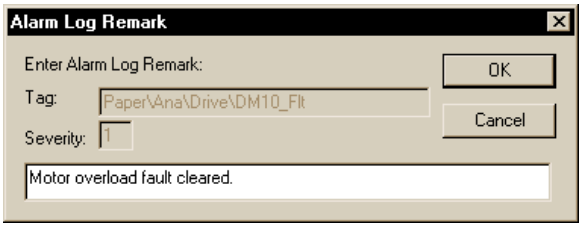
To create a custom message, type any message you want. For more information see“Configuring alarms for analog tags” on page 6-43 and “Configuring alarms for digital tags” on page 6-48. Your message can say whatever you want and can use both words and placeholders. For a list of placeholders, see page 6-37.

Adding remarks to the alarm log file at runtime

Using the AlarmLogRemark command, you can add information to the alarm log file at runtime.

Alarm log remarks appear in the alarm log file, and can also be printed. You cannot display alarm log remarks in alarm summaries.

The AlarmLogRemark command has parameters that let you add a text comment, the alarm severity, and the tag name to the alarm log file. Other parameters let you prompt the operator for the text part of the remark at runtime, and log the remark to a printer as well as to the alarm log file.



Using the /P parameter with the AlarmLogRemark command, you can prompt the operator for an alarm log remark at runtime.

At runtime, only one Alarm Log Remark dialog box is displayed at a time, and the operator must respond to the dialog box before the next one is displayed.

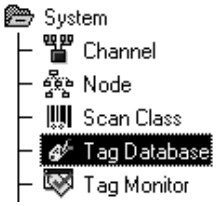
Alarm logging must be on before you can use the AlarmLogRemark command. To start alarm logging, issue the AlarmLogOn command.

For details about the AlarmLogRemark command, see Appendix A, *RSView32 commands*, or see Help.

Specifying alarm conditions for analog and digital tags

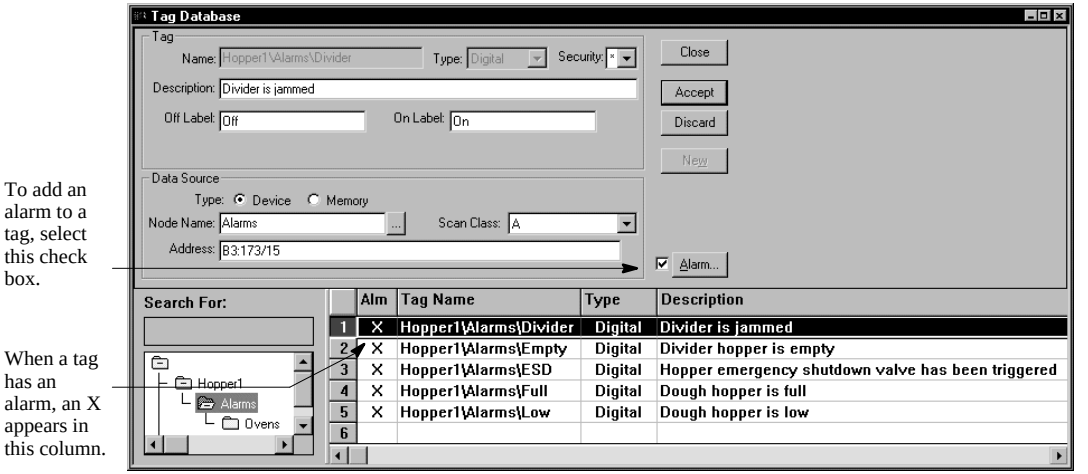
For each analog and digital tag that will be monitored for alarms, specify the alarm conditions in any of the following ways:

- by configuring alarm tags in the Tag Database editor. For more information about using the Tag Database editor to configure alarms, see this section.
- by importing tags into the tag database using the Database Import & Export Wizard. For more information about using the Database Import & Export Wizard, see page 4-27.
- by using the RSView32 Object Model with VBA. For more information about using the RSView32 Object Model, see Help.



To open the Tag Database editor:

1. In the Project Manager, open the System folder.
2. Open the Tag Database editor by doing one of the following:
   - double–click the Tag Database icon
   - right–click the Tag Database icon and then click Show



To add an alarm to a tag, select this check box.

When a tag has an alarm, an X appears in this column.

When can I configure an alarm for a tag?

You can configure an alarm for a tag at the time you create the tag or later.

To configure an alarm for an existing tag, select the tag in the Tag Database spreadsheet, and then click the Alarm check box. Click the Alarm button to open the Analog Alarm or Digital Alarm dialog box.

Configuring alarms for analog tags

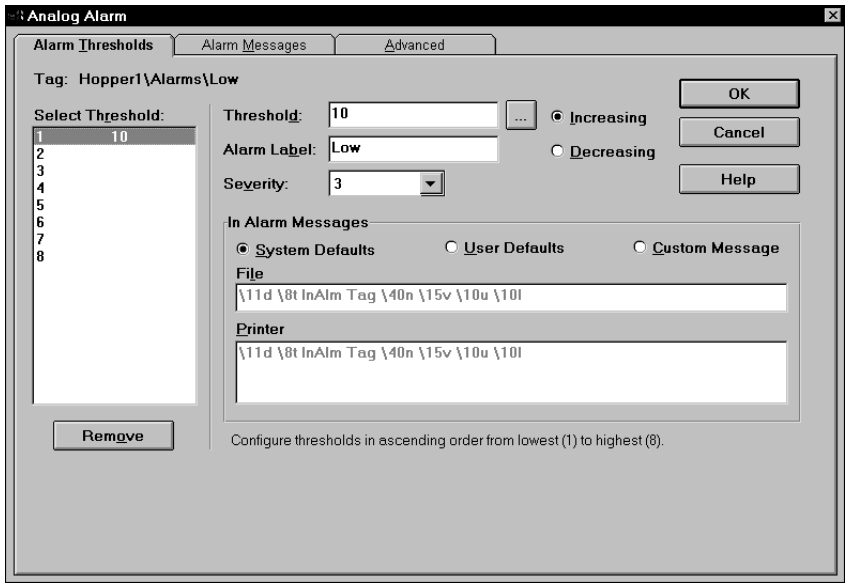
These are the main steps to configure alarms for analog tags:

- configure the alarm threshold, and choose the message that will appear if the threshold is crossed
- configure the messages that are sent when a tag goes out of alarm and when an operator acknowledges an alarm
- configure advanced features, such as deadband and handshake

Alarm thresholds

1. Click the Alarm Thresholds tab.

To configure a threshold, first select the threshold in this box.



2. Select a threshold.

   You do not have to configure all eight thresholds, but you have to configure the ones you use in ascending order. For example, you

can configure thresholds 1, 2, 5, and 8 as long as you configure them in that order.

3. Fill in the fields as follows:

Threshold

To define a constant threshold, type a number. To define a variable threshold, specify a tag name.

> **IMPORTANT** At runtime a variable threshold must not become higher than the threshold above it or lower than the threshold below it, or an alarm fault will be generated for the tag.

Increasing/Decreasing

To monitor for a rising value that passes the threshold, click Increasing. To monitor for a falling value that passes the threshold, click Decreasing.

Alarm Label

Type a description of the alarm up to 21 characters long. This description is displayed in the alarm summary and alarm banner.

Severity

Select a severity level. Severity 1 is most severe, Severity 8 is least severe.

Severities are configured in the Alarm Setup editor. For details, see "Configuring alarm severity" on page 6-33.

In Alarm Messages

Select the message you want when the tag goes into alarm.

If you click Custom Message, type the message in the File and/or Printer fields. You can use both words and placeholders.

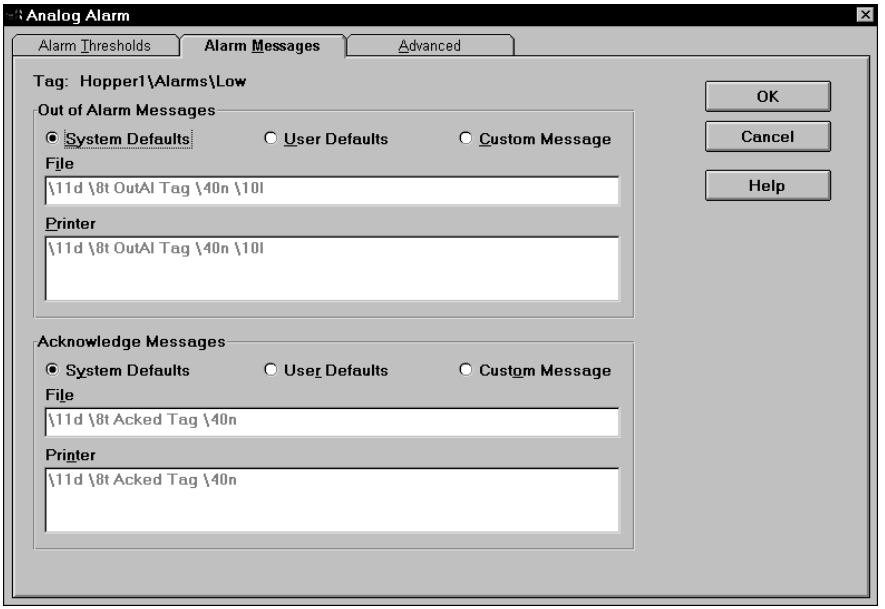
For detailed information about messages, see "Configuring alarm messages" on page 6-36.

4. To configure additional thresholds, select another threshold and fill in each field.

   When you select another threshold, the information you configured for the previous threshold is saved.

Alarm messages

1. Click the Alarm Messages tab.



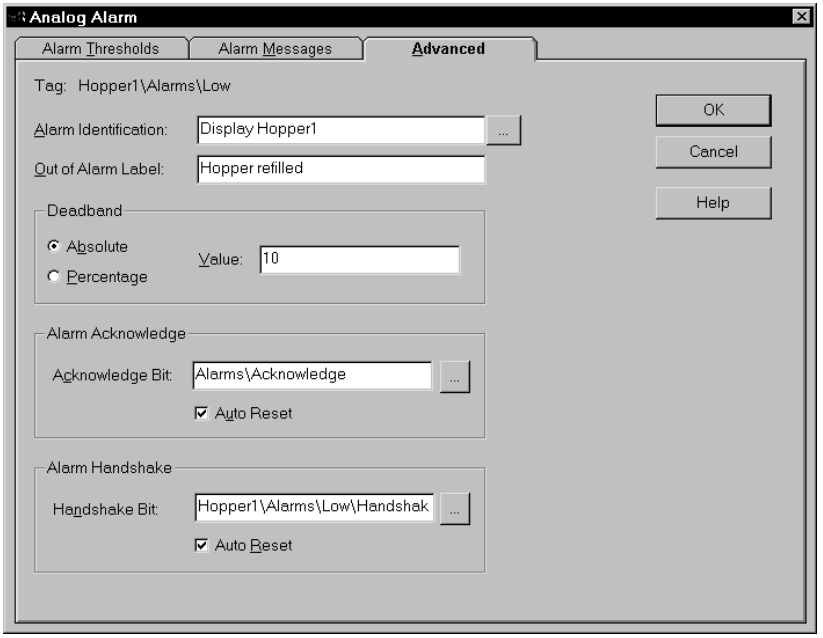
2. Select the file and printer messages for when a tag goes out of alarm and when an operator acknowledges an alarm.

   If you click Custom Message, type the message in the File and/or Printer fields. You can use both words and placeholders.

   For detailed information about messages, see "Configuring alarm messages" on page 6-36.

Advanced

1. Click the Advanced tab.



2. Fill in the fields as follows:

Browse button

Alarm Identification

Type a command or macro file name, or click the Browse button to open the Command Wizard.

This command or macro runs in RSView32 when you highlight the alarm in the alarm summary and click Alarm Identify on the menu. The command or macro also runs when you use the Identify command, whether or not the tag is in alarm.

Out of Alarm Label

Type a message up to 21 characters long that will be displayed in the alarm summary when the tag is no longer in alarm. This

message can also appear in the alarm banner, if the banner is configured to display it.

Deadband

Click Absolute or Percentage and then type a value.

The deadband is a buffer zone on the edge of an alarm threshold. For more information, see "Deadband" on page 6-5.

Alarm Acknowledge

In the Acknowledge Bit field, type the name of the tag that refers to the acknowledge bit's address. When the operator acknowledges the alarm, the acknowledge bit is set to 1 and RSView32 logs an alarm acknowledgment.

When another RSView32 station detects the acknowledge bit changing from 0 to 1, the RSView32 station acknowledges all tags associated with this acknowledge bit and RSView32 logs a remote acknowledgment to the alarm log file. The bit is set only once per acknowledgment.

To have the acknowledge bit automatically reset (set back to 0) when the tag goes back into alarm, check the Auto Reset box. Otherwise the programmable controller must reset the bit.

For more information, see "Acknowledge bit (globally acknowledging alarms)" on page 6-17.

Alarm Handshake

In the Handshake Bit field, type the name of the tag that refers to the handshake bit's address. When a tag goes into alarm, the handshake bit is set to 1.

To have the handshake bit automatically reset (set back to 0) when the tag goes out of alarm, check the Auto Reset box. Otherwise the programmable controller must reset the bit.

For more information, see "Handshake bit" on page 6-18.

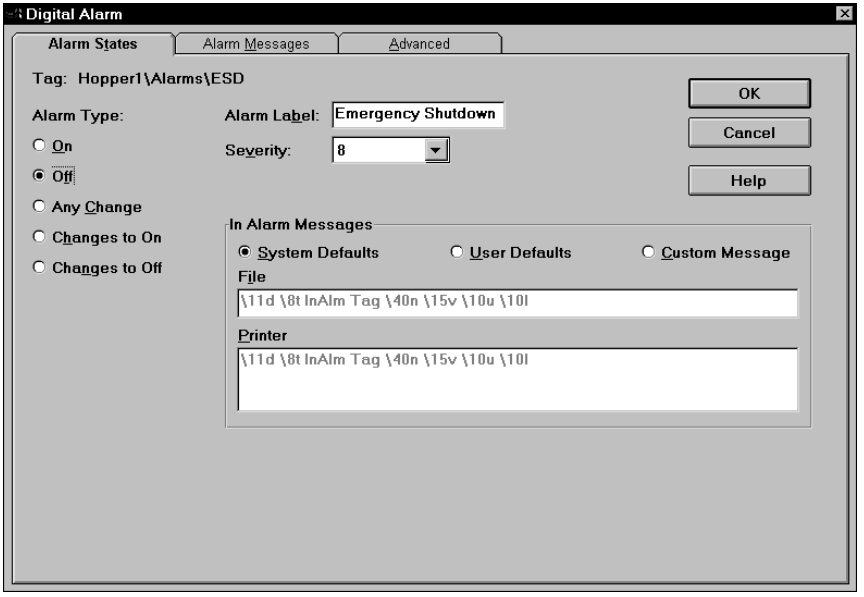
Configuring alarms for digital tags

These are the main steps to configure alarms for digital tags:

- configure alarm states
- configure the messages that are sent when a tag goes out of alarm and when an operator acknowledges an alarm
- configure advanced features, such as handshake

Alarm states

1. Click the Alarm States tab.



2. Fill in the fields as follows:

   Alarm Type

   Select a type.

   For a description of types, see "Alarms for digital tags" on page 6-7.

   Alarm Label

   Type a description of the alarm up to 21 characters long. This description is displayed in the alarm summary and alarm banner.

   Severity

   Select a severity level. Severity 1 is most severe, Severity 8 is least severe.

   Severities are configured in the Alarm Setup editor. For details, see "Configuring alarm severity" on page 6-33.

   In Alarm Messages

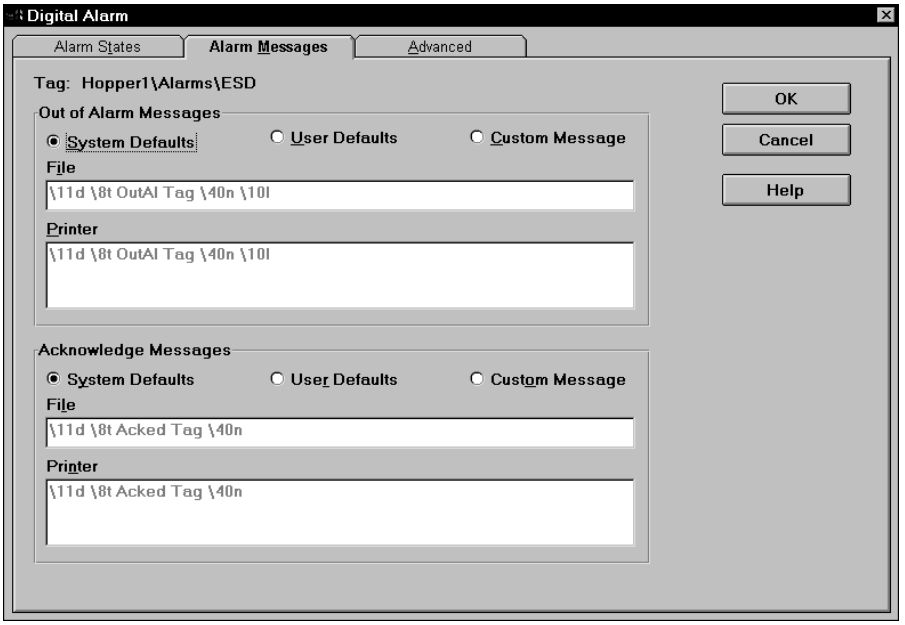
   Select the message you want when a tag changes state and goes into alarm.

   If you click Custom Message, type the message in the File and/or Printer fields. You can use both words and placeholders.

   For detailed information about messages, see "Configuring alarm messages" on page 6-36.

Alarm messages

1. Click the Alarm Messages tab.



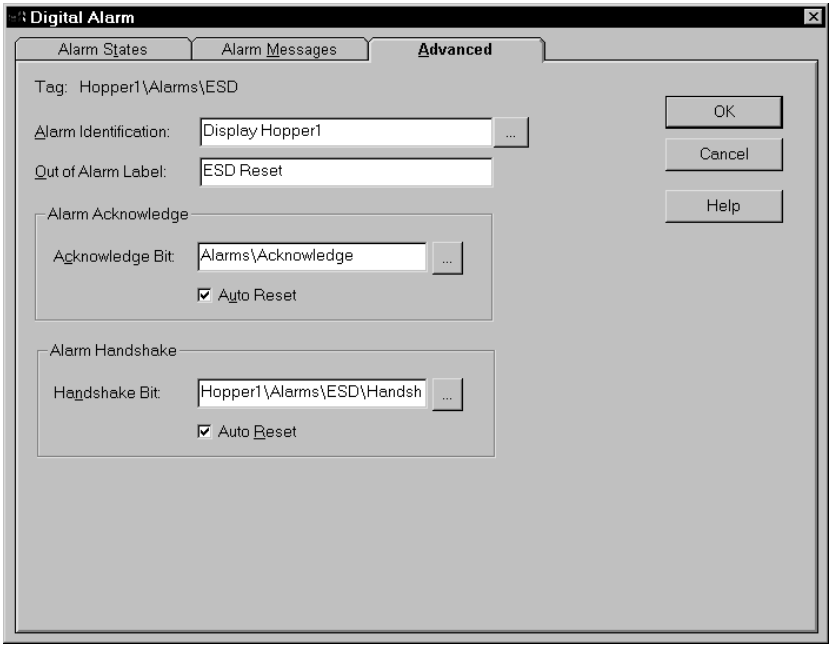
2. Select the file and printer messages for when a tag goes out of alarm and when an operator acknowledges an alarm.

   If you click Custom Message, type the message into the File and/or Printer fields. You can use both words and placeholders.

   For detailed information about messages, see "Configuring alarm messages" on page 6-36.

Advanced

1. Click the Advanced tab.



2. Fill in the fields as follows:

Browse button

Alarm Identification

Type an RSView32 command or a macro, or click the Browse button to open the Command Wizard.

This command or macro runs in RSView32 when you highlight the alarm in the alarm summary and click Alarm Identify on the menu. The command or macro also runs when you use the Identify command, whether or not the tag is in alarm.

Out of Alarm Label

Type a message up to 21 characters long that will be displayed in the alarm summary when the tag is no longer in alarm. This

message can also appear in the alarm banner, if the banner is configured to display it.

Alarm Acknowledge

In the Acknowledge Bit field, type the name of the tag that refers to the acknowledge bit's address. When the operator acknowledges the alarm, the acknowledge bit is set to 1 and RSView32 logs an alarm acknowledgment.

When another RSView32 station detects the acknowledge bit changing from 0 to 1, the RSView32 station acknowledges all tags associated with this acknowledge bit and RSView32 logs a remote acknowledgment to the alarm log file. The bit is set only once per acknowledgment.

To have the acknowledge bit automatically reset (set back to 0) when the tag goes back into alarm, check the Auto Reset box. Otherwise the programmable controller must reset the bit.

For more information, see "Acknowledge bit (globally acknowledging alarms)" on page 6-17.

Alarm Handshake

In the Handshake Bit field, type the name of the tag that refers to the handshake bit's address. When a tag goes into alarm, the handshake bit is set to 1.

To have the handshake bit automatically reset (set back to 0) when the tag goes out of alarm, check the Auto Reset box. Otherwise the programmable controller must reset the bit.

The bit cannot be reset automatically for tags with a change of state alarm type (Any Change, Changes to On, or Changes to Off).

For more information, see "Handshake bit" on page 6-18.

Viewing the alarm log file

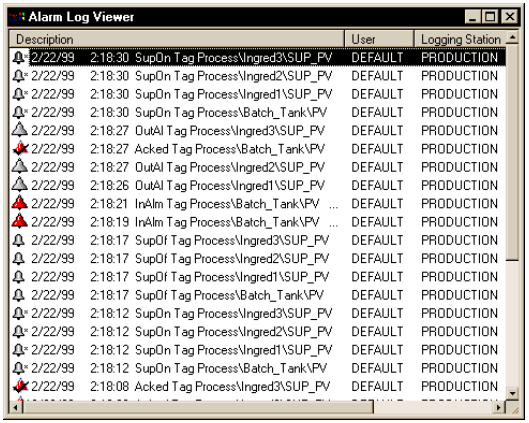
The Alarm Log Viewer displays the description, user, and logging station fields from the alarm log file. The contents of this file will depend on how you configured alarm severities in the Alarm Setup editor. By default, the alarm log file will have a record of all alarms that are generated.

For information about all the fields in the alarm log file, see page 16-9.

To view the alarm log file:

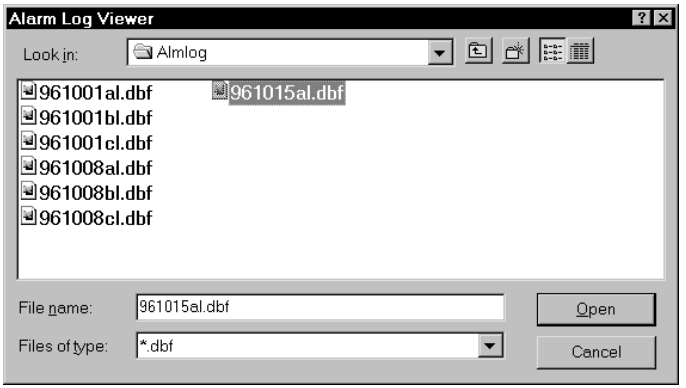
1. In the Project Manager, open the Alarms folder.
2. Open the Alarm Log Viewer by doing one of the following:
   - double–click the Alarm Log Viewer icon
   - right–click the Alarm Log Viewer icon and then click Show

   The Alarm Log Viewer opens, displaying the contents of the most recent log file.



3. To select another file for viewing, click Select Log File on the Records menu.

One or more log files is displayed. The number of files depends on how you set up file management in the Alarm Setup editor.



4. Click the file you want to view. The contents of the file are then displayed in the viewer.

5. To close the viewer, click Close on the File menu.

Or right click any tab in Alarm Log Viewer, such as Description, User and so on. Click Select Log File from Records menu, and then select the file you want to view.

Creating an alarm summary

The alarm summary displays the alarms recorded in the computer's memory. To configure an alarm summary, specify what data to display and create the format you want the data to appear in.

At runtime, operators can use the alarm summary to view and interact with the alarms.

To create an alarm summary, you can:

- use the Alarm Summary editor in the Project Manager
- use the Alarm Summary tool in the Graphic Display editor

No matter where you create the alarm summary, you use the same methods to customize how the information will appear.

Embedding the alarm summary as an object in a graphic display offers better screen management than creating an alarm summary file. When the summary is embedded in a graphic display you can use the Display command, which allows you to specify screen properties such as size and position. You can also use the Cache After Displaying and Allow Multiple Running Copies options in the Display Settings dialog box.

Creating an alarm summary file

1. In the Project Manager, open the Alarms folder.
2. Open the Alarm Summary editor by doing one of the following:
   - double–click the Alarm Summary icon
   - right–click the Alarm Summary icon and then click New

   An empty alarm summary window appears. You can configure all aspects of this window's appearance.
3. Configure the appearance of the alarm summary as described on the following pages.
4. When you are finished, click Save on the File menu.
5. Type a file name.

   The file you have created is listed in the right pane of the Project Manager. At runtime, use the Summary command to display the alarm summary.

Creating an alarm summary object

An alarm summary object can be part of a graphic display or it can be the entire graphic display. You can use the pre–built alarm summary, called Alarm Information, in the graphics objects library, or you can create your own alarm summary object.

To create the alarm summary object:

1. Open a graphic display.
2. On the Objects menu, click Advanced Objects, and then click Alarm Summary. The cursor changes to the Alarm Summary tool:

3. Drag the mouse to create a box approximately the size you want for the alarm summary.

   When you release the mouse, an empty alarm summary window appears. The menu bar changes to display the menus for the Alarm Summary editor.

4. Configure the appearance of the alarm summary object as described on the following pages.

   You can edit the alarm summary object as you would any other graphic object. You can move it, resize it, and so on. You can also use this object in other graphic displays by dragging it from one display and dropping it in another.

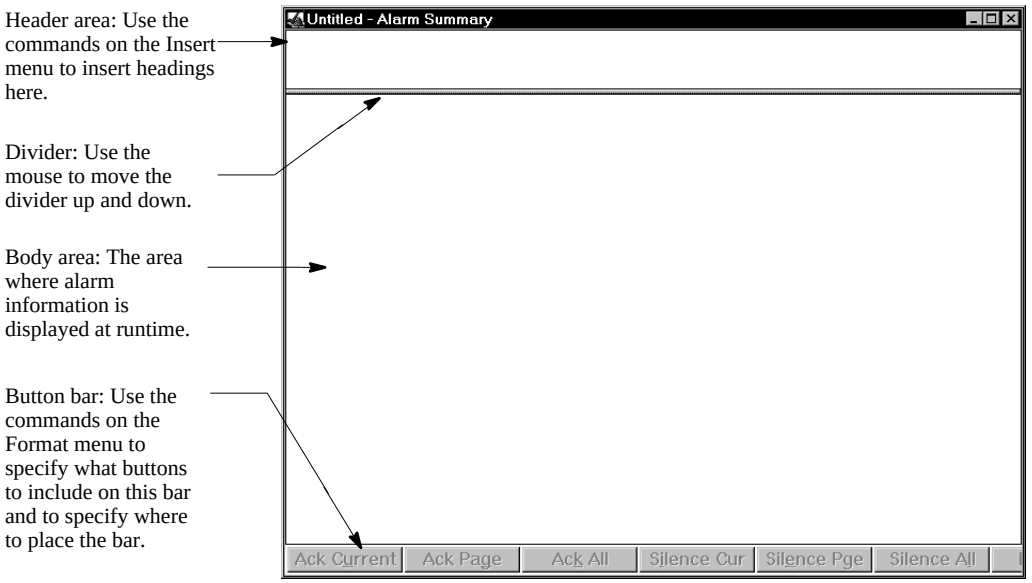
   For detailed information about graphic objects, see Chapter 11, *Creating graphic displays*.

5. When you are finished, save the graphic display.

The parts of an alarm summary

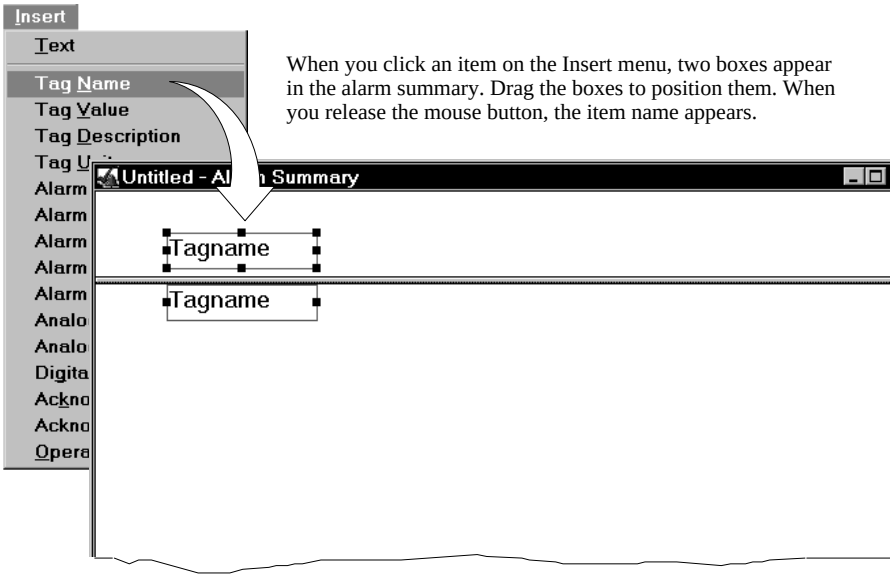
The alarm summary is a table for displaying information. You decide how many columns you want the table to have, how wide the columns will be, and what information the columns will contain.

A new alarm summary looks like this:



Inserting headings

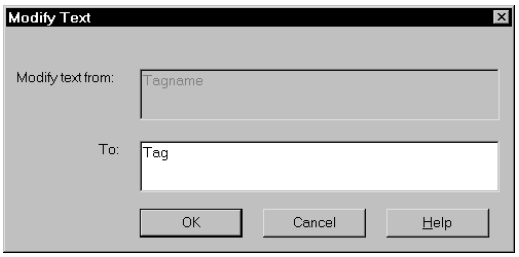
The Insert menu contains the items that can appear in the summary. To add a heading for an item, click the item on the Insert menu. You can add as many items as you want and place them in any order you want.



When you click an item on the Insert menu, two boxes appear in the alarm summary. Drag the boxes to position them. When you release the mouse button, the item name appears.

To reposition items, click them and drag them with the mouse. To resize items, click them and then drag a handle with the mouse. To change an item, you only have to select one box—when you move or resize one box, the other box is also moved or resized.

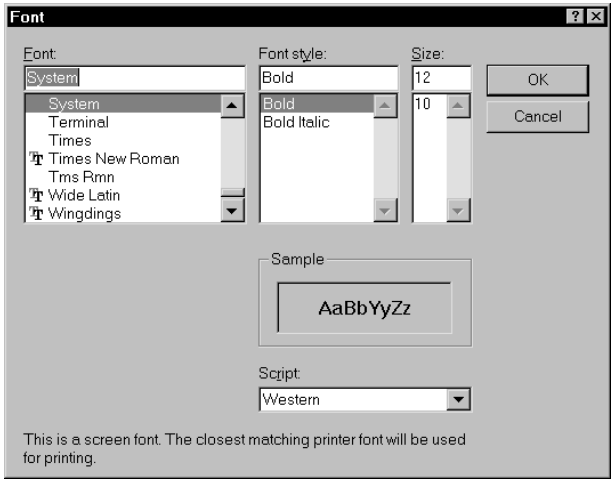
To edit the text in a box, double–click the box. The Modify Text dialog box appears. Type the new text in the To field, and then click OK.



Choosing fonts

The header and body fonts can be different. For example, you might choose a larger font for the header and a smaller font for the body. To change a font, click Body Font or Header Font on the Format menu.

The fonts listed here depend on which fonts you have installed in Windows.



Choose the font, style, and size you want. When you are finished, click OK.

To increase the size of the header area so a large font is more easily displayed, drag the divider down.

Choosing colors and blink styles

You can configure the color of:

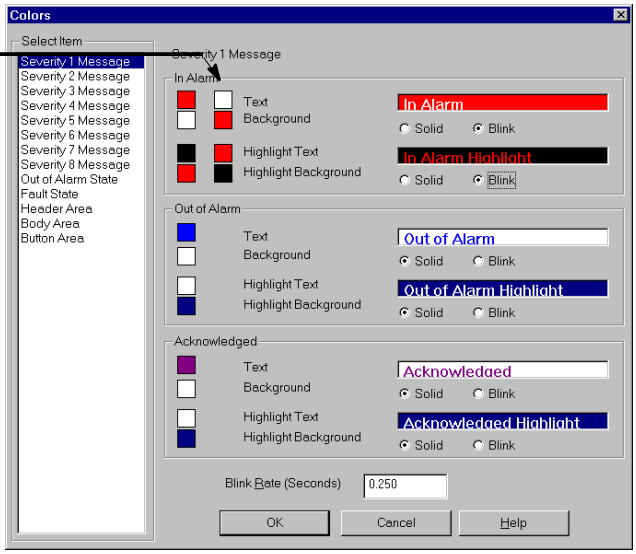
- Severity 1 through 8 messages
- Out of Alarm and Fault State messages
- Header, body, and button areas

You can configure the blink style of:

- Severity 1 through 8 messages
- Out of Alarm and Fault State messages

To configure colors and blink styles, click Colors on the Format menu.

Blink colors appear to the right of the solid colors when you select Blink.



Click an item and then select the colors you want. To select a color, place the cursor over the color box, click to open the color palette, and then click a color in the palette. To configure the blink style for an item's state, click Blink and select the blink colors.

If you use the blink option for any item's state, specify a blink rate in the Blink Rate field. The blink rate applies to all items that use the blink option in this alarm summary.

Text and Background are the colors the message initially appears in. If you select the blink option, the default blink colors are the text and background colors reversed.

Highlight Text and Highlight Background are the colors the message changes to when it is selected. If you select the blink option, the

default colors are the highlight text and highlight background colors reversed.

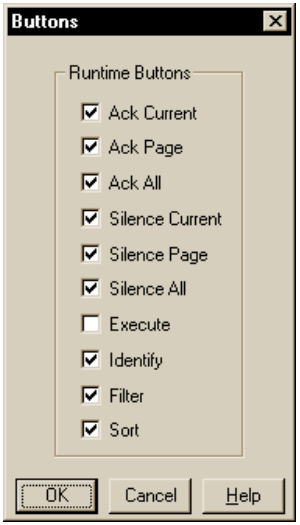
When you are finished, click OK.

Formatting buttons

You can specify which buttons you want on the button bar and where you want the bar located.

To choose which buttons to include, click Buttons on the Format menu. The Buttons dialog box appears. If you do not want certain buttons displayed, clear the check boxes for those buttons. When you are finished, click OK.

If you select the Execute check box, the Execute Command dialog box appears. For information about using the Execute button, see "Using alarm data with commands" on page 6-68.



The following table describes what the buttons do:

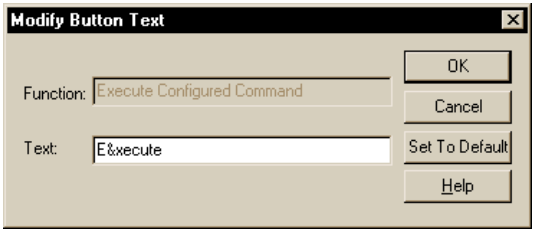
This button	Does this
Ack Current	Marks the highlighted alarm as acknowledged. If a bell is associated with the alarm, acknowledging the alarm turns off the bell. If the tag has gone out of alarm, it is removed from the alarm summary when it is acknowledged.
Ack Page	Marks all alarms on the screen as acknowledged. If a bell is associated with an alarm, acknowledging the alarm turns off the bell. If a tag has gone out of alarm, it is removed from the alarm summary when it is acknowledged.
Ack All	Marks all alarms in the alarm summary as acknowledged. If a bell is associated with an alarm, acknowledging the alarm turns off the bell. If a tag has gone out of alarm, it is removed from the alarm summary when it is acknowledged.
Silence Current	If the highlighted alarm is configured to set off the internal bell, silences the computer's sound. If the highlighted alarm is configured to set off the external bell, resets the associated bit in the programmable controller.
Silence Page	If any alarms on the screen are configured to set off the internal bell, silences the computer's sound. If any alarms on the screen are configured to set off the external bell, resets the associated bits in the programmable controller.
Silence All	If any alarms in the alarm summary are configured to set off the internal bell, silences the computer's sound. If any alarms in the alarm summary are configured to set off the external bell, resets the associated bits in the programmable controller.
Execute	Runs a command, macro, or VBA program, if one was assigned to the Execute button. You can pass parameters from the highlighted alarm (for example the tag name) to the command, macro, or VBA program.

This button	Does this
Identify	Runs a macro for the alarm if one was created and entered in the Alarm Identification field of the Advanced tab in the Analog Alarm or Digital Alarm editor.
Filter	Opens the Filter dialog box, so alarm information can be temporarily filtered out of the alarm summary.
Sort	Opens the Sort dialog box, so alarm information can be temporarily sorted.

In addition to providing Filter and Sort buttons that the operator can use at runtime, you can permanently filter or sort alarms at design time. The result of the design time filter or sort operation will be retained each time the summary is activated at runtime. For more information see "Choosing data" on page 6-64.

Changing the button text

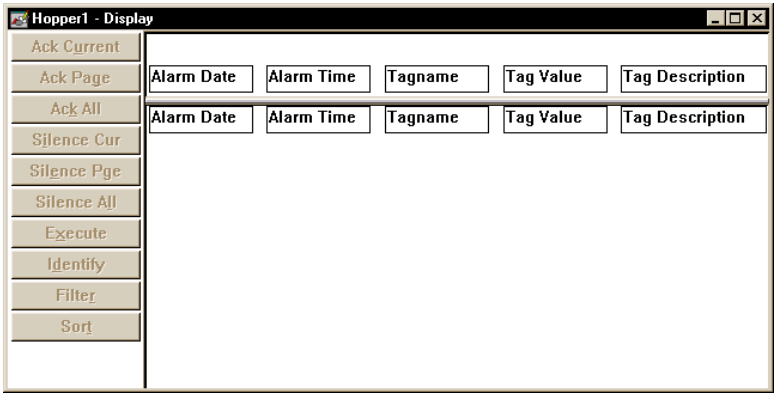
To change the text that is displayed on any of the buttons in an alarm summary, double–click the button, then type the new button text in the Text box.



To change the keyboard accelerator key that is used to activate the button from the keyboard at runtime, type an ampersand character (&) in front of the character you want to use as the accelerator key. For example, to use Alt–X to activate the Execute button, type E&xecute in the text box.

Positioning the button bar

To specify the location of the button bar, click Button Bar Position on the Format menu, and then click a location. In the following illustration, Left was chosen as the button bar position.



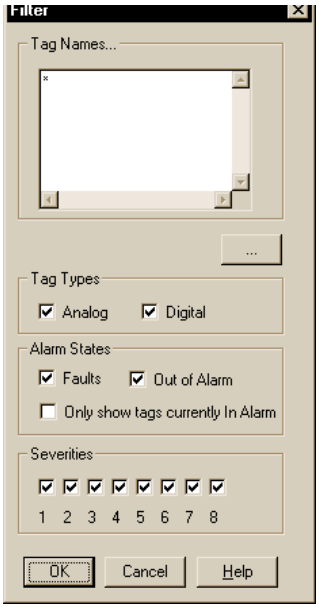
Choosing data

Use the Filter and Sort items in the Data menu to specify which alarm information is displayed. Use Filter to filter out information—that is, to specify information you do not want displayed in the alarm summary. Use Sort to specify the order in which alarm information is displayed.

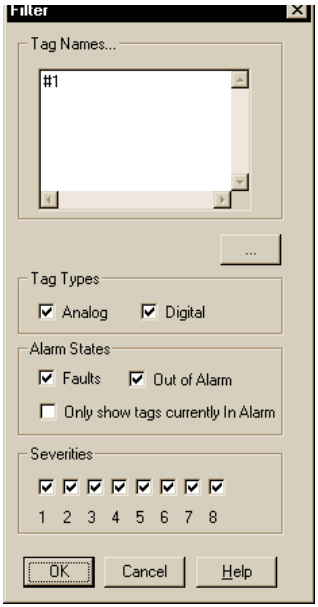
Alarm information can be filtered and sorted at runtime, but changes are not saved.

Filtering data

To filter data, click Filter on the Data menu. The Filter dialog box opens. If a check box is selected, the information is included in the alarm summary. Clear the check boxes for information you want *excluded* from the alarm summary.



You can use wildcards or tag placeholders in the alarm summary filter.



Tag Names

Specify the tag names you want to appear in the alarm summary, entering each tag on a separate line. You can use wildcards to select tags. These are the wildcards:

This wildcard	Does this
*	Matches any number of characters, including the backslash (\) character.
?	Matches any single character.
~	When placed before a tag name, excludes the tag. When placed before a folder name, excludes the tags in the folder.

By default, the Tag Names field contains an *, which means all tags are displayed.

If the alarm summary is an object embedded within a graphic display, you can also use tag placeholders to specify the tag names to appear in

the alarm summary. A tag placeholder is the cross-hatch character (#) followed by a number from 1 to 500. The placeholder can also contain wildcards and folder names. See "Using tag placeholders" on page 11-37 for more information.

If you use tag placeholders, at runtime you must specify the tag each placeholder represents, either by using a parameter file or by typing the tag names on the command line. You can also use wildcards in the parameter file or on the command line.

Example: Using a parameter file to replace tag placeholders

The parameter file called Beans specifies which tags to use for the placeholders in a display:

#1 = bean_weight
#2 = bean_level
#3 = bean_temp

To run the display called Canning with the Beans parameter file, type:

Display Canning /PBeans

For more information see "Using a parameter file to replace tag placeholders" on page 11-38 and"Listing tag names to replace tag placeholders" on page 11-40.

Tag Type

Only the tag types that are checked will appear in the alarm summary. To include all alarms, leave both Analog and Digital checked.

Alarm States

If you want a message to appear in the alarm summary when an alarm is in fault or when a tag goes out of alarm, leave both Faults and Out of Alarm checked.

If you leave the Out of Alarm state unchecked, the alarm summary item changes color when the tag goes out of alarm. Tags that are out of alarm remain in the alarm summary until they are acknowledged.

If you want to see only the tags that are in alarm in the summary, click Only show tags currently In Alarm. Digital change of state alarms and InAndOutOfAlarm events are not displayed in the alarm summary when you select this checkbox.

Alarm Severities

To include alarms of all severities, leave all boxes checked. To exclude an alarm severity, clear its check box.

Out of alarm messages do not have severities, so if you select the Out of Alarm option all out of alarm messages will be shown whether or not you show the InAlarm message for a given severity.

Sorting data

To sort data, click Sort on the Data menu. You can specify three levels of sorting.

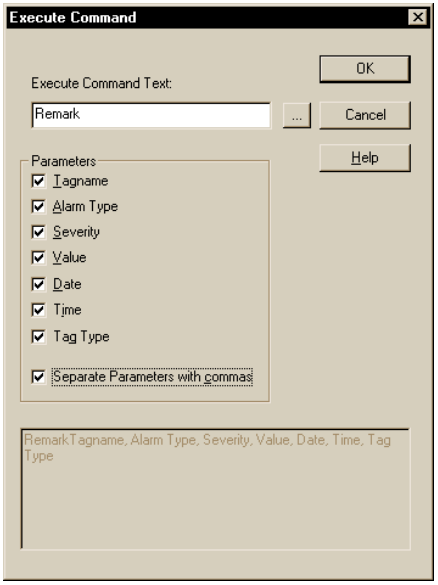
By default, alarm information is sorted first by date and time, then by severity, and finally by tag name. This means that the alarms will be presented chronologically. If two or more alarms have the same time

and date, these alarms are presented in order of severity. If any alarms have the same time and date and the same severity, they are then presented by tag name.

You can sort data that has been filtered.

Using alarm data with commands

Use the Execute item in the Data menu to execute a command (whether an RSView32 command, an RSView32 macro, or a VBA program) and to append data items derived from the highlighted alarm to the command.



Alarm information is appended to the command in the same order in which the parameters appear in the dialog box. Parameters are

separated by a space, unless you click Separate Parameters with commas.

IMPORTANT A space is not automatically appended to the end of the command text. If you are using parameters and require a space between the end of the command, macro, or VBA program and the first parameter, be sure to include the space with the command text.

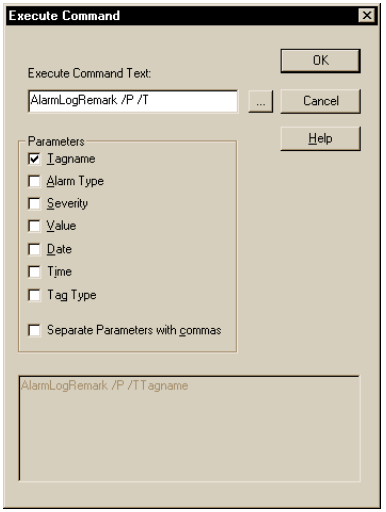
Severity and value are shown only for alarms of type IntoAlarm. For alarm types OutOfAlarm and IntoFault, severity is 0.

If you configure the Execute button to run a VBA program, and you copy the alarm summary from one project to another project, you must ensure that the VBA program is available in the new project, otherwise the Execute button will not run the VBA program.

When passing parameters to VBA programs, you must select the checkbox Separate Parameters with commas.

Example: Using the AlarmLogRemark command with the Execute button in an alarm summary

You cannot change the order in which parameters are passed to the command line for the alarm summary Execute button. To use the alarm summary Execute button with the AlarmLogRemark command, and have the tag name added correctly to the AlarmLogRemark's /T argument, you must make sure that the tag name argument (/T) appears last on the command line:



For details about using the AlarmLogRemark command, see "Adding remarks to the alarm log file at runtime" on page 6-40, and see Appendix A, *RSView32 commands,* or see Help.

Suppressing alarm printing

You can stop all alarms from printing, while continuing to log alarms to the alarm log file. This is useful for testing or performing repairs or maintenance on equipment.

To suppress alarm printing for all tags, use the RSView32 AlarmPrintOff command. To re–enable printing of alarms, use the RSView32 AlarmPrintOn command.

Alarms will print when the AlarmOn command is issued, unless the AlarmPrintOff command was issued before the AlarmOn command was issued in the same session of RSView32. The AlarmPrintOff and AlarmPrintOn commands are not retained across RSView32 sessions.

The AlarmPrintOff and AlarmPrintOn commands have no arguments.

Suppressing alarm monitoring

You can suppress alarm monitoring for tags. This is useful for testing or performing repairs or maintenance on a piece of equipment.

To suppress alarm monitoring for tags, use the RSView32 SuppressOn command. To suppress all alarms for the specified tags, issue the SuppressOn command before the AlarmOn command.

To view a list of the tags not being monitored, use the Suppressed List. You can also turn monitoring back on from this list.

The SuppressOn command is not retained after an AlarmOff command is issued. The Suppressed List is therefore empty after the AlarmOff command is issued.

Suppressing alarm monitoring for tags

1. Open the command line.
2. Type the following RSView32 command and press Enter:

   SuppressOn <*tag name*>

   To suppress more than one tag, use a wildcard.

The wildcards are:

This wildcard	Does this
*	Matches any number of characters, including the backslash (\) character.
?	Matches any single character.

Viewing suppressed tags

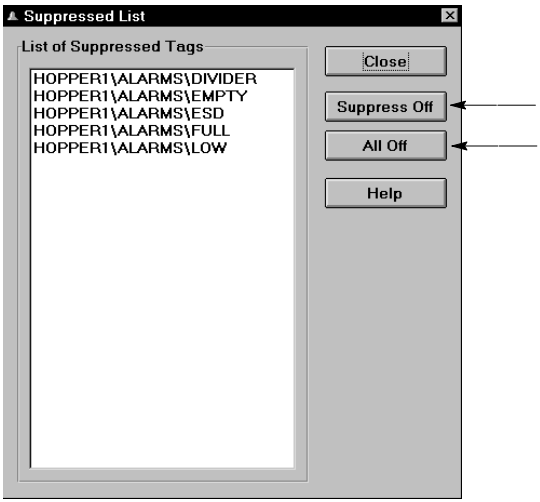
The Suppressed List shows which tags are suppressed—that is, which tags are not being monitored for alarms.

To open the Suppressed List:

1. In the Project Manager, open the Alarms folder.
2. Open the Suppressed List editor by doing one of the following:
   - double–click the Suppressed List icon
   - right–click the Suppressed List icon and then click Show

Using the Suppressed List

Use the Suppressed List to see which tags are not being monitored for alarms and to turn alarm monitoring back on.



Click a tag name and then click here to turn off suppression for that tag.

Click here to turn off suppression for all tags.

More RSView32 commands

You can also use RSView32 commands to turn off suppression and to open the Suppressed List. For details, see Appendix A, *RSView32 commands*, or see Help.

Starting and stopping alarm monitoring

There are many ways to start and stop alarm monitoring. Choose the way that works best for your project.

For a complete list of RSView32 commands and their command syntax, see Appendix A, *RSView32 commands*, or see Help.

Ways to start alarm monitoring

- In the Startup editor, select the Alarming check box.
- In the Macro editor, create a startup or login macro and include the AlarmOn command.

- In the Graphic Display editor, create a button object and specify the AlarmOn command as the press action. When the button is pressed, alarm monitoring starts.
- In the Graphic Display editor, create a graphic object and attach touch animation with the AlarmOn command as the action. When the object is touched, alarm monitoring starts.
- In the Events editor, specify the AlarmOn command as the action for an event.
- On the command line, type **AlarmOn** and then press Enter.
- In the Graphic Display editor, specify the AlarmOn command in the Startup field in the Display Settings dialog box.

Ways to stop alarm monitoring

When a project stops, alarm monitoring stops as well. To stop alarm monitoring without stopping the project, use any of the methods described next.

- In the Graphic Display editor, create a button object and specify the AlarmOff command as the press action. When the button is pressed, alarm monitoring stops.
- In the Graphic Display editor, create a graphic object and attach touch animation with the AlarmOff command as the action. When the object is touched, alarm monitoring stops.
- In the Events editor, specify the AlarmOff command as the action for an event.
- On the command line, type **AlarmOff** and then press Enter.

Chapter

7 Configuring data logging

Data log is an RSView32™ component that collects and stores tag values (data). You specify the type of data to collect, when to collect it, and where to store it by defining a data log model.

The data that is collected is stored in dBASE® IV (.dbf) format or ODBC (Open Database Connectivity) format.

You can display the data in trends, archive it for future use, or analyze it using third–party software, such as Microsoft® Excel, Crystal Reports®, and Microsoft Visual FoxPro®.

What is a model?

A data log model defines which tags to log data for, when to log the data, and what file to log the data to. In the model you also specify the format of the log files (dBASE IV or ODBC) and when to create and delete the files.

How to use multiple data log models

At runtime, up to 400 models can run simultaneously. Use multiple data log models to:

- store related information in separate files
- log groups of tags at different rates
- log groups of tags based on events

Summary of steps

To set up a data log model, specify:

- what format to use
- where to store data log data (primary and secondary paths)
- when to create and delete log data
- what actions will trigger logging
- which tags to log data for
- what to call the model

About data log storage formats

For easy access, logged data is stored in either dBASE IV (.dbf) format or using the ODBC connectivity standard.

If you use the dBASE IV format, data log files are created in sets. The number of files in a set depends on the .dbf file format you choose (narrow or wide). Each file in the set contains a particular type of data.

If you use the ODBC format, tag values are logged to tables in an ODBC database. This allows you to use third-party ODBC-compliant

relational database software to retrieve and manipulate the data. If the database becomes inaccessible, RSView32 logs the data to backup files in binary format.

If you need to use data in multiple formats, define multiple data log models for the same tags.

The .dbf file format

Data logged in the .dbf format can be stored in narrow or wide format. The data file names vary depending on which format you choose.

Narrow .dbf file format

The narrow .dbf format stores one date, one time, and one tag value per line. The following figure shows how tag values are stored in the file. For a detailed description of the file's contents, see page 16-13.

This is one snapshot of data.

Date1	Time1	Tag1 value
Date1	Time1	Tag2 value
Date1	Time1	Tag3 value
Date2	Time2	Tag1 value
Date2	Time2	Tag2 value
Date2	Time2	Tag3 value

Wide .dbf file format

The wide .dbf format stores one date, one time, and multiple tag values per line. The following figure shows how tag values are stored in the file. For a detailed description of the file's contents, see page 16-15.

This is one snapshot of data.

Date1	Time1	Tag1 value	Tag2 value	Tag3 value
Date2	Time2	Tag1 value	Tag2 value	Tag3 value
Date3	Time3	Tag1 value	Tag2 value	Tag3 value
Date4	Time4	Tag1 value	Tag2 value	Tag3 value
Date5	Time5	Tag1 value	Tag2 value	Tag3 value
Date6	Time6	Tag1 value	Tag2 value	Tag3 value

Choosing between narrow and wide .dbf file formats

The following table summarizes the features of each file format:

Narrow	Wide
Limit of 10,000 tags in the model.	Limit of 100 tags in the model.
Most useful for storing data that changes infrequently (as in on–change logging).	Most useful for storing frequently changing data (as in periodic logging). Particularly useful for storing data from batch applications.
Data is harder to use for sums and averages because it crosses rows.	Data is more easily used for sums and averages because it is all in one column.
Does not create a new log file set if tags are added to or deleted from the model.	Creates a new log file set if tags are added to or deleted from the model.
Stores numeric and string values in separate files.	Stores numeric and string values in the same file.
Preferred for queries because you can join tables.	Can't join tables for queries.

How .dbf log files are named

When a .dbf log file is created, it is named automatically. The name is based on the date the file was created and the type of data it contains.

Long file names

RSView32 gives you the option to use long file names. When you choose this option, at runtime RSView32 creates data log files with long file names unless either the primary or secondary path does not support long file names, or unless either path is inaccessible when data logging starts. The maximum data log file name, including path, is 200 characters. This is the format for the name:

YYYY MM DD NNNN <*Log File Identifier String*> <(*type*)>.dbf

- YYYY is the year
- MM is the month
- DD is the day
- NNNN is the sequential file identifier. This number indicates the sequence files were created in. You can have up to 9999 file sets per day. At midnight, the sequence starts at 0000 again.
- <*Log File Identifier String*> is a text string you can specify to help identify the log file. The maximum string length is 20 characters.
- <(*type*)> is the file type. Note that the type is enclosed in parentheses. *Narrow* format has three file types: Tagname, Float (for analog and digital tag values), and String. *Wide* format has two file types: Tagname and Wide. The Wide type stores both floating point and string values.

Example: Long file name

The log file named 1997 10 28 0004 Oven Temperatures (Wide).dbf was created in the year 1997, month 10, and day 28. The 0004 indicates that this is the fourth file set created that day. Oven Temperatures is the log file identifier string, which the user defined to help identify the data. (Wide) indicates that this file is in wide file format and may contain both floating point and string tag data.

Short file names

RSView32 uses 8-character file names if you do not choose to use long file names, or if either the primary or secondary path does not support long file names, or if either path is inaccessible when data logging starts. This is the format for 8-character file names:

YYMMDDnz.dbf

- YY is the year
- MM is the month
- DD is the day
- n is the sequence letter (a, b, c, and so on). This letter indicates the sequence files were created in. You can have up to 26 file sets (a to z) per day. If you attempt to create a 27th file, RSView32 continues logging data to the 26th file. At midnight, the sequence starts at "a" again.
- z is the file type. *Narrow* format has three file types: t for tag names, f for floating point (analog and digital tag) values, and s for string tag values. *Wide* format has a two file types: t for tag names and w for wide. The w file stores both floating point and string values.

Example of short file names for narrow .dbf format

For narrow .dbf file format, data log files are created in sets of three. Even if your project does not contain a particular type of data, three files are created. If data is not available for a file, the file remains empty.

Example: Narrow .dbf short log file name

The log file named 971028cs.dbf was created in the year 97, month 10, and day 28. The c indicates that this is the third file set created that day. The s indicates that this is a file containing string tag data.

Example: Narrow .dbf short log file set

If you were to look in the directory containing the data log files, you would find three files with almost the same name.

971028ct.dbf	contains the tag name data
971028cf.dbf	contains the floating point data from analog and digital tags
971028cs.dbf	contains the data from string tags

Example of short file names for wide .dbf format

For wide .dbf file format, data log files are created in sets of two.

Example: Wide .dbf short log file name

The log file named 971028dw.dbf was created in the year 97, month 10, and day 28. The d indicates that this is the fourth file set created that day. The w indicates that this file is in wide file format and may contain both floating point and string tag data.

Example: Wide .dbf short log file set

If you were to look in the directory containing the data log files, you would find two files with almost the same name.

971028dt.dbf	contains the tag name data
971028dw.dbf	contains the floating point data from analog and digital tags and the string data from string tags

---

The ODBC storage format

Use the ODBC storage format to store your data using an ODBC data source such as Microsoft Access or Microsoft SQL Server. The ODBC format stores data in up to three tables, similar to narrow format:

- Tag table (optional)—stores tag names in an index so they can be referenced using a 2- or 4-byte numeric field (rather than a 40-byte character field) in the float and string tables
- Float table—stores analog and digital tag values

- String table (optional)—stores string tag values

For a detailed description of the tables' contents, see page 16-17.

ODBC backup files are stored as binary files with the extension .obf. You cannot view the contents of the .obf files.

How ODBC tables are named

The ODBC tables are created with the default names TagTable, FloatTable, and StringTable. However, you can edit these names before creating the tables, or specify different tables to use, in the Data Log Setup dialog box. If you specify a backup path for an ODBC model, RSView32 names the backup log files as described for narrow .dbf files. If you use long file names you can specify a log file identifier string for the backup file names.

Using an existing ODBC data source

You can log data to an existing ODBC data source, but its tables must contain fields that are formatted for the RSView32 data log. There are two ways to prepare tables for data logging to an existing database:

- set up the RSView32 data log fields in the existing ODBC tables before setting up your data log model
- automatically or manually create new tables in the existing database in the Data Log Setup dialog box

To use the tables in an existing ODBC data source:

1. Add fields for the data log data to the tables in the ODBC database. See the example on page 7-16 for information about adding fields to an existing table.

   "Data log—ODBC format" on page 16-17 describes the order and type of fields needed to log data to an ODBC database. Edit the tables as described in the documentation for the ODBC relational database you are using.

2. Set up your data log model, as described in "Setting up a model" on page 7-11. Specify the existing ODBC database as the ODBC Data Source, and specify the tables you edited.

To create new tables in an existing ODBC data source:

1. Specify the name of the existing ODBC data source in the ODBC Data Source field of the Data Log Setup editor. See "Setting up a model" on page 7-11 for more information.

2. Click Create Tables. RSView32 automatically creates new data log tables in the existing database. You can also create tables manually, as described in the example on page 7-16.

3. Set up the rest of your data log model, as described in "Setting up a model" on page 7-11.

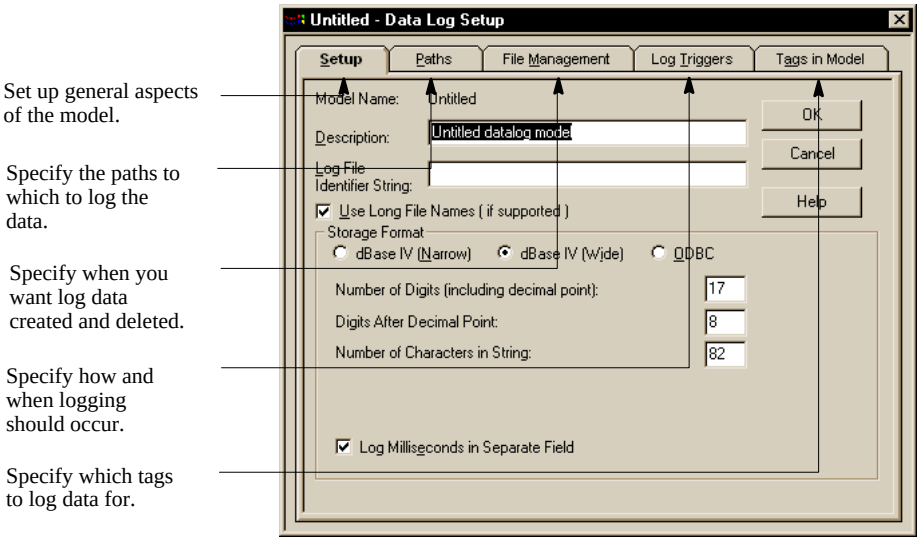
Creating a new ODBC data source

You can also create a new ODBC data source when you set up your data log model, as described in "Setting up a model" on page 7-11. RSView32 can create the ODBC tables automatically, or you can create the tables manually. See page 7-16 for an example of how to create a new ODBC data source.

The Data Log Setup editor

To open the Data Log Setup editor:

1. In the Project Manager, open the Data Log folder.
2. Open the Data Log Setup editor by doing one of the following:
   - double–click the Data Log Setup icon
   - right–click the Data Log Setup icon and then click New



Setting up a model

1. In the Data Log Setup editor, click the Setup tab.
2. Type a description of the model. This is for your information only.
3. Specify whether to use long file names for the data log files.

   If you choose to use long file names, type a log file identifier string, up to 20 characters. This string of text forms part of the file name

for the data log files. For more information about long file names see “Long file names” on page 7-5.

If you choose the ODBC storage format in step 4, long file names apply to the backup files only.

You can change the log file identifier string at runtime, as described on page 7-44. However, the runtime change affects the current data log session only. When you stop and restart the model RSView32 uses the string you set up here.

4. Click a file storage format.

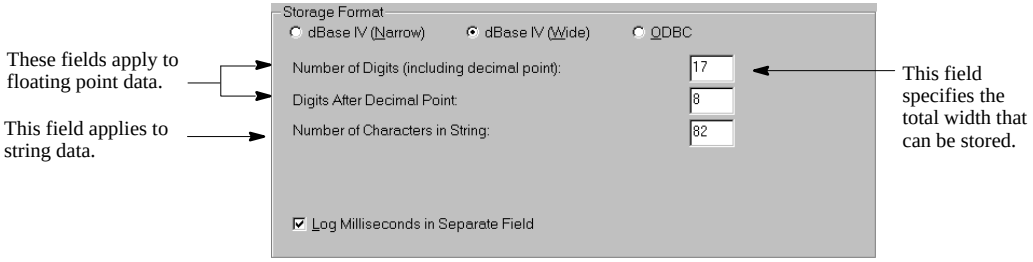
   Narrow dBASE IV format stores one tag value per line, with multiple time and date stamps per record. Wide dBASE IV format stores multiple tag values per line, with one time and date stamp per record. For more information about dBASE IV (.dbf) log file formats see “The .dbf file format” on page 7-3.

   ODBC format logs tag values to tables in an ODBC database. For more information about ODBC tables see “The ODBC storage format” on page 7-8. If you choose this format, go to step 6.

5. If you chose the dBase IV (Narrow) or dBase IV (Wide) storage format in step 4, specify storage options for the .dbf log file.

   `Number of Digits (including decimal point)`

   Type the number of digits, including the decimal point, to be stored for floating point numbers. Use this field and the Digits After Decimal Point field to achieve the precision you want.



Digits After Decimal Point

Type the number of digits after the decimal point that are to be stored for floating point numbers. Use this field and the Number of Digits field to achieve the precision you want. For example, if your process has very large numbers, you can increase the total number of digits and reduce the number of digits after the decimal point.

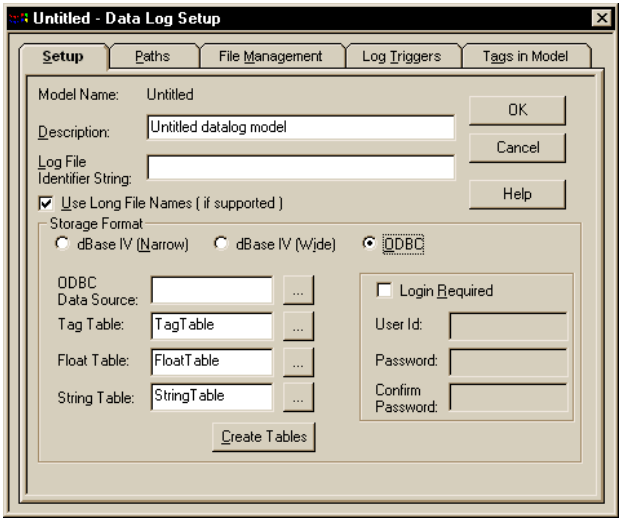
Number of Characters in String

Type the number of characters to be logged for all string tags in the model.

Log Milliseconds in Separate Field

Specify whether to log the millisecond portion of the time in a separate field in the .dbf file. If you do not select this option the milliseconds are logged in the time field.

When you have finished specifying options for the dBASE IV storage format, go to "Setting up logging paths" on page 7-20.

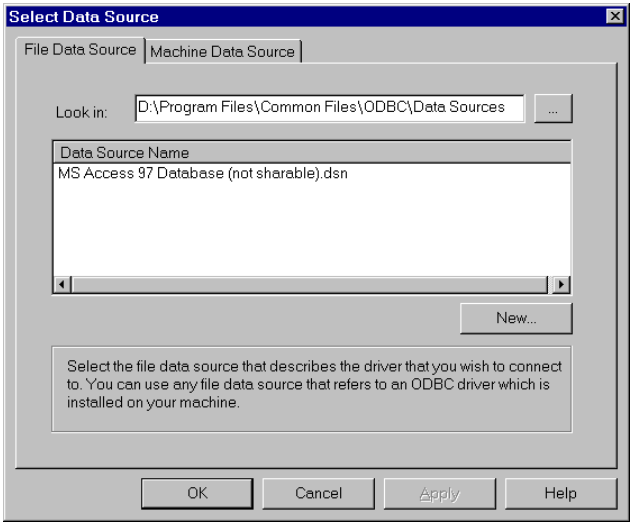


6. If you chose the ODBC storage format in step 4, specify the ODBC data source.

Browse button

Type the path and file name of an existing ODBC data source, or click the Browse button to select an existing data source or create a new one.

If you click the Browse button the Select Data Source dialog box appears.



- To use an existing file-based ODBC data source, select it from the Data Source Name list box or click ... to browse for the file folder that contains the data source.
- To use an existing machine-based ODBC data source, click the Machine Data Source tab and select it from the list box.
- To use a new ODBC data source, click the File Data Source or Machine Data Source tab, then click the New button. The Windows® Create New Data Source wizard appears. Follow the instructions on screen to create the new ODBC data source. For an example of how to create a new ODBC data source, see page 7-16.

7. Specify one or more ODBC tables. See "The ODBC storage format" on page 7-8 for a description of each table's purpose.

- To choose a table from the existing tables at the data source, click the ... button. Select a table from the Select ODBC Table dialog box that appears. To view the order, type, length, and precision of the fields in the table, highlight the table and click Details.

  If you don't specify a table name for the tag table, the tag name is used instead of a tag index in the float and string tables. This uses more database space than using a separate tag table.

  When you save the data log model, RSView32 informs you if the fields in a selected table are not in the order or of the type required to log data. In this case you must edit the table as described in the documentation for the ODBC relational database you are using. See "Data log—ODBC format" on page 16-17 for information about the order and type of fields needed to log data to an ODBC database.

- To automatically create the tables at the data source you specified, type the table names to use in the table fields, then click Create Tables. Delete the name in a table field if you don't want to create that table.

  If RSView32 is unable to create the tables automatically, you must create the tables manually. Follow the instructions in "Using an existing ODBC data source" on page 7-9, or see the example, next.

  If RSView32 cannot create an index automatically, a message informs you that you must create it manually, as described on page 7-19.

8. If the ODBC database you are using requires that you enter a password to connect to it, click the Login Required checkbox and enter your user ID and password. The use of this option is database-dependent. For example, you must log in to SQL Server, but you may not need to log in to Microsoft Access, depending on how your database is configured.

Example: Creating a new ODBC data source

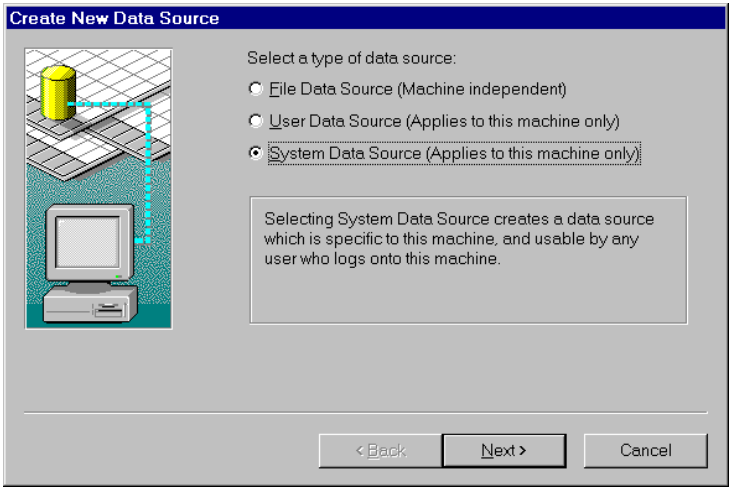
This example shows how to create a new ODBC data source that connects to an SQL Server database called Bakery. The SQL Server is called Athena. The new data source will be called Bakery_Stats.

The data source will be used on the current computer only, but will be used by multiple users at the computer. In this example, you will set up the ODBC data log tables manually using Microsoft Query.

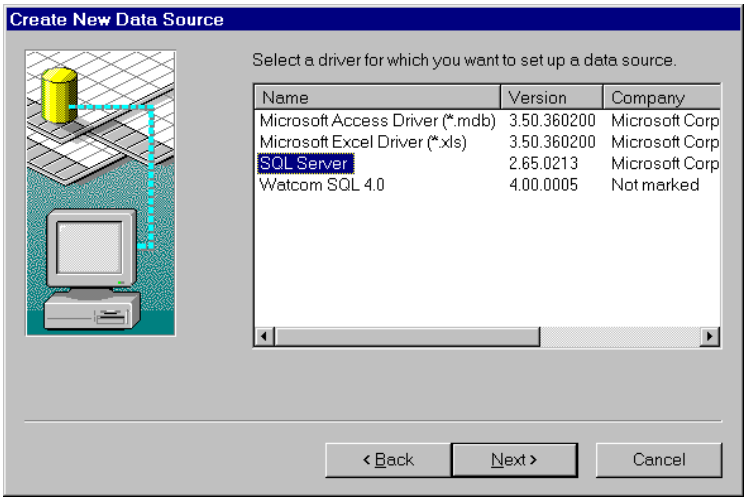
First, create the ODBC data source. Then set up the ODBC tables.

To create the ODBC data source:

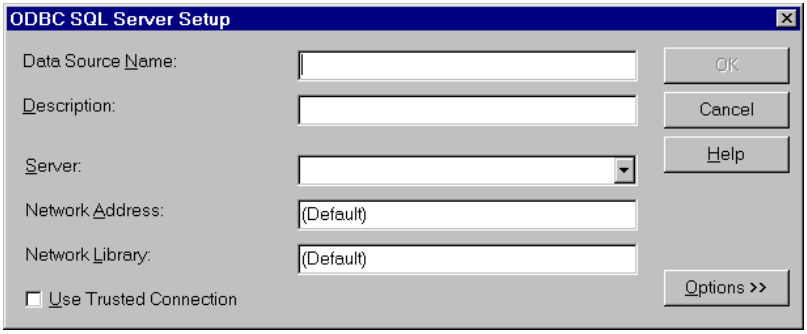
1. In the Setup page of the Data Log Setup editor, choose the ODBC storage format and click ... beside the ODBC Data Source field.
2. In the Select Data Source dialog box, click the Machine Data Source tab and click New.



3. In the Create New Data Source dialog box, select System Data Source, then click Next.

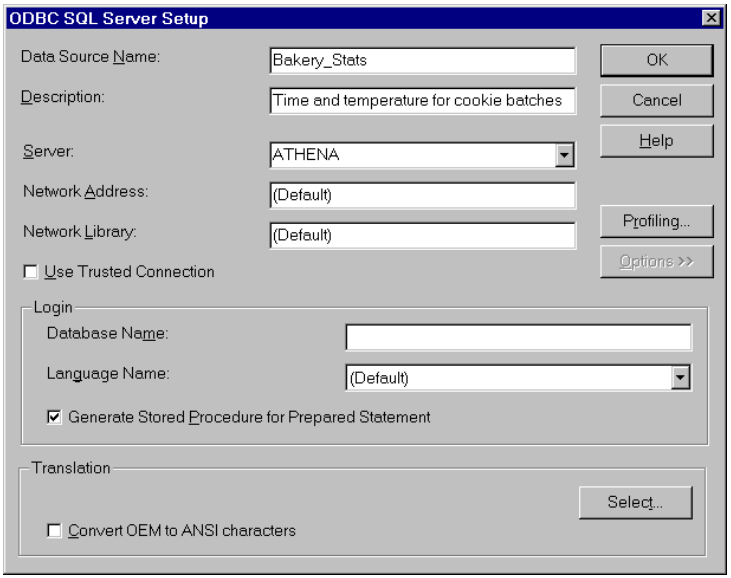


4. Select SQL Server from the list of ODBC drivers installed on the computer, and click Next. Click Finish.



5. In the ODBC SQL Server Setup dialog box, enter the data source name (Bakery_Stats) and a description.

6. In the Server field, select Athena, the name of the server where the SQL database is located. Click Options.



7. In the Database Name field, type Bakery, the name of the SQL database to log the data to.

8. Clear the check box Generate Stored Procedure for Prepared Statement. Click OK.

9. In the Select Data Source dialog box, select Bakery_Stats and click OK.

Note that you could also create the ODBC data source in the Windows Control Panel, then select the data source in the ODBC Data Source field of the Data Log Setup editor.

To set up the ODBC data tables:

You must have access to the SQL Server to log in and create the tables.

1. Double-click Microsoft Query in the MSOffice directory and choose Table Definition from the File menu.
2. In the Select Data Source dialog box, specify the data source you just created and click Use. Enter your login ID and password.
3. Click New in the Select Table dialog box.
4. Enter information to set up the first field in a table called TagTable:

Table Name:	TagTable
Field Name:	TagName
Type:	char
Length:	255

5. Click Add.
6. Enter the following to set up the second field in the table.

Field Name:	TagIndex
Type:	smallint

   In the Type field, choose the type that most closely matches the SQL Data Type for the field you are adding, as listed in the tables beginning on page 16-17.

7. Enter the following to set up the third field in the table.

Field Name:	TagType
Type:	smallint

8. Enter the following to set up the fourth field in the table.

Field Name:	TagDataType
Type:	smallint

9. Click Create.

10. Repeat steps 4 through 7 to add the FloatTable and StringTable. See page 16-15 for information about the field types and lengths.

If you want to edit a table that already exists, after you log in choose the table name and click View. The order of the data log fields must match the order listed in the tables beginning on page 16-15. If you add the data log fields to an existing table, the data log fields must be first. However, you can use different names for the data log fields.

To add an index for the FloatTable and StringTable:

1. In the Select Table dialog box, select FloatTable and click Index.
2. In the Index Name field, type FloatTableIndex.
3. In the Index Fields field select DateAndTime (or the name you assigned to the first field in the FloatTable).
4. Click Add, then click Close.
5. Repeat steps 1 through 4 for the StringTable. Click Close.

Setting up an index for these tables enhances logging performance.

Setting up logging paths

Switching logging paths

RSView32 allows you to specify a secondary or backup path to log data to if the primary path for .dbf files or the ODBC database becomes unavailable. The primary path or ODBC database could

become unavailable because of network failures, or because of lack of disk space on the primary path or where the ODBC database is located.

If the primary path or ODBC database becomes unavailable, RSView32 begins to store the data in a buffer. The buffer can hold up to 64 Kb of data. When the buffer fills, or when the maximum amount of time to buffer data has elapsed, if the primary path or ODBC database is still unavailable RSView32 switches to the secondary or backup path.

RSView32 checks periodically to determine whether the primary .dbf file path or ODBC database has become available again. If the primary path or ODBC database has become available, RSView32 switches back automatically.

RSView32 also checks the status of the primary path or ODBC database if the secondary or backup path becomes unavailable, and will switch back if possible. If both paths are unavailable, RSView32 buffers the data. If the buffer fills and both paths are still unavailable, RSView32 empties the buffer (the data in the buffer is lost) and begins storing new data in the buffer. RSView32 continues checking both paths until one becomes available.

If the data log file is locked by another program, for example if it is opened with Excel, data is buffered for the time specified for Maximum Time To Buffer in the Advanced Configuration dialog, and then a new set of files is created on the primary path. If the secondary path is not configured, the data is buffered for 10 minutes (the default value for maximum time). If the maximum time is set to 0, a new file is started immediately.

If the model is logging to the secondary path and the file is locked, the behavior is the same. That is, the data is buffered and then a new file created when the specified time period has elapsed.

You can also switch back to the primary path or ODBC database manually, using the DataLogSwitchBack command (see page 7-25) or the DataLogMergeToPrimary command (see page 7-26).

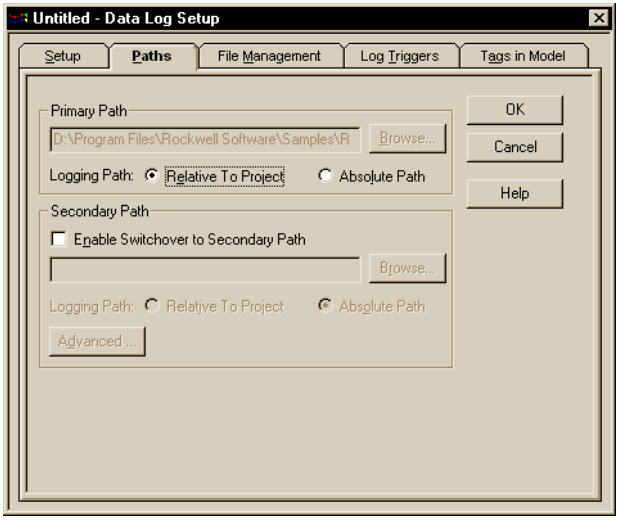
For models that use the dBASE IV format, RSView32 creates a new file set each time the logging path changes.

Specifying logging paths

You can specify the .dbf primary and secondary file paths and the ODBC backup file path by editing the data log model in the RSView32 Works Project Manager, as described next. You can also change the logging paths at runtime using RSView32 Runtime, as described in "Changing logging paths using RSView32 Runtime" on page 7-41.

To specify .dbf primary and secondary file paths and ODBC backup file path:

1. In the Data Log Setup editor, click the Paths tab. If you are using the ODBC storage format, go to step 3.



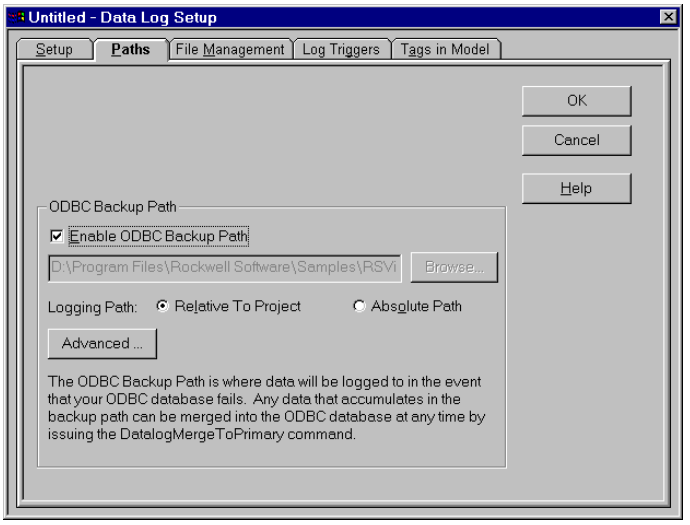
2. If you are using dBASE IV storage format, specify the primary path where you want to store the .dbf data log files.

Relative To Project

Click this to store the log files in the project directory. RSView32 creates a directory called Dlglog and a subdirectory with the same name as the model name and stores the files there.

Absolute Path

Click this to specify a particular path. If the path you type does not exist, RSView32 will create it. The first time data logging runs, RSView32 creates a subdirectory with the same name as the model name and stores the files there.



3. Specify whether to enable RSView32 to switch to a secondary .dbf file path or a backup path if the primary path or ODBC database becomes unavailable. See "Switching logging paths" on page 7-20 for more information.

Relative To Project

Click this to store the secondary path or backup log files in the project directory. RSView32 creates a directory called Dlglog and a subdirectory with the same name as the model name and stores the files there.

For .dbf data log files, if you used this default path as your primary path, specify a different path for the secondary path.

Absolute Path

Click this to specify a particular path. If the path you type does not exist, RSView32 will create it. The first time data logging runs, RSView32 creates a subdirectory with the same name as the model name and stores the files there.

4. If you choose to use a secondary or backup path, click Advanced. Specify the parameters to use when switching between the primary path or ODBC database and the secondary or backup path.

Maximum time to buffer data before attempting switchover (minutes)

If you specify 0, RSView32 switches over immediately and no data is buffered.

The buffer can hold up to 64 Kb of data. If the buffer fills before the specified time and the primary path is still unavailable, RSView32 switches to the secondary path.

If the primary path becomes available before the maximum time, RSView32 logs the data in the buffer to the primary path and continues to use the primary path.

Note that the amount of time RSView32 buffers the data may vary slightly from the time you specify, depending on the log rate for periodic models or the frequency with which tag values change for on-event models.

How often to retry primary for automatic switchback (minutes)

If you specify 0, RSView32 will not switch back automatically. The operator must issue the DataLogSwitchBack or DataLogMergeToPrimary command to switch logging back to the primary path.

In all other cases, RSView32 checks whether the primary path has become available after the specified time has elapsed.

Minimum free disk space required for auto switchback (MB)

For data log models that use dBASE IV storage format, specify an amount that is high enough to prevent RSView32 from frequently switching between paths due to low disk space on the primary path. The needs of your project may vary considerably from the default value of 10 MB, depending on the frequency and amount of data you expect to log. This option is not available if you use the ODBC storage format.

Note that RSView32 does not use this amount to trigger a switch to the secondary path. The amount is used only to determine whether to switch back *automatically* to the primary path after the time to retry has elapsed.

Using the DataLogSwitchBack command to switch logging paths

You can switch back to the primary path manually by using the DataLogSwitchBack <*file*> command or DataLogSwitchBack * command.

The DataLogSwitchBack <*file*> command switches logging for the specified data log model. The DataLogSwitchBack * command switches logging for all data log models that are currently running. Use these commands anywhere an RSView32 command or macro can be entered. For example, type the command as the action for an event.

These commands perform a switchback only if the model is running, RSView32 is logging data to the secondary or backup path, and the primary path or ODBC database is available. For .dbf files, RSView32 creates a new set of files when it switches back to the primary path.

In order to prevent an impact on performance, data is not moved from the secondary or backup path when you switch back to the

primary path or ODBC database. You must move it manually using the DataLogMergeToPrimary command.

RSView32 also switches back to the primary path or ODBC database when you use the DataLogMergeToPrimary command. Note that you cannot switch manually from the primary path or ODBC database to the secondary or backup path.

You can give operators ways to issue these commands at runtime. For example, you can create a button object and use the DataLogSwitchBack <*file*> command as the press action.

Using the DataLogMergeToPrimary command to move secondary files to the primary path

When you begin writing to or reading from a data log model, RSView32 sends a message to the activity log if there are files on the secondary or backup path. You must move data manually from the secondary or backup path to the primary path or ODBC database using the DataLogMergeToPrimary <*file*> command or DataLogMergeToPrimary * command.

The DataLogMergeToPrimary <*file*> command moves data for the specified data log model, whether or not the model is running. The DataLogMergeToPrimary * command moves data for all data log models that are currently running. Use these commands anywhere an RSView32 command or macro can be entered.

If a model is running when you issue these commands, RSView32 also performs a switchback to the primary path or ODBC database for the specified model or all running models. If a model uses the .dbf format, RSView32 moves all files on the secondary path (including the current file set) to the primary path, begins a new file set on the primary path, and continues logging to the new file set. If a model uses the ODBC format, RSView32 merges the data in the ODBC backup files into the ODBC database and continues logging to the ODBC database.

To restore the secondary or backup data, give operators a way to issue the DataLogMergeToPrimary <*file*> command or the DataLogMergeToPrimary * command at runtime. For example, you can create a button object and use the command as the press action.

Creating .dbf log files

If your data log model uses the ODBC format, data is added continually to the same database, and this section does not apply. If your data log model uses the dBASE IV format, RSView32 logs the data to sets of files. You can set up your project to create new sets of .dbf log files, over these time intervals:

- periodically
- at specified times
- when a particular event occurs
- never

If you use short file names, a maximum of 26 new file sets can be created for each data log model in a given 24–hour period. If you attempt to create a 27th file, RSView32 continues logging data to the 26th file. At midnight, the sequence starts over again with a new file set (with the new date).

Log files are saved in the directory you specified in the Paths tab.

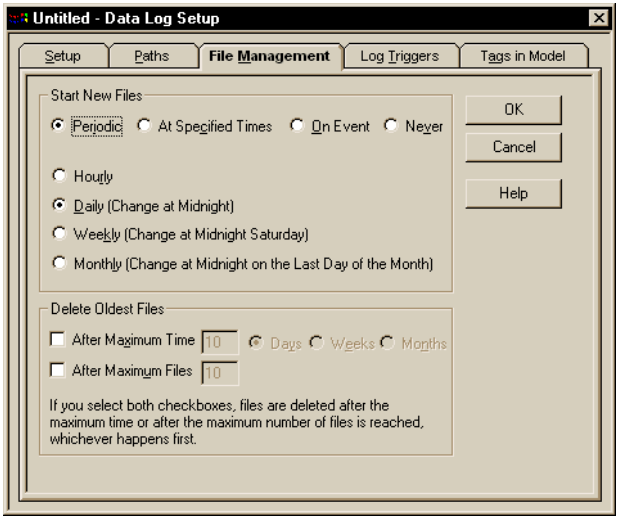
Monitoring disk space

If the hard disk space for the primary path is full, data logging switches to the secondary path, if enabled, until space becomes available on the primary path. However, if you do not set up a secondary path, when the primary path runs out of disk space data logging stops and no more log files are created.

To prevent loss of data, you can monitor disk space. See page 18-14.

To specify when to start new .dbf files:

1. In the Data Log Setup editor, click the File Management tab.



2. Under Start New Files, click a button to specify when you want to have new files created. See the topics below for information on the different times.

Creating files periodically

Click Periodic, and then click a time period. A new file is created after the specified interval has elapsed.

For this period	The new file is created
Hourly	Approximately on the hour
Daily	Each day approximately at midnight
Weekly	Each Sunday approximately at midnight
Monthly	On the first day of each month approximately at midnight

Creating files at specified times

Click At Specified Times, and then type a time or list of times when you want data to be logged to a new file. Start a new line for each new time and allow at least five minutes between start times.

Use any of the following to specify time:

Time	Format
Day	Sun, Mon, Tue, Wed, Thu, Fri, or Sat
Date	1 – 31 Specifying 31 means that months that do not have 31 days will not have new log files.
Hour	00: to 23:
Minute	:00 to :59

You can combine hours and minutes with a day or date.

Example: Creating a new file

To have a new file start every Wednesday at 2:00 am and every Friday at 2:00 pm, type the following start times:

Creating files when a particular event occurs

1. Click On Event.
2. In the Expression field, create the expression that will trigger creation of a new file. For details about expressions, see Chapter 14, *Creating expressions*.

You can use on-event logging to create sets of data for use with file-based trending. For more information, see Chapter 13, *Configuring trends*.

Example: Creating a new file for a new shift

You can set up your project so it creates a new log file at the end of a shift or batch process. For example, create a tag called NextShift. In the Data Log Setup editor, click On Event and type NextShift as the expression.

When the tag evaluates to true, a new data log file is created to store the data from the new shift.

Never creating new files

Click Never. Logged data is added to a single file.

To manage disk space if a log file grows too large, stop data logging, move or delete the data log file, and then restart data logging. You cannot delete a log file while data is being logged to it. For details about how to monitor disk space, see "Monitoring disk space" on page 18-14.

Using the DataLogNewFile command to create files

You can also create new ODBC backup files and .dbf log files with the DataLogNewFile <*file*> command or the DataLogNewFile * command.

The DataLogNewFile <*file*> command creates a new file set for the specified data log model. The DataLogNewFile * command creates a new file set for all data log models that are currently running. Use these commands anywhere an RSView32 command or macro can be entered.

If your data log model uses the ODBC format, these commands create a new set of backup files if RSView32 is logging to the backup path when the command is issued. If RSView32 is logging to the ODBC database, RSView32 logs an End snapshot and then a Begin snapshot when you issue these commands.

If your data log model uses the dBASE IV format, these commands start a new file set regardless of when new files have been configured to start in the Data Log Setup editor. The new .dbf file set is created on the same path that RSView32 is currently logging to.

These commands record two snapshots of data: an End record in the old file and a Begin record in the new file. If you use the DataLogNewFile <*file*> command or the DataLogNewFile * command, it is not necessary to also use the DataLogSnapshot command.

If you use short file names, a maximum of 26 new file sets can be created for each data log model in a given 24–hour period. If you attempt to create a 27th file, RSView32 continues logging data to the 26th file. At midnight, the sequence starts over again with a new file set (with the new date). If you use long file names, RSView32 can create up to 9,999 files per day.

You can give operators ways to issue the command at runtime. For example, you can create a button object and use the command as the

press action. When an operator presses the button, the command is issued, a new file is created, and data is logged to that file.

Deleting ODBC database records and .dbf log files

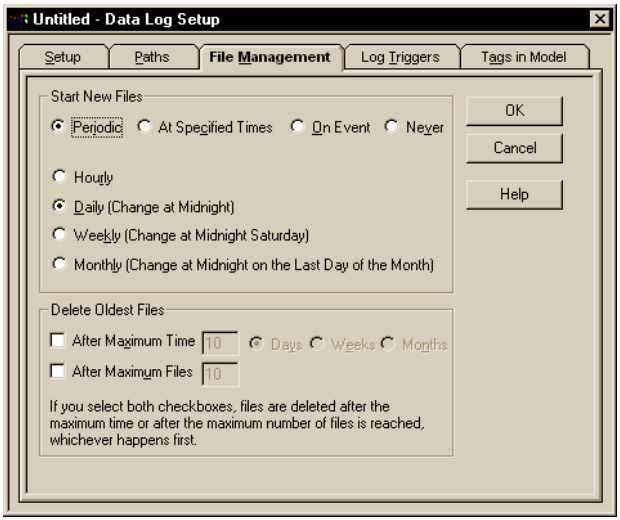
If your data log model uses the ODBC database format, you can purge old records from the database using standard relational database tools or SQL queries. You can also configure RSView32 to delete (purge) records in the ODBC database after a specified time.

If your data log model uses the dBASE IV format, you can delete .dbf log file sets after a specified period or once a specified number of file sets has been created. If you never want .dbf files deleted, leave the check boxes under Delete Oldest Files blank.

Data log file sets are deleted only when a new file set is created. So, if your project creates a new file set each day and deletes the oldest file set every third day, your project will have file sets for the three previous days' data as well as a file set for the current day.

To specify when to delete .dbf files or ODBC database data:

1. In the Data Log Setup editor, click the File Management tab. If you are using the ODBC storage format, go to step 3.



2. If you are using dBASE IV storage format, under Delete Oldest Files, select one or both check boxes and type a number to specify when to delete the .dbf log file sets. If you select both check boxes, files sets are deleted after the maximum time or after the maximum number of files is reached, whichever happens first. If you do not want files deleted, leave the check boxes under Delete Oldest Files blank.

   After Maximum Time

   File sets are deleted after the maximum time has expired. For example, if two days is the specified time, file sets are deleted at midnight of the third day so you always have the two previous days' data and the current day's data.

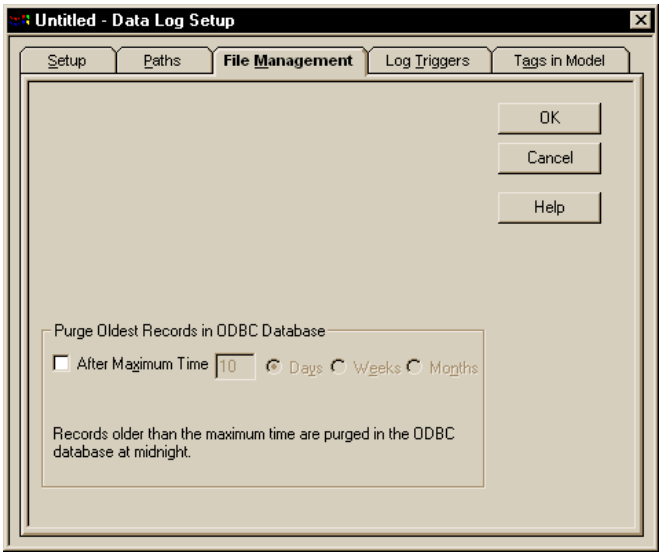
   After Maximum Files

   The oldest log file set is deleted after the specified maximum has been reached. The files currently being logged to are not included in this number. For example, if you specify 10, you will have a

maximum of 11 data log file sets at any time—10 old ones and the current set. When a new set is started, the oldest file set is deleted.

These options apply to .dbf files on the primary path only, not the files on the secondary path. RSView32 deletes files on the secondary path only when the DataLogMergeToPrimary command is issued.

When you have finished specifying options for deleting .dbf files, go to "Specifying when to log data" on page 7-35.



3. If you are using ODBC storage format, under Purge Oldest Records in ODBC Database, select the After Maximum Time check box. Type a number to specify when to delete the records, and select whether the number is measured in days, weeks, or months.

   If you do not want records deleted, leave the check box blank.

   This option purges records from the ODBC database only, not from the backup files. RSView32 deletes ODBC backup files only when the DataLogMergeToPrimary command is issued.

Specifying when to log data

You can set up logging so tag values are logged:

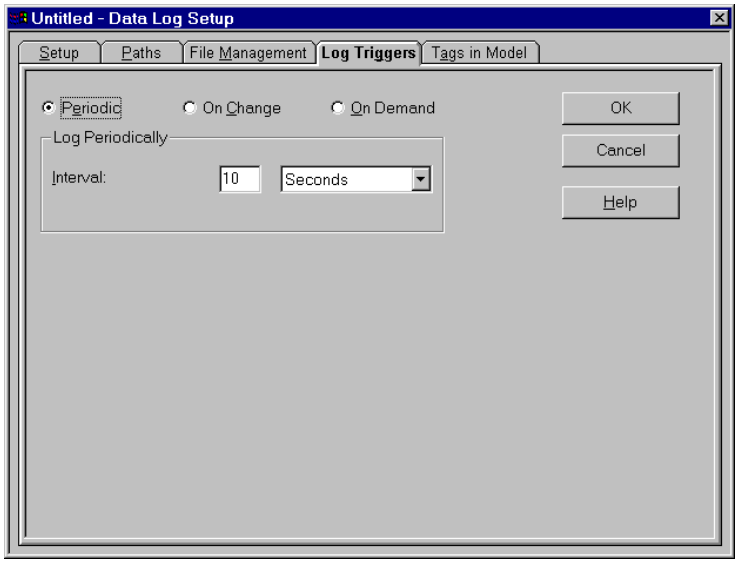
- periodically (periodic logging)
- only when a tag value changes (on–change logging)
- when a particular event occurs and triggers the DataLogSnapshot command (on–demand logging)

  DataLogSnapshot <*file*> is the RSView32 command for logging data for a single data log model on demand, where <*file*> is the name of the data log model. Use the DataLogSnapshot * command to log a snapshot of the data for all data log models that are currently running.

You can combine types of logging. For more information, see "Combining logging" on page 7-39.

To specify what should trigger logging:

1. In the Data Log Setup editor, click the Log Triggers tab.



2. Click a button to specify a log trigger and fill in any additional information. See the topics below for information on the different types of log triggers.

Logging periodically

Periodic logging is used to take a snapshot of all tag values at a particular point in time. You can use the dBASE IV (narrow), dBASE IV (wide), or ODBC storage format for periodic logging. For periodic logging to dBASE IV files, the dBASE IV (wide) file format is most efficient for storing the data.

1. Click Periodic.
2. In the Interval field, type a time and click a time unit to specify how often tag values will be logged. All tags in the model will be logged each time this interval expires.

   Do not set the interval faster than the scan class rate, OPC® update rate, or DDE poll rate, or you will log redundant data. For information about scan classes, see "Scanning for new tag values" on page 2-17. For information about update rates see "Scanning for new tag values" on page 3-17.

   You can change the periodic log rate at runtime, as described on page 7-43. However, the runtime change affects the current data log session only. When you stop and restart the model, RSView32 uses the log rate you set up here.

Logging on change

On-change logging is used to log only tags whose values have changed, when the change occurs. You can use the dBASE IV (narrow), dBASE IV (wide), or ODBC storage format for on-change logging. For on-change logging to dBASE IV files, the dBASE IV (narrow) file format is most efficient for storing the data. The dBASE IV (wide) format is not recommended because records are logged for

all tags, whether their values have changed or not, making the wide format inefficient.

1. Click On Change.

2. In the Change Percentage field, type the percent the tag value has to change in order to trigger logging. You can type a decimal value, if desired.

   The percentage is based on the tag's minimum and maximum values as configured in the Tag Database editor. Only the tags that change by the specified percentage are logged. Zero means all changes are logged.

3. In the Heartbeat field, type a time, and then click a time unit to specify how often tag values will be logged even if no change has occurred. If you do not want to use the heartbeat, type 0.

   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.

Logging on demand

Logging on demand means that data is logged for a model only when the DataLogSnapshot command is issued. When the DataLogSnapshot command is executed, tag values for all tags in the specified model or models are logged.

To log on demand:

1. Click On Demand.

2. Run the model or models for which data will be logged. To run a model, select the model in the Startup editor or issue the DataLogOn <*file*> command where *file* is the name of the data log model.

3. Issue the DataLogSnapshot command, as described next.

Using the DataLogSnapshot command

You can record tag values using the DataLogSnapshot <*file*> command or DataLogSnapshot * command.

The DataLogSnapshot <*file*> command records tag values for all tags in the specified model at the instant the command is executed. The DataLogSnapshot * command records tag values for all tags in all running models at the instant the command is executed.

Use these commands anywhere an RSView32 command or macro can be entered. For example, enter the command as the action for an event.

Operators can also use these commands at runtime. For details, see "Providing operators with a way to log on demand" on page 7-39.

Example: Creating an event for on demand logging

To create an event that will trigger logging when an alarm occurs:

1. Click On Demand as the log trigger.
2. Open the Event editor. Create an expression such as:

   If alm_in_alarm(motor_fault) and new_batch_started then 1 else 0

3. In the Event editor's Action field, type **DataLogSnapshot <*file*>** where file is the name of the data log model.

When tag1 goes into alarm, the DataLogSnapshot <*file*> command runs. All tags in the model will then be logged (not just the tag in alarm).

Combining logging

You can combine periodic or on–change logging with on–demand logging. This enables data to be captured at particular times, as well as when a particular event occurs.

To combine logging:

1. In the Data Log Setup editor, choose Periodic or On Change as the log trigger.
2. Type the DataLogSnapshot <*file*> command or the DataLogSnapshot * command anywhere an RSView32 command or macro can be used.

Providing operators with a way to log on demand

At runtime, operators might need to take a snapshot of data. To do this, they need a way to issue the DataLogSnapshot <*file*> command or the DataLogSnapshot * command. Possible methods include:

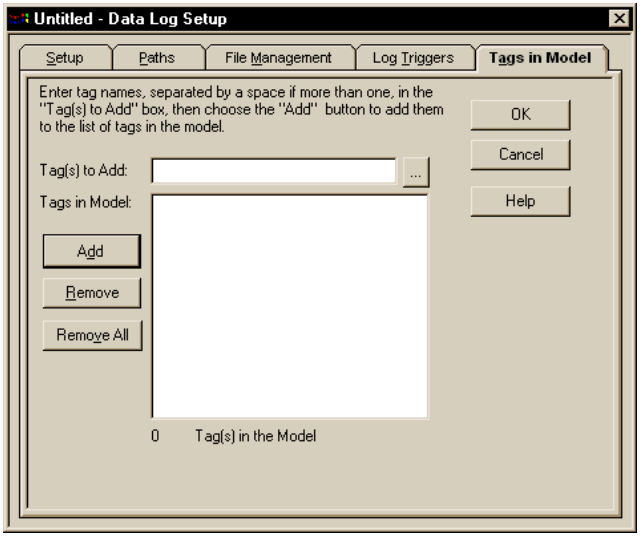
- creating a button object and using the command as the press action—operators can then press the button to take a data log snapshot
- creating a display key or global key and using the command as the press action—operators can then press a key to take a data log snapshot
- providing a command line—operators can then type the command directly on the command line

Choosing the data to log

For narrow–format dBASE IV models and ODBC models, the model can contain up to 10,000 tags. For wide–format dBASE IV models, the model can contain up to 100 tags.

To specify tags:

1. In the Data Log Setup editor, click the Tags in Model tab.



2. In the Tag(s) to Add field, specify the tags that will be logged by:

   - typing the tag names, separating multiple tag names by a space or a comma
   - using the selection button to open the Tag Browser and then selecting tags. To select multiple tags, Shift–click to select groups of tags or Ctrl–click to select individual tags.

3. Click the Add button. The tags listed in the Tag(s) to Add field appear in the Tags in Model field.

   To remove a tag from the Tags in Model field, click a tag, and then click Remove. To remove multiple tags, Shift–click the tags and

then click Remove. To remove all tags, click Remove All. Tags that you remove appear in the Tag(s) to Add field. Delete the tags you want to remove from the Tag(s) to Add field before you click OK.

Editing the data log model

You can edit a model during development or runtime. If you change a model at runtime, the changes will not take effect until you stop data logging and then restart it.

For narrow–format dBASE IV models and ODBC models, adding or deleting a tag in the model does not cause a new file set to be created the next time the DataLogOn <*file*> command runs. For wide–format dBASE IV models, adding or deleting a tag in the model causes a new log file set to be created the next time the DataLogOn <*file*> command runs.

To edit the data log model:

1. In the Project Manager, open the data log model you want to change.
2. Make the required changes.
3. Save the changes.

IMPORTANT If you delete a tag from a data log model, and the tag is also used in a trend object, be sure to remove all references to the deleted tag from the trend object.

Changing logging paths using RSView32 Runtime

You can change the logging paths at runtime using RSView32 Runtime (you don't need to use RSView32 Works). You can change the primary and secondary paths for dBASE IV data log models, and

the backup path for ODBC data log models. You cannot change the ODBC database using RSView32 Runtime.

To edit the logging paths:

1. In the Project Manager, open the Data Log folder.
2. Open the Data Log Path editor.
3. Specify paths as described in "Specifying logging paths" on page 7-22.

Changing logging paths using the DataLogPath command

The operator can also change logging paths at runtime using the DataLogPath <*file*> command, where <*file*> refers to the data log model you want to change paths for.

The command opens the Data Log Path editor. Use the editor to specify paths as described in "Specifying logging paths" on page 7-22. You can use the editor to change the primary and secondary paths for dBASE IV data log models, and the backup path for ODBC data log models. You cannot change the ODBC database using the Data Log Path editor.

You can use the DataLogPath command anywhere an RSView32 command or macro can be entered.

Making runtime changes without editing the data log model

You can change certain data log parameters at runtime without editing the data log model. These runtime changes take effect immediately, but are not retentive:

- changing the log rate for periodic logging
- changing the log file identifier string

Use these commands anywhere an RSView32 command or macro can be entered. For example, type the command directly on the command line.

Changing the log rate for periodic logging

You can change the log rate for periodic logging at runtime using the DataLogChangeRate <*file*> <*value*> [*unit*] command.

- <*file*> is the name of the data log model
- <*value*> is the numeric portion of the time interval for the log rate. For example, if you want to log data every 20 seconds, the value is 20.
- [*unit*] is the time unit of the log rate: hundredths, tenths, seconds, minutes, hours, or days. The default is seconds if you omit the [*unit*] parameter.

The change to the logging rate applies during the current logging session only. When you stop and restart logging, RSView32 uses the logging rate you specified in the data log model.

Changing the log file identifier string

You can change the log file identifier string that is used as part of the file name for dBASE IV log files that use long file names. The log file identifier string is also used in the names of ODBC backup files that use long file names. To change the string, use the DataLogRenameFile <*file*> <*LogFileIDString*> command.

- <*file*> is the name of the data log model
- <*LogFileIDString*> is the log file identifier string, up to 20 characters

The change to the log file identifier string applies during the current logging session only. When you stop and restart logging, RSView32 uses the log file identifier string you specified in the data log model.

Displaying data in a trend

The data for historical trends comes from data log files. You can set up trends to display data from one file set or from all file sets. When data comes from one file set, it is called file–based trending. When you configure trending, you can specify exactly which file you want to see. When data comes from all the file sets, it is referred to as historical trending.

For more information about trends, see Chapter 13, *Configuring trends*.

Starting and stopping data logging

There are many ways to start and stop data logging. Choose the way that works best for your project.

For a complete list of RSView32 commands and their command syntax, see Appendix A, *RSView32 commands*, or see Help.

Ways to start data logging

In the descriptions below, <*file*> represents the name of the data log model.

- In the Startup editor, select the Data Logging check box and specify a data log model. If you want to start more than one data log model for a project, include the DataLogOn <*file*> command in a startup or login macro.
- In the Macro editor, create a startup or login macro that includes the DataLogOn <*file*> command.
- In the Graphic Display editor, specify the DataLogOn <*file*> command in the Startup field in the Display Settings dialog box.
- In the Graphic Display editor, create a button object and specify the DataLogOn <*file*> command as the press action. When the button is pressed, data logging of the specified model starts.
- In the Graphic Display editor, create a graphic object and attach touch animation with the DataLogOn <*file*> command as the press action. When the object is touched, data logging of the specified model starts.
- In the Events editor, specify the DataLogOn <*file*> command as the action for an event.
- On the command line, type **DataLogOn <*file*>** and then press Enter.

Ways to stop data logging

When a project stops, all data log models automatically stop as well. To stop data logging without stopping the project, use any of the methods described next.

To stop a single data log model, use the DataLogOff <*file*> command where <*file*> is the name of the data log model. To stop all data log models, use the DataLogOff * command.

- In the Graphic Display editor, specify the DataLogOff <*file*> command or the DataLogOff * command in the Shutdown field in the Display Settings dialog box.

  Note that if the display is cached using the Always Updating option, the DataLogOff command won't be executed until the display is removed from the cache (for example, by using the FlushCache command).

- In the Graphic Display editor, create a button object and specify the DataLogOff <*file*> command or the DataLogOff * command as the press action. When the button is pressed, the specified command runs.

- In the Graphic Display editor, create a graphic object and attach touch animation with the DataLogOff <*file*> command or the DataLogOff * command as the action. When the object is touched, the specified command runs.

- In the Events editor, specify the DataLogOff <*file*> command or the DataLogOff * command as the action for an event.

- On the command line, type **DataLogOff <file>** or type **DataLogOff *** and then press Enter.

Chapter

8 Configuring activity logging

Activity log records information about various types of system activity. The information is stored in dBASE® IV (.dbf) format and can be:

- viewed with the Activity Log Viewer
- archived for future processing or analysis
- used with third–party software, such as Microsoft® Excel, Crystal Reports®, and Microsoft Visual FoxPro®, for display or analysis
- exported to ODBC format while online

Which activities can be logged?

You can log some or all of the following types of system activity:

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

You can also log custom messages generated by VBA programs.

If you use the electronic signature button, the activity log records the name and comment of the operator who initiates the button's action, and, if required, the name and comment of the supervisor who

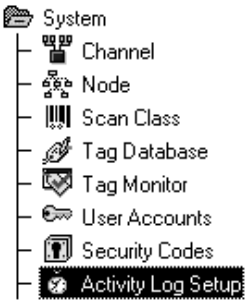
authorizes the action. For tag writes, the activity log also records the old value and the new value.

Summary of steps

By default, RSView32™ is set up to log activities. You can change the default settings and specify:

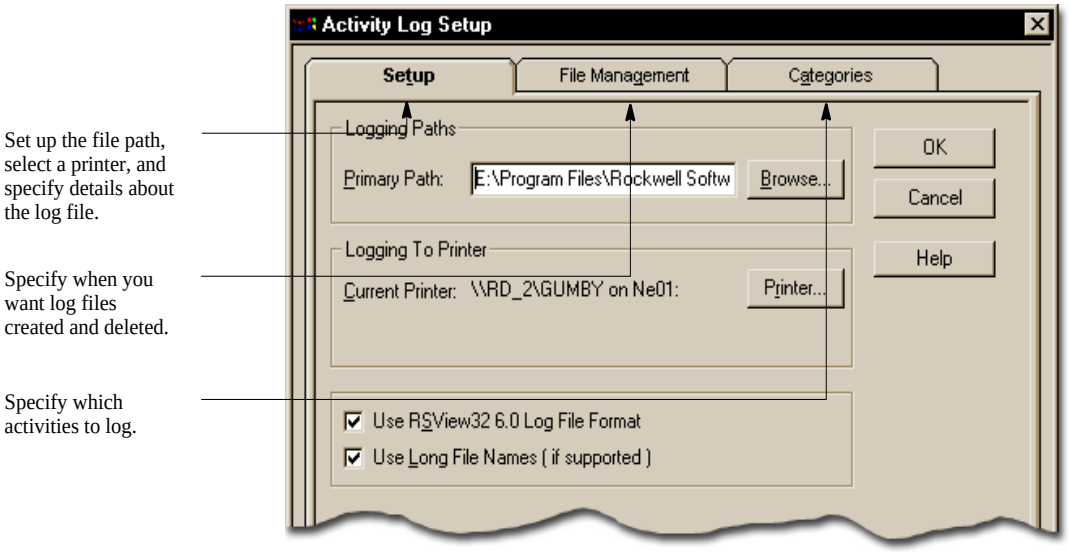
- where to store activity log files
- when to create and delete log files
- which activities to log

The Activity Log Setup editor



To open the Activity Log Setup editor:

1. In the Project Manager, open the System folder.
2. Open the Activity Log Setup editor by doing one of the following:
   - double–click the Activity Log Setup icon
   - right–click the Activity Log Setup icon and then click Show



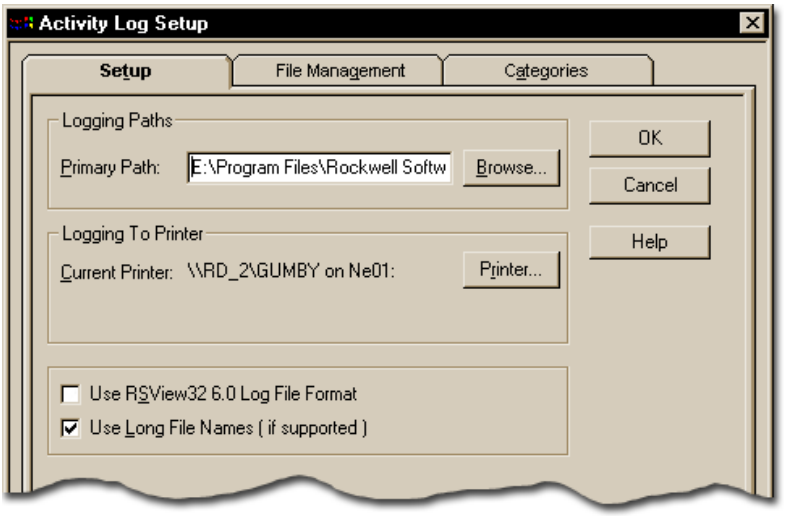
RSView32 versions 6.2 and later contain extra fields in the dBASE IV file format for storing activity log data. The newer .dbf file format logs details about the computer on which the logging server is running.

Specifying where to store activity log files

By default, activity log files are stored in the ACTLOG subdirectory of your project.

To specify where to store log files:

1. In the Activity Log Setup editor, click the Setup tab.



2. If you want to change where the log files are stored, type a new path.

   When log files are created, they will be stored in the directory specified here.

3. If you want activities logged to a printer, click the Printer button to display a list of available printers.

   Only printers already set up on your system are available for printing. For information on installing a printer, see your Windows® documentation.

IMPORTANT Page printers, such as laser printers, are not supported.

4. If you want to log activities in a format that is compatible with projects running in RSView32 version 6.0 or earlier, click Use RSView32 6.0 Log File Format.

5. If you want your activity log files to be named using the MS-DOS® eight–character file name and three–character extension format, click to deselect Use Long File Names. If the path where the log files are stored supports long file names, the date stamp part of the log file name includes a four–digit year.

6. Click OK.

Creating log files

You can set up your project to create new log files:

- periodically
- at specified times
- when a particular event occurs
- never

Up to 26 new files can be created in each 24–hour period. If you attempt to create a 27th file, RSView32 continues logging data to the 26th file.

For log files with both long and short file names, the sequence starts again at midnight, with the first new file for the new day.

Log files are saved in the directory you specified under the Setup tab.

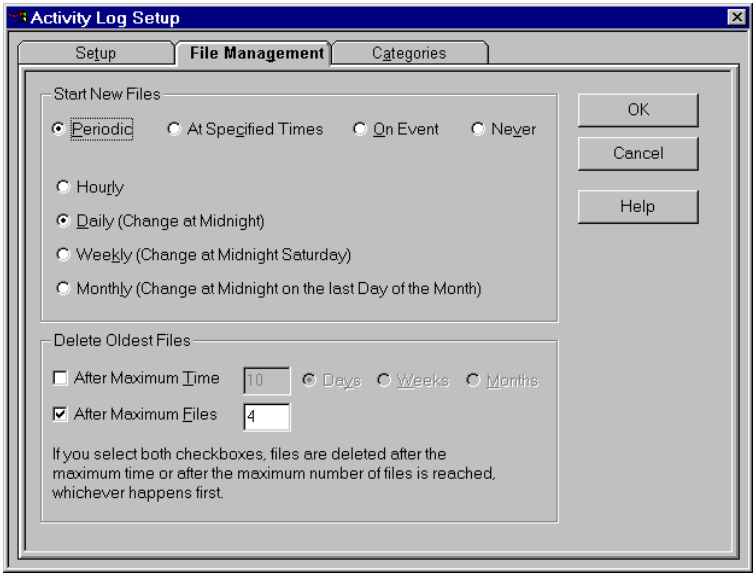
For more information about activity log files, see "About activity log files" on page 8-10, "Bringing logged dBASE IV data into Microsoft Excel" on page 16-4, and "Activity log files" on page 16-7.

Monitoring disk space

If your computer's hard disk is full, activity logging stops and no more log files are created. To monitor disk space, see page 18-14.

To specify when to start new files:

1. In the Activity Log Setup editor, click the File Management tab.



2. Under Start New Files, click a button to specify when you want to have new files created. See the topics below for information on the different times.

Creating files periodically

Click Periodic, and then click a time period. A new file is created after the specified interval has elapsed.

For this period	The new file is created
Hourly	Approximately on the hour

Daily	Each day approximately at midnight
Weekly	Each Sunday approximately at midnight
Monthly	On the first day of each month approximately at midnight

Creating files at specified times

Click At Specified Times, and then type a time or list of times when you want activities to be logged to a new file. Start a new line for each new time and allow at least five minutes between start times.

Use any of the following to specify time:

Time	Format
Day	Sun, Mon, Tue, Wed, Thu, Fri, or Sat
Date	1 – 31 **Note:** Specifying 31 means that months that do not have 31 days will not have new log files.
Hour	00: to 23:
Minute	:00 to :59

You can combine hours and minutes with a day or date.

Example: Creating a new file

To have a new file start every Wednesday at 2:00 am and every Friday at 2:00 pm, type the following start times:

Creating files when a particular event occurs

1. Click On Event.
2. In the Expression field, create the expression that will trigger creation of a new file. For details about expressions, see Chapter 14, *Creating expressions*.

Example: Creating a new file for a new shift

You can set up your project so it creates a new log file at the end of a shift or batch process. For example, create a tag called NextShift. In the Activity Log Setup editor, click On Event and type **NextShift** as the expression.

When the tag evaluates to true, a new activity log file is created to store the data from the new shift.

Never creating new files

Click Never. Logged data is added to a single file.

When considering how much data to log to a file, keep in mind that the Activity Log Viewer can display a maximum of 32,767 records at one time.

To manage disk space if a log file grows too large, stop activity logging, delete the activity log file, and then restart activity logging. You cannot delete a log file while activities are being logged. For details about how to monitor disk space, see page 18-14.

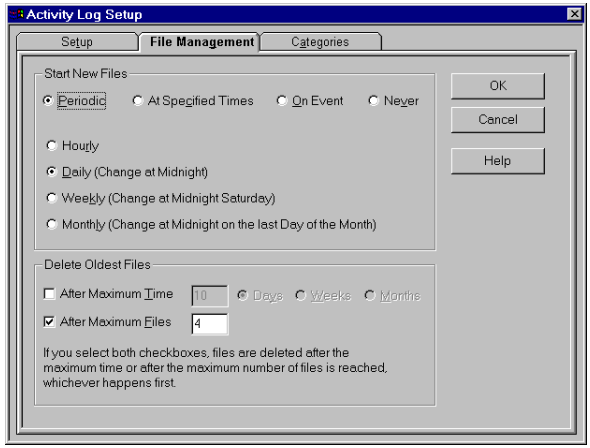
Deleting log files

You can delete old log files after a specified period or once a specified number of files has been created. If you never want files deleted, leave the check boxes under Delete Oldest Files blank.

Activity log files are deleted only when a new file is created. So, if your project creates a new file each day and deletes the oldest file every third day, your project will have files for the three previous days' data as well as a file for the current day.

To specify when to delete files:

1. In the Activity Log Setup editor, click the File Management tab.



2. Under Delete Oldest Files, select one or both check boxes and type a number to specify when to delete the log files. If you select both check boxes, files are deleted after the maximum time or after the maximum number of files is reached, whichever happens first. If you do not want files deleted, leave the check boxes under Delete Oldest Files blank.

   #### After Maximum Time

   Files are deleted after the maximum time has expired. For example, if two days is the specified time, files are deleted at midnight of the

third day so you always have the two previous days' data and the current day's data.

After Maximum Files

The oldest log file is deleted after the specified maximum has been reached. The files currently being logged to are not included in this number. For example, if you specify 10, you will have a maximum of 11 activity log files at any time—10 old ones and the current one. When a new file is started, the oldest file set is deleted.

About activity log files

Logged activities are stored in dBASE IV (.dbf) format.

How log files are named

When a log file is created, it is named automatically. The name is based on the date the file was created and the type of data it contains. The format for the name is YYYYMMDDnz.dbf, where:

- YYYY are the four digits of the year
- MM is the month
- DD is the day
- n is the sequence letter (a, b, c, and so on). This letter indicates the sequence files were created in. You can have up to 26 files (a to z) per day. At midnight, the sequence starts at "a" again.
- z is the file type: i is for activity

If the path where the log files are stored does not support long file names, the format for the name is YYMMDDnz.dbf, where YY are the last two digits of the year.

Example: Log file name

The activity log file named 971028bi.dbf was created in the year 97, month 10, and day 28. The b indicates that this is the second file created that day. The i indicates that this is an activity log file.

Exporting activity log files to ODBC format

Using the command, ActivityLogSendToODBC, you can export logged activities from dBASE IV (.dbf) format to an ODBC database.

If the table in the database to which you are attempting to export data is not ODBC–compliant, the export will fail. If an ODBC–compliant table does not exist, RSView32 will try to create it. RSView32 supports the following ODBC–compliant databases: Microsoft Access, Sybase® SQL Server™, Oracle®, and Microsoft SQL Server.

When you export data to an ODBC table, RSView32 keeps track of the data that was exported in a control file, Activity.exp. This is located in the log path where the .dbf files are stored. The next time you export data, only the newest data will be exported. If the control file is deleted, all the activity log data in the .dbf file will be exported when you issue the export command.

If you have set up file management to delete the oldest files when a new set is started, and you are exporting data to an ODBC database, make sure you export the data before the oldest files are deleted.

Example: Exporting activity log files to ODBC once a day

To export the contents of the activity log files to an ODBC database once every day, create an event file that specifies when and where to export the data. ActivityLogSendToODBC exports only the records added to the activity log files since the last export.

1. If required, using the ODBC Administrator, set up an ODBC data source name. For more information about setting up an ODBC data source, see page 7-16.
2. Double–click Events in the RSView32 Logic and Control folder.
3. In the Expression box, type: **time("01:00")**. This expression runs the command or macro you type in the Action box at 1:00 am every day.
4. If the ODBC data source is called RSView32ActivityLog, the target table name is ActivityTable, the user name is Derek, and the password is golf, in the Action box, type:

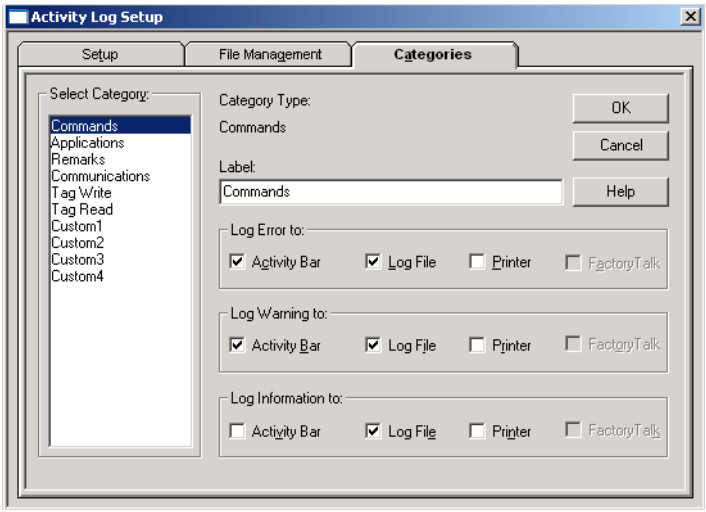
   ActivityLogSendToODBC RSView32ActivityLog ActivityTable / UDerek /Pgolf
5. Click Accept to save the event.
6. Click Close to save the event file.
7. At the command line, type **EventOn <*filename*>** where <*filename*> is the name of the event file you saved.

For information about the contents of the activity log ODBC tables, see page 16-8.

Specifying which activities to log

To specify which types of activity to log:

1. In the Activity Log Setup editor, click the Categories tab.



2. In the Select Category area, click a category:

This activity category	Logs
Commands	The execution of a command.
Applications	Applications such as security logins and data logging. ActiveX® events if the event has been set up to do so in the ActiveX Control Events dialog box.
Remarks	Remarks entered using the Remark command.

This activity category	Logs
Communications	Communication errors for device, DDE, or OPC® tags. Important: To log communication errors, you must also select the Communication Status check box in the Startup editor, or type the command ComStatusOn at the command line.
Tag Write	Any tag write (not write errors). Tag writes are done by the = (Equal), Ramp, Set, and Toggle commands, as well as by downloading data from numeric input, string input, and recipe fields in a graphic display.
Tag Read	Any tag read (not read errors). Tag reads can be done by uploading data into numeric and string input fields in a graphic display. Normal scanning is not logged as a tag read.
Custom 1 through Custom 4	User-defined messages for use with RSView32 VBA programs. For more information about using custom activity categories, see Help.

3. The label appears in the log file to identify an activity category. To create your own label, type a new label up to 20 characters long.

4. Check the appropriate boxes to specify where you want the activity logged. You can log to the activity bar, log file, and printer.

   For more information about the activity bar, see "Using the activity bar" on page 8-15. For more information about log files, see "Creating log files" on page 8-5.

5. Complete Steps 2 through 4 for each category you want to log.

You can also use the EchoOff and EchoOn commands to control activity logging. For more information see Appendix A, *RSView32 commands*.

Editing activity log setup

You can edit the activity log setup during development or runtime. If you change the activity log setup at runtime, the changes will not take effect until you stop activity logging and then restart it.

To edit the activity log setup:

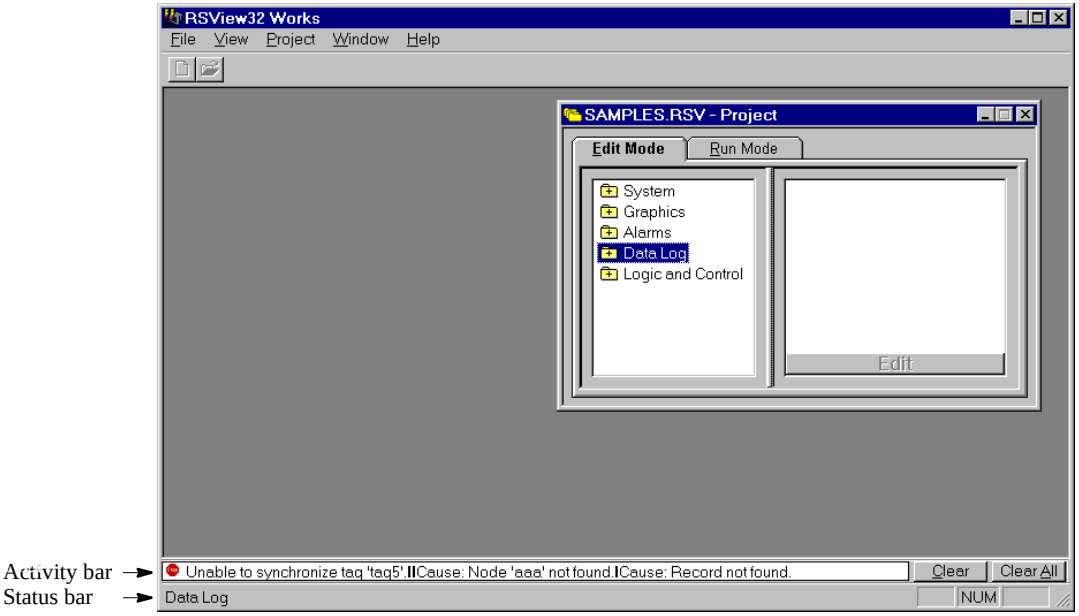
1. Open the Activity Log Setup editor.
2. Make the required changes.
3. Save the changes.

Using the activity bar

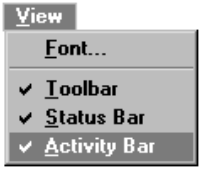
Use the activity bar to keep track of what is happening when a project is running. To log activities to the activity bar, the Activity Bar check boxes must be selected in the Categories tab of the Activity Log Setup editor.

Hiding, showing, and moving the activity bar

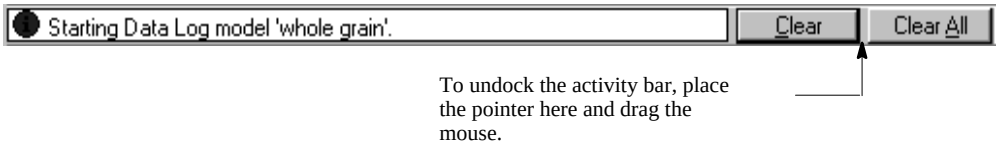
When RSView32 first starts, the activity bar is visible and is docked above the status bar in the RSView32 main window.



To show and hide the activity bar, click Activity Bar on the View menu for the Project Manager. When Activity Bar has a check mark beside it, the activity bar is visible. You can also use the ActivityBarOn and ActivityBarOff commands to show and hide the activity bar.



To undock the activity bar, place the pointer over the grey area between the Clear and Clear All buttons, and then drag the mouse until the bar is where you want it. You can place the activity bar anywhere on your screen, or redock it to the bottom of the RSView32 main window by dragging it to the bottom. To move the bar when it is not docked, grab the title bar and drag.

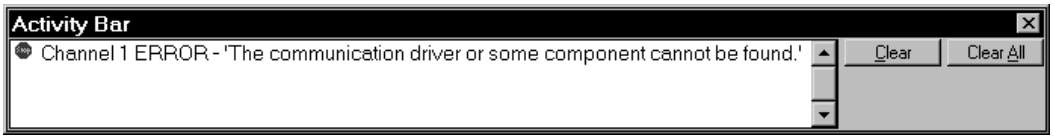


When the activity bar is undocked, you can make it any size you like, for example to view more than one message at a time. To resize the bar, grab an edge or corner and drag until the bar is the desired size.

Messages in the activity bar

The types of messages that appear in the activity bar depend on what is set up in the Categories tab of the Activity Log Setup editor.

Activity messages are preceded by a blue, yellow, or red icon. Blue indicates information, yellow indicates a warning, and red indicates an error. The following illustration shows an error:



To clear a message, use the Clear and Clear All buttons. Clear removes the top message. Clear All removes all the messages. Clearing a message in the activity bar does not delete the message from the activity log file.

Using the Activity Log Viewer

With the Activity Log Viewer, you can view records in the activity log file. Files can be viewed in both edit and run modes.

The Activity Log Viewer does not display all the information in the log file. To see the complete log file, use an application that reads dBASE IV (.dbf) files, such as Microsoft Excel, or export the data to an ODBC database and view it using a viewer such as Microsoft

Query. For more information, see "Tracking system usage" on page 8-19 and "Activity log files" on page 16-7.

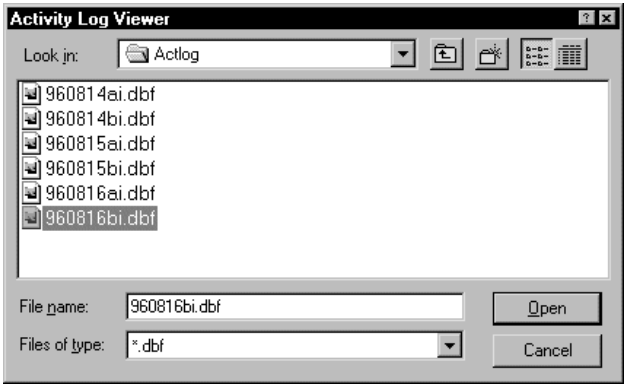
To open the Activity Log Viewer:

1. In the Project Manager, open the System folder.
2. Open the Activity Log Viewer by doing one of the following:
   - double–click the Activity Log Viewer icon
   - right–click the Activity Log Viewer icon and then click Show

Selecting a record

When the Activity Log Viewer opens, it displays the contents of the most recent log file. To select another file:

1. On the Records menu, click Select Log File.

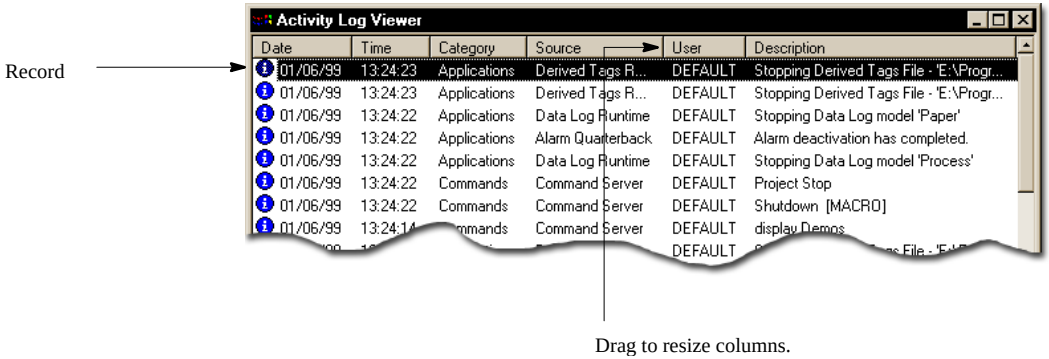


2. Click the file you want to view. The contents of the file are displayed in the viewer.

Or right click any tab in Activity Log Viewer, such as Data, Time and so on. Click Select Log File from Records menu, and then select the file you want to view.

Understanding records

The Activity Log Viewer displays up to 32,767 records. A record is made up of the items shown below:



The icon at the beginning of the record can be red, yellow, or blue. The colors provide a visual cue to the importance of the record. Red indicates an error, yellow indicates a warning, and blue indicates information.

Tracking system usage

If you have set up security for your project, you can use the activity log file to track what users are doing on the system. As shown in the figure above, when an activity is logged, the ID of the current user is also logged.

Starting and stopping activity logging

By default, activity logging is on when you start a project. However, if you need to start or stop activity logging, you can use any of the following methods:

Ways to start activity logging

- In the Macro editor, create a startup or login macro that includes the ActivityOn command.
- In the Graphic Display editor, create a button object and specify the ActivityOn command as the press action. When the button is pressed, activity logging starts.
- In the Graphic Display editor, create a graphic object and attach touch animation with the ActivityOn command as the action. When the object is touched, activity logging starts.
- In the Events editor, specify the ActivityOn command as the action for an event.
- On the command line, type **ActivityOn** and then press Enter.

Ways to stop activity logging

- In the Macro editor, create a shutdown or logout macro that includes the ActivityOff command.
- In the Graphic Display editor, create a button object and specify the ActivityOff command as the press action. When the button is pressed, activity logging stops.
- In the Graphic Display editor, create a graphic object and attach touch animation with the ActivityOff command as the action. When the object is touched, activity logging stops.

- In the Events editor, specify the ActivityOff command as the action for an event.
- On the command line, type **ActivityOff** and then press Enter.

For a complete list of RSView32 commands and command syntax, see Appendix A, *RSView32 commands*, or see Help.

Chapter

9 Configuring events

Events are expressions that trigger actions. Expressions are equations containing tag values, mathematical operations, if–then–else logic, and other built–in RSView32™ functions. Actions are RSView32 commands, symbols, or macros. An action could, for example:

- initiate a snapshot of tag values using the DataLogSnapshot command
- display an error screen using the Display command
- change a tag value using the Set command
- execute a VBA program using the VBAExec command

This chapter describes how to use the Events editor to create events. It does not describe the expressions used to produce the event's actual function, or the events associated with VBA programs. If you do not know how to use expressions, see Chapter 14, *Creating expressions*. For information about events in VBA programs, see the Help topics that relate to the RSView32 Object Model.

How to use multiple event files

You can create multiple event files. At runtime, up to 20 event files (containing a maximum of 1,000 events each) can run simultaneously.

Use multiple event files to:

- group events that need to be evaluated at different rates
- group events that are active only when a particular graphic display is active

Summary of steps

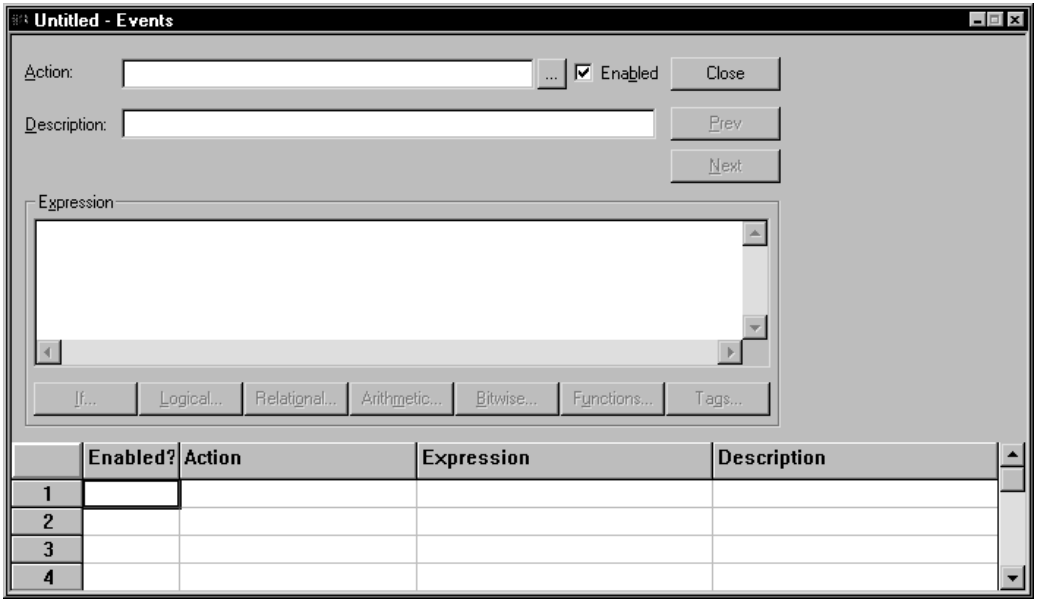
The main steps for configuring events are:

- set up the evaluation interval for the event file in the Event Setup dialog box
- create the events in the Events editor

The Events editor

To open the Events editor:

1. In the Project Manager, open the Logic and Control folder.
2. Open the Events editor by doing one of the following:
   - double–click the Events icon
   - right–click the Events icon and then click New



Using the Accept and Discard buttons

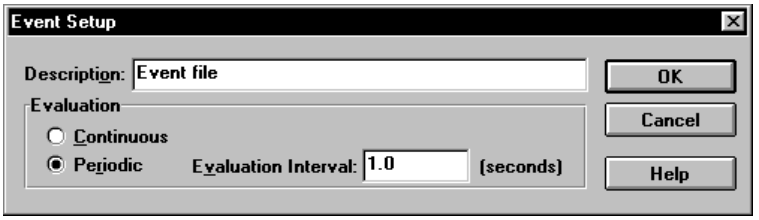
When you enter information in the editor, the Prev and Next buttons change to Accept and Discard. Click Accept to save information. Click Discard to discard information.

Setting up the evaluation interval

To set up the evaluation interval for the event file:

1. On the menu bar, click Setup and then click Event Setup.

   The Event Setup dialog box opens.



2. Type a brief description of the event file. This description is for your information only—it doesn't appear anywhere else.

   For example, if you were creating an event file for a certain area of your plant, you might type something like "East Wing Assembly Line" to identify the area.

3. Choose a type of evaluation to specify how often to evaluate expressions at runtime. When the evaluation interval expires, RSView32 evaluates the expressions that contain tags with values that have changed.

   To have expressions evaluated as quickly as possible, click Continuous. To have expressions evaluated at a particular interval, click Periodic and type a number in the Evaluation Interval field. You can use fractional seconds. For example, if you type .6, the expression will be evaluated every six–tenths of a second. If you're

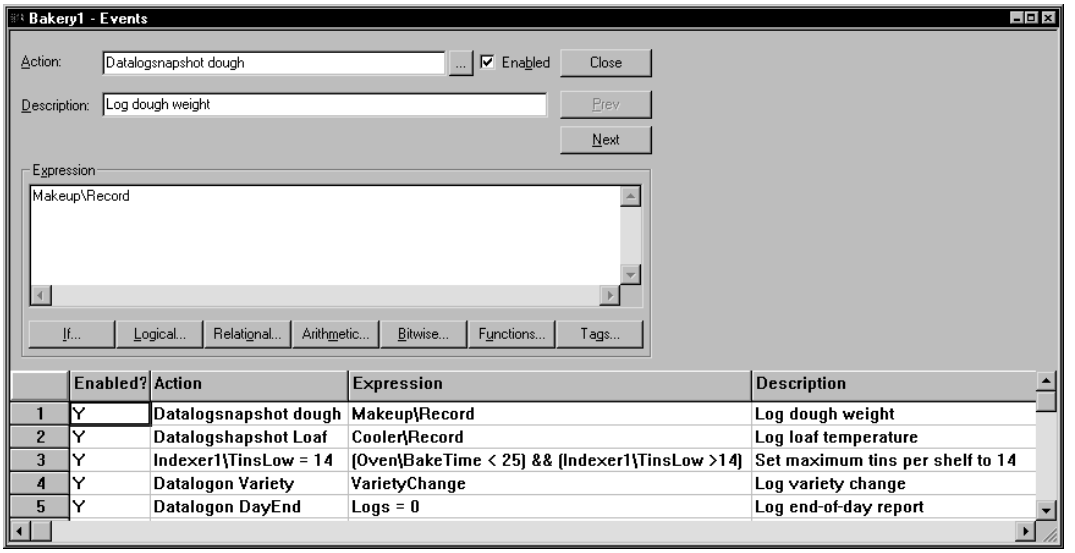
using tags, don't specify an evaluation interval faster than the scan class background period, DDE server polling rate, or OPC® server update rate.

4. Click OK.

Creating events

An event is made up of an expression and an action. When the expression changes from false on the previous evaluation to true on the current evaluation, the action is triggered.

The following illustration shows an event file.



To create an event:

1. In the Action field, type an RSView32 command, a macro, or a symbol that will run when the expression goes from false to true (but not from true to false).

   IMPORTANT Do not create events that depend on other events. Events are not processed sequentially.

   For a complete list of RSView32 commands, see Appendix A, *RSView32 commands*, or see Help.

   For more information about macros and symbols, see Chapter 15, *Setting up navigation*.

2. To disable the event, clear the Enabled check box. When the event file runs, this disabled event will not be evaluated.

3. In the Description field, type a brief description to document the event's function. This description is for your information only—it doesn't appear anywhere else.

4. In the Expression area, create an expression to specify the conditions that will trigger the action.

   For more information on expressions, see Chapter 14, *Creating expressions*.

5. Click Accept.

6. Repeat Steps 1 through 5 to create more events.

   Use the Next button to move to a new record in the spreadsheet.

Editing events

You can edit events during development or when you run the project using RSView32 Works.

1. Open the event file you want to edit.
2. Use the Prev and Next buttons to move among events. Make the required changes.
3. Save the changes.

If you change the event file while running the project, the changes won't take effect until you stop running the file and then restart it.

Starting and stopping event processing

There are many ways to start and stop event processing. Choose the way that works best for your project.

For a complete list of RSView32 commands and their command syntax, see Appendix A, *RSView32 commands*, or see Help.

Ways to start event processing

- In the Startup editor, select the Event Detector check box and specify an event file.
- In the Macro editor, create a startup or login macro that includes the EventOn <*file*> command.
- In the Graphic Display editor, specify the EventOn <*file*> command in the Startup field of the Display Settings dialog box.
- In the Graphic Display editor, create a button object and specify the EventOn <*file*> command as the press action. When the button is pressed, event detection starts.

- In the Graphic Display editor, create a graphic object and attach touch animation with the EventOn <*file*> command as the action. When the object is touched, event detection starts.

- On the command line, type **EventOn <*file*>** and then press Enter.

Ways to stop event processing

When a project stops, event processing stops as well. To stop event processing without stopping the project, use any of the methods below.

- In the Graphic Display editor, specify the EventOff <*file*> command in the Shutdown field of the Display Settings dialog box.

  Note that if the display is cached using the Always Updating option, the EventOff command won't be executed until the display is removed from the cache (for example, by using the FlushCache command).

- In the Graphic Display editor, create a button object and specify the EventOff <*file*> command as the action. When the button is pressed, event detection stops.

- In the Graphic Display editor, create a graphic object and attach touch animation with the EventOff <*file*> command as the action. When the object is touched, event detection stops.

- On the command line, type **EventOff <*file*>** and then press Enter.

Chapter

10 Adding security

This chapter describes the RSView32™ security system, and outlines how to:

- configure security codes
- secure RSView32 commands, macros, graphic displays, OLE objects, and tags
- configure user accounts
- use the electronic signature button to keep track of tag writes and command usage
- secure the RSView32 Project Manager
- prevent users from going outside of the project

About security

Use security to prevent users from accessing certain parts of the system.

Users and security codes

You can enter user names and passwords in the User Accounts editor, or, if you are using Windows Server 2003, Windows® XP, Windows 2000, or Windows Vista, you can use the Windows user list instead of creating a custom RSView32 list. No matter which method you choose to create the user list, you still have to assign security access to the individual users.

Security is based on a system of codes. Each code allows users with security privileges for that code to access the RSView32 features allowed by that code. Users can be assigned combinations of security codes, allowing each user to access a different set of features.

Security function

The user_haspermission security function allows you to check whether the current user has a specific security code. You can use this function anywhere that expressions are used. For more information, see Chapter 14, *Creating expressions*.

Electronic signatures

In addition to using security codes to limit access on a tag-by-tag or command-by-command basis, you can use the electronic signature button to keep track of who initiates actions such as writing tag values and issuing commands. You can also require that the action is approved by a pre-authorized verifier before the action is initiated.

The electronic signature button, together with other RSView32 security features, allows you to meet the security standards required for regulated manufacturing applications, for example those required for US Government 21 CFR Part 11 compliance.

Security Monitor utility

Use the Security Monitor utility, included with the RSView32 Resource Kit™, to customize user access to objects on graphic displays. With this utility, you can create a single set of graphic displays for all users, but have some objects visible or operable for some users, and not for others.

Example: Assigning security codes

The following security codes are set up:

- the DataLogOn command is assigned security code B
- a graphic display named Boiler is assigned security code D
- a tag named Tag1 is assigned security code E

In the User Account editor, the following security codes are assigned:

- Alice is assigned security codes B, D, and E
- Simon is assigned security codes B and D

User Accounts

	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	ALICE	N	Y	N	Y	Y	N	N	N	N	N	N	N	N	N	N	N		
3	SIMON	N	Y	N	Y	N	N	N	N	N	N	N	N	N	N	N	N		
4																			

This means that Alice has access to the command, the display, and the tag. Simon has access to the command and display, but not the tag.

Summary of steps for setting up security codes

The steps involved in setting up security codes are:

- assigning security codes to RSView32 commands and macros in the Security Codes editor
- assigning security codes to graphic displays and OLE objects with verb animation in the Graphic Display editor
- assigning security codes to tags in the Tag Database editor

- assigning security codes to users in the User Accounts editor

Before you begin

Before you begin, gather a list of:

- RSView32 commands and macros

  For a complete list of RSView32 commands, see Appendix A, *RSView32 commands*, or see Help.

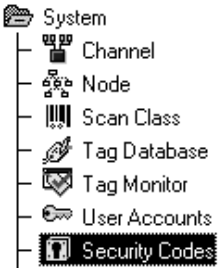
- graphic displays, OLE objects with verb animation, and tags

- users or groups of users requiring accounts

Configuring security codes

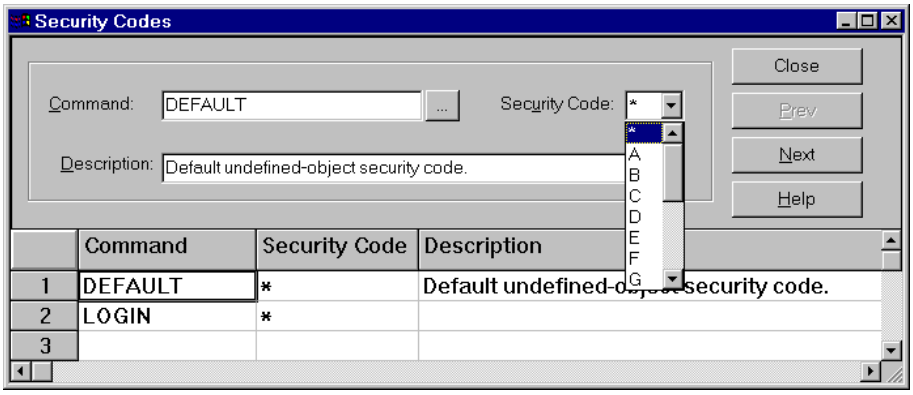
In the Security Codes editor, you create a list of RSView32 commands and macros and then assign a security code to each item in the list.

Here, you can also turn off strict security, which means commands or macros issued from somewhere other than the command line—such as from a graphic object with touch animation—are not checked for security. For details, see "Using strict security" on page 10-7.



To open the Security Codes editor:

1. In the Project Manager, open the System folder.
2. Open the Security Codes editor by doing one of the following:
   - double–click the Security Codes icon
   - right–click the Security Codes icon and then click Show



Security codes

RSView32 has 17 security codes: an asterisk (*) and the letters A through P. The asterisk is for unlimited access, and the letters are for limited access. The letters are not hierarchical—that is all letters provide the same level of security. You do not have to use all of the security codes, nor do you have to assign the codes in a particular order. For example, you can choose to use only the codes D and P and you can assign P before you assign D.

The default

The first record in the spreadsheet is called Default. Any commands or macros that are not listed in the spreadsheet use the security code selected for the default.

You can change the security code for the default. Initially, it is an asterisk (*), which means unlimited access. If you leave it as an asterisk, you have to list all RSView32 commands and macros you want to secure. This is referred to as security by inclusion. If you change the default to a letter, you have to list only those commands you want users who are assigned this code to have access to. This is referred to as security by exclusion.

Setting up security by inclusion

Security by inclusion means all RSView32 commands and all macros requiring security are listed in the Security Codes editor.

1. For Default, leave the security code as *.
2. In the Command field, type the command or macro you want to assign security to.

   If you assign security to the Login and Logout commands, be sure to give all users, including Default, access to these commands. Otherwise, users might be locked in or out of the system. It is recommended that Login and Logout keep the * security code.

3. In the Security Code field, select a code for the command or macro.
4. If you like, type a descriptive remark in the Description field.
5. Repeat steps 2 through 4 for each command and macro.
6. Save the configuration by choosing Close.

Setting up security by exclusion

Security by exclusion means only the RSView32 commands and macros you want users who are assigned this code to have access to are listed in the Security Codes editor.

1. For Default, change the security code to any letter.
2. In the Command field, type a command or macro you want users who are assigned this code to have access to.

   Ensure you include the Login and Logout commands and assign them the * security code.

3. In the Security Code field, select a code for the command or macro.

4. If you like, type a descriptive remark in the Description field.
5. Repeat steps 2 through 4 for each command and macro.
6. Save the configuration by choosing Close.

Preventing access to the Security Codes and User Accounts editors

Both the Security Codes editor and the User Accounts editor have commands that can be used at runtime to open these editors. The Security command opens the Security Codes editor and the Account command opens the User Accounts editor.

Be sure to secure the Security and Account commands in the Security Codes editor to prevent users from accessing these editors at runtime. If users open the editors, they can edit any information. Also be sure to restrict access to the ProjectShow command, as it allows access to these editors. For additional information see "Securing the Project Manager" on page 10-16.

Using strict security

When strict security is on, the system checks the security codes of commands and macros no matter where they are issued from. When strict security is off, the system checks the security codes of commands and macros only when they are issued from the command line.

When strict security is on, RSView32 checks security access to commands or macros issued from:

- macros
- command line
- button objects
- object, display, and global keys

- objects configured with touch animation
- Alarm Identification field in the Tag Database editor

By default, strict security is on. For most projects, strict security is desirable.

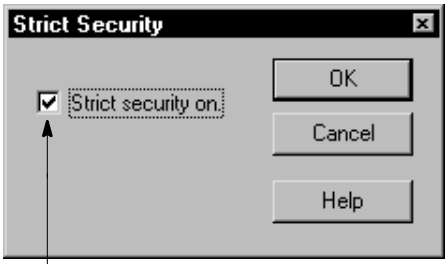
IMPORTANT Strict security always applies to graphic displays, OLE verbs, and tags. If you assign security to any of these items, their security is always checked.

Turning off strict security

If you turn off strict security, security access to graphic displays, OLE verbs, and tags is still checked. As well, commands issued from the command line are checked. However, the system does *not* check security access to commands issued from components other than the command line. For example, if strict security is off, commands issued from a graphic display are not checked for security access.

To turn off strict security:

1. Open the Security Codes editor.
2. On the menu bar, click Setup, and then click Strict Security.



If you do NOT want strict security, clear this check box.

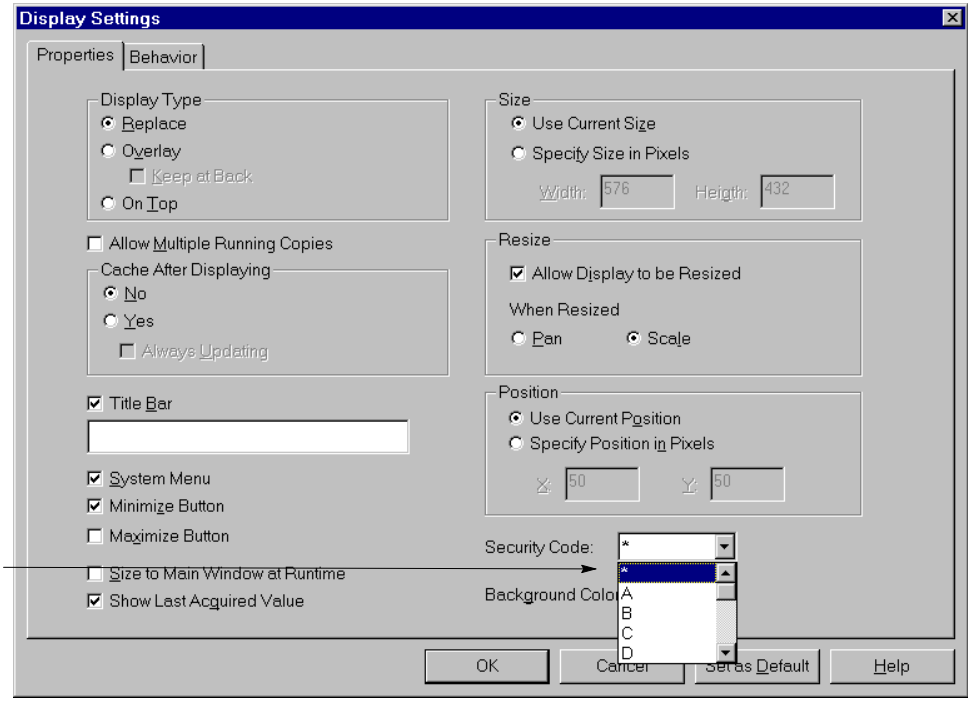
3. Clear the check box.
4. Click OK.

Assigning security to a graphic display

Security is assigned to a graphic display in the Graphic Display editor. You can assign security while you are creating a graphic display, or you can assign it later.

1. In the Graphic Display editor, open Display Settings by doing one of the following:

   - click Display Settings on the Edit menu
   - right–click the mouse button and then click Display Settings



Select a security code.

2. Select a security code.

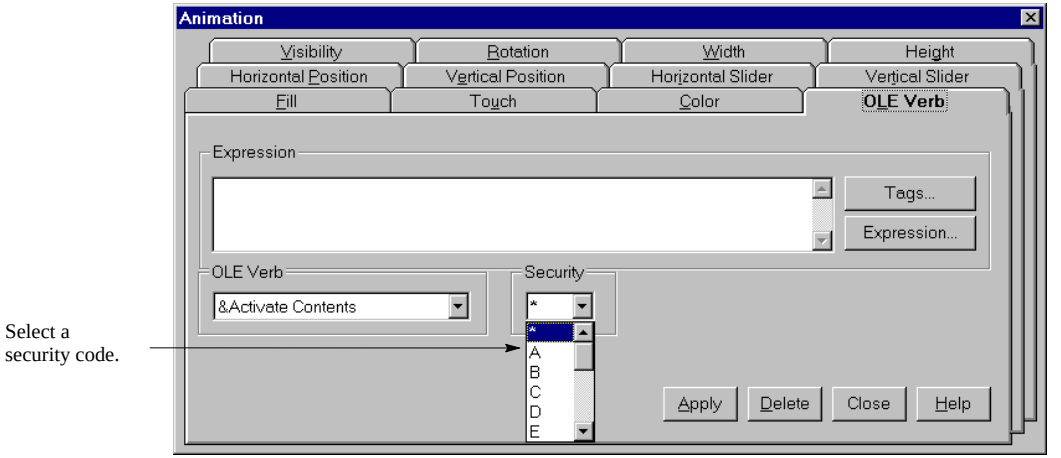
3. Click OK.

Assigning security to an OLE object

Security is assigned to a graphic object with OLE verb animation in the Graphic Display editor.

IMPORTANT Once an OLE object is activated, there is no security within the associated application. Therefore, the only way to secure the application is to assign security to the OLE object.

1. Open the Graphic Display editor.
2. Select the OLE object you would like to secure.
3. Open the Animation dialog box by doing one of the following:
   - click an item on the Animation menu
   - click Animation on the View menu
   - click Animation on the context menu and click an item
4. Click the OLE Verb tab.



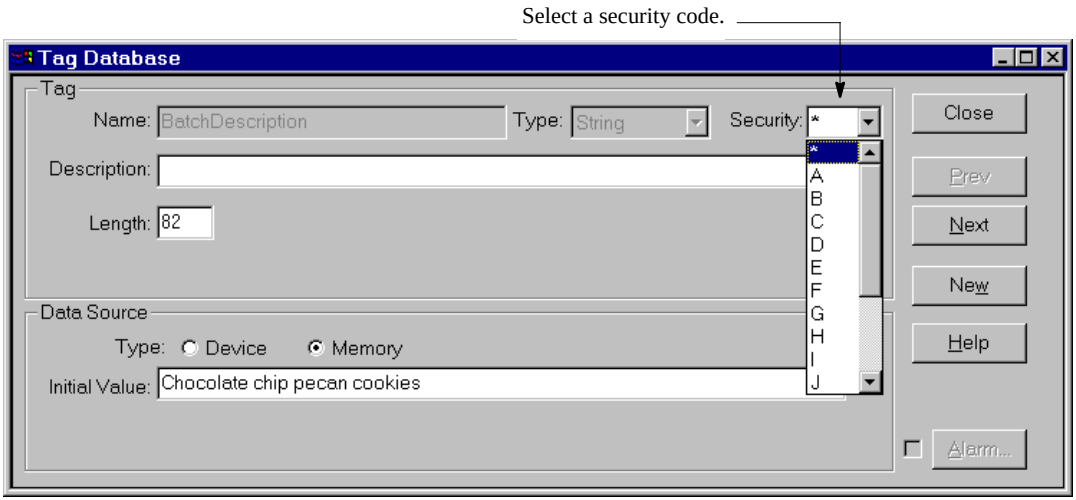
5. In the OLE Verb field, select the verb you want to secure.
6. Select a security code.

7. Click Apply.

Assigning security to a tag

Security is assigned to tags in the Tag Database editor. By assigning security, you can restrict write access to a tag so a user cannot change the tag's value.

1. Open the Tag Database editor.
2. Select the tag that requires security.
3. Select a security code.



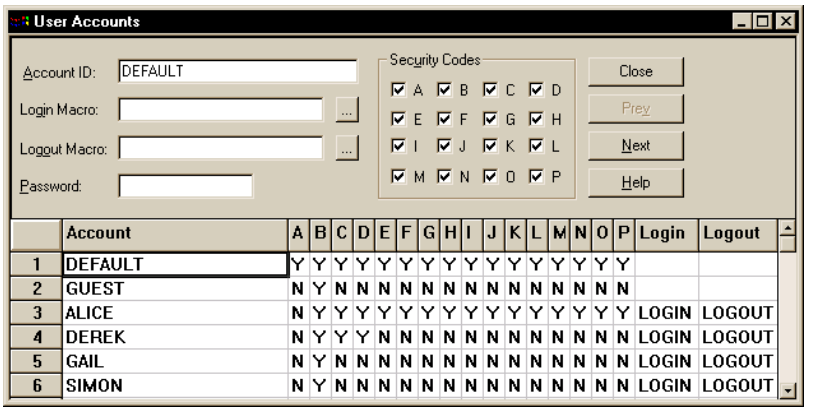
4. Click Accept.

Configuring user accounts

Once you have assigned security codes to RSView32 components, assign these codes to users. You can configure user accounts in the User Accounts editor, or, if you are using Windows Server 2003, Windows XP, Windows 2000, or Windows Vista, you can use the Windows user list instead of configuring a custom RSView32 list.

To open the User Accounts editor:

1. In the Project Manager, open the System folder.
2. Open the User Accounts editor by doing one of the following:
   - double–click the User Accounts icon
   - right–click the User Accounts icon and then click Show



	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	GUEST	N	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	N		
3	ALICE	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	LOGIN	LOGOUT
4	DEREK	N	Y	Y	Y	N	N	N	N	N	N	N	N	N	N	N	N	LOGIN	LOGOUT
5	GAIL	N	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	N	LOGIN	LOGOUT
6	SIMON	N	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	N	LOGIN	LOGOUT

About the default user

The default user account is active when no user is logged into the system. When setting up security, keep the following in mind:

- You can change the security codes for the default user account, but you cannot change the account ID, or add a password.
- For a completely secure project, clear all security codes for the default user account. This ensures that the default user does not have any privileges.

Ensuring you always have access

When setting up accounts, first create a "super user" account for the system administrator, filling in the fields as specified below. Be sure to select all security codes (A through P).

Creating user accounts

You can create user accounts in the User Accounts editor, or, if the computer on which RSView32 is installed is running Windows Server 2003, Windows XP, Windows 2000, or Windows Vista, you can create user accounts by adding users from the Windows domain user list. You cannot use both Windows and RSView32 to maintain user accounts in the same project.

When you use the Windows user list you can't enter or change user names or passwords in the User Accounts editor, but you can specify login and logout macros.

All users you add from the Windows user list must be in the same Windows domain. All Windows users added to the RSView32 User Accounts will have the same security codes as DEFAULT in the User Accounts editor.

Once you have added users from the Windows user list, you will have to specify security access for each user you added in the RSView32 User Accounts editor.

To create user accounts using the User Accounts editor:

1. In the Account ID field, type a user ID up to 20 characters long. The ID can include letters and numbers, but cannot include spaces, or the characters / \ [ ] ; : | = , . + * ? < >. The ID also cannot be NULL.

   The account ID can be the name of a user, a name for a group of users, or an ID number.

2. If you like, type the name of a macro in the Login Macro and Logout Macro fields.

   These macros run each time this user logs in and out. For more information about macros see "Login and logout macros" on page 10-15.

3. In the Password field, type a password up to 15 characters long. The password can include letters and numbers, and is not case sensitive. A blank or null password is acceptable.

   Users can change the password at runtime. For details, see "Changing passwords at runtime" on page 10-18.

4. In the Security Codes area, select the check box for each security code you want this user to have access to.

5. Click Accept.

6. Repeats steps 1 through 5 for each user.

7. To save the user account configuration, click Close.

To create users from the Windows domain user list:

1. On the Setup menu, click Windows Security Options.

   In the Windows Security Options dialog box you select which Windows users you want to make up the RSView32 user accounts list. All users must be in the same Windows domain. All Windows users added to the RSView32 User Accounts will have the same security codes as DEFAULT in the User Accounts editor. You will have to specify individual users' security access in the User Accounts editor's main dialog.

2. Click the option Use Windows User Accounts as Source for RSView32 User Accounts.

3. Select the Windows domain that contains the users you want to add to the RSView32 user list.

4. Do one of the following:

   - Select users from the Windows Domain User Accounts list, and then click the single right arrow (>) or double–click one of the user names to copy them into the RSView32 User Accounts list. To copy all the users from the Windows Domain User Accounts list, click the double arrow (>>).

   - Check the option Synchronize RSView32 User Accounts with Windows User Accounts, to use all Windows user accounts for the RSView32 user accounts list and have it automatically updated whenever new users are added to, or removed from the domain.

Login and logout macros

Each person with a user account can have a login and logout macro.

Any macro file can be a login or logout macro and the file can contain any RSView32 command. For example, a login macro could contain a command to bring up a graphic display for an area of the plant. A

logout macro could contain commands to close all active screens and redefine sensitive keys.

For more information on macros, see "Creating macros" on page 15-7.

Using electronic signatures to prevent unauthorized actions

Use the electronic signature button to prevent unauthorized users from writing values to tags and running commands. You can set up the button so that the action the button press performs must be approved by a pre-authorized verifier before the action is initiated.

If you use the electronic signature button, the activity log records the name and comment of the operator who performs the button's action, and, if required, the name and comment of the supervisor who approves the action.

Add the electronic signature button to your graphic displays in the Graphic Display editor. For details, see "Recording and authorizing run-time changes using electronic signatures" on page 11-79.

Securing the Project Manager

There is no security from within the Project Manager. Therefore, to prevent unrestricted access to project components, ensure users cannot access the Project Manager. To do this, you can:

- assign security to the ProjectStop and ProjectShow commands in the Security Codes editor. For details about these commands and how to hide the Project Manager, see Appendix A, *RSView32 commands*, or see Help.
- disable the Windows shortcut keys for accessing the Project Manager (Ctrl–Alt–P) by selecting the appropriate check box in the Startup editor. For details, see page 18-4.

Preventing users from going out of the RSView32 project

To prevent users from going outside of the RSView32 project, do one or more of the following:

- do not include title bars or minimize and maximize buttons on graphic displays by deselecting the appropriate options in the Graphic Display editor's Display Settings dialog box. For details, see page 11-17.

- disable access to the operating system as follows:

  - for all operating systems, prevent users from switching to other applications by disabling "Switch to other Apps" in the Startup editor

  - for Windows Vista, Windows Server 2003, Windows XP, or Windows 2000, prevent users from accessing the desktop by using Win2K XP DeskLock tool in the RSView32 Tools program folder

  For details about the Startup editor, see Chapter 18, *Running your project*.

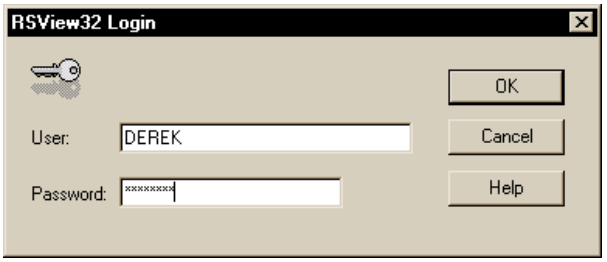
  For details about the DeskLock tool, see the Win2K XP DeskLock Help.

Logging in at runtime

When you use the Windows Security Options, user authentication at login is performed by Windows Server 2003, Windows XP, Windows 2000, or Windows Vista rather than by RSView32.

If your project requires users to log in when the project opens, ensure you include a way for them to issue the Login command. For example,

create a button and use the Login command as the press action. When a user presses the button, the following dialog box appears:



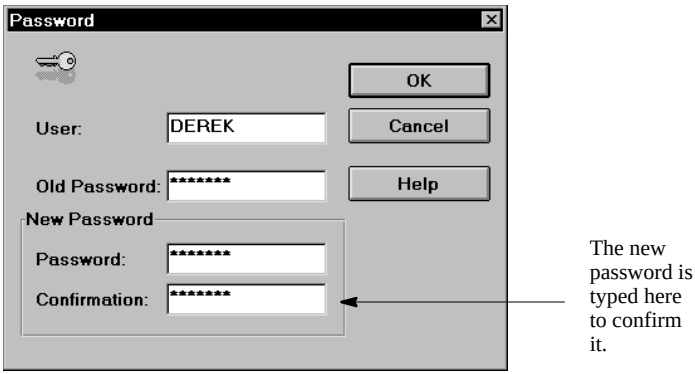
If your project does not require users to log in when the project opens, and you are not using the Windows Security Options, the user called DEFAULT is logged in automatically. If you are using the Windows Security Options, the current Windows XP, Windows 2000, Windows 2003 or Windows Vista user is logged into RSView32 instead of DEFAULT, if the current Windows user also has an RSView32 user account. If the user doesn't also have an RSView32 user account, RSView32 opens with DEFAULT as the user.

When the current user logs out, DEFAULT is shown as the logged-in user.

Changing passwords at runtime

If you want operators to be able to change their passwords, include a way for them to access the Password dialog box.

One way is to create a button and use the Password command as the press action. When the button is pressed, the Password dialog box appears.



The new password is also added to the Password field of the User Accounts editor.

IMPORTANT If your project is using the Windows Security Options, and you change your password using the RSView32 Password command, your password for Windows Server 2003, Windows XP, Windows 2000, or Windows Vista domain will automatically be changed as well.

Chapter

11 Creating graphic displays

This chapter describes the Graphic Display editor and outlines how to:

- set up the drawing environment
- draw, edit, and arrange graphic objects
- use objects from the Graphic Library editor

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 device such as a programmable controller. Operators can also print the display at runtime to create a visual record of tag values.

The components that make up a graphic display are called graphic objects. Objects can be:

- created in the Graphic Display editor
- dragged and dropped from a graphic library
- copied and pasted from another Windows® application
- created by another Windows application and inserted in the graphic display using OLE (Object Linking and Embedding)
- ActiveX® objects embedded in the graphic display

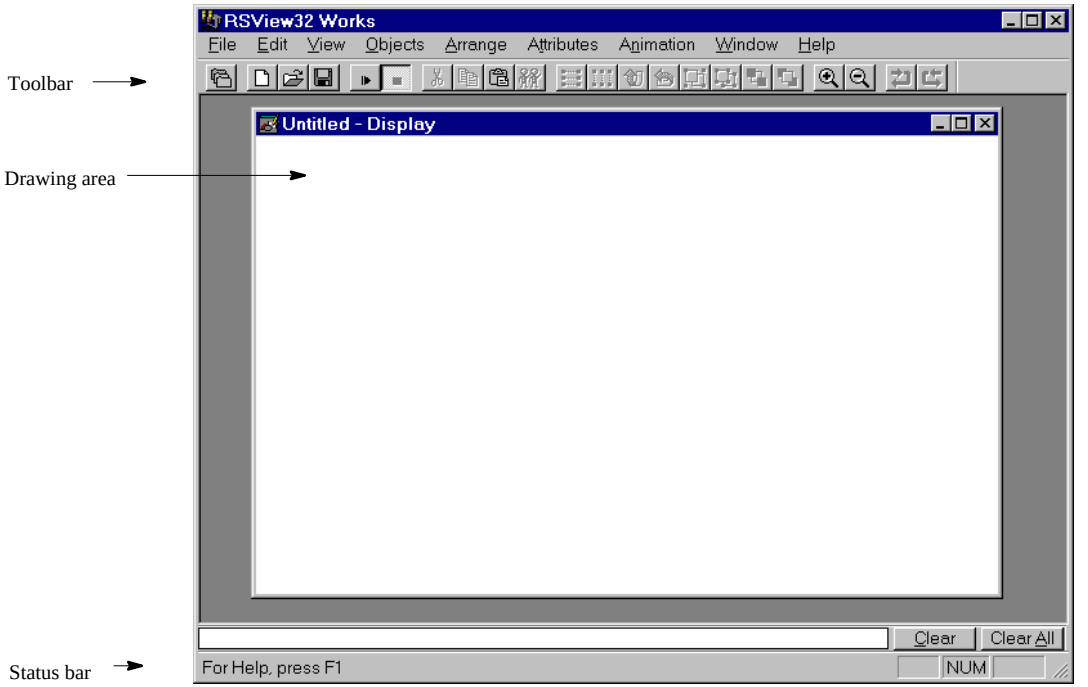
The Graphic Display editor

To open the Graphic Display editor:

1. In the Project Manager, open the Graphics folder.
2. Open the Graphic Display editor by doing one of the following:
   - double–click the Display icon
   - right–click the Display icon and then click New

The editor's main components

The figure below shows the main components of the Graphic Display editor. Each component is briefly described in the table on the following page.



The Graphic Display editor's main components are:

Toolbar	Contains buttons for commonly used menu items. The figure on the previous page shows only one toolbar but there are several, including toolbars for drawing tools, line and fill colors, and fill patterns. You can hide or show toolbars using the View menu, and you can move the toolbars anywhere on the screen. For more information about toolbars, see page 11-4
Drawing area	Is the area for creating graphic displays. Change the background color of this area in the Display Settings dialog box. For details, see page 11-22.
Status bar	Describes the action to be performed by the selected menu item or button. The status bar also displays the *x* and *y* coordinates, name, width, and height of the selected object.

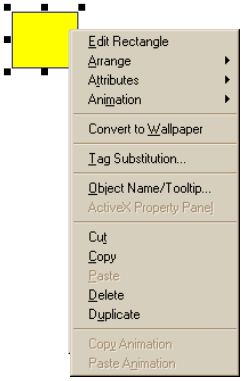
Mastering basic techniques

When working on a graphic display, certain actions and techniques are used frequently. Knowing how to perform these actions can save you time.

Using the context menu

No matter where you are in the Graphic Display editor, you can open a context menu by clicking the right mouse button. The items on the menu depend on the cursor's location. For example, when you right-click on an object, the menu contains items relevant to that object.

When you right-click an object . . .



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

Switching between normal and test modes


Test mode


Normal mode

To quickly test objects in a graphic display, use test mode. When you are finished testing, switch back to normal mode to continue editing. To switch between test and normal modes, use the buttons on the toolbar or the items on the View menu.

If your graphic displays contain objects associated with device tags, your system must be set up to communicate with programmable controllers, OPC® servers, or DDE servers in order for you to use test mode.

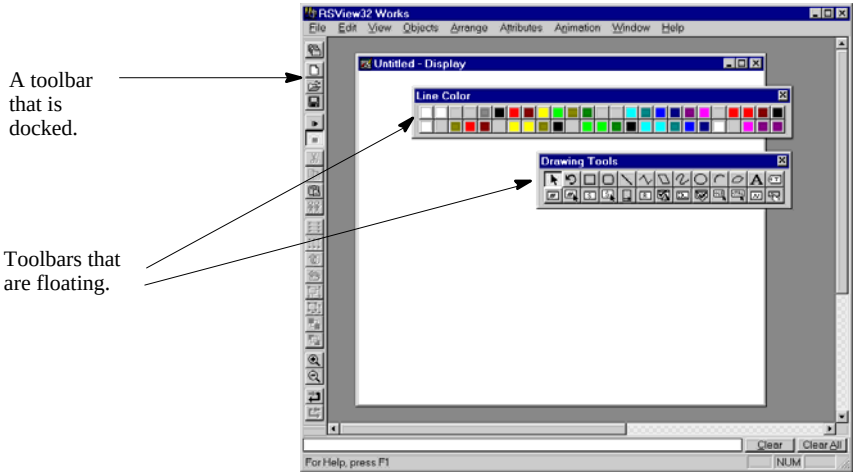
IMPORTANT Test mode is not the same as running the display. It does not change the appearance or position of the display as set up in the Display Settings dialog box.

Using the toolbars

The toolbars are a convenient way to quickly perform an action. You can:

- hide or show them using the items on the View menu. If there is a check mark beside the toolbar name, the toolbar is visible. If there is no check mark, the toolbar is hidden.
- drag them anywhere on the screen

- dock them to an edge of the window (except the ActiveX Toolbox)

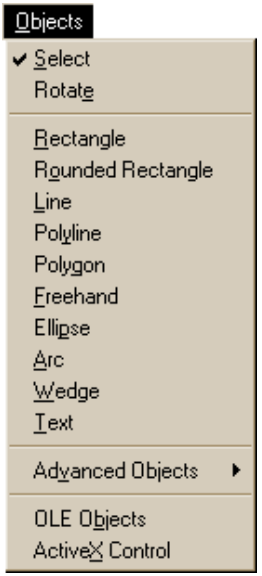


Selecting a drawing tool

The Drawing Tools toolbox contains tools for creating, selecting, and rotating objects. The tools are also available on the Objects menu.

Drawing Tools toolbox

Objects menu



Before you can draw an object, you must select the appropriate tool.

To select a drawing tool, click the tool in the toolbox or on the Objects menu. When you click a tool, the pointer changes to show which tool is active.

Freehand tool

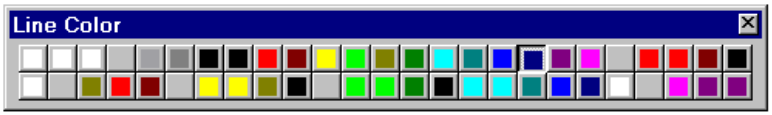
Text tool

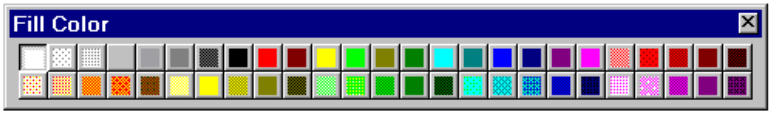
To deselect a drawing tool, do one of the following:

- click the Select tool
- click another drawing tool

Selecting colors

The color palettes contain the colors you can assign to objects. To show and hide the color palettes, click them on the View menu. You can also select colors using the color items on the Attributes menu. You can select colors before you draw an object, or you can apply them to an existing object.





Use the Line Color palette to select a color for the outline of an object, for text, or for hollow objects.

Use the Fill Color palette to select a color for the inside of an object or for solid objects.

Selecting and deselecting objects

Select tool

To work with an object, you must first select it with the Select tool. You can click this tool in the Drawing Tools toolbox or on the Objects menu.

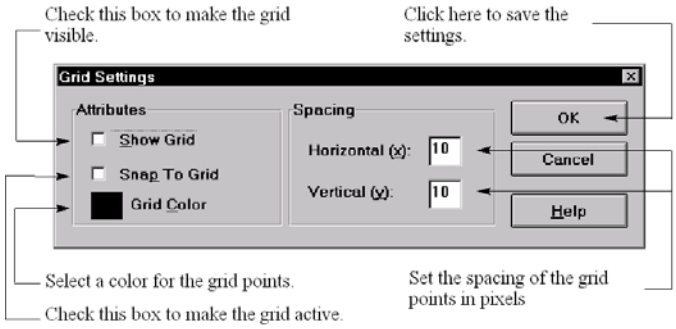
To deselect a drawing tool, click the Select tool in the toolbox or on the Objects menu.

To select	Do this
An object	Click the object.
Several objects	Click the first object, Ctrl–click additional objects.
All objects in an area	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	Click Select All on the Edit menu.

To deselect	Do this
An object	Ctrl–click the object.
Several objects	Hold down Ctrl and drag a selection border around the objects.
All selected objects	Click in the drawing area, away from any objects.

Using the grid

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



The grid can be active or passive. If you turn on Snap to Grid, the grid is active and all the objects you draw or position are pulled to the closest grid point. This makes it easy to align and size objects. If you turn off Snap to Grid, the grid is passive and does not affect your drawing or the position of your objects.

Turn off the grid to either draw or position an element between the grid lines. Turn on the grid and the next object you draw or place will automatically be aligned with the grid. Turning on the grid does not affect the placement of existing objects.

You can click Show Grid and Snap On on the View menu.

Using the Rotate tool


Rotate tool

Use this tool to rotate an object or group of objects around an anchor point.

You can also use the Rotate tool when attaching rotation animation to a graphic object. For details about rotation animation, see "Configuring rotation animation" on page 12-25.

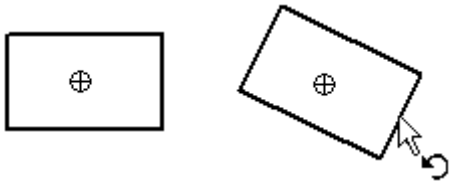
You cannot rotate OLE objects, ActiveX objects, bitmaps, and text.

To rotate an object:

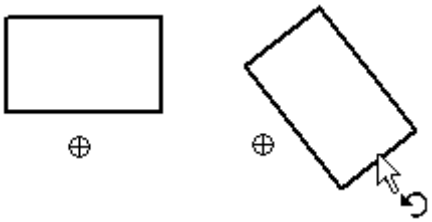
1. Click the Rotate tool.

2. Click the mouse button. A small circle with a crosshair appears. This is the anchor point that is used as the center of rotation. To move the center of rotation, drag the crosshair.

   You can place the crosshair inside an object...



   ... or you can place it outside an object.



3. Place the pointer on an edge of the object and drag the object to rotate it.

   To rotate the object in five–degree increments, press Ctrl while you drag.

4. When the object is in the desired position, release the mouse button.

Zooming in and out


Zoom In


Zoom 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.

To zoom in on objects:

1. Select the objects you want to zoom in on.
2. Click Zoom In on the View menu or click the Zoom In button on the toolbar.

To zoom out:

Click Zoom Out on the View menu or click the Zoom Out button on the toolbar. You can also click Cancel Zoom on the View menu.

Correcting mistakes


Undo


Redo

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

To undo an operation:

Click Undo on the Edit menu or click the Undo button on the toolbar.

To redo an operation:

Click Redo on the Edit menu or click the Redo button on the toolbar.

Setting up the display

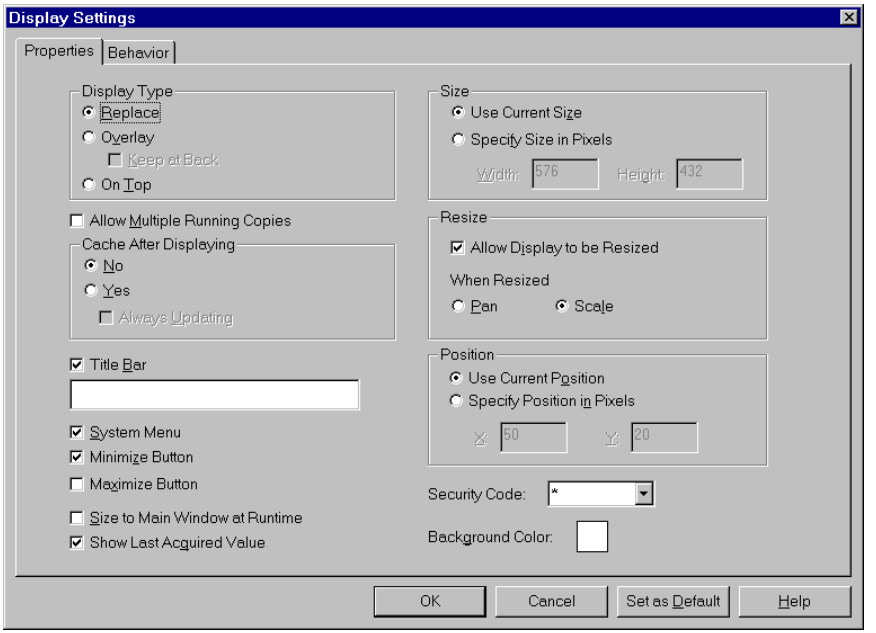
To set up a graphic display, use the Display Settings dialog box.

To open the Display Settings dialog box, do one of the following:

- click Display Settings on the Edit menu
- right–click in an empty area of the display and then click Display Settings on the context menu

The Display Settings dialog box contains many options for defining the appearance of a graphic display.

You can edit these options any time during the drawing process.



Saving the display settings

You can save the settings for the current graphic display, or you can save the settings as the default for all new graphic displays.

To save the settings for the current display, click OK.

Creating a default

Set as Default

To create your own default settings, click Set as Default. When you open a new graphic display, it will use the display settings you have configured.

Note that if you click Set as Default the settings for the current display are not saved. You must also click OK to save the settings for the current display.

Using the Display Settings dialog box

The Display Settings dialog box has two tabs, Properties and Behavior.

Use the Properties tab to specify these display options:

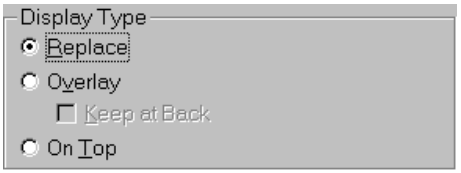
- display type
- multiple running copies
- caching
- title bar and other display attributes
- size, resizing, and position
- security
- background color

Use the Behavior tab to specify these display options:

- startup and shutdown commands
- input field colors
- behavior of interactive objects
- behavior of objects with input focus
- on-screen keyboard

These options are described in the sections that follow.

Specifying the display type



Replace

Replace is the default display type. Use this option if you want the graphic display to replace other open graphic displays when it opens. RSView32™ will close any graphic display that the newly opened display overlaps. This way you don't need to issue separate commands to close the other displays.

Overlay

Use this option if the graphic display doesn't need to replace others or appear on top. The display will layer with other displays, overlapping some and being overlapped by others as the focus changes between multiple displays.

Overlay displays will always appear behind On Top displays, and will be replaced by Replace displays. Use Overlay with care, as keeping multiple displays open can affect system performance adversely.

Keep at Back

Check this box if you always want this graphic display at the back. However, we recommend that you use the On Top display type to control the layering of displays. Note that you must choose the Overlay option to use Keep at Back.

On Top

Use this option to keep the graphic display on top at all times. It will remain on top even if another display has focus. However, if more

than one graphic display of the On Top type is open at once, the display that has focus, or had the most recent focus, appears on top.

Use the PullForward, PushBack, and SetFocus commands to cycle through multiple On Top and Overlay screens.

Allowing multiple running copies

Use this option with displays of type Overlay or On Top. Check this box to allow more than one copy of the graphic to be displayed at runtime. When this option is not selected, running displays are brought to the foreground when they are called via the Display command, rather than a new copy being loaded.

You can also run multiple copies without checking this option, by using the Display command with different parameter files for each copy of the display. For example, to display two copies of the same graphic in different places on the screen you could use these commands:

Display PID /PLevel1 /Q1

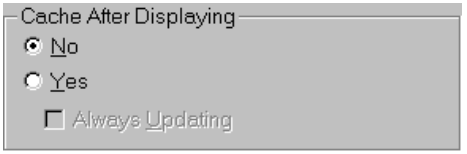
Display PID /PLevel2 /Q2

PID is a display and Level1 and Level2 are parameter files.

For details about parameter files, see "Using a parameter file to replace tag placeholders" on page 11-38.

If multiple copies or several separate displays are running and one is hidden behind another, use the SetFocus command to bring the hidden display forward. For details, see Appendix A, *RSView32 commands*, or see Help. However, remember that graphic displays of the On Top type will always be at the front, regardless of which display has focus.

Specifying caching



Cache After Displaying

Select Yes to load the graphic display into the display cache when it is displayed for the first time. Placing the graphic in the cache makes subsequent displays of the graphic faster because it does not have to be read from disk. You can have up to 200 graphic displays in the cache. We suggest you use this option for large or complex displays only, to minimize the use of system resources.

Select No if you don't want RSView32 to load the display into the display cache.

IMPORTANT Cached displays consume memory. Once Windows consumes all physical memory, it is forced to swap to disk, which slows all system activities.

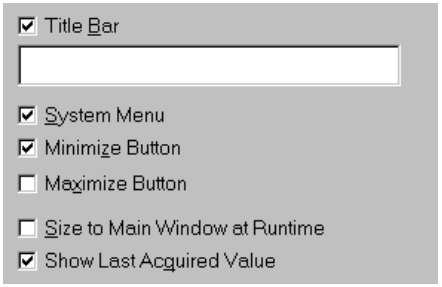
Always Updating

Check this box to keep the cached display up-to-date. For example, choose this option to update trend data continuously for the display, even when the display is not visible. This option also makes subsequent displays faster.

IMPORTANT Always updating a cached display can cause added communications overhead because data will be retrieved for tags whose values would not otherwise be needed.

Choosing this option affects the behavior of the display's startup and shutdown commands. See "Specifying startup and shutdown commands" on page 11-23 for more information.

Specifying the title bar and other display attributes



Title Bar

To have a title bar appear on the graphic display at runtime, select the Title Bar check box. If the Title Bar check box is not selected, the check boxes for the System Menu, Minimize button, and Maximize button are not available (because these items all appear on the title bar). You can also type a title for the graphic display, which will appear in the title bar at runtime in place of the component name. The title can be anything you want and can include spaces. You cannot type a title if the Title Bar check box is not selected.

You must select Title Bar to be able to move the screen's position at runtime.

The following illustration shows the window style options available if you select the Title Bar check box. To include an item, select the appropriate check box. Otherwise, leave the check box blank.

Size to Main Window at Runtime

If you select this check box, the graphic display will be the size of the RSView32 main window when the display starts running. The graphic display is panned or scaled, depending on which option is selected under Resize. See page 11-20 for more information.

RSView32 has resolution–independent graphics. This means that no matter what resolution you use to create your graphic displays, they will automatically resize to fit the monitor on which they are displayed.

Show Last Acquired Value

Select this check box to have a graphic displayed with the last known value for each tag in the display until current values arrive from the programmable controller. In many projects, selecting this option will result in graphics displaying more quickly.

If you do not select this option, objects with values that have not yet been updated will appear in outline form. The outline indicates that data is not current or is in error.

Selecting Show Last Acquired Value might not affect a graphic display the first time the display starts because the tags used in the display might not be initialized and so might not have any values. To indicate that there are no tag values, the objects appear in outline form. Once the tags have been initialized and tag values arrive, the objects appear in their normal form.

This option does not affect objects with tags that are in error. If an object has a tag that is in error, the object will appear in outline form.

Preventing scroll bars on the RSView32 main window

If a graphic display is larger than the RSView32 main window, scroll bars will appear on the main window and will remain there even if subsequent displays are smaller than the main window.

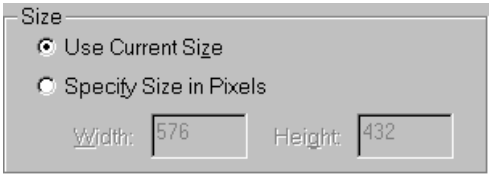
To prevent scroll bars, all graphic displays must be smaller than the working area in the RSView32 main window. Keep in mind that the size of the working area depends on several factors: the size you make the window, your monitor's display resolution, and whether you select the RSView32 toolbar, status bar, and activity bar (on the View menu).

To minimize scroll bars, RSView32 tries to position all graphic displays within the working area of the RSView32 main window unless explicitly overridden by the /X and /Y parameters of the Display command.

To ensure the RSView32 main window never has scroll bars, select the Size to Main Window at Runtime option for large displays. Do not select this option for smaller graphic displays that are not meant to fill the screen. However, be sure to position the smaller displays so they are completely visible, otherwise scroll bars might appear.

You can also turn scroll bars on and off using the Windows registry keys. To change the registry key settings for scroll bars, use the Registry Configuration tool in the RSView32 Resource Kit™. For details about the Resource Kit, see the RSView32 Resource Kit Help.

Specifying display size



To set the display size, do one of the following:

- select Use Current Size. When you save the graphic display, the size of the window at that time becomes the default size.
- select Specify Size in Pixels, and type values in the Width and Height fields.

The window size and position you specify here can be overridden by the RSView32 Display command. The Display command accepts size and position parameters, which override the Display Settings options. For more information about the Display command, see Appendix A, *RSView32 commands*, or see Help.

Specifying resize behavior

Allow Display to be Resized

If you want a window that can be resized with the mouse, select this check box. This option works with the pan and scale options.

If you do not select the check box, the graphic display cannot be resized at runtime.

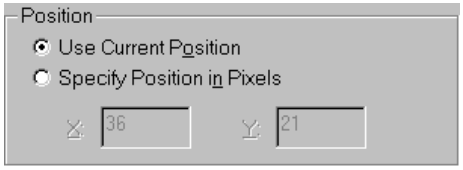
When Resized

Select Pan or Scale.

Pan resizes the display so objects retain their original size when the display size changes. For example, if the display was resized to one quarter its original size, only one quarter of the display would be visible. In this case scroll bars appear for viewing the rest of the display.

Scale resizes the display so objects in the display are magnified or reduced to retain their size in relation to the display size. For example, if the display was resized to one quarter its original size, the entire display would be visible—but it would all be one quarter its original size.

Specifying display position



To set the display position, do one of the following:

- select Use Current Position. When you save the graphic display, the position of the window at that time becomes the default position.
- select Specify Position in Pixels and type values in the X and Y fields. These fields specify the position of the window in relation to the top–left corner of the RSView32 main window. The X value positions the window from the left edge of the main window and the Y value positions the window from the top of the main window.

The window size and position you specify here can be overridden by the RSView32 Display command. The Display command accepts size and position parameters, which override the Display Settings options.

For more information about the Display command, see Appendix A, *RSView32 commands*, or see Help.

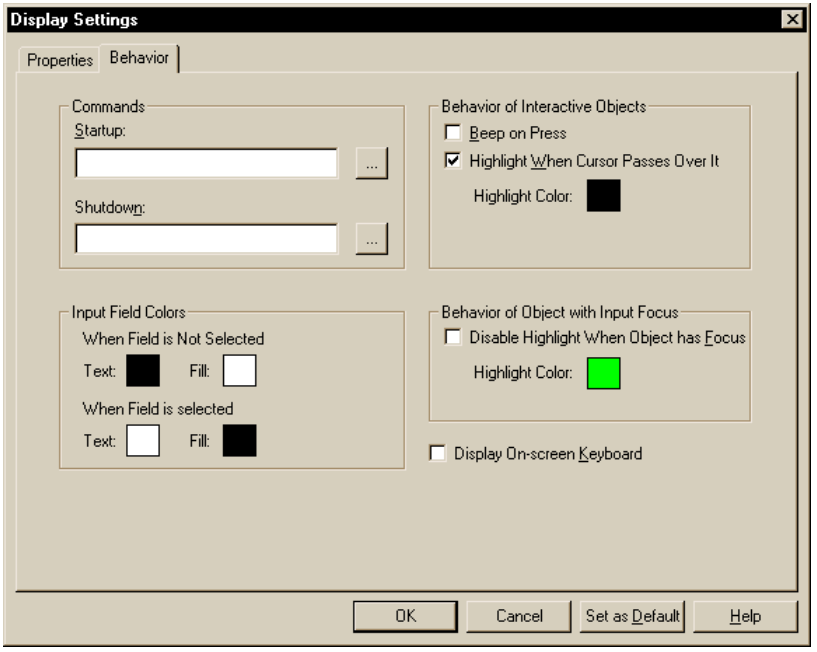
Specifying a security code

To restrict access to the graphic display, select a security code. For detailed information about security, see Chapter 10, *Adding security*.

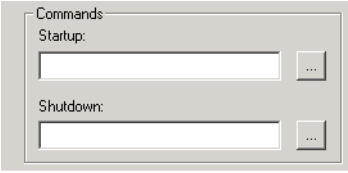
Specifying background color

To select a background color, click the Background Color box, and then click a color on the palette.

Use the Behavior tab of the Display Settings dialog box to specify startup and shutdown commands and the appearance and behavior of input fields and other interactive objects.



Specifying startup and shutdown commands



Type commands or macros in the Startup and Shutdown fields, or click the ... buttons to open the Command Wizard and select the commands or macros.

To run RSView32 commands or macros each time this graphic display starts or stops, specify the commands or macros. The startup command runs before the graphic opens so commands such as UploadAll or RecipeRestore will not work in a startup macro. The shutdown command runs after the display closes, so commands such as DownloadAll or RecipeSave will not work in a shutdown macro.

If you use the Always Updating option with the Cache After Displaying option, the startup command is executed when the display is loaded into the cache. The shutdown command is executed only when the cache is flushed (using the FlushCache command) or when you stop the project. If you do not use the Always Updating option, the startup and shutdown commands work as described in the previous paragraph.

For a complete list of RSView32 commands, see Appendix A, *RSView32 commands*, or see Help.

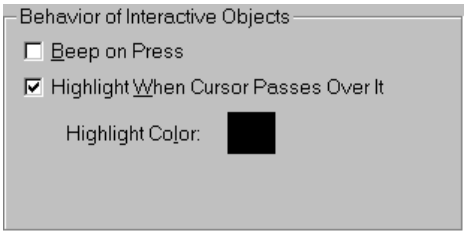
Specifying colors for input fields

Input fields are created with the Numeric Input, String Input, and Recipe drawing tools. At runtime, operators can use these fields to read values from or write values to the programmable controller. Click the colored boxes to open the color palette, and then choose colors.

Text color is the color of the text in the input field. Fill color is the background color of the input field. The text changes to white and the background to red if an error occurs at run time.

When choosing colors for the input fields, be sure to choose colors that will stand out from the background color of the display. Choose different colors for when the field is selected, so the operator can tell that the field is highlighted.

Specifying the behavior of interactive objects



Interactive objects are those that the operator can interact with at runtime, either using a mouse, keyboard, or touch screen. For example, a button that has a press action is interactive.

You can create a tab sequence for interactive objects that use index numbers. For details, see "Creating a tab sequence" on page 12-47.

Beep on Press

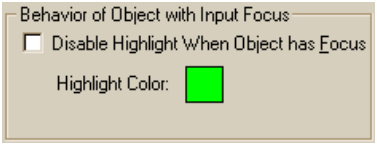
Check this box if you want the computer to beep when a button object or an object with touch animation is clicked.

Highlight When Cursor Passes Over It

Check this box to turn on the highlight for interactive objects. Click the colored box to open the color palette and then choose the highlight color. At runtime, when the mouse cursor is over an interactive object, the object will be highlighted.

When choosing a highlight color, be sure to choose a color that stands out from the display's background color.

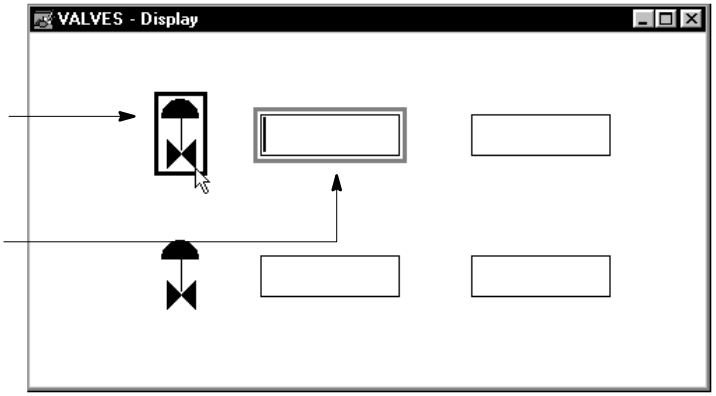
Specifying the behavior of objects with input focus



When an object has input focus—that is, the object is ready to accept keyboard or mouse input—the object will have a highlight box. You can enable or disable this highlight box, and select the color of the box.

When choosing a highlight color, be sure to choose a color that stands out from the display's background color.

The following illustration shows the two types of highlight:



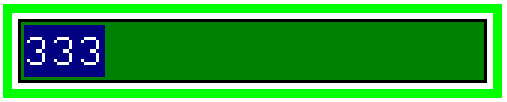
This object is an interactive object, but it is not the object with input focus.

This object is the one with focus*as indicated by the cursor. The highlight box is a different color than the highlight box for the interactive object.

An object can have both types of highlight at one time.

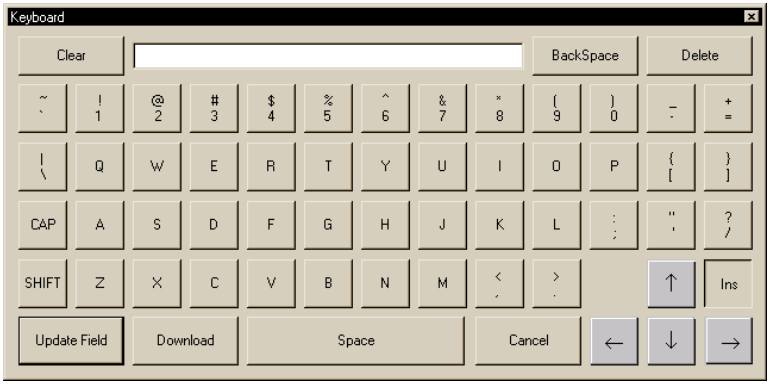
Displaying the on–screen keyboard

Select this option to display a keyboard on the screen at runtime for numeric input, string input, and recipe fields in the graphic display. The keyboard appears only when an operator selects one of these fields for input. The on-screen keyboard is typically used with systems that do not have a hardware keyboard, such as systems that use touch screens only.



This field is selected for input.

When the operator clicks or touches the selected field, or presses Enter on a hardware keyboard, the on-screen keyboard appears. The keyboard for string input and recipe fields allows alphanumeric entry.



The keypad for numeric input fields allows numeric entry only.

Displaying graphics more quickly

Graphic displays appear more quickly if they have been stored in the display cache. You can place up to 200 graphic displays in the cache.

To cache displays:

- select the Cache After Displaying option in the Display Settings dialog box. For details, see page 11-16.
- use the [*cache*] parameter with the Display command. The [*cache*] parameter loads a graphic display into the cache without displaying it. The [*cache*] parameter has two options: /Z and /ZA. For

example, the command Display Bakery /Z loads the graphic display called Bakery into the cache but does not display it. When the graphic is called up, it is displayed quickly. The command Display Bakery /ZA loads the display into the cache and continually updates the values in the display. For more details about the Display command, see Appendix A, *RSView32 commands*, or see Help.

Removing displays from the cache

To remove all graphic displays from the display cache, use the FlushCache command. To remove a specific graphic display from the display cache, use the FlushCache <*file*> command. Graphic displays are also removed from the cache when a project is closed or stopped.

If a display uses the Always Updating option with the Cache After Displaying option, the display's shutdown command is executed when you issue a FlushCache command, or when you close the project. For details about the FlushCache commands, see Appendix A, *RSView32 commands*, or see Help.

Types of graphic objects

You can create the following types of objects:

- Simple objects: geometric and freehand objects, and text. These objects are created in the RSView32 Graphic Display editor.
- Advanced objects: complex objects that typically require data configuration.
- OLE objects: objects such as spreadsheets, charts, or text produced by other Windows applications. The types of OLE objects that are available depend on the software installed on your system.

- `ActiveX objects` (formerly called OLE custom controls or OCXs): control objects such as gauges, sliders, and buttons, and objects you create yourself using a tool like Visual Basic®. These objects allow an external action, such as a mouse click, to initiate an action within RSView32. The ActiveX objects that are available depend on the software installed on your system.

Most objects, including OLE objects, can have animation attached to them. For more information, see Chapter 12, *Animating graphic objects*.

Creating simple objects

Use the drawing tools in the Drawing Tools toolbox or on the Objects menu to draw simple objects. Once you have selected a drawing tool, there are two ways to draw objects: dragging, or clicking end points. Some objects, such as rectangles, ellipses, and arcs, can be drawn only by dragging. Others, such as polylines and polygons, can be drawn only by clicking end points.

Drawing a rounded rectangle


Rounded Rectangle tool

Use the Rounded Rectangle tool to draw a rectangle with rounded corners.

1. Click the Rounded Rectangle tool.
2. Drag the drawing tool diagonally until the object is the size you want.

   You can change a rounded rectangle into a right–angle rectangle by using the small black box that appears inside the rounded rectangle. Place the pointer on the box and drag the drawing tool until the rectangle is the desired shape.

Rectangle tool

Drawing a rectangle or square

Use the Rectangle tool to draw a rectangle or square.

1. Click the Rectangle tool.
2. To draw a rectangle, drag the drawing tool diagonally until the object is the size you want.

   To draw a square, hold down Ctrl while you drag.

Drawing an ellipse or circle

Ellipse tool

Use the Ellipse tool to draw an ellipse or circle.

1. Click the Ellipse tool.
2. To draw an ellipse, drag the drawing tool diagonally until the object is the size you want.

   To draw a circle, hold down Ctrl while you drag.

Drawing a line

Line tool

Use the Line tool to draw straight lines in any direction.

1. Click the Line tool.
2. Drag from the beginning point to the end point.

   To draw horizontal or vertical lines (not diagonal lines), hold down Ctrl while you drag the mouse.

You can also use the Snap to Grid option to draw straight lines.

You can change the style and width of lines using Line Properties on the Attributes menu. For details, see page 11-103.

Drawing a polyline or polygon


Polyline tool


Polygon tool

A polyline is a series of connected line segments. A polygon is a closed polyline shape.


Polyline Hollow polygon Filled polygon

1. Click the Polyline or Polygon tool.
2. Drag the drawing tool to create the first segment of the object. Release the mouse button.

   To draw horizontal or vertical lines (not diagonal lines), hold down Ctrl while you drag the mouse.

3. Move the drawing tool to where you want the angle of the polyline or polygon to be and click.

   Repeat this step until you have completed the object.

4. To finish drawing, click the Select tool.

Drawing a freehand object

Drawing freehand is similar to drawing with a pen on paper.


Freehand tool

1. Click the Freehand tool.
2. Drag the drawing tool to create the shape you want.

Drawing an arc or wedge


Arc tool


Wedge tool

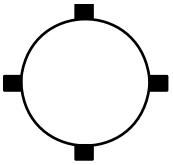
Arcs and wedges are drawn in two steps: first you create a circle, and then you reshape the circle.

To draw the arc or wedge in 45–degree increments, hold down Ctrl while you draw.

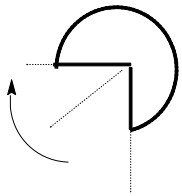

Arc Hollow wedge Filled wedge

1. Select the Arc or Wedge tool.
2. Drag to draw a circle. Release the mouse button.

   When you release the mouse button, a set of handles appears so you can reshape the circle.



3. Click a handle, and drag the mouse to ‘cut out’ part of the circle.



You can also use the Arc and Wedge tools to reshape any arc, ellipse, or wedge.

Creating text


Text tool

1. Click the Text tool.

   The pointer becomes an I–beam (I).

2. Type the text.

   Once the Text tool is selected, you can create more than one text object. To do so, move to an empty spot in the drawing area, click, and then type the text.

   To edit text, select the text object and double–click. The I–beam appears. To delete text characters, use the Backspace and Delete keys.

You cannot rotate text.

Choosing a font

You can choose a font before or after you create text. Fonts apply to all objects, including display and input objects.

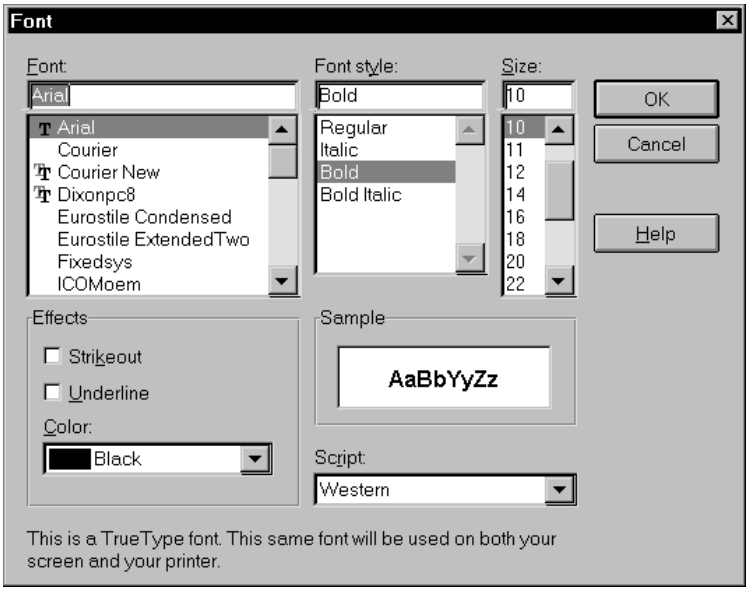
1. Select the text object or objects you want to format, or position the I–beam where you want to begin typing text.

2. On the Attributes menu, click Font.

3. Select the font style, size, and effects you want.

IMPORTANT You can select any font you have installed, but TrueType™ fonts are recommended. These fonts can be resized with graphic scaling.

The fonts listed here depend on the fonts you have installed in Windows.



4. Click OK.

You can also choose font color using the Line Color palette or using the Line Color item on the Attributes menu.

Font substitution at runtime

If you run a project on a computer that does not have the fonts you used when configuring the project, Windows will substitute fonts.

Reshaping simple objects

You can easily reshape any simple object.

To reshape lines, rectangles, polylines, and polygons:

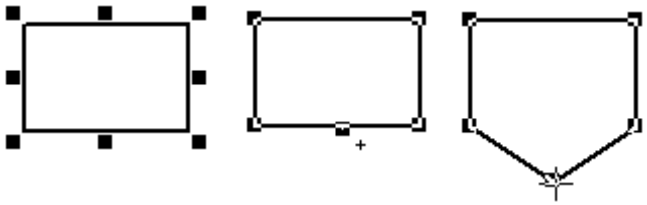
1. Place the pointer on the object you want to reshape and double–click, or right–click and then click Edit Object.

   The cursor changes to the Polygon tool.

2. Move the cursor over any line in the object.

   A handle with a cross–hair appears.

3. Drag the handle until the object is the desired shape.



To maintain the aspect ratio of any object while resizing, grab a corner handle, press Shift, and drag the mouse.

To reshape arcs, ellipses, and wedges:

1. Place the pointer on the object you want to reshape and double–click, or right–click and then click Edit Object.

   The cursor changes to the Arc or Wedge tool, and handles appear on the object.

2. Place the pointer on one of the handles.

   A cross–hair appears.

3. Drag the handle until the object is the desired shape.

Creating advanced objects

To create advanced objects, use the drawing tools in the Drawing Tools toolbox or the items under the Advanced Objects sub–menu. The basic steps are:

1. Click a drawing tool and drag it to create a box approximately the size you want for the object.

   When you release the mouse button, a dialog box opens.

2. Configure the object by entering the required information.

   Most advanced objects display information about a tag. Therefore, as part of configuration, you have to supply a tag name or tag placeholder.

Objects described in other chapters

Detailed information about configuring certain advanced objects is contained in other chapters. The following table lists where you can find information:

To configure this object	See
Tag monitor	Chapter 4, *Creating tags*
Alarm summary	Chapter 6, *Configuring alarms*
Trend	Chapter 13, *Configuring trends*
Command line	Appendix A, *RSView32 commands*

Using tag names

When creating advanced objects, you can use the name of an existing tag or a tag that is not yet in the tag database. If you specify a tag that does not exist, you are prompted to create it.

To supply a tag name, do one of the following:

Browse button

- type a tag name in a Tag Name field or in an Expression field
- click the Browse button and select a tag from the list

Using tag placeholders

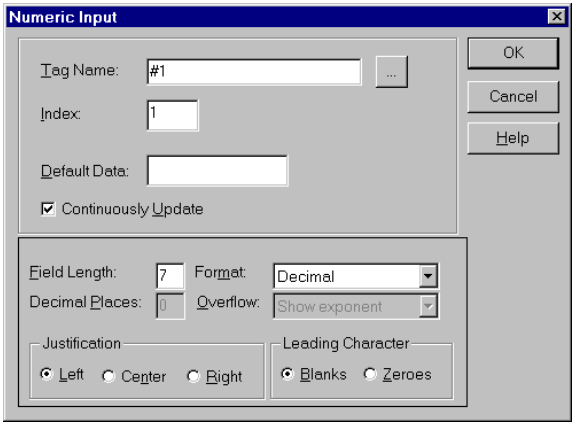
Tag placeholders provide a way to use one graphic display to represent a number of similar operations.

For example, imagine you are creating displays for a plant that cans corn and beans. The machinery used in both processes is identical. Instead of drawing two displays and specifying corn–related tags in one display and bean–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.

When the display is run, the tag each placeholder represents must be specified. This can be done in two ways: with a parameter file, or by specifying the tag names.

Creating a tag placeholder

A tag placeholder is the cross–hatch character (#) followed by a number from 1 to 500, as shown in the example below:



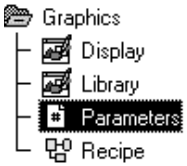
You can also add a folder name to the placeholder. For example, #1\PV is a valid placeholder and requires only one parameter (the folder name).

For tag placeholders in alarm summary objects (when they are contained in graphic displays only), you can use wildcards in the placeholder. For example, #1\PV* is a valid placeholder.

You cannot use wildcards in tag placeholders in alarm summary files when they are not contained in a graphic display. That is, you cannot use wildcards if the alarm summary was created using the Alarm Summary editor. For more information about alarm summaries see "Creating an alarm summary" on page 6-54.

Using a parameter file to replace tag placeholders

A parameter file contains one entry for each unique placeholder in a display. When you run a display, you specify the filename along with the /P parameter. For details about the Display command, see Appendix A, *RSView32 commands*, or see Help.



To create a parameter file:

1. Open the Parameters editor.
2. Type one entry for each unique placeholder in the display, associating the placeholder with a tag name. For example:

   #1 = bean_weight
   #2 = bean_level
   #3 = bean_temp

3. Save the file with a meaningful name (for example, Beans).

For tag placeholders in alarm summary objects in graphic displays only, you can use wildcards in the parameter file. For example, #1 = bean_* is a valid parameter entry. The alarm summary would display any alarms associated with tags beginning with bean_.

Note that you cannot use wildcards in placeholders for any other type of graphic object.

To run a parameter file:

Type the following command in a macro or anywhere else you can use an RSView32 command:

Display <*file*> [/P*file*]

where:

<*file*>	is the name of the graphic display file.
[/P*file*]	is the parameter file containing the tags to be substituted into the display.

Example: Using a Parameter File to Replace Tag Placeholders

To run the display called Canning with the parameter file called Beans, type:

Display Canning /PBeans

Listing tag names to replace tag placeholders

When you run a graphic display, you can specify the tag names using the RSView32 Display command with the /T parameter.

To replace tag placeholders:

Type the following command in a macro or anywhere else you can use an RSView32 command:

Display <*file*> /T[*tag_name*]

where:

<*file*>	is the name of the graphic display file.
/T[*tag_name*]	is one or more tags to be substituted into the display. The tag name can also be a folder name. If multiple tag names are used, separate them with commas. Do not use spaces.

For tag placeholders in alarm summary objects in graphic displays only, you can use wildcards when you specify tag names on the command line.

Example 1: Replacing tag placeholders by listing tag names

To run the display called Canning with the tags Pea_Weight, Pea_Level, Pea_Temp:

Type:

Display Canning /TPea_Weight,Pea_Level,Pea_Temp

Example 2: Replacing tag placeholders by using a folder name

In the following example, the tag database contains these tags:

Corn\Weight	Bean\Weight
Corn\Level	Bean\Level
Corn\Temp	Bean\Temp

Anywhere a tag name is required, the placeholder #1 is used for the folder name. That is, all objects that use these tags would be set up using the folder placeholder and the tag name: #1\Weight, #1\Level, or #1\Temp.

To run the display called Canning with the folder containing corn tags, type:

Display Canning /TCorn

To run the display called Canning with the folder containing bean tags, type:

Display Canning /TBean

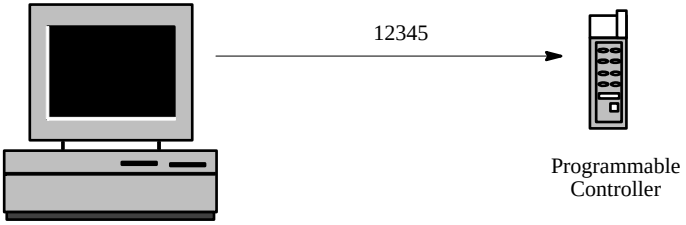
Creating numeric and string input fields


Numeric Input tool


String Input tool

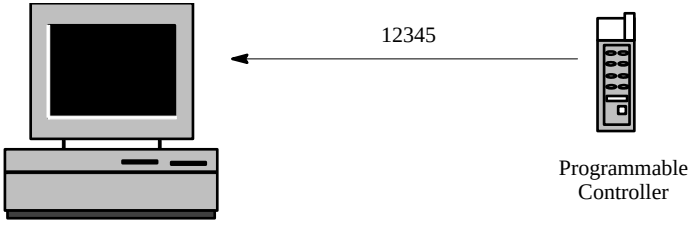
Use the Numeric Input tool to create fields that operators can use to enter data for analog and digital tags. Use the String Input tool to create fields that operators can use to enter data for string tags. When the display runs, operators can use these fields to write values to the value table. The values can then be accessed by the programmable controller, external OPC or DDE device, or RSView32 memory.

A display can contain up to 500 input fields.



To download data, the operator types a number into the input field and presses PgDn.

Numeric and string input fields can also be used to upload values and display them in a graphic display.



To upload data and display it in the input field, the operator presses PgUp.

Operators can select any one of the input fields in the display and read or write the values associated with that field, or they can read or write all the values at once. You also have the option of setting input fields so that tag values update continuously when the operator is not using the field to input data.

An operator can also retrieve a series of values from a recipe file, change them, write the changed values back to the programmable

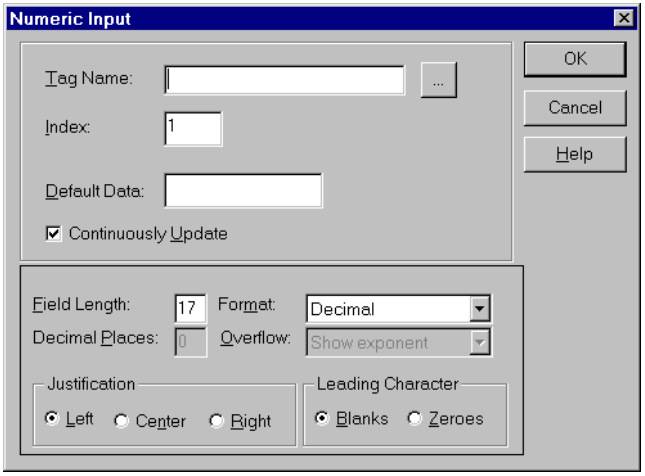
controller and/or save them to a recipe file. For more information on recipe files, see "Creating a recipe field" on page 11-61.

If an upload fails because of a communication error, question marks appear in the numeric input fields.

Colors for input fields are set in the Display Settings dialog box. For details, see "Specifying colors for input fields" on page 11-24.

To create a Numeric Input field:

1. Click the Numeric Input tool.
2. Drag the mouse to draw the field.
3. Release the mouse button.



4. Fill in the fields as follows:

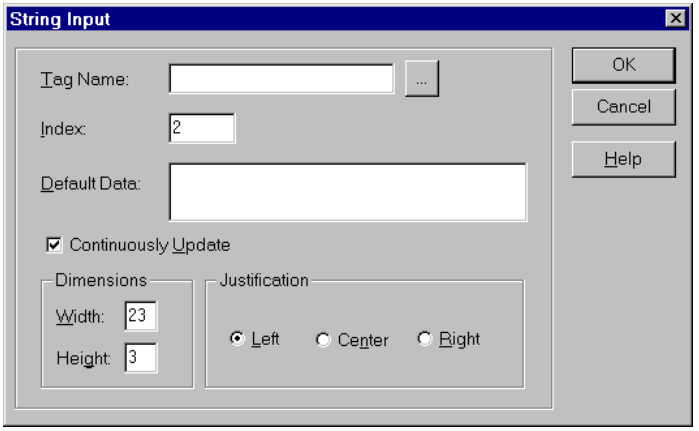
In this field	Do this
Tag Name	Type a tag name or a placeholder for an analog or digital tag. For details about placeholders, see "Using tag placeholders" on page 11-37.
Index	Either leave the default as it is or type a number other than the default. Index numbers determine the Tab sequence for interactive objects such as input objects and buttons, and are also used in recipe files. For details, see "Using index numbers" on page 12-45.
Default Data	Type a value that will appear in the numeric input field when the graphic is initially displayed.
Continuously Update	Check this box to have tag value changes appear in the field when the operator is not using the field to input data.
Field Length	Type a value to specify the maximum number of characters that will be displayed in this field. Be sure the field is long enough to accommodate all the possible values for the tag.
Format	Select a number base for the value.
Decimal Places	Type the number of places you want after the decimal point. This number must be at least one less than the field width.
Overflow	You can select this field only if Floating Point is selected in the Format field. Specify how you want the floating point value displayed if it is too long for the field. The value can be shown as an exponent, rounded up to fit in the field, or completely replaced by asterisks.

In this field	Do this
Justification	Select Left, Center, or Right to specify how the values will be aligned within the field.
Leading Character	Select Blanks or Zeroes.

5. Click OK.

To create a String Input field:

1. Click the String Input tool.
2. Drag the mouse to draw the field.
3. Release the mouse button.



4. Fill in the fields as follows:

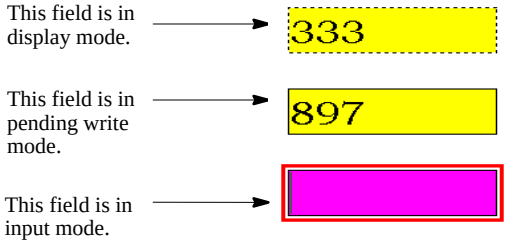
In this field	Do this
Tag Name	Specify a tag name or a placeholder for a string tag. For details about placeholders, see "Using tag placeholders" on page 11-37.
Index	Either leave the default as it is or type a number other than the default. Index numbers determine the tab sequence for interactive objects such as input objects and buttons, and are also used in recipe files. For details, see "Using index numbers" on page 12-45.
Default Data	Type the text that will appear in the string input field when the graphic is initially displayed.
Continuously Update	Check this box to have tag value changes appear in the field when the operator is not using the field to input data.
Dimensions	Type a value to specify the maximum number of characters that will be displayed in this field. Be sure the field is long enough to accommodate the string for the tag.
Justification	Select Left, Center, or Right to specify how the values will be aligned within the field.

5. Click OK.

Using input fields at runtime

At runtime, operators can use input fields to retrieve data from and send data to the value table so it can be accessed by the programmable controller, external OPC server or DDE device, or by RSView32 memory.

Continuously updating tag values



When a numeric or string input field is set to update continuously and display tag values, its appearance changes to reflect which mode the field is in. When the field is displaying a value from the programmable controller or server (display mode), the border around the field is dotted. When a value has been entered in the field but not downloaded yet (pending write mode), the border around the field becomes solid. When a field is ready to receive input (input mode), the border is solid and the field is surrounded by a highlight box.

The operator can put the field into input mode by setting focus on the field, uploading to the field, or restoring a recipe to the field. The operator can set the field back to display mode by pressing the Escape key.

When you first open a display containing fields set to update continuously, default focus is given to the first non-updating field in the index sequence. If all fields in the display are set to update continuously, no field is given focus until the operator sets focus on a field.

If an upload fails because of a communication error, question marks appear in the numeric input fields.

Keys

Operators can use the following keys to retrieve data from and send data to the value table. You can re–assign these actions to other keys or assign them to button objects.

- PgDn: downloads the contents of all input fields in the active graphic display to the value table
- Ctrl–PgDn: downloads the contents of a selected input field to the value table
- Enter: downloads the contents of a selected input field to the value table, unless the display was invoked using the /E parameter, which disables the Enter key.

  If the display has been set up to use the on-screen keyboard, pressing Enter brings up the on-screen keyboard.
- PgUp: uploads all values from the value table and displays them in the input fields
- Ctrl–PgUp: uploads a value from the value table for the selected input field
- Tab: moves between input fields

RSView32 commands

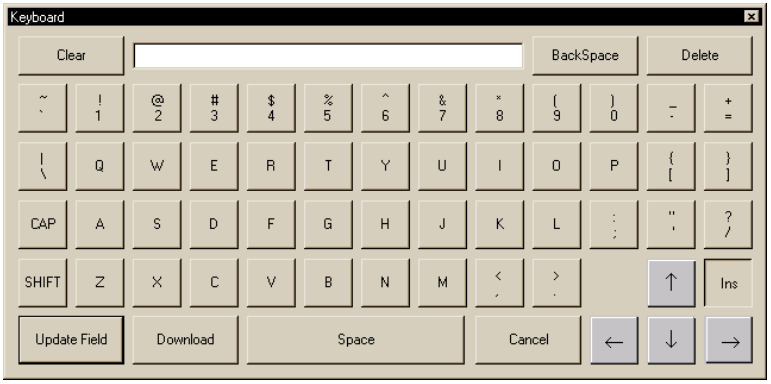
Operators can use these commands to retrieve data from and send data to the value table:

- `Download`: downloads the contents of the selected input field to the value table
- `DownloadAll`: downloads the contents of all input fields to the value table
- `Upload`: uploads a value from the value table and displays it in the selected input field

- UploadAll: uploads all the values from the value table and displays them in the input fields

For detailed information about commands, see Appendix A, *RSView32 commands*, or see Help.

Using the on–screen keyboard



Displays can be set up so that an operator can use an on-screen keyboard for input entry in numeric, string, and recipe input fields. The characters the operator types using the on-screen keyboard appear in the selected input field when the operator presses the Download or Update Field button on the on-screen keyboard, or when the operator presses Enter on a hardware keyboard.

This button	Does this
Update Field	Closes the on-screen keyboard and stores the new value on screen, for later download.

This button	Does this
Download	For numeric and string input fields, closes the on-screen keyboard and downloads the value or text the operator typed. For recipe fields, closes the on-screen keyboard, opens the Recipe dialog box, and inserts in the Recipe File field the text the operator typed.
Cancel	Discards the operator's changes and closes the on-screen keyboard.

For information about setting up displays to use the on-screen keyboard see "Displaying the on–screen keyboard" on page 11-26.

Creating numeric and string display fields

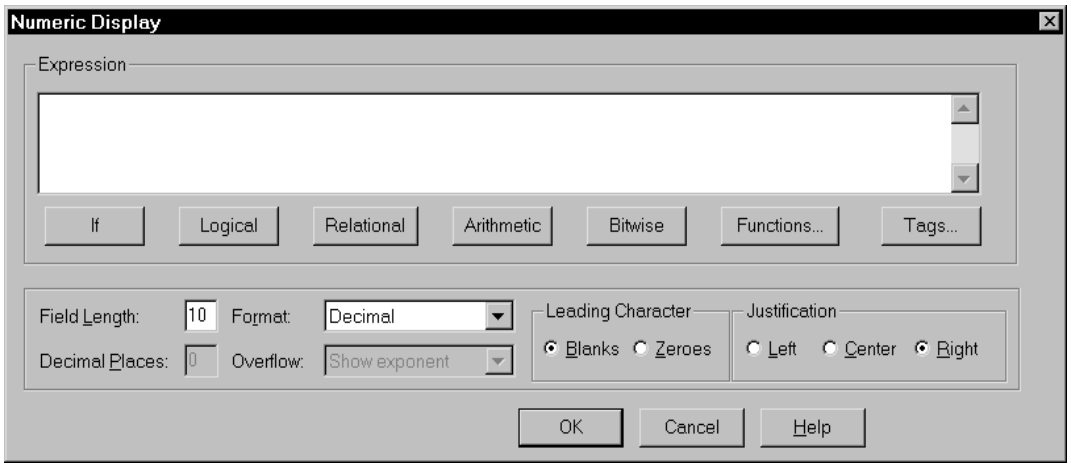

Numeric Display tool


String Display tool

Use the Numeric Display tool to create fields that operators can use to display the current value of an analog or digital tag or a value based on an expression. Use the String Display tool to create fields that operators can use to display the current value of a string tag.

To create a Numeric Display field:

1. Click the Numeric Display tool.
2. Drag the mouse to draw the field.
3. Release the mouse button.



4. Fill in the fields as follows:

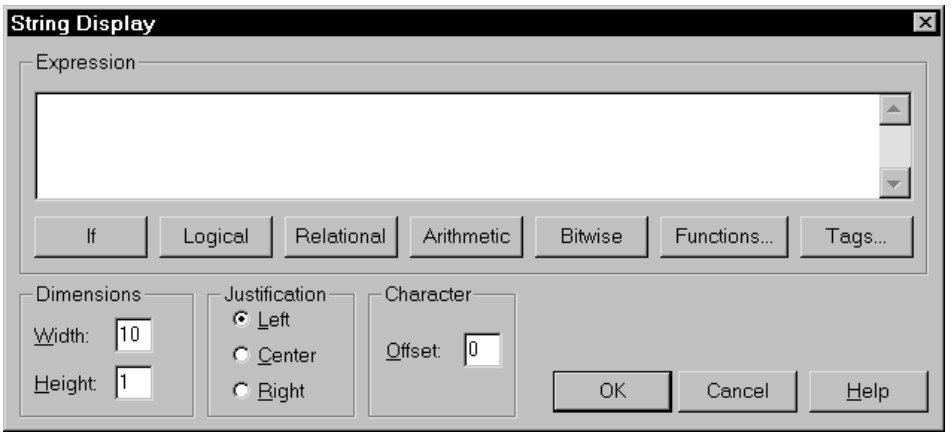
In this field	Do this
Expression	Create an expression. At runtime, the numeric result of this expression is displayed in the Numeric Display field. For details about expressions, see Chapter 14, *Creating expressions*.
Field Length	Type a value to specify the maximum number of characters that will be displayed in this field. Be sure the field is long enough to accommodate the result of the expression.
Format	Select a number base for the value.
Decimal Places	Type the number of places you want after the decimal point. This number must be at least one less than the field width.
Overflow	This field is available only if Floating Point is selected in the Format field. Use this field to specify how you want the floating point value displayed if it is too long for the field. The value can be shown as an exponent, rounded up to fit in the field, or completely replaced by asterisks.

In this field	Do this
Leading Character	Select Blanks or Zeroes.
Justification	Select Left, Center, or Right to specify how the values will be aligned within the field.

5. Click OK.

To create a String Display field:

1. Click the String Display tool.
2. Drag the mouse to draw the field.
3. Release the mouse button.



4. Fill in the fields as follows:

In this field	Do this
Expression	Create an expression. At runtime, the string result of this expression is displayed in the String Display field. For details about expressions, see Chapter 14, *Creating expressions*.
Dimensions	Type a value to specify the maximum number of characters that will be displayed in this field. Be sure the field is long enough to accommodate the result of the expression.
Justification	Select Left, Center, or Right to specify how the values will be aligned within the field.
Character Offset	Select a number of characters. This number determines the first characters to be displayed in the field starting at 0. You can display an entire string or part of a string. You can also display parts of the same string in different string display fields. For example, assume you have a string 12 characters long. The first eight characters contain the tag address. The last four characters contain the tag status. To display only the status, specify a character offset of 8. The address part of the string will not be displayed. To display the address in a separate field, create another string display field, specify the same tag name and specify a field width of 8 and an offset of 0.

5. Click OK.

Creating labels


Label tool

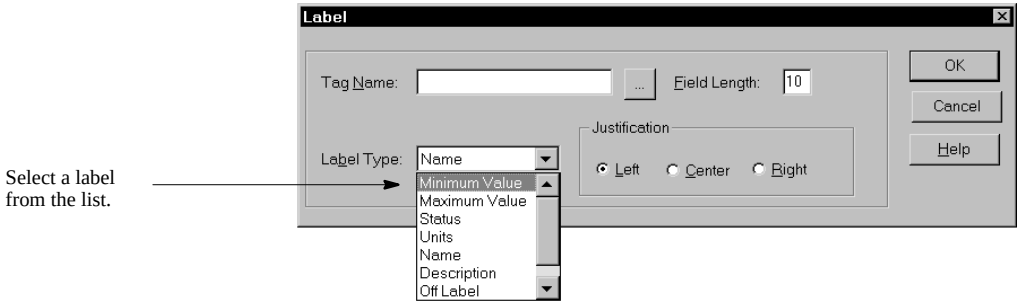
Use the Label tool to create fields that display different types of tag information at runtime. All the information comes from fields you configure for the tag in the Tag Database editor.

You can create the following types of labels:

This label	Displays
Minimum	An analog tag's minimum value
Maximum	An analog tag's maximum value
Status	The current status of a digital tag. When the tag value is 1, "On Label" is displayed; when the tag value is 0, "Off Label" is displayed
Units	An analog tag's units label
Name	A tag's name
Description	A tag's description
Off Label	A digital tag's off label
On Label	A digital tag's on label

To create a label:

1. Click the Label tool.
2. Drag the mouse to draw the label field.
3. Release the mouse button.



4. Fill in the fields as follows:

In this field	Do this
Tag Name	Specify a tag name or placeholder. For information on placeholders, see "Using tag placeholders" on page 11-37.
Field Length	Type a value to specify the maximum number of characters that will be displayed in this field. Be sure the field is long enough to accommodate the label. The maximum field width depends on the type of label you are creating.
Label Type	Select a type.
Justification	Select Left, Center, or Right to specify how the values will be aligned within the field.

5. Click OK.

Creating arrows


Arrow tool

Use the Arrow tool to create arrows that move based on the results of an expression. Arrows can move vertically or horizontally.

Vertical arrows move up or down in relation to a tag's minimum and maximum values. Horizontal arrows move left and right in relation to the minimum and maximum values.

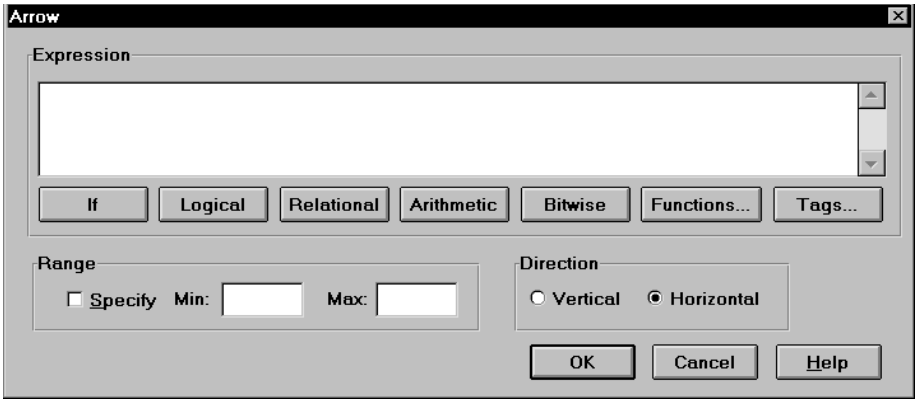
For vertical arrows, if the value is less than or equal to the minimum value, the arrow is at the bottom. If the value is equal to or greater than the maximum value, the arrow is at the top.

For horizontal arrows, if the value is less than or equal to the minimum value, the arrow is at the left. If the value is equal to or greater than the maximum value, the arrow is at the right.

To create an arrow:

1. Click the Arrow tool.
2. To draw a rectangle for a vertical arrow, drag the mouse vertically.

   To draw a rectangle for a horizontal arrow, drag the mouse horizontally.
3. Release the mouse button.



4. Fill in the fields as follows:

In this field	Do this
Expression	Create an expression. At runtime, the numeric result of the expression positions the arrow. For details about expressions, see Chapter 14, *Creating expressions*.
Range	To use the minimum and maximum values for the first tag in the expression, clear the Specify check box. To specify a minimum and maximum value that is different than the first tag's, enter values in the Min and Max fields.
Direction	Select Vertical or Horizontal.

5. Click OK.

Creating buttons

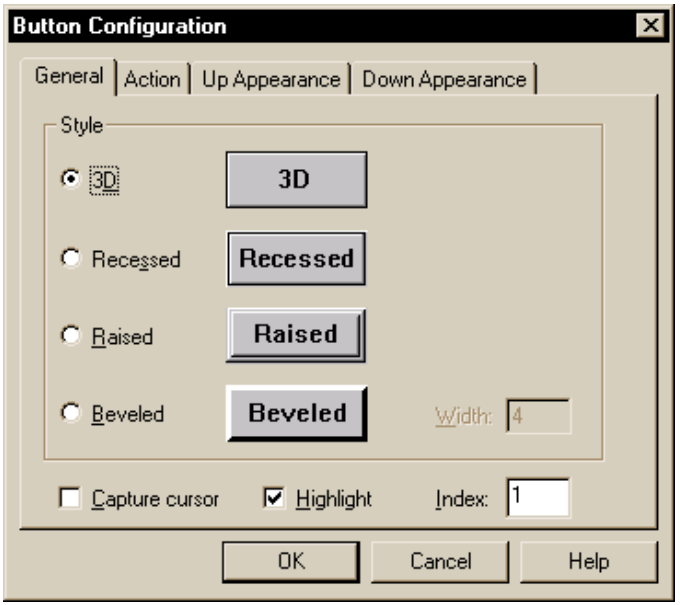

Button tool

Use the Button tool to create buttons that work like standard Windows buttons. You can attach RSView32 commands to the buttons so they trigger actions when pressed and released.

You can apply visibility, color, horizontal and vertical slider, horizontal and vertical position, width, and height animation to the button.

To create a button:

1. Click the Button tool.
2. Drag the mouse to draw a button about the size you want.
3. Release the mouse button.



4. Fill in the fields in each tab to configure how you want the button to look and act, as described in the sections that follow. When finished, click OK.

General

1. In the General tab, click a button style.

   3D, Recessed, and Raised styles can be used only for rectangular–shaped buttons. The Beveled style supports rectangular and polygonal shapes. If you change a 3D, recessed, or raised button to another shape, or rotate it, the button automatically changes to beveled.

   The highlight and shadow colors on the beveled button use the current system settings.

   To reshape a button, select it, click the Polygon tool and then move or add vertices as you would for any other polygonal shape.

2. To have the cursor captured when the button is pressed at runtime, check the Capture cursor check box. When the cursor is captured, it will not move off the button until the button is released. Use this feature when you need to ensure that a button's release action is carried out.

   If the Capture cursor check box is not selected, the button will behave like standard Windows buttons, allowing the user to 'cancel' the release action by holding the mouse and moving off the button.

3. If you want the button to be highlighted when the button has focus, check the Highlight box.

   The option, Disable Highlight When Object has Focus, on the Behavior tab of the Display Settings dialog box, overrides this Highlight setting.

4. In the Index field, either leave the default value or type a new value. Index numbers determine the tab sequence for interactive objects such as buttons and input fields and are also used in recipe files. For details, see "Using index numbers" on page 12-45.

Action

In the action tab, click an action:

`Set`: Sets the specified tag to 1 when the button is released (mouse down = no action, mouse up = Set <tag> to 1).

`Reset`: Sets the specified tag to 0 when the button is released (mouse down = no action, mouse up = Set <tag> to 0).

`Toggle`: Sets the specified tag to 0 or 1 depending on its current state. If the tag's value is 0, the tag is set to 1 when the button is pressed. If the tag's value is any non–zero value, the tag is set to 0 when the button is pressed.

Momentary On: Sets the specified tag to 1 when the button is pressed (mouse button is pressed and held down) and sets the tag to 0 when the button is released (mouse button is released).

Momentary Off: Sets the specified tag to 0 when the button is pressed (mouse button is pressed and held down) and sets the tag to 1 when the button is released (mouse button is released).


Browse button

Command: Runs the specified RSView32 command or macro. In the Press action, Repeat action, and Release action fields, type an RSView32 command or macro, or press the Browse button to open the Command Wizard.

You must specify either a press or release action; both are not required. If you specify a repeat action, the action is repeated at the rate specified in the Repeat rate field for as long as the mouse button is held down.

Pressing the Enter key does not cause a repeat action to be executed because Windows interprets this as a series of press actions, so the repeat action is not carried out. The Enter key works for the press and release actions.

Up Appearance

In the Up Appearance tab, specify what the button will look like when it is not pressed.

1. In the Button Label field, type a label for the button. Click the color box to specify the label's color and then click Font to specify a font for the button. Choose only TrueType fonts.
2. In the Fill field, choose a fill pattern for the button.
3. If desired, click Import to import a bitmap that will appear in the center of the button. The label, as specified in step 1, appears on top of the bitmap.

If the button is a polygon, the label text and any imported bitmap graphic are clipped at the rectangular extents of the button.

Down Appearance

In the Down Appearance tab, specify what the button will look like when it is pressed.

If you want the button to appear the same when it is not pressed and pressed, click Same as "Up Appearance". If you want the button to appear differently, choose different options. See "Up Appearance," above, for details about the fields.

Editing a button object

To edit a button object, double–click the button object to open the Button Configuration dialog box.

To change a button's label, use the font style and color in the Button Configuration dialog box or use the commands on the Attributes menu.

Reshaping a button object

If you reshape or rotate a button, the button type always changes to beveled. Only beveled buttons can be a polygon (or non–rectangle) shape.

To reshape a button, select the button and then click the Polygon tool. Move or add vertices as you would with any polygon shape.

Creating a recipe field

Recipe tool

Use the Recipe tool to create a field that operators can use to specify the name of a recipe file containing tag values for all the numeric and string input fields in a graphic display.

With a recipe field, operators can load all the values from a recipe file into the numeric and string input fields in one keystroke rather than

having to enter values one by one. Operators can then write all these values to the programmable controller with another keystroke.

IMPORTANT A graphic display can have only one recipe field.

To create a recipe field:

1. Click the Recipe tool.
2. Drag the mouse to draw the field.
3. Release the mouse button.

4. In the Default File Name field, type the name of the recipe file to and from which values will be saved and restored. Do not include a file extension.
5. In the Field Length field, type a value to specify the maximum number of characters that can be displayed in this field.
6. In the Justification field, select Left, Center, or Right to specify how the recipe file name will be aligned within the field.
7. Click OK.

Creating a recipe file

A recipe file contains tag values for all the numeric and string input fields in a graphic display. The recipe file uses index numbers to specify which tag value goes into which input field.

RSView32 automatically assigns index numbers to input objects and button objects as you create them. To check the index number for an object, double–click the object to open its configuration dialog box, and then check the number in the Index field.

For details about index numbers, see "Using index numbers" on page 12-45.

Two ways to create a recipe file

You can create a recipe file with the Recipe editor or, at runtime, you can create a recipe file by specifying a file name in the recipe field and then saving values to that file.

To create a recipe file with the Recipe editor:

1. Open the Recipe editor.
2. Type one entry per line. Type one entry for each input field in the display. You can have up to 500 entries.

   An entry is the index number, a comma, and the value you want to load into the input field, *with no spaces*. Index numbers must start at one and increase by one.

   If you want, you can include the tag name, preceded by an exclamation mark (!), as a comment. Tag names are automatically added to the file when values are written to the file.
3. Save the file.

To create a recipe file at runtime:

1. At development time, in a graphic display, create an input field for each value the recipe is to contain.
2. Create a recipe field for the display.
3. Save the graphic display.

4. At runtime, type values in the input fields.

5. Type a file name in the recipe field and press Enter. The recipe dialog box opens with the name in the recipe file field.

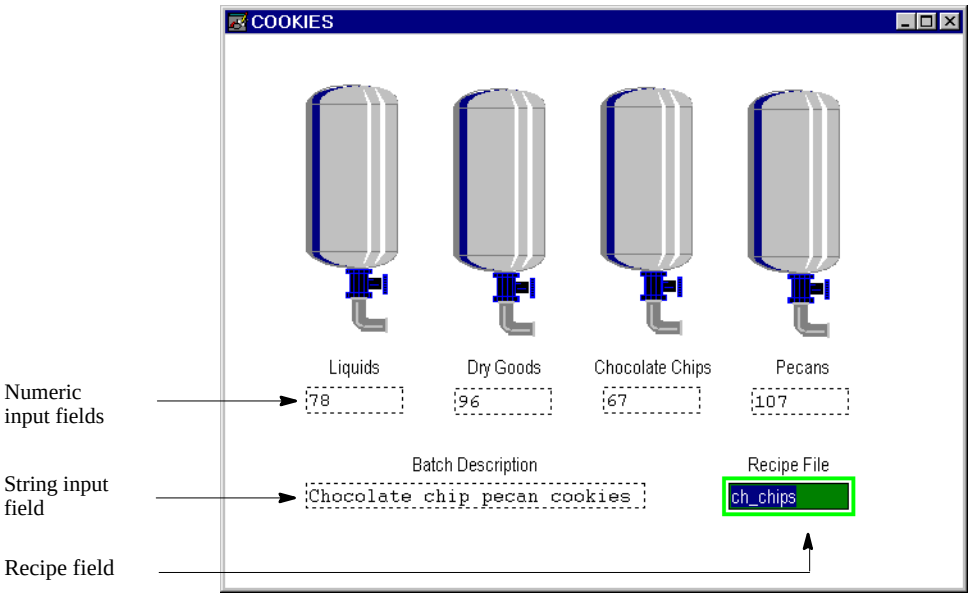
   If the display has been set up to use the on-screen keyboard, pressing Enter brings up the on-screen keyboard. Pressing the Download button on the on-screen keyboard opens the Recipe dialog box, where you can save the recipe file.

6. To save the values in the input fields and at the same time create a recipe file, click Save.

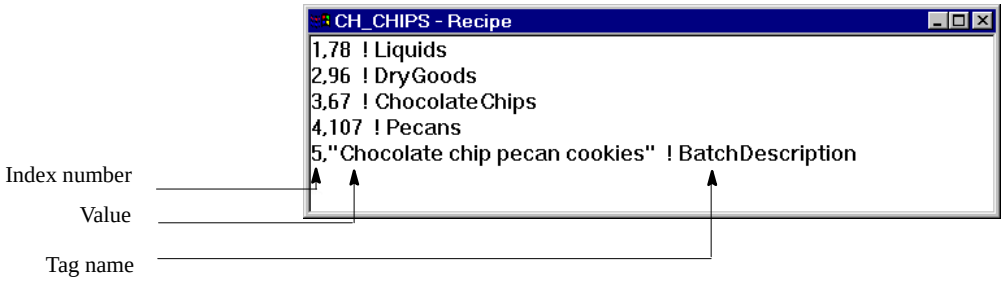
   A recipe file is created. When the Recipe icon is selected, the file appears in the right pane of the Project Manager.

Example: Creating a recipe file at runtime

The following display was used to create a recipe file for chocolate–chip cookies:



This is the recipe file that was created:



Using a recipe at runtime

At runtime, operators can restore values from a recipe file into input fields and send those values to the programmable controller or server. Operators can also upload values from a programmable controller or server into input fields, and then save those values to a recipe file.

If an upload fails because of a communication error, question marks appear in the numeric input fields.

To move to a recipe field, users can do any one of the following:

- use the mouse. Double-click the recipe field to open the Recipe dialog box and save or restore the recipe file.
- press Ctrl–R to move to the field and then press Enter to restore the contents of the recipe file.

  If the display has been set up to use the on-screen keyboard, selecting the recipe field and pressing Enter brings up the on-screen keyboard. Pressing the Download button on the on-screen keyboard opens the Recipe dialog box, where you can restore the contents of the recipe file.
- press Ctrl–W to move to the field and then press Enter to save the recipe file.

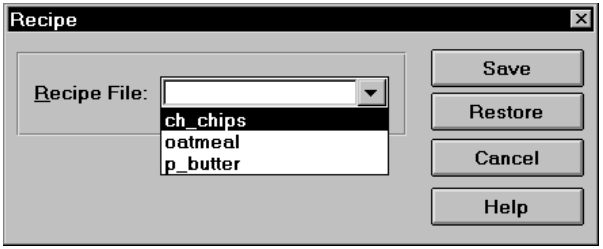
If the display has been set up to use the on-screen keyboard, pressing Enter brings up the on-screen keyboard. Pressing the Download button on the on-screen keyboard opens the Recipe dialog box, where you can save the recipe file.

To download recipe values to a programmable controller or server:

1. Restore the values from a recipe file as follows:

   a. In the recipe field, type the name of a recipe file and press Enter, or click in the recipe field and press Enter. The Recipe dialog box opens.

      If the display has been set up to use the on-screen keyboard, selecting the recipe field and pressing Enter brings up the on-screen keyboard. Type the name of a recipe file using the on-screen keyboard and press the Download button on the keyboard. The Recipe dialog box opens.



   b. If you didn't type a name, select a file from which to restore values.

   c. Click Restore.

2. Download the values in the input fields by pressing PgDn, or by using the RSView32 Download or DownloadAll command.

You can also restore the values from a recipe file using the RSView32 RecipeRestore command. For details, see Appendix A, *RSView32 commands*, or see Help.

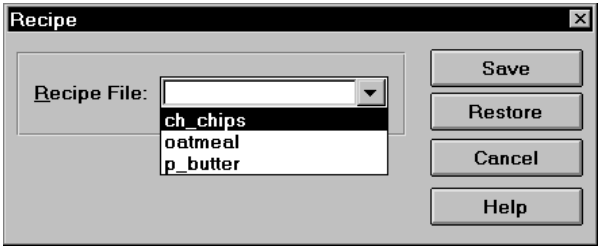
To save recipe values from a programmable controller or server:

1. Upload the values to the input fields by pressing PgUp, or by using the RSView32 Upload or UploadAll command.

2. Save the values to the recipe file as follows:

   a. In the recipe field, type the name of a recipe file and press Enter, or click in the recipe field and press Enter. The Recipe dialog box opens.

      If the display has been set up to use the on-screen keyboard, selecting the recipe field and pressing Enter brings up the on-screen keyboard. Type the name of a recipe file using the on-screen keyboard and press the Download button on the keyboard. The Recipe dialog box opens.



   b. If you didn't type a name, select a file to which values will be saved.

   c. Click Save.

You can also save the values from a recipe file using the RSView32 RecipeSave command. For details, see Appendix A, *RSView32 commands*, or see Help.

Replacing text associated with objects

You can replace any text string used to configure the graphic objects in your display by using tag substitution. For example, tag names, RSView32 commands, and expressions used to animate a graphic object are all text strings that you can replace using tag substitution.

Tag substitution does not work for text objects you create using the Text tool.

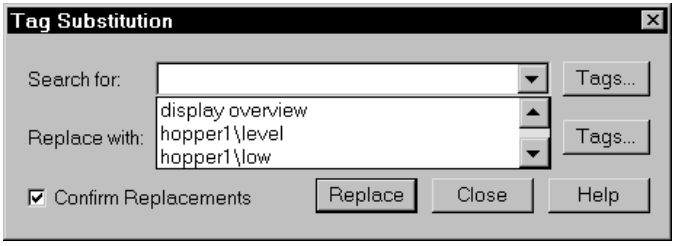
To replace text:

1. Select an object or group of objects. To select all the objects in the display, click Select All on the Edit menu.

2. On the Edit menu, click Tag Substitution.

3. Click the down arrows to display a list of the possible text items you can search for and replace, or type text in the Search for and Replace with fields. The string can be part or all of:

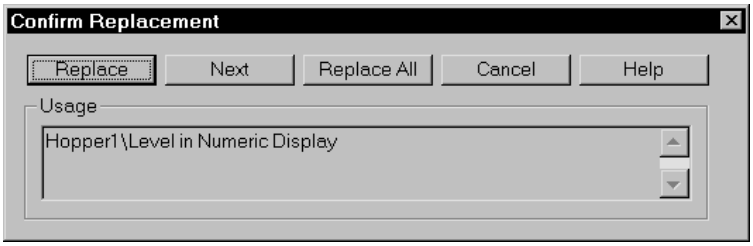
   - a tag name (without wildcards)
   - a folder name (without wildcards)
   - the text in an expression
   - an RSView32 command



4. Click Replace.

   If the Confirm Replacements check box is *not* selected, all occurrences of the text in the Search for field are automatically replaced with the text in the Replace with field.

   If the Confirm Replacements check box is selected, the Confirm Replacement dialog box opens, showing where the text is used.



To replace the text, click Replace or click Replace All. To move to the next selected object that uses the text string, click Next.

5. When all replacements are done, click Close.

Creating and editing OLE objects

OLE stands for Object Linking and Embedding. OLE objects are objects created in other Windows applications and linked to or embedded in an RSView32 graphic display. RSView32 is an OLE client application, which means it cannot be embedded in other Windows applications.

The main difference between linking and embedding is where data is stored. Linked objects are stored in the source file. The graphic display stores only the location of the source file and displays a representation of the linked data. Embedded objects become part of a graphic display.

This difference means that:

- linking pastes the object into the graphic display and retains links to the source file in addition to allowing it to be edited. If the source file is changed, the object in the display is changed.

  When you double–click a linked object to edit it, its application comes up in another window. The object's source file is active.

  If you move your project, remember to move, copy, or update the link for the source file to the new location.

- embedding pastes the object into the graphic display and allows it to be edited. If the source file is changed, the object in the display is not affected.

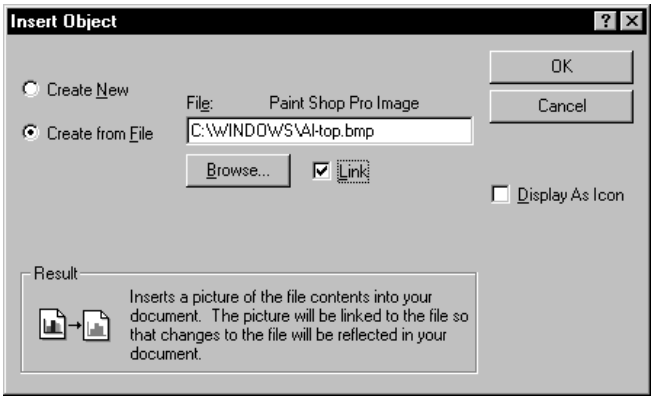
  When you double–click an embedded object to edit it, the Graphic Display editor's toolbar is replaced by the application's toolbar. A border appears around the object to indicate that it can be edited. This is called in–place editing.

  If you move your project, embedded objects are automatically moved with the project.

To create an OLE object:


OLE Tool

1. Click OLE Objects on the Objects menu or click the OLE tool in the Drawing Tools toolbox.
2. Draw a box about the size you want for the object.



3. Click Create New to create and embed a new object.

   Click Create from File to insert an existing file. To create a link to the source file, click Link. To embed the file, do not click Link.

4. Select an object type or file.
5. If you want the embedded object displayed as an icon, click Display As Icon.

6. Click OK.

Other methods for inserting OLE objects

You can also insert OLE objects by:

- copying the information from the source file onto the clipboard and then choosing Paste Special
- choosing Insert Object on the Edit menu. You can then select an object type or file.

Converting OLE objects

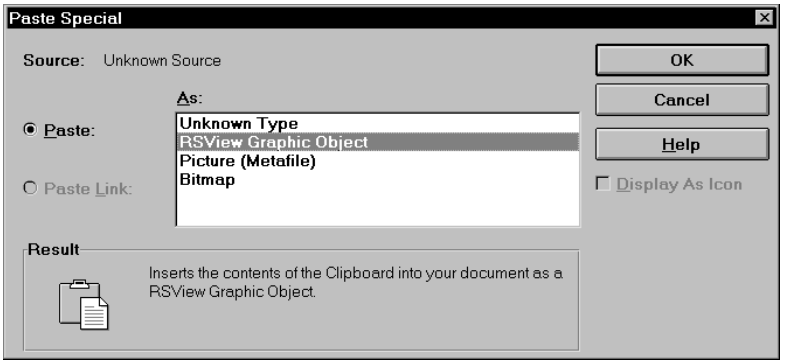
The reasons to convert an object are:

- to change any type of embedded vector–based object into a polygon that is more readily manipulated
- to reduce the size of a graphic display file

  Embedding an object in a graphic display increases the size of the graphic file because the embedded object includes information about its source application. This lets you double–click the object and edit it using the source application. To reduce the size of the graphic file, convert the object to an RSView32 graphic object. You can no longer use its source application to edit the object, but you can still use the editing tools in the Graphic Display editor to work with the object.

To convert an object:

1. Do one of the following:
   - select the object and cut it to the clipboard
   - copy the object from its source application to the clipboard
2. On the Edit menu, click Paste Special. The Paste Special dialog box opens.
3. Click the Paste or Paste Link button.



   Paste copies the contents of the clipboard into the active graphic but does not link to the source application. This is an embedded object.

   Paste Link copies the contents of the clipboard into the active graphic and links it to the source application. This is a linked object. This option is not available if the object comes from an application that does not support OLE linking.

4. Click RSView Graphic Object.
5. Click OK.

Creating and editing ActiveX objects

An ActiveX object is a software component that is supplied independently from RSView32 through products such as Microsoft® Visual Basic, Office 97, and many other third–party applications. An ActiveX object provides functions that can be accessed through the object's properties, events, and methods. By embedding an ActiveX object in an RSView32 graphic display and then assigning properties or specifying handlers for the object's events, the object can interact with RSView32. Information is passed between an ActiveX object and RSView32 using RSView32 tags.

For example, you can embed a third-party gauge in an RSView32 graphic display and attach an RSView32 tag to the gauge's Value property. As the tag's value changes, the gauge's needle changes position to reflect the tag's value.

To pass information between an ActiveX object and RSView32, information must be in the same format as the RSView32 tags, that is, an analog or digital number, or a string. RSView32 does not support pointer parameters in an ActiveX object.

An ActiveX object has three types of attributes:

`Properties`: named characteristics and values of an object such as shape, color, position, or number. For details about attaching control to an object's properties, see page 12-36.

`Events`: actions triggered by the ActiveX object in response to an external action on the object, such as a mouse click. In RSView32 you can use events to change the value of an RSView32 tag or to run an RSView32 command or a macro. When the event happens, the command or macro runs. To use the ActiveX object to change a tag's value, associate the tag with one of the object's event parameters. For details about attaching control to an object's events, see page 12-38.

`Methods`: functions implemented in the ActiveX object that allow external actions to change the object's appearance, behavior, or properties. A call to a method might be made in response to events

from other controls and could trigger other events. You can use the RSView32 Invoke command as the external event that calls a method. For details about attaching control to an object's methods, see page 12-39.

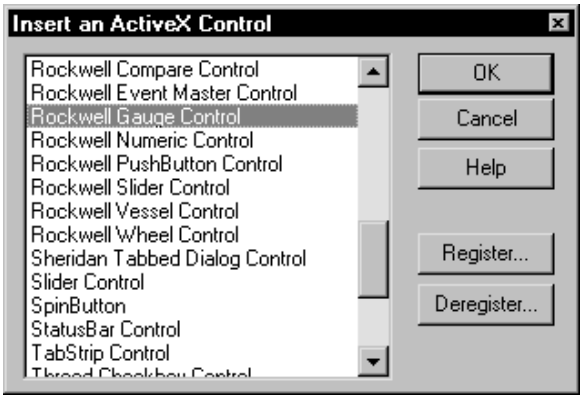
To create an ActiveX object:

ActiveX Control

1. Click ActiveX Control on the Objects menu or click the ActiveX Control tool in the Drawing Tools toolbox.

   If you have set up tools in the ActiveX Toolbox, as described on page 11-76, click the tool in the toolbox, draw a box about the size you want for the object, and skip the remainder of these steps.

2. Draw a box about the size you want for the object.



3. Click the object you want to add to your graphic display. The list of objects depends on what software you have installed.

   If some objects you have installed do not appear in the list, the objects might not be registered. To register them, click Register, and then choose the objects you want to add.

   To remove an object from the list, select the object, and then click Deregister.

4. Click OK.

The object appears in the graphic display. To edit the object's properties, right–click the object, then click ActiveX Property Panel on the context menu. For details, see "Using the ActiveX Property Panel," next.

To attach control to the object so it can interact with RSView32, use the ActiveX Property Panel and the ActiveX Control commands on the Animation context menu. For details, see "Configuring ActiveX control" on page 12-33.

You can also create an ActiveX object using the ActiveX Toolbox, as described in "Using the ActiveX Toolbox" on page 11-76.

Using the ActiveX Property Panel

Use the ActiveX Property Panel to:

- set up or modify properties for an ActiveX object. With multiple ActiveX objects selected, you can simultaneously set up or modify the properties they have in common.
- attach control to object properties. For details, see "Configuring ActiveX control" on page 12-33.

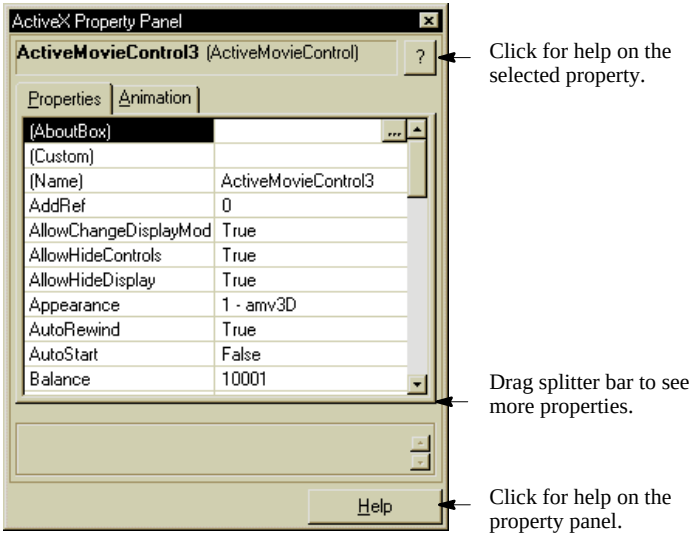
For information about the [Name] property, see "Naming an ActiveX object" on page 12-35.

To set up or modify properties:

1. Right–click the object, then click ActiveX Property Panel on the context menu.

   To open the property panel you can also use the View menu on the Graphic Display editor's menu bar. Click View, then click ActiveX Property Panel.

2. Click the Properties tab if it is not already selected.



3. In the column on the right, type the value for the property. You cannot specify values for properties that are read only.

   If a selection list or window is available for the property, when you click in the column the selection list or window opens. Select the value to use for the property.

4. If custom property pages are available for the ActiveX object, click in the column beside [Custom] to open the property pages and set up more properties.

Once the property panel is open, you can set up properties for multiple objects at the same time by Ctrl-clicking them. The properties common to the selected objects are listed in the property panel.

Using the ActiveX Toolbox

You can use the ActiveX Toolbox to set up tools for the ActiveX objects you use frequently. This toolbox cannot be docked.

By default, the ActiveX Toolbox contains some of the Forms 2.0 ActiveX controls that are installed with VBA. For examples of using

these controls, see the ActiveX Forms 2.0 sample graphic displays in the Samples project.

To add tools to the ActiveX Toolbox:

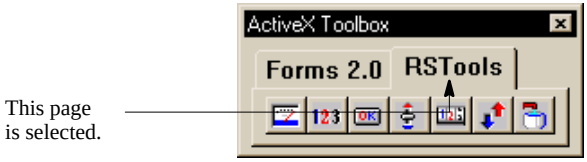
1. If the toolbox is not open, click ActiveX Toolbox on the View menu.
2. Select the page of the toolbox to add objects to.
3. Right-click the page and click Additional Controls.
4. Click the checkboxes of the tools to add from the list of installed controls, then click OK.

You can use up to 10 pages in the toolbox, to group related tools, although the number of tabs you can view at one time depends on the length of the tab names.

To add pages to the ActiveX Toolbox:

1. Right-click an existing tab in the toolbox.
2. Click New Page on the context menu.

   RSView32 creates a new page with the name "New Page." To give the page a new name, rename it as described next.



To rename or remove pages in the ActiveX Toolbox:

1. Select the page to rename or remove.
2. Right-click the tab label.

3. Click Rename or Delete Page on the context menu.

4. If renaming the page, type a name in the Caption field.

   You can also type descriptive text in the Control Tip Text field. This text appears when the operator positions the cursor over the page tab at runtime.

Note that the page with focus is deleted when you choose Delete Page, even though the tab for that page may not be visible. When a tab has focus (is selected) a dotted line appears around the label text.

To remove tools from the ActiveX Toolbox:

1. Select the tool to remove.

2. Right-click, and click Delete Item on the context menu.

To add an object to a graphic display using the ActiveX Toolbox:

1. In the ActiveX Toolbox, click on the icon for the object to add.

2. Draw a box about the size you want for the object.

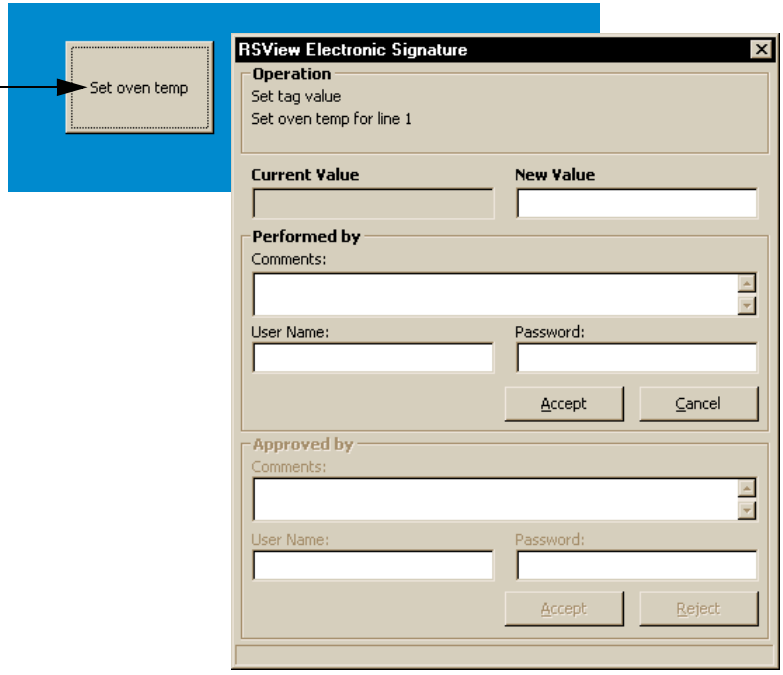
   The object appears in the graphic display. To edit the object's properties, right–click the object, then click ActiveX Property Panel on the context menu. For details, see "Using the ActiveX Property Panel" on page 11-75.

   To attach control to the object so it can interact with RSView32, use the ActiveX Property Panel and the ActiveX Control commands on the Animation context menu. For details, see "Configuring ActiveX control" on page 12-33.

Recording and authorizing run-time changes using electronic signatures

RSView32 includes an electronic signature verification and authorization feature that provides a way to secure operations by verifying the identity of the operator before an action can occur.

When the operator clicks this button, the RSView Electronic Signature dialog box opens, and the user must be authenticated before writing a new value to the tag.



The operator's identity is verified by the signature button—an ActiveX control that allows certain operations to be performed only if the operator provides the appropriate user name and password.

Securing tag writes and commands

Using the signature button, you can secure these operations:

- setting a tag value
- issuing an RSView command

For added security, the signature button can also be set up so that authorization by another person, such as a supervisor, is required before the operation can be carried out.

At run time, the action can be prevented from being carried out and an error message can be displayed if a user name or password is incorrect, or if other information, such as an operator's comment, is required but not provided.

Tracking changes with activity logging

The actions performed using the electronic signature button are recorded in the activity log, and can be viewed in the Activity Log Viewer. The information that is logged includes the user name, old value, new value, the operator's comments about why the change was made, and the name of the person who approved the change.

For more information about activity logging, see Chapter 8, *Configuring activity logging*.

Creating signature buttons

The signature button is an ActiveX control that you add to a graphic display to control the actions that can be performed by the operator at run time.

To create a signature button

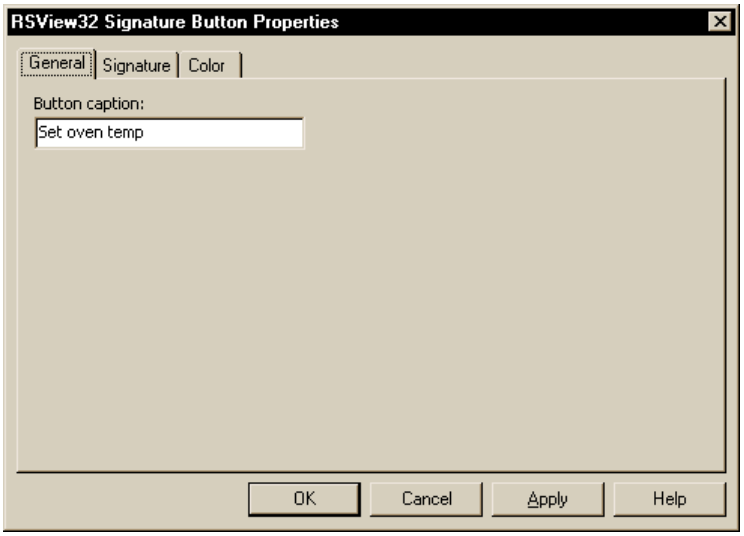
1. In the Graphic Display editor in RSView32, open the display to which you want to add the signature button.
2. On the Objects menu, click ActiveX Control.
3. Draw a box the size you want for the signature button.

   When you release the mouse button, the Insert an ActiveX Control dialog box opens.

4. In the Insert an ActiveX Control dialog box, click RSView32 Signature Button, and then click OK.

5. Double-click the button to set it up.

6. In the RSView32 Signature Button Properties dialog box, fill in the fields in each tab to set up the button's appearance and what it does, as described in the sections that follow.



7. When you are finished, click OK.

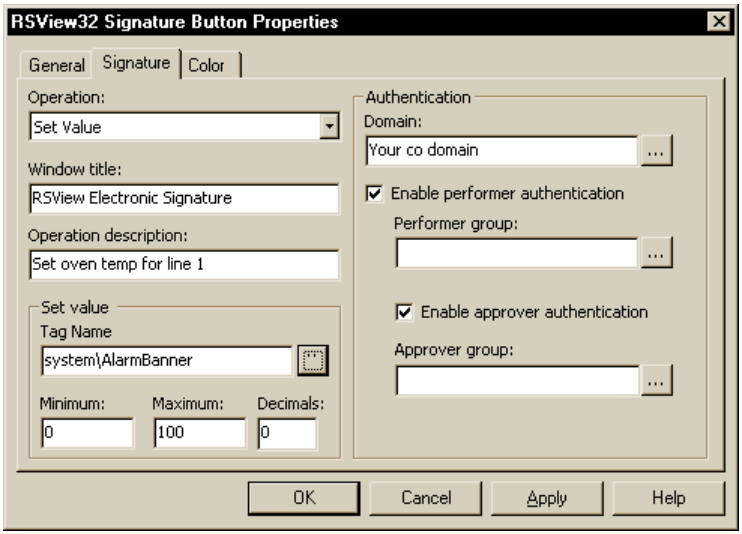
Specifying a caption for the signature button

In the General tab, type the caption that appears on the button at run time

`Button caption` Type a caption for the button.

Setting up the runtime behavior of the signature button

When the operator clicks the signature button at run time, the authentication dialog box appears. In the Signature tab, set up how the authentication dialog box behaves at run time.



Operation Click an operation in the list:

- Set Value sets the value of a tag.
- Send Command issues a command.

Window title Type the title that is displayed in the title bar of the authentication dialog box at run time.

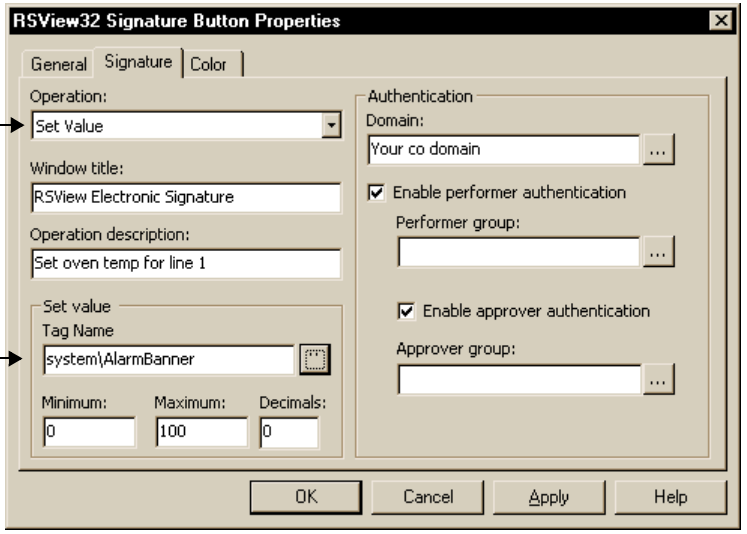
Operation description Type a description of the operation that the button will carry out. This description is displayed in the authentication dialog box, and is logged to the activity log at run time.

Set value If the button's operation is Set Value, select a tag and then specify the maximum, minimum, and number of decimal places that is

set for the tag. If maximum and minimum are the same value, they are ignored.

When you click an option here ...

... the options displayed change here.



`Tag Name` Specify the tag to write a value to at run time.

`Minimum` Specify the minimum allowable value that the tag can be set to.

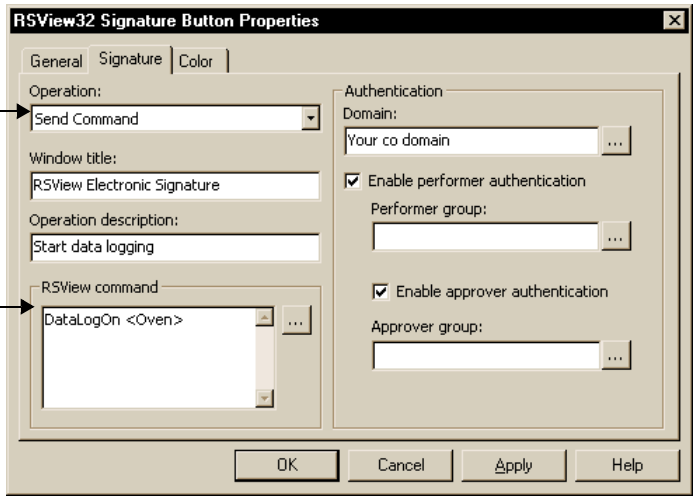
`Maximum` Specify the maximum allowable value that the tag can be set to.

`Decimals` Specify the number of decimal places that are used to show current and entered tag values in the authentication dialog box.

RSView32 command If the button's operation is Send Command, type the command string, or click the Browse button to open the Command Wizard. The command string must include the command name and the parameters required for the command.

When you click an option here ...

... the options displayed change here.



Browse button

Domain Type the name of the domain the operator and approver are members of, or click the Browse button, and then select a domain.

Enable performer authentication Select the check box to enable the User Name and Password boxes for the operator in the Authentication dialog box at run time. This means that the person who is currently logged in to the project must verify their login identity before they can perform the operation.

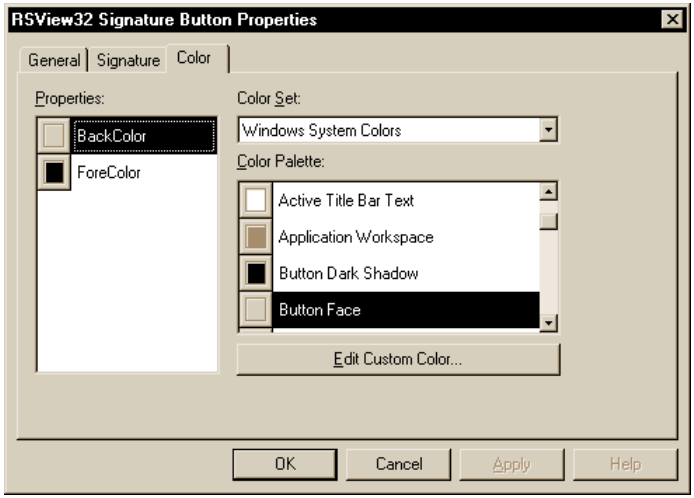
Performer group Specify the name of the group that the performer must be a member of. If the Performer group box is blank, the performer does not need to belong to any group.

Enable approver authentication Select the check box to enable the User Name and Password boxes for the approver in the Authentication dialog box at run time. The person who approves can be any valid user in the specified domain or approver group.

Approver group Specify the name of the group that the approver must be a member of. If the Approver group box is blank, the approver does not need to belong to any group.

Specifying colors for the signature button

In the Color tab, specify the colors for the background and foreground of the signature button.



Properties Select the property for which you want to specify a color.

Color Set Click the color set you want to use. You can use either a standard set of colors, or you can select the Windows System Colors.

Color Palette Click the color you want to use for the property. You can also create custom colors.

Changing the style and color of the font

To change the style of the button's font, use the Font property in the Properties tab of the ActiveX Property Panel. To change the font's color, change the ForeColor property.

You can also use the ActiveX Property Panel to change other properties for the button, such BackColor, Height, and Width.

For details about using the ActiveX Property Panel, see page 11-75.

Naming graphic objects

Once you have drawn a graphic object, you can name it. Naming a graphic object allows you to manipulate the object using commands (for example, when using the Invoke command with an ActiveX object).

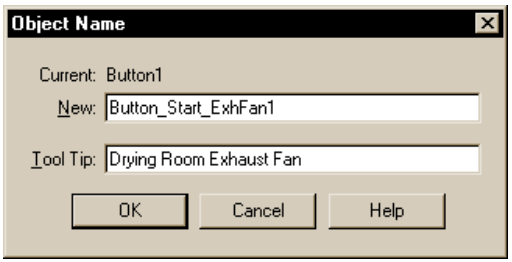
You can also give the object a tooltip description. Tooltips appear at runtime when you bring the cursor to rest over an object for a few seconds, if the object is not inactive (grayed out).

Tooltips only appear on buttons, data entry fields, recipe fields, and objects with touch, slider, or object key animation.

Also see "Naming an ActiveX object" on page 12-35.

To name an object and type a tooltip description:

1. Select one object.
2. Right–click the object, and then click Object Name/Tooltip.



3. In the New field, type a name for the object.
4. If required, type a tooltip description.

5. Click OK to save the changes, or click Cancel to discard the changes.

Working with objects

Once you have drawn an object, you can select the object and edit it. You can:

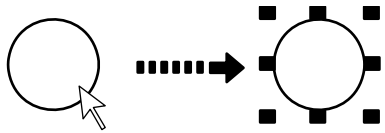
- move objects
- copy objects
- duplicate objects
- resize objects (except text objects)

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.

To drag objects:

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.

You can move several objects at once by selecting them all and then dragging one of the selected objects.

To move objects in small increments:

1. Select one or more objects.
2. Hold down Shift while you press an arrow key. Holding Shift is the same as pressing the left mouse button.

   Use the plus (+) and minus (-) keys to increase or decrease, per press, the distance moved by the arrow keys.

Copying objects

To copy objects, you can:

- drag and drop objects
- copy and paste objects to and from the clipboard

Dragging and dropping objects

You can drag and drop objects between displays. This is particularly useful for copying objects from a graphic library.

To drag objects between displays:

1. Select one or more objects.
2. Hold down the mouse button and drag the object.
3. When the object is where you want it, release the mouse button.

To drag objects in the same display:

1. Select one or more objects.
2. Drag the object, and then press Ctrl.

When you press Ctrl, a plus sign is added to the cursor.

3. When the object is where you want it, release the mouse button and Ctrl key.

   A new copy of the object is created.

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.

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.

Once you copy an object, you can paste it anywhere in the drawing area of:

- the same graphic display
- a graphic display in the same or a different project
- a graphic library in the same or a different project

To cut or copy objects:


Cut


Copy

1. Select one or more objects.
2. Click Cut or Copy on the Edit menu, or click the Cut or Copy button on the toolbar.

- To remove the original object, click Cut.
- To retain the original object, click Copy.

To paste objects:


Paste

1. Click in the Graphic Display editor.
2. Click Paste on the Edit menu or click the Paste button on the toolbar.

To delete objects:

Select one or more objects and then click Delete on the Edit menu, or press Delete on the keyboard.

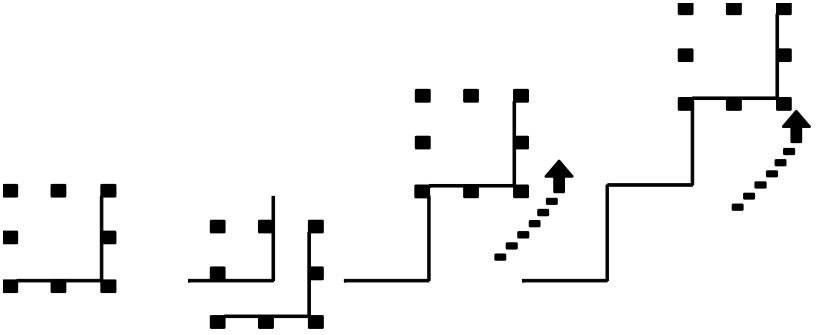
Duplicating objects

Unlike Cut and Copy, Duplicate does not use the clipboard.


Duplicate

1. Select one or more objects.
2. Click Duplicate on the Edit menu or click the Duplicate button on the 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.

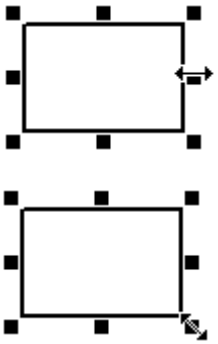
Duplicate works until you deselect the object.

When an object is duplicated, any animation attached to the object is also duplicated. If a group is duplicated, the new copy of the group can be ungrouped to individual objects, just like the original.

Resizing objects

You can resize objects using the mouse or using the keyboard. The keys let you resize objects in small increments.

When you select an object, handles appear around it. Use these handles to resize the object.



Drag a side handle to change either the width or height.

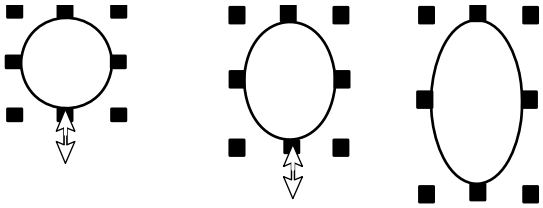
Drag a corner handle to change both the width and height.

To resize an object by dragging 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.



For perfect circles and squares, hold down Ctrl while you drag a *corner* handle.

To maintain the object's original proportions (width to height), hold down Shift while you drag a *corner* handle.

When advanced objects, such as input fields, are resized, the font is resized to fit the new boundary.

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 or shape.

Arranging objects

You can arrange objects in a number of ways using the items on the Arrange menu or the buttons on the toolbar. You can:

- combine several objects into a group that behaves as a single object
- divide a grouped object into its component objects
- stack objects by moving them in front of or behind other objects

- align objects with each other
- space objects horizontally or vertically
- flip objects horizontally or vertically

Grouping and ungrouping objects

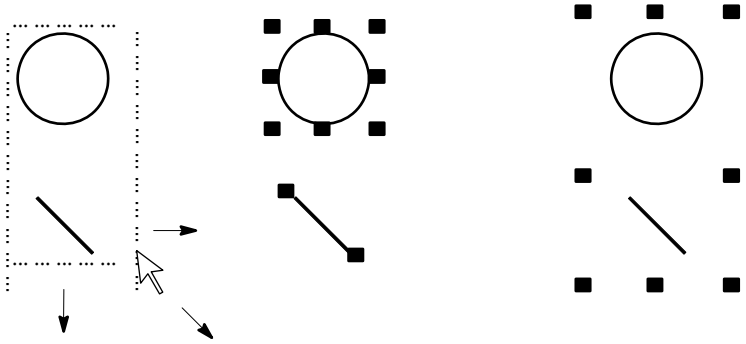
Grouping combines several objects into a single object so you can manipulate them as a single object. You can attach animation to a group, and any animation attached to individual objects in the group remains active.

To group objects:


Group

1. Select all the objects you want grouped.
2. Click Group on the Arrange menu or click the Group button on the toolbar.

   The handles around each object are replaced by a set of handles around the group.


Select the objects

Group them

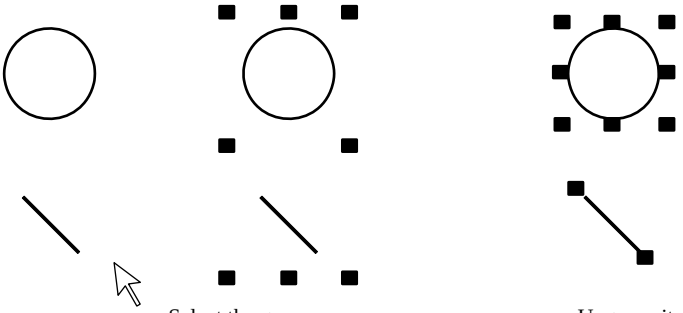
Deleting a group deletes all individual objects in the group. Changing the color or fill pattern of the group changes the color or fill pattern of all individual objects in the group.


Ungroup

To ungroup objects:

1. Select the objects you want to ungroup.
2. Click Ungroup on the Arrange menu or click the Ungroup button on the toolbar.

   The handles around the group are replaced with handles around each object.

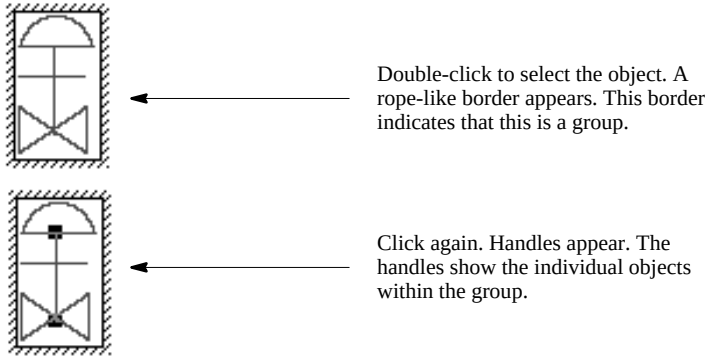


Ungrouping deletes any animation attached to the group, because the group no longer exists. However, animation attached to the individual objects that were in the group remains active.

Performing group editing

With group editing, you can edit the objects in a group as you would individual objects. This allows you to edit a group of objects without breaking the group, which is particularly useful when you have animation attached to groups.

To use group editing, double–click on the grouped object. A rope–like border appears around the group. Double–click inside this box to access another group or to access the individual objects.



When you double–click, 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. To see what objects are selected, either look at the status bar, or right–click to see the Edit menu item on the context menu. To stop editing, click outside of the group.

Stacking objects

You can stack objects on top of each other. Objects are stacked in the order they are created, with the most recently created object on top. Change the stacking order with Send to Back and Bring to Front.

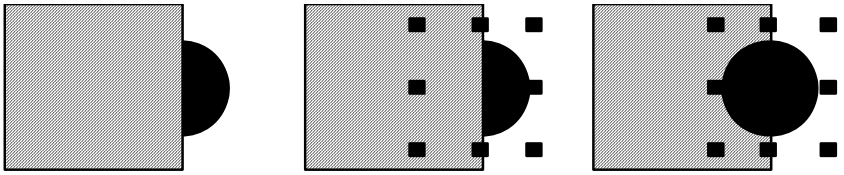
Send to Back moves the selected object to the bottom of the stack.

Bring to Front moves the selected object to the top of the stack.

Bring to Front

To bring an object to the front:

1. Select an object.
2. Click Bring to Front on the Arrange menu or click the Bring to Front button on the toolbar.



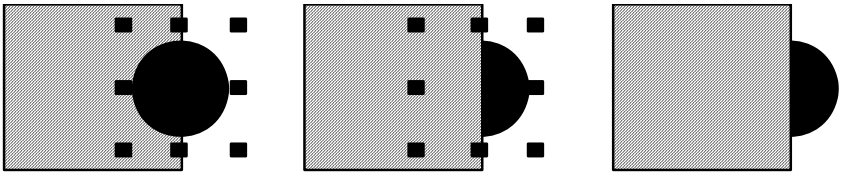
Select the object from behind.

Bring the object to front.

Send to Back

To send an object to the back:

1. Select an object.
2. Click Send to Back on the Arrange menu or click the Send to Back button on the toolbar.



Select the object.

Send the object to back.

To select the object in the back, place your pointer on the object, click once, pause, and then click again. Do not double–click and do not move the mouse.

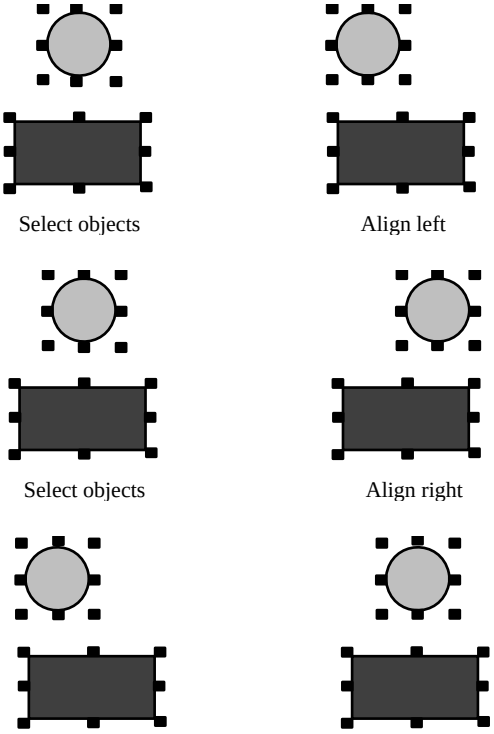
Aligning objects

Objects can easily be aligned with each other and with the grid. Align objects with each other when you want the tops, bottoms, or sides to line up.

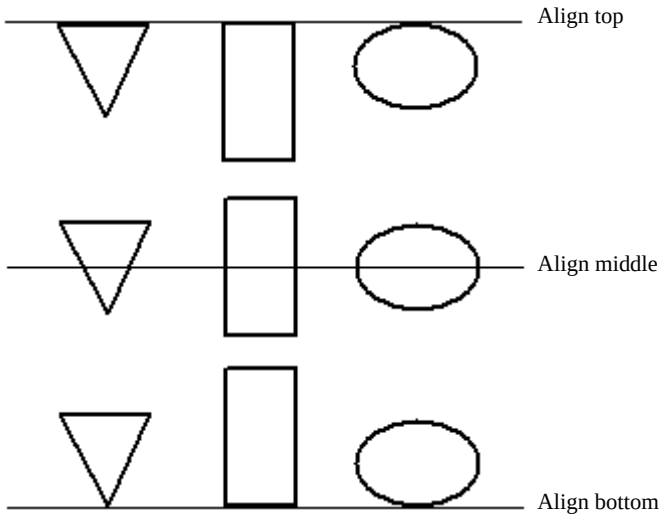
1. Select the objects you want to align.
2. Click the appropriate button or menu item:

This button or menu item		Aligns selected objects with
	Align Left	Left–most selected object
	Align Center	Horizontal center of all selected objects
	Align Right	Right–most selected object
	Align Top	Top–most selected object
	Align Middle	Vertical center of all selected objects
	Align Bottom	Bottom–most selected object
	Align Center Points	Center of all selected objects
	Align to Grid	Grid

Aligning objects left, right, and center



Aligning objects top, middle, and bottom

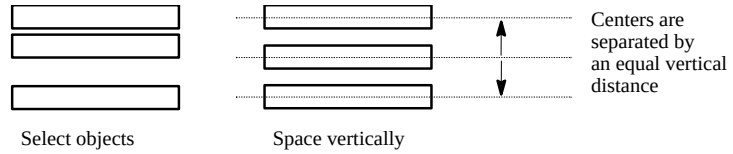


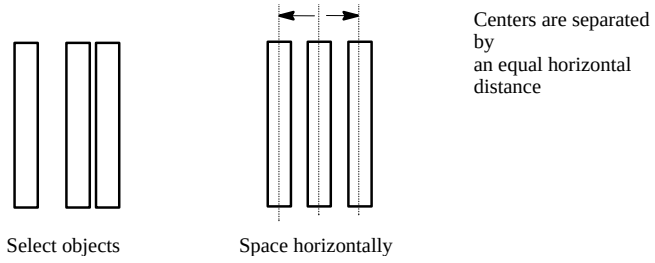
Spacing objects

With Space Vertical and Space Horizontal, objects are moved vertically or horizontally to have the same amount of space from the *center point* of each object.

1. Select the objects you want to space.
2. Click the appropriate button or menu item:

This button or menu item	Does this
 Space Horizontal	Places the centers of the selected objects an equal distance apart horizontally.
 Space Vertical	Places the centers of the selected objects an equal distance apart vertically.



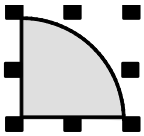


Flipping objects

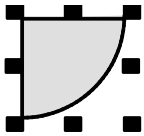
Flipping an object creates a mirror image of that object. You can flip most objects.

1. Select an object.
2. Click the appropriate button or menu item:

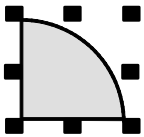
This button or menu item	Flips selected objects
 Flip Vertical	Top to bottom (upside–down)
 Flip Horizontal	Left to right



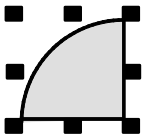
Select object



Flip vertical



Select object



Flip horizontal

Applying colors

You can define both line and fill colors for an object. Line color applies to the outline of an object. Fill color applies to the inside of an object.

To make objects blink, attach color animation to the objects. For details, see page 12-13.

To apply colors before drawing:

1. Select line and fill colors from the color palette or from the Attributes menu.
2. Select a drawing tool and draw the object.

To apply colors to existing objects:

1. Select one or more objects.
2. Select line and fill colors from the color palette or from the Attributes menu.

Applying colors to text

To apply color to text, use the Line Color palette, or click Font on the Attributes menu and then click a color in the Font dialog box.

Applying fill patterns

Fill patterns apply to the interior of objects. Closed objects such as rectangles, circles, polygons, text objects, and wedges are completely filled. Open or partially open objects, such as polylines or freehand objects, can also take a fill pattern. The editor draws an imaginary line from the start and end points, and then fills the object as a closed object.

Hollow polyline object Filled polyline object

Selecting fill patterns

Fill patterns are available on the Attributes menu or on the Fill Style toolbar. To see the toolbar, click Fill Style Toolbar on the View menu.

Applying fill patterns

You can apply fill patterns to objects before or after you draw them.

To apply a fill pattern before drawing:

1. Select a drawing tool.
2. Select a fill pattern from the Attributes menu.

To apply a fill pattern to an existing object:

1. Select one or more objects.
2. Select a fill pattern from the Attributes menu.

How colors and patterns work

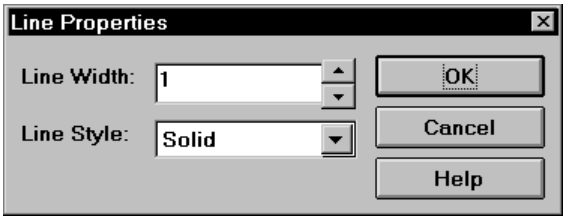
Color is applied to graphic objects with patterns as follows:

- the pattern is the selected line color
- the background is the selected fill color

Changing line properties

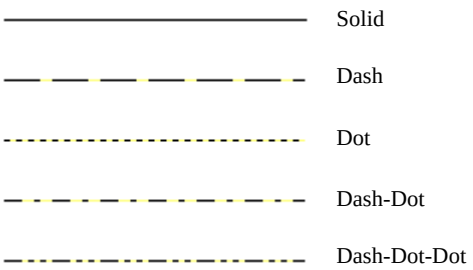
You can change line width and style. You can select a line object and change its properties, or you can select the properties before drawing an object.

1. On the Attributes menu, click Line Properties.



2. Specify a line width and style. Line styles are available only when the line width is 1.

   The styles are:



3. Click OK.

4. Click Line Color or Fill Color on the Attributes menu to apply line or fill colors.

   Line style uses both the line color and fill color attributes. Line color applies to the line, and fill color applies to the spaces in the line. For example, to obtain the dash–dot line, choose black as the line color, and choose white as the fill color. Black is applied to the dots and dashes and white is applied to the spaces between the dots and dashes.

5. Select a color, then click OK.

For trend objects, you can also customize line width and color using the Pen Configuration tab of the Trends dialog box.

Peeking at objects

Use Peek to view any or all of the following objects in a graphic display:

- obscured (hidden) objects
- numeric or string input objects
- the recipe object
- objects with animation
- objects linked to a particular tag

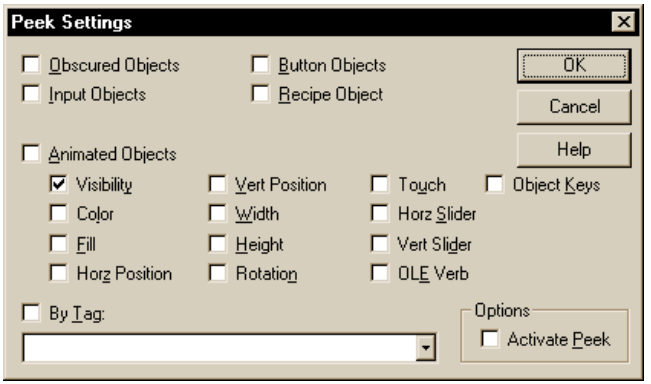
When Peek is turned on, a red box appears around all selected graphic objects. For example:

- if you select Obscured Objects, all objects that are totally hidden by other objects will have a highlighted box around them
- if you select By Tag and then specify a tag name, all objects associated with this tag will have a highlighted box around them

The Peek highlight is not visible in a graphic display with a red background.

To specify which objects you want to peek at:

1. On the View menu, click Peek Settings.



2. Select the check boxes for the objects you want to view.

   To select animated objects, check the Animated Objects check box, and then select the individual types of animation.

   When you check By Tag, the field below it is active. To list the tags associated with a graphic display, either type a tag name, or click the arrow beside the By Tag field and scroll through the list. The list contains the names of all tags used in the display except tags in commands.

   You can peek at as many types of objects as you want. However, Peek does not distinguish between the objects.

   For example, if you choose color and visibility animation, all objects with these types of animation are highlighted and Peek does not indicate which objects have which types of animation.

3. If you want Peek to be active when you close the dialog box, click Activate Peek.

   Otherwise, you can turn on Peek by clicking Peek On on the View menu.

4. To save your settings, click OK.

To turn Peek on and off:

- click Peek On on the View menu
- click Activate Peek in the Peek dialog box

When Peek is on, the cursor looks like this:

Peek is automatically turned off as soon you do any action in the Graphic Display editor. For example, if you are peeking at objects and then move an object, Peek is turned off.

Creating a background for your display

You can create a background for your graphic display by converting 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. This is useful for importing photographs of your machine or process and overlaying them with animated objects.

Converting objects that do not need to be selected or animated speeds up animated displays. Converting bitmaps to wallpaper can significantly improve the performance of a graphic display.

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

Objects that cannot be converted

The following objects cannot be converted to wallpaper: numeric inputs, string inputs, numeric displays, string displays, labels, and trends.

To convert objects to wallpaper:

1. Select one or more objects.
2. On the Edit menu, select Wallpaper and click Convert to Wallpaper.

To unlock wallpaper:

On the Edit menu, select Wallpaper and click Unlock Wallpaper. All objects that were previously converted to wallpaper will be unlocked.

Importing graphic files from third–party applications

RSView32 can import the following types of files:

File extension	Type of file
.gfx	Graphics
.mgx, .mgl	ControlView™ for MS-DOS® graphic files
.wmf, .clp	Windows metafiles
.bmp, .gif, .tif, .pcx	Bitmap files
.dxf	AutoCAD® files*
.jpg	JPEG files

* RSView32 does not import AutoCAD 13 or later .dxf files. To import an AutoCAD 13 or later graphic, export it as a .wmf file from within AutoCAD, and open the .wmf file in RSView32.

Before importing files, configure your video adapter to display more than 256 colors to ensure that the colors of imported objects appear the same as in the original.

To import files:

1. In the Graphic Display editor, click the File menu and then click Open.
2. In the Open dialog box, go to Files of type and select the type of file you want to import.
3. Select the directory and file to open.
4. Click Open.
5. If the Convert Object dialog box appears, click Yes to convert the object to a native RSView32 object or click No to leave the object in its original format.

Transparent backgrounds for image files

RSView32 supports transparent backgrounds for .gif files that you import into your project. This means that the imported image's background can change to match the display's background color.

If you want a .bmp image to have a transparent background, use Object Linking and Embedding to import the file into your project. For information about Object Linking and Embedding, see page 11-69.

Converting imported objects to RSView32 native objects

Converting imported objects to native objects offers the following advantages:

- graphic files are smaller
- objects are groups of objects rather than a single object. This means you can edit the individual parts of the object, including attaching animation to individual parts.

Using bitmaps

Bitmaps consume Windows resources, so when using bitmaps follow these guidelines:

- Use device–dependent bitmaps

  Device–dependent bitmaps (.bmp files) display faster than display–independent bitmaps (.dib files) because the RSView32 Graphic Display editor is optimized for device–dependent bitmaps. Also, you can in–place edit device–dependent bitmaps using the Microsoft Paint program.

- Avoid unnecessary color depth

  Create bitmaps in the lowest color depth possible. The more colors you use, the more memory that is consumed:

  - 16–color bitmaps consume 4 bits per pixel (1/2 byte per pixel)
  - 256–color bitmaps consume 8 bits per pixel (1 byte per pixel)
  - 24–bit bitmaps consume 24 bits per pixel (3 bytes per pixel)

  If possible, use 16–color bitmaps. To change a higher–resolution bitmap to 16–colors, open the bitmap in the Microsoft Paint program and save the bitmap as a 16–color bitmap.

- In 256–color systems, match palettes

  In a 256–color system, if bitmaps use two different color palettes, Windows must recalculate and redraw all bitmaps when window focus changes. Redrawing the bitmaps causes delays and can make a scanned image or photograph 'sparkle' or appear as a negative.

  To match palettes, use a bitmap–oriented graphical tool that lets you match palettes.

  Palette matching is an issue only for 256–color video adapters. 24–bit color systems do not match palettes and 16–color systems

dither colors (that is, alternate pixels of different colors to approximate another color).

- Do not use the Scale option

  The Scale option in the Display Settings dialog box causes the contents of a graphic display to change size to suit the size of the graphic display's window. To speed up the display of a graphic containing bitmaps, choose Pan rather than Scale because bitmaps take longer to draw when they are scaled to a size different from their original size.

  An OLE object can be a bitmap or a bitmap wrapped in a metafile. These types of OLE objects will also draw more slowly when scaled.

- Avoid large bitmaps

  Graphic displays that contain large bitmaps consume memory and can be very slow to display because of the delay in loading them from disk.

  You can change a bitmap to a native RSView32 object by converting the bitmap to wallpaper, tracing over the bitmap with RSView32 drawing tools, and then deleting the bitmap.

- Avoid many bitmaps

  Whenever possible, create graphical objects using the RSView32 drawing tools.

When could a bitmap help?

Bitmaps generally make graphic displays slower. However, objects with large amounts of detail, such as subtle shading, might draw more quickly if converted to a bitmap because bitmaps take the same amount of time to draw regardless of their complexity.

Using graphic libraries

RSView32 comes with a set of libraries that contain graphic objects and displays. Additional libraries are installed if you install the RSView32 Resource Kit. Many of the objects are preconfigured with animation. You can:

- look at the objects and displays to get ideas for your own project
- drag and drop objects from the libraries into your own displays

Use the objects as they are or change them to suit your needs.

Location of library files

By default, library files are stored in a different directory than RSView32. The default installation places the files in:

C:\Program Files\Rockwell Software\Samples\RSView\Library

To open a graphic library:

1. In the Project Manager, open the Graphics folder.
2. Click the Library icon. The libraries are displayed in the right pane of the Project Manager.
3. To open a library, either double–click its icon, or right–click it and then click Edit.

To create a graphic library:

1. In the Project Manager, open the Graphics folder.
2. Open the Graphics Library editor by doing one of the following:

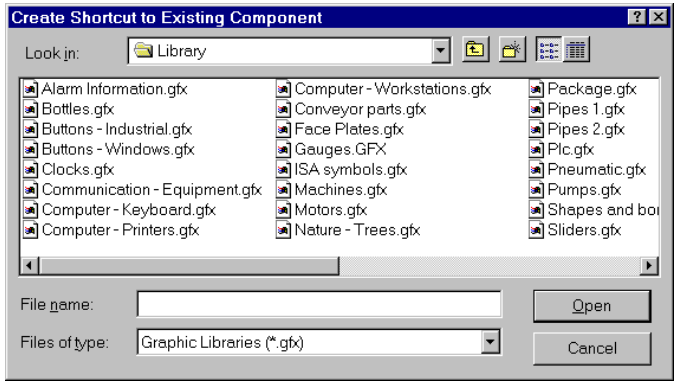
- double–click the Library icon
- right–click the Library icon and then click New

3. When you are finished creating the library, click Save or Save As on the File menu and name the library.

   The library name is added to the other names in the right pane of the Project Manager.

To add a library to a project:

1. In the Project Manager, open the Graphics folder.
2. Right–click the Library icon and then click Create Shortcut to Existing Component.
3. In the dialog box, select the library file you want.



4. Click OK.

   The library is displayed in the right pane of the Project Manager.

Printing displays at runtime

Operators can print graphic displays at runtime using the PrintDisplay command. You must provide the operator with a way to issue the command when you create the display. For example, create a button

object, display key, or global key with the PrintDisplay command as the press action, or provide a command line in the graphic display.

When you use the PrintDisplay command RSView32 prints the entire display, even if parts are covered by other displays. You can also use the ScreenPrint command to print an image of whatever shows on the monitor. For more information about these commands see Appendix A, *RSView32 commands*, or see Help.

Chapter

12 Animating graphic objects

This chapter describes the various types of animation you can attach to graphic objects, and outlines how to:

- use tag names, tag placeholders, expressions, and commands when attaching animation
- use Object Smart Path™ (OSP) to quickly define an object's range of motion
- attach object and display key animation
- attach animation to OLE objects
- attach control to ActiveX® objects

Types of animation

Once you have created graphic objects, you can:

- attach animation that links an object to a tag so the object's appearance changes to reflect changes in the tag's value
- attach key animation that links an object or display to a key or mouse button so operators can perform an action by pressing a key or mouse button
- attach OLE verb animation to an OLE object so when the expression evaluates to true, it activates an OLE object by initiating one of the verbs (for example, edit or open) associated with the object

- attach control to ActiveX objects so you can:
  - map tags to an ActiveX object's properties so changes to the object's properties change the tag's value and, in some cases, changes to the tag's value change the object's properties
  - map commands to an ActiveX object's events so commands run based on the object's events
  - map tags to event parameters

Which objects can have animation?

All graphic objects can have animation attached to them. Groups of objects can also have animation attached.

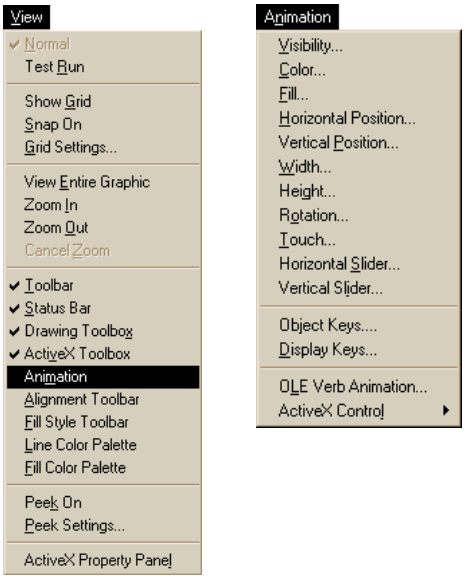
You can attach as many types of animation to an object as you like. For example, apply both width and height animation to an object to give it the appearance of moving into or out of the display as it shrinks and grows.

Using the Animation dialog box

To attach animation, use the Animation dialog box.

To open the Animation dialog box, do one of the following:

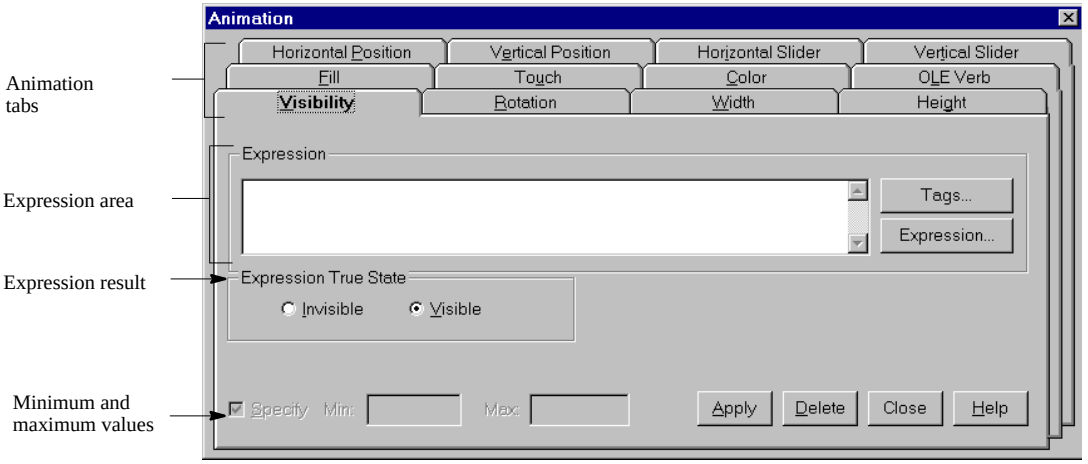
- select an object and click Animation on the View menu
- select an object, click Animation on the menu bar to open the Animation menu, and then click a menu item
- right–click an object to open the context menu, select Animation, and then click a menu item



To attach key animation, use the Object Key and Display Key dialog boxes. For information about key animation, see "Associating objects and displays with keys" on page 12-42.

About the Animation dialog box

The Animation dialog box is a floating dialog box, which means you can have it open all the time and can move it around the screen, select other objects, and open other dialog boxes.



Animation Tabs

Click the tab for the type of animation you want to configure.

Expression Area

Create one or more expressions either by typing them, choosing the Expression button, or both. Multiple expressions are evaluated in the order they are listed.

To supply a tag name for an expression, click the Tags button and then select a name, or type the name. If you use multiple tags in an expression, the first tag is used for the minimum and maximum values if you do not specify these values.

Enclose tag names that contain dashes or start with a number in braces { } when you use them in an expression. This distinguishes the characters in the tag name from the characters in the expression. Also use braces when using wildcards (* or ?) to represent multiple tags in an expression.

For more information about creating expressions, see Chapter 14, *Creating expressions*.

Expression Result

Specify how the object's appearance should change based on the result of the expression. The fields in this area change for each type of animation.

For some types of animation, you have to specify a change of state. For example, an object with visibility animation will switch between visible and invisible.

For other types of animation, you have to specify a range of motion. For example, an object will move from a fixed starting point to a fixed end point. The range of motion is related to the minimum and maximum values for the expression. The object moves from the At Minimum position to the At Maximum position as the expression value changes to the maximum value.

Minimum and Maximum Values

If you do not want to use the values set for the tag in the Tag Database editor, specify minimum and maximum values. If a value falls outside the specified range, it will be evaluated as either the minimum or maximum value. If you do not specify minimum and maximum values, RSView32™ uses the minimum and maximum values for the first tag in the expression. For details, see "Setting minimum and maximum values" on page 12-8.

Apply, Delete, and Close Buttons

These buttons do the following:

- Apply: Applies and validates the animation configured for the selected object or group of objects. Choosing another tab is the same as choosing Apply—the animation you have configured is applied to the object and validated.

- Delete: Deletes the animation for the selected object.

- **Close**: Prompts to apply changes and closes the dialog box.

Using Object Smart Path to visually set animation

Because the Animation dialog box stays open, you can go back and forth between the dialog box and the graphic display. This makes it easy to set the range of motion for an object because you do not have to know how many pixels you want an object to move. Instead, use the RSView32 Object Smart Path (OSP) feature.

For details, see "Defining a range of motion" on page 12-9.

Testing animation

Test mode

Normal mode

Quickly test the animation you have set up in a graphic display by switching to test mode. When you are finished testing, switch back to normal mode to continue editing. To switch between test and normal modes, use the buttons on the toolbar or the items on the View menu.

If your graphic displays contain objects associated with device tags, your system must be set up to communicate with programmable controllers or servers in order for you to test animation.

IMPORTANT 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 configuring animation for objects, you are linking objects to tags, so you have to specify a tag name or tag placeholder. Following is a brief description of how to use tag names and placeholders. For more information, see "Using tag names" on page 11-36.

Tag names

You can use tag names that you have already added to the tag database or you can use a new tag name.

Tag placeholders

Tag placeholders allow you to create displays that can be used with different tags. A placeholder is a cross–hatch character (#) followed by a number between 1 and 500. Tag names are substituted for placeholders when the display is run. Folder names can also be substituted for part of the tag name. For example, #1\#2\MotorValve. This allows the same animation to be added to multiple objects where only the folder name is different.

When setting up object keys, you can specify the [Tag] parameter as a placeholder for a tag name or any character string. The [Tag] parameter is used for object keys *only*. For more information on this parameter, see "Using the Current [Tag] parameter" on page 12-48.

Using commands and macros

Some types of animation, such as touch animation, require you to specify an action. The action is an RSView32 command or a macro. The command or macro you use depends on what type of action you want. For example, if you want the action to open another graphic display, use the Display command.

This chapter does not provide detailed information on using RSView32 commands or macros. For a complete list of commands and command syntax, see Appendix A, *RSView32 commands*, or see Help.

For details about macros, see "Creating macros" on page 15-7.

Using expressions

Many types of animation require an expression. You can use expressions involving tag values, constants, mathematical equations, and if–then–else program logic for animation. A tag name or tag placeholder can be included as part of an expression, or it can stand alone as the entire expression.

This chapter does not provide detailed information on creating expressions. If you are not familiar with the expression language, see Chapter 14, *Creating expressions*, before you begin.

Setting minimum and maximum values

Many types of animation require a minimum and maximum range for an expression. These values determine the start and end points for a range of motion.

When configuring animation, do one of the following:

- use the tag's minimum and maximum values—this is the default, so you do not have to do anything. The values are taken from the Minimum and Maximum fields in the Tag Database editor.
- specify minimum and maximum values by selecting the Specify check box and then typing minimum and maximum values

Why specify minimum and maximum values?

The minimum and maximum values specified for a tag in the Tag Database editor limit the range of values that can be written to the programmable controller but do not limit the values that are read. Therefore, a tag's actual minimum and maximum values might be greater than those specified in the Tag Database editor. If so, you might want to specify the tag's actual minimum and maximum values when configuring an object.

On the other hand, you might want to limit the range of values, which you can also do by specifying minimum and maximum values yourself. 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 results to 200, the object does not change from its At Maximum position.

If an expression uses more than one tag, the first tag in the expression is used for the minimum and maximum values.

Defining a range of motion

To define a range of motion for an object, do one of the following:

- move the objects in the Graphic Display editor. This is called OSP (Object Smart Path).
- type values in the At Minimum and At Maximum fields

All motion is defined in pixels.

Objects that do not have a range of motion

Objects with visibility, color, and touch animation do not have a range of motion, because these types of animation represent a change of state, not a range.

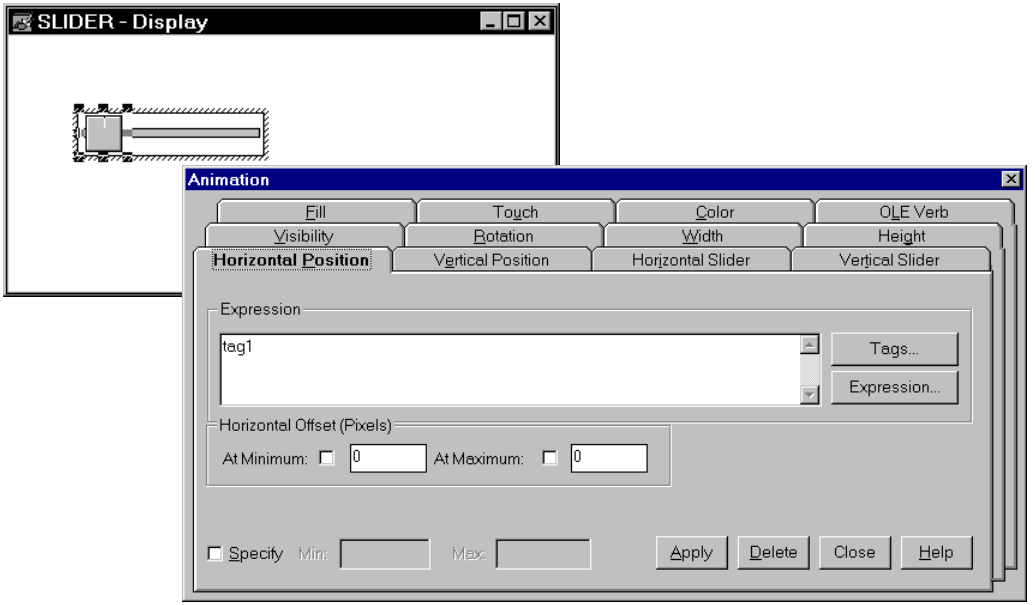
Using OSP (Object Smart Path)

With OSP, you can easily set the range of motion for an object. The following example shows how OSP works.

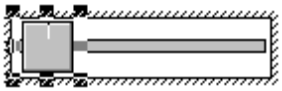
Example: Using OSP to define the range of motion for horizontal slider animation

To define a range of motion for a slider object:

1. In the Graphic Display editor, create a slider object or copy a slider object from a library.
2. Open the Animation dialog box and click the Horizontal Slider tab.
3. In the Graphic Display editor, select the slider button.
4. In the Tag field of the Animation dialog box, specify a tag name.

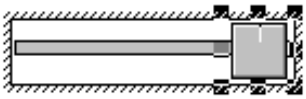


5. In the Graphic Display editor, drag the button object to the position that will indicate the lowest number in the range.



In the Animation dialog box, set this position by clicking the At Minimum check box.

6. In the Graphic Display editor, drag the button object to the position that will indicate the highest number in the range.



In the Animation dialog box, set this position by clicking the At Maximum check box.

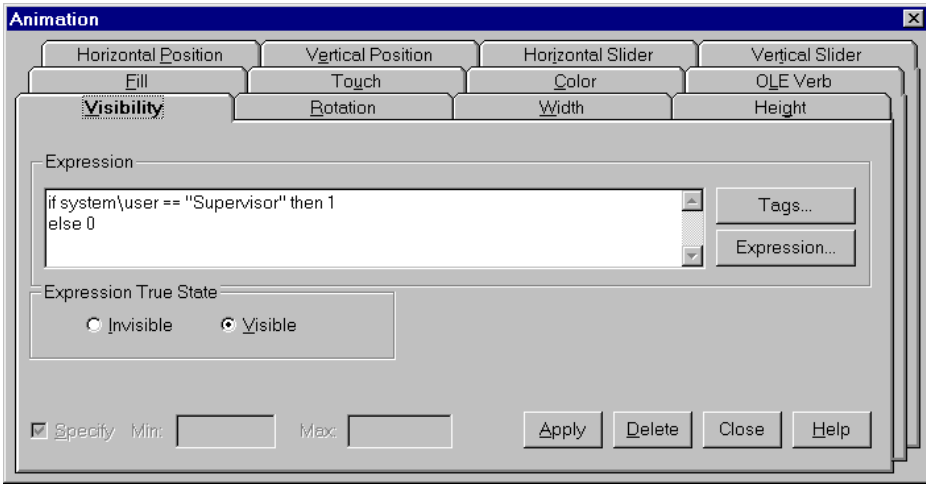
7. To save the settings, click Apply.

When you finish configuring the button object, it returns to its starting position.

Configuring visibility animation

With visibility animation, an object becomes visible or invisible based on a tag value or the result of a logical expression.

If an object is invisible, no other animation attached to the object is evaluated to prevent unnecessary processing.



To configure visibility animation:

1. Select the object.
2. Click the Visibility tab in the Animation dialog box.
3. Create an expression. The expression can be a tag name or a more complex expression. If a tag name is used, the tag's value determines visibility. A value other than 0 evaluates to true.
4. If you want the object to be invisible when the tag or expression value is true—that is, when it does not equal zero—click invisible.

   If you want the object to be visible when the tag or expression value is true—that is, when it does not equal zero—click visible.

5. Click Apply.

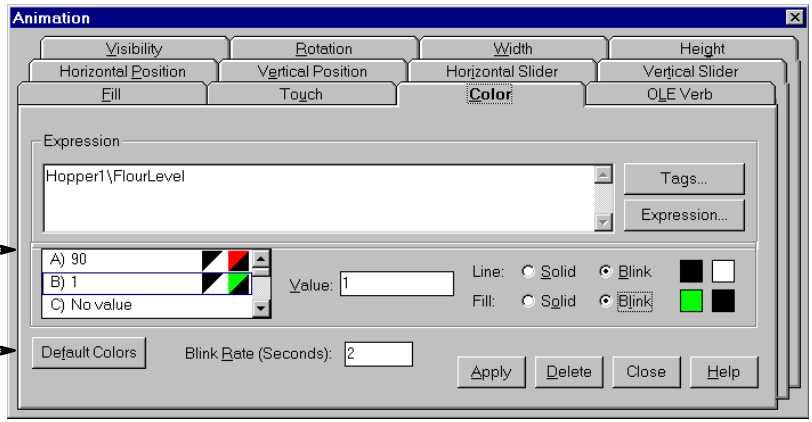
Configuring color animation

With color animation, an object changes color based on a tag value or the result of a logical expression. 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.

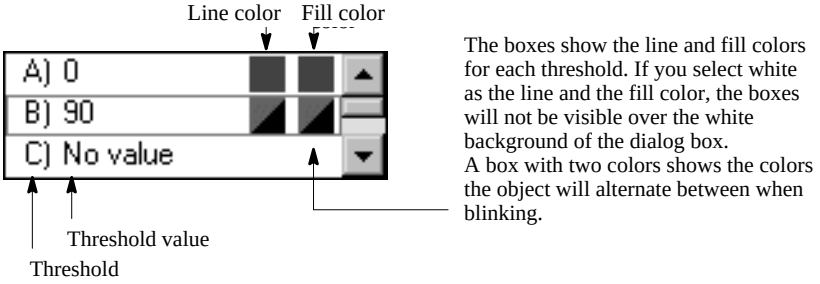
Color animation does not affect string input, numeric input, or recipe fields. Color for these fields is defined in the Display Settings dialog box.

The list box displays the values and colors for each threshold.

To return to the default colors and thresholds, click this button.



The parts of the list box



To configure color animation:

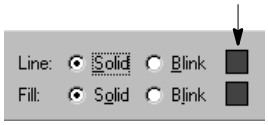
1. Select the object.
2. Click the Color tab in the Animation dialog box.
3. Create an expression. The expression can be a tag name or a more complex expression. If a tag name is used, the tag's value determines the color.
4. In the list box, select a threshold (A through P) for which you will configure a value and colors. You can change the default values and colors for thresholds A and B. The other thresholds have no defaults.
5. In the Value field, type the threshold value. When the expression value reaches this threshold, the object's color changes.

   Enter threshold values in ascending order. That is, A must be lower than B, and B must be lower than C , and so on.

   To delete a value for a threshold (A - P), select the threshold and delete the value in the Value field. In the list box, the value will be replaced with "No Value."
6. Click Solid or Blink for the line and fill colors and then click the line and fill colors. Line colors apply to the outline of the object and to text. Fill colors apply to the inside of the object. To select a

color, place the cursor over the box, click to open the color palette, and then click the desired color.

Specify the solid color here.



Specify the blinking colors here.

Solid colors have only one line and one fill color.

Blinking colors have two line and two fill colors, which are the line and fill colors the object will alternate between when blinking. If you select blink, the two colors must be different.

7. In the Blink Rate field, specify how many seconds each blink cycle will be. For example, if you specify four seconds, the object will be one color for two seconds and the other color for two seconds.

8. Click Apply.

Example 1: Creating a text object that blinks

This example describes how to create a text object that blinks between two colors. In this example, the expression is simply a constant value that matches the value for the selected threshold.

For details about creating text and other graphic objects, see page 11-33.

1. Using the Text tool, type the text.

2. Select the text.

3. Open the Animation dialog box, and then click the Color tab. Attach color animation as follows:

   - in the Expression field, type **0**

     Zero is the default value for threshold A.

- in the list box, click threshold A
- leave the value in the Value field as 0
- for Line color, click Blink (only line color affects text)
- click each color box to open the color palette and then click a color

4. 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.

1. Using the Rectangle tool, create a rectangle.
2. Select the rectangle.
3. Using the Fill Style toolbar, make the rectangle solid.
4. Using the Line Color and Fill Color palettes, make the rectangle gray.

5. Open the Animation dialog box, and click the Fill tab. Attach fill animation as follows:

   - in the Expression field, type **Hopper1\FlourLevel** (this is the tag that controls the fill level)
   - for Fill Direction, click Up
   - click Apply

6. Click the Color tab. Attach color animation as follows:

   Create the expression

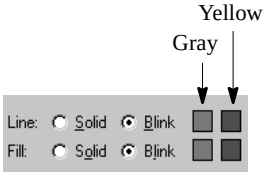
   - in the Expression field, type **Hopper1\FlourLevel** (the same tag that was used in the Fill tab)

   Configure the color for the normal state

   - in the list box, click A
   - in the Value field, leave the value as 0
   - for Line and Fill colors, click Solid
   - for each, open the color palette and click gray (the same gray used for the rectangle)

   Configure the color for the first warning

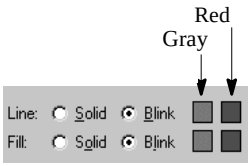
   - in the list box, click B
   - in the Value field, type 80



- for Line and Fill colors, click Blink
- for Line and Fill, open the color palettes and click gray for the first color and yellow for the second color

Configure the color for the second warning

- in the list box, click C
- in the Value field, type 95



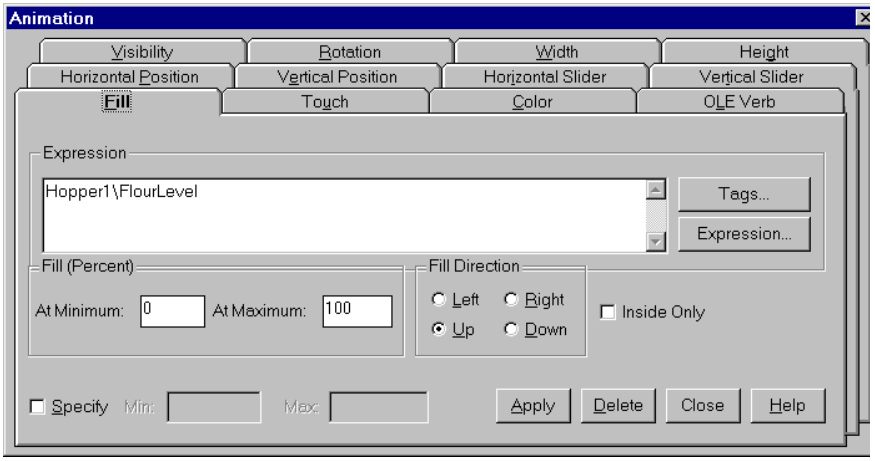
- for Line and Fill colors, click Blink
- for Line and Fill, open the color palettes and click gray for the first color and red for the second color

7. Click Apply.

Configuring fill animation

With fill animation, the level of fill in an object changes based on a tag's value in relation to its minimum and maximum values. The object's fill level is proportional to the value of the expression. For example, if the value of the expression is halfway between the minimum and maximum values, the object will be half full.

Fill animation does not affect string input, numeric input, or recipe fields, nor does it affect arrow objects. It also does not affect hollow objects or line objects even if those objects are grouped into a single object.

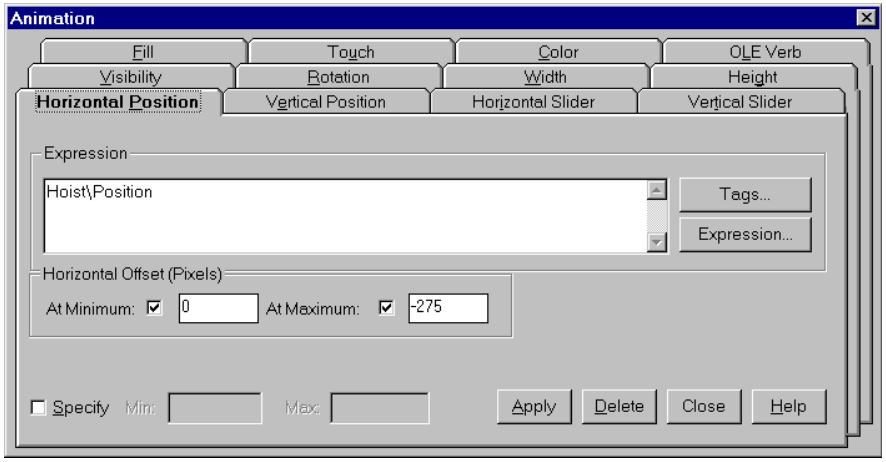


To configure fill animation:

1. Select the object.
2. Click the Fill tab in the Animation dialog box.
3. Create an expression. The expression can be a tag name or a more complex expression. If a tag name is used, the tag's value determines the fill levels.
4. Specify At Minimum and At Maximum values for the fill percentage levels.
5. Click a fill direction.
6. Select the Inside Only check box if you want the object's outline to remain constant so only the inside fill level varies.
7. To specify minimum and maximum values, select the Specify check box and type the values.
8. Click Apply.

Configuring horizontal position animation

With horizontal position animation, an object moves horizontally based on the result of an expression in relation to its minimum and maximum values. The object's horizontal position is proportional to the value of the expression. 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.



To configure horizontal position animation:

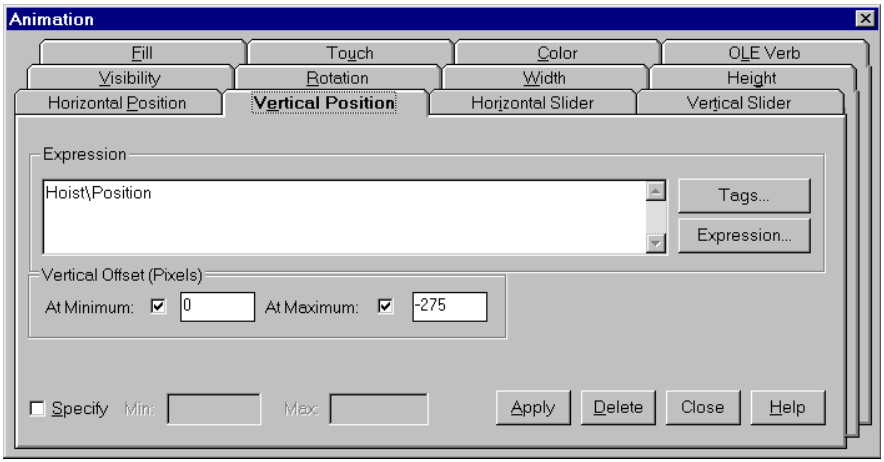
1. Select the object.
2. Click the Horizontal Position tab in the Animation dialog box.
3. Create an expression. The expression can be a tag name or a more complex expression. If a tag name is used, the tag's value determines the horizontal position.
4. Set the starting point for the object by dragging the object or by typing a value. Click the At Minimum check box.
5. Set the ending point for the object by dragging the object or by typing a value. Click the At Maximum check box.

6. To specify minimum and maximum values, click the Specify check box and type the values.

7. Click Apply.

Configuring vertical position animation

With vertical position animation, an object moves vertically based on the result of an expression in relation to its minimum and maximum values. The object's vertical position is proportional to the value of the expression. 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.



To configure vertical position animation:

1. Select the object.

2. Click the Vertical Position tab in the Animation dialog box.

3. Create an expression. The expression can be a tag name or a more complex expression. If a tag name is used, the tag's value determines the vertical position.

4. Set the starting point for the object by dragging the object or by typing a value. Click the At Minimum check box.

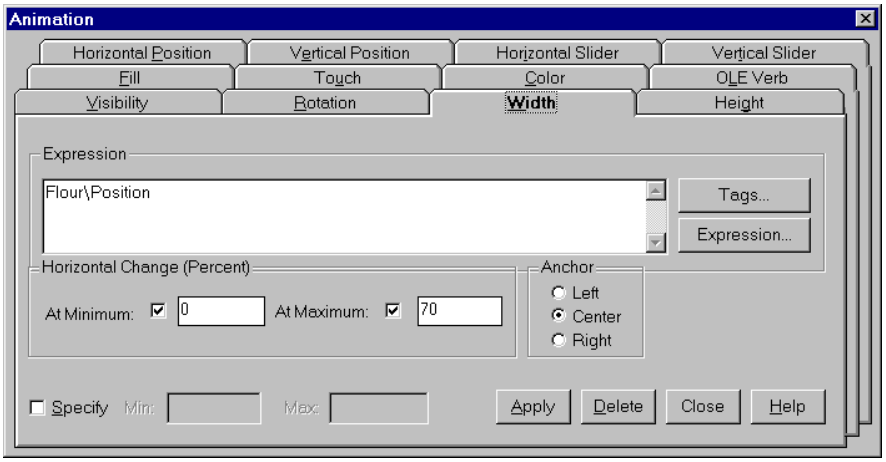
5. Set the ending point for the object by dragging the object or by typing a value. Click the At Maximum check box.

6. To specify minimum and maximum values, click the Specify check box and type the values.

7. Click Apply.

Configuring width animation

With width animation, an object's width changes based on a tag value or the result of an expression. The object's width is proportional to the value of the expression. For example, if the value of the expression is halfway between the minimum and maximum values, the object will be half the full width.



To configure width animation:

1. Select the object.

   When the object is first selected, its width is 100 percent.

2. Click the Width tab in the Animation dialog box.

3. Create an expression. The expression can be a tag name or a more complex expression. If a tag name is used, the tag's value determines the object's width.

4. Set the minimum width for the object by doing one of the following:

   - click a handle on the left or right side of the object and drag it to resize the object
   - type the width you want the object to be when the expression evaluates to its minimum value

   Select the At Minimum check box.

5. Set the maximum width for the object by doing one of the following:

   - click a handle on the left or right side of the object and drag it to resize the object
   - type the width you want the object to be when the expression evaluates to its maximum value

   Select the At Maximum check box.

6. Click an anchor point.

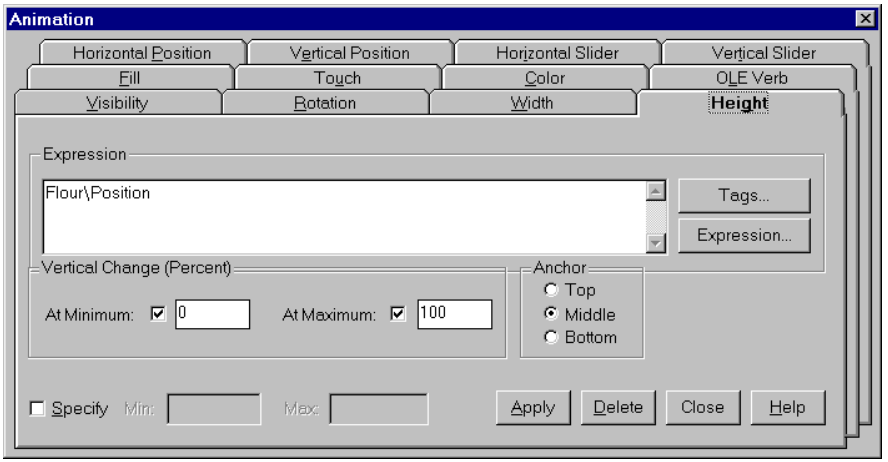
   This is the part of the object that does not move. For example, click Left if you do not want the left side of the object to move. As the value of the expression changes, the object will grow to or shrink from the right.

7. To specify minimum and maximum values, click the Specify check box and type the values.

8. Click Apply.

Configuring height animation

With height animation, an object's height changes based on a tag value or the result of an expression. The object's height is proportional to the value of the expression. For example, if the value of the expression is halfway between the minimum and maximum values, the object will be half the full height.



To configure height animation:

1. Select the object.

   When the object is first selected, its height is 100 percent.

2. Click the Height tab in the Animation dialog box.

3. Create an expression. The expression can be a tag name or a more complex expression. If a tag name is used, the tag's value determines the object's height.

4. Set the minimum height for the object by doing one of the following:

   - click a handle on the top or bottom of the object and drag it to resize the object
   - type the height you want the object to be when the expression evaluates to its minimum value

   Click the At Minimum check box.

5. Set the maximum height for the object by doing one of the following:

   - click a handle on the top or bottom of the object and drag it to resize the object
   - type the height you want the object to be when the expression evaluates to its maximum value

   Click the At Maximum check box.

6. Click an anchor point.

   This is the part of the object that does not move. For example, click Top if you do not want the top of the object to move. As the value of the expression changes, the object will grow to or shrink from the bottom.

7. To specify minimum and maximum values, click the Specify check box and type the values.

8. Click Apply.

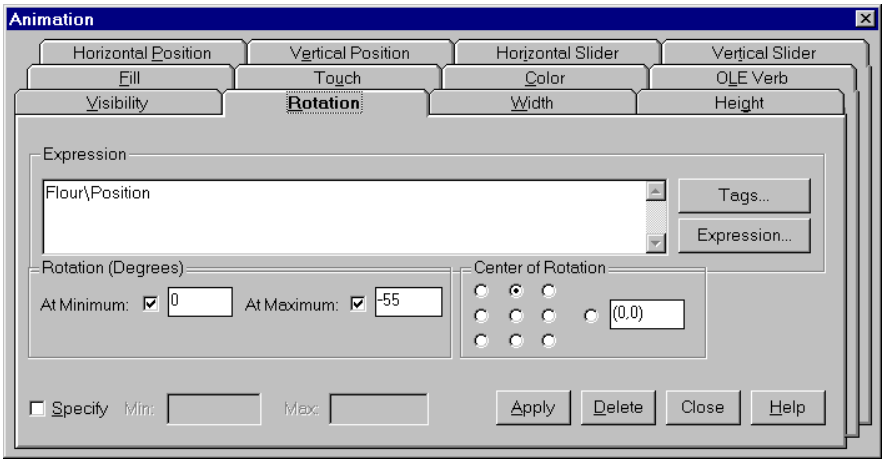
Configuring rotation animation

With rotation animation, an object rotates around an anchor point based on the result of an expression in relation to its minimum and maximum values. The degree of rotation is proportional to the value of the expression. For example, if the value of the expression is

halfway between the minimum and maximum values, the object will rotate half the specified amount.

Text, advanced objects except arrows, OLE objects, ActiveX objects, and bitmaps cannot be rotated.

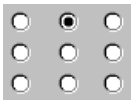
RSView32 does not support rotation animation for rounded rectangles because of Windows limitation.



To configure rotation animation:

1. Select the object.
2. Click the Rotation tab in the Animation dialog box.
3. Create an expression. The expression can be a tag name or a more complex expression. If a tag name is used, the tag's value determines the object's rotation.
4. Set the center of rotation using one of the methods described below. The center of rotation is the point around which the object will rotate. This point can be inside or outside of the object. If it is outside, the object will appear as if it is moving in an arc.

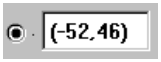
Using the Default Center Points



To use the default center points, select a button.

Why use the default center points? If you set the center of rotation with the default center points, the object will rotate around the same point even if the object is resized. For example, the top–middle corner will always be the center of rotation no matter what size the object is.

Specifying Coordinates



The default coordinates 0,0 are the center of the object; all coordinate values are relative to the center. To specify coordinates, do one of the following:

- using the mouse, place the crosshair at the desired center of rotation and select the button beside the coordinates field
- type values in the coordinates field and then select the button beside the field

5. Set the range of motion for the object.

   To set the minimum, do one of the following and then select the At Minimum check box:

Rotate tool

- click the Rotate tool and visually set the degree of rotation
- type the desired degree of rotation (this value is relative to the object's current position). For clockwise rotation, use a positive number. For counterclockwise rotation, use a negative number.

To set the maximum, do one of the following and then select the At Maximum check box:

- click the Rotate tool and visually set the degree of rotation
- type the desired degree of rotation (this value is relative to the object's current position). For clockwise rotation, use a positive number. For counterclockwise rotation, use a negative number.

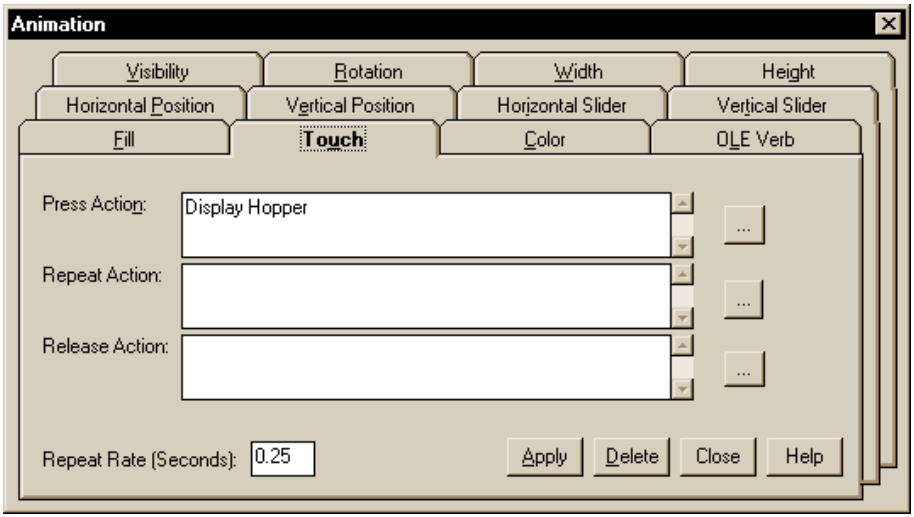
6. To specify minimum and maximum values, click the Specify check box and type the values.
7. Click Apply.

Configuring touch animation

With touch animation, you can specify press, repeat, and release actions that are triggered when an operator touches an object with a mouse or a touch screen.

To highlight touch objects, use the options in the Display Settings dialog box. You can have a highlight box appear around a touch object when a cursor passes over the object. You can also have the computer beep when a touch object is selected.

IMPORTANT If you require a momentary push button, create a button object with a momentary push button action rather than an object with touch animation.



To configure touch animation:

1. Select the object.
2. Click the Touch tab in the Animation dialog box.
3. In the Press Action field, type an RSView32 command or a macro.

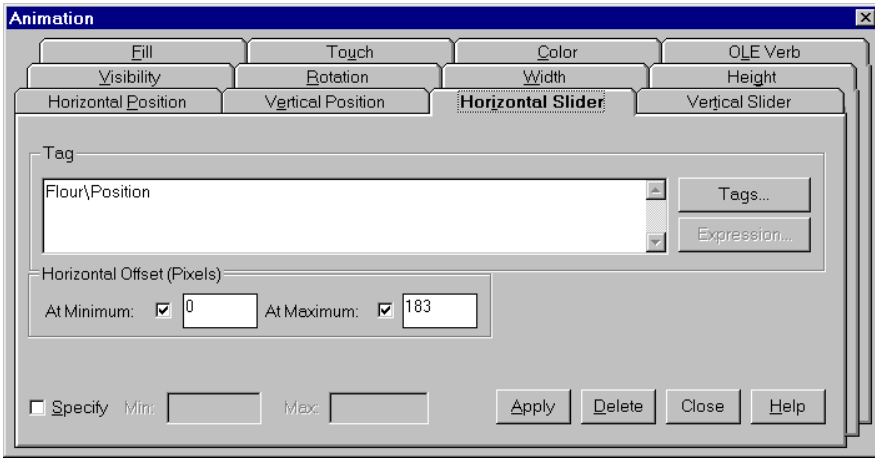
   Separate multiple commands or macros with a semi–colon (;) or place them on separate lines. Multiple commands are executed in the order they are listed.

   If you want repeat and release actions, type commands or macros in these fields as well. Press and release actions occur when the object is pressed or released. Repeat actions occur at the rate specified in the Repeat Rate field and do not wait for the press command to be completed.

4. If you specified a repeat action, specify a repeat rate. This is how often the action will be repeated while the object is pressed.
5. Click Apply.

Configuring horizontal slider animation

With horizontal slider animation, you can create a graphic object that sets the value of a tag. To do this, define a path for the object and then use the mouse to move the object horizontally. The pixel position of the object is translated into values that are written to the tag. An object can have both vertical and horizontal slider animation.



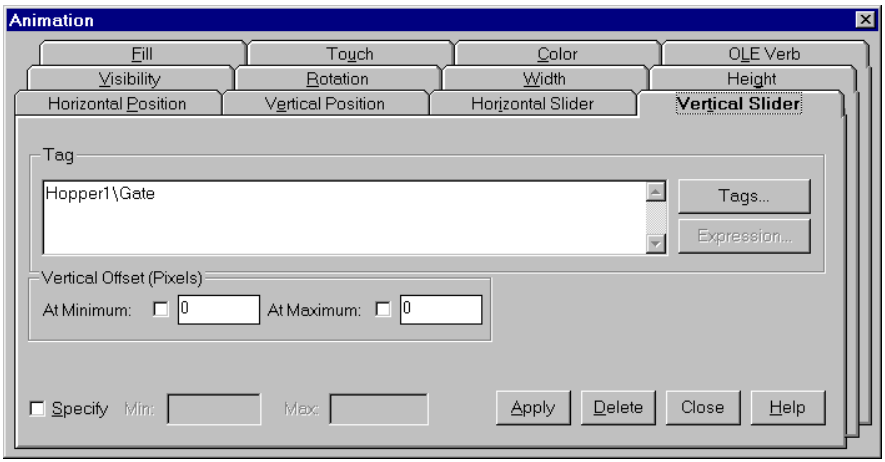
To configure horizontal slider animation:

1. Select the object.
2. Click the Horizontal Slider tab in the Animation dialog box.
3. Type the name of the tag whose value will be determined by the slider.
4. Set the starting point for the slider object by dragging the object or by typing a value. Select the At Minimum check box.
5. Set the ending point for the slider object by dragging the object or by typing a value. Select the At Maximum check box.
6. To specify minimum and maximum values that will be written to the tag, click the Specify check box and type the values.

7. Click Apply.

Configuring vertical slider animation

With vertical slider animation, you can create a graphic object that sets the value of a tag. To do this, define a path for the object and then use the mouse to move the object vertically. The pixel position of the object is translated into values that are written to the tag. An object can have both vertical and horizontal slider animation.



To configure vertical slider animation:

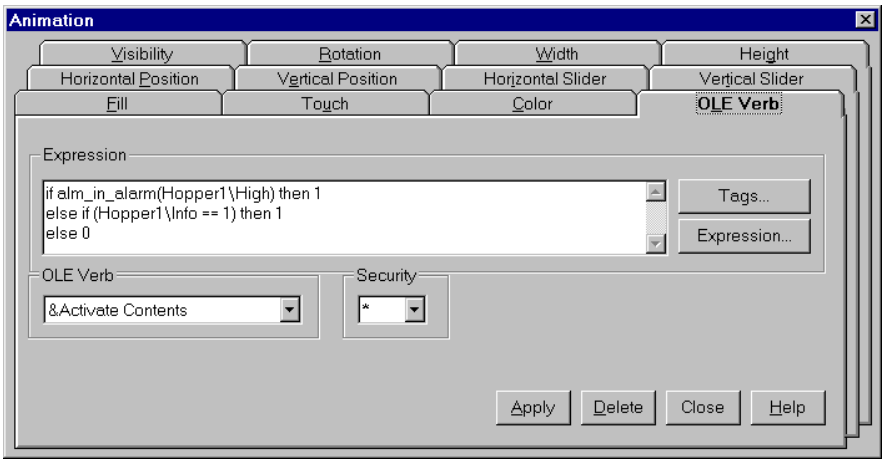
1. Select the object.
2. Click the Vertical Slider tab in the Animation dialog box.
3. Type the name of the tag whose value will be determined by the slider.
4. Set the starting point for the slider object by dragging the object or by typing a value. Select the At Minimum check box.
5. Set the ending point for the slider object by dragging the object or by typing a value. Select the At Maximum check box.

6. To specify the minimum and maximum values that will be written to the tag, click the Specify check box and type the values.

7. Click Apply.

Configuring OLE verb animation

With OLE (Object Linking and Embedding) verb animation, you can set up OLE objects to perform certain actions. When the expression evaluates to true—that is, when the expression does not equal zero—the specified OLE verb is activated. The verbs available depend on the OLE object. Typical verbs include open, edit, and run.



To configure OLE verb animation:

1. Select the OLE object.

2. Click the OLE Verb tab in the Animation dialog box.

3. Create an expression. The expression can be a tag name or a more complex expression. If a tag name is used, the tag's value determines when the OLE verb is activated. A value other than 0 evaluates to true.

4. In the OLE Verb field, click the down arrow to display the OLE verbs available for the selected OLE object. Click a verb in the list.

5. Click a security code.

   To restrict access to this object, assign the appropriate security code. For example, you might want to restrict access so only a senior operator can edit an embedded spreadsheet. For more information about security, see Chapter 10, *Adding security*.

6. Click Apply.

Attaching other types of animation to OLE objects

You can attach many types of animation to OLE objects—just as you can with other objects. And like other objects, the type of animation you attach depends on the object. For example, you could attach visibility animation to a spreadsheet and then create a button that, when selected, would display or hide the spreadsheet. This could be used to show or hide various shift reports or management summaries contained in embedded spreadsheets or database forms.

Configuring ActiveX control

With ActiveX control, you can map RSView32 tags to an ActiveX object's properties, and map RSView32 commands to an ActiveX object's events.

You can change an ActiveX object's properties without using a tag. If you choose this method, the object's properties do not change dynamically at runtime. For more information about making static changes to an object's properties, see "Using the ActiveX Property Panel" on page 11-75.

For details about how to create an ActiveX object, see "Creating and editing ActiveX objects" on page 11-73.

The object's properties versus RSView32 animation

Each ActiveX object has a set of properties. To view the object's properties, right–click the object, then click ActiveX Property Panel on the context menu. The content of the property panel is determined by the application that created the object, not by RSView32.

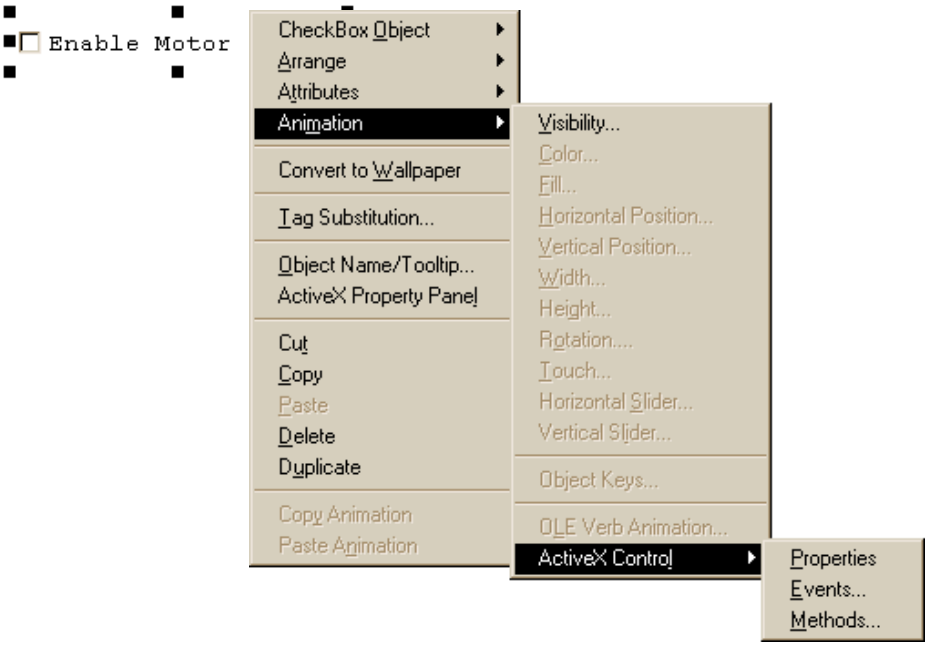
To link the ActiveX object to RSView32, you must attach ActiveX control to the object.

IMPORTANT The runtime behavior of ActiveX objects depends on the vendor's implementation. Before running your project, test ActiveX objects thoroughly to ensure they behave as desired.

To configure ActiveX control:

1. Right–click the object to open the context menu, point to Animation, ActiveX Control, and then click the control you want.

   You can also use the Animation menu on the Graphic Display editor's menu bar. Click Animation, point to ActiveX Control, and then click the type of control you want.



2. Configure the control for properties and events as described on the following pages.

Naming an ActiveX object

All objects have a default name. You can change the default name of all objects, including ActiveX objects. The object's name is used when logging events for that object. The object's name is also used for the Invoke command—to use the Invoke command to call a method, you must specify the name of the object in which the method is implemented.

For more information about ActiveX events, see "Attaching ActiveX control events " on page 12-38. For more information about the Invoke command, see "Using the Invoke command to call an ActiveX method" on page 12-40.

To name an object:

1. Select the ActiveX object.
2. Click the right mouse button to open the context menu and then click Object Name/Tooltip.
3. Type a name for the object, or accept the default name. Each object in a graphic display must have a unique name. Object names are case sensitive.

   The first character of the name must be a letter, but subsequent characters can use numbers or the underscore character (_).
4. Click OK.

To name an object using the ActiveX Property Panel:

1. Right–click the object, then click ActiveX Property Panel on the context menu.
2. Click the Properties tab if it is not already selected.
3. In the column beside [Name], type the name for the object.

Attaching ActiveX control properties

The ActiveX Property Panel shows the properties associated with the selected ActiveX object and allows you to attach an RSView32 tag to a property. The property type is determined by the ActiveX object, not by RSView32.

Property Type

A property type can be Bindable or Not Bindable. The type determines how the property and the tag interact at runtime.

Bindable—When the tag value changes the property value also changes, and when the property value changes the tag value also changes. For example, a slider object has the bindable property Value, which is attached to a tag called Tag1. When Tag1 changes, the slider's

knob changes position accordingly. Likewise, when the slider's knob changes position (for example, by being dragged with the mouse) the slider's value is written to Tag1.

Not Bindable—When the tag value changes, the property value changes. However, the reverse is not true. For example, if the slider object described above has a property Value that is Not Bindable, Tag1's value will not change when the slider's knob is changed but the slider's knob will change when Tag1's value changes.

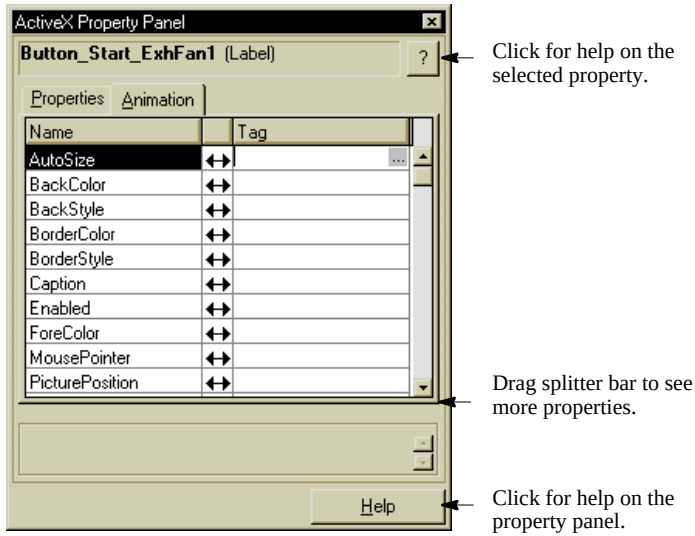
If a property is Not Bindable and read only, it does not appear on the Animation tab of the ActiveX Property Panel.

To attach an RSView32 tag to a property:

1. Right–click the object, then click ActiveX Property Panel on the context menu.

   To open the property panel you can also right–click the object to open the context menu, point to Animation, ActiveX Control, and then click Properties.

2. Click the Animation tab if it is not already selected.



The middle column indicates whether the property updates the tag or the tag updates the property:

- A left arrow indicates the tag updates the property
- A right arrow indicates the property updates the tag
- A double arrow indicates the tag and property update each other

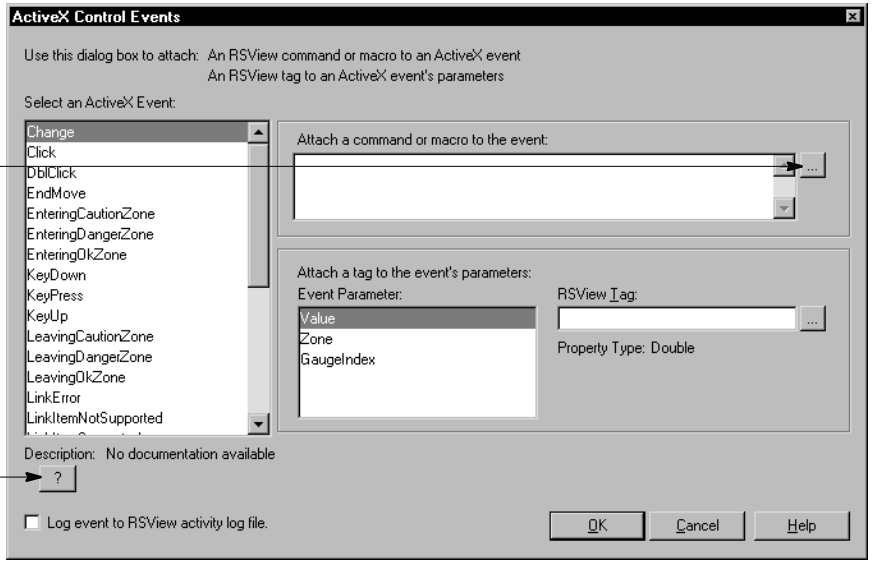
3. Click in the Tag column to specify the tag to use for the property. Type the tag name or click the ... button to open the Tag Browser and select a tag.

Attaching ActiveX control events

The ActiveX Control Events dialog box shows the events associated with the selected ActiveX object and allows you to specify RSView32 commands or macros that will run when the event occurs at runtime.

To launch the Command Wizard, click this button.

For more information about the object and its events, click this button.



To attach RSView32 commands or macros:

1. Select the ActiveX object.
2. Click the right mouse button to open the context menu, point to Animation, point to ActiveX Control and then click Events.
3. Select the event you want to attach the command or macro to.
4. Type the command or macro name, or click the ... button to open the Command Wizard, and then click a command or macro.

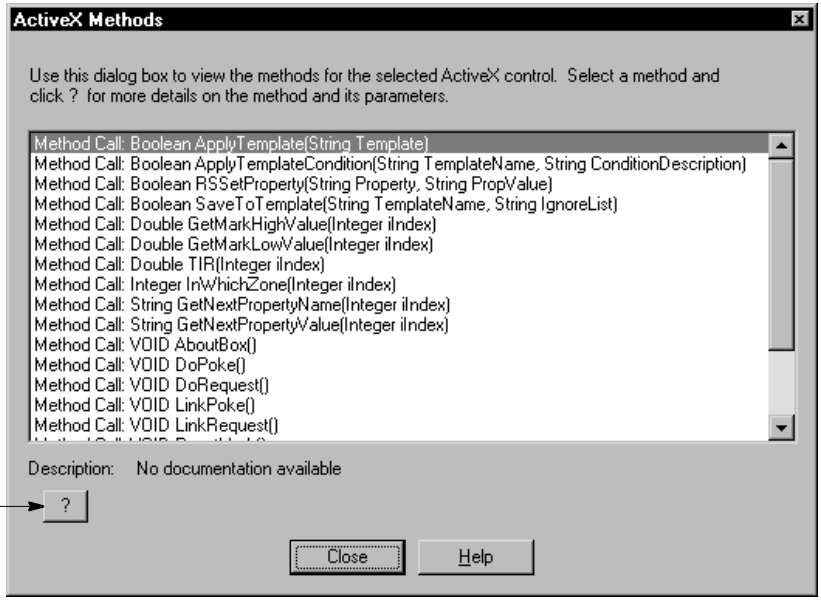
   Separate multiple commands or macros with a semi–colon (;) or place them on separate lines. Multiple commands are executed in the order they are listed.
5. To attach a tag to an event parameter, select an event parameter.
6. Type the tag name or click the ... button to open the Tag Browser and select a tag. The tag's value is determined when the ActiveX event occurs.
7. To log the event, click the Log event to RSView activity log file check box and set up logging in the Activity Log Setup editor.

   ActiveX events are logged under the Applications category and will be logged to whatever destination you specify (activity bar, log file, printer). For information about setting up activity categories, see "Specifying which activities to log" on page 8-13.

   When an event is logged, the name of the ActiveX object is the message that is logged. For details about naming an object, see "Naming an ActiveX object" on page 12-35.

Viewing ActiveX control methods

The ActiveX Control Methods dialog box shows the methods implemented for the selected object. A method is a function that is part of the ActiveX object.



For more information about the object and its methods, click this button.

To view an object's method description:

1. Select the ActiveX object.
2. Right–click to open the context menu, point to Animation, ActiveX Control, and then click Methods.
3. Select the method you want to view the description for.

Using the Invoke command to call an ActiveX method

To call an ActiveX method, the object must have a name. You then use the RSView32 Invoke command to call the method for the named object. For details about naming an object, see page 12-35.

With the Invoke command you can:

- call an object's method
- assign the value returned by a method to a tag
- set an object's property to a tag value or a constant
- set a tag to the value of an object property

To call a method on an object:

On the command line or anywhere else that accepts a command, type the following command:

Invoke *file.object.method(parameter1, parameter2, . . .)*

file	The name of the graphic display that contains the ActiveX object.
me	can be used instead of *file*. At runtime it resolves to the graphic file that currently has focus.
object	The name of the ActiveX object as specified in the Object Name dialog box.
method	The name of a function or sub–routine in the ActiveX object. The method is initiated by an external event such as the Invoke command.
parameter	The tag name or constant that the method will use.

The easiest way to specify the *file.object.method(parameter1, parameter2, . . .)* string for the Invoke command is to use the Command Wizard.

Associating objects and displays with keys

You can associate RSView32 commands with graphic objects in a display and with the display itself using object keys and display keys. A key is either a key on a keyboard or keypad, or a button on a touch screen that is connected to the computer or monitor an operator uses to interact with your RSView32 project at runtime. Operators can use these keys to perform actions such as moving between screens, setting tag values, and so on.

Object keys and display keys are different from global keys. Object keys and display keys are active only while a particular object or display has input focus. Global keys are active at all times. Object and display keys are discussed on the following pages. For details about global keys, see page 15-19.

For details about the order of precedence among object, display, and global keys, see page 15-14.

Creating object keys

Object keys associate graphic objects with keys. When an object has input focus, an operator can use keys to interact with the object.

For detailed information about how keys work at runtime, see "Specifying the behavior of interactive objects" on page 11-24.

Example: Using object keys

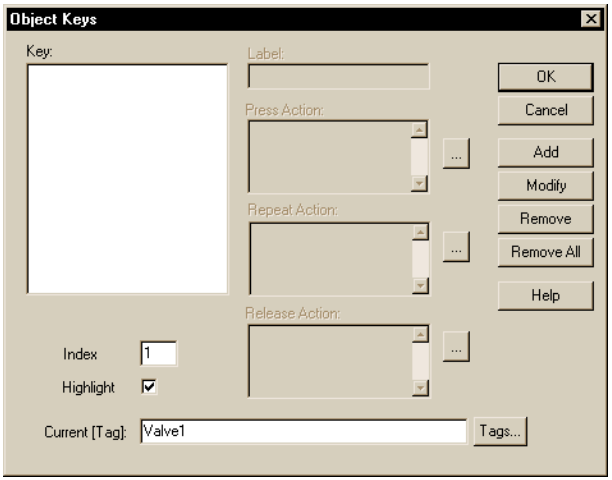
Imagine you have a display showing a tank with two valves. The two valves control the flow in and out of the tank. Both valves have been configured with object key animation as follows:

- Valve 1 F2 = Open
  F3 = Close
- Valve 2 F2 = Open
  F3 = Close

At runtime, operators can select either valve, press F2 to open it and press F3 to close it.

To create an object key:

1. Select an object.
2. On the Animation menu, click Object Keys.



3. Click Add.

4. Specify a key. If desired, select one or both modifiers.

   Some keys are normally reserved for use by Windows and RSView32. For details about assigning reserved keys as object, display, or global keys, see "Reserved keys" on page 15-17.

5. Click OK.

   The key you added is displayed in the Key field. If you specified a modifier, the first letter of that modifier is also displayed. If you create a label, in the next step it is also listed in this field.

   The information in the Key field is used in the key list, which appears at runtime so operators know which keys are associated with an object and a display. For details about the key list, see "Viewing the key list at runtime" on page 12-58.

6. In the label field, if desired, type a label for the key.

7. In the Press Action field and, if desired, in the Release Action field, type an RSView32 command or a macro. The command or macro is the action that will occur when the key is pressed or released. Separate multiple commands or macros with a semi–colon (;) or place them on separate lines.

   If you want the command to perform an action on a tag, include a tag name or the Current [Tag] parameter. The Current [Tag] parameter is a placeholder for a tag name or any character string. For details about the Current [Tag] parameter, see "Using the Current [Tag] parameter" on page 12-48.

8. If you want an action to repeat while the key is held down, type the RSView32 command or macro name in the Repeat Action field.

The repeat action repeats at the rate specified in the Keyboard properties of the Windows Control Panel.

9. If, at runtime, you want a highlight box to appear around the object when it has input focus, select the Highlight check box. For details, see "Specifying the behavior of interactive objects" on page 11-24.

10. Click OK.

For details about the Index field, see "Using index numbers" on page 12-45. For details about the Current [Tag] field, see "Using the Current [Tag] parameter" on page 12-48.

Using index numbers

RSView32 assigns index numbers to the following objects:

- numeric and string input objects
- button objects
- objects with object key animation

As you create these objects, they automatically receive an index number. The number increases by one for each object you create. For example, if you create a numeric input object, then a button object, and then a string input object, the objects will have the index numbers 1, 2, and 3.

How index numbers are used

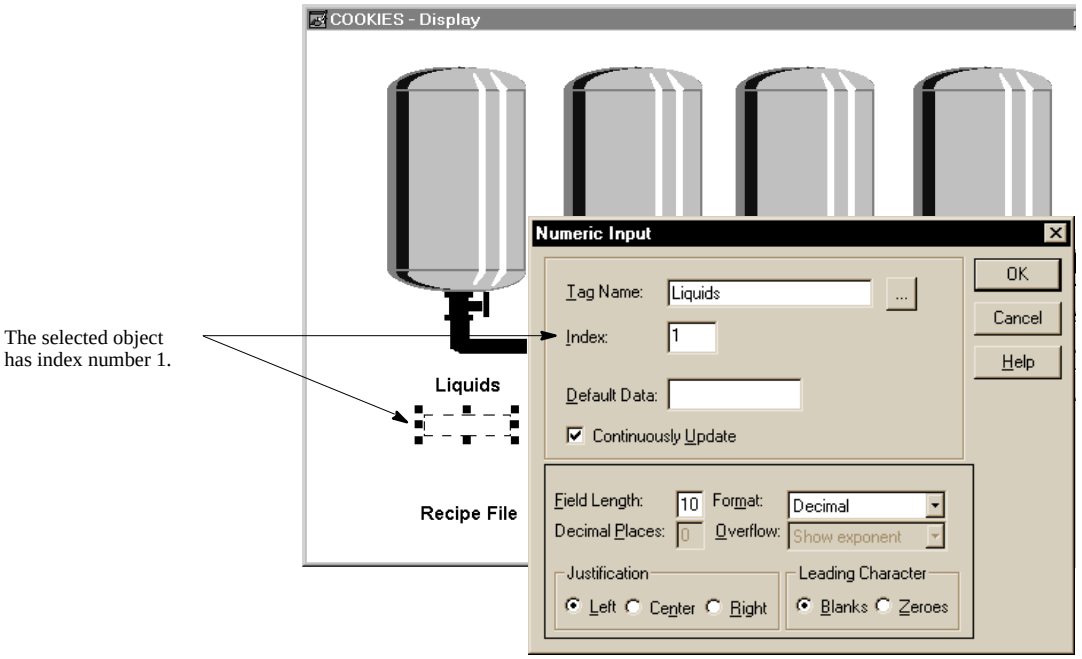
Index numbers are used to:

- determine a tab sequence for interactive objects
- move among objects using the Position, NextPosition, and PrevPosition commands at runtime. For details about these commands, see Appendix A, *RSView32 commands*, or see Help.

- specify which tag value goes into which numeric or string input field in a recipe file. For details about recipe files, see "Creating a recipe file" on page 11-62.

Checking an object's index number

To check an object's index number, double–click the object and check the number in the Index field.



Changing index numbers

Once you have created two or more objects with index numbers, you can change the index numbers.

For example, if you have created four input fields, you can change the order of their index numbers. You can change input field 4 to index

number 1. However, you cannot change input field 4 to index number 5, because you have not created five input fields.

When you change an index number, other numbers are adjusted so two objects do not have the same number and there are no gaps in the numbering.

To change an index number:

1. Do one of the following:

   - for a numeric or string input object, open the object's configuration dialog box by double–clicking the object

   - for a button object, open the object's configuration dialog box by double–clicking the object

   - for an object with object key animation, select the object and then open the Object Keys dialog box

2. In the Index field, type a new number.

3. Click OK.

   If you typed a number that is too high, RSView32 automatically adjusts the index number to use the highest available number.

   If you type a number that is already in use, RSView32 renumbers the other objects in the display. This will change the tab sequence.

Creating a tab sequence

A tab sequence is the order in which users can move through a series of objects using the Tab key. To create a tab sequence, use index numbers.

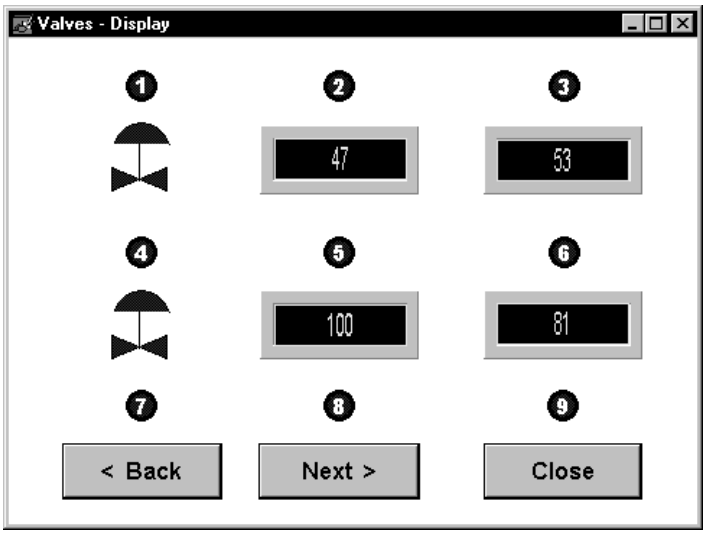
To move through a tab sequence:

- press Tab to move through the objects from lowest index number (1) to highest index number.
- press Shift–Tab to move through the objects from highest index number to lowest index number (1).

Example: Creating a selection order

In the display below, pressing the Tab key moves users through the objects in a left to right pattern.

The valves are objects with object key animation.
The boxes are numeric input fields.
The buttons are button objects.
The numbers above the objects show each object's index number.



Using the Current [Tag] parameter

The Current [Tag] parameter is a placeholder for a tag name or any character string. Use this parameter to create a command that is object–specific.

For example, if you want F2 to set the value of a selected object's tag to 0, you would set up a display key for F2, using the [tag] parameter, and then set up object keys for each object on the screen, specifying which tag to use for each object.

Summary of steps

1. Create a graphic object.
2. In the Display Keys dialog box, associate a key with an RSView32 command. Use the [tag] placeholder as the command's parameter.
   - To open the Display Keys dialog box, click the Animation menu and then click Display Keys.
   - In the Press Action field, specify an RSView32 command with [tag] as the command parameter.
3. Select the graphic object.
4. In the Object Keys dialog box, supply the tag name or character string that will replace the placeholder.
   - To open the Objects Keys dialog box, click the Animation menu and then click Object Keys.
   - In the Current [Tag] field, specify a tag name or a character string.

At runtime, when the object is selected and the display key is pressed, the contents of the Current [Tag] field replace [tag] in the RSView32 command.

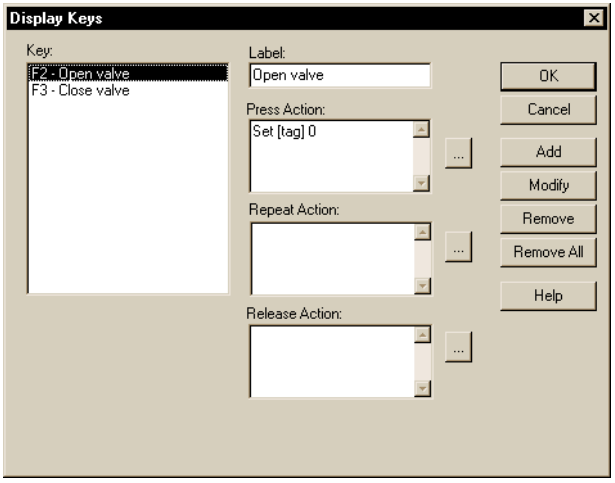
Examples

For ways to use the [tag] parameter, see these examples:

Example 1: Creating display–wide keys to open and close valves

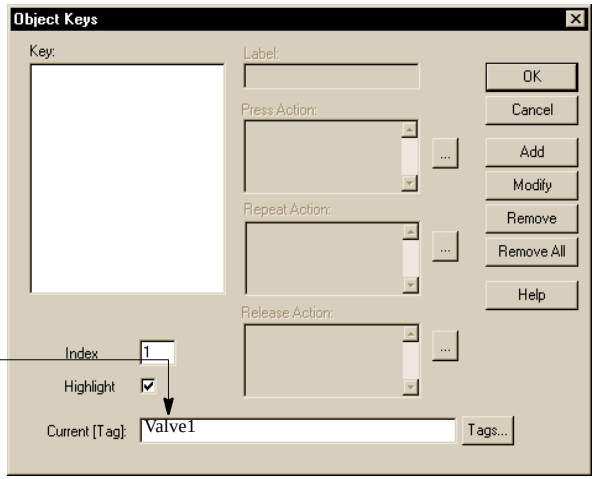
Imagine you have a graphic display containing 20 valves and you want operators to be able to open and close all the valves with the same two keys. Instead of specifying the tag name for each valve, use the [tag] parameter with display keys.

1. In the Display Keys dialog box, assign two display keys. For the press action, type **Set [tag]**.



2. In the Object Keys dialog box, type the tag name in the Current [Tag] field for each valve object.

Type the tag name here.

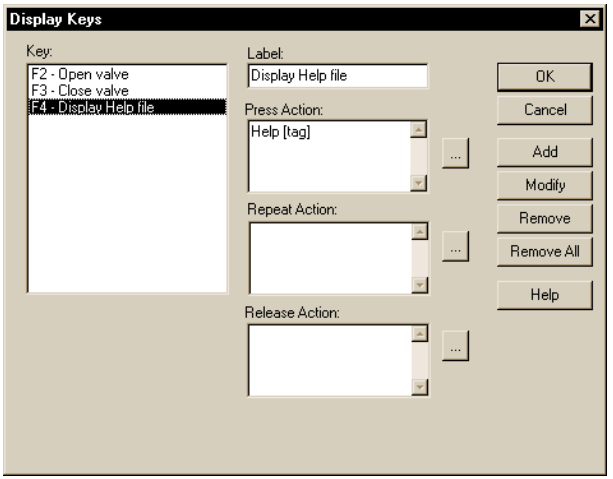


At runtime, the operator can select any valve object, and press F2 to open the valve and F3 to close it.

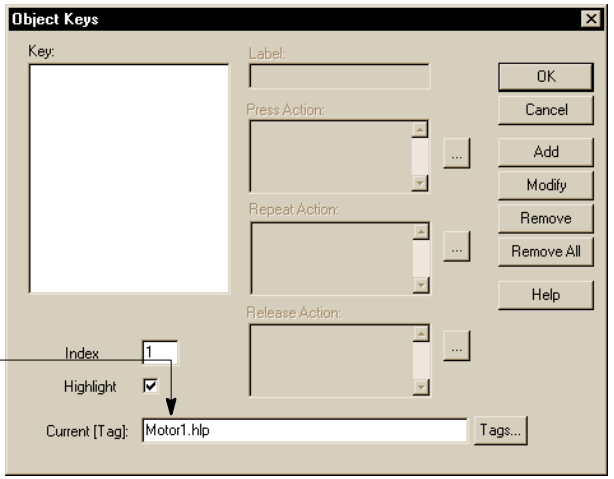
Example 2: Opening object–specific Help

Imagine you have a graphic display containing various graphic objects that represent plant–floor equipment. If something goes wrong with a piece of equipment, you want operators to be able to select the appropriate object and display a Help file that suggests steps for correcting the situation.

1. In the Display Keys dialog box, assign a display key. In the Press Action field, type **Help [tag]**.



2. In the Object Keys dialog box, type the appropriate help file name in the Current [Tag] field for each equipment object.



Type the name of the help file here.

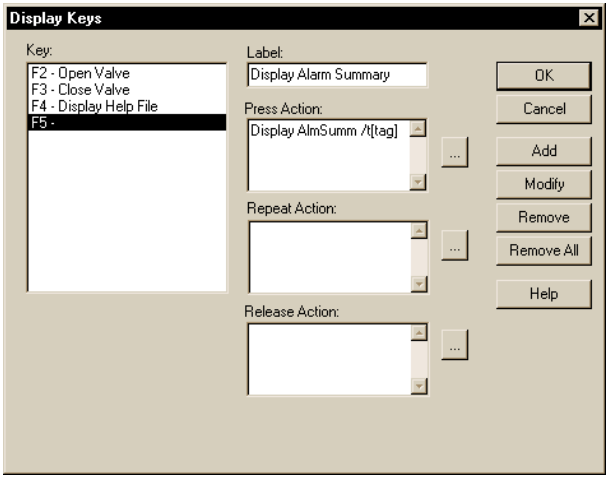
At runtime, when an operator selects any equipment object and presses F4, the help file for that piece of equipment is displayed.

Example 3: Opening an object–specific alarm summary

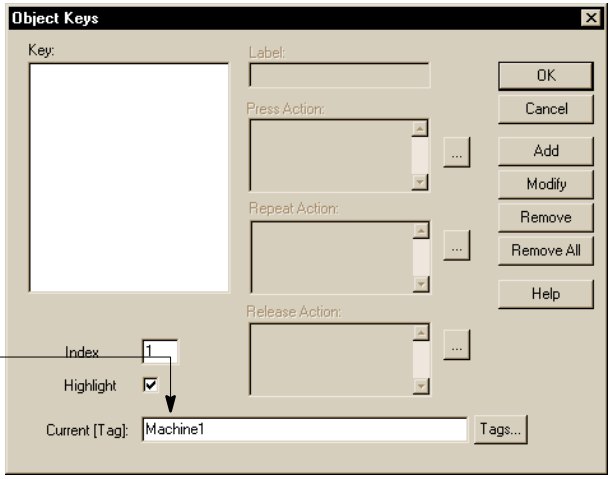
Imagine you want to have alarm information available for a specific machine. If something goes wrong and causes an alarm, you want the operator to be able to display an alarm summary for that machine.

1. Create an alarm summary that uses a filter to display only the alarms for the machine. For more information about creating an alarm summary, see page 6-54.

2. In the Display Keys dialog box, assign a display key. In the Press Action field, type **Display AlmSumm /t[tag]**.



3. In the Object Keys dialog box, type the name of the alarm summary file in the Current [Tag] field for each machine object.



Type the name of the alarm summary object.

At runtime, when the operator selects an equipment object and presses F5, the alarm summary for that piece of equipment appears.

Creating display keys

Display keys associate graphic displays with keys. Using the keys, operators can interact with the graphic displays at runtime.

Example: Using a display key

Suppose you want the Home key to display a main menu display. To do this, create a display key as follows:

In the Press Action field, type: **Display Main Menu**

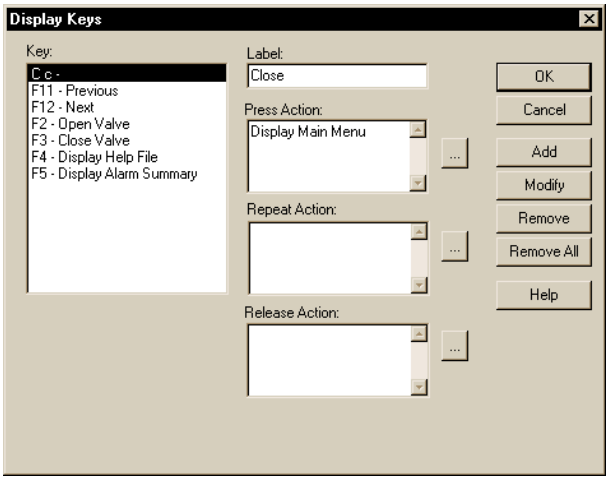
Whenever an operator presses Home, the active graphic display closes and the Main Menu display opens.

If the Main Menu display is of the Overlay display type, you must use the Abort command to close the active display.

For details about how keys and other interactive objects work at runtime, see "Specifying the behavior of interactive objects" on page 11-24.

To create a display key:

1. On the Animation menu, click Display Keys.



2. Click Add.

3. Specify a key and, if desired, select one or both modifiers.

Some keys are reserved for use by Windows and RSView32. Reserved keys do not appear in the Key field in the Add Key dialog box.

4. Click OK.

   The key you added is displayed in the Key field. If you specified a modifier, the first letter of that modifier is also displayed. If you create a label in the next step, it is also listed in this field.

   The information in the Key field is used in the key list, which appears at runtime so operators know which keys are associated with an object and a display. For details about the key list, see "Viewing the key list at runtime" on page 12-58.

5. In the label field, if desired, type a label for the key.

6. In the Press Action field and, if desired, in the Release Action and Repeat Action fields, specify an RSView32 command or a macro. Type the command or macro or click the ... button to open the Command Wizard. The command or macro is the action that will occur when the key is pressed, pressed and held, or released. Separate multiple commands or macros with a semi–colon (;) or place them on separate lines.

   If you want the command to perform an action on a tag, include a tag name or the [tag] parameter. For details about the [tag] parameter, see "Using the Current [Tag] parameter" on page 12-48.

7. Click OK.

Editing display and object keys

Editing display and object keys is the same except that for object keys you must first select an object.

Modifying a key

1. On the Animation menu do one of the following:

   - to modify object keys (you must have an object or group of objects selected first), click Object Keys
   - to modify display keys, click Display Keys

2. In the Key field, select the key you want to modify.
3. Click the Modify button.
4. Make the necessary changes, and then click OK.

Removing a key

1. On the Animation menu do one of the following:

   - to remove object keys (you must have an object or group of objects selected first), click Object Keys
   - to remove display keys, click Display Keys

2. In the Key field, select the key you want to remove.
3. Click the Remove button, and then click OK.

Removing all keys

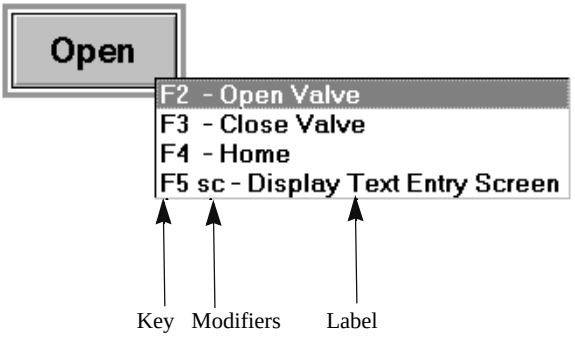
1. On the Animation menu do one of the following:

   - to remove object keys (you must have an object or group of objects selected first), click Object Keys
   - to remove display keys, click Display Keys

2. Click the Remove All button, and then click OK.

Viewing the key list at runtime

At runtime, users can use the key list to see which keys are associated with an object and display, and to see what actions the keys will perform.



The key list displays the keys listed in the Key fields of the Object Keys and Display Keys dialog boxes. All object keys are displayed and then all display keys. The key list does not separate the two types of keys because this distinction does not matter to operators—they only need to know what action will occur when they press a key.

To display a key list at runtime:

1. Place the cursor over an object with key animation.
2. Click the left mouse button.

   The key list is displayed. It lists keys associated with this object and all keys associated with this display.

Disabling the key list

To disable the key list, use the /O parameter with the Display command. For details, see Appendix A, *RSView32 commands*, or 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 evaluated from the inside out.

To apply animation to objects within groups, use the group edit feature. For details, see page 11-94.

Checking the animation on objects

To see what type of animation an object or group of objects has:

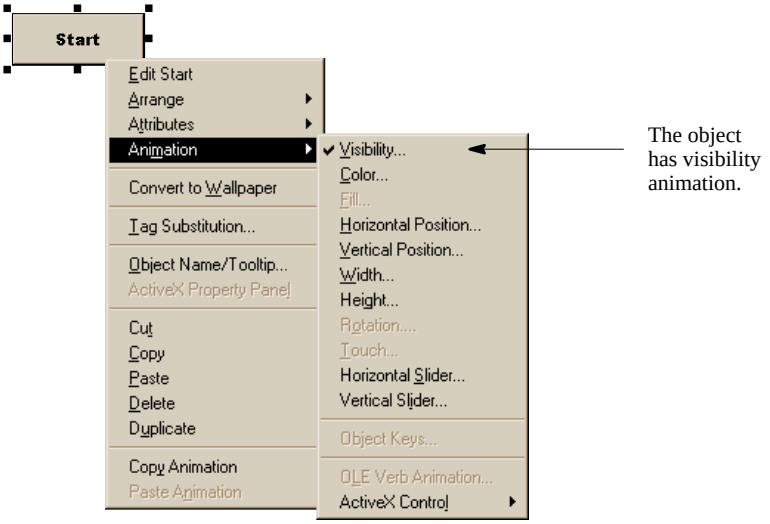
- use the Animation menu or the Animation dialog box
- use Peek, as described on page 12-61

Using the Animation menu and the Animation dialog box

Use the Animation menu or the Animation dialog box to see what type of animation a graphic object or grouped object has. To see what type of animation objects within a group have, use the group edit feature. For details, see page 11-94.

To view the animation on an object using the menu:

1. Select an object.
2. View the animation by doing one of the following:
   - on the menu bar, click Animation and see which items have a check mark
   - place the cursor over the object and press the right mouse button to display the context menu. Then click Animation from this menu and 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, click the tabs to see which types of animation have been set up.

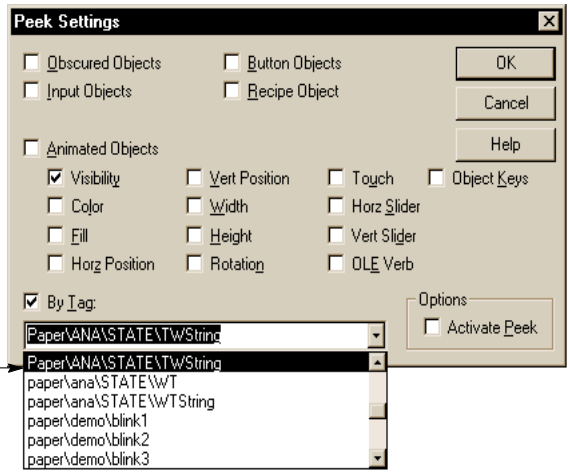
Using Peek

Use Peek to view the animation attached to a graphic object or group of objects. In the Peek Settings dialog box, you specify what type of animation you want to check. When Peek is turned on, any objects with the type of animation you have specified are surrounded by a red box.

For example:

- if you click Color, any objects with color animation will have a red box
- if you click Object Keys, any objects that have keys associated with them will have a red box

Viewing this list is a good way to see which tags have been used in the graphic display. Tags in commands are not included on the list.



The Peek highlight is not visible in a graphic display with a red background.

To specify types of animation:

1. On the View menu, click Peek Settings.
2. Click Animated Objects, and then click any of the types of animation.

You can click as many types of animation as you want. However, Peek does not show the specific type of animation an object has.

For example, if you choose color and visibility animation, all objects with these types of animation will be highlighted, but you will not know which objects have which types of animation.

3. If you want Peek to be active when you close the dialog box, click Activate Peek.

   Otherwise, specify the settings and save them. Later when you want to turn on Peek, click Peek On on the View menu.

4. To save your settings, click OK.

To turn Peek on and off:

Do any of the following to turn Peek on:

- click Peek On on the View menu
- click Activate Peek in the Peek dialog box

When Peek is on, the cursor looks like this:

Peek automatically turns off as soon you do any action in the Graphic Display editor. For example, if you are peeking at objects and then move an object, Peek is turned off.

Changing the animation on objects

You can change the animation attached to a group of objects or to individual objects within the group. To access objects within a group, use the group edit feature. For details, see page 11-94.

To change the animation on objects:

1. Select the object.
2. Open the Animation dialog box.
3. Make the required changes.
4. Click Apply.

Copying or duplicating objects with animation

You can copy or duplicate objects that have animation attached to them. When you do, the animation attached to the objects is also copied or duplicated. If you copy or duplicate a group, the copy of the group can be ungrouped to individual objects, just like the original.

For information about copying and duplicating objects, see pages 11-88 and 11-90.

To copy objects with animation:

1. Select the objects.
2. Do one of the following:
   - use the copy and paste commands on the Edit menu or toolbar, or use Ctrl–C to copy and Ctrl–V to paste
   - in the same display, drag the object and then press Ctrl and drop the object
   - between displays, drag and drop objects

To duplicate objects with animation:

1. Select the objects.
2. On the Edit menu, click Duplicate.

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't use RSView32 animation on ActiveX controls.

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.
3. Select the object(s) that you want to copy the animation to.
4. On the Edit menu, click Paste Animation.

Chapter

13 Configuring trends

This chapter describes trends, and outlines how to:

- create and configure a trend object
- layer trends to compare real-time and historical tag values
- use objects from the Trends graphic library
- provide buttons and sliders for controlling a trend at runtime

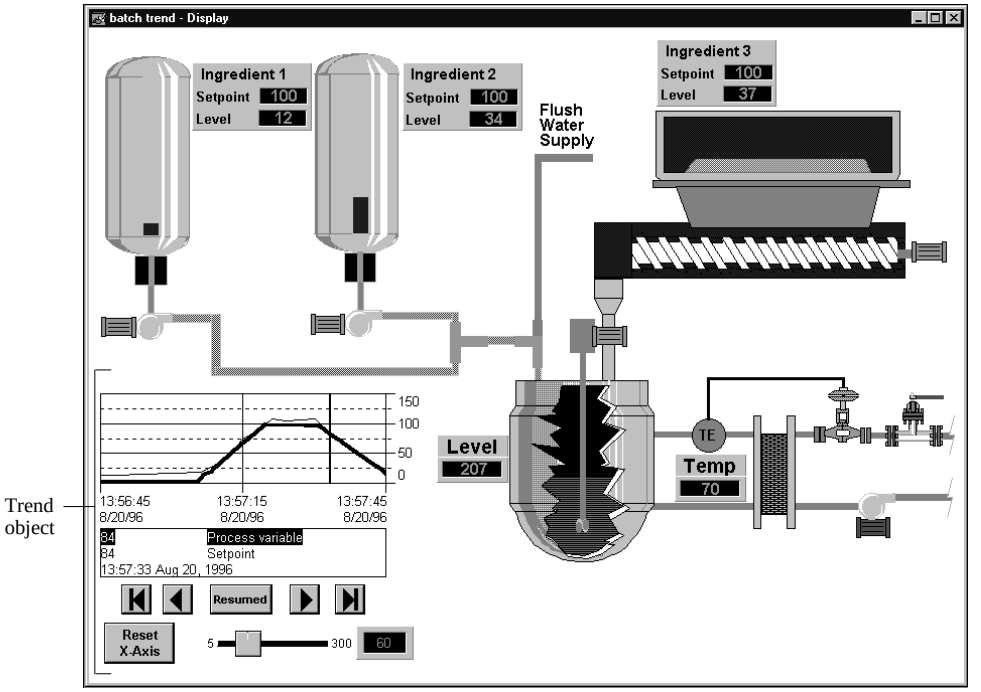
About trends

A trend is a visual representation of real-time or historical tag values. The trend provides operators with a way of tracking plant activity as it is happening.

You can:

- plot data for as many as sixteen tags on one trend
- use shading to emphasize when a particular tag crosses a reference value
- create a trend that is part of a graphic display or acts as the entire graphic display

The illustration on the following page shows a trend that has been added to a graphic display.



Key concepts

Trend object

A trend object is created in the Graphic Display editor. It can be created and edited like any other advanced object.

Trend dialog box

The Trend dialog box contains two tabs for configuring the appearance and content of the trend: Trend Configuration and Pen Configuration. By filling in the fields under these tabs, you specify what kind of data the trend will plot and how the data will look.

Data source

The data displayed in a trend can come from two sources. For real-time trends, data comes from the value table as it is collected. For historical trends, data comes from a data log model's set of files.

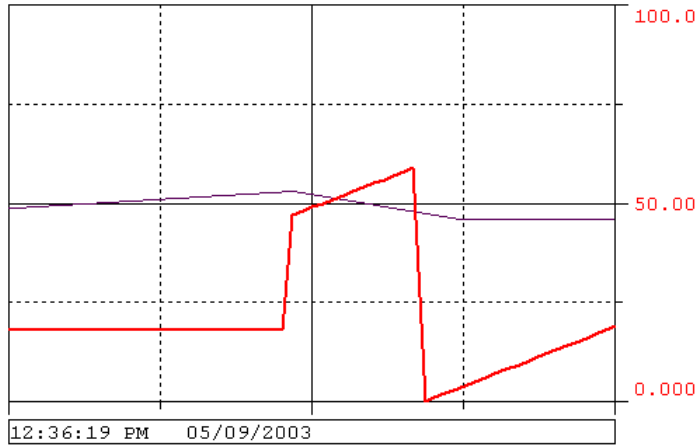
Historical trends can also be set up to display data from a single log file at a time. This is called file–based trending, and is useful if you want to display data from a particular shift or batch process.

For historical trends you can display data from a data log model in the project you are running, or you can display data from a different project, either on the same computer or on another computer on the network. Displaying data from a different project is called remote trending.

Pens

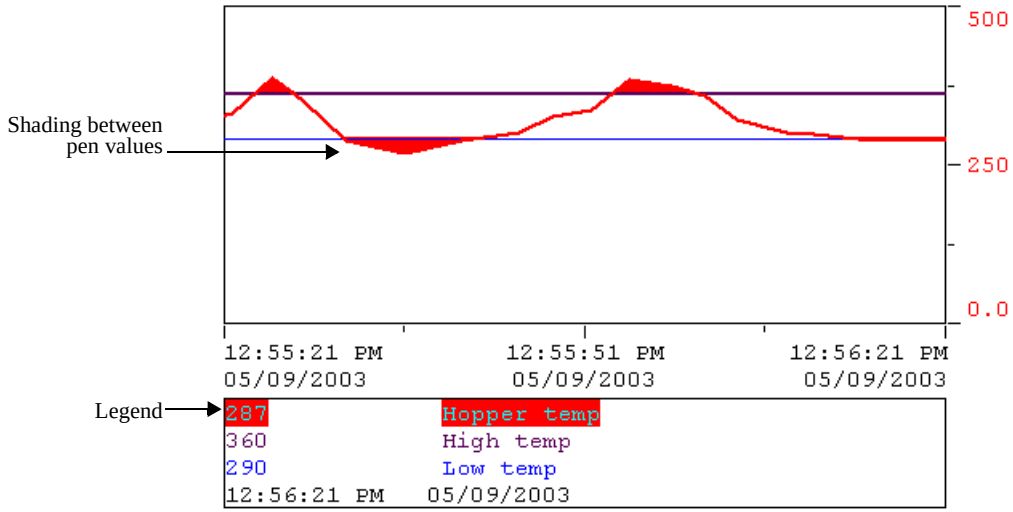
Pens are the lines and/or symbols used to represent values. The values can be tags you are monitoring or they can be constant values. To show a tag value, specify a tag name. To show a constant value—such as a tag's alarm levels—specify a value instead of a tag name. To define the pen's tag at runtime, use a tag placeholder. For details, see "Configuring pen style" on page 13-19.

Both of these lines are pens. Pens can use different colors, widths, and symbols so operators can easily distinguish one pen from another.



Shading

Use shading to show relationships between tags and to compare tag values to constants. The figure below calls attention to tag values in alarm. The difference between the tag's value and the alarm's level is shaded.



Legend

Include a legend at the bottom of the trend to identify the data that is being drawn by each pen. You can include some or all of the pens in the legend, and can label each pen.

Control tags

Control tags are a type of memory tag—that is, they are tags that are created and updated by RSView32™. You can use these tags to control the view of the trend at runtime—for example, you can scroll and zoom in on the trend.

Summary of steps

These are the steps for creating a trend:

- create a trend object in the Graphic Display editor
- configure the trend in the Trend dialog box
- provide a method for controlling the trend

Creating a trend object

To create a trend object:

1. Open the Graphic Display editor.
2. Choose the Trend drawing tool by doing one of the following:
   - open the Objects menu, click Advanced Objects, and then click Trend
   - click  in the Drawing Tools toolbox

   The cursor changes to the trend drawing tool: 
3. Drag the mouse to create a box approximately the size you want for the trend.

   When you release the mouse, the Trend dialog box opens.
4. Configure the trend as described on the following pages.

   Once you have configured the trend, you can edit it as you would any other graphic object. You can move it, resize it, attach animation to it, and so on. You can also use this object in other graphic displays by dragging it from one display and dropping it into another.

For detailed information about graphic objects, see Chapter 11, *Creating graphic displays*.

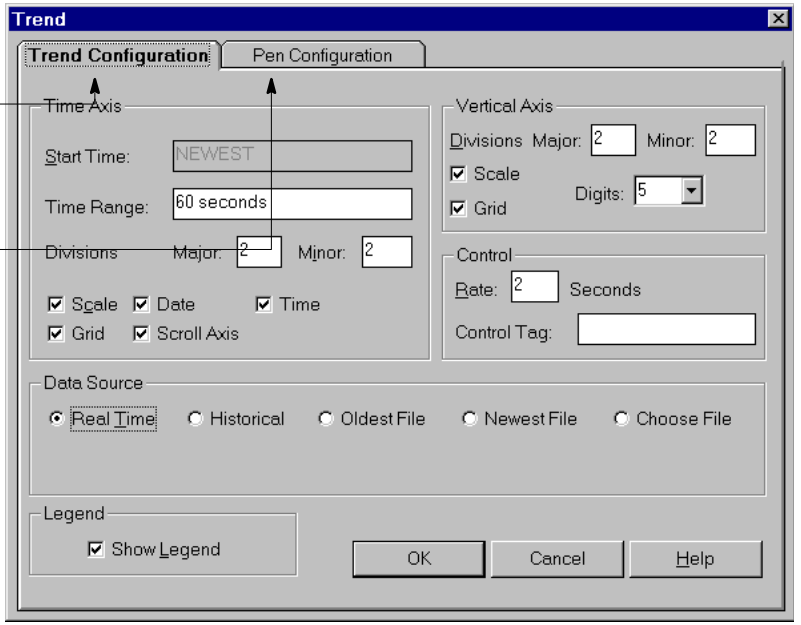
Instead of creating a trend from scratch, you can use the trend in the Trends graphic library. For more information, see "Using the Trends graphic library" on page 13-35.

Working in the Trend dialog box

When you release the mouse button after drawing a trend object, the Trend dialog box appears.

Click this tab to specify the appearance of the time and vertical axes and other features of the trend's appearance.

Click this tab to set up the pens that will plot the values of the trend.



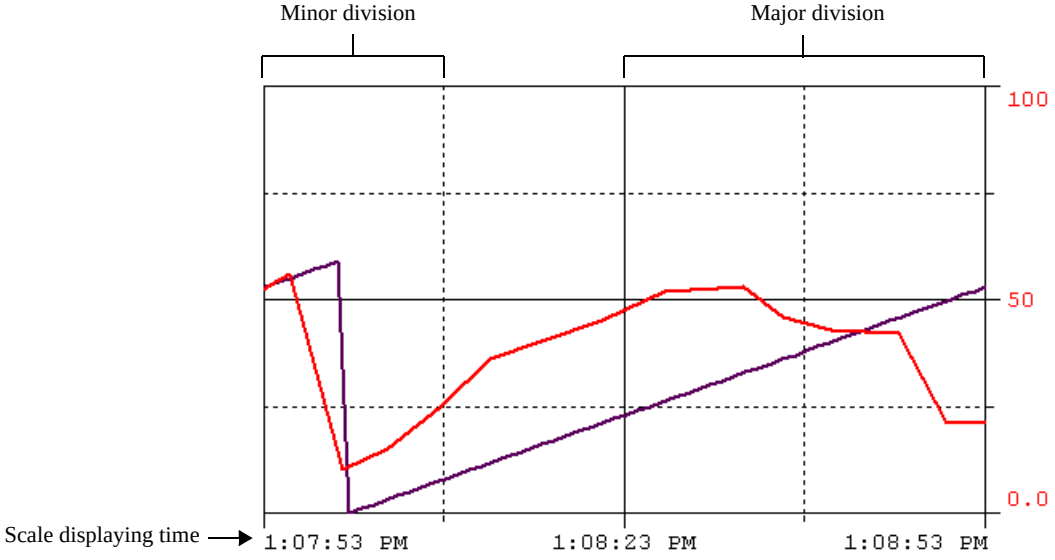
Trend configuration

To configure the time axis, vertical axis, and other aspects of the trend's appearance:

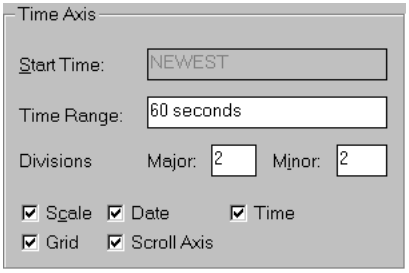
1. In the Trend dialog box, click the Trend Configuration tab.
2. Fill in the fields. See the topics on the following pages for information about the fields.
3. Click OK.

Configuring the time axis

The following illustration shows many of the components of the time axis:



To configure the time axis, fill in the following fields as outlined below.



Start time for a real-time trend

For a real-time trend, NEWEST is shown. Data will start plotting as soon as the trend starts, with the newest data available.

You cannot modify the start time for a real-time trend.

Start time for a historical trend

Start times for historical data can be relative or absolute. With relative time, plotting always starts relative to the newest or oldest data in the log model or log file. With absolute time, plotting always starts at the specified date and time.

You can also specify a start time at runtime. For details, see "Specifying a start time" on page 13-34.

To specify relative time, type one of the following:

- the word NEWEST or NEWEST minus (-) a time range
- the word OLDEST or OLDEST plus (+) a time range

Specify the time range as a whole number followed by a unit. Valid units are: Sec, Min, Hour, Day, Week.

Example: Relative Time

To display data starting 90 minutes from the oldest data in the log model, type:

To specify absolute time:

Absolute time is specified by the month, day, year, hour, minute, and second. For an absolute start time, type:

MMM DD YYYY hh:mm:ss where:

MMM	is month
DD	is day
YYYY	is year
hh:mm:ss	is hours, minutes, seconds

Time Range

The time range determines the time span on the time axis. Together, the start time and time range determine how many points are plotted on the time axis.

Specify the time range as a whole number followed by a unit. Valid units are: Sec, Min, Hour, Day, Week.

Examples: Start Time and Time Range

To plot real-time data in a 60–second window, specify:

Start Time:	NEWEST
Time Range:	60 seconds

To display one day of data starting on Jan 19, 1998 at 1:30 pm, type:

Start Time:	Jan 19 1998 13:30
Time Range:	1 Day

Divisions

Specify the number of major and minor divisions you want marked on the time axis. Keep the number of divisions small so they will be visible.

Scale

Check this box to have a time scale appear at the bottom of the trend. Depending which check boxes you select, the scale can contain any or all of the following: the major and minor divisions, the date, and the time. After you close the Trend dialog box, you can change the font displayed in the scale by selecting Fonts on the Attributes menu.

Grid

Check this box to have vertical grid lines extend from the major and minor divisions on the time axis.

Date

Check this box to show the date in the scale.

The format of the date is determined by the Short date format specified in the Regional Settings option in the Windows® Control

Panel. For more information about this option, see“Specifying time, date, and number formats” on page 18-12, or see your Windows documentation.

Scroll Axis

Check this box to have the grid for the time axis scroll across the trend. When this box is not checked, the grid for the time axis is fixed.

Time

Check this box to show the time in the scale. Time is displayed in the following format: HH:MM:SS (hour, minute, second).

Relative Time

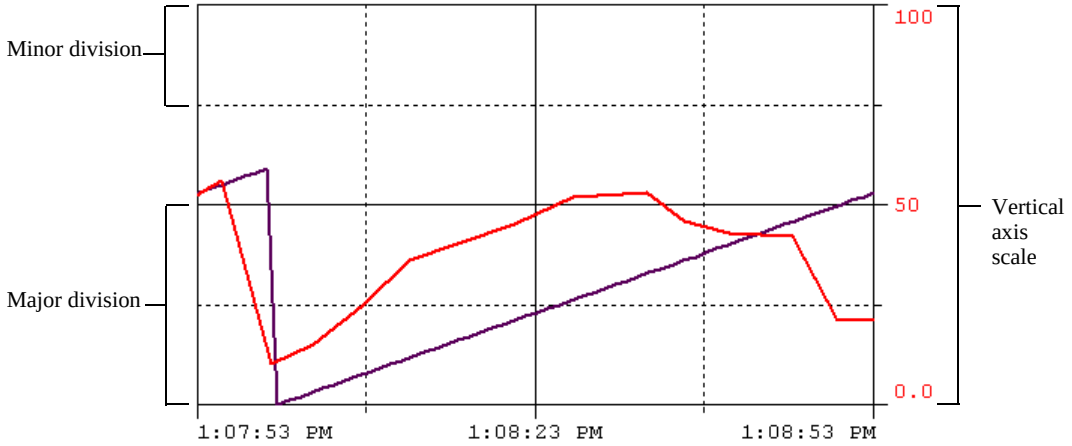
This check box is visible only when Historical is selected as the data source. Check this box to show the time of the trend in relation to the oldest time. The oldest time is one of the following:

- for a historical trend, it is the oldest logged data in the log model
- for a file–based trend, it is the oldest logged data in a log file

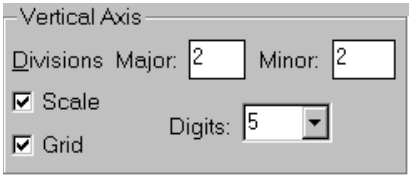
Relative time is displayed in the following format: DD:HH:MM:SS (day, hour, minute, second).

Configuring the vertical axis

The following illustration shows the components of the vertical axis:



To configure the vertical axis, fill in the fields as outlined below:



Divisions

Specify the number of major and minor divisions you want marked on the vertical axis. Keep the number of divisions small so they will be visible.

Scale

Check this box to display a scale with the range of values for a pen. These values are determined by the minimum and maximum values for the pen scale, which are configured in the Pen Configuration tab. The font color and vertical axis scale are determined by the pen that is selected when the trend is running. By default, pen 1 is selected.

Digits

Select the number of characters you want to display in the pen scale, including the decimal point. The values that appear in the scale are selected in the Pen Configuration tab. Specify enough digits so the scale is wide enough to display the minimum and maximum values for all your tags. If the pen value does not fit it appears in scientific notation.

To display the division markings on the vertical axis without numbers, select 0.

Grid

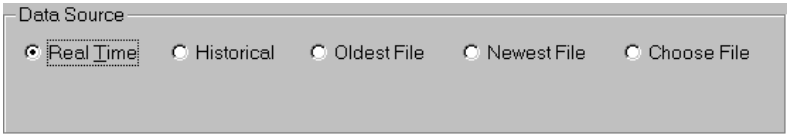
Check this box to have horizontal grid lines extend from the major and minor divisions on the vertical axis.

Choosing a data source

The data for trends can be real-time, historical, or file–based. Real-time data comes from the value table. Historical data comes from a data log model's set of files. File–based data comes from a single log file at a time.

For a real-time trend:

Click the Real Time button.

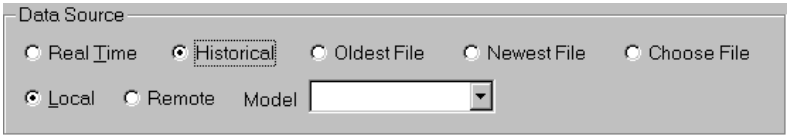


The buffer for each real-time trend pen can contain up to 2,000 tag values. A tag value is saved to the buffer whenever that value changes. When the buffer is full, the oldest value is overwritten with a new value.

To ensure a real-time trend contains data, see "Ensuring real-time trends have data" on page 13-26.

For a local historical trend:

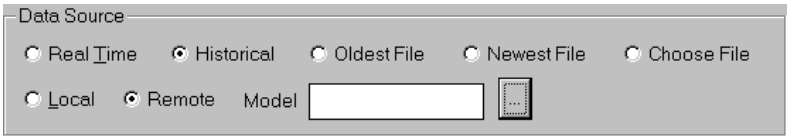
To display historical data from a data log model in the project you are running, click Historical, then click Local and specify a data log model in the Model field.



For a remote historical trend:

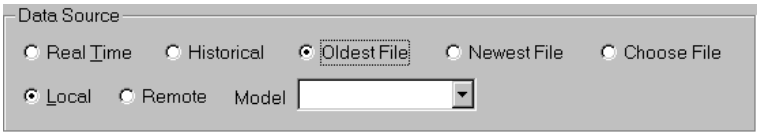
To display historical data from a different project (from another location on the same computer or from another computer), click Historical, then click Remote.

In the Model field, type the complete path to the logged data (to the .dlg file), or click ... and select a .dlg file.



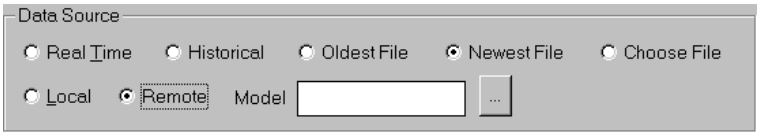
For a file–based trend:

Click Oldest File to display data from the oldest file in the data model. For local data, specify a data log model in the Model field. For remote data, type the complete path to the logged data (to the .dlg file), or click ... and select a .dlg file.



Click Newest File to display data from the newest file in the data model. For local data, specify a data log model in the Model field. For

remote data, type the complete path to the logged data (to the .dlg file), or click ... and select a .dlg file.



Click Choose File to select the data file that will be used. For local data, specify a data log model in the Model field. For remote data, type the complete path to the logged data (to the .dlg file), or click ... and select a .dlg file.

In the File field, select a data log file.

For detailed information about how data log files are named, see Chapter 7, *Configuring data logging*.

Configuring control

To configure control, fill in the fields as outlined below:

Rate

Type a number to specify how often to update the trend.

For real-time data, the rate determines how often the value table is checked for new data. If you have specified a scan class for the tags, do not specify a rate faster than the scan class rate.

For historical data, the rate determines how often the log file is checked for new data. Do not specify a rate faster than the rate at which the data is logged to the file. For example, if you set up periodic logging with a 20–second interval, do not specify a rate less than 20 seconds, because no new data will be available.

Control Tag

Type a name for the folder that will contain the trend control tags. Control tags are used to control the view of the trend at runtime. When you save the trend configuration, a folder by this name will be created in the Tag Database. This folder will contain the trend control tags.

For example, if you type Trend1 in the Control Tag field, the system will create a folder called Trend1. Each tag in the folder will have Trend1 as the first part of its name.

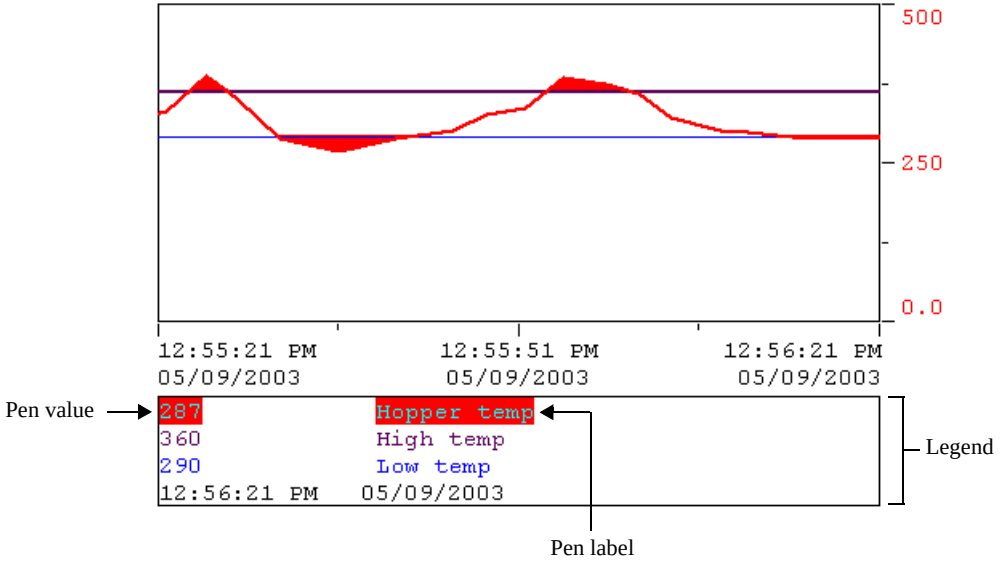
For more information about these tags, see "Creating control for a trend" on page 13-27.

Creating a legend

To include a legend, check the Show Legend box.

In the Pen Configuration tab, you can specify which pens you want included in the legend and create a label for each pen.

The following illustration shows a trend with a legend:

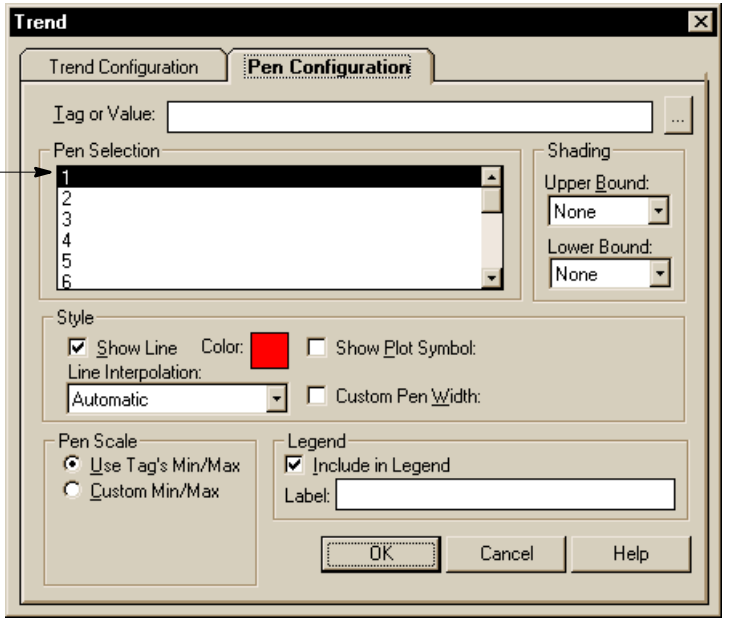


Pen configuration

To configure the pens that will plot the data for the trend:

1. In the Trend dialog box, click the Pen Configuration tab.

To begin configuring pens, select a pen here. When you select another pen, the configuration for the previous pen is saved.



2. Select a pen. For each pen you select, fill in the fields in this tab. The fields are described below.

   To move to another pen, select it in the Pen Selection field.

Configuring the tag or value

In the Tag or Value field, specify one of the following:

- an analog or digital tag, or a tag placeholder

  Tag placeholders allow you to insert tag names at runtime. A placeholder is a cross–hatch character (#) followed by a number

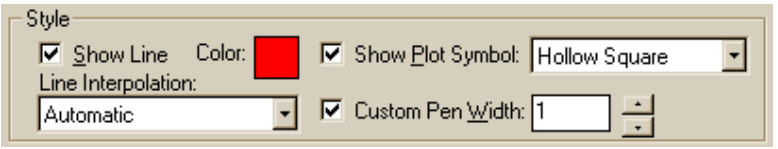
from 1 to 500. For details about placeholders, see "Using tag placeholders" on page 11-37.

- a value

  When you specify a value, the pen draws a constant horizontal line on the trend. Use horizontal lines to provide a frame of reference for your tags. For example, if you define values that are the limits within which a tag should operate, when a tag crosses one of these limits the tag's alarm condition is obvious on the trend.

Configuring pen style

To configure pen style, fill in the fields as described below:



Show Line

Check this box if you want to draw a line between the plotted symbols. If you want *only* plot symbols visible, leave this box empty.

Color

Select a color for the pen. Do not choose the same color as the background of the trend object.

Show Plot Symbol

Check this box if you want a plot symbol. The plot symbol appears at each point that is plotted.

Line Interpolation

Line interpolation determines how a line is drawn. The choices are:

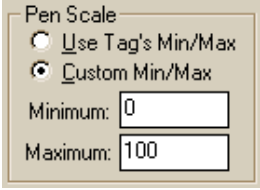
This item	Does this
Automatic	Draws the appropriate type of line based on the tag type. For example, for a digital tag, digital interpolation is automatically used. For an analog tag, linear interpolation is automatically used.
Linear	Draws a straight line between two points, which suggests a gradual change from the first point to the second point. For example: 
Digital	Draws a line along the time axis at the first value then, when the value changes, draws a vertical line to the second value. For example: 
Full Width	Draws the most recent value for a tag horizontally across the trend. For example, if the most recent value for a tag is 75, draws a line across the trend at 75. When the value changes, redraws the line at the new value. You can use full width to display values that act as high and low setpoints.

Custom Pen Width

The custom pen width affects the thickness of the line and the plot symbols.

Check this box if you want to specify a different pen width. If you do not specify a width, the line for the pen will be the same as the grid lines.

Configuring pen scale



The pen scale defines the range of numbers on the vertical axis. The vertical axis changes to reflect the minimum and maximum values for the selected pen's tag.

For example, if Tag1 has a minimum value of 10 and a maximum value of 100, the range on the vertical axis will be 10 to 100 when the Tag1 pen is selected. If Tag2 has a minimum of -10 and a maximum of 50, the range on the vertical axis will change to -10 to 50 when the Tag2 pen is selected.

If you want all pens in the trend to use the same range on the vertical axis, specify the same range in the Custom Min/Max field.

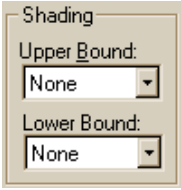
Use Tag's Min/Max

Select this button to use the tag's minimum and maximum range as configured in the Minimum and Maximum fields of the Tag Database editor.

Custom Min/Max

Select this button to specify a range, then type minimum and maximum values. To always have the same range on the vertical axis, specify the same minimum and maximum values for all pens.

Configuring shading



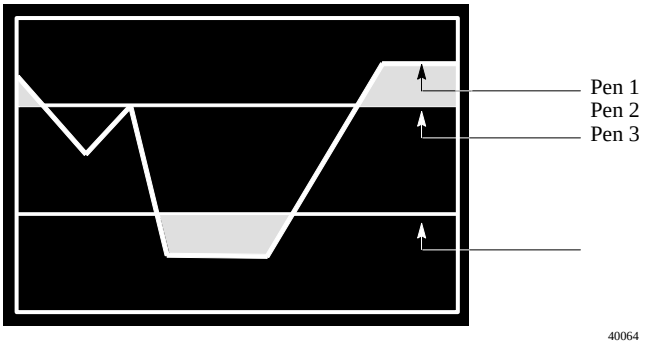
Use shading to compare the values of different pens. To have shading, at least two pens must be defined.

For the upper and lower boundaries, select the pens with which to compare values. When the pen you are defining plots above the value of an upper boundary pen, or below the value of a lower boundary pen, the area between the pen you are defining and the boundary pen will be shaded. The shading color will be the color you select under Style.

IMPORTANT Shading is determined by the position of lines on the screen—not by the actual tag values—because each tag has its own vertical axis. This is important if you have specified different minimum and maximum values for the pens.

Example: Shading with three pens

The upper pen, Pen 2, has a constant value of 75 and the lower pen, Pen 3, has a constant value of 25. Pen 1 represents the tag called VIN_LEVEL. The trend will be shaded whenever Pen 1 goes above Pen 2 or below Pen 3. A plot for this trend looks like this:

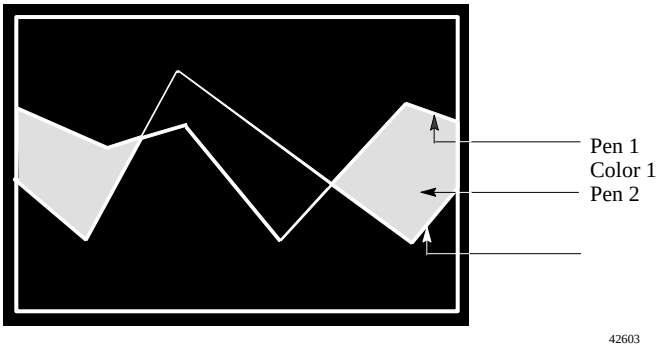


To produce the shading shown above, the following settings were used:

Pen	Tag Name or Value	Shading	
		Upper Bound	Lower Bound
Pen 1	VIN_LEVEL	Pen 2	Pen 3
Pen 2	75		
Pen 3	25		

Example: Shading with two pens

Whenever Pen 1 goes above Pen 2, the trend will be shaded like this:

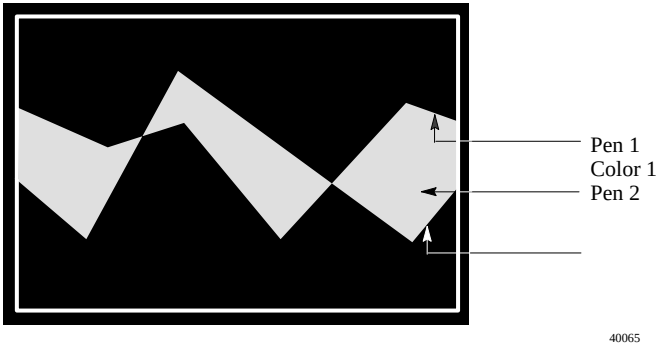


To produce the shading shown above, the following settings were used:

Pen	Tag Name	Shading	
		Upper Bound	Lower Bound
Pen 1	VIN_LEVEL	Pen 2	
Pen 2	OIL_LEVEL		

Example: Shading between two pens

Whenever Pen 1 goes above or below Pen 2, the trend will be shaded like this:

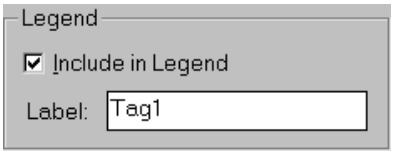


To produce the shading shown above, the following settings were used:

Pen	Tag Name	Shading	
		Upper Bound	Lower Bound
Pen 1	VIN_LEVEL	Pen 2	Pen 2
Pen 2	OIL_LEVEL		

Creating a legend

To include a pen in the legend, leave the box checked. To label the pen, type a label such as a tag name or description. If you do not type a label, the pen's tag name appears in the legend. If you use a tag placeholder in the Tag or Value field, you can also type the tag placeholder here, to insert the tag name in the legend at runtime.



Ensuring real-time trends have data

Real-time trends collect data only while the trend is displayed. This means that a trend will not contain any data when it starts. To ensure a trend contains data once it has started, keep the trend updating in the background by loading it into the display cache.

Example: Ensuring a real-time trend has data

1. Create a startup macro that includes this command:

   Display Trend1 /ZA

   where Trend1 is the name of the display containing the real-time trend, and /ZA is the parameter for loading the display into the display cache (but not making it visible) and continually updating the display even when it is not visible.

   The display is loaded when you start the project and remains in the cache until you use the FlushCache command or stop running the project.

2. When you want the real-time trend to become visible, specify the following command:

   Display Trend1

   Trend1 will then be displayed in the foreground and will contain data.

Comparing real-time and historical data

You can layer trends, which is useful for comparing real-time and historical data in order to see process changes.

To layer trends:

1. Create two or more trends of the same size.
2. Configure the trends.
3. Select the trend that will be on top. On the Attributes menu, click Hollow.
4. Move the trend that will be on top over the other trend.
5. With the trend still selected, click Bring to Front on the Arrange menu.

Creating control for a trend

To control a trend, operators require buttons and other graphic objects that are associated with the trend's control tags. You can draw your own buttons and objects for controlling a trend, or you can use the objects in the Trends library. For details, see "Using the Trends graphic library" on page 13-35.

Control tags are a type of memory tag—that is, they are tags that are created and updated by RSView32. You can use these tags to control the view of the trend at runtime—for example, you can scroll and zoom in on the trend.

To create control tags, you have to type a name in the Control Tag field in the Trend dialog box. When you do, a folder with that name, containing the trend control tags, is created in the tag database.

IMPORTANT If at runtime you display multiple trends that use the same control tags, changes to one trend affect all the other trends that use the tags, including trends that are loaded in the cache and are not visible.

If you copy a trend, the new trend uses the same Control Tag folder name. Therefore, if you plan to display both trends simultaneously, rename the copied trend's Control Tag folder name.

Trend control tags

The trend control tags are:

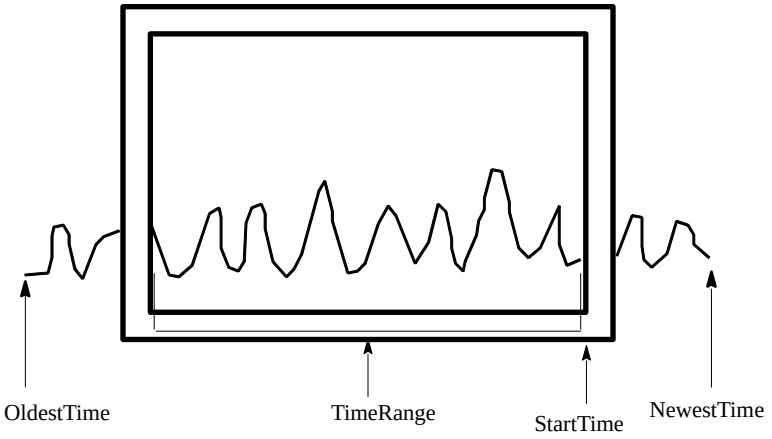
Tag name	Function	Read or Write?
\CurrentFile	Number of the current data log file. Each data log file is numbered in sequence.	Read and write (see Function column)
\CurrentPen	Number of the current pen (1 – 16) highlighted in the legend.	Read and write
\NewestFile	Offset from current data log file to newest data log file.	Read only
\NewestTime	Time of the newest data sample available for plotting.	Read only
\OldestFile	Offset from current data log file to oldest data log file.	Read only
\OldestTime	Time of the oldest data sample available for plotting.	Read only

Tag name	Function	Read or Write?
\Paused	A tag value of 1 pauses the trend. A tag value of 0 resumes movement of the trend. For real-time trends, RSView32 reads the value of this tag when the trend is first displayed to determine whether to start the trend in paused or resumed mode. If this tag doesn't exist, the trend is started in resumed mode. For historical trends, RSView32 reads the value of this tag when the trend is first displayed to determine whether to start the trend in paused or resumed mode. If this tag doesn't exist, the trend is started in paused mode. File-based trends are always started in paused mode.	Read and write
\PenMask	A 16–bit mask that controls the visibility of the trend pens. If the bit corresponding to a pen is set in this mask, the pen is displayed. For example: PenMask = 0000 0000 0000 0000 = 0 No pens are displayed. PenMask = 0000 0000 0000 0100 = 4 Only Pen 3 is displayed.	Read and write
\StartTime	Long integer tag specifying the time at the right margin of the time scale. The start time value is the number of seconds elapsed since midnight (00:00:00), January 1, 1970, coordinated universal time (UTC).	Read and write
\StartTimeDate	String tag representing the start time and date for the trend (at the right margin of the time scale). For example, JAN 01 1998 13:00:00.	Read and write
\TimeRange	Time range of the time scale in seconds.	Read and write
\Updating	Digital tag that indicates whether the trend object is retrieving data log data. The tag value is 1 if retrieving data, and 0 if not.	Read only

Tag name	Function	Read or Write?
\YMag	Magnification of the vertical axis in percent. 0No magnification 100Twice the resolution (half the range) -100Half the resolution (twice the range)	Read and write
\YOffset	Offset of the vertical axis in percent. Moves the view up or down but does not change the time range.	Read and write

How the trend control tags work

When a trend is running, the data for a trend—either real-time or historical—is stored in a buffer. The trend is a view of this buffer. The values of the control tags determine how the data is viewed. The following illustration shows what the OldestTime, TimeRange, StartTime, and NewestTime control tags represent:



When the value of one control tag changes, some aspect of this view changes. For example, the TimeRange tag determines how much of the data is shown at one time and the StartTime determines where the right margin of the trend is in relation to the total time span represented by the data.

The values for the trend control tags initially come from the information configured in the Trend dialog box. As the trend runs, some values are updated, such as the times of the newest and oldest data. The time of the oldest data changes when the trend's buffer becomes full and the oldest data is discarded. The time of the newest data changes when new data is available for the trend.

Creating objects to animate a trend

To provide animated objects, use the items in the Trends library, or create your own objects and configure animation for them. See "Using the Trends graphic library" on page 13-35 for details about the Trends graphic library.

To create your own objects, follow the steps in Chapter 11, *Creating graphic displays*. To configure animation for the objects you create, follow the steps in Chapter 12, *Animating graphic objects*.

The following table lists some expressions you can use when configuring animation. When creating expressions, remember to use the full tag name, which includes the Control Tag folder name. For example, for a Control Tag folder called Trend, the full tag name is Trend\StartTime, Trend\OldestTime, and so on. For brevity, the folder name is omitted from the tag names in the examples below.

To	Use this expression
Move all the way to the left (view the oldest data)	StartTime = OldestTime + TimeRange
Move all the way to the right (view the newest data)	StartTime = NewestTime
Move one view to the left	StartTime = StartTime – TimeRange
Move two views to the left	StartTime = StartTime – 2 × TimeRange
Move one view to the right	StartTime = StartTime + TimeRange

To	Use this expression
Move two views to the right	StartTime = StartTime + 2 × TimeRange
Pause the trend	Paused = 1
Resume the trend	Paused = 0
Specify the newest data log file as the current file*	CurrentFile = Current File + NewestFile
Move from the current file to one file earlier*	CurrentFile = CurrentFile – 1
Move from the current file to one file later*	CurrentFile = CurrentFile + 1
Specify the oldest data log file as the current file*	CurrentFile = CurrentFile – OldestFile

* Expressions using CurrentFile are applicable to trends using the Choose File, Oldest File, and Newest File Data Sources. Historical trends move between files automatically.

Masking pens

By default, all pens in a trend are visible. However, too many pens on one display can be difficult to read. To enable operators to hide or show individual pens, set up pen masking.

The Trends graphic library contains buttons that are already configured for pen masking. To use these buttons, drag and drop them into your graphic display.

To set up pen masking, create an expression that sets the value of the bit for the \PenMask control tag. To show the pen, the bit must be 1. To hide the pen, the bit must be 0.

You cannot use binary numbers to set a value—you must use decimals. The following table shows the decimal value for each pen:

Pen Number	Binary Mask Value	Decimal Value
1	0000 0000 0000 0001	1
2	0000 0000 0000 0010	2
3	0000 0000 0000 0100	4
4	0000 0000 0000 1000	8
5	0000 0000 0001 0000	16
6	0000 0000 0010 0000	32
7	0000 0000 0100 0000	64
8	0000 0000 1000 0000	128
9	0000 0001 0000 0000	256
10	0000 0010 0000 0000	512
11	0000 0100 0000 0000	1024
12	0000 1000 0000 0000	2048
13	0001 0000 0000 0000	4096
14	0010 0000 0000 0000	8192
15	0100 0000 0000 0000	16384
16	1000 0000 0000 0000	32768

Example: Showing or hiding a pen

The following example describes how to use pen masking to show or hide a pen.

To hide Pen 10 (without affecting other pens), use the bitwise AND operator and the complement of the pen's decimal value:

PenMask = PenMask & ~ 512

To show Pen 10 again, use the bitwise OR operator and the pen's decimal value:

PenMask = PenMask | 512

Specifying a start time

To specify an absolute trend start time, use the \StartTimeDate control tag. The \StartTimeDate control tag overrides the time specified in the Start Time field of the Trend dialog box. Create a string input object so that the operator can enter the date and time of the start time.

To specify a relative trend start time, create an = (Equal) command that uses the system\DateAndTimeInteger tag as the current time and performs calculations relative to its value. The value that is added to or subtracted from the current time must be in seconds.

Example: Specifying an absolute start time

The current display contains these objects:

- A historical trend with a Control Tag folder called Trend
- A string input object configured with the control tag Trend\StartTimeDate

To specify a start time of 1:00 pm on January 1, 1998, the operator enters this string in the string input object:

JAN 01 1998 13:00:00

Example: Specifying a start time one hour before the current time

Display "Process Trend"
Trend\StartTime=system\DateAndTimeInteger - 3600

When these commands run, RSView32 displays the trend graphic called Process Trend and sets the start time for the trend to the current time minus 3600 seconds (1 hour).

You can specify the start time from a graphic object or from a macro. For example, create a button object and use the above commands as the press action for the button.

IMPORTANT Do not set control tags from a macro that is launched from the Startup field in the Display Settings dialog box of the Graphic Display editor. All commands and macros launched from the Startup field are executed before the graphic display is initialized.

Using the Trends graphic library

The Trends graphic library contains a real-time trend and objects for controlling the trend. You can use the trend and objects as they are, or you can edit them to suit your needs. To use the objects, drag and drop them into your graphic display and then type a folder name in the trend's Control Tag field.

To use the Trends graphic library:

1. In the Project Manager, open the Graphics folder.
2. Open the Graphics Library folder.

   The graphic library files are displayed in the right pane of the Project Manager.

3. Double-click Trends.
4. Drag and drop one or more trend objects into your display.

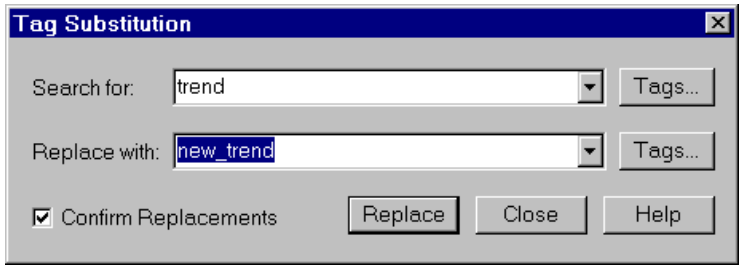
Setting the name of the Control Tag folder

You can use the Control Tag folder name ("trend") that has already been configured for the trend objects in the Trends graphic library, or you can change the name of the folder and then apply the new name to all objects associated with this trend.

To change the trend's Control Tag folder name and replace the old folder name:

1. Open the Trend dialog box by doing one of the following:
   - double–click the trend
   - select the trend, place the cursor over it, right–click to display the context menu, and then click Edit Trend
   - select the trend, open the Edit menu on the menu bar, and then click Edit Trend
2. In the Control Tag field, type a new name.
3. Click OK.

   The Control Tag folder is created in the tag database. It contains the control tags for the trend. You now have to replace the old folder name with the new name for the buttons and touch control objects that the operator uses to control the trend at runtime.
4. Select all the remaining objects.
5. On the Edit menu, click Tag Substitution.
6. In the Search for field, specify the old Control Tag folder name. In the Replace with field, specify the new folder name.



7. Click Replace.

   If the Confirm Replacements check box is *not* selected, all occurrences of the old folder name are automatically replaced with the new name. If the Confirm Replacements check box is selected, the name that is about to be replaced is displayed along with its usage.

Choosing fonts, colors, and lines

The following table summarizes where to choose fonts, colors, and lines for a trend. Before doing any of the actions described below, select the trend.

To choose	Do this
Background fill color	Choose a color from the Fill Color palette or from the Attributes menu.
Background fill pattern	Choose a pattern from the Fill Style toolbar or from the Attributes menu. Choose Hollow to create a transparent trend.
Grid line color	Choose a color from the Line Color palette or from the Attributes menu.
Grid line width	Choose Line Properties from the Attributes menu and then specify a line width.

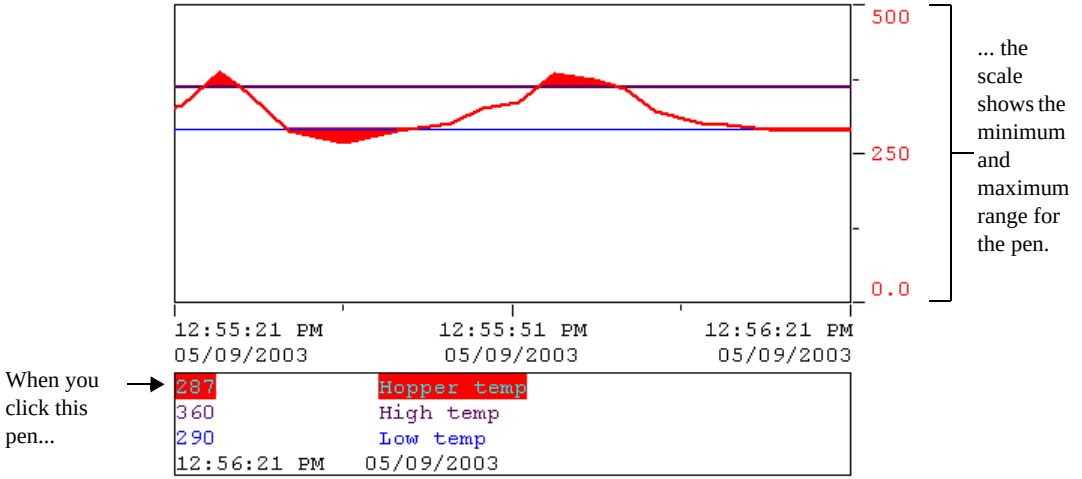
To choose	Do this
Pen line color	In the Trend dialog box, choose the Pen Configuration tab, and then choose a color in the Color field. You must configure each pen separately. This color is also used for the vertical axis labels and for the pen values in the legend.
Pen line width	Choose Line Properties from the Attributes menu and then specify a width. If you use this method the width applies to all the pens in the trend. Or, in the Trend dialog box, choose the Pen Configuration tab and then choose a width in the Custom Pen Width field. If you use this method, you must configure each pen separately. If you do not specify a pen width, the pen lines default to the width selected for the grid lines.
Pen line symbol	In the Trend dialog box, choose the Pen Configuration tab and then choose a symbol in the Show Plot Symbol field. You must configure each pen separately.

To choose	Do this
Marker color	Choose Font from the Attributes menu and then choose a color. For information about the marker see page 13-41. The marker color is also used for time axis labels (if used) and for the time and date in the legend.
Text font family, size, and color	Choose Font from the Attributes menu and then choose a font, size, and color. The font and size are used for all the text used for axis labels and all the text in the legend. The font color is used for time axis labels (if used), for the time and date in the legend, and for the marker color.

Using the trend at runtime

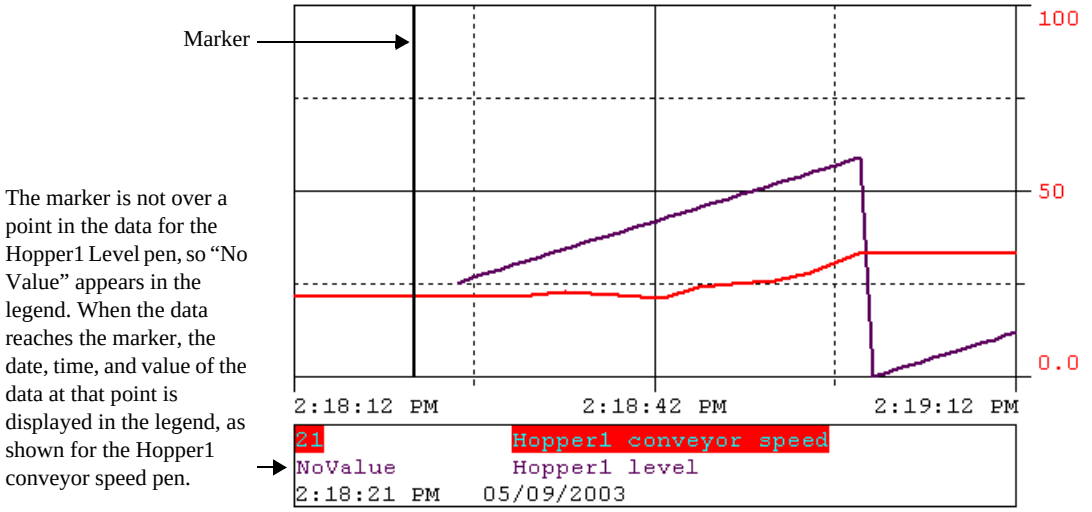
Selecting pens

To display details about a pen, select the pen by clicking it in the legend. When the pen is selected, the vertical scale changes to reflect the minimum and maximum values for that pen.



Selecting points

To view details about a specific point in the trend, use the marker. When the marker is over a point in the data, the pen's date, time, and value at the marker's location are displayed in the legend.



By default, the marker is at the right–most edge of the trend (and might not be visible). To move the marker, position the cursor on the trend and then click. The marker moves to the point you clicked. To hide the marker, click the vertical axis.

Changing the marker's color

By default, the marker is black (which means it is not visible on a trend with a black background). The marker uses the same color as the text for the time axis labels (if used) and for the time and date in the legend, so changing the marker color also changes this text color.

To change the marker color:

1. Select the trend.
2. Right–click, point to Attributes, and then click Font.
3. In the Font dialog box, select a new color.

Editing a trend

You can edit the physical characteristics of the trend object as well as the trend configuration.

Editing the trend object

You can edit a trend object as you would any other graphic object. You can move it, resize it, attach animation to it, and so on.

For detailed information about working with graphic objects, see Chapter 11, *Creating graphic displays*.

Editing the trend configuration

1. Open the Trend dialog box by doing one of the following:

   - double–click the trend
   - select the trend, place the cursor over it, right–click to display the context menu, and then click Edit Trend
   - select the trend object, click Edit on the menu bar, and then click Edit Trend

2. Edit the information in any of the fields.

   For detailed information about the fields, see "Trend configuration" on page 13-7 and "Pen configuration" on page 13-18.

3. Click OK.

Chapter

14 Creating expressions

This chapter includes:

- instructions for creating expressions
- description of the components used for building expressions

About expressions

Sometimes the data you gather from devices is only meaningful when you:

- compare it to other values
- combine it with other values
- create a cause–effect relationship with other values

Expressions allow you to create mathematical or logical combinations of data that return more meaningful values.

Expression components

Expressions can be built from:

- tag values
- constants
- mathematical, relational, logical, and bitwise operators
- built–in functions
- if–then–else logic

Where you can use expressions

Expressions can be used in the following editors:

- Graphic Display: You can define an expression to control various aspects of a graphic object's appearance. You can also display the value of an expression in numeric and string display objects.
- Derived Tags: You can define an expression and specify the name of a tag that will store the result of the expression.
- Events: You can define an expression and associate it with an action. When the expression changes from false to true (from zero to any non–zero value), the action (a command or macro) runs.
- Activity Log Setup: When configuring file management, you can choose to have a log file created when a particular event occurs. One way of doing this is to create an expression.
- Data Log Setup: When configuring file management, you can choose to have a log file created when a particular event occurs. One way of doing this is to create an expression.
- Alarm Setup: When configuring file management, you can choose to have a log file created when a particular event occurs. One way of doing this is to create an expression.

Using expressions in a command

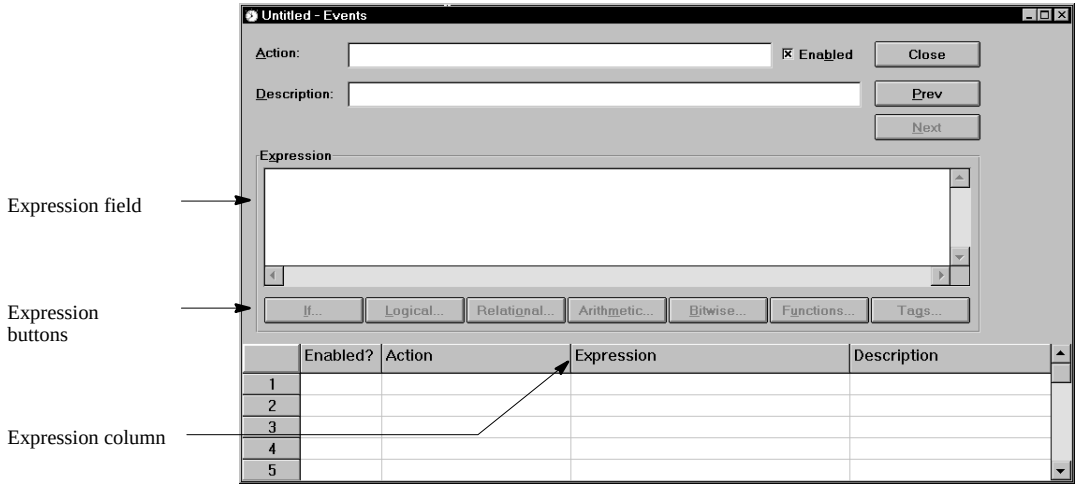
You can also use expressions in a command to set the value of a tag. For details, see "Using the = (Equal) command" on page 14-6.

Creating expressions

All editors that use expressions include an Expression field. In some editors, you will also find:

- expression buttons
- an expression column

The following illustration shows the items for creating an expression in the Events editor.



Expression buttons

These are the expression buttons:

This button	Displays a list of	This button	Displays a list of
If...	If–then–else operators	Bitwise...	Bitwise operators
Logical...	Logical operators	Functions...	Built–in functions
Relational...	Relational operators	Tags...	Tags in the tag database
Arithmetic...	Arithmetic operators		

Cutting, copying, and pasting expressions

You can cut, copy, or paste an expression or parts of an expression. The method for performing these actions depends on whether the expression is in a window or in a dialog box.

When you are working in a window, you can use the commands on the Edit menu, the toolbar, or the keyboard. When you are working in a dialog box, you can use only the keyboard because you cannot access the menu bar or toolbar.

When you cut or copy an expression, a copy of it is placed on the clipboard. Once it is on the clipboard, you can paste it into any other Expression field or Expression column. You can also paste it into a command line.

To cut or copy expressions in a window:

1. Select the expression in the form or in the spreadsheet.
2. Do one of the following:


Cut


Copy

   - click Cut or Copy on the Edit menu
   - click the Cut or Copy button on the toolbar
   - press Ctrl–X or Ctrl–C

To paste expressions in a window:

1. Click where you want to paste the expression.

   You can paste into the Expression field in the form or into the Expression column in the spreadsheet.


Paste

2. Do one of the following:
   - click Paste on the Edit menu
   - click the Paste button on the toolbar
   - press Ctrl–V

To cut or copy expressions in a dialog box:

1. Select the expression in the Expression field.
2. Press Ctrl–X or Ctrl–C.

To paste expressions in a dialog box:

1. Click in the Expression field where you want to paste the expression.
2. Press Ctrl–V.

Formatting expressions

You can format expressions so they are easier to read. However, do not let tag names, key words, function names, or function arguments span more than one line.

When formatting expressions, you can use tabs, line returns, and multiple spaces.

When you're working in the Animation dialog box in the Graphic Display editor, type Ctrl-Tab to insert a tab in the expression.

Example: Formatting an expression

To format this if–then–else statement, you can align the "else" with the appropriate "if" so the logic is easy to understand:

If (tag1 > tag2) Then 0
Else If (tag1 > tag3) Then 2
Else 4

Or you can condense it to the following:

If (tag1 > tag2) Then 0 Else If (tag1 > tag3) Then 2 Else 4

Using the = (Equal) command

You can type an expression as a command using the following syntax:

[&] <*tag_name*> = <*expression*> where:

[&]	Forces the command to be executed asynchronously, which makes the command faster.
<*tag_name*>	The name of an analog, digital, or string tag that will store the result of the expression.

<expression> A value or string, a tag name, or a more complex expression.

Enclose tag names that contain dashes or start with a number in braces { } when you use them in an expression. This distinguishes the characters in the tag name from the characters in the expression. Also use braces when using wildcards (* or ?) to represent multiple tags in an expression.

Enclose strings in quotes. The string can contain any character, and can include spaces.

Do not use braces for the tag name *before* the equal sign.

You cannot nest braces.

Examples: The = (Equal) command

Tag1 = Tag1 + 1
Increases the value of tag1 by 1.

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

Tag1 = if (Tag2 < Tag1) then 4 else 3
Performs the if–then–else calculation and stores the result in Tag1.

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

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

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

Using tag names and tag placeholders

A tag name can be included as part of an expression or can stand alone as the entire expression.

To supply a tag name, do one of the following:

- type a tag name

  You can type a tag name that does not exist in the tag database. When you click OK, a dialog box appears prompting you to create the tag.

- click the Tags button and select a tag from the Tags list

Enclose tag names that contain dashes or start with a number in braces { } when you use them in an expression. This distinguishes the characters in the tag name from the characters in the expression. Also use braces when using wildcards (* or ?) to represent multiple tags in an expression.

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

For detailed information about tags, see Chapter 4, *Creating tags*.

Using tag placeholders instead of tag names

The Graphic Display editor accepts tag placeholders instead of tag names. Placeholders allow you to use the same display with a variety of tags.

You can use tag placeholders in the same way you use tag names. A tag placeholder is the cross–hatch character (#) followed by a number from 1 to 500. For detailed information about placeholders, see Chapter 11, *Creating graphic displays*.

Constants

A constant can have any of the following formats:

- integer (123)
- floating point (123.45)
- scientific notation (1.2345E2)
- string constant (“character string”)
- the symbol “pi”. RSView32™ replaces the symbol with its numeric value.

Arithmetic operators

Arithmetic operators calculate values based on two or more numeric values. The arithmetic operators are:

Symbol	Operator	Example (For these examples, tag1 = 5 and tag2 = 7)
+	addition	tag1 + tag2 returns a value of 12
-	subtraction	tag1 - tag2 returns a value of –2
*	multiplication	tag1 * tag2 returns a value of 35
/	division	tag1 / tag2 returns a value of 0.7142857
MOD, %	modulus (remainder)	tag2 MOD tag1 returns a value of 2 The modulus operator is the remainder of one number divided by another. For example, the remainder of 13 divided by 5 is 3; so 13 % 5 = 3. Important: This operator is for integers only, not floating point numbers.
**	exponent	tag1 ** tag2 returns a value of 78125

IMPORTANT Be sure that any tag value you use as a divisor cannot at some point have a value of zero. Expressions that attempt to divide a number by zero produce an error at runtime.

String operands

The + operator can be used to join string operands. For example, the expression “hello” + “world” returns: helloworld.

Relational operators

Relational operators compare two numeric or string values to provide a true or false result. If the statement is true, a value of 1 is returned. If false, 0 is returned.

The relational operators are:

Symbol	Operator	Numeric Examples[1]	String Examples[2]
[1] For the numeric examples, tag1 = 5 and tag2 = 7			
[2] For the string examples, serial_no = ST009			
EQ, ==	equal	tag1 == tag2 false	serial_no == “ST011” false
NE, <>	not equal	tag1 <> tag2 true	serial_no <> “ST011” true
LT, <	less than	tag1 < tag2 true	serial_no < “ST011” true
GT, >	greater than	tag1 > tag2 false	serial_no > “ST011” false
LE, <=	less than or equal to	tag1 <= tag2 true	serial_no <= “ST011” true
GE, >=	greater than or equal to	tag1 >= tag2 false	serial_no >= “ST011” false

How string operands are evaluated

String operands are evaluated by case and by alphabetical order. Upper case letters are greater than lower case letters. For example, H is greater than h. Letters later in the alphabet are greater than those earlier in the alphabet. For example, B is greater than A.

Logical operators

Logical operators determine the validity of one or more statements. There are three logical operators: AND, OR, and NOT. The operators return a non–zero value if the expression is true, or a zero if the expression is false.

The logical operators are:

Symbols	Operator	Action	Example (For these examples, tag1 = 5 and tag2 = 7)
AND, &&	and	Returns a 1 if the statements to the right and to the left of the operator are both true.	(tag1 < tag 2) AND (tag1 == 5) both statements are true; returns a 1
OR, ||	or	Returns a 1 if either the statement to the left or to the right of the operator is true.	(tag1 > tag2) OR (tag1 == 5) tag1 == 5 is true; returns a 1
NOT	negation	Reverses the logical value of the statement it operates on.	NOT(tag1 < tag2) although tag1 < tag2 is true, NOT reverses the logical value; returns a 0

IMPORTANT The parentheses are essential in the above expressions. See "Evaluation order of operators" on page 14-22.

Bitwise operators

Bitwise operators examine and manipulate individual bits within a value.

IMPORTANT These operators are for integers only, not floating point numbers.

Symbol	Operator	Action
&	AND	Compares two integers or integer tags on a bit–by–bit basis. Returns an integer with a bit set to 1 if both the corresponding bits in the original numbers are 1. Otherwise, the resulting bit is 0.
|	inclusive OR	Compares two integers or tags on a bit–by–bit basis. Returns an integer with a bit set to 1 if either or both of the corresponding bits in the original numbers are 1. If both bits are 0, the resulting bit is 0.
^	exclusive OR (XOR)	Compares two integers or tags on a bit–by–bit basis. Returns an integer with a bit set to 1 if the corresponding bits in the original numbers differ. If both bits are 1 or both are 0, the resulting bit is 0.
>>	right shift	Shifts the bits within an integer or tag to the right. Shifts the bits within the left operand by the amount specified in the right operand. The bit on the right disappears. Either a 0 or a 1 is shifted in on the left, depending on whether the left–most bit is a 0 or a 1. If the left–most bit is 0, a 0 is shifted in. If the left–most bit is 1, a 1 is shifted in. In other words, the sign of the number is preserved.
<<	left shift	Shifts the bits within an integer or tag to the left. Shifts the bits within the left operand by the amount specified in the right operand. The bit on the left disappears and 0 always shifts in on the right.
~	complement	Returns one's complement; that is, it toggles the bits within an integer or tag. Reverses every bit within the number so every 1 bit becomes a 0 and vice versa.

Example: Bitwise operators

For these examples tag1 = 5 (binary 0000 0000 0000 0101), tag2 = 2 (binary 0000 0000 0000 0010)

tag1 & tag2
Returns 0 (binary 0000 0000 0000 0000).

tag1 | tag2
Returns 7 (binary 0000 0000 0000 0111).

tag1 ^ tag2
Returns 7 (binary 0000 0000 0000 0111).

tag1 >> 1
Returns 2 (binary 0000 0000 0000 0010).

tag1 << 1
Returns 10 (binary 0000 0000 0000 1010).

~ tag1
Returns -6 (binary 1111 1111 1111 1010).

Built–in functions

The types of built–in functions are:

- tag
- time
- file
- math
- security

Many functions check for specific true and false conditions. They return 1 if the condition is true, and 0 if the condition is false.

Tag functions

The following built–in functions examine the status of a tag (tag) or multiple tags (tag*).

This function	Returns
ALM_IN_ALARM(tag) *or* ALM_IN_ALARM(tag*)	1 (true) if the tag or alarm event is in alarm. If examining multiple tags, 1 (true) if one or more of the tags or alarm events are in alarm.
ALM_ACK(tag) *or* ALM_ACK(tag*)	1 (true) if the tag or alarm event's alarm has been acknowledged. If examining multiple tags or alarm events, 1 (true) if one or more of the tags' or alarm events' alarms have been acknowledged.
ALM_ALLACKED(tag) *or* ALM_ALLACKED(tag*)	1 (true) if the tag's alarm has been acknowledged. If examining multiple tags, 1 (true) if all of the tags' alarms have been acknowledged.
ALM_SEVERITY(tag) *or* ALM_SEVERITY(tag*)	The severity of the alarm—a value between 1 and 8, or 0 if the tag or alarm event is not in alarm. If examining multiple tags or alarm events, the highest severity of the tags or alarm events that are in alarm. For example, if the current alarms have severities of 1, 3, and 6, this function returns the value 1.
ALM_LEVEL(tag) *or* ALM_LEVEL(tag*)	The alarm level or threshold for an analog tag: a value between 1 and 8, or 0 if the tag is not in alarm. If examining multiple tags, the highest level of the tags that are in alarm. For example, if the current alarms are levels 2, 6, and 8, this function returns the value 8.
ALM_SUPPRESS(tag) *or* ALM_SUPPRESS(tag*)	1 (true) if the tag's alarms are suppressed. If examining multiple tags, 1 (true) if one or more of the tags' alarms are suppressed.

This function	Returns
ALM_FAULT(tag) *or* ALM_FAULT(tag*)	1 (true) if there has been an alarm fault for the specified tag. If examining multiple tags, 1 (true) if there has been an alarm fault for one or more of the tags.
COMM_ERR(tag)	1 (true) if the last read or write operation for the specified tag indicated a communication failure. Note that you can examine the status of only one tag with this function.

To examine multiple tags at once, use a wildcard in the expression argument.

This wildcard	Does this
*	Matches any number of characters, including the backslash (\) character.
?	Matches any single character.

Example: Tag functions

ALM_IN_ALARM(vessel3\TIC3\pv*)
Returns 1 (true) if one or more tags in the specified folder have a name beginning with the letters "pv" and are in alarm. Returns 0 (false) if none of the specified tags are in alarm.

Time functions

The following built–in functions examine system time. These functions use the *time* or *interval* parameters.

These are the functions:

This function	Returns
TIME("time")	1 (true) if the time specified is the current time.

This function	Returns
BEFORE_TIME(“time”)	1 (true) if the expression is evaluated before the specified time.
AFTER_TIME(“time”)	1 (true) if the expression is evaluated after the specified time.
INTERVAL(“interval”)	1 (true) if the specified time interval has elapsed—the interval timer starts running when an event file starts running.
GetDayofWeek(D)	Return value is from 1 to 7. 1 indicates Sunday and 7 indicates Saturday. The other values correspondingly represent each day of week.

IMPORTANT The time and interval parameters must be enclosed in quotes.

The time functions are described on the following pages.

The *time* parameter can include the following options:

- day of week [Sun, Mon, Tue, Wed, Thu, Fri, or Sat]
- month [Jan, Feb, Mar, Apr, May, Jun, Jul, Aug, Sep, Oct, Nov, or Dec]
- date [1-31]
- year [1997-2100]
- hour of day [00:-23:]
- minute [:00-:59]
- seconds [:00-:59]

It does not matter in what order options are listed. You can include any or all of these options; the more you include, the more specific the time becomes.

Example: Specific time parameters

The following all represent the same date and time, and are valid time parameters:

- **“mon aug 18 1997 17:00”**
- **“mon aug 18 1997 17: :00”**
- **“:00 aug 18 mon 1997 17:”**

IMPORTANT The validity of the date is not checked. In the above example if Aug 18 1997 is not a Monday, this error is not detected.

Example: Less specific time parameters

Following are valid examples of time parameters:

- **“17:00”**
  Means any day at 5:00 pm.
- **“ :30 ”**
  Means any hour, on the half hour.
- **“ mon 17:”**
  Means 5:00 pm each Monday.

The *interval* parameter has this format:

<*number*> <*units*>

where <*units*> is one of:

- mil (millisecond)
- sec (second)
- min (minute)
- hou (hour)
- day (day)
- wee (week)
- mon (month)
- yea (year)

Examples: Time and interval functions

TIME("sun aug 18 1997 14:30")

Returns 1 (true) if it is exactly 2:30 pm and 0 seconds, on Sunday, Aug 18, 1997; otherwise returns 0 (false).

AFTER_TIME("sun aug 18 1997 14:30")

Returns 1 the first time the expression is evaluated after 2:30 pm on Sunday Aug 18, 1997.

BEFORE_TIME("aug 18 1997")

Returns 1 (true) the first time the expression is evaluated before Aug 18, 1997.

INTERVAL(“1 min”)

Returns 1 (true) if a minute has elapsed since the expression last returned a 1.

(tag1 > 500) and INTERVAL (“30 sec”)

Returns 1 (true) when tag1 > 500 on some 30–second interval since the event file started running. (It does *not* mean 30 seconds after tag1 > 500.)

File functions

The following built–in functions check if a file exists and check the amount of free disk space.

The *file* parameter is the MS-DOS® path name, surrounded by quotes. The *drive* parameter is the drive letter.

These are the functions:

This function	Returns this value	Example
FILE_EXISTS(“file”)	1 (true) if the specified file exists.	FILE_EXISTS “C:\Proj1\Dlglog\Aug\970412bf.dbf” returns 1 (true) if the file exists or 0 (false) if the file does not exist. Use this function to set a tag when a specified file has been created or deleted.

This function	Returns this value	Example
FREE_BYTES(drive)	The number of bytes free on the specified drive.	FREE_BYTES(c) returns the number of bytes available on drive C, up to a maximum of 2.1 GB. Use this function to display a message or trigger an alarm when disk space is getting low.

If you want an expression containing these functions to be evaluated more than once, assign the expression to an event rather than to an object in a graphic display.

Math functions

These functions perform math on an expression:

This function	Returns this value
SQRT (expression)	The square root of the expression
LOG (expression)	The natural log of the expression
LOG10 (expression)	The base ten log of the expression
SIN (expression)	The sine of the expression in radians
COS (expression)	The cosine of the expression in radians
TAN (expression)	The tangent of the expression in radians
ARCSIN (expression)	The arc sine of the expression in radians
ARCCOS (expression)	The arc cosine of the expression in radians
ARCTAN (expression)	The arc tangent of the expression in radians
SIND (expression)	The sine of the expression in degrees
COSD (expression)	The cosine of the expression in degrees
TAND (expression)	The tangent of the expression in degrees
ARCSIND (expression)	The arc sine of the expression in degrees

ARCCOSD (expression)	The arc cosine of the expression in degrees
ARCTAND (expression)	The arc tangent of the expression in degrees

Security function

The following built–in function checks if the current user has the specified security code.

The *security* parameter is the security code letter, from A to P.

This function	Returns this value	Example
USER_HASPERMISSION (security)	1 (true) if the specified security code has been assigned to the current user	USER_HASPERMISSION(C) returns 1 (true) if security code C has been assigned to the current user, and 0 (false) if the user does not have access to the security code. Use this function to control access to your project.

For more information about setting up security for your project, see Chapter 10, *Adding security*.

Evaluation order of operators

Expressions with more than one operator are evaluated as follows:

- Operators in parentheses are evaluated first.

  Therefore, to change the order of precedence, use parentheses.

- The operator with the highest precedence is evaluated next.

- When two operators have equal precedence, they are evaluated from left to right.

Operators are evaluated in the following order:

Evaluation order	Symbols
1 (highest)	( )
2	NOT ~
3	* / MOD, % ** AND, && & >> <<
4	+ - OR, || | ^
5 (lowest)	EQ, = NE, <> LT, < GT, > LE, <= GE, >=

Example: Evaluation order

For these examples, tag1 = 5, tag2 = 7, and tag3 =10.

(tag1 > tag2) AND (tag1 < tag3)

is evaluated in this sequence:

1. tag1 > tag2 = 0
2. tag 1 < tag3 = 1
3. 0 AND 1 = 0

The expression evaluates to 0 (false).

---

tag1>tag2 AND tag3

is evaluated in this sequence:

1. tag2 AND tag3 = 1
2. tag1 > 1 = 1

The expression evaluates to 1 (true).

NOT tag1 AND tag2 > tag3 ** 2

is evaluated in this sequence:

1. NOT tag1 = 0
2. 0 AND tag2 = 0
3. tag3 ** 2 = 100
4. 0 > 100 = 0

The expression evaluates to 0 (false).

If–then–else

If–then–else expressions carry out an action conditionally or branch actions depending on the statements in the expression. The if–then–

else statements enable the expression to perform different actions in different situations and to repeat activities until a condition changes.

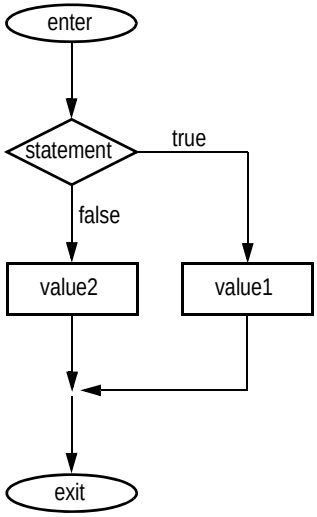
To build conditional expressions, use the relational operators and the logical operators.

The if–then–else structure is:

if *statement* then *value1* else *value2*

If the *statement* is true then the expression returns *value1*; if the *statement* is false then the expression returns *value2*. Keep in mind that the *statement* is a mathematical equation and true means a non–zero value, and false means zero.

The if–then–else structure is illustrated below.



Nested if–then–else structure

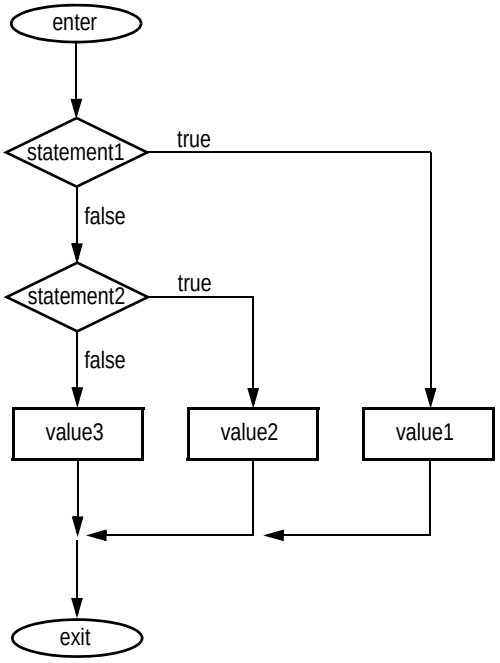
It is common to nest an if–then–else structure inside the 'then' or 'else' part of an if–then–else structure.

Example 1: Nested if–then–else

This expression:

if (statement1) then (value1)
else if (statement2) then (value2)
else (value3)

has this interpretation:

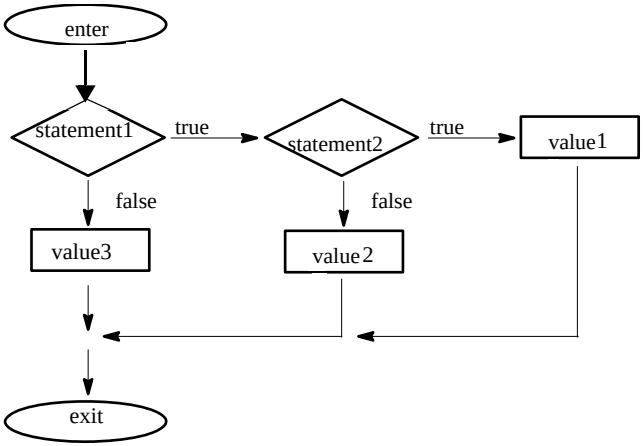


Example 2: Nested if–then–else

This expression:

if (statement1) then
if (statement2) then (value1)
else (value2)
else (value3)

has this interpretation:



Chapter

15 Setting up navigation

An important part of the complete operator interface is the way operators navigate through and interact with your project. RSView32™ gives you the tools for linking displays and creating an overall project structure that is easy for operators to use.

This chapter provides:

- examples and ideas for creating a hierarchy of displays
- examples of how users can move among displays
- procedures for linking displays

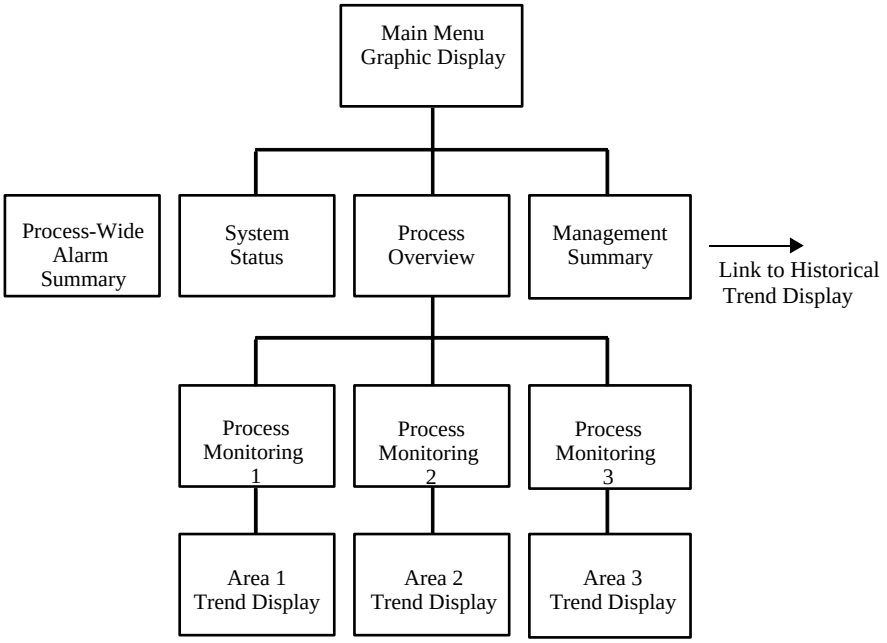
Developing a hierarchy of displays

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

A hierarchy could include:

- an initial graphic display that serves as a menu
- an overview of the plant
- a comprehensive display of each process being monitored
- process–specific displays
- management summary displays
- trend displays of historical and real-time data

The following illustration shows a display hierarchy.



Methods for moving among displays

To set up displays so operators can easily move among them, you can:

- create a keyboard–based project
- create a mouse– or touch screen–based project

You can use one or both of these methods in your project. Although the methods look different to the operator, they work similarly. That is, they all initiate RSView32 commands.

Commands for moving among displays

To open, close, and switch between displays, use these commands:

RSView32 Command	Function
Display	Opens the specified graphic display. If a display is already open and the display allows multiple running copies (specified in the Display Settings dialog box in the Graphic Display editor), this command will open another display and make it active. If the display is already open but does not allow multiple running copies, this command simply makes the display active. If a display of type Replace overlaps any other display(s) when it opens, the display(s) it overlaps will be closed. Displays of type Overlay open on top of any other open displays without closing them. Displays of type On Top will remain on top of any other open graphic displays.
Abort	Use this command only for displays of type Overlay or On Top. The Abort command closes the active display or a specified display.
PullForward	Pulls forward the specified display. If the specified graphic display is of the Replace or Overlay type, PullForward gives the specified display focus and positions it behind any On Top display that is open.
PushBack	Pushes the specified display behind other displays. If the specified graphic display is of the On Top type, PushBack positions the display behind any other open On Top displays, and in front of any open displays of the Replace or Overlay type.

The PullForward and PushBack commands provide quick display changes because displays are already up and running. However, be aware that the more displays that are open, the more memory is used.

The display type you choose gives you additional control over how the operator navigates between displays. For example, use the On Top option to keep a display on top at all times, even when another display has focus. Or use the Replace option if you want a display to replace all other open displays when it opens. For details about assigning display type see "Specifying the display type" on page 11-14.

Reducing display call–up time

You can reduce the time required to display a graphic by loading the graphic into the display cache. You can:

- load the graphic before it is displayed by using the Display command with the /Z or /ZA parameter. For details, see Appendix A, *RSView32 commands*, or see online help.
- load the graphic when it is displayed for the first time by using the Cache After Displaying option in the Display Settings dialog box of the Graphic Display editor. For details, see "Specifying caching" on page 11-16.

Where to use RSView32 commands

Commands can be used in the following places:

- a field that requires you to enter an action
- a macro
- a command line

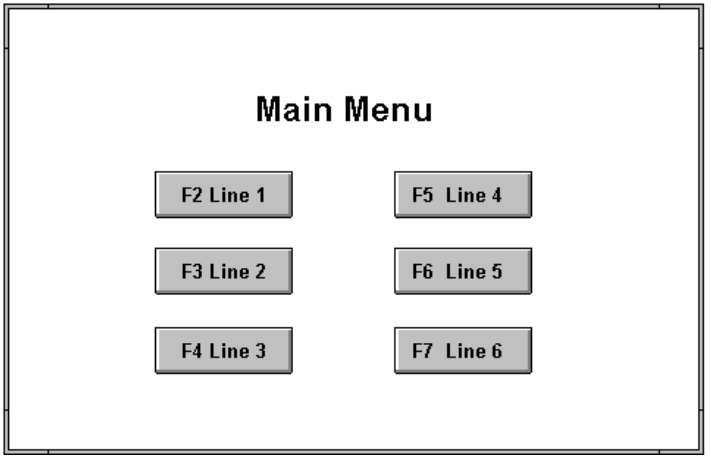
Many RSView32 commands accept parameters. For a complete list and description of commands, see Appendix A, *RSView32 commands*, or see Help.

Example of navigation methods

Following are examples of various navigation methods:

Example: Keyboard operation

The following graphic display has been designed to act as a menu, listing keys users can press to open different displays.



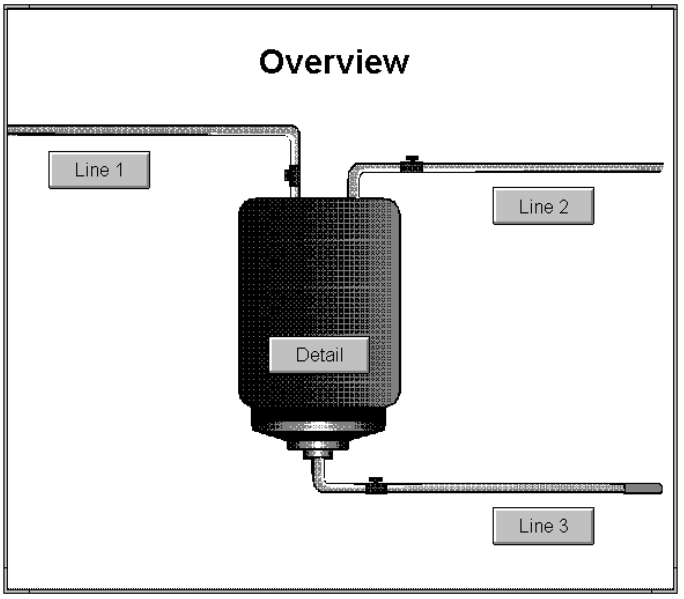
To create this display, the designer assigned various RSView32 commands to keys using the three types of key definitions: object, display, and global. In all cases, keys (not mouse buttons) were defined to run commands.

Object key and display key animation are configured in the Graphic Display editor. For details, see Chapter 12, *Animating graphic objects*. Global keys are created in the Global Keys editor. For details, see "Creating global keys" on page 15-19.

Example: Mouse/touch screen operation

The following graphic display contains buttons that users can click with the mouse or press on a touch screen to call up detail displays. This display presents information and acts as a menu.

The Line 1, Line 2, and Line 3 buttons have touch animation attached to them.



To create the buttons, the designer used the Button drawing tool in the Graphic Display editor. The buttons can be selected with a mouse or with a touch screen. For details about how to create buttons, see "Creating buttons" on page 11-57.

The tools

To build a complete operator interface, use:

- macros to replace a set of commands with a single command
- symbols to replace long commands or commands with parameters
- key definitions to assign commands, symbols, macros, or a series of replacement keystrokes to keys or mouse buttons

Precedence

At runtime, components are evaluated in the following order:

- symbols, commands, macros
- object keys, display keys, global keys

For details about the order of precedence among object, display, and global keys, see page 15-14.

Creating macros

A macro is a series of commands stored in a macro file. The name of the macro file is then used like a command and can be used anywhere a command can be used. When the file name is entered, the macro runs, executing all the commands in the file.

You can create macros to perform almost any action. For example, a macro can:

- open a group of windows and define their initial positions
- define temporary key definitions
- close any open windows
- set tag values

Instead of using macros to set tag values, you can also set tag values using the tag collections in the RSView32 Object Model's WritePendingValues method. For more information about using the RSView32 Object Model, see Help.

To create a macro:

1. In the Project Manager, open the Logic and Control folder.
2. Open the Macro editor by doing one of the following:
   - double–click the Macro icon
   - right–click the Macro icon and then click New
3. Type your macro commands and, if required, add command parameters.

   When entering commands, follow these guidelines:

   - Separate each identifier, specification, or string with a space or a tab.
   - Start each command on a new line, or separate commands on the same line with a semicolon (;).
   - Precede comments with an exclamation mark (!). The comment lasts until the next semicolon (;) or line break.
   - To replace a tag name with its current value when the command is evaluated, enclose the tag name in dollar signs ($) to create a placeholder in the command.
   - To indicate a percent in a macro, use two percent signs (%%) because a single percent sign indicates a parameter.

   For information about parameters, see "Using parameters" on page 15-10. For more information about command syntax, see "How to use commands" on page A-1.

   For assistance while typing macro commands, double–click anywhere in the Macro editor to open the Command Wizard. For

more information about using the Command Wizard, see page A-5.

4. On the File menu, click Save As.
5. Type a file name. Remember, the file name is the macro name so ensure the name does not conflict with symbols or commands. If names conflict, only the symbol or command will run.

At runtime, operators can type the macro name anywhere they can type an RSView32 command. For example, if you include a command line in your project, operators can run a macro by typing its name on the command line.

Example: A macro called factory

Display Overview

Display Detail

Valve23 = Open

When the macro called Factory runs, the graphic display Overview appears, then the graphic display Detail appears, then the tag Valve23 is set to its open state.

Example: A macro using placeholders in commands

Display Screen$Tag1$

Display $Tag3$$Tag2$

Valve23 = Open

Tag1 = 1, Tag2 = 2, and Tag3 = Screen. Note that these are all string tags. When the macro runs, RSView32 replaces the placeholders in the commands with the tags' current string values. The graphic display

Screen1 appears, then the graphic display Screen2 appears, then the tag Valve23 is set to its open state.

Note that you don't need to put braces around tag names when using placeholders in commands.

Using parameters

Macros can accept parameters. To specify a parameter in a macro, type a percent (%) sign followed by a number. Up to nine parameters are allowed.

To run the macro and parameters, specify the macro name followed by the parameters. Separate multiple parameters with spaces.

For example, here is the same Factory macro with two parameters:

Example: Factory macro with two parameters

Display Overview

Display %1

valve23 = %2

To run the macro, type **Factory Detail Open**

The macro performs the same actions as in the original Factory example because it substitutes "detail" wherever %1 appears in the macro and substitutes "open" wherever %2 appears in the macro.

Nesting macros

You can insert a macro within another macro—this is called nesting. You can have eight nesting levels in macros.

Example: Nesting macros

A macro called Draw contains:

Display Overview

Display Detail

and a macro called Factory contains:

Draw

Valve23 = Open

Typing **Factory** performs the same actions as the original Factory macro in the previous example.

Creating a macro that starts when a project starts

If you have created a project with components that must start in a particular order, create a startup macro. You can then configure the Startup editor to run this macro when your project starts.

For more information about the Startup editor, see Chapter 18, *Running your project*.

Creating symbols

If you have long commands or commands with parameters that are hard to remember or easy to mix up, you can rename those commands with a single word called a symbol.

Symbols can be used anywhere a command can be used: in a field that requires an action, in a macro, or on the command line.

You can define symbols in a macro or on the command line. However, symbols are mainly an operational convenience when using the system from the command line.

To define a symbol:

▶ On the command line or in a macro, type:

Define <*symbol*> <*string*>

<*symbol*>	the abbreviated command, without spaces
<*string*>	an existing command with or without parameters. It can contain spaces and other symbols.

Example: The Define command

Define Show Display Overview

In this example, the command Display Overview is replaced with the word Show.

Important guidelines

When creating symbols, keep the following in mind:

- RSView32 does not check for security access on symbol names. Therefore, be sure to put security on the underlying RSView32 command. For more information, see Chapter 10, *Adding security*.

- A symbol and a macro should not have the same name. If they do, the symbol runs instead of the macro.

  The order of precedence is: symbol, command, macro.

To clear a symbol:

▶ On the command line or in a macro, type one of the following:

This command	Does this
Undefine <*symbol*> where <*symbol*> is the name of the symbol you want to delete	clears the symbol
Undefine *	clears all defined symbols

Example: Undefining symbols

Undefine Show

Clears the symbol Show.

Key definitions

You can associate RSView32 commands with objects in a display and/or with the entire display using object key animation, display key animation, and touch animation. You can also associate commands with keys that will be active at all times throughout the system by creating global keys. At runtime, operators use these keys to interact with the system, for example to change displays or set tag values.

When deciding what type of key to create, use the following table as a guide:

To	Do this	For details, see
Associate a key with a specific graphic object (object key)	Attach object key animation in the Graphic Display editor	page 12-42
Associate a key with a specific graphic display (display key)	Attach display key animation in the Graphic Display editor	Page 12-54
Create a key that works everywhere (global key)	Create a key definition file in the Global Keys editor	Page 15-19

General rules about precedence

You can assign a single key to one or more of the three types of key definitions—object, display, or global. For example, the F2 key can open a valve when the valve object has input focus, or it can close a popup display that has focus, or the F2 key can be a global key that opens a graphic display containing an overview of your process.

When a graphic display is active and an object has input focus, object keys have precedence over display keys and global keys.

When a graphic display is active, display keys have precedence over global keys. This means that if you assigned the F2 key as a display key in some graphic displays in your project, and you assigned F2 as a global key in the same project, F2 will only work as a global key if the current display does not have F2 assigned as a display key as well.

When you design your system, pay particular attention to the keys used by embedded objects. Object keys and display keys have precedence over keys used by embedded objects (for example, ActiveX®, or OLE objects), except for OLE objects that are not part of RSView32 (for example, an Excel worksheet), whose keys have precedence over object or display keys. For details, see the pages that follow.

Precedence and the F1 key

When you are editing an RSView32 project, the F1 key always launches context–sensitive Help.

At runtime, if a runtime editor has focus, F1 launches context–sensitive Help for that editor. If a graphic display has focus, and a press, release, or repeat action has been defined for the F1 key, F1 acts as a display, object, or global key instead of launching Help.

Precedence and embedded ActiveX objects

When a graphic display is active and an embedded ActiveX object has input focus, a key that triggers an action in the embedded object will not trigger that action if the key has been defined as an object or display key as well. When you press the key, the action of the embedded ActiveX object will not be executed; the action of the object key or display key will be triggered instead.

For example, you might have an ActiveX slider object to control the speed of a motor, with the F2 key defined to increase the motor's speed, and the F3 key defined to decrease the motor's speed. If you have defined F2 as an object key to jog the motor's position, pressing F2 will never increase the motor's speed—every time an operator presses F2, the motor's position will be jogged instead.

If a key that triggers an action in an embedded ActiveX object has been defined as a global key, pressing that key will trigger both the action defined for the embedded object and the action defined for the global key.

For example, if the F2 key for an ActiveX gauge object increases a motor's speed, and you have defined F2 as a global key to print the current graphic display, each time the operator presses F2, the motor's speed will be increased, and the graphic display will be printed.

Precedence and embedded OLE objects

The order of precedence for embedded OLE objects differs, depending on whether the OLE object is an RSView32 OLE object, for example, an embedded command line, alarm summary, or tag monitor object, or whether the object is a non–RSView32 OLE object, for example, an Excel worksheet.

Precedence and embedded RSView32 OLE objects

When a graphic display is active and an embedded RSView32 OLE object has input focus, a key that triggers an action in the embedded object will not trigger that action if the key has been defined as an object or display key as well. When you press the key, the action of the object or display key will be triggered instead.

If a key that triggers an action in an embedded RSView32 OLE object has been defined as a global key, pressing that key will trigger both the action defined for the embedded object and the action defined for the global key.

Precedence and embedded non–RSView32 OLE objects

For non–RSView32 embedded OLE objects (for example, an Excel worksheet), a key that triggers an action in the embedded object will trigger only that action, even if it has also been defined as an object or display key. In this case, the action defined for the object or display will not be triggered at all.

If a key that triggers an action in an embedded non–RSView32 OLE object has been defined as a global key, pressing that key will trigger both the action defined for the embedded object and the action defined for the global key.

Reserved keys

The following keys and key combinations are normally reserved for use by Windows® and RSView32.

This reserved key	Does this
+ on the numeric keypad	Displays the Recipe dialog box, or saves the recipe if Ctrl-W was pressed previously, or restores the recipe if Ctrl-R was pressed previously.
Enter	If Enter is pressed when a button has focus, the button's press and release actions are executed. If Enter is pressed when an input field has focus, the field's value is downloaded to the PLC. If the input field is configured to display the on–screen keyboard, pressing Enter displays the on–screen keyboard. If Enter is pressed when a recipe field has focus, the Recipe dialog box is displayed. If Ctrl-W was pressed previously, the recipe is saved. If Ctrl-R was pressed previously, the recipe is restored. If the recipe field is configured to display the on–screen keyboard, pressing Enter displays the on–screen keyboard.
Tab	Moves focus to the object with the next highest index number.
Shift–Tab	Moves focus to the object with the next lowest index number.
Ctrl–Up Arrow, Ctrl–Left Arrow, Ctrl–Down Arrow, Ctrl–Right Arrow	Moves focus to an object in the direction in which the arrow points.
PgUp	Uploads data into all input fields.
Ctrl–PgUp	Uploads data into the selected input field.
PgDn	Downloads data from all input fields.
Ctrl–PgDn	Downloads data from the selected input field.
Ctrl–R	Sets input focus to the recipe object, and prepares for a recipe restore.
Ctrl–W	Sets input focus to the recipe object, and prepares for a recipe save.
Up Arrow, Down Arrow	Moves the selection bar on the Object Key menu.

This reserved key	Does this
Left Arrow, Right Arrow	Moves the cursor one position left or right.
Esc	Closes the Object Key menu, or exits the input mode of a continuously–updating input field.
Backspace	Deletes the character to the left of the cursor.
Del	Deletes the character to the right of the cursor.
Shift–End–Delete	Deletes all characters from the cursor position to the end of the line.
Home–Shift–End–Delete	Deletes the contents of the input field.
Ctrl–C or Ctrl–Ins	Copies the selected items to the clipboard
Ctrl-X or Shift–Del	Cuts the selected items and places them in the clipboard.
Ctrl–V or Shift–Ins	Pastes the contents of the clipboard at the current cursor position.
Home	Positions the cursor at the beginning of the data entry field.
Ctrl–Alt–P	Toggles the Project Manager.
Ctrl–F4, or Ctrl–Shift–F4	Closes the active window.
Ctrl–F6	Moves focus to the next window.
Ctrl–Shift–F6	Moves focus to the previous window.

If you define a press, release, or repeat action for a reserved key, to use the key as an object or display key, the object or display key function takes precedence, and the default, reserved function of that key is disabled.

For example, you might want to evaluate the contents of an input field using a VBA program before you download the input field's value to a PLC. To do this, create an object key for the input object, and assign the VBAExec command to the press action of the Enter key. To do this for all input objects on the display, create a display key for the PgDn key, and assign the VBAExec command to the key's press action.

If you use a reserved key or key combination as a global key, the key will perform both the actions of the global key you defined, as well as the action of the reserved key. Because the results can be unpredictable, defining global key actions for reserved keys is not recommended.

Tips for using keys

Keys with repeat actions are ideal for such tasks as 'ramping' a tag's value.

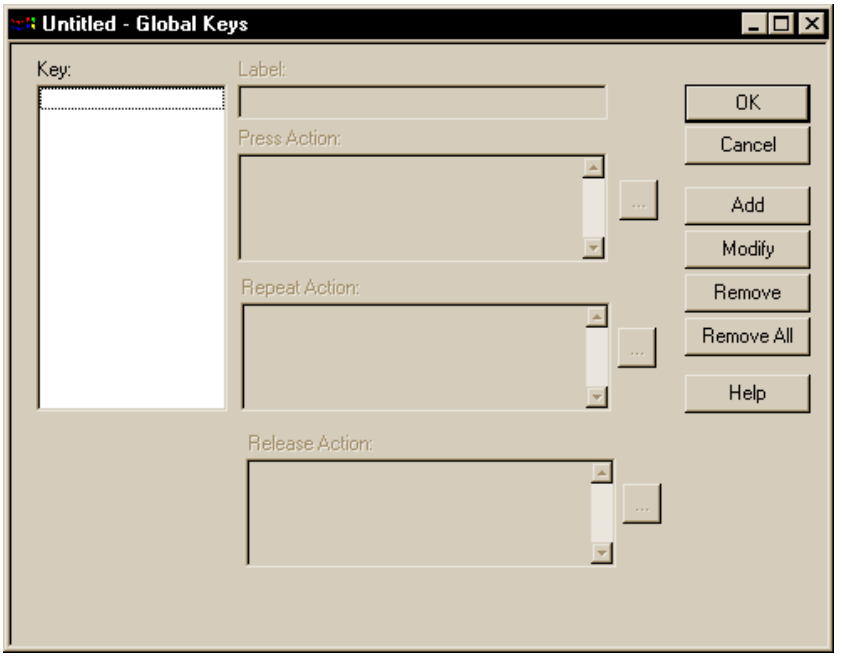
To define keys for running VBA programs or macros, define press actions and release actions only. Repeat actions could produce unexpected results, or could flood the system with VBA programs or macros, if the operator is unsure about whether pressing the key triggered the desired action, and then presses the key repeatedly or holds it down.

Creating global keys

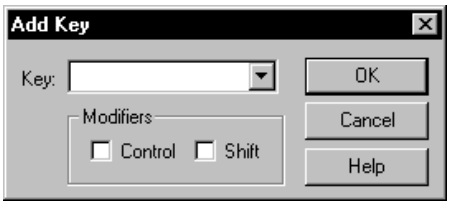
A global key is a key that has been assigned commands or macros. At runtime, when the key is pressed, the assigned action is triggered. A global key is active at all times because it is not associated with a particular graphic object or display.

To create a global key:

1. In the Project Manager, open the Logic and Control folder.
2. Open the Global Keys editor by doing one of the following:
   - double–click the Global Keys icon
   - right–click the Global Keys icon and then click New



3. Click Add.



4. Specify a key and, if desired, click one or both modifiers.

Some keys are reserved for use by Windows and RSView32. Reserved keys do not appear in the Key field in the Add Key dialog box.

5. Click OK.

   The key you add is displayed in the Key field. If you specified a modifier, the first letter of that modifier is also displayed. If you create a label in the next step, it will also be listed in this field. As you continue to add keys, they will be listed here.

6. In the Label field, if you want, type a label for the key.

7. In the Press Action field and, if desired, in the Release Action field, specify an RSView32 command or a macro by typing it or by clicking the ... button to open the Command Wizard and choose it. The command or macro is the action that will occur when the key is pressed or released. You can type multiple commands or macros. If you do, separate them with a semi–colon (;) or type them on separate lines.

8. If you want an action to repeat while the key is held down, type the RSView32 command or macro name in the Repeat Action field.

   The repeat action repeats at the rate specified in the Keyboard properties of the Windows Control Panel.

9. Click OK to save the global key file.

Running global key files

Use the RSView32 Key command to run global key files. Type this command in a macro or anywhere else you can use an RSView32 command.

IMPORTANT You cannot run more than one global key file at a time. If you try to run more than one file, the files are not merged. Instead, the second file overrides the first file.

To start running a global key file, do one of the following:

- In the Startup editor, select the Global Key File check box and specify the file you want to run
- On the command line or in a macro, type:

  Key <*file*>

<*file*>	the name of the global key file without an extension

To stop running a global key file:

- On the command line or in a macro, type:

  Key /R

/R	removes all key definitions

For a complete list of RSView32 commands and command syntax, see Appendix A, *RSView32 commands*, or see Help.

Chapter

16 Sharing data with other Windows applications

Methods for sharing data

RSView32™ is based on standards that allow data to be accessed and shared among Windows® applications. With RSView32, you can:

- retrieve historical data using other Windows applications

  RSView32 stores all historical data in dBASE® IV (.dbf) format, so you can access data from log files using any software that supports this file format. With data logs, you also have the option of storing the data in ODBC-compliant databases. With activity logs and alarm logs, you can optionally send the data to an ODBC-compliant database.

  This chapter includes a procedure for accessing data from activity, alarm, and data log files. It also shows one way to display historical data using a pivot table created in Microsoft® Excel.

- access and update tag values

  RSView32 works as a DDE (Dynamic Data Exchange) server and client, as well as an OPC® (OLE for Process Control) server and client. This means you can exchange tag values with a wide range of devices and other Windows applications.

  You can also use the RSView32 Object Model to read and write tag values, or to execute RSView32 commands from another application. For more information about using the RSView32 Object Model, see *Getting Results with* RSView32*,* and see Help.

This chapter describes how to set up RSView32 as a *local* server or client for OPC and DDE, and includes an example of setting up RSView32 as a DDE server that provides data to a Microsoft Excel worksheet.

See Chapter 17, *Using networks*, for information about setting up RSView32 as a server or client on a network.

- use other Windows tools to manage tag databases

  RSView32 stores tag and alarm information in a format that is ODBC–compatible. This means you can use another Windows application—such as Microsoft Access—to create a front end for managing your tag database.

- visually integrate with other Windows products

  RSView32 supports object linking and embedding (OLE 2.0) so you can link to other applications as well as files created in other applications.

  With this feature, you can:

  - provide management information from a remote database by embedding a Microsoft Excel chart
  - allow operators to enter shift data into an external database by activating an embedded database form
  - embed any OLE 2.0 server application that meets your specific needs

  You can link or embed OLE objects in the Graphic Display editor. For details, see Chapter 11, *Creating graphic displays*.

- insert an ActiveX® object into a graphic display and link the object to an RSView32 tag

  For details, see Chapter 11, *Creating graphic displays* and Chapter 12, *Animating graphic objects*.

Retrieving historical data

All logged data is stored in files in dBASE IV or ODBC table format, so you can retrieve data from log files using any software that reads these formats. (ODBC format is available for data logs only, not alarm or activity logs, unless you send the alarm log or activity log data to an ODBC database online.) Many software products are available for retrieving and analyzing data. This chapter briefly describes how to bring data from .dbf log files into Microsoft Excel. It also describes how to create a pivot table using .dbf data from data log files.

For information about how alarm log files are named, see page 6-31. For information about how the dBASE IV data log files are named, see page 7-5. For information about how ODBC data log tables and backup files are named, see page 7-9. For information about how activity log files are named, see page 8-10. For information about how to send activity log data or alarm log data to an ODBC database, see page 6-32.

Before retrieving data, consider how the data will be used. This will help you choose the best method for retrieving it. For example, you can bring .dbf data from log files directly into Microsoft Excel. However, it might be more valuable to limit the data you retrieve. Suppose you want to examine the values of certain tags over time. To do that, you could perform a query (with Microsoft Query) using tag names and time as criteria so you retrieve only relevant data.

For detailed information about working in Microsoft Excel and Microsoft Query, see your Microsoft documentation.

Retrieving tag names from data log files

For data log models, RSView32 often uses an index file or table for tag names. The file or table contains a list of all the tags used in the model, together with an index number for each tag. Other data log files or tables use the index number rather than the full tag name.

This storage format	Stores tag information in this file or table
dBASE IV with short file names	YYMMDDnt.dbf, where the t indicates this is the tag name file. This file is used for the wide .dbf storage format only if tag names are greater than 10 characters long.
dBASE IV with long file names	YYYY MM DD NNNN <*Log File Identifier String*> Tagname.dbf This file is used for the wide .dbf storage format only if tag names are greater than 10 characters long.
ODBC	TagTable This is the default name for the table. You can change the name. Use of this table is optional. If this table isn't used, RSView32 stores the full tag name in the FloatTable or StringTable.

When retrieving information from data log files, you will likely want the tag names—not the tag index. Therefore, you may have to retrieve data from more than one file or table. To do this, you have to *join* the tables. For information about joining tables, see "Joining tables and selecting data" on page 16-22.

Bringing logged dBASE IV data into Microsoft Excel

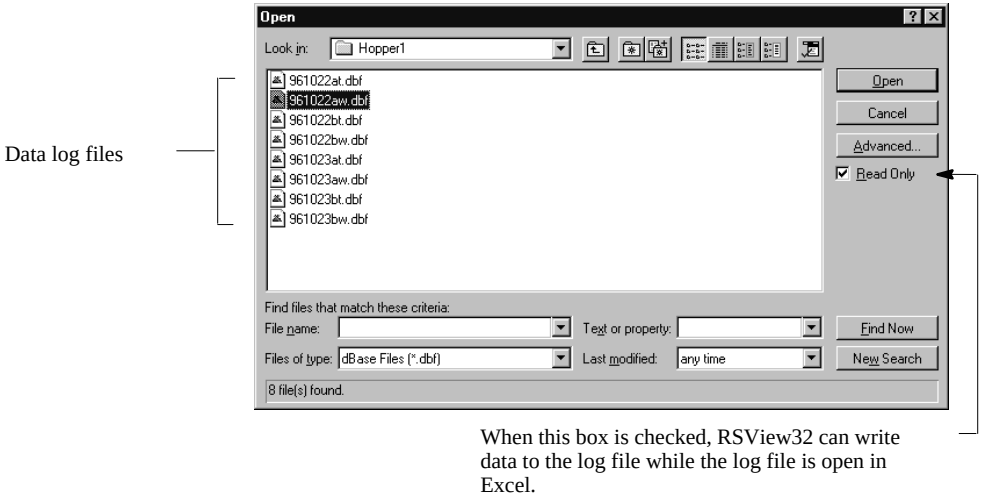
Use the following procedure to bring the information from dBASE IV log files into Microsoft Excel.

1. Open Microsoft Excel.
2. On the File menu, click Open.
3. In the List Files of Type field, click dBase Files (*.dbf).

4. In the “Look in” field, choose a project directory and the subdirectory containing the log files.

   If you used the default logging paths when setting up logging, the files will be in the following subdirectories (substitute the drive and project name you used for C: and Example):

   - activity log files—C:\Example\Actlog
   - alarm log file—C:\Example\Almlog
   - data log file—C:\Example\Dlglog\Model name



5. Select a .dbf file.

6. To allow RSView32 to continue writing data to the log file while the file is open in Microsoft Excel, select the Read Only check box.

   If the Read Only check box is not selected, RSView32 cannot write to the log file. If the Error category is selected in the Activity Log Setup editor, an error is reported in the activity bar and in the activity log file.

7. Click OK.

   The contents of the log file appear in the spreadsheet.

961022aw.dbf [Read-Only]

	A	B	C	D	E	F	G	H	I	J	K	L
1	Date	Time	Marker	0	Sts_00	1	Sts_01	2	Sts_02	3	Sts_03	
2	10/22/96	17:51:21.116	B	1		10.00000000		860.00000000		50.00000000		
3	10/22/96	17:51:31.170		1		10.00000000		860.00000000		50.00000000		
4	10/22/96	17:51:41.175		1		10.00000000		860.00000000		50.00000000		
5	10/22/96	17:51:51.179		1		10.00000000		860.00000000		50.00000000		
6	10/22/96	17:52:01.183		1		10.00000000		860.00000000		50.00000000		
7	10/22/96	17:52:11.188		0		10.00000000		860.00000000		50.00000000		
8	10/22/96	17:52:21.192		0		40.00000000		860.00000000		50.00000000		
9	10/22/96	17:52:31.196		0		40.00000000		860.00000000		50.00000000		
10	10/22/96	17:52:41.201		0		40.00000000		860.00000000		50.00000000		

961022AW

This is a wide-format data log file. This format has multiple tag values per time stamp.

Understanding the content of the log files

Following is a description of the contents of the activity, alarm, and data log files. Unless otherwise indicated, the illustrations show log files that have been opened in Microsoft Excel.

Activity log files

19990205BI.DBF

	A	B	C	D	E	F	G	H	I	J	K	L
1	Type	Id	Date	Time	Militim	DstFlag	Category	Source	User	Dscrptn	UserStn	LoggingStn
2	2	0	05/02/99	10:54:41	987	0	Commands	Command Server	DEFAULT	display Demos		PRODUCTION
3	2	0	05/02/99	10:54:42	508	0	Commands	Command Server	DEFAULT	suppresson paper*		PRODUCTION
4	2	0	05/02/99	10:54:43	79	0	Commands	Command Server	DEFAULT	suppresson process*		PRODUCTION
5	2	0	05/02/99	10:54:43	419	0	Commands	Command Server	DEFAULT	alarmon		PRODUCTION
6	2	8388910	05/02/99	10:54:43	960	0	Applications	Alarm Quarterback	DEFAULT	Alarm activation has completed.		PRODUCTION
7	2	0	05/02/99	10:54:43	990	0	Commands	Command Server	DEFAULT	derivedon paper		PRODUCTION
8	2	130	05/02/99	10:54:45	923	0	Applications	Derived Tags Runtime	DEFAULT	Starting Derived Tags File - 'D:\Progr		PRODUCTION

19990205BI

This column	Contains
Type	The number of the activity type. The numbers are: 0 for error, 1 for warning, and 2 for information.
Id	The number of the RSView32 component that sent the log message. This number is for RSView32 internal use only.
Date	The date the activity occurred. The date format is specified by the Regional Settings in the Windows Control Panel.
Time	The time the activity occurred. The time format is specified by the Regional Settings in the Windows Control Panel.
Militime	The number of milliseconds.
DstFlag	The Daylight Savings Time (DST) flag, where 1 means DST is in effect and 0 means DST is not in effect. This number is for RSView32 internal use only
Category	The activity category. For a description of these categories, see page 8-13.
Source	The RSView32 component that generated the activity.
User	The user that was logged on when the activity occurred.
Dscrptn	The description of the activity.
UserStn	For future use.
LoggingStn	The name of the computer on which the logging server is running.

Activity log—ODBC format

ODBC format activity log data uses one table. The illustrations show ODBC tables that have been opened in Microsoft Query. For more information about how the log files are named, see "The ODBC storage format" on page 7-8.

Type	Id	DateAndTime	Millitm	DstFlag	Category	Source	UserId	Dscrptn	UserStn	LoggingStn
2	0	1999-02-05 01:54:41.000	987	0	Commands	Command Server	DEFAULT	display Demos		PRODUCTION
2	0	1999-02-05 01:54:42.000	508	0	Commands	Command Server	DEFAULT	suppresson paper*		PRODUCTION
2	0	1999-02-05 01:54:43.000	79	0	Commands	Command Server	DEFAULT	suppresson process*		PRODUCTION
2	0	1999-02-05 01:54:43.000	419	0	Commands	Command Server	DEFAULT	alarmon		PRODUCTION
2	8388910	1999-02-05 01:54:43.000	960	0	Applications	Alarm Quarterback	DEFAULT	Alarm activation has completed.		PRODUCTION
2	0	1999-02-05 01:54:43.000	990	0	Commands	Command Server	DEFAULT	derivedon paper		PRODUCTION

This column	Contains	SQL Data Type	Length
Type	The number of activity type: 0 for error, 1 for warning, 2 for information.	SQL_SMALLINT or SQL_INTEGER	2 or 4
Id	The number of the RSView32 component that sent the log message (for RSView32 internal use only).	SQL_INTEGER	4
DateAndTime	The time and date data was logged.	SQL_TIMESTAMP	Driver dependent
Millitm	Millisecond time when data was logged.	SQL_SMALLINT or SQL_INTEGER	2 or 4
DstFlag	The Daylight Savings Time (DST) flag, where 1 means DST is in effect and 0 means DST is not in effect (for RSView32 internal use only).	SQL_VARCHAR or SQL_CHAR	1
Category	The activity category.	SQL_VARCHAR or SQL_CHAR	20
Source	The RSView32 component that generated the activity.	SQL_VARCHAR or SQL_CHAR	20
UserID	The user that was logged on when the activity occurred.	SQL_VARCHAR or SQL_CHAR	20
Dscrptn	The description of the activity.	SQL_VARCHAR or SQL_CHAR	132

This column	Contains	SQL Data Type	Length
UserStn	For future use.	SQL_VARCHAR or SQL_CHAR	15
LoggingStn	The name of the computer on which the logging server is running.	SQL_VARCHAR or SQL_CHAR	15

Alarm log files

19990205BL.DBF

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	Date	Time	Militime	TransType	TagName	TagValue	TagType	ThreshVal	ThreshNum	ThreshLabl	Severity	DstFlag	UserId	AlarmType
2	05/02/99	11:10:06	527	SupOn	Process\Batch_Tank\PV	0.0000000000	D	0.0000000000	0		0	N	DEFAULT	7
3	05/02/99	11:10:06	547	SupOn	Process\Ingred1\SUP_PV	0.0000000000	D	0.0000000000	0		0	N	DEFAULT	7
4	05/02/99	11:10:06	677	SupOn	Process\Ingred2\SUP_PV	0.0000000000	D	0.0000000000	0		0	N	DEFAULT	7
5	05/02/99	11:10:06	727	SupOn	Process\Ingred3\SUP_PV	0.0000000000	D	0.0000000000	0		0	N	DEFAULT	7
6	05/02/99	11:10:13	276	SupOf	Process\Batch_Tank\PV	0.0000000000	D	0.0000000000	0		0	N	DEFAULT	8
7	05/02/99	11:10:13	296	SupOf	Process\Ingred1\SUP_PV	0.0000000000	D	0.0000000000	0		0	N	DEFAULT	8
8	05/02/99	11:10:13	317	SupOf	Process\Ingred2\SUP_PV	0.0000000000	D	0.0000000000	0		0	N	DEFAULT	8

19990205BL

19990205BL.DBF

	H	I	J	K	L	M	N	O	P	Q
1	ThreshVal	ThreshNum	ThreshLabl	Severity	DstFlag	UserId	AlarmType	Dscription	UserStn	LoggingStn
2	0.0000000000	0		0	N	DEFAULT	7	2/5/99 11:10:06 SupOn Tag Process\Batch_Tank\PV		PRODUCTION
3	0.0000000000	0		0	N	DEFAULT	7	2/5/99 11:10:06 SupOn Tag Process\Ingred1\SUP_PV		PRODUCTION
4	0.0000000000	0		0	N	DEFAULT	7	2/5/99 11:10:06 SupOn Tag Process\Ingred2\SUP_PV		PRODUCTION
5	0.0000000000	0		0	N	DEFAULT	7	2/5/99 11:10:06 SupOn Tag Process\Ingred3\SUP_PV		PRODUCTION
6	0.0000000000	0		0	N	DEFAULT	8	2/5/99 11:10:13 SupOf Tag Process\Batch_Tank\PV		PRODUCTION
7	0.0000000000	0		0	N	DEFAULT	8	2/5/99 11:10:13 SupOf Tag Process\Ingred1\SUP_PV		PRODUCTION
8	0.0000000000	0		0	N	DEFAULT	8	2/5/99 11:10:13 SupOf Tag Process\Ingred2\SUP_PV		PRODUCTION

19990205BL

This column	Contains
Date	The date the alarm was generated.
Time	The time the alarm was generated.
Militime	The number of milliseconds.

This column	Contains
TransType	The type of alarm that was generated. The types are: InAlmIn Alarm (severities 1 through 8) OutAlmOut of Alarm AckedAcknowledged RmAckRemote Acknowledged InFltIn Fault OutFltOut of Fault SupOnSuppress On SupOfSuppress Off
TagName	The name of the tag or alarm event that caused the alarm.
TagValue	The value of the tag at the time the alarm occurred.
TagType	The type of tag in alarm: A for analog, D for digital, S for string.
ThreshVal	The threshold value.
ThreshNum	The threshold number.
ThreshLabl	The threshold label.
Severity	The alarm severity (1 is highest severity and 8 is lowest severity).
DstFlag	The Daylight Savings Time (DST) flag, where Y means DST is in effect and N means DST is not in effect. This number is for RSView32 internal use only.
UserId	The user that was logged on when the alarm occurred.
AlarmType	The number RSView32 assigns to the transaction type.
Dscription	The message that is associated with the transaction (alarm) type.

This column	Contains
UserStn	For future use.
LoggingStn	The name of the computer on which the logging server is running.

Alarm log files—ODBC format

ODBC format alarm log data uses one table. The illustrations show ODBC tables that have been opened in Microsoft Query. For more information about how the log files are named, see "The ODBC storage format" on page 7-8.

DateAndTime	Millitm	TransType	TagName	TagValue	TagType	ThreshVal	ThreshNum	ThreshLabl	Severity	DstFlag	UserId
1999-02-05 11:01:32.00	734	InAlm	Process\Ingred1\SUP_PV	4.0	A	5.0	1	LOLO	1	N	DEFAULT
1999-02-05 11:01:32.00	404	Acked	Process\Ingred1\SUP_PV	0.0	D	0.0	0		0	N	DEFAULT
1999-02-05 11:01:33.00	415	Acked	Process\Ingred1\SUP_PV	0.0	D	0.0	0		0	N	DEFAULT
1999-02-05 11:01:35.00	308	Acked	Process\Batch_Tank\PV	0.0	D	0.0	0		0	N	DEFAULT
1999-02-05 11:01:36.00	400	InAlm	Process\Ingred2\SUP_PV	13.0	A	15.0	2	LO	2	N	DEFAULT
1999-02-05 11:01:38.00	653	InAlm	Process\Ingred2\SUP_PV	4.0	A	5.0	1	LOLO	1	N	DEFAULT

ThreshNum	ThreshLabl	Severity	DstFlag	UserId	AlarmType	Dscription	UserStn	LoggingStn
1	LOLO	1	N	DEFAULT	1	2/5/99 11:10:32 InAlm Tag Process\Ingred1\SUP_PV		PRODUCTION
0		0	N	DEFAULT	5	2/5/99 11:10:32 Acked Tag Process\Ingred1\SUP_PV		PRODUCTION
0		0	N	DEFAULT	5	2/5/99 11:10:33 Acked Tag Process\Ingred1\SUP_PV		PRODUCTION
0		0	N	DEFAULT	5	2/5/99 11:10:35 Acked Tag Process\Batch_Tank\PV		PRODUCTION
2	LO	2	N	DEFAULT	1	2/5/99 11:10:36 InAlm Tag Process\Ingred2\SUP_PV		PRODUCTION
1	LOLO	1	N	DEFAULT	1	2/5/99 11:10:38 InAlm Tag Process\Ingred2\SUP_PV		PRODUCTION

This column	Contains	SQL Data Type	Length
DateAndTime	The time and date the alarm was generated.	SQL_TIMESTAMP	Driver dependent
Millitm	The millisecond time when the alarm transaction was generated.	SQL_SMALLINT or SQL_INTEGER	2 or 4
TransType	The type of alarm that was generated.	SQL_VARCHAR or SQL_CHAR	5
TagName	The name of the tag or alarm event that caused the alarm.	SQL_VARCHAR or SQL_CHAR	255
TagValue	The value of the tag at the time the alarm occurred.	SQL_DOUBLE or SQL_INTEGER or SQL_SMALLINT	8 or 4 or 2

This column	Contains	SQL Data Type	Length
TagType	The type of the tag in alarm: A for analog, D for digital.	SQL_VARCHAR or SQL_CHAR	1
ThreshVal	The threshold value.	SQL_DOUBLE or SQL_INTEGER or SQL_SMALLINT	8 or 4 or 2
ThreshNum	The threshold number.	SQL_SMALLINT or SQL_INTEGER	2 or 4
ThreshLabl	The threshold label.	SQL_VARCHAR or SQL_CHAR	20
Severity	The alarm severity.	SQL_SMALLINT or SQL_INTEGER	2 or 4
DstFlag	The Daylight Savings Time (DST) flag, where Y means DST is in effect and N means DST is not in effect (for RSView32 internal use only).	SQL_VARCHAR or SQL_CHAR	1
UserID	The user that was logged in when the alarm occurred.	SQL_VARCHAR or SQL_CHAR	20
AlarmType	The number RSView32 assigns to the transaction type.	SQL_SMALLINT or SQL_INTEGER	2 or 4
Dscription	The message that is associated with the transaction (alarm) type, the log message for the alarm event, or the alarm log remark.	SQL_VARCHAR or SQL_CHAR	132
UserStn	For future use.	SQL_VARCHAR or SQL_CHAR	15
LoggingStn	The name of the computer on which the logging server is running.	SQL_VARCHAR or SQL_CHAR	15

If the ODBC database doesn't support the SQL_TIMESTAMP data type, then the data may be truncated. For example, the Oracle® ODBC driver does not support the SQL_TIMESTAMP type. Use SQL_DATE instead to store both the date and time without truncating the data in Oracle.

Data log files—narrow .dbf format

Narrow .dbf format log files are created in sets of three. For more information about .dbf data log files, see "The .dbf file format" on page 7-3.

Floating point and string data

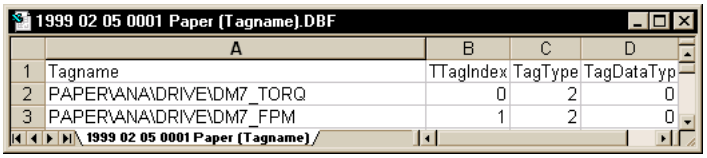
Log files for floating and string data are the same except one contains analog and digital tag data and the other contains string tag data.

	A	B	C	D	E	F	G
1	Date	Time	TagIndex	Value	Status	Marker	Internal
2	9/24/96	13:58:35.480	0	33.00000000		B	____
3	9/24/96	13:58:52.510	1	55.00000000		B	____
4	9/24/96	13:58:55.360	2	33.00000000		B	____
5	9/24/96	13:58:48.390	3	98.00000000		B	____

This column	Contains
Date	The date the tag values were logged.
Time	The time the tag values were logged.
TagIndex	The index number for the tag. The tag name that corresponds to this number is listed in the tag name file.
Value	The analog, digital, or string value of the tag.
Status	Blank if communications are working properly. D if a node is disabled. E if a communication error occurred while RSView32 was trying to acquire the tag value. S if the tag value is stale; that is, if the value has been acquired before but has not been updated. U if the tag is uninitialized.

This column	Contains
Marker	B when the DataLogOn command was issued and logging began. E when the DataLogOff command was issued and logging ended. S when the DataLogSnapshot command was issued.
Internal	Information relevant to RSView32 only.

Tag name



1999 02 05 0001 Paper (Tagname).DBF

	A	B	C	D
1	Tagname	TTagIndex	TagType	TagDataTyp
2	PAPER\ANA\DRIVE\DM7_TORQ	0	2	0
3	PAPER\ANA\DRIVE\DM7_FPM	1	2	0

1999 02 05 0001 Paper (Tagname)

This column	Contains
TagName	The tag name.
TTagIndex	The index number assigned to the tag name.
TagType	The tag type: 2—analog tag 3—digital tag 4—string tag
TagDataTyp	The tag data type: 0—long 1—float 2—string

Data log files—wide .dbf format

Wide .dbf format data log files are created in sets of two. For more information about .dbf data log files, see "The .dbf file format" on page 7-3.

Floating point and string data

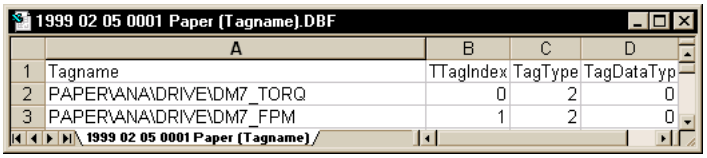
Tag name or index | Status | Tag values

	A	B	C	D	E	F	G	H	I	J	K
1	Date	Time	Marker	0	Sts_00	1	Sts_01	2	Sts_02	3	Sts_03
2	9/24/96	16:04:53.830	B	80.00000000		77.00000000		90.00000000		99.00000000	
3	9/24/96	16:05:03.820		80.00000000		77.00000000		90.00000000		99.00000000	
4	9/24/96	16:05:13.870		45.00000000		77.00000000		90.00000000		99.00000000	
5	9/24/96	16:05:23.930		45.00000000		77.00000000		90.00000000		45.00000000	
6	9/24/96	16:05:33.920		33.00000000		77.00000000		34.00000000		45.00000000	

This column	Contains
Date	The date the tag values were logged.
Time	The time the tag values were logged.
Marker	B when the DataLogOn command was issued and logging began. E when the DataLogOff command was issued and logging ended. S when the DataLogSnapshot command was issued.
Tag name/ Tag index	The tag name, if the name is 10 characters or less. Otherwise, contains the index number for the tag. The tag name that corresponds to the number is listed in the tag name file.

This column	Contains
Status	D if a node is disabled. E if a communication error occurred while RSView32 was trying to acquire the tag value. S if the tag value is stale; that is, if the tag value was acquired but has not been updated. U if the tag is uninitialized. Blank if communications are working properly.
Tag values	The analog, digital, or string values for the tag.

Tag name



1999 02 05 0001 Paper (Tagname).DBF

	A	B	C	D
1	Tagname	TTagIndex	TagType	TagDataTyp
2	PAPER\ANA\DRIVE\DM7_TORQ	0	2	0
3	PAPER\ANA\DRIVE\DM7_FPM	1	2	0

1999 02 05 0001 Paper (Tagname)

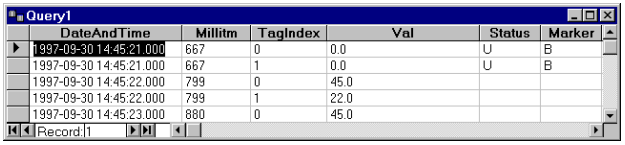
This column	Contains
Tagname	The tag name.
TTagIndex	The index number assigned to the tag name.
TagType	The tag type: 2—analog tag 3—digital tag 4—string tag
TagDataTyp	The tag data type: 0—long 1—float 2—string

Data log—ODBC format

ODBC format log data uses up to three tables. The illustrations show ODBC tables that have been opened in Microsoft Query. For more information, see "The ODBC storage format" on page 7-8.

Floating point and string data

Log tables for floating and string data are the same except one contains analog and digital tag data and the other contains string tag data.



Query1

DateAndTime	Millitm	TagIndex	Val	Status	Marker
1997-09-30 14:45:21.000	667	0	0.0	U	B
1997-09-30 14:45:21.000	667	1	0.0	U	B
1997-09-30 14:45:22.000	799	0	45.0		
1997-09-30 14:45:22.000	799	1	22.0		
1997-09-30 14:45:23.000	880	0	45.0		

Record: 1

This column	Contains	SQL Data Type	Length
DateAndTime	The date and time the tag values were logged.	SQL_TIMESTAMP	Driver dependent
Millitm	The millisecond time the tag values were logged.	SQL_SMALLINT *or* SQL_INTEGER	4
TagIndex *or*	The index number for the tag. The tag name that corresponds to this number is listed in the tag name table.	SQL_SMALLINT *or* SQL_INTEGER	2 *or* 4
TagName	If the tag table isn't used, the tag name appears in this column.	SQL_VARCHAR *or* SQL_CHAR	255
Val	The analog or digital value of the tag.	SQL_DOUBLE *or* SQL_INTEGER *or* SQL_SMALLINT	8 *or* 4 *or* 2
	The string value of the tag.	SQL_VARCHAR *or* SQL_CHAR	255

This column	Contains	SQL Data Type	Length
Status	Blank if communications are working properly. D if a node is disabled. E if a communication error occurred while RSView32 was trying to acquire the tag value. S if the tag value is stale; that is, if the value has been acquired before but has not been updated. U if the tag is uninitialized.	SQL_VARCHAR *or* SQL_CHAR	1
Marker	B when the DataLogOn command was issued and logging began. E when the DataLogOff command was issued and logging ended. S when the DataLogSnapshot command was issued.	SQL_VARCHAR *or* SQL_CHAR	1

Tag name

	TagName	TagIndex	TagType	TagDataType
	system\Minute	0	2	0
	system\Second	1	2	0

This column	Contains	SQL Data Type	Length
TagName	The tag name.	SQL_VARCHAR *or* SQL_CHAR	255
TagIndex	The index number assigned to the tag name.	SQL_SMALLINT *or* SQL_INTEGER	2
TagType	The tag type: 2—analog tag 3—digital tag 4—string tag	SQL_SMALLINT	1
TagDataType	The tag data type: 0—long 1—float 2—string	SQL_SMALLINT	2

Creating a pivot table in Microsoft Excel

Use a pivot table to display and analyze data from any narrow–format .dbf log file.

The basic steps for creating a pivot table are:

- Open Microsoft Excel and start the PivotTable® Wizard
- Select the data source
- Join tables and select data
- Organize the pivot table

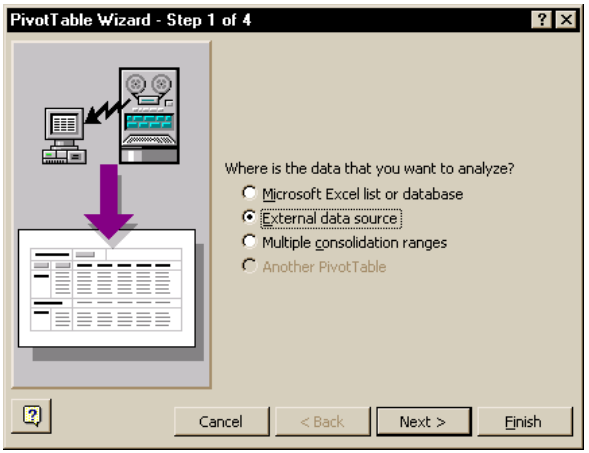
Once you have created the pivot table, you can then display the data in a chart. This additional step is also described.

Starting the PivotTable Wizard

1. Open Microsoft Excel.
2. On the Data menu, click PivotTable Report.

   If you did not install the Microsoft Office Data Access components, the PivotTable Report item cannot be selected from the Data menu in Excel.

   The PivotTable Wizard appears.



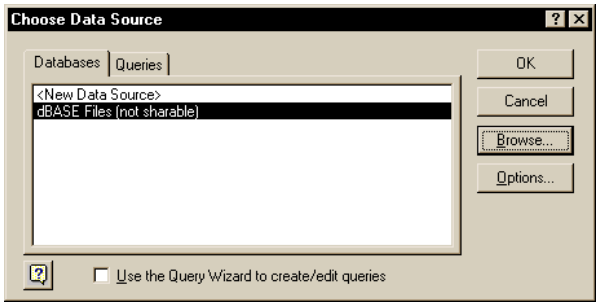
Selecting the data source

1. In the PivotTable Wizard, click External Data Source, and then click Next.

   Step 2 of the PivotTable Wizard appears.

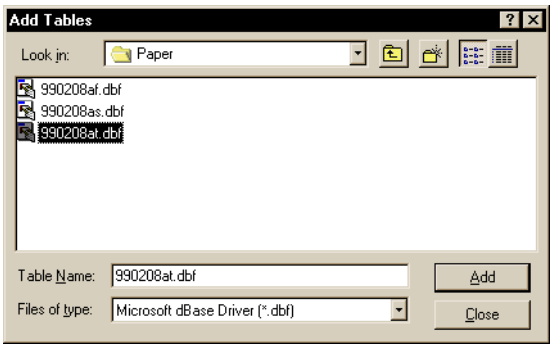
2. Click Get Data.

   This brings up Microsoft Query and the Select Data Source dialog box. This dialog box displays a list of the available data sources. If the ODBC data source you want to use (in this case, dBASE Files) is *not* listed, you can add it by clicking the Browse button and selecting a data source from the Program Files\Common Files\Odbc\Data Sources directory.



3. Click dBASE Files (not sharable), and then click OK.

   The Add Tables dialog box appears.



4. In the “Look in” field, choose a project directory. Then choose the directory containing the data log files.

   If you used the default logging path, the files will be in C:\Proj1\Dlglog\Model name, where Proj1 is the name of your project and Model name is the name of the data log model.

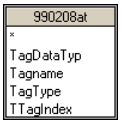
5. Under Table Name, choose the file with a “t” before the .dbf extension. For example: 990208at.dbf.

   The “t” stands for tag name. It is important to select this file first because it supplies the tag names for the other files.

   The dBASE IV ODBC driver will not read files with long file names. If you see the error message “Invalid string or buffer length” after selecting a file, copy the file to a path that does not contain long file names (for example, c:\data), and rename it, using a short (8.3–character) file name. If you rename the file without copying it, Trend objects will not be able to find the data in the file.

6. Click Add.

   The table appears as a field list at the top of the Query window.



7. Choose *one* other file—either floating point data “f” or string data “s”.

8. Click Add. The new field list appears beside the first field list.

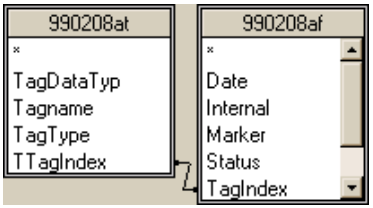
Joining tables and selecting data

For narrow format .dbf files, the tag name file contains tag names and index numbers. Each tag you create in the tag database is assigned an index number. The tag index number is stored in the floating point and string files; the tag name is not stored.

When retrieving data from log files, you will likely want the tag names—not the tag index. Therefore, you have to retrieve data from more than one table. To do this, you have to *join* tables. When you join tables, you connect one or more fields in the tables. These fields must have the same name and must contain the same type of data.

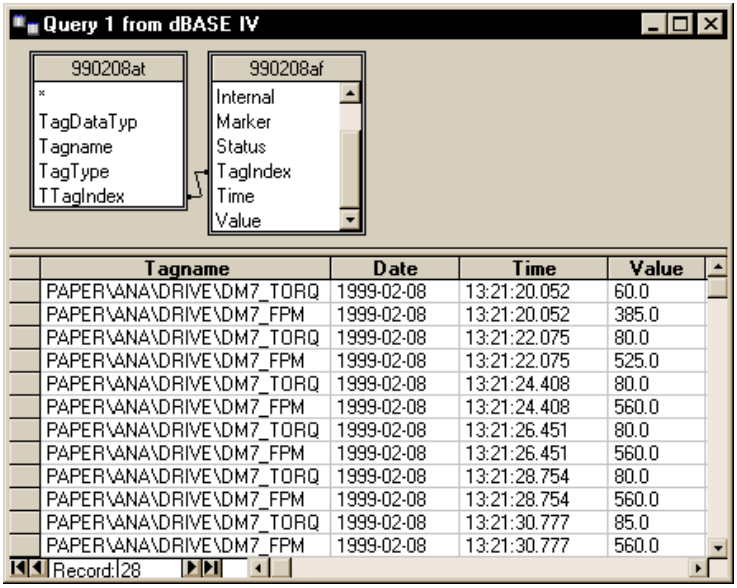
1. Join the TTagindex field in the tag name field list to the Tagindex field in the other list.

When you drag TTagindex from one table to the equivalent field in the other table, a join is formed.



2. Select the fields in the floating point or string list that you want data for. You can select the fields in any order.

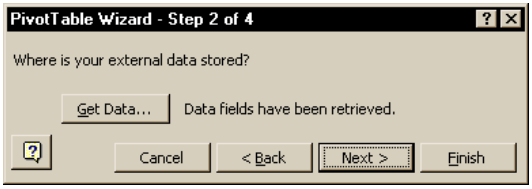
   To select fields, double–click them. The data for that field will appear in the Query spreadsheet.



Tagname	Date	Time	Value
PAPER\ANA\DRIVE\DM7_TORQ	1999-02-08	13:21:20.052	60.0
PAPER\ANA\DRIVE\DM7_FPM	1999-02-08	13:21:20.052	385.0
PAPER\ANA\DRIVE\DM7_TORQ	1999-02-08	13:21:22.075	80.0
PAPER\ANA\DRIVE\DM7_FPM	1999-02-08	13:21:22.075	525.0
PAPER\ANA\DRIVE\DM7_TORQ	1999-02-08	13:21:24.408	80.0
PAPER\ANA\DRIVE\DM7_FPM	1999-02-08	13:21:24.408	560.0
PAPER\ANA\DRIVE\DM7_TORQ	1999-02-08	13:21:26.451	80.0
PAPER\ANA\DRIVE\DM7_FPM	1999-02-08	13:21:26.451	560.0
PAPER\ANA\DRIVE\DM7_TORQ	1999-02-08	13:21:28.754	80.0
PAPER\ANA\DRIVE\DM7_FPM	1999-02-08	13:21:28.754	560.0
PAPER\ANA\DRIVE\DM7_TORQ	1999-02-08	13:21:30.777	85.0
PAPER\ANA\DRIVE\DM7_FPM	1999-02-08	13:21:30.777	560.0

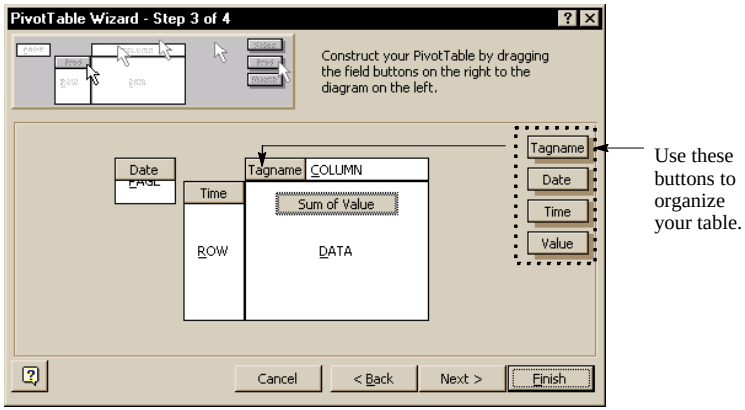
3. When you have selected all the fields you want, open the File menu and then click Return Data to Microsoft Excel.

   When you are back in Microsoft Excel, click Next in the PivotTable Wizard.

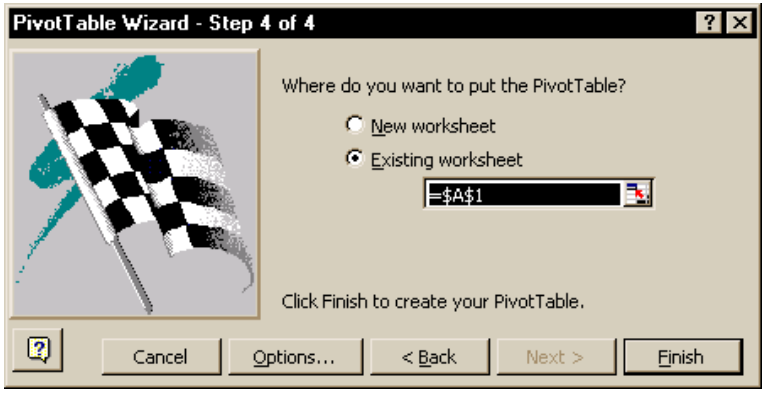


Organizing the pivot table

After you have selected the data for your pivot table, specify how you want that data to appear.



1. In the Wizard, drag the field buttons and place them in the table.
2. When the table is set up, click Next.
3. Specify a location for the pivot table.



4. To display the table, click Finish.

   The pivot table is displayed in the worksheet.

	A	B	C
1	Date	(All)	
2			
3	Sum of Value	Tagname	
4	Time	PAPER\ANA\DRIVE\DM7_FPM	PAPER\ANA\DRIVE\DM7_TORQ
5	13:21:20.052	385	60
6	13:21:22.075	525	80
7	13:21:24.408	560	80
8	13:21:26.451	560	80
9	13:21:28.754	560	80
10	13:21:30.777	560	85
11	13:21:32.780	595	85
12	13:21:34.903	595	85
13	13:21:37.096	595	85
14	13:21:39.149	595	85
15	13:21:41.252	595	85
16	13:21:43.425	595	85
17	13:21:45.578	595	85

Creating a chart

1. To create a chart from the pivot table, select the data you want to use.

2. On the toolbar, click the Chart Wizard button.

3. Follow the instructions in the Wizard to create the type of chart you want.

When you finish, the chart will be displayed in the worksheet.

Sharing tag values locally

RSView32 works as both an OPC or DDE server and an OPC or DDE client. This means you can share tag values with a wide range of devices and other Windows applications.

The rest of this chapter explains how to use OPC and DDE to exchange values between different applications on the same computer (that is, *locally*). For exchanging tag values between multiple RSView32 computers over a network, OPC is the recommended method. For details on exchanging values over a network, see "Using OPC for peer–to–peer network communications" on page 17-5.

Providing tag values to local OPC or DDE clients

When Windows applications request tag values from RSView32, the requesting applications are OPC or DDE clients and the RSView32 project providing the tag values is an OPC or DDE server.

Enabling RSView32 as a server

To enable RSView32 as a server, do one of the following:

- select the OPC/DDE Server check box on the Startup page of the Startup editor and run the project
- issue the RTDataServerOn command (from the command line or another RSView32 component)

Setting up a local OPC client application

To use OPC, the OPC server must be registered on the computer. The Node editor lists OPC servers that are registered on the computer (click the Browse button next to the Server Name field).

To request data from RSView32, a third-party OPC client application on the same computer must use this information:

Server:	RSI.RSView32OPCTagServer
Type:	Local
Server Computer Name or Address:	Since the client and server are on the same computer, this field is inaccessible.
Access Path:	Project name. You can leave this blank. If you specify a name, use the name of the open project.
Update Rate:	A rate in seconds.
Address:	Name or address of the tag in the server. (You specify the address when you assign the OPC node to a tag in the Tag editor.)

Each OPC client application uses different delimiters to separate these fields; use the delimiters that are appropriate to your application. For an example of how to set up an RSView32 station as an OPC client, see "Using OPC for peer–to–peer network communications" on page 17-5.

Setting up a local DDE client application

To request data from RSView32 a DDE client application on the same computer must use this information:

Application:	RTData
Topic:	Project name
Item:	Tag name

Each DDE client application uses different delimiters to separate these three fields; use the delimiters that are appropriate to your application.

Example: Using Microsoft Excel to read a tag value

This example describes how to use Microsoft Excel to read a tag value. Microsoft Excel is the DDE client application. RSView32 is the server application.

To read the value for Tag1 from an RSView32 project named Sample, type the following in the spreadsheet cell:

=RTData|Sample!Tag1

Getting tag values from servers

When RSView32 requests tag values from other Windows applications such as another RSView32 project, RSView32 is the OPC or DDE client and the application providing the tag values is the OPC or DDE server.

Setting up RSView32 as the client

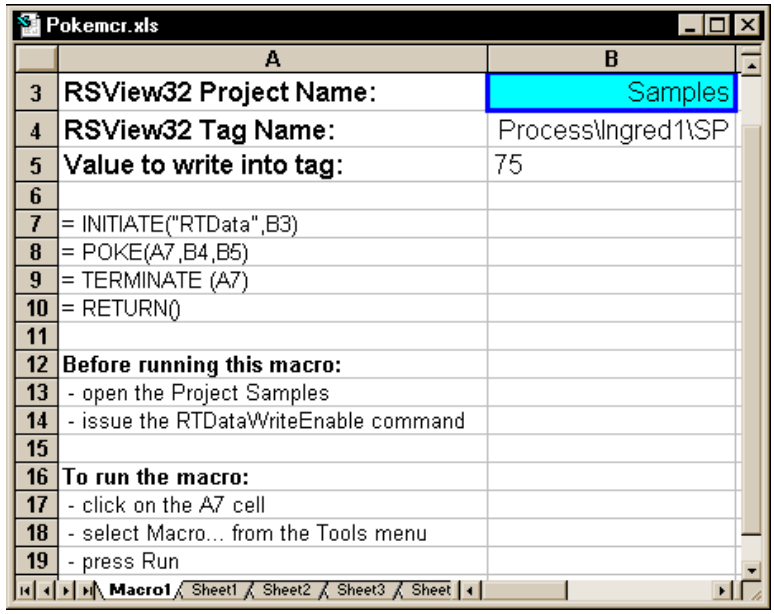
To request tag values from a server, you must set up an OPC or DDE node and then use that node name when creating a tag. For details about creating an OPC node, see page 3-5. For details about creating a DDE node, see page 3-12. For details about creating tags, see Chapter 4, *Creating tags*.

Enabling RSView32 for tag writes

By default, other applications cannot write to tags in RSView32. To enable writing to tags, you have to issue the RTDataWriteEnable command (from the command line or another RSView32 component).

Example: Writing to a tag

The following example shows a Microsoft Excel macro that will write to the Process\Ingred1\SP tag in the Samples project. Microsoft Excel is the DDE client and RSView32 is the DDE server.



Pokemcr.xls

	A	B
3	**RSView32 Project Name:**	Samples
4	**RSView32 Tag Name:**	Process\Ingred1\SP
5	**Value to write into tag:**	75
6		
7	= INITIATE("RTData",B3)	
8	= POKE(A7,B4,B5)	
9	= TERMINATE (A7)	
10	= RETURN()	
11		
12	**Before running this macro:**	
13	- open the Project Samples	
14	- issue the RTDataWriteEnable command	
15		
16	**To run the macro:**	
17	- click on the A7 cell	
18	- select Macro... from the Tools menu	
19	- press Run	

Macro1 / Sheet1 / Sheet2 / Sheet3 / Sheet

Sending DDEExecute commands to other applications

You can use RSView32 to send DDEExecute commands to other applications. However, RSView32 does not accept DDEExecute commands from other applications. To send commands to RSView32 from other applications, use the RSView32 Object Model with a programming language such as Visual Basic®. For more information about using the RSView32 Object Model, see Help.

1. Run the application to which the command is being sent.
2. Issue the DDEExecute <*application*>|<*topic*> <*command*> command. You can issue this command from the command line or from another RSView32 component.

   For details about this command, see Appendix A, *RSView32 commands*, or see Help.

Example: Sending a command to RSLinx

The following example sends the Who_Active command to RSLinx® (application name = rslinx):

DDEExecute rslinx|__Drivers [Who_Active()]

Drivers must be preceded by two underscores.

When this command runs, the default RSWho window is displayed.

Chapter

17 Using networks

With RSView32™ on a network, you can:

- share project components among multiple workstations during development and runtime
- share data logged by one workstation
- use OPC® to share tag values among multiple workstations

Sharing project components during development and runtime

You can set up RSView32 to share project components during development and runtime by storing common components on a file server or shared drive.

Components can run from multiple stations concurrently, but only one component file can be edited by a station at a time. Any change in a component file is reflected in runtime stations the next time the project runs.

Sharing components during development

If you set up RSView32 to share project components during development, a group of engineers can develop a project simultaneously. For example, one engineer can work on a graphic display, another on derived tags, and so on.

Sharing components at runtime

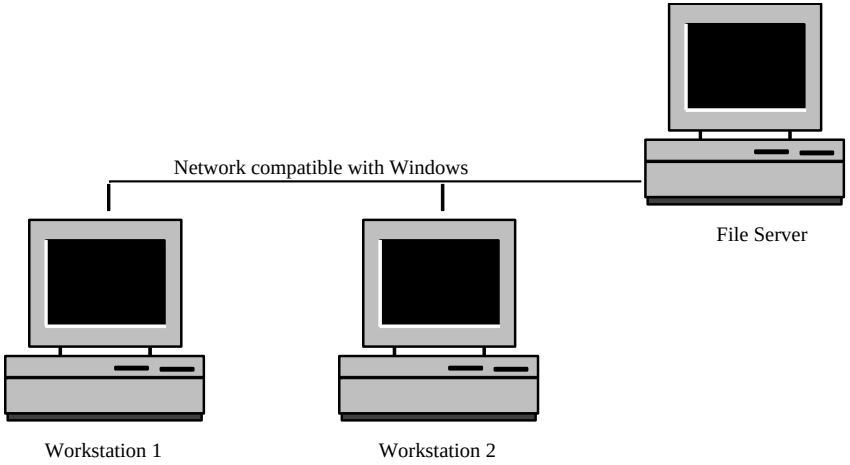
Sharing components at runtime allows you to centrally maintain a project. For example, you could store the following components on a central file server:

- security
- graphic displays
- activity, alarm, and data logs

IMPORTANT You cannot share a tag database.

When setting up a project to share components, ensure you have read and write access to the shared drive.

The following illustration shows two workstations with RSView32 installed. Both workstations have local tag databases but are configured to point to the file server for project components such as graphic displays and macros.



How to share components

To share project components, follow these steps:

1. Create projects on each machine that will be accessing the shared components.
2. On each machine, use the Project Paths dialog box to set up paths to common components.

   For detailed information about the Project Paths dialog box, see "Setting the project path" on page 18-8.

Example: Data logging on one RSView32 station and displaying a historical trend on another station

The following example outlines how to log data on one computer and display a historical trend on another computer using that data. For this example, \\Computer1 contains the remote data log model, and \\Computer2 contains the trend object. \\Computer1 and \\Computer2 must be on the same network.

1. Configure a data log model (call it LogModel) on Computer1.

   LogModel's data log path can use a drive on \\Computer1 that \\Computer2 can map to, or a common network drive that both \\Computer1 and \\Computer2 can map to (for our purposes on a computer called \\NetworkComputer).

   For this example we will use the common drive and path

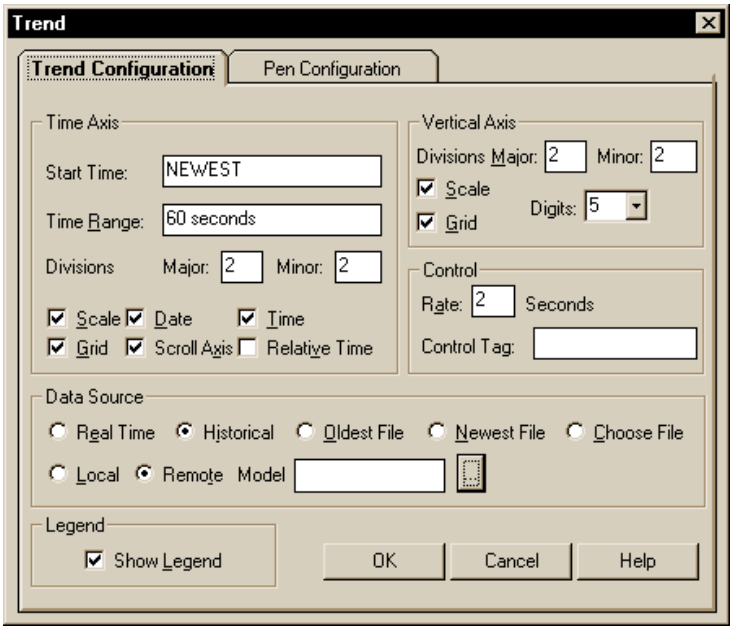
   \\NetworkComputer\RSVProj\Datalog.

   When logging LogModel, data is written to this file:

   \\NetworkComputer\RSVProj\Datalog\LogModel\filename.dbf.

   A file named LogModel.dlg is also created in the same LogModel folder.

2. On \\Computer2, in the Trend Configuration dialog box, select Historical, and choose Remote for the Data Source.



Use the Browse button (...) to browse to this file:

\\NetworkComputer\RSVProj\Datalog\LogModel\LogModel.dlg.

The LogModel folder and the LogModel.dlg file will not exist if data logging for LogModel has not been started yet. In this case, type this path in the Remote field:

\\NetworkComputer\RSVProj\Datalog\LogModel\LogModel.dlg

3. Start data logging for LogModel on \\Computer1 and start the graphic display containing the trend object on \\Computer2.

   \\Computer2 will read the logged data from \\NetworkComputer and display it in the trend.

If the data log model on Computer1 is configured to use the ODBC storage format and data source, Computer2 must have an ODBC data source configured with the same name in order for the remote historical trend to work.

Using OPC for peer–to–peer network communications

RSView32 supports the OPC 1.0a and 2.0 specifications.

This section describes how to set up OPC to share tag values over a network. You can set up one RSView32 station as an OPC client, and another as an OPC server, to achieve peer-to-peer networking.

Using OPC, you can both read from and write to tags on another RSView32 station on the network. Follow the steps below to set up OPC in Windows 2003 Server, Windows® XP, Windows 2000, or Windows Vista.

To use OPC:

- you need Windows Server 2003, Windows XP, Windows 2000, or Windows Vista, with a Primary Domain Controller to authenticate all computers on the network. All computers on the network must be in the same domain.

- Microsoft® Distributed COM (DCOM) must be installed and configured, both on the client and the server computers.

- the OPC server must be registered on the OPC client machine. The Node editor lists OPC servers that are registered on the client machine (click the Browse button next to the Server Name field).

For more information about the requirements for using OPC on a client/server network, see the RSView32 Release Notes.

Identifying the RSView32 server computer

To uniquely identify an RSView32 server for OPC communications, the computer must have a name or address. The server computer can use Windows Server 2003, Windows XP, Windows 2000, or Windows Vista.

To give the computer a name or address, you can use any of these methods:

- assign a name using the Universal Naming Convention
- assign a name using the Domain Name System
- set up a TCP/IP address

For more information, see your Windows documentation.

Enabling an RSView32 OPC server for reading and writing

1. Enable RSView32 as an OPC server by doing one of the following:
   - select the OPC/DDE Server check box in the Startup editor and run the project
   - issue the RTDataServerOn command (from the RSView32 command line or another RSView32 component)
2. Enable RSView32 for writes by issuing the RTDataWriteEnable command (from the RSView32 command line or another RSView32 component).

Configuring the RSView32 OPC client application

To request data from an RSView32 OPC server, you must set up a node that references the server. You set up the node in the RSView32 project on the OPC client computer using this information:

Server:	RSI.RSView32OPCTagServer
Type:	Remote
Server Computer Name or Address:	The name or address of the server computer. See "Server Computer Name or Address" on page 3-9 for information about the format to use.
Access Path:	Project name. You can leave this blank. RSView32 automatically uses the open project on the server computer.
Update Rate:	A rate in seconds.
Address:	Name or address of the tag in the server. (You specify the address when you assign the OPC node to a tag in the Tag editor.)

For more information about creating the node see "Creating an OPC node" on page 3-5.

Once you set up the node, assign it to tags that will read from or write to the server. Create tags, select Device as the data source, and assign the node that you have created. For details, see Chapter 4, *Creating tags*.

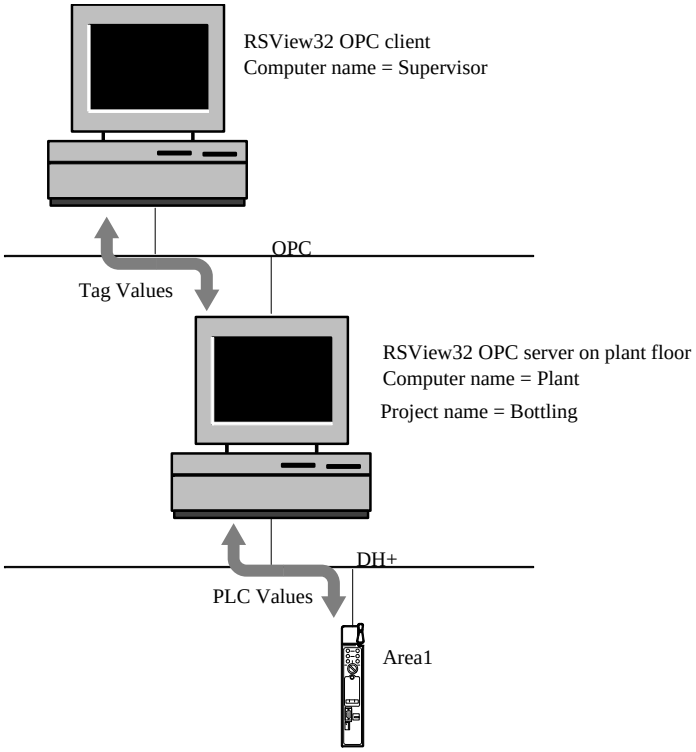
Example: Sharing tag values between two RSView32 stations

An RSView32 computer on the plant floor contains a tag called RejectCount. You are the supervisor and want to include this tag's value in a graphic display on your computer.

For this example, assume that:

- the client computer is your computer, and the computer is named Supervisor
- the server computer is the plant floor computer, and the computer is named Plant

- the project on the Plant computer is called Bottling and it contains a tag called RejectCount



How the Supervisor Gets Values

In the Node editor, you create an OPC node called Plant_Computer that has the following information:

Server:	RSI.RSView32OPCTagServer
Type:	Remote
Server Computer Name or Address:	\\Plant

Access Path: Bottling (optional)

Update Rate: 5.000 seconds

You create a tag that points to the Plant computer. In the tag's Node field, you assign the Plant_Computer node. In the tag's Address field, you enter **RejectCount**, which is the tag you want values for. The information in the Address field is the OPC tag address.

When the RejectCount tag is used anywhere in the Supervisor computer, it gets its value from the RejectCount tag in the Bottling project on the Plant computer.

You can also write to the RejectCount tag in the Bottling project using the RSView32 Set or = (Equal) commands (if writes are enabled in the real-time data server on the Plant computer). The write will go through to the programmable controller.

Connecting to RSLinx Gateway as a remote OPC server

RSLinx® Gateway provides remote access to OPC clients, such as RSView32, over a TCP/IP network. RSLinx Gateway supports up to 5 remote clients.

To use OPC with RSLinx Gateway, you must configure settings both in RSLinx and in RSView32.

Configuring RSLinx Gateway

To use RSLinx Gateway, do the following in RSLinx:

- configure RSLinx Gateway with drivers for each control network RSLinx is connected to
- create a DDE/OPC topic for each PLC on each control network

- enable RSLinx Gateway

For information about configuring RSLinx Gateway, see the documentation supplied with RSLinx.

Configuring RSView32 for use with RSLinx Gateway

To use RSLinx Gateway with RSView32, do the following in RSView32:

- use the RSLinxOPCRemote program provided on the RSLinx CD to register the RSLinx Gateway on the computer on which RSView32 is installed.

- in the Node editor, set up a remote OPC node for each PLC. For more information about setting up an OPC node, see page 3-5.

- create tags. For more information about creating tags, see Chapter 4, *Creating tags*.

At runtime, use the same login name and password for the computer running RSLinx Gateway and for the computer running RSView32. If this is not practical, on the computer running RSLinx configure DCOM to grant the RSView32 user access to the RSLinx computer. For more information about configuring DCOM, see the Help supplied with the DCOMCNFG utility.

Example: Configuring an OPC node for RSLinx Gateway

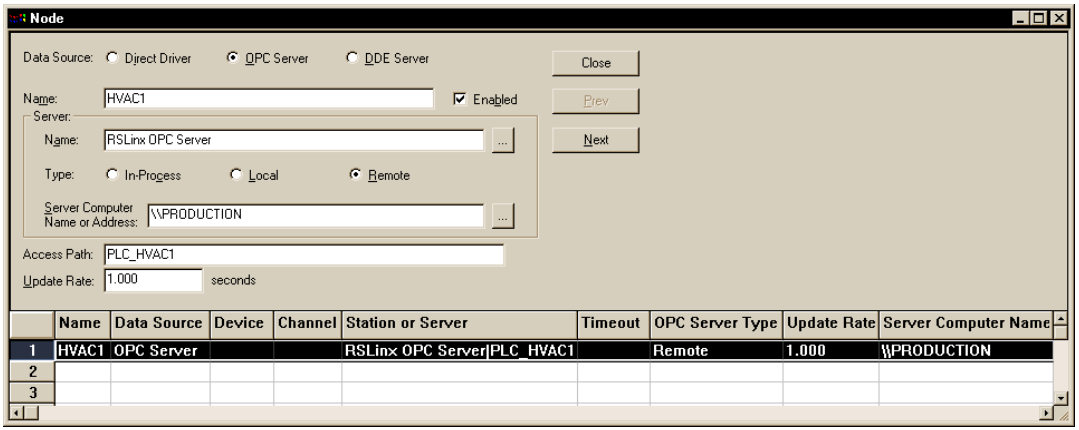
The following example describes how to create a node to connect to RSLinx Gateway as a remote OPC server.

Server Name: **RSLinx OPC Server** or
RSLinx Remote OPC Server
If you are using RSLinx 2.0, the driver name is RSLinx OPC Server. If you are using RSLinx 2.1, the

driver name is RSLinx Remote OPC Server. You don't need to specify a vendor or version number.

Access Path: **PLC_HVAC1**
The access path is the DDE/OPC topic name in RSLinx.

The figure below shows how the node looks in the Node editor.

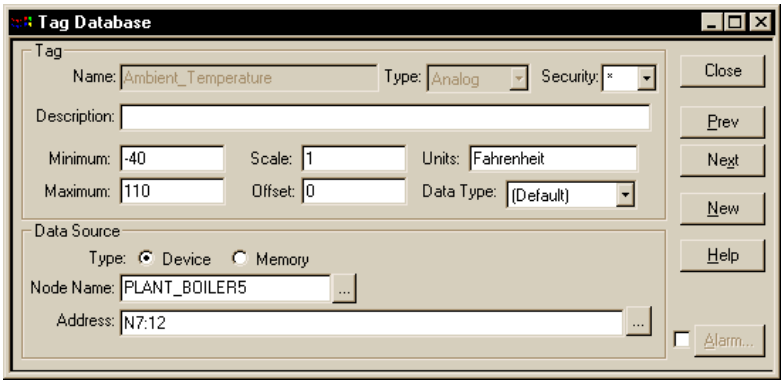


Once you have created the node, assign it to a tag in the Tag Database editor. The address tells RSView32 where in the node to get the data.

Address: **N7:12**
The PLC-5® programmable controller called PLC_HVAC1 has been previously set up as a DDE/OPC topic in RSLinx; N7:12 is the address in the PLC.

If you don't include the access path when configuring the node, you can enter the tag's address as **[PLC_HVAC1]N7:12**.

The figure below shows how the tag looks in the Tag editor.



Chapter

18 Running your project

Summary of steps

Once you have developed your project, you are ready to run it. The steps involved in running a project are:

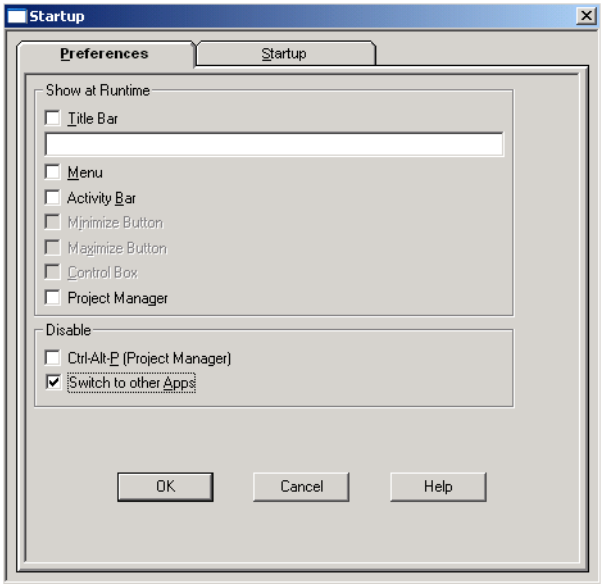
- specifying startup settings
- if necessary, moving the project to another drive, such as a network drive, or to another computer
- configuring communications and communication hardware if you moved the project
- running the project

Specifying startup settings

In the Startup editor, specify how the project will look and what components will run when the project starts.

To open the Startup Editor

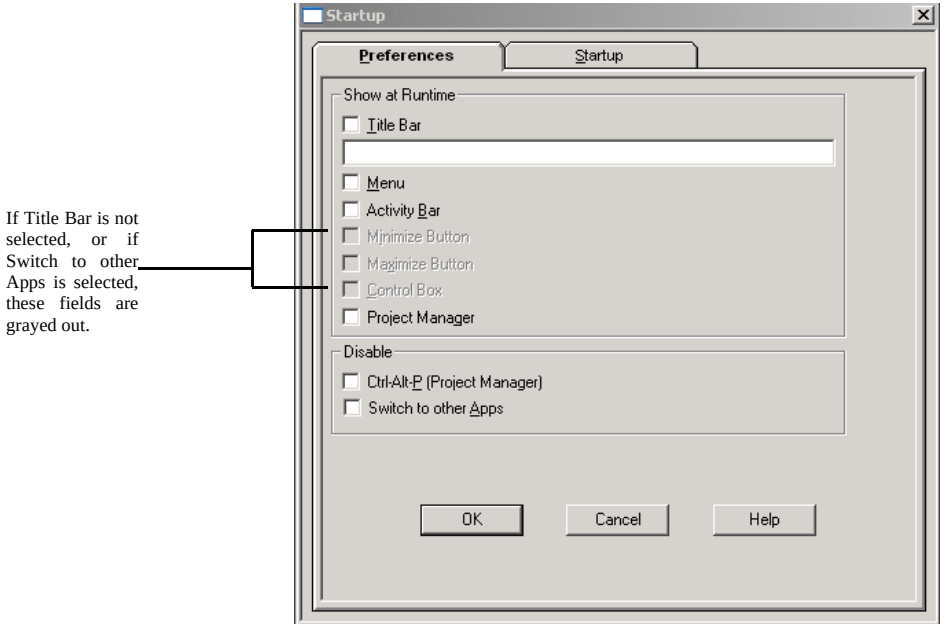
1. In the Project Manager, open the System folder.
2. Open the Startup editor by doing one of the following:
   - double–click the Startup icon
   - right–click the Startup icon and then click Show



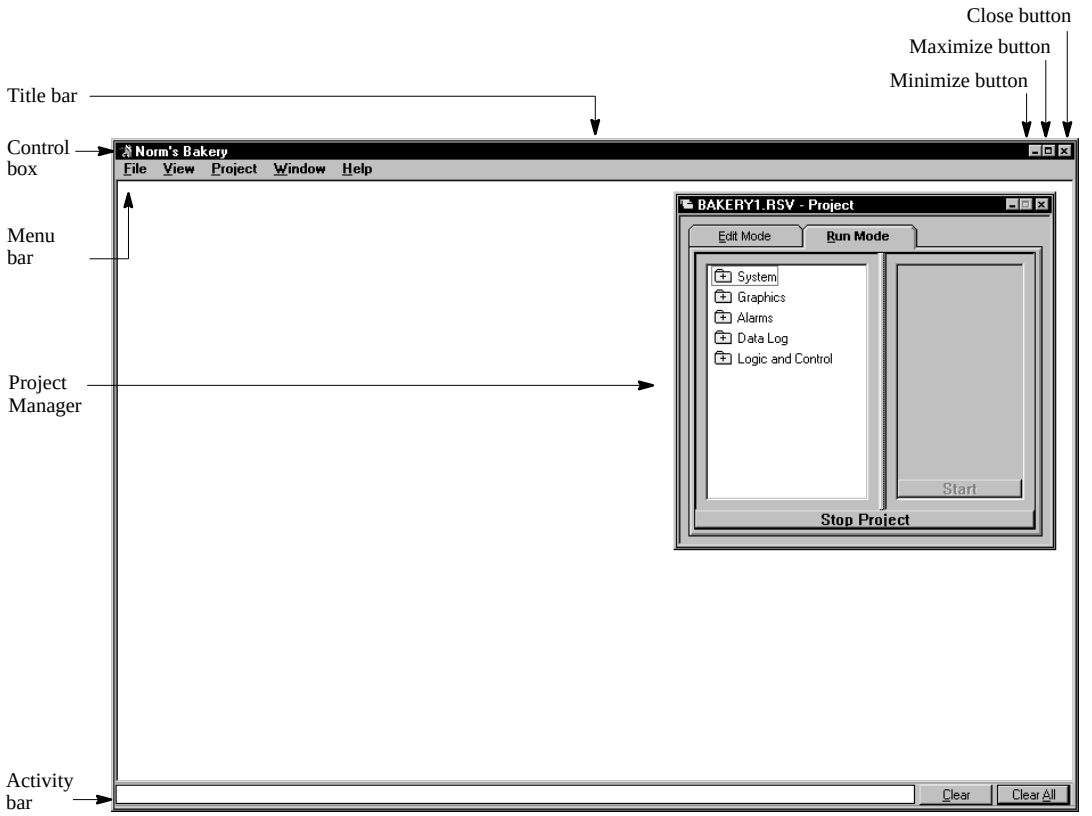
Preferences

To specify how the project window will look at startup:

1. Click the Preferences tab.



2. Under Show at Runtime, select the check box for each item you want at runtime. Each item is shown in the illustration on the following page.



3. Under Disable, select the check box for each item you want to disable.

   On Windows Server 2003, Windows XP, Windows 2000, and Windows Vista, you cannot disable Ctrl–Alt–Del through the Startup editor. To lock users into an RSView32 runtime application on these operating systems, use the Win2K XP DeskLock tool included in the RSView32 Tools program folder.

   Ctrl–Alt–P: This key combination shows or hides the Project Manager. Once the Project Manager is open, users can access all parts of an RSView32 project. You can secure the Project Manager by securing the ProjectShow command. For details about security,

see Chapter 10, *Adding security*. For details about the ProjectShow command, see Appendix A, *RSView32 commands*, or see Help.

`Switch to other Apps`: When Switch to other Apps is disabled, the following occurs at runtime:

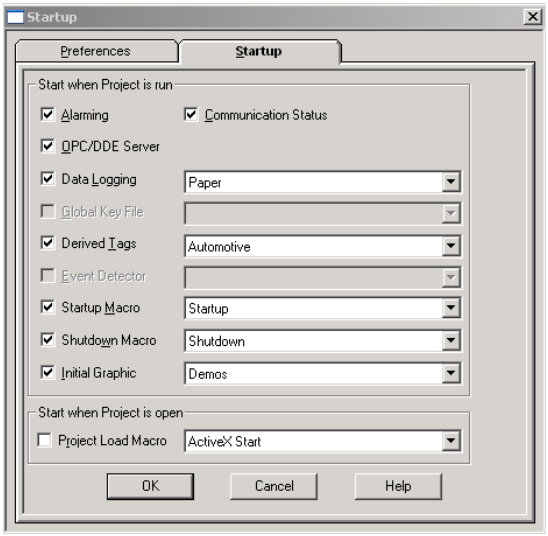
- Alt–Tab, Alt–Shift–Tab, and Ctrl–Alt–Esc, which switch to other applications, are disabled
- Alt–F4, which closes RSView32, is disabled

4. Click OK.

Startup

To specify the project components you want to run at startup:

1. Click the Startup tab.



IMPORTANT The order items appear in the Startup editor is not the order in which items will run. If you have created a project that has components that must start in a particular order, create a macro that will run when the project starts.

2. Check the box for each item you want to run when the project starts. Where required, specify the file you want to run.

   Alarming

   Starts alarm monitoring. This is the same as using the AlarmOn command.

Communication Status

Logs communication errors to the activity log file and/or the activity bar if you set the project up to do this. To set this up, open the Activity Log Setup editor and ensure the Log File and Activity Bar check boxes are selected for the Communications category.

OPC/DDE Server

Enables RSView32 as an OPC® and DDE server. This is the same as using the RTDataServerOn command.

Data Logging

Starts running the specified data log model. This is the same as using the DataLogOn command. Up to 20 data log model files can run simultaneously, but only one can be specified in the Startup editor. To run more files, list them in a startup macro.

Global Key File

Runs the specified global key file. This is the same as using the Key <*file*> command.

Derived Tags

Runs the specified derived tags file. This is the same as using the DerivedOn <*file*> command. Up to 20 derived tag files can run simultaneously, but only one can be specified in the Startup editor. To run more files, list them in a startup macro.

Event Detector

Runs the specified event file. This is the same as using the EventOn <*file*> command. Up to 20 event files can run simultaneously, but only one file can be specified in the Startup editor. To run more files, list them in a startup macro.

Startup Macro

Runs the specified macro. A startup macro allows you to run a series of commands when the project starts. Any macro can be used as a startup macro.

Shutdown Macro

Runs the specified macro. Any macro can be used as a shutdown macro.

Initial Graphic

Displays the specified graphic display file.

3. Click OK.

Setting up a project in a new location

It is important to test your project in the location from which it will run, if you will run the project from a different directory or different computer than the one on which you configured the project.

1. Use the Project Transport Utility, provided with the RSView32 Resource Kit™, to copy the project directory to the target location.

   The Project Transport Utility is also available from the Windows Start menu, on the RSView32 Tools menu.

2. When the project is in the new location, ensure the project paths are correct. See "Setting the project path," next.

3. If you moved the project to a new computer, set up RSView32 for communications. For details, see Chapter 2, *Setting up direct driver communications* or see Chapter 3, *Setting up OPC and DDE communications*.

4. If your project includes VBA programs that reference object models, ensure that object references are installed and enabled.

Setting the project path

In the Project Paths dialog box you can change the application and database paths for a project. A path consists of a drive letter, directory, and subdirectory, and tells the system where a project's database and editor files are stored.

When you copy a project from one computer to another, RSView32 automatically changes the default paths to the drive and directory the project has been copied to. Therefore, you need only change project paths when:

- a project that has editors configured to store files on a network drive is moved to a computer with a different drive mapping
- a project that was copied from another machine uses files in directories other than the default directories (that is, the files were added using Create Shortcut to Existing Component)
- you move the files for an editor from their original location to another location on the same computer

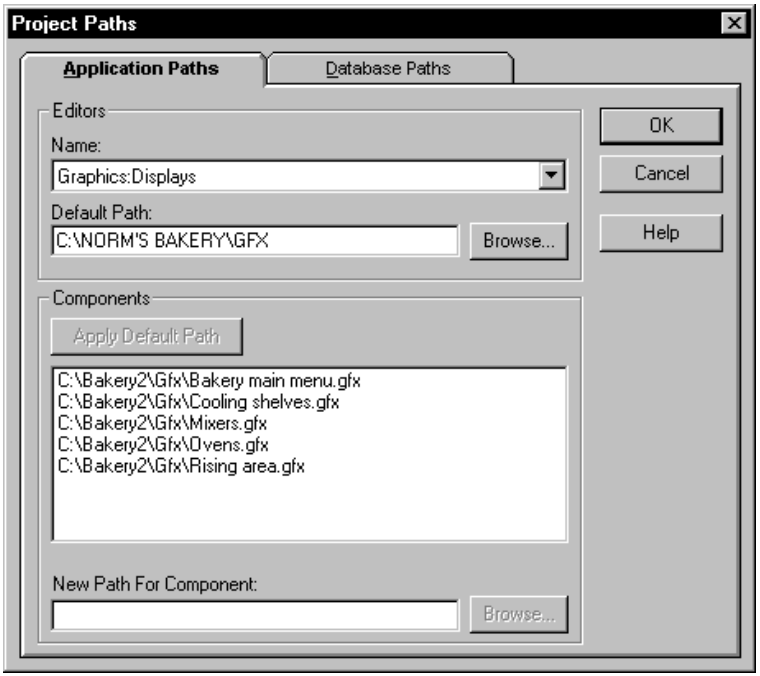
When you change the default path for an editor, new files will be stored in the new location. Existing files will remain in their original location unless you physically move them using My Computer, Windows® Explorer, or File Manager. To add the files to the project, use Copy Existing Component into Project or Create Shortcut to Existing Component on the context menu.

If you apply a new default path to files that are in their original location, the files will be inaccessible (grayed out) in the Project Manager.

To use the Project Paths dialog box:

1. With the Project Manager active, click Project on the menu bar and then click Project Paths.

   The Project Paths dialog box opens.



2. Change the application or database paths as described below.
3. Click OK.

Changing application paths

The Application Paths tab lists RSView32 editors and shows the current default path for all components associated with the editors.

When you change the default path for an editor, any new components you create for it will automatically be stored in the new path. To move existing components to the new path, move the files using a tool such as My Computer, Windows Explorer, or File Manager and then reference the new path.

To change the default path for new components:

1. In the Name field, select an editor.
2. In the Default Path field, specify a new path.
3. Click OK.

To change the default path for existing components:

1. In My Computer, Windows Explorer, or File Manager, move the file to its new location.
2. In the RSView32 Project Paths dialog box, click the Application Paths tab.
3. In the Name field, select an editor.

   The components associated with the editor are displayed in the Components field.
4. In the Default Path field, click Browse to open the Browse for Folder dialog box and specify the new path.
5. Click Apply Default Path.

   The components are updated to the new path.
6. Click OK.

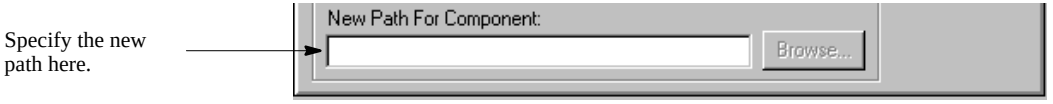
To change the path for a single component:

1. In My Computer, Windows Explorer, or File Manager, move the file to its new location.
2. In the RSView32 Project Paths dialog box, click the Application Paths tab.
3. In the Name field, select an editor.

   The components associated with the editor are displayed in the Components field.

4. Select a component.

5. In the New Path For Component field, specify a new path.



6. Click OK.

Changing the database path

In the Database Paths tab, you can change the database that will be the data source for the project.

1. Click the Browse button beside the Path to Database field.
2. Select the new data source and then click Open.
3. Click OK.
4. Close and re–open the project to complete the operation.

Specifying time, date, and number formats

If the target computer is configured for a different locale than the development computer, and the new locale uses different time, date, or number formats, follow these steps. Once the project is loaded on the computer on which it will run, use the Windows Control Panel to specify time, date, and number formats. These formats apply to the runtime components of the project only. You can also change these formats after the project is running, but you must close and restart the project for the changes to take effect.

1. Click the Start button on the Windows task bar, point to Settings, and then click Control Panel.

   The Control Panel window opens.

2. Double-click Regional Settings or Regional Options.

3. In the dialog box that opens, select the language whose settings you wish to use.

4. Verify and/or customize the settings on the Numbers, Time, and Date tabs.

5. Click OK.

For more information, see your Windows documentation.

Running a project

When you are developing a project, you can test it by clicking the Run Mode tab in the Project Manager and then clicking the Run Project button. If you configured the Startup editor, the RSView32 project window will appear as configured and the selected components will start when you click Run Project.

Click this button to run a project.

Running a project automatically

You can set up a project to run automatically when Windows starts.

1. Click the Start button on the Windows task bar, point to Settings, and then click Taskbar or click Taskbar & Start Menu.
2. Click the Start Menu Programs tab or Advanced tab.
3. Click Add.
4. Type the path to RSView32 or click Browse and locate RSView32. Add the project name and the /r parameter to the command line. For example, for a project called Norm's Bakery, you would type the following on the command line:

   "C:\Program Files\Rockwell Software\RSView\RSView32.exe" "C:\Norm's Bakery\Norm's Bakery.rsv" /r

   If the path contains spaces, you must enclose it in double quotes. The /r parameter must be outside the quotes.
5. Click Next.
6. In the Select Program Folder dialog box, select the StartUp folder.
7. Specify a name for the shortcut.
8. Click Finish.

For more information, see your Windows documentation.

Monitoring disk space

When you run an RSView32 project, be sure that the computer's disk space does not fall below 10 MB.

To monitor disk space, do one of the following:

- use the System Agent utility available with the Windows 95 Plus Pack or Microsoft® Plus! 98.

- in the RSView32 Events editor, create an event that uses the free_bytes function and displays a message when disk space falls below 10 MB

  See page 14-21 for more information about the free_bytes function. See Chapter 9, *Configuring events*, for information about events.

Stopping a project

To stop a project, do any of the following:

- in the Project Manager, click the Stop Project button

- issue the ProjectStop command

  To issue the ProjectStop command, type it on the command line or create a button or global key with ProjectStop as the action. When the button or key is pressed, the ProjectStop command is issued.

When a project stops

When a project stops, the following occurs:

- open displays and RSView32 components close

- running data log models stop

- running derived tag files stop

- running event files stop

- alarm monitoring stops

- the OPC or DDE server is disabled

- execution of VBA programs stops, but events may continue to fire if your VBA program does not destroy its objects

If a shutdown macro has been specified in the Startup editor, the macro will run once the above components have closed and stopped running.

Appendix

A RSView32 commands

This appendix describes:

- where and how to use RSView32™ commands
- how to use the command line
- RSView32 commands and their syntax

Using RSView32 commands

Where to use commands

You can use commands in the following places:

- in a field that requires you to enter an action. For example, as the press, release, or repeat action when you assign touch animation to an object in a graphic display, or as the action for a button
- in a macro or symbol
- in a command line

How to use commands

When entering commands, keep the following guidelines in mind:

- Parameters enclosed in angle brackets < > are required.
- Parameters enclosed in square brackets [ ] are optional.
- Commands and parameters are *not* case sensitive.

- Parameters do *not* have to be entered in the order they are listed.
- Start each new command on a new line or separate commands on the same line with a semicolon (;).
- Separate multiple parameters with a space.
- Enclose long file names containing spaces with double quotes when the file names are used as parameters. For example

  ActivityLogSendToODBC "c:\mydsn\activity db.dsn" ActivityTbl /UDerek /Ppasswd
- The exclamation mark (!) indicates the start of a comment. Everything after the exclamation mark is ignored unless the exclamation mark and what follows it are enclosed in double quotes.
- Many commands accept wildcards. The wildcards are:

  * — matches any number of characters, including the backslash (\) and period (.) characters

  ? — matches any single character

  If a command accepts wildcards, this fact is noted in the description of the command.

Using placeholders in commands

To replace a tag name with its current value when the command is evaluated, enclose the tag name in dollar signs ($) to create a placeholder in the command. If the placeholder is enclosed within double quotes, or nested in the string value of another placeholder in the command, RSView32 does not substitute the tag value.

The maximum number of characters for floating point tag values is 17. If the value uses more than 17 characters, it will be represented in scientific format. The maximum command length is 255. The

command will be truncated if the substituted tag values cause the command to exceed this length.

Using dollar signs to create a placeholder in the command is an alternative to the Parse utility available in the RSView32 Resource Kit™. The dollar signs alternative offers better performance.

Example 1: A macro using placeholders in commands

Display Screen$Tag1$

Display $Tag3$$Tag2$

Valve23 = Open

When the macro runs, Tag1 = 1, Tag2 = 2, and Tag3 = Screen. Note that these are all string tags.

RSView32 replaces the placeholders in the commands with the tags' current string values. The graphic display Screen1 appears, then the graphic display Screen2 appears, then the tag Valve23 is set to its open state.

You don't need to put braces around tag names when using placeholders in commands.

Example 2: Changing the value of a tag and tag placeholders

In this example, Tag1's initial value is zero. The value 4 is assigned to the tag Tag1, which is then used in a macro. Type the following text in a button's press action:

Tag1 = 4	Sets the value of Tag1 to 4.
Display_Detail Tag1	Executes the Display_Detail macro, using Tag1 as a parameter.

In the Display_Detail macro, type the following:

Display Screen$%1$	Displays a graphic display whose name is Screen plus the value of Tag1 (for example, Screen 4).

RSView32 replaces the placeholder in the command with the tag's current string value. The graphic display Screen4 appears.

Tag placeholders are evaluated before commands are executed. You can ensure Tag1 evaluates to 4 by embedding the tag placeholder in a macro, not in the button. If you include the tag placeholder in the button, the tag placeholder evaluates before the value of the tag is set to 4. $Tag1$ will therefore evaluate to zero (the tag's initial value), not 4.

You don't need to put braces around tag names when using placeholders in commands.

Precedence

Commands take precedence over macros. For example, if you have a macro called Activity the Activity command will run whenever you try to run the Activity macro.

Using the command line

Use the command line during development and runtime. To use a command line, either:

- create a command line within a graphic display by choosing the Command Line tool from the Drawing Tools toolbox or by choosing Command Line from the Objects menu
- open the command line in the Project Manager by double–clicking the Command Line icon, or right–clicking the icon and then choosing Show
- create a global key with the CommandLine command as the press action

Using the Command Wizard

Use the Command Wizard to build command strings. The Command Wizard lists all RSView32 commands and, where applicable, lists the command's parameters. The Wizard also lists any macros that you have created.

To open the Command Wizard, do one of the following:

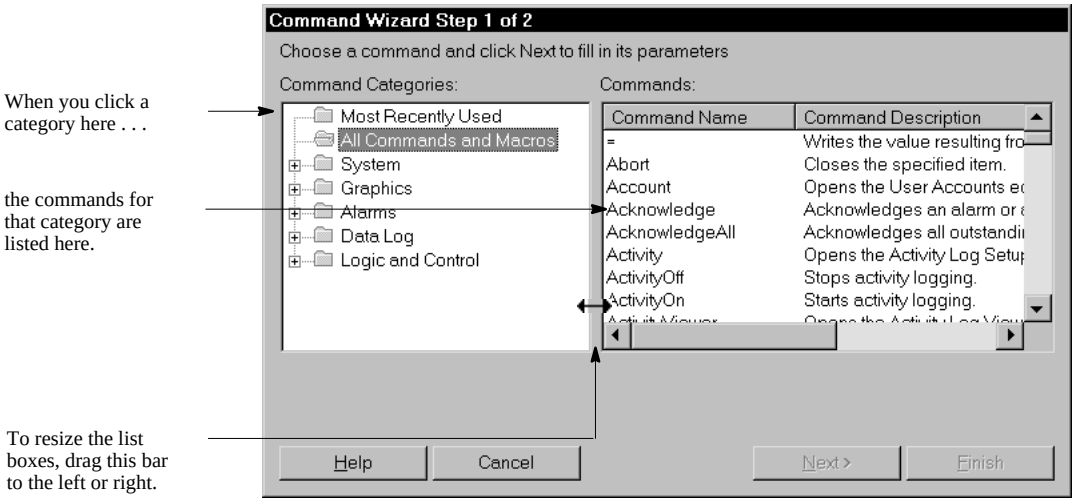
- double–click in an action field or, in the Macro editor, double–click anywhere in the editor
- click the ... button beside an action field or any field requiring an RSView32 command

This button opens the Command Wizard.

- in the Command Line editor, Security Codes editor, Events editor, and Macro editor, click Commands on the Edit menu

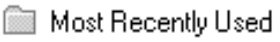
Building a command string

1. Open the Command Wizard.



2. In the Command Categories list, click a folder.

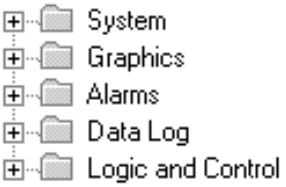
   To see the commands and macros you last used, click this folder:

   To see all commands and macros, click this folder:

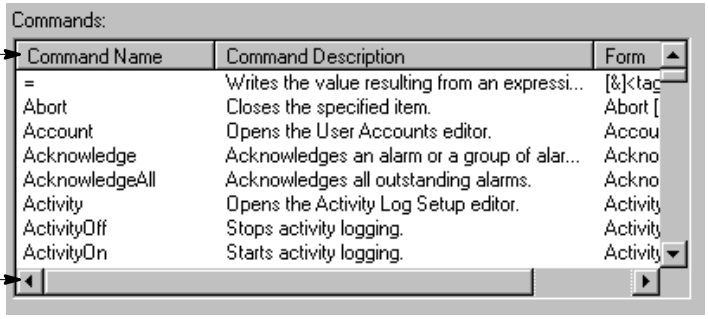
   To see the commands that can be used for a particular part of the system, click one of these folders:

3. Select a command by clicking it in the Commands field.

To change the order in which commands are listed, click the column title.

To see all the information for a command, use the scroll bar.



`Command Name`: Lists the commands in the open folder.

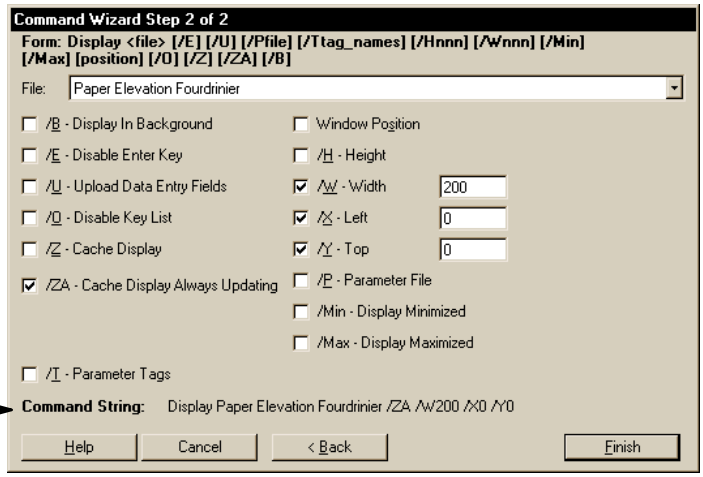
`Command Description`: Describes the command's function.

`Form`: Shows the command syntax. Angle brackets < > indicate a required parameter. Square brackets [ ] indicate an optional parameter.

4. Click Next to add parameters or click Finish. If a command has parameters the Next button will be active. If a command doesn't have parameters, only the Finish button will be active.

5. Choose parameters.

As you add parameters, they are listed here.



6. When the command is complete, click Finish.

The RSView32 commands, listed alphabetically

= (Equal)

`[&]<tag_name> = <expression>`

Writes the value resulting from an expression to a tag.

[&]	Forces the command to be executed asynchronously, which makes the command faster.
<*tag_name*>	The name of the tag that will store the result of the expression.
<*expression*>	A value, string, tag name, or a more complex expression. Enclose tag names that contain dashes or start with a number in braces { } when you use them in an expression. This distinguishes the characters in the tag name from the characters in the expression. Enclose strings in quotes. The string can contain any character, and can include spaces. Do not use braces for the tag name *before* the equal sign. You cannot nest braces.

You can attach security to the = (Equal) command just as you can for any RSView32 command. For more information about security, see Chapter 10, *Adding security*.

For more information about expressions, see Chapter 14, *Creating expressions*.

Examples: The = (Equal) command

&Tag1 = Tag1 + 1
Evaluates the command asynchronously. Increases the value of Tag1 by 1.

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

Tag1 = Tag2 + Tag3
Adds the values of Tag2 and Tag3 and stores the result in Tag1.

1Pump = {Industry–2} + {2Pump}
Adds the values of Industry–2 and 2Pump and stores the result in 1Pump. Braces surround Industry–2 because of the dash in the name. Braces surround 2Pump because the name starts with a number. No braces are used for 1Pump because this name is on the left side of the equal sign.

Tag1 = if (Tag1 < Tag2) then 3 else 4
If Tag1 is less than Tag2, Tag1 is set to 3, but if Tag1 is equal to or greater than Tag2, Tag1 is set to 4.

Tank1\Message = "Tank1 Overflow"
Writes the string Tank1 Overflow to the Tank1\Message tag.

Abort

Abort [parameter]

Closes one or more windows. Without a parameter, the Abort command closes the window that has focus.

[*parameter*] is one of the following:

me	Closes the window from which the command is executed.
editor	Closes the specified editor, such as a graphic display or an alarm summary. To name the editor, use the

RSView32 command that opens the editor. See the examples below.

*	Closes all windows.

Ctrl–F4 also closes the active window.

Examples: The Abort command

Abort
Without a parameter, closes the window that has focus.

Abort me
Closes the window from which the command is executed.

Abort Display
Closes all open graphic displays.

Abort Display Pumps or **Abort Pumps**
Closes the graphic display called Pumps.

Abort Monitor
Closes all open tag monitors.

Abort *
Closes all windows.

Account

Account

Opens the User Accounts editor. To prevent security from being changed at runtime, restrict access to this command.

Acknowledge

Acknowledge [tag_name]

Acknowledges an alarm or a group of alarms. This command gives no indication that it has run but will display a message if not executed properly.

If an acknowledge bit is associated with an alarm, acknowledging the alarm sets the acknowledge bit.

[*tag_name*] The name of the tag to be acknowledged. This can be a tag name, a name with wildcards, or the [tag] literal string.

If no tag is specified, this command acknowledges the most–severe, most–recent unacknowledged alarm.

[tag] Specifying the word "tag" inside square brackets acknowledges alarms for the tag associated with the highlighted object in the active graphic display.

IMPORTANT If alarms are occurring rapidly, don't run the Acknowledge command without a tag name. The Acknowledge command could acknowledge a new alarm rather than the intended alarm.

Examples: The Acknowledge command

Acknowledge Hopper1\Flow

Acknowledges all outstanding alarms for the tag Hopper1\Flow.

Acknowledge Hopper1*

Acknowledges all outstanding alarms for all tags in the folder called Hopper1.

Acknowledge *

Acknowledges all outstanding alarms.

Acknowledge [tag]
Acknowledges the alarm for the tag associated with the highlighted object in the active graphic display.

AcknowledgeAll

AcknowledgeAll

Acknowledges all outstanding alarms. This command runs more quickly than Acknowledge *. It gives no indication that it has run but will display a message if not executed properly.

If an acknowledge bit is associated with an alarm, acknowledging the alarm sets the acknowledge bit.

There is no limit to the number of tags that can be acknowledged with this command.

Activity

Activity

Opens the Activity Log Setup editor.

ActivityBarOff

ActivityBarOff

Hides the activity bar.

ActivityBarOn

ActivityBarOn

Shows the activity bar.

You can undock the activity bar and move it anywhere on the screen. To move the bar, click between the Clear and Clear All buttons and drag. To redock the activity bar, click the title bar and drag the bar until it touches the RSView32 status bar.

To resize the activity bar, drag any corner or edge.

ActivityLogSendToODBC

ActivityLogSendToODBC <data_source> <target_table_name> [/Wn] [/Uuser_name] [/Ppassword]

Exports activity log data from DBF files to the ODBC database. The connection to the ODBC database is maintained for the length of time specified by the wait (/W) parameter.

<*data_source*>	A valid ODBC data source name. If the name has a space embedded in it, enclose the name in quotes (“”).
<*target_table_name*>	The name of a table in the ODBC database where the data will be exported. If the table does not exist RSView32 attempts to create it.
[/W*n*]	The time the connection to the ODBC database will be maintained. If nothing is specified, the wait time defaults to about 5 minutes. A wait time of zero keeps the connection open until the project is stopped. This parameter allows frequent exports to the database without having to connect every time. Once the connection is established, RSView32 waits the specified time and, if another command is received to export data, the command is executed and the wait timer is reset. If no command is received within the wait time, the connection is closed.
[/U*user_name*]	A user ID that is valid on the data source.
[/P*password*]	A password that is valid on the data source.

ActivityOff

ActivityOff

Stops activity logging.

ActivityOn

`ActivityOn`

Starts activity logging.

Activity logging is on by default.

ActivityPrintOff

`ActivityPrintOff`

Turns off the printing of activity logging. By default, activity log printing is turned on when you start an RSView32 project.

ActivityPrintOn

`ActivityPrintOn`

Turns on the printing of activity logging if it has been turned off by the ActivityPrintOff command. By default, activity log printing is turned on when you start an RSView32 project.

ActivityViewer

`ActivityViewer`

Opens the Activity Log Viewer.

Alarm

`Alarm`

Opens the Alarm Setup editor.

AlarmEvent

`AlarmEvent <EventName> <EventType> [TagType] [/VTagValue] [/SSeverity] [/H“Timestamp”] [/L“LogMessage”]`

Creates an alarm event. Alarm events are not processed unless the AlarmOn command is issued, and alarm events stop being processed when the AlarmOff command is issued.

You cannot specify the threshold for an alarm.

<*EventName*> The name of the alarm event, up to 255 characters long. The event name must follow the syntax of a tag name, and can, but need not, be a tag name in the tag database. The alarm event name *cannot* be the name of an alarm tag.

<*EventType*> The type of alarm transaction, which must be one of the following:

[IntoAlarm] or [In]	Indicates that the tag has gone into alarm.
[OutOfAlarm] or [Out]	Indicates that the tag has gone out of alarm.
[InAndOut OfAlarm] or [InAndOut]	Indicates that an alarm has occurred, but the tag is again immediately out of alarm, such as a digital change–of–state alarm.

[*TagType*] The type of tag which must be one of:

[/A]	Analog
[/D]	Digital

If you don't specify either /A or /D, the alarm is assumed to be analog.

[/V*TagValue*] A floating–point value associated with the alarm event. If the floating–point value is not specified, the tag value is 0.0.

If the name of an alarm event is the name of a tag in the tag database, the value specified by this parameter will not update the tag's value in the value table.

[/S*Severity*] The alarm severity. The severity is an integer from 1 to 8. Alarm severity can be specified only for alarm events of type IntoAlarm, or InAndOutOfAlarm. If a value is not specified, the alarm severity is 1.

[/H*Time–stamp*] The time stamp associated with the alarm transaction, in the format:<HH:MM:SS>[*Date*]:

<HH:MM:SS> The 24–hour military format for time. You must use this format for indicating the time.

[*Date*] A date that can be specified in the same format as the Windows® date style configured for your computer. If you want to use a VBA program to set the date, you can use any date format that conforms to the MFC class COleDateTime. If you do not specify a date, the current date is used.

If you specify a time stamp for an alarm, the alarm may not appear as the most recent alarm in the \system\AlarmBanner tag, even if it was logged after an alarm with a more recent time stamp.

[/L*Log Message*] The alarm message, up to 132 characters long, to be logged to disk and/or printer. The log message can contain any of the placeholders available to alarm messages. If you do not specify a log message, the user default message is used.

AlarmLogOff

AlarmLogOff

Stops alarm logging.

AlarmLogOn

AlarmLogOn

Starts alarm logging.

Alarm logging is on by default.

AlarmLog Remark

AlarmLogRemark ["Text"] [/P] [/Sn] [/R] [/Ttagname]

Adds the specified text string as a transaction in the alarm log file.

[*"Text"*] A text string, up to 132 characters long. The text can contain the following placeholders:

- [\D] the current date
- [\T] the current time
- [\N] the tag name. If the tag is in a local tag database, you can also use the placeholders [\S] tag description and [\U] tag units.

[/P] Prompts the operator for a remark at runtime by displaying a dialog box containing a text box. The operator can type a remark up to 132 characters long. The remark can also include the placeholders shown above.

If both the Text parameter and the /P parameter are specified, the contents of the Text parameter will appear in the text field at runtime, and the operator can modify or add to the contents of the Text parameter before it is logged to the alarm log file. If the tag name (/T parameter) is specified, the prompt dialog box will display the tag name at runtime, but the operator cannot change the tag name.

[/S*n*] Associates an alarm severity with the remark. The severity is an integer from 1 to 8. This value is shown in the Severity column of the alarm log file. If the remark is logged to a printer, the alarm severity determines which printer will print the remark.

If both the /P parameter and the /S*n* parameter are specified, the prompt dialog box will display the

alarm severity at runtime, but the operator cannot change the severity.

[/R] Logs the remark to a printer as well as to the alarm log file. If the alarm severity is not specified (/S*n* parameter), the printer for Severity 1 is used. If no printer is assigned to the specified severity, the alarm log remark is not printed.

[/T*tagname*] The string that is logged in the Tagname column of the alarm log file. This string can be a tag name, the name of a user–generated alarm event, or any other string that matches the syntax of a tag name. You can use this parameter to correlate remarks with specific alarm transactions for generating reports later.

AlarmLogSendToODBC

`AlarmLogSendToODBC <data_source> <target_table_name> [/Wn] [/Uuser_name] [/Ppassword]`

Exports alarm log data from DBF files to the ODBC database. The connection to the ODBC database is maintained for the length of time specified by the wait (/W) parameter.

<*data_source*> A valid ODBC data source name. If the name has a space embedded in it, enclose the name in quotes (“”).

<*target_table_name*> The name of a table in the ODBC database where the data will be exported. If the table does not exist RSView32 attempts to create it.

[/W*n*] The time the connection to the ODBC database will be maintained. If nothing is specified, the wait time defaults to about 5 minutes. A wait time of zero keeps the connection open until the project is stopped.

This parameter allows frequent exports to the database without having to connect every time. Once

the connection is established, RSView32 waits the specified time and, if another command is received to export data, the command is executed and the wait timer is reset. If no command is received within the wait time, the connection is closed.

[/U*user_name*] A user ID that is valid on the data source.

[/P*password*] A password that is valid on the data source.

AlarmOff

AlarmOff

Stops alarm monitoring. Once this command has run, it displays a message indicating that alarm monitoring has stopped.

AlarmOn

AlarmOn [/H]

Starts alarm monitoring. Once this command has run, it displays a message indicating that alarm monitoring has started.

[/H] Turns on handshaking the moment alarm monitoring starts and sets the handshake bit for any tags in alarm at that moment.

To have alarming start when a project starts, open the Startup editor and click the Alarming check box.

AlarmPrintOff

AlarmPrintOff

Stops alarms from printing.

AlarmPrintOn

AlarmPrintOn

Starts alarm printing.

Alarm printing is on by default.

AlarmViewer

AlarmViewer

Opens the Alarm Log Viewer.

AppAbort

AppAbort <application>

Closes the specified Windows application.

<application> The name of a Windows application exactly as it appears in the application's title bar.

Example: The AppAbort command

If Notepad is open and contains an untitled file, the Notepad title bar will read Untitled – Notepad. To close Notepad you must type exactly what's in the Notepad title bar as follows:

AppAbort Untitled - Notepad

AppActivate

AppActivate <application>

Activates (pulls forward) the specified Windows application. The application must already be running. (You can use the AppStart command to start the application.)

<application> The name of the Windows application you want to activate. Typically, this is the name that appears in the application's title bar.

AppStart

AppStart <application>

Runs the specified application, which can be another Windows application or an "application extender" you've programmed.

<application> The path and executable required to start the program.

Examples: The AppStart command

AppStart c:windows\notepad c:\autoexec.bat
Opens Notepad and displays the autoexec.bat file.

AppStart c:\Program Files\Plus!\Microsoft Internet\Iexplore.exe
Opens Microsoft® Internet Explorer.

Beep

`Beep`

Runs a wave file to produce a sound from the computer speaker. The sound is a wave file assigned to the Default Beep in the Windows Control Panel.

Channel

`Channel`

Opens the Channel editor.

Class

`Class`

Opens the Scan Class editor.

CommandLine

`CommandLine`

Opens the command line.

ComStatus

`ComStatus`

Obsolete. Use ComStatusOff or ComStatusOn.

ComStatusOff

`ComStatusOff`

Stops logging of communication errors.

ComStatusOn

ComStatusOn

Starts logging of communication errors if RSView32 is set up to do so.

To log communication errors, ensure the Communications category is selected in the Activity Log Setup editor.

To have error logging automatically start when a project starts, open the Startup editor and click the Communication Status check box.

Database

Database

Opens the Tag Database editor.

DatabaseSync

DatabaseSync

Makes RSView32 convert the tag database into binary format the next time the project opens. Use this command if you change the tag database that a project uses (using the Project Paths dialog box), after changing a node's data source, or after changing a direct driver's device type.

To synchronize the tag database:

1. On the command line type **DatabaseSync**, and then press Enter.
2. Close the project.
3. Open the project. The database will be synchronized as the project opens.

DataLog

DataLog [file]

Without the parameter, opens the Data Log Setup editor. With the parameter, opens the specified data log file.

[*file*]	The name of a data log model you want to edit in the Data Log Setup editor. If you don't specify a file name, the editor opens so you can create a new model file.

DataLogChangeRate

DataLogChangeRate <file> <value> [unit]

Changes the periodic log rate. The change affects the current logging session only, and won't be retained if data logging is stopped and restarted.

<*file*>	The name of a data log model, without a file extension.
<*value*>	The numeric portion of the time interval for the log rate. For example, if you want to log data every 20 seconds, the value is 20. The value must be an integer from 1 to 64,000.
[*unit*]	The time unit of the log rate: hundredths, tenths, seconds, minutes, hours, or days. If you omit the [*unit*] parameter, the default is seconds.

DataLogMergeToPrimary

DataLogMergeToPrimary <parameter>

Moves data from the secondary or backup path to the primary path or ODBC database, for a specified model or for all models that are currently running.

<*file*>	The name of a data log model without a file extension.
*	Moves data for all models that are currently running.

You can use the DataLogMergeToPrimary<*file*> command whether or not the specified model is running. If a model is running when you issue the DataLogMergeToPrimary command, RSView32 switches back to the primary path or ODBC database. If a model uses the .dbf format, RSView32 moves all files on the secondary path (including the current file set) to the primary path, begins a new file set on the primary path, and continues logging to the new file set. If a model uses the ODBC format, RSView32 merges the ODBC backup files into the ODBC database and continues logging to the ODBC database.

DataLogNewFile

DataLogNewFile <parameter>

Creates a new data log file for the specified model or for all models, on the path RSView32 is currently logging to (either the primary path or the backup path). If RSView32 is logging to an ODBC database, RSView32 logs an End snapshot and then a Begin snapshot when you issue this command.

<file>	The name of the data log model without a file extension.
*	Creates new files for all models that are currently running.

DataLogOff

DataLogOff <parameter>

Stops data logging for a specified model or stops data logging for all models.

<file>	The name of a data log model without a file extension.
*	Stops data logging for all models.

DataLogOn

DataLogOn <file>

Starts data logging for the specified model.

<file>	The name of a data log model without a file extension.

To have data logging automatically start when a project starts, open the Startup editor, click the Data Logging check box and specify a file.

DataLogPath

DataLogPath <file>

Opens the Data Log Path editor. You can use the editor to change the primary and secondary paths for dBASE® IV data log models, and the backup path for ODBC data log models. You cannot change the ODBC database using the Data Log Path editor.

<*file*>	The name of a data log model without a file extension.

DataLogRenameFile

DataLogRenameFile <file> <LogFileIDString>

Changes the log file identifier string that is used as part of the file name for dBASE IV log files and ODBC backup files that use long file names. The change affects the current logging session only, including the current set of log files.

<*file*>	The name of a data log model, without a file extension.
<*LogFileID String*>	The log file identifier string, up to 20 characters.

DataLog Snapshot

DataLogSnapshot <parameter>

Logs one snapshot of data to the data log file, for the specified model or all models.

<*file*>	The name of the data log model without a file extension.
*	Logs a snapshot of data for all models that are running.

IMPORTANT The data log model must be running before the DataLogSnapshot command is issued.

DataLogSwitchBack

`DataLogSwitchBack <parameter>`

Switches data logging back to the primary dBASE IV file path or ODBC database for the specified model or for all models. This command switches data logging for a model only if the model is running, RSView32 is logging data to the secondary or backup path, and the primary path or ODBC database is available. For .dbf files, RSView32 creates a new set of files when it switches back to the primary path.

<*file*>	The name of the data log model without a file extension.
*	Switches data logging for all models that meet the conditions outlined above.

DDEExecute

`DDEExecute <application>|<topic> <command>`

Sends a command or series of commands to an application through a DDE channel.

<*application*>	The name of the server application you want to send a command to. This is usually the name of the application's .exe file without the .exe extension.
<*topic*>	The name of the subject of the communication, preceded by the | character. Many applications that support DDE recognize a topic named System, which is always available.
<*command*>	A command or series of commands recognized by the server application. Multiple commands must be in one string.

If the command string contains an exclamation mark (!), enclose the string in quotes. If the string includes quotes, use double quotes.

IMPORTANT Before using the DDEExecute command, the server application must be running (but it can be minimized).

Examples: The DDEExecute command

DDEExecute RSlinx|__Drivers [Who_Active()]
Sends the Who_Active command, which displays the default RSLinx® RSWho window.
Drivers must be preceded by two underscores.

DDEExecute WINAB5|SYSTEM .SR 3
Sends WINtelligent LOGIC 5™ (WINAB5) the Dot command SR 3, which means search for Rung 3.

DDEExecute WINAB5|SYSTEM .UI
Sends WINtelligent LOGIC 5 (WINAB5) the Dot command UI, which displays the System Information window.

DDEExecute Winrecip|IcomDdeExe [CONTROL_PANEL_DEFAULTS ()]
Sends WINtelligent RECIPE™ the CONTROL_PANEL_DEFAULTS command, which opens the default WINtelligent RECIPE Control Panel.

DDEPokeDisable

DDEPokeDisable

Obsolete. Use RTDataWriteDisable.

DDEPokeEnable

DDEPokeEnable

Obsolete. Use RTDataWriteEnable.

DDEServerOff

DDEServerOff

Obsolete. Use RTDataServerOff.

DDEServerOn

DDEServerOn

Obsolete. Use RTDataServerOn.

Define

Define <symbol> [string]

Creates a symbol. A symbol is an abbreviation for a command or a command with parameters. The symbol can be used anywhere a command can be used. You cannot nest symbols.

Symbol definitions are valid only during the current session; they must be re–defined each time RSView32 is restarted. Symbols are typically defined in a startup or login macro.

<*symbol*>	The abbreviated command. It cannot contain spaces.
[*string*]	An existing command with or without parameters. It can contain spaces and other non-alphanumeric characters. Omitting the [*string*] parameter deletes the symbol definition.

See also Undefine.

Examples: The Define command

Define Di Display

Creates the symbol Di for the command Display. Typing Di as a command in any valid command syntax will have the same effect as typing Display.

Define Show Display Overview /CC

Creates the symbol Show for the command Display Overview /CC. Whenever Show is used, the graphic called Overview is displayed in the center of the screen.

Define Di

Deletes the symbol Di.

Derived

Derived [file]

In edit mode, without the parameter opens the Derived Tag editor. With the parameter, opens the specified derived tag file.

[*file*]	The name of a derived tag file without a file extension.

DerivedOff

DerivedOff <file>

Stops running the specified derived tag file.

<*file*>	The name of a derived tag file without a file extension.

DerivedOn

DerivedOn <file>

Starts running the specified derived tag file.

<*file*>	The name of a derived tag file without a file extension.

To have a derived tag file automatically start when a project starts, open the Startup editor, click the Derived Tags check box and specify a file.

Display

Display <file> [/B] [/E] [/U] [/O] [cache] [/Pfile] [/Ttag_name] [/Hnnn] [/Wnnn] [/Min] [/Max] [position]

Runs the specified graphic display file. Parameters specified here override settings in the Display Settings dialog box in the Graphic Display editor.

If you are using the Cache After Displaying option in the Display Settings dialog to cache displays, use the position parameters with the Display command to ensure that displays open in the correct position after caching. Otherwise, if a user moves a display at runtime, the new position is remembered by the cache option.

Do not cache more than 200 displays using the [*cache*] parameter and/or the Cache After Displaying option.

<*file*> The name of a graphic display file without a file extension.

[/B] Displays the specified graphic display in the background.

[/E] Disables the Enter key so it does not download values in numeric input fields to the programmable controller or server, unless the Display On-Screen Keyboard option is selected (in the Behavior tab of the Display Settings dialog box).

[/U] Updates tag values in all input fields when the display first opens.

[/O] Suppresses the display of the key list.

[*cache*] Specifies how to load the specified graphic display into the display cache, as follows:

/Z Loads the specified graphic display into the cache (but does not make it visible), so the display appears quickly when it is first used.

/ZA Loads the specified graphic display into the cache (but does not make it visible) and continually updates the graphic display, even when it is not visible. For example, use /ZA for a display that contains a real-time trend, so that the trend displays data for its entire time range when you view it.

To remove all displays from the cache, use the FlushCache command. To remove a particular

display from the cache, use the FlushCache [*file*] command.

[/P*file*] The name of the parameter file that contains the tag names to be substituted for placeholders in the display. If the display does not contain placeholders, do not use this parameter.

If the parameter file has a long file name, enclose the file name in quotes, for example /P"Long file name".

[/T*tag_name*] One or more tags, separated by commas and no spaces, to be substituted for placeholders in the display. If the display does not contain placeholders, do not use this parameter.

[/H*nnn*] Specifies the height of the graphic display in pixels.

[/W*nnn*] Specifies the width of the graphic display in pixels.

[/Min] Runs the graphic display minimized (as an icon).

[/Max] Runs the graphic display maximized (full–screen size).

[*position*] Specifies the position of the window as follows:

/Q1	top right corner
/Q2	top left corner
/Q3	bottom left corner
/Q4	bottom right corner
/CT	centered in the top half
/CB	centered in the bottom half
/CL	centered on the left side
/CR	centered on the right side
/CC	centered in the screen
/X*nnn*	*nnn* pixels from the left edge
/Y*nnn*	*nnn* pixels down from the top

Examples: The Display command

Display Sample
The first time the graphic display called Sample is opened, it will be positioned and sized as specified in its Display Settings dialog box. When the display is closed, its size and position will be saved, so the next time it is opened it will be the same size and position as when it was last closed.

Display Picture /PNames /CB
Positions the graphic display called Picture in the bottom half of the screen, using the file called `Names` to replace tag placeholders with tag names.

Display Picture /H300 /W400 /CC
Makes the graphic display called Picture 300 pixels high and 400 pixels wide, and positions the display in the center of the screen.

Example: Replacing tag placeholders in a graphic display

If a graphic display called Canning uses three tag placeholders, and you want to substitute tags for canning corn, you would type:

Display Canning /Tcorn\off,corn\on,corn\weight
Placeholder #1 is replaced by the corn\off tag, placeholder #2 is replaced by the corn\on tag, and placeholder #3 is replaced by the corn\weight tag.

Download

Download

Writes the value in the selected input field of the active graphic display to the programmable controller or server.

This command operates on the active graphic display. If no display is active, this command is ignored.

Ctrl–PgDn also downloads the value in the selected input field.

The Enter key also downloads the value in the selected input field. However, if the /E parameter is used with the Display command, the Enter key is disabled, unless the Display On-Screen Keyboard option is selected (in the Behavior tab of the Display Settings dialog box). If the selected input field is a recipe field, pressing the Enter key opens the Recipe dialog box.

DownloadAll

DownloadAll

Writes the values in all input fields of the active graphic display to the programmable controller or server.

This command operates on the active graphic display. If no display is active, this command is ignored.

PgDn also downloads all the values in the input fields.

DriverPrimary

DriverPrimary <channel>

Switches from the secondary driver to the primary driver on the specified channel.

<*channel*>	The number of the channel (1 through 4) that is being switched from its secondary to primary driver.

DriverSecondary

DriverSecondary <channel>

Switches from the primary driver to the secondary driver on the specified channel.

<*channel*>	The number of the channel (1 through 4) that is being switched from its primary to secondary driver.

DriverToggle

DriverToggle <channel>

Switches from the current driver to the one not being used on the specified channel.

<*channel*>	The number of the channel (1 through 4) that is being switched from one driver to another.

EchoOff

EchoOff

Stops logging commands to the activity log file. Other activities, such as errors and tag values, are still logged.

This command is normally used in macros to prevent the contents of the macro from being logged.

EchoOn

EchoOn

Restores logging to normal after an EchoOff command.

Event

Event [file]

In edit mode, without the parameter, opens the Events editor; with the parameter, opens the specified event file.

[*file*]	The name of an event file without a file extension.

EventOff

EventOff <file>

Stops running the specified event file.

<*file*>	The name of an event file without a file extension.

EventOn

EventOn <file>

Starts running the specified event file.

<file>	The name of an event file without a file extension.

To have an event file automatically start when a project starts, open the Startup editor, click the Event Detector check box and specify a file name.

FlushCache

FlushCache [file]

Without the parameter, unloads all graphic displays from the display cache. With the parameter, unloads the specified graphic display from the display cache.

[*file*]	The name of a graphic display file without a file extension.

Displays can be added to the cache by using the [*cache*] parameter with the Display command or by selecting the Cache After Displaying option in the Display Settings dialog box of the Graphic Display editor. You can cache up to 200 graphic displays.

If a display uses the Always Updating option with the Cache After Displaying option, the display's shutdown command is executed when you issue the FlushCache command.

FTDataServerOff

FTDataServerOff

Stops running the FactoryTalk® live data server. This command has no parameters.

FTDataServerOn

FTDataServerOn

Runs the FactoryTalk® live data server, allowing FactoryTalk clients to read RSView32 tags and other live data. This command has no parameters.

FTDataWrite Disable

FTDataWriteDisable

Stops FactoryTalk Clients from writing values to RSView32 tags. This command has no parameters.

FTDataWrite Enable

FTDataWriteEnable

Allows FactoryTalk clients to write values to RSView32 tags. This command has no parameters.

Graphic

Graphic [file]

In edit mode, without the parameter, opens the Graphic Display editor; with the parameter, opens the specified graphic display file.

[*file*]	The name of a graphic file without a file extension.

HandshakeOff

HandshakeOff

Disables alarm handshaking, regardless of whether the individual handshake bits are configured. This command gives no indication that it has run but will display an error message if not executed properly.

HandshakeOn

HandshakeOn

Enables alarm handshaking. By default this setting is off. Handshaking can be disabled with the HandshakeOff command. This command gives no indication that it has run but will display a message if not executed properly.

IMPORTANT This command will not set the handshake bit for any tag already in alarm when the command is executed.

Help

Help [word] [/Ffile]

Displays a Windows help file.

[*word*] A word you want to search for in the help file. When you specify a search word, the command will either:

- open the help file at a topic if the word uniquely identifies that topic
- open a list of related topics

[/F*file*] The name of a Windows help file. The default help file is for RSView32.

If no search word is specified, the command opens the RSView32 help file and displays the Contents topic.

Identify

Identify [tag_name]

Runs the command or macro associated with the named tag, whether or not the tag is in alarm.

[*tag_name*] The name of the tag in alarm. The command or macro associated with this tag will run. If no tag name is specified, the Identify command runs the command or macro associated with the most recent, most severe unacknowledged alarm.

[tag] Specifying the word "tag" inside square brackets runs the identify command for the tag associated with the highlighted object in the active graphic display.

Running the Identify command is not the same as acknowledging an alarm.

IMPORTANT When many alarms are occurring rapidly, do not use the Identify command without a tag name. A new alarm could become the current alarm before the Identify command runs, and the command or macro that runs might not be the one expected.

Examples: The Identify command

Identify Hopper1\Divider

Runs the Identify command or macro for the tag Hopper1\Divider, whether or not the tag is in alarm.

Identify [tag]

Runs the Identify command or macro for the selected tag in the active graphic display.

Identify

Runs the Identify command or macro for the most recent, most severe unacknowledged alarm.

Invoke

`Invoke <parameter>`

Use this command with ActiveX® objects. Use the command to:

- call an object's method
- assign the value returned by a method to a tag
- set an object's property to a tag value or a constant
- set a tag to the value of an object's property

The easiest way to specify the <*parameter*> string for the Invoke command is to use the Command Wizard.

The syntax for this command has four variations:

- *file.object.method(parameter1, parameter2, . . .)* calls an object's method

file	The name of the graphic display that contains the ActiveX object
me	An alternative to using *file*. At runtime it resolves to the graphic file that has focus.

object The name of the ActiveX object as specified in the Object Name dialog box in the Graphic Display editor.

method The name of a function or sub–routine in the ActiveX object. The method is initiated by an external event such as the Invoke command.

parameter The tag name or constant that the method will use. You must specify all of the parameters, even those that are optional.

- *tag_name=file.object.method(parameter1, parameter2, . . .)* assigns the value returned by a method to the specified tag

  tag_name The name of the tag to which the value returned by the method will be assigned.

- *file.object.property(tag_name or constant)* sets an object's property to the specified tag's value or to a constant value

- *tag_name=file.object.property* sets the specified tag's value to the value of the object's property

Key

`Key <parameter>`

Starts or stops running the global key file.

<*parameter*> is one of the following:

file The name of a global key file without a file extension.

/R Stops running the global key file.

To have a global key file automatically start when a project starts, open the Startup editor, click the Global Key File check box and specify a file.

KeyEdit

KeyEdit [file]

Without the parameter, opens the Global Key editor. With the parameter, opens the editor and the specified file.

[*file*]	The name of a key file without a file extension.

LInsertStringTag

LInsertStringTag [sheet] [tagname series]

Use this command to select one or more string tags from the tag database and insert the tag names to an Excel spreadsheet if the tags do not exist in the spreadsheet.

[*sheet*]	The spreadsheet name of Excle file.
[*tagname series*]	A series of tag names.

Make sure Microsoft Excel has been installed before using this command.

If the inserted tags have already existed in the Excel file, there will be a warning message logged into Activity Bar.

System string tags cannot be inserted in the spreadsheet by executing LInsertStringTag command.

Login

Login [username] [password]

Logs users into the system. To log in, users must have an account in the User Accounts editor.

[*username*]	The user's name as defined in the User Accounts editor.
[*password*]	The user's password as defined in the User Accounts editor. If this parameter is omitted, a window appears prompting the user to enter the password.

Using this command with both parameters logs the user into the system. Using this command with only one parameter displays the login dialog box.

Logout

Logout

Logs the current user off the system.

LTagSubstitute

LTagSubstitute [language] [sheet]

Use this command to substitute string values of all the tags specified in the selected spreadsheet with the selected language.

[*language*]	The selected language name.
[*sheet*]	The spreadsheet name of Excel file.

Space is not allowed in Excel spreadsheet name.

The Excle file is created automatically with the project name and located in the current project folder by default. Its name and location can not be changed, or the commands LTagSubstitute and LInsertString will not work.

MacroEdit

MacroEdit [file]

Without the parameter, opens the Macro editor. With the parameter, opens the specified macro file.

[*file*]	The name of a macro file without a file extension.

Monitor

`Monitor [file][/Xnnn] [/Ynnn][/Ttag_name]`

In edit mode, without the [*file*] parameter, opens the Tag Monitor editor; with the [*file*] parameter, opens the specified tag monitor file.

In run mode, with the [*file*] parameter, opens the specified tag monitor file. With the [/T*tag_name*] parameter, opens a tag monitor containing the specified tags.

[*file*]	The name of a tag monitor file without a file extension.
[/X*nnn*]	Positions the tag monitor *nnn* pixels from the left edge of the screen. The width depends on screen resolution.
[/Y*nnn*]	Positions the tag monitor *nnn* pixels from the top edge of the screen. The height depends on screen resolution.
[/T*tag_name*]	The name of a tag. You can use wildcards and can name more than one tag. Precede each tag name with a space and /T.

You can monitor up to 100 tags in one file.

Examples: The Monitor command

Monitor /THopper1\Flow
Opens a tag monitor displaying the tag Hopper1\Flow.

Monitor /THopper1\Flow /THopper\Temp
Opens a tag monitor displaying the tags Hopper1\Flow and Hopper\Temp.

Monitor /T*
Displays information on the first 100 tags in the tag database.

Monitor /THopper*\Divider
Displays information on the first 100 tags called Divider from all folders beginning with Hopper.

Monitor Bread
Displays the tag monitor file called Bread.

NextPosition

NextPosition

Moves focus to the object with the next highest index number.

This command operates on the active graphic display. If no display is active, this command is ignored.

Tab also moves focus to the object with the next highest index number.

See also Position and PrevPosition.

NextWindow

NextWindow

Moves focus to another open graphic display.

Ctrl–Tab and Ctrl–F6 also move focus to another open graphic display.

See also PrevWindow.

Node

Node

Opens the Node editor.

NodeDisable

NodeDisable <node name>

Disables the specified node.

<*node name*> The name of the node you want to disable.

NodeEnable

NodeEnable <node name>

Enables the specified node.

<*node name*> The name of the node you want to enable.

NodeSwitch

NodeSwitch <node name> <parameter>

Permanently changes a device node's address, an OPC® node's computer name, server name, and access path, or a DDE node's application and topic.

<*node name*>	The name of the node that you want to switch to another programmable controller address, server, or application.

<*parameter*> is one of the following:

station	For device nodes, the physical address for the programmable controller you want to switch to.
*computer name**server name*[|*access path*]	For OPC servers, the computer name, server name, and access path (if in use) for the OPC server you want to switch to. Separate the access path from the server name with the | character.
application|*topic*	For DDE servers, the application and topic, separated by the | character, for the DDE server you want to switch to.

When you use the NodeSwitch command to change a node's address or server information, the change appears in the Node editor's spreadsheet. If the Node editor is open when you use the command, the change won't appear until you've refreshed the display by closing and re–opening the editor.

Parameter

Parameter [file]

In edit mode, without the parameter, opens the Parameter editor; with the parameter, opens the specified parameter file.

[*file*]	The name of a parameter file without a file extension.

Password

`Password`

Displays the Password dialog box so users can change their password. Users must already be logged in to use this command.

Pause

`Pause <seconds>`

Specifies a pause between the execution of two commands. You can use this command in macros, from the command line, or as an action for a button.

All commands or macros that follow the Pause command must not be asynchronous (preceded by the & sign), otherwise the Pause command has no effect.

<*seconds*>	The number of seconds that will elapse between the execution of the first and second command.

PlayWave

`PlayWave <file>`

Plays the specified wave file.

<*file*>	The complete path to the wave file, including the .wav extension.

Position

`Position <n>`

Moves focus to the object with the specified index number.

<*n*>	The object's index number.

These are the objects that use index numbers:

- numeric and string input objects
- buttons
- objects to which you have assigned object keys

This command operates on the active graphic display. If no display is active, this command is ignored.

See also PrevPosition and NextPosition

PrevPosition

PrevPosition

Moves focus to the object with the previous index number.

This command operates on the active graphic display. If no display is active, this command is ignored.

Shift–Tab also moves focus to the object with the previous number.

See also Position and NextPosition.

PrevWindow

PrevWindow

Moves focus to another open graphic display.

Ctrl–Shift–Tab and Ctrl–Shift–F6 also move focus to another open graphic display.

See also NextWindow.

PrintDisplay

PrintDisplay [parameter] [/Wait=tttt] [/U] [/Pfile] [/Ttag_name]

Prints the specified graphic display to the default printer. If no display is specified, prints the display that has focus.

[*parameter*] Specifies which graphic display to print, as follows:

- *file* The name of a graphic display file without a file extension.
- me The current graphic display (the display from which the command is executed).

[/Wait=*tttt*] Specifies the amount of time to wait before starting to print, where *tttt* is the time in milliseconds. If you use the /U parameter, specify enough time to allow for the upload of tag values. If you do not specify a time, the default is 2000 milliseconds.

[/U]	Initiates an update of tag values in all input fields before starting to print. This parameter is not necessary with input fields that are updated continuously.
[/P*file*]	Specifies the name of a parameter file that contains tag names to be substituted for placeholders in the display.
[/T*tag_name*]	Specifies one or more tag names to be substituted for placeholders in the display. Separate multiple tag names with commas; do not use spaces.

If the specified display is not currently visible, RSView32 prints the display without making it visible. If this command is issued without specifying a display, and no display has focus, RSView32 logs an error to the activity log.

PrintDisplay prints the entire runtime display, even if parts are covered by other displays. However, PrintDisplay does not necessarily print ActiveX or OLE objects in their runtime state.

The ScreenPrint command prints an image of whatever shows on the monitor. Use ScreenPrint to ensure that the display is printed showing all objects in their current, runtime state (provided they are not covered by other displays).

If you issue the PrintDisplay command when RSView32 is in Edit mode, RSView32 sends the last-saved version of the display file to the printer. Any changes you make after saving the display are not reflected in the printout. To ensure the printout is up-to-date, save the display before printing it.

Project

Project

Obsolete. Use ProjectHide, ProjectRun, ProjectShow, or ProjectStop.

ProjectHide

```
ProjectHide
```

Hides the Project Manager so it is not visible on the screen.

Ctrl-Alt-P also hides the Project Manager if it is visible.

ProjectRun

```
ProjectRun
```

Starts running the project. This is the same as choosing the Run Project button in the Run Mode tab of the Project Manager.

ProjectShow

```
ProjectShow
```

Displays a hidden Project Manager.

Ctrl-Alt-P also shows the Project Manager if it is hidden.

ProjectStop

```
ProjectStop
```

Stops running the project. This is the same as choosing the Stop Project button in the Run Mode tab of the Project Manager.

PullForward

```
PullForward <file>
```

Moves the specified graphic display in front of all other windows. If the specified graphic display is of the Replace or Overlay type, and a display of the On Top type is open, PullForward positions the specified display behind the back-most On Top display and gives the specified display focus.

<*file*>	The name of an open graphic display file without a file extension.

If the specified display is of the Replace or Overlay types, and if no other Replace or Overlay displays are open, nothing happens when you issue this command.

PushBack

PushBack <file>

Moves the specified graphic display behind all other windows. If the specified graphic display is of the On Top type, PushBack positions the display behind any other open On Top displays, and in front of any open displays of the Replace or Overlay type.

<*file*> The name of an open graphic display file without a file extension.

If the specified display is of the On Top type, and if no other On Top displays are open, nothing happens when you issue this command.

Quit

Quit [/R]

Quits RSView32, stopping all project components, and returns to Windows.

[/R] Restarts the computer.

Ramp

Ramp [/V] <tag_name> <value>

Increases or decreases a tag value by a particular value or by another tag's value.

Use this command only with analog tags.

[/V] Performs a read immediately after the write to verify that the value was altered in the programmable controller or server.

This parameter is useful if the network is in poor condition or susceptible to noise interference.

If the verification fails, the error message is logged to the activity log, activity bar, or printer using the Tag Write category. Specify where to send Tag Write errors using the Categories tab of the Activity Log Setup editor.

<*tag_name*> The name of an analog tag.

<*value*> The amount to add or subtract from the current programmable controller value, as follows:

- plus (+) or minus (-) a numeric value
- plus (+) or minus (-) a percentage of a numeric value in the form: +value%
- plus (+) or minus (-) a tag

If Ramp calculates a value that is outside of the tag's minimum and maximum range, it will write the highest or lowest allowable value to the programmable controller or server.

IMPORTANT If you use the Ramp command in a macro, you must use two percent signs (%%) instead of one. A single percent sign is used in a macro to indicate a parameter. For example, to create a macro that increases the value of tag1 by 75%, you would type: Ramp tag1 + 75%%

Examples: The Ramp command

Ramp Hopper1\Level +50%
If the value of Hopper1\Level is 100, Min = –100 and Max = 900, the command writes the value 600 to the programmable controller.

Ramp Hopper1\Level +75%
If Hopper1\Level is 900, Min = 0 and Max = 1000, the command writes 1000 to the programmable controller because this is the highest allowable value.

Ramp Hopper1\Level delta
If Hopper1\Level is 1000 and delta is –200, the command writes 800 to the programmable controller.

RecipeEdit

RecipeEdit [file]

Without the parameter, opens the Recipe editor. With the parameter, opens the specified recipe file.

[*file*]	The name of a recipe file without a file extension.

RecipeRestore

RecipeRestore <file>

Reads the values from a recipe file into all input fields in the active graphic display. This command is used with the Recipe field.

<*file*>	The name of the file, without a file extension, tag values are read from.

This command operates on the active graphic display. If no display is active, this command is ignored.

RecipeSave

RecipeSave <file>

Saves the values in all input fields of the active graphic display to a recipe file. This command works with the Recipe field.

<*file*>	The name of the file, without a file extension, to which the values will be saved. If a file of this name does not exist, it is created. If a file of this name does exist, this command prompts you to overwrite it.

This command operates on the active graphic display. If no display is active, this command is ignored.

Remark

Remark <comment>

Writes a text string to an activity log file, which is useful for operators to store comments.

<comment> A string up to 132 characters long. The string can contain any characters, including spaces. Enclose the exclamation mark (!) and the semi–colon (;) in single or double quotes.

To log comments, the Remarks category must be selected in the Activity Log Setup editor.

RTDataServer Off

RTDataServerOff

Stops running the RSView32 real-time data server.

RTDataServerOn

RTDataServerOn [/Quiet] [/NetDDE]

The RSView32 OPC or DDE server is also known as the real-time data server. This command runs the RSView32 real-time data server, allowing OPC and DDE client applications to read (but not write) tag values.

To enable writes, use the RTDataWriteEnable command.

[/Quiet] Makes RSView32 use the current Remote Users accessibility setting in the Windows Registry. Without this parameter or if the setting is not configured correctly, RSView32 displays a dialog box that allows you to specify the setting when you issue the command.

[/NetDDE] Enables RSView32 as a NetDDE server to remote DDE clients. If the real-time data server is already running, this parameter is ignored.

RTDataWrite Disable

RTDataWriteDisable [/Quiet] [/NetDDE]

Disables writes by external Windows applications running OPC or DDE, so these applications cannot change tag values in RSView32.

The RSView32 OPC or DDE server is also known as the real-time data server. If the RSView32 real-time data server is not running—that is, if the RTDataServerOn command has not been run—RTWriteDisable also starts the RSView32 real-time data server.

[/Quiet] Makes RSView32 use the current Remote Users accessibility setting in the Windows Registry. Without this parameter or if the setting is not configured correctly, RSView32 displays a dialog box that allows you to specify the setting when you issue the command.

[/NetDDE] Enables RSView32 as a NetDDE server to remote DDE clients. If the real-time data server is already running, this parameter is ignored.

By default, writes are disabled. Therefore, the RTDataWriteDisable command is required only after the RTDataWriteEnable command has been used.

RTDataWrite Enable

RTDataWriteEnable [/Quiet] [/NetDDE]

Enables writes by external Windows applications using OPC or DDE, so these applications can change tag values in RSView32.

The RSView32 OPC or DDE server is also known as the real-time data server. If the RSView32 real-time data server is not running—that is, if the RTDataServerOn command has not been run—RTDataWriteEnable also starts the RSView32 real-time data server.

[/Quiet] Makes RSView32 use the current Remote Users accessibility setting in the Windows Registry. Without this parameter or if the setting is not configured correctly, RSView32 displays a dialog box that allows

you to specify the setting when you issue the command.

[/NetDDE] Enables RSView32 as a NetDDE server to remote DDE clients. If the real-time data server is already running, this parameter is ignored.

By default, writes are disabled.

ScreenPrint

`ScreenPrint`

Generates a screen print on the default printer specified in Windows.

See also PrintDisplay.

Security

`Security`

Opens the Security Codes editor. To prevent users from changing security at runtime, restrict access to this command.

SendKeys

`SendKeys <"keystring">`

Sends the specified keystrokes to the active window.

<"*keystring*"> A list of keys. The quotes must be included.

The following syntax rules apply:

- Use braces { } to enclose special keys, such as F3 or Enter; for example, "{Enter}" sends Enter.
- Use ^ to send a control key. For example, "^{F2}" sends Ctrl–F2.
- Use + to send a shift key. For example, "+{F3}" sends Shift–F3.
- Use % to send an alt key. For example, "%A" sends Alt–A.

Special keys can be in upper and/or lower case letters. You can type any of the following to represent the special keys on the keyboard:

Backspace, BkSp, BS	Insert
End	Left
Enter	PgDn
Escape, Esc	PgUp
Delete, Del	PrtSc
Down	Right
F1 to F12	Tab
Home	Up

Set

`[&]Set [/V] <tag_name> <value>`

Writes a value to a tag.

IMPORTANT If a node has been disabled, the Set command changes the value in the value table but not in the programmable controller.

[&] Forces the command to be executed asynchronously, which makes the command faster.

[/V] Performs a read immediately after the write to verify that the value was altered in the programmable controller or server.

This parameter is useful if the network is in poor condition or susceptible to noise interference.

If the verification fails, the error message is logged to the activity log, activity bar, or printer using the Tag Write category. Specify where to send Tag Write errors using the Categories tab of the Activity Log Setup editor.

<*tag_name*> The name of a tag.

<*value*> is one of the following, depending on the tag type:

For analog tags:

- Numeric value within the range specified by the tag's minimum and maximum values.
- Percentage of the total min/max range. The formula is: value = min + percentage/100 * (max – min)
- Tag name of another analog or digital tag.

For digital tags:

- Numeric value of 0 or 1.
- Tag's on or off label specified in the tag database. Setting a digital tag to its on label writes the value 1, and setting the tag to its off label writes the value 0.
- Name of another analog or digital tag. If it is an analog tag with a value that is *not* 0, the value 1 is written to the digital tag, otherwise the value 0 is written.

For string tags:

- String enclosed in quotation marks. The string can contain any character and can include spaces.
- Name of another string tag.

Examples: The Set command

Set Hopper1\Flow 10
Hopper1\Flow is a tag. This command writes the value "-10" to the programmable controller or server.

Set Hopper1\Level 50%
Hopper1\Level is a tag with the minimum specified as -100 and the maximum defined as 900. This command writes the value "-400" to the programmable controller or server.

Set Valve\23 open
Valve\23 is a digital tag with its on label configured as open. This command uses the on label for the tag to write the value "1" to the programmable controller or server.

Set Hopper1\Level Preset
Hopper1\Level is a tag and Preset is a tag with a value of "90." This command writes "90" to the programmable controller or server.

Set String\string1 "open"
String\string1 is a string tag. This command writes "open" to the programmable controller or server.

SetFocus

SetFocus <file>

Sets the focus to a particular graphic display.

<*file*>	The name of a graphic display file without a file extension.

Silence

Silence <tag_name>

If the alarm for the specified tag is configured to use the internal bell, this command silences the computer's sound.

If the alarm for the specified tag is configured to use the external bell, this command resets the tag associated with the external bell and silences the associated audio device.

<*tag_name*>	The name of a tag that is in alarm. You can use wildcards.

SilenceAll

SilenceAll

Silences the internal and external bells for all tags in alarm.

Using this command is faster than using the Silence command with the asterisk (*) wildcard.

StartupConfig

`StartupConfig`

Opens the Startup editor.

Summary

`Summary <file> [/Xnnn] [/Ynnn]`

Runs the specified alarm summary file.

<*file*>	The name of an alarm summary file without a file extension.
[/X*nnn*]	Positions the X coordinate of the alarm summary window to *nnn* pixels from the left edge of the screen. Valid range depends on screen resolution.
[/Y*nnn*]	Positions the Y coordinate of the alarm summary window to *nnn* pixels from the top edge of the screen. Valid range depends on screen resolution.

Suppressed

`Suppressed`

Opens the Suppressed List editor.

SuppressOff

`SuppressOff <tag_name>`

Restores alarm reporting for the specified suppressed alarm.

<*tag_name*>	The name of a tag that no longer requires alarm suppression. You can use wildcards.

SuppressOffAll

`SuppressOffAll`

Restores alarm reporting for all suppressed alarms.

This command is faster than the SuppressOff * command.

SuppressOn

`SuppressOn <tag_name>`

Suppresses reporting of alarms for the specified tag.

<tag_name> The name of a tag, or a wildcard.

This command is useful when equipment repairs or maintenance would otherwise result in alarms being generated. All alarms for each threshold of the monitored tag are suppressed. Alarm suppression can take place before or after issuing the AlarmOn command.

Toggle

`Toggle [/V] <tag_name>`

Reads the tag's value and writes back a 1 or 0 as follows:

- if the tag value is 0, Toggle changes it to 1
- if the value is not 0, Toggle changes it to 0

[/V] Performs a read immediately after the write to verify that the value was altered in the programmable controller or server.

This parameter is useful if the network is in poor condition or susceptible to noise interference.

If the verification fails, the error message is logged to the activity log, activity bar, or printer using the Tag Write category. Specify where to send Tag Write errors using the Categories tab of the Activity Log Setup editor.

<tag_name> The name of an analog or digital tag.

Undefine

Undefine <symbol>

Deletes a symbol definition that was created using the Define command.

Example: The Undefine command

Undefine test
Deletes the definition for the symbol "test" that was previously created with the Define command.

Undefine *
Deletes all symbol definitions.

See also Define.

Upload

Upload

In a graphic display, reads a value from the programmable controller or server and displays it in the selected input field.

This command operates on the active graphic display. If no display is active, this command is ignored.

Ctrl–PgUp also uploads the value to the selected input field.

UploadAll

UploadAll

In a graphic display, reads values from the programmable controller or server and displays them in all the input fields.

This command operates on the active graphic display. If no display is active, this command is ignored.

PgUp also uploads all the values to the input fields.

VBAEdit

VBAEdit [program_name]

Opens the VBA integrated development environment (IDE) so you can edit a VBA program.

[*program_name*]	Any Sub statement in the ThisProject module. If you don't specify a program name, the IDE opens at the first program. If you specify a program name, the IDE opens with the cursor at the specified Sub statement. The program name is not case sensitive.

VBAExec

VBAExec <program_name> [parameters]

Runs a VBA program.

<*program_name*>	The name of the program as specified in the Sub statement.
[*parameters*]	Any argument that a particular program requires. Separate arguments must be separated with commas.

Appendix

B System tags

System tags are preconfigured tags created by RSView32™. Use system tags for read–only applications in your project.

Alarms

The following tags display alarm information:

Tag Name	Type	Displays information about
system\AlarmBanner	String	The most recent, most severe alarm. If an alarm of an equal or higher severity occurs, it replaces the first alarm, even if the previous alarm has not been acknowledged.
system\AlarmMostRecentDate	String	The date of the most recent, most severe alarm.
system\AlarmMostRecentLabel	String	The threshold label of the tag of the most recent, most severe alarm.
system\AlarmMostRecentSeverity	Analog	The severity of the most recent, most severe alarm.
system\AlarmMostRecentTagDesc	String	The description of the tag of the most recent, most severe alarm.
system\AlarmMostRecentTagname	String	The name of the tag of the most recent, most severe alarm.
system\AlarmMostRecentTime	String	The time of the most recent, most severe alarm.
system\AlarmMostRecentUnits	String	The units of the most recent, most severe alarm.
system\AlarmStatus	String	The number of unacknowledged and suppressed alarms.

Tag Name	Type	Displays information about
system\AlarmSummaryItems	Analog	The number of alarm transactions in an unfiltered alarm summary.
system\AlarmSummaryItemsUnacked	Analog	The number of unacknowledged alarms in an unfiltered alarm summary.
system\AlarmSuppressedCount	Analog	The number of tags with alarm suppression turned on.

Communications

The following tags record device communication information. These tags are added to the system folder when you configure a channel in the Channel editor. Each channel you configure will have these four tags. The number on the end identifies the tags for each channel. For example, system\ComErrorString1 is for channel 1.

To report communication errors, issue the ComStatusOn command.

Tag Name	Type	Displays information about
system\ComErrorString1	String	Most recent device error message.
system\ComErrorValue1	Analog	Internal number of most recent device error.
system\ComStatusString1	String	Current status of device communications. Will be the same as system\ComErrorString1 if the error condition still exists.
system\ComStatusValue1	Analog	Internal number indicating current status of device communications. Will be the same as system\ComErrorValue1 if the error condition still exists.

The following tags record OPC® client communication information. These tags are added to the system folder when you configure an OPC node in the Node editor.

Tag Name	Type	Displays information about
system\ComErrorStringOPC	String	Most recent OPC error message.
system\ComErrorValueOPC	Analog	Internal number of most recent OPC error.
system\ComStatusStringOPC	String	Current status of OPC communications. Will be the same as system\ComErrorStringOPC if the error condition still exists.
system\ComStatusValueOPC	Analog	Internal number indicating current status of OPC communications. Will be the same as system\ComErrorValueOPC if the error condition still exists.

The following tags record DDE client communication information. These tags are added to the system folder when you configure a DDE node in the Node editor.

Tag Name	Type	Displays information about
system\ComErrorStringDDE	String	Most recent DDE client error message.
system\ComErrorValueDDE	Analog	Internal number of most recent DDE client error.
system\ComStatusStringDDE	String	Current status of DDE client communications. Will be the same as system\ComErrorStringDDE if the error condition still exists.
system\ComStatusValueDDE	Analog	Internal number indicating current status of DDE client communications. Will be the same as system\ComErrorValueDDE if the error condition still exists.

Graphics

The following tags can be used to make graphic objects appear as though they are blinking on and off:

Tag Name	Type	Function
system\BlinkFast	Digital	Toggles on and off every 100 ms (10 times per second).
system\BlinkSlow	Digital	Toggles on and off every 500 ms (twice per second).

A more efficient way to make graphic objects blink is to use the blinking color option in color animation. For details, see page 12-13.

Time

The following tags record time and date information in various formats:

Tag Name	Type	Provides this data	Read or write
system\Date	String	System date.	Read only
system\ DateAndTimeInteger	Analog	Number of seconds elapsed since midnight (00:00:00) January 1, 1970, coordinated universal time (UTC).	Read only
system\ DateAndTimeString	String	Complete date and time display For example: Monday, December 12 1997 10:47:50 AM	Read only
system\DayOfMonth	Analog	Day of the month (1 – 31).	Read only
system\DayOfWeek	Analog	Day of the week (1 – 7); Sunday = 1.	Read only
system\DayOfYear	Analog	Day of the year (1 – 366).	Read only
system\Hour	Analog	Hour of the day (0 – 23).	Read and write
system\Minute	Analog	Minutes (0 – 59).	Read and write
system\Month	Analog	Number for month.	Read only
system\MonthString	String	Name of the month.	Read only
system\Second	Analog	Seconds (0 – 59).	Read and write
system\Time	String	System time.	Read only
system\Year	Analog	The year (1980 – 2099).	Read only

Trends

The following tags are created each time you define a trend control tag in the Trend configuration dialog box. These tags are not stored in the system folder. Rather, they are stored in the folder that is created when you name the trend animation tag.

For example, if you typed Trend as the control tag, you would find a folder called Trend in the list of folders displayed in the Tag Database editor. The folder would contain the tags listed in the following table, but each tag would be prefixed with "Trend". The \CurrentPen tag would be Trend\CurrentPen, and so on.

Tag name	Type	Function	Read or Write?
\CurrentFile	Analog	Number of the current data log file. Data log files are numbered sequentially. You can write to this tag if Choose File, Oldest File, or Newest File is the trend's data source.	Read and write (see Function column)
\CurrentPen	Analog	Number of the current pen (1 – 16) highlighted in the legend.	Read and write
\NewestFile	Analog	Offset from current data log file to newest data log file.	Read only
\NewestTime	Analog	Time of the newest data sample available for plotting.	Read only
\OldestFile	Analog	Offset from current data log file to oldest data log file.	Read only
\OldestTime	Analog	Time of the oldest data sample available for plotting.	Read only
\Paused	Digital	A tag value of 1 pauses the trend. A tag value of 0 resumes movement of the trend. For a real-time trend, the \Paused tag has a default value of 0 so the trend scrolls initially. For a historical trend, the \Paused tag has a default value of 1 so the trend pauses initially.	Read and write

Tag name	Type	Function	Read or Write?
\PenMask	Analog	A 16–bit mask that controls the visibility of the trend pens. If the bit corresponding to a pen is set in this mask, the pen is displayed. For example: PenMask = 0000 0000 0000 0000 = 0 No pens are displayed. PenMask = 0000 0000 0000 0100 = 4 Only Pen 3 is displayed.	Read and write
\StartTime	Analog	Integer tag specifying the time at the right margin of the time scale. The start time value is the number of seconds elapsed since midnight (00:00:00), January 1, 1970, coordinated universal time (UTC).	Read and write
\StartTimeDate	String	String tag representing the start time and date for the trend (at the right margin of the time scale). For example, JAN 01 1998 13:00:00.	Read and write
\TimeRange	Analog	Time range of the time scale in seconds.	Read and write
\Updating	Digital	Digital tag that indicates whether the trend object is retrieving data log data. The tag value is 1 if retrieving data, and 0 if not.	Read only
\YMag	Analog	Magnification of the vertical axis in percent. 0No magnification 100Twice the resolution (half the range) -100Half the resolution (twice the range)	Read and write
\YOffset	Analog	Offset of the vertical axis in percent. Moves the view up or down but does not change the time range.	Read and write

User

The following tag contains the name of the current user in the activity log file:

Tag Name	Type	Function
system\User	String	Contains name of logged–in user.

Windows memory resources

The following tags that record Windows® resources are no longer valid.

Tag Name	Type	Provides this data
system\MemoryB1Meg	Analog	This tag is no longer valid and has a value of 0.
system\MemoryGDI	Analog	This tag is no longer valid and has a value of 0.
system\MemoryUser	Analog	This tag is no longer valid and has a value of 0.
system\MemoryVirtual	Analog	This tag is no longer valid. The value is unreliable.

Appendix

C Differences between RSView32 and ControlView

This appendix describes:

- how to import ControlView™ and ControlView Builder projects into RSView32™
- differences between RSView32, and ControlView, and ControlView Builder

Importing ControlView projects

You can import most components from a ControlView or ControlView Builder project into RSView32 using the ControlView Project Import Wizard in the RSView32 Tools group.

For details, see the documentation accompanying this tool.

Activity log

Activity log files are not stored in a circular file set. Instead, you configure when to create and delete files.

Information in the activity log file is stored in .dbf (dBase® IV) file format. You can access the information in the file with any third–party software that reads .dbf, such as Microsoft® Excel, Crystal Reports®, and Visual FoxPro®.

Alarms

Alarm banner and alarm status display

The alarm banner and alarm status display are not preconfigured in RSView32. To include these items in your project, either use the objects in the graphic library called Alarms or create them yourself in the Graphic Display editor.

The information for an alarm banner and alarm status display comes from system tags that report on alarms. System tags are preconfigured tags provided with RSView32. These tags are in the System folder in the Tag Database editor.

To create an alarm banner or alarm status display, use the numeric display or string display objects with the appropriate alarm system tags.

Alarm log

Alarm log files are not stored in a circular file set. Instead, you configure when to create and delete files.

Information in the alarm log file is stored in .dbf (dBase IV) file format. You can access the information in the file with any third–party software that reads .dbf, such as Microsoft Excel, Crystal Reports, and Visual FoxPro.

Alarm summary

The alarm summary is not preconfigured in RSView32. To include an alarm summary in your project, either use the alarm summary object in the graphic library called Alarms or create an alarm summary in the Alarm Summary editor. A project can contain multiple alarm summaries.

You can format an alarm summary in any way. The Alarm Summary editor has tools for formatting headings, fonts, colors, and buttons. You can also filter and sort data so only particular alarm information is displayed.

Commands

Obsolete commands

The following table lists commands not supported in RSView32. If you import ControlView macros, event files, global key files, graphic displays, or alarm definitions that use these commands, you will have to revise them.

ABDiag	Documentor	ModemStatus	Print
AccountRpt	EventRpt	ModemString	PrinterConfig
ActivityRpt	GrafixRpt	MouseConfig	PrintInit
AlarmRpt	HangUp	NetConfig	Push
Archive	ICCBootOff	NetDiag	RemCopy
BeepOff	ICCBootOn	NetLogOff	Report
BeepOn	ICCConfig	NetLogOn	ReportOff
Capture	ICCInfo	NetStatus	ReportOn
Chain	ICCSessionOff	NodeRpt	Restore
ChainClr	ICCSessionOn	Novell	Revision
ClassRpt	KTConfig	NovRpt	RevisionRpt
Clock	List	OptConfig	S85Config
CmdLineOff	ListConfig	Optimize	SecurityRpt
CmdLineOn	Load	PanelOff	StartUp
CmdLineToggle	LPRCancel	PanelOn	Time
CmsConfig	LPRCapture	PathConfig	TopLevelOff

CVDos	LPRConfig	PCIMConfig	TopLevelOn
DataLogExport	Macro	Plot	TouchConfig
DataLogRpt	Menu	PMClear	TouchOff
DBExp	MenuBar	PMConfig	TouchOn
DBImp	MenuBoxOff	PMDisplay	Trend
DBRpt	MenuBoxOn	PMEventLog	TrendRpt
DCConfig	MenuBoxToggle	PMLimits	Unload
DerivedRpt	ModDiag	PMRealTime	UnsCacheOff
DeviceRpt	ModemCommand	PMSnapshot	UnsCacheOn
Dial	ModemDirectory	PMStatus	WindowConfig
	ModemSetUp	PMWaveform	

Renamed commands

The following table lists ControlView commands that have been renamed in RSView32:

This ControlView command	Is this RSView32 command
BatchRestore	RecipeRestore
BatchSave	RecipeSave
Hello	Login
Bye	Logout
Key	KeyEdit
Macro	MacroEdit

RSView32 still has a Key command, but this command runs a global key file. The KeyEdit command opens a global key file for editing.

For a list of all RSView32 commands and a definition of the actions they perform, see Appendix A, *RSView32 commands*, or see Help.

Data log

You cannot import ControlView data log models into RSView32.

In RSView32, data log files are not stored in a circular file set. Instead, you configure when to create and delete files. Information in the data log file is stored in .dbf (dBase IV) file format or in ODBC storage format. You can access the information in the .dbf file with any third–party software that reads .dbf, such as Microsoft Excel, Crystal Reports, and Visual FoxPro, or store the data in any ODBC-compliant database.

Derived tags

You can import ControlView derived tag files into RSView32.

In RSView32, derived tags are processed on exception, not sequentially. Therefore, do not create derived tags that depend on the results of other derived tags, because they might not produce the desired results.

You can store the result of a derived tag calculation in any tag, not just a memory (local) tag.

The number of derived tag files is limited only by memory and disk space. Each derived tag file can contain up to 1,000 derived tags as compared to ControlView's limit of 300 derived tags. You can run up to 20 derived tag files simultaneously.

Events

You can import ControlView event files into RSView32.

In RSView32, events are processed on exception, not sequentially. Therefore, do not create events that depend on the results of other events, because they might not produce the desired results.

The number of event files is limited only by memory and disk space. Each event file can contain up to 1,000 events as compared to ControlView's limit of 600 events. You can run up to 20 event files simultaneously.

Global keys

You cannot import ControlView global key files into RSView32.

In RSView32, you cannot run more than one global key file at a time. If you try to run more than one file, the files are *not* merged. Instead, the second file overrides the first file.

Graphics

In RSView32, you can:

- import the following types of files: ControlView .mgx files, ControlView Builder .gfx and .mgl files, AutoCAD® .dxf files (for AutoCAD 12 and earlier), and any files in the following formats: .bmp, .clp, .gif, .pcx, and .wmf
- drag and drop objects between RSView32 graphic files and other Windows® programs
- use OLE (object linking and embedding) to insert third–party objects, such as a Microsoft Excel spreadsheet, a Word document, or a Visio® graphic
- use ActiveX® to insert third–party control objects
- use the button drawing tool to create button objects that behave as standard Windows buttons
- use the full Windows color palette and all installed fonts
- attach these new kinds of animation:

- blinking color animation
- horizontal and vertical position
- horizontal and vertical size
- rotation
- horizontal and vertical fill
- horizontal and vertical slider
- OLE verb

RSView32 does not contain a tool for drawing bar graphs. To create a bar graph, draw a rectangle and apply height, width, or fill animation. If you import a bar graph from ControlView, the bar graph will automatically be changed to a rectangle with the appropriate type of animation and will work as it worked in ControlView.

Scan classes

In RSView32, scan class configuration has been simplified. There is no distinction between scan classes for string tags and for other tag types—one scan class can handle any tag type. Also, the number of tags that can be assigned to a scan class is not limited, and a device type is no longer required.

RSView32 has 12 scan classes: A through K.

SLC addressing syntax

The I/O address syntax for the fixed SLC™, SLC 5/01, SLC 5/02, and SLC 5/03 (OS300) has changed. If you import a ControlView project with tags referencing I/Os from these SLC types, you must modify the addresses for these tags. For details, see Appendix D, *Addressing syntax for Allen–Bradley programmable controllers*.

The I/O address syntax for the SLC 5/03 (OS301) and SLC 5/04 has *not* changed. If you import a ControlView project that references I/Os from these SLC types, ensure the Type field of the Node editor is set to SLC 5 (Enhanced).

Tag database

In RSView32, group tags and structure tags are not supported. Instead, folders are used to organize tags. In RSView32, a local tag is called a memory tag.

Tag names can be up to 255 characters long. Separate the folder name from the rest of the tag name with a backslash (\).

RSView32 comes with a set of system tags. These preconfigured tags are in the folder called System in the Tag Database editor. For a complete list of system tags, see Appendix B, *System tags*.

Trends

You cannot import a ControlView trend into RSView32. In RSView32, trends are configured as part of a graphic display.

Real-time and historical trends are supported; x–y trends are not.

You can configure trends to be transparent, so one graph can be placed over another. This lets you show a real-time trend over top of a historical "ideal" trend to see when a variable deviates from normal.

ControlView features integrated into RSView32

The Windows environment means that the following ControlView options and tools are not required as separate features in RSView32:

- Reporting option—for historical data, use any third–party program that reads .dbf, such as Microsoft Excel, to access data in

log files. For real-time data, use RSView32's OPC® or DDE server capabilities.

- Modem option—use Windows and third–party products to support a modem.
- C–Toolkit tasks—use a tool such as scripting in RSView32 or Visual Basic® to create custom Windows applications that access real-time data through the RSView32 Object Model or DDE, and access historical data through ODBC/.dbf.

Appendix

D

Addressing syntax for Allen–Bradley programmable controllers

This appendix contains:

- addressing syntax for Allen–Bradley® PLCs
- addressing syntax for Allen–Bradley SLCs™
- addressing syntax for SoftLogix™ 5 controllers
- mnemonic tables

The information here is applicable only for tags that have device as their data source. For detailed information about creating tags, see Chapter 4, *Creating tags*.

PLC addressing syntax

This section provides addressing syntax for these types of programmable controllers:

- PLC–2
- PLC–3
- PLC–5®, which includes the PLC–5/10, PLC–5/12, PLC–5/15, and PLC–5/25
- PLC–5 (Enhanced), which includes the PLC–5/11, PLC–5/20, PLC–5/30, PLC–5/40, PLC–5/60, and PLC–5/80

PLC–2

aaaa/bb

aaaa	Address: 0 – 7777 octal
bb *(optional)*	Bit offset within word: 0 – 17 octal

Example of digital address: 11/17

Example of analog and string address: 1264

PLC–3 data table sections

Fnnn:wwww/bb

F	File type: A = ASCII B = Binary N = Integer D = Decimal (BCD) O = Output I = Input F = Floating point S = Status H = High order integer
nnn	File number: 0 – 999 decimal
wwww	Word address: For I/O section: 0 – 7777 octal For all others: 0 – 9999 decimal
bb *(optional)*	Bit offset within word: 0 – 17 octal Bit offset not permitted in the F and H sections.

Example of digital address: B5:173/15

Example of analog address: N3:173

Example of string address: A1:126

PLC–3 timers and counters

FWWW:nnnn/bb

F	File type: C = Counter T = Timer
WWW	Structured word: CTL = Control word PRE = Preset value ACC = Accumulated value
nnnn	Counter/Timer number: 0 – 9999 decimal
bb	Bit offset within word: 15 octal = done bit 16 octal = timing bit 17 octal = enable bit

Example of digital address: TCTL:125/17

Example of analog address: CPRE:125

PLC–5 data files

Fnnn:eee/bb

F	File type: B = Binary N = Integer D = Decimal (BCD) F = Floating point A = ASCII
nnn	File number: 3 – 999 decimal For direct driver communication, binary, integer, and floating point file types use the default file number if the file number is absent. The default numbers are 3 (binary), 7 (integer), and 8 (floating point).
eee	Element number: 0 – 999 decimal
bb *(optional)*	Bit offset within word: 0 – 15 decimal Not applicable to floating point file types.

Example of bit address: B3:173/15

Example of word address: N7:12

PLC–5 binary files: optional syntax

Fnnn/bbbbb

F	File type: B = Binary
nnn	File number: 3 – 999 decimal For direct driver communication, the default file number 3 is used if the file number is absent.
bbbbb	Bit offset from start of file: 0 – 15999 decimal

Example: B3/1024

PLC–5 I/O and status files

F:ee/bb

F	File type: O = Output I = Input S = Status
ee	Element number: For I/O files: PLC–5/10: 0 – 037 octal PLC–5/12: 0 – 037 octal PLC–5/15: 0 – 037 octal PLC–5/25: 0 – 077 octal For status files: 0 – 31 decimal
bb *(optional)*	Bit offset within word: For I/O files: 0 – 17 octal For status files: 0 – 15 decimal

Example: O:64/17

PLC–5 timers, counters, and control files

Fnnn:eee.MNE/bb

F	File type: C = Counter T = Timer R = Control
nnn	File number: 3 – 999 decimal For direct driver communication, timer, counter and control file types use the default file number if the file number is absent. The default numbers are 4 (timer), 5 (counter), and 6 (control).
eee	Element number: 0 – 999 decimal
MNE	Member mnemonic (see mnemonic tables starting on page D-30)
bb *(optional)*	Bit number: 0 – 15 decimal Only applies to analog word members.

Example: T57:38.ACC

PLC–5 (Enhanced) I/O and status files

F:eee/bb

F	File type: I = Input O = Output S = Status
eee	Element number: For I/O files: PLC–5/11: 0 – 037 octal PLC–5/20: 0 – 037 octal PLC–5/30: 0 – 077 octal PLC–5/40: 0 – 177 octal PLC–5/60: 0 – 277 octal PLC–5/80: 0 – 277 octal For status files: 0 – 127 decimal
bb *(optional)*	Bit offset within word: For I/O files: 0 – 17 octal For status files: 0 – 15 decimal

Example: O:167/11

PLC–5 (Enhanced) binary, BCD, integer, ASCII, float, and string files

Fnnn:eee/bb
or
Fnnn:eeee/bb

F	File type: B = Binary D = Decimal (BCD) N = Integer F = Floating point A = ASCII ST = String
nnn	File number: 3 – 999 decimal For direct driver communication, binary, integer, and floating point file types use the default file number if the file number is absent. The default numbers are 3 (binary), 7 (integer), and 8 (floating point).
eee	Element number: 0 – 999 decimal
or	
eeee	Element number: 0 – 1999 decimal for PLC–5/80 Series E firmware
bb *(optional)*	Bit offset within word: 0 – 15 decimal Bit offset is not supported for floating point and string file types.

Example: B84:113/13

PLC–5 (Enhanced) binary files: optional syntax

Fnnn/bbbbb

F	File type: B = Binary
nnn *(optional)*	File number: 3 – 999 decimal For direct driver communication, the default file number 3 is used if the file number is absent.
bbbbb	Bit offset from start of file: 0 – 15999 decimal

Example: B27/248

PLC–5 (Enhanced) timer, counter, control, SFC status, message, PID, block transfer, and token data files

FFnnn:eee.MNE[ss]/bb

FF	File type: T = Timer C = Counter R = Control SC = SFC status MG = Message PD = PID control BT = Block transfer TD = Token data
nnn	File number: 3 – 999 decimal For direct driver communication, timer, counter, and control file types use the default file number if the file number is absent. The default numbers are 4 (timer), 5 (counter), and 6 (control).
eee	Element number: 0 – 999 decimal
MNE	Member mnemonic (see mnemonic tables starting on page D-30)
ss	Submember Only applies to .ADDR and .DATA members of PID structure and .DATA member of MSG structure.
bb *(optional)*	Bit number: 0 – 15 decimal Only applies to analog word members.

Example: MG59:33.DATA[0]/15

SLC addressing syntax

This section provides addressing syntax for these types of programmable controllers:

- SLC 5, which includes the fixed I/O SLC 5, SLC 5/01, SLC 5/02, and SLC 5/03 (OS300)
- SLC 5 (Enhanced), which includes the SLC 5/03 (OS 301), SLC 5/04, and SLC 5/05

SLC 5 I/O files

F:ss.www/bb

F	File type: I = Input O = Output
ss	I/O slot number: 0 – 30 decimal
www *(optional)*	I/O word number expansion: 0 – 255 decimal
bb *(optional)*	Bit offset within word: 0 – 15 decimal When input slot is 0: 0 – 23 decimal

Example: I:22.254/13

IMPORTANT Writing to the output files of an SLC 5 is not recommended. However, if you do, be sure the SLC is not in RUN mode. If it is in RUN mode, the write will fail and an error message will be logged to the activity log file.

Important information for addressing SLC 5 I/O modules

The RSView32™ I/O module addressing system differs from the corresponding ControlView™, APS, A.I.™ 500, and RSLogix 5™ or RSLogix 500™ addressing systems. The RSView32 I/O data section addressing does not match the physical slot of the I/O module.

In RSView32, the first physical module of each type (input or output) is address slot number 0. The next module of the same type in the next higher–numbered rack slot is address slot number 1, and so on.

Example: SLC 5 I/O module addressing

SLC Type	Rack Configuration	CV for MS-DOS® Address or APS Address	RSView32 Address
Fixed L40	I/O module slot 0 (fixed)	I:0.0 or I:0 I:0.1 O:0	I:0.0 or I:0 I:0.1 or I:1 O:0
	I module slot 2	I:2	I:2
Fixed L30	I/O module slot 0 (fixed)	I:0.0 or I:0 I:0.1 O:0	I:0.0 or I:0 I:0.1 or I:1 O:0
	I module slot 1	I:1	I:2
	O module slot 2	O:2	O:1
Fixed L20	I/O module slot 0 (fixed)	I:0.0 or I:0 O:0	I:0.0 or I:0 O:0
	I module slot 1	I:1	I:1
	I module slot 2	I:2	I:2
Modular	CPU slot 0	N/A	N/A
	O module slot 1	O:1	O:0
	I module slot 2	I:2	I:0
	O module slot 3	O:3	O:1

SLC 5 status files

F:ww/bb

F	File type: S = Status
ww	Word address: SLC 500™: 0 – 15 decimal SLC 5/01: 0 – 15 decimal SLC 5/02: 0 – 32 decimal SLC 5/03: 0 – 68 decimal
bb *(optional)*	Bit offset within word: 0 – 15 decimal

Example: S:15/6

SLC 5 binary and integer files

Fnnn:www/bb

F	File type: B = Binary N = Integer
nnn *(optional)*	File number: Binary: 3, 9 – 255 decimal Integer: 7, 9 – 255 decimal For direct driver communication, binary and integer file types use the default file number if the file number is absent. The default numbers are 3 (binary) and 7 (integer).
www	Word address: 0 – 255 decimal
bb *(optional)*	Bit offset within word: 0 – 15 decimal

Example: N17:129/2

SLC 5 binary files: optional syntax

Fnnn/bbbb

F	File type B = Binary
nnn *(optional)*	File number: 3, 9 – 255 decimal For direct driver communication, the default file number 3 is used if the file number is absent.
bbbb	Bit offset from start of file: 0 – 4095 decimal

Example: B3/3999

SLC 5 timer, counter, and control files

Fnnn:eee.MNE/bb

F	File type: T = Timer C = Counter R = Control
nnn *(optional)*	File number: Timer: 4, 9 – 255 decimal Counter: 5, 9 – 255 decimal Control: 6, 9 – 255 decimal For direct driver communication, timer, counter, and control file types use the default file number if the file number is absent. The default numbers are 4 (timer), 5 (counter), and 6 (control).
eee	Element number: 0 – 255 decimal
MNE	Member mnemonic (see mnemonic tables starting on page D-30)
bb *(optional)*	Bit number: 0 – 15 decimal Applies to analog members only.

Example: R67:123.EN

SLC 5 timer, counter, and control files bit member addressing: optional syntax

Fnnn:eee/MNE

F	File type: T = Timer C = Counter R = Control
nnn *(optional)*	File number: Timer: 4, 9 – 255 decimal Counter: 5, 9 – 255 decimal Control: 6, 9 – 255 decimal For direct driver communication, timer, counter, and control file types use the default file number if the file number is absent. The default numbers are 4 (timer), 5 (counter), and 6 (control).
eee	Element number: 0 – 255 decimal
MNE	Bit member mnemonic (see mnemonic tables starting on page D-30)

Example: C77:99/OV

SLC 5 timer, counter, and control files bit member addressing by bit address: optional syntax

Fnnn:eee/bb

F	File type: T = Timer C = Counter R = Control
nnn *(optional)*	File number: Timer: 4, 9 – 255 decimal Counter: 5, 9 – 255 decimal Control: 6, 9 – 255 decimal For direct driver communication, timer, counter, and control file types use the default file number if the file number is absent. The default numbers are 4 (timer), 5 (counter), and 6 (control).
eee	Element number: 0 – 255 decimal
bb	Bit number: Timer: 13 – 15 Counter: 10 – 15 Control: 8 – 11, 13, 15

Example: T87:133/14

SLC 5 timer, counter, and control files analog member addressing: optional syntax

Fnnn:eee.o/bb

F	File type: T = Timer C = Counter R = Control
nnn *(optional)*	File number: Timer: 4, 9 – 255 decimal Counter: 5, 9 – 255 decimal Control: 6, 9 – 255 decimal For direct driver communication, timer, counter, and control file types use the default file number if the file number is absent. The default numbers are 4 (timer), 5 (counter), and 6 (control).
eee	Element number: 0 – 255 decimal
o	Word offset: 1 – 2 decimal
bb *(optional)*	Bit number: 0 – 15 decimal

Example: R44:72.1/14

SLC 5 (Enhanced) I/O files

F:ss.www/bb

F	File type: I = Input O = Output
ss	I/O slot number: 0 – 30 decimal
www *(optional)*	I/O word number expansion: 0 – 255 decimal
bb *(optional)*	Bit offset within word: 0 – 15 decimal When input slot is 0: 0 – 23 decimal

Example: I:22.254/13

IMPORTANT Writing to the output files of an SLC 5 is not recommended. However, if you do, be sure the SLC is not in RUN mode. If it is in RUN mode, the write will fail and an error message will be logged to the activity log file.

SLC 5 (Enhanced) status files

F:ww/bb

F	File type: S = Status
ww	Word address: SLC 5/03: 0 – 68 decimal SLC 5/04: 0 – 96 decimal
bb *(optional)*	Bit offset within word: 0 – 15 decimal

Example: S:15/6

SLC 5 (Enhanced) binary, integer, float, ASCII, and string files

Fnnn:www/bb

F	File type: B = Binary N = Integer F = Floating Point A = ASCII ST = String
nnn *(optional)*	File number: Binary: 3, 9 – 255 decimal Integer: 7, 9 – 255 decimal Floating Point: 8, 9 – 255 decimal ASCII: 9 – 255 decimal String: 9 – 255 decimal For direct driver communication, binary, integer, and floating point file types use the default file number if the file number is absent. The default numbers are 3 (binary), 7 (integer), and 8 (floating point).
www	Word address: 0 – 255 decimal
bb *(optional)*	Bit offset within word: 0 – 15 decimal Bit offset is not supported for floating point and string file types.

Example: F8:129

SLC 5 (Enhanced) binary files: optional syntax

Fnnn/bbbb

F	File type B = Binary
nnn *(optional)*	File number: 3, 9 – 255 decimal For direct driver communication, the default file number 3 is used if the file number is absent.
bbbb	Bit offset from start of file: 0 – 4095 decimal

Example: B3/3999

SLC 5 (Enhanced) timer, counter, and control files

Fnnn:eee.MNE/bb

F	File type: T = Timer C = Counter R = Control
nnn *(optional)*	File number: Timer: 4, 9 – 255 decimal Counter: 5, 9 – 255 decimal Control: 6, 9 – 255 decimal For direct driver communication, timer, counter, and control file types use the default file number if the file number is absent. The default numbers are 4 (timer), 5 (counter), and 6 (control).
eee	Element number: 0 – 255 decimal
MNE	Member mnemonic (see mnemonic tables starting on page D-30)
bb *(optional)*	Bit number: 0 – 15 decimal Applies to analog members only.

Example: R67:123.EN

SLC 5 (Enhanced) timer, counter, and control files bit member addressing: optional syntax

Fnnn:eee/MNE

F	File type: T = Timer C = Counter R = Control
nnn *(optional)*	File number: Timer: 4, 9 – 255 decimal Counter: 5, 9 – 255 decimal Control: 6, 9 – 255 decimal For direct driver communication, timer, counter, and control file types use the default file number if the file number is absent. The default numbers are 4 (timer), 5 (counter), and 6 (control).
eee	Element number: 0 – 255 decimal
MNE	Bit member mnemonic (see mnemonic tables starting on page D-30)

Example: C77:99/OV

SLC 5 (Enhanced) timer, counter, and control files bit member addressing by bit address: optional syntax

Fnnn:eee/bb

F	File type: T = Timer C = Counter R = Control
nnn *(optional)*	File number: Timer: 4, 9 – 255 decimal Counter: 5, 9 – 255 decimal Control: 6, 9 – 255 decimal For direct driver communication, timer, counter, and control file types use the default file number if the file number is absent. The default numbers are 4 (timer), 5 (counter), and 6 (control).
eee	Element number: 0 – 255 decimal
bb *(optional)*	Bit number: Timer: 13 – 15 Counter: 10 – 15 Control: 8 – 11, 13, 15

Example: T87:133/14

SLC 5 (Enhanced) timer, counter, and control files analog member addressing: optional syntax

Fnnn:eee.o/bb

F	File type: T = Timer C = Counter R = Control
nnn *(optional)*	File number: Timer: 4, 9 – 255 decimal Counter: 5, 9 – 255 decimal Control: 6, 9 – 255 decimal For direct driver communication, timer, counter, and control file types use the default file number if the file number is absent. The default numbers are 4 (timer), 5 (counter), and 6 (control).
eee	Element number: 0 – 255 decimal
o	Word offset: 1 – 2 decimal
bb *(optional)*	Bit number: 0 – 15 decimal

Example: R44:72.1/14

SoftLogix 5 addressing syntax

This section provides addressing syntax for SoftLogix 5 controllers.

SoftLogix 5 I/O and status files

F:eee/bb

F	File type: I = Input O = Output S = Status
eee	Element number: For I/O files: 0 – 277 octal For status files: 0 – 511 decimal
bb *(optional)*	Bit offset within word: For I/O files: 0 – 17 octal For status files: 0 – 15 decimal

Example: O:167/11

SoftLogix 5 binary, BCD, integer, long integer, ASCII, float, and string files

Fnnnn:eeee/bb

F	File type: B = Binary D = Decimal (BCD) N = Integer L = Long integer A = ASCII F = Floating point ST = String
nnnn	File number: 3 – 4095 decimal For direct driver communication, binary, integer, long integer, and floating point file types use the default file number if the file number is absent. The default numbers are 3 (binary), 7 (integer), and 8 (floating point).
eeee	Element number: 0 – 4095 decimal
bb *(optional)*	Bit offset within word: 0 – 15 decimal Bit offset is not supported for long integer, floating point, and string file types.

Example: L4094:4090

SoftLogix 5 binary files: optional syntax

Fnnnn/bbbbb

F	File type: B = Binary
nnnn *(optional)*	File number: 3 – 4095 decimal For direct driver communication, the default file number 3 is used if the file number is absent.
bbbbb	Bit offset from start of file: 0 – 65535 decimal

Example: B4095/65308

SoftLogix 5 timer, counter, control, SFC status, message, PID, block transfer, and token data files

FFnnnn:eeee.MNE[ss]/bb

FF	File type: T = Timer C = Counter R = Control SC = SFC status MG = Message PD = PID control BT = Block transfer TD = Token data
nnnn	File number: 3 – 4095 decimal For direct driver communication, timer, counter, and control file types use the default file number if the file number is absent. The default numbers are 4 (timer), 5 (counter), and 6 (control).
eeee	Element number: 0 – 4095 decimal
MNE	Member mnemonic (see mnemonic tables starting on page D-30)
ss	Submember Only applies to .ADDR and .DATA members of PID structure and .DATA member of MSG structure.
bb *(optional)*	Bit number: 0 – 15 decimal Only applies to analog word members.

Example: MG4095:3000.DATA[0]/15

Mnemonic tables

Timer mnemonics

Mnemonic	Instruction	Type
ACC	Accumulator Value	Analog
DN	Done	Digital
EN	Enable	Digital
PRE	Preset Value	Analog
TT	Timing	Digital

Counter mnemonics

Mnemonic	Instruction	Type
ACC	Accumulated Value	Analog
CD	Count Down Enable	Digital
CU	Count Up Enable	Digital
DN	Done	Digital
OV	Overflow	Digital
PRE	Preset Value	Analog
UN	Underflow	Digital
For fixed I/O SLC only:		
UA	Update Accumulator Value	Digital

Control mnemonics

Mnemonic	Instruction	Type
DN	Done	Digital
EN	Enable	Digital
ER	Error	Digital
FD	Found	Digital
IN	Inhibit	Digital
LEN	Length	Analog
POS	Position	Analog
UL	Unload	Digital
For all programmable controllers except the fixed I/O SLC and the SLC 5/01:		
EM	Empty	Digital
EU	Enable Unloading	Digital

PID mnemonics

Mnemonic	Instruction	Type	Submember Range
ADDR[]	Address of Master Loop %	Analog	0 – 3
BIAS	Output Bias %	Analog	
CA	Control Action	Digital	
CL	Cascaded Loop	Digital	
CT	Cascaded Type	Digital	
DATA[]	Reserved / Internal Use	Analog	0 – 13
DB	Deadband	Analog	
DO	Derivative Of	Digital	
DVDB	Deviation Alarm Deadband	Analog	
DVN	Deviation Alarm -	Analog	
DVNA	Deviation High Alarm	Digital	
DVP	Deviation Alarm +	Analog	
DVPA	Deviation Low Alarm	Digital	
EN	Enable	Digital	
ERR	Error	Analog	
EWD	Error Within Deadband	Digital	
INI	PID Initialized	Digital	
KD	Derivative Time	Analog	
KI	Integral Gain	Analog	
KP	Proportional Gain	Analog	
MAXI	Input Range Maximum	Analog	
MAXO	Output Limit High %	Analog	
MAXS	Setpoint Maximum	Analog	
MINI	Input Range Minimum	Analog	
MINO	Output Limit Low %	Analog	

Mnemonic	Instruction	Type	Submember Range
MINS	Setpoint Minimum	Analog	
MO	Mode	Digital	
OLH	Output Limit High	Digital	
OLL	Output Limit Low	Digital	
OUT	Output	Analog	
PE	PID Equation	Digital	
PV	Process Variable	Analog	
PVDB	Process Variable Alarm Deadband	Analog	
PVH	Process Variable Alarm High	Analog	
PVHA	Process Variable High Alarm	Digital	
PVL	Process Variable Alarm Low	Analog	
PVLA	Process Variable Low Alarm	Digital	
PVT	Process Variable Tracking	Digital	
SO	Set Output %	Analog	
SP	Setpoint	Analog	
SPOR	Setpoint Out of Range	Digital	
SWM	Software A/M Mode	Digital	
TIE	Tieback %	Analog	
UPD	Update Time	Analog	

Message mnemonics

Mnemonic	Instruction	Type	Submember Range
AD	Done	Digital	
AE	Error	Digital	
CO	Continuous	Digital	
DATA[]	Reserved / Internal Use	Analog	0 – 51
DLEN	Done Length	Analog	
DN	Synchronization Done	Digital	
EN	Enable	Digital	
ER	Synchronization Error	Digital	
ERR	Error Code	Analog	
EW	Enable Waiting	Digital	
NR	No Response	Digital	
RLEN	Request Length	Analog	
ST	Start Transmission	Digital	
TO	Time Out	Digital	

Block transfer mnemonics

Mnemonic	Instruction	Type
CO	Continue	Digital
DLEN	Done Length	Analog
DN	Done	Digital
ELEM	Element Number	Analog
EN	Enable	Digital
ER	Error	Digital
EW	Enable Waiting	Digital
FILE	File Number	Analog
NR	No Response	Digital
RGS	Rack Group Slot	Analog
RLEN	Requested Length	Analog
RW	Read Writes	Digital
ST	Start	Digital
TO	Time Out	Digital

Token data mnemonics

Mnemonic	Instruction	Type
LO	Low	Analog
HI	High	Analog

SFC status mnemonics

Mnemonic	Instruction	Type
DN	Done	Digital
ER	Step Error	Digital
FS	Forced Scan	Digital
LS	Last Scan	Digital
OV	Timer Overflow	Digital
PRE	Preset	Analog
SA	Scan Active	Digital
TIM	Active Time	Analog

Appendix

E Station addressing for nodes connecting to Allen–Bradley devices

This appendix describes:

- local station addressing
- remote station addressing

Local station addressing

The following table lists valid address entries for a node connected to the same network as the RSView32™ system:

Communication Channel	Valid Entries
DH	0 – 376 (octal)
DH+™	0 – 77 (octal)
DH–485	0 – 31 (decimal)
TCP/IP	Host name (as described next)

Host name

When entering a host name, use one of the following:

- a direct IP (Internet Protocol) address in the form www.xxx.yyy.zzz where www, xxx, yyy, and zzz are numbers from 000 to 255
- an alias for the address. An alias is an alphanumeric string from one to eight characters. The first character must be a letter and the name is case–sensitive.

Remote station addressing

This section outlines valid address entries for a node connected to a remote network.

An RSView32 system can communicate with nodes on remote DH, DH+, or DH–485 networks when connected to:

- a DH+ network using a KT–family card (KT, KT2, KTX, KTXD, PCMK)
- a TCP/IP network using an Ethernet® card

Remote DH or DH+ networks can be bridged by a 1785–KA interface module or by a Pyramid Integrator™ that has an RM or KA module.

Remote DH–485 networks can be bridged by a 1785–KA5.

DH and DH+ networks bridged by a 1785–KA

The format of the station address for nodes on remote DH and DH+ networks is:

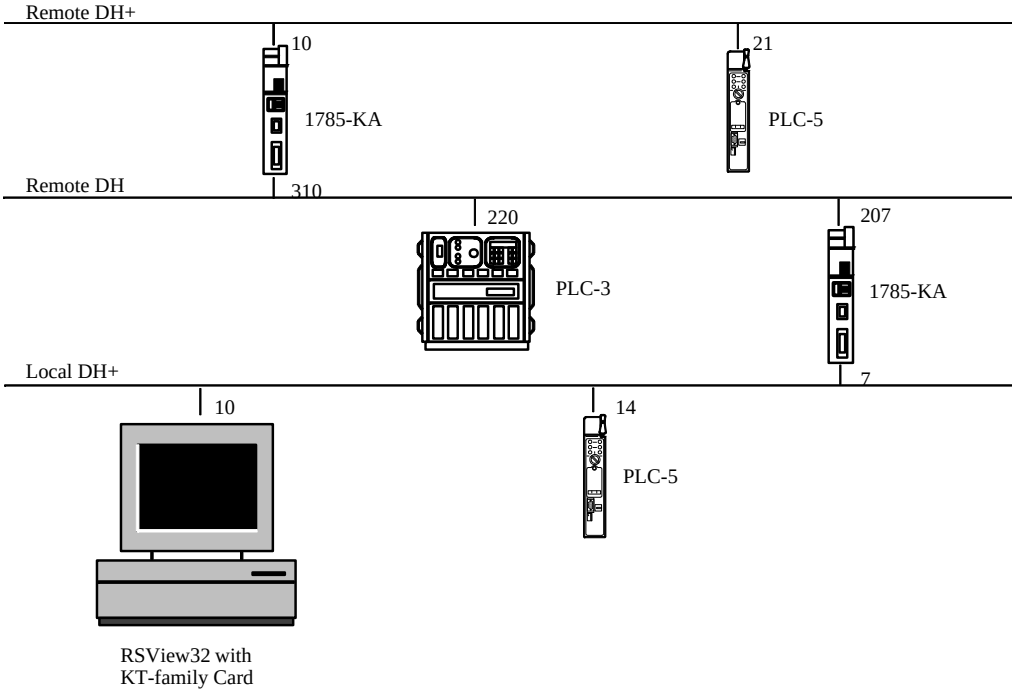
Remote Network	Station Address	Valid Entries
DH	ll.sss	
	lllocal bridge address	0 – 77 (octal)
	sssstation address on remote DH	0 – 376 (octal)
DH+	ll.rrr.ss	
	lllocal bridge address	0 – 77 (octal)
	rrrremote bridge address	0 – 376 (octal)
	ssstation address on remote DH+	0 – 77 (octal)
	or	
	ll.rss	
	lllocal bridge address	0 – 77 (octal)
	rsscombined remote bridge address and remote station address	0 – 376 (octal)
	The address ll.rss is an offlink address shortened by combining the remote bridge and remote station addresses into one three–digit number. The system reads only the first digit of the remote bridge address, and adds the two–digit remote station address to produce a shorter address that still points to the same node.	

Example: Bridging DH and DH+ networks

The following figure shows an RSView32 system connected to a DH+ network with a KT–family card. The local DH+ network is bridged to a remote DH network, which is bridged to a second remote DH+ network. The 1785–KA interface modules are used to bridge the networks.

The valid station entries for the various nodes in the figure are:

Station Address	Valid Entries
14	14
220	7.220
21	7.310.21 or 7.321


Remote DH+
10
1785-KA
21
PLC-5
Remote DH
310
220
PLC-3
207
1785-KA
Local DH+
7
10
14
PLC-5
RSView32 with
KT-family Card

DH+ and DH–485 networks bridged by a 1785–KA5

Only bridging from DH+ to DH–485 is supported. The format of the station address for nodes on the remote DH–485 network is:

Station Address	Valid Entries
ll.ss	
lllocal bridge address	0 – 77 (octal)
ssstation address on remote DH–485	0 – 37 (octal)
Note: The 1785–KA5 link ID is not required for addressing.	

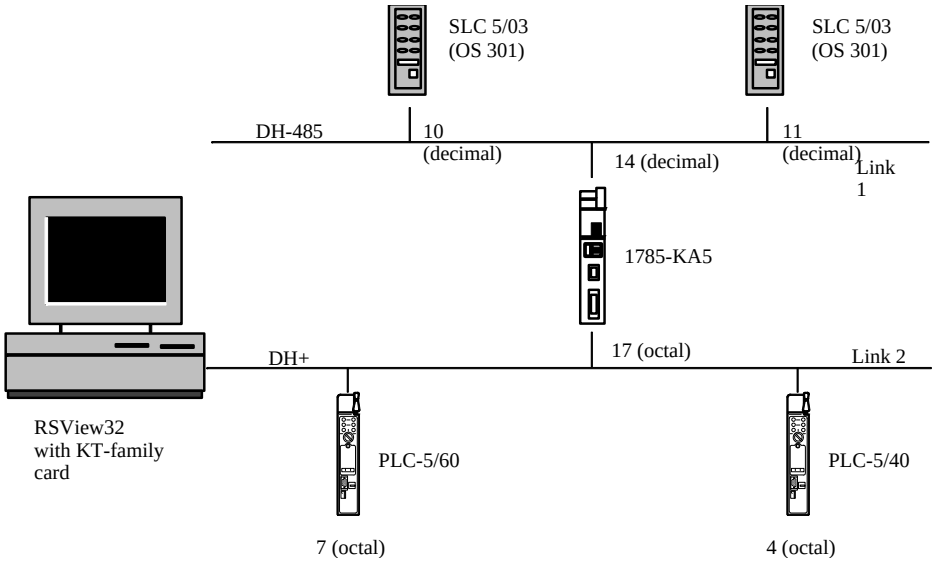
IMPORTANT Only Enhanced SLC™ 5/03 (OS 301) nodes are supported.

Example: Bridging DH+ and DH-485 networks

The following figure shows an RSView32 system connected to a DH+ network with a KT–family card. The local DH+ network is bridged to a remote DH–485 network using the 1785–KA5 communication adapter.

The valid station entries for the various nodes in the figure are:

Station Address	Valid Entries
7 (octal)	7
4 (octal)	4
10 (decimal)	17.12
11 (decimal)	17.13



Multiple DH+ networks connected by a Pyramid Integrator

The format of the station address for nodes on a remote DH+ network is:

Station Address		Valid Entries
ll:rrrrr.ss		
lll	local bridge address	0 – 77 (octal)
rrrrr	PI Link number	0 – 65535 (decimal)
ss	station address on remote DH+	0 – 77 (octal)

The Pyramid Integrator (PI) link number for each DH+ network must be unique. Use the 6200 Series Programming Software to configure link numbers.

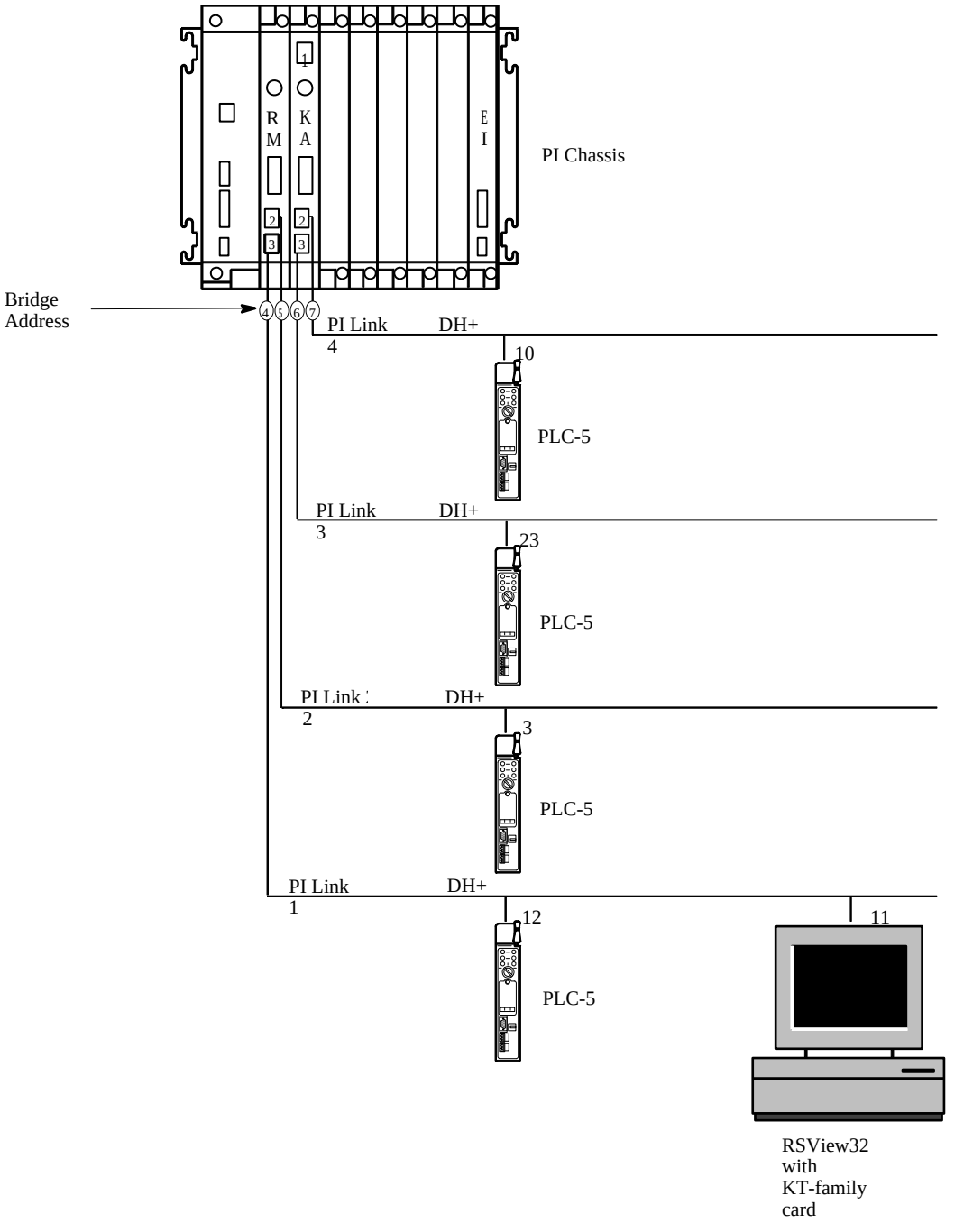
A PI chassis contains one RM module with two network channels. It can also contain up to four KA modules, each with two network channels. Using the RM and four KA modules, an RSView32 system can communicate with programmable controllers on any or all of 10 DH+ networks.

Example: Bridging with a Pyramid Integrator

The figure on the following page shows an RSView32 system connected to a DH+ network with a KT–family card. The PI routes requests among four DH+ networks.

The valid station entries for the various nodes in the figure are:

Station Address	Valid Entries
12	12
3	6:2.3
23	6:3.23
10	6:4.10


PI Chassis
R
M
K
A
E
I
Bridge
Address
4
5
6
7
PI Link
4
DH+
10
PLC-5
PI Link
3
DH+
23
PLC-5
PI Link
2
DH+
3
PLC-5
PI Link
1
DH+
12
PLC-5
11
RSView32
with
KT-family
card

DH and DH+ connected to a TCP/IP network by a Pyramid Integrator

You can use a Pyramid Integrator (PI) with an Ethernet interface to route requests from a TCP/IP network to either DH or DH+ networks. The PI chassis will contain one RM module with two network channels and up to four KA modules, each with two network channels. Using the RM and four KA modules, an RSView32 system can communicate with programmable controllers on any or all of 10 DH or DH+ networks. The RSView32 system can also bridge from a DH+ channel to a DH network and back to a DH+ network using 1785–KA modules.

IMPORTANT To communicate with programmable controllers connected through an Ethernet interface, be sure to choose TCP/IP Bridge as the network type in the Channel editor.

The format of the station address for nodes on remote DH or DH+ networks is:

`host_name::PI_port_ID.station_address`

`host_name` is either:

- a direct IP (Internet Protocol) address in the form www.xxx.yyy.zzz where www, xxx, yyy, and zzz are numbers from 000 to 255
- an alias for the address. An alias is an alphanumeric string from one to eight characters. The first character must be a letter and the name is case–sensitive.

`PI_port_ID` is the remote network connected to a channel, as follows:

- if connected on the RM, type: 0RM:*n*

  where 0 is the PI slot number of the RM and *n* is the RM channel number (2 or 3). The RM slot number is always zero, so you can omit the 0RM and just use the channel number if you wish.

- if connected on a KA, type: *m*KA:*n*

  where *m* is the pushwheel number (1 to 4) on the KA and *n* is the KA channel number (2 or 3).

`station_address` is one of the following:

Remote Network	Station Address		Valid Entries
DH	lll	local station address	0 – 376 (octal)
DH+	ll	local station address	0 – 77 (octal)
DH bridged by a 1785–KA module	ll.sss		
	ll	local bridge address	0 – 77 (octal)
	sss	station address on remote DH+	0 – 376 (octal)
DH+ bridged by two 1785–KA modules	ll.rrr.ss		
	ll	local bridge address	0 – 77 (octal)
	rrr	remote bridge address	0 – 376 (octal)
	ss	station address on remote DH+	0 – 77 (octal)
	or		
	ll.rss		
	ll	local bridge address	0 – 77 (octal)
	rss	combined remote bridge address and remote station address	0 – 376 (octal)
	The address ll.rss is an offlink address that is shortened by combining the remote bridge and remote station addresses into one three–digit number. The system reads only the first digit of the remote bridge address, and adds the two–digit remote station address to produce a shorter address that still points to the same node.		

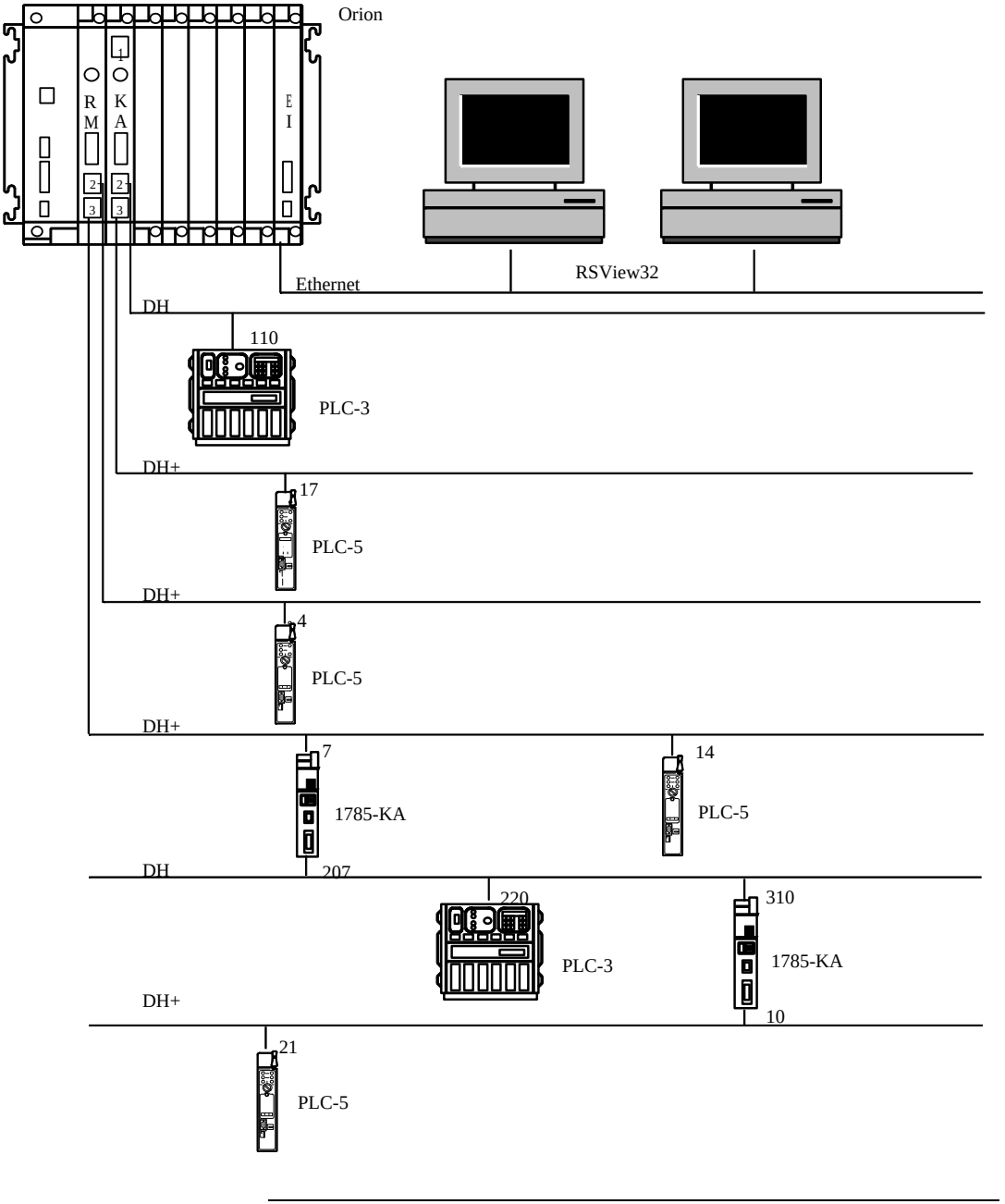
Example: Bridging to a TCP/IP network

The figure on the following page shows an RSView32 system connected to a TCP/IP network through an Ethernet interface with a PI.

The valid station entries for the nodes in the following figure are:

Station Address	Valid Entries
110	orion::1KA:2.110
17	orion::1KA:3.17
4	orion::ORM:2.4
14	orion::ORM:3.14
220	orion::ORM.3.7.220
21	orion::ORM:3.7.310.21

The name “orion” is a host name that maps to an IP address.


Orion
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3
2
3
RSView32
Ethernet
DH
110
PLC-3
DH+
17
PLC-5
DH+
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DH+
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1785-KA
14
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220
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310
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DH+
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Appendix

F Importing and exporting XML files

This appendix describes:

- exporting, editing, and importing XML files.
- the XML file structure for RSView32 graphics.

About XML

XML is the Extensible Markup Language used to create documents with structured text information. It has a standardized format and structure. You can use XML to edit the elements and attributes needed to create or to modify graphic displays.

For more information about XML, see the World Wide Web Consortium's web page about XML at:

http://www.w3.org/XML.

Creating XML files by exporting

The quickest way to create an XML file for your application's graphic displays is to export the data from RSView32. You can then open the XML file in an editor, make your changes and import the file back into RSView32.

To export graphic display information to an XML file

1. In RSView32, click the Project menu.
2. On the Project menu, click Graphics Import Export Wizard.
3. Follow the instructions in the wizard.

   For more information about using the Graphics Import Export Wizard, see the RSView32 online help.

RSView32 creates XML files for the selected graphic displays, in the location you specify.

Editing XML files

To edit XML files, you can use Notepad or any XML editors.

Saving XML files in Notepad

Save the XML files created or edited in Notepad using either UTF-8 or UTF-16 file format. Notepad's Unicode file type corresponds to UTF-16 file format. For files containing strings in English or other Latin-based languages, UTF-8 is recommended, to reduce the size of the XML file. For other languages such as Chinese, Japanese, or Korean, UTF-16 is recommended.

Importing XML files

You can import a graphic display that has been created using an external programming tool or editor, or you can import an XML file that you originally exported from RSView32 and then modified.

Importing graphic XML file

You can import one single graphic display XML file at a time. You can also choose whether to create a new display or update an existing display.

To import graphic display information from an XML file

1. In RSView32, click the Project menu.
2. On the Project menu, click Graphics Import Export Wizard.
3. Follow the instructions in the wizard.

   For more information about using the Graphics Import Export Wizard, see the RSView32 online help.

Graphic display XML file structure

The RSView32 XML document is an XML file that describes the objects and settings for a graphic display. The root element of the XML document is called **GFXDocument**. It represents the graphic display. An XML document can contain only one root element. All other elements in the document must be contained or nested within the root element.

In an XML document, the start of an element is marked **<element name>**. The end is marked **</element name>**.

Here is a sample structure for a graphic display XML document containing one graphic object.

Element	Description
<GFXDocument>	Root element.
<GfxDisplay>	Contains properties of the display.

Element	Description
<Data>	Contains information of the display with encoded data. This section cannot be changed.
</Data>	Indicates the end of Data element.
<ReplaceableFields>	Contains attributes of the display which can be modified.
<Property Name = >	Contains each attribute for the display. Only the attribute value can be modified.
</Property>	Indicates the end of Property element.
</ReplaceableFields>	Indicates the end of ReplaceableFields element.
</GfxDisplay>	Indicates the end of GfxDisplay element.
<RSGFX element = "*object* ">	Contains the properties of the object.
<Data>	Contains information of the object with encoded data. This section cannot be changed.
</Data>	Indicates the end of Data element.
<ReplaceableFields>	Contains attributes of the object which can be modified.
<Property Name = >	Contains each attribute for the object. Only the attribute value can be modified.
</Property>	Indicates the end of Property element.
<Animations>	Contains an animation element for each type of animation set up for the project.
<Color>	Contains attributes for Color animation.
</Color>	Indicates the end of Color animation.
</Animations>	Indicates the end of the animations element.
</ReplaceableFields>	Indicates the end of ReplaceableFields element.
</RSGFX>	Indicates the end of the object element.
</GFXDocument>	Indicates the end of the root element.

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