OPTODISPLAY USER'S GUIDE

FORM 723-060620—JUNE, 2006

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OptoDisplay User's Guide
Form 723-060620—June, 2006

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Welcome to OptoDisplay

Welcome to OptoDisplay™, Opto 22's human-machine interface (HMI), alarming, and trending software for Microsoft® Windows® 2000® and Windows XP operating systems. OptoDisplay is a part of the Opto 22 FactoryFloor® suite of products.

OptoDisplay lets you easily create graphical, on-screen operator interfaces to monitor and manage control applications running on Opto 22 industrial controllers. With OptoDisplay, you can present real-time controller information to the operator, set alarms to notify the operator of changing data, and visually track trends in the data using graphs. Additionally, you can configure the interface to allow the operator to change values such as alarm thresholds.

About This Guide

This user's guide teaches you how to use OptoDisplay, including how to design an OptoDisplay project, configure and connect a controller, and monitor information in your operator interface.

This guide assumes that you are already familiar with Microsoft Windows on your personal computer, including how to use a mouse, standard menus and commands, and how to open, save, and close files. If you are not familiar with Windows or your PC, see the documentation from Microsoft and your computer manufacturer.

Here's what is in this user's guide:

Chapter 1: Quick Start—A short lesson to get you up and running with an OptoDisplay project as quickly as possible. You'll use a sample project to learn how to work with graphics, assign dynamic attributes, and run a project.

Chapter 2: What Is OptoDisplay?—An introduction to OptoDisplay, basic design and programming concepts, and OptoDisplay controls and windows.

Chapter 3: Working with Projects—An explanation of what OptoDisplay projects are, the files they're made of, and how they're organized.

Chapter 4: Configuring Controllers & Tags—Detailed procedures on configuring controllers and I/O from an OptoControl strategy for use in an OptoDisplay project.

Chapter 5: Working with Graphics—Detailed steps for working with graphics—including assigning animation attributes—and the windows in which graphics appear.

Chapter 6: Using Animated Graphics—Covers how to assign dynamic attributes to on-screen objects to create an animated, real-time display of I/O information.

Chapter 7: Working with Trends—Explains how to create and configure graphs to track data from I/O points over time.

Chapter 8: Configuring Trigger-Based Events—Explains how to use historical logging, application launching, sounds, recipes, and how to change window states based on events.

Chapter 9: Using OptoDisplay Runtime—Describes how to customize configurable Runtime features and what you'll see during a Runtime project session.

Appendix A: OptoDisplay Troubleshooting—Gives tips for solving problems you may encounter while building and using your OptoDisplay project.

Appendix B: OptoDisplay Errors—Explains warnings and error messages you may see while running a program in OptoDisplay Runtime.

Appendix C: OptoDisplay Files—Lists all OptoDisplay files located in the OptoDisplay directory.

Appendix D: OptoDisplay Menu Reference—Lists all commands and other options available from the menu bar.

OptoDisplay Index—Provides an alphabetical list of key words and the pages on which they are located.

Also included is a master **FactoryFloor Glossary,** which defines terms used in the FactoryFloor suite of products, located at the back of the *OptoServer User's Guide* binder.

Document Conventions

The following conventions are used in this document:

- Italic typeface indicates emphasis and is used for book titles. (Example: "See the *OptoDisplay User's Guide* for details.")
- Names of menus, commands, dialog boxes, fields, and buttons are capitalized as they appear in the product. (Example: "From the File menu, select Print.")
- File names appear either in all capital letters or in mixed case, depending on the file name itself. (Example: "Open the file TEST1.txt.")
- Key names appear in small capital letters. (Example: "Press SHIFT.")
- Key press combinations are indicated by plus signs between two or more key names. For example, SHIFT+F1 is the result of holding down the shift key, then pressing and releasing the F1 key. Similarly, CTRL+ALT+DELETE is the result of pressing and holding the CTRL and ALT keys, then pressing and releasing the DELETE key.

- “Click” means press and release the left mouse button on the referenced item. “Right-click” means press and release the right mouse button on the item.
- Menu commands are referred to with the Menu→Command convention. For example, “File→Open Project” means to select the Open Project command from the File menu.
- Numbered lists indicate procedures to be followed sequentially. Bulleted lists (such as this one) provide general information.

Other FactoryFloor Resources

Documents and Online Help

To help learn and use the FactoryFloor suite of products, the following resources are provided:

- **Online Help** is available in OptoControl, OptoDisplay, OptoServer, and most of the OptoUtilities. To open online Help, choose Help→Contents and Index in any screen.
- ***OptoControl User's Guide, OptoDisplay User's Guide,*** and ***OptoServer User's Guide*** give step-by-step instructions for using each of these products. The *OptoServer User's Guide* binder also contains a master **FactoryFloor Glossary,** which defines terms for all FactoryFloor products.

  Online versions (Adobe® Acrobat® format) of these and other FactoryFloor documents are available from the Help menu in your FactoryFloor application. To view a document, select Help→Manuals, and then choose a document from the submenu.
- ***OptoControl Command Reference*** contains detailed information about each command (instruction) available in OptoControl.
- Two **quick reference cards**, *OptoControl Commands* and *Beginner's Guide to OptoControl Commands*, are located in the front pocket of the *OptoControl Command Reference*.
- FactoryFloor resources are also available on the Opto 22 Web site at factoryfloor.opto22.com. You can conveniently access this and other sections of the Opto 22 Web site using the Help menu in your FactoryFloor application. Select Help→Opto 22 on the Web, and then select an online resource from the submenu.

Product Support

If you have any questions about FactoryFloor, you can call, fax, or e-mail Opto 22 Product Support.

Phone:	800-TEK-OPTO (835-6786) 951-695-3080 (Hours are Monday through Friday, 7 a.m. to 5 p.m. Pacific Time)
Fax:	951-695-3017
Email:	support@opto22.com
Opto 22 website:	www.opto22.com

NOTE: Email messages and phone calls to Opto 22 Product Support are grouped together and answered in the order received.

When calling for technical support, be prepared to provide the following information about your system to the Product Support engineer:

- Software and version being used
- Controller firmware version
- PC configuration (type of processor, speed, memory, operating system)
- A complete description of your hardware and operating systems, including:
  - jumper configuration
  - accessories installed (such as expansion daughter cards)
  - type of power supply
  - types of I/O units installed
  - third-party devices installed (e.g., barcode readers)
- Specific error messages seen.

Installing OptoDisplay

OptoDisplay installation is easy and quick. Insert the FactoryFloor CD in your CD-ROM drive, and the installation wizard should appear. If the wizard does not appear, start Windows Explorer and navigate to your CD-ROM drive. Double-click Setup.exe to begin installation.

If you have trouble installing OptoDisplay or need 3.5-inch disks rather than a CD, contact Opto 22 Product Support at 800/835-6786 or 951/695-3080.

System Requirements

Installation Requirements

Here’s what you need to install and run OptoDisplay:

- A computer with at least the minimum processor required for your version of Microsoft® Windows® (1 GHz Pentium®-class or better recommended). Additional computer requirements include:

  - Ethernet capability, if using an M4-series controller with M4SENET-100 Ethernet adapter card.
  - An RS-232 serial port and serial cable, for downloading firmware updates to a controller.
- Microsoft Windows XP or Windows 2000® workstation operating system with the most recent service packs.
- At least 128 MB RAM (256 MB recommended)
- At least 150 MB of available hard drive space
- VGA or higher resolution monitor (Super VGA recommended)
- Mouse or other pointing device
- Installed Windows printer (optional).

IMPORTANT: *If your OptoDisplay project uses many basic trends, SuperTrends, or XY Plots, we strongly recommend adding RAM to your computer beyond the amount suggested here. See "Memory Requirements for SuperTrend Pens" on page 7-13 for more information on memory requirements.*

Additional Hardware Requirements

Multiple Video Cards

If you plan to use multiple monitors for your operator interface, you can display the interface you create in OptoDisplay on more than one monitor as long as all monitors use identical video cards.

Controller and I/O Hardware

OptoDisplay works with OptoControl strategies running on an Opto 22 controller. To download and run OptoControl strategies, you'll need the following hardware:

- Opto 22 controller
- Opto 22 SNAP brains, I/O units, bricks, or brain boards
- Opto 22 SNAP, G4, or G1 I/O modules.

To communicate with a controller, the following additional hardware is required:

- One of the following communication methods:
  - Standard RS-232 serial port
  - Ethernet card
  - Contemporary Controls PCA66 series ARCNET card
  - Contemporary Controls PCI20 ARCNET cards (PCI20-CXS, PCI20-FOG-ST, or PCI20-485)
  - Opto 22's AC24AT, AC37, or AC422AT adapter cards.

- Serial cables or ARCNET coaxial cables and hubs, for multidrop connections from the PC to the controllers. Opto 22 recommends the Contemporary Controls Mod Hub series of active hubs. The appropriate expansion cards are:
  - EXP-CXS Coax Star
  - EXP-FOG-ST Fiber ARCNET
  - EXP-485 Twisted pair ARCNET (DC coupled).

NOTE: If you are using a G4LC32ISA or G4LC32ISA-LT controller, you can communicate with it through the ISA bus in your PC.

Firmware Requirements

Firmware is loaded on your controller so that you can download and run OptoControl strategies. If your controller's firmware is not at the required release number, you'll receive an error message. You can download firmware to your controller using the OptoTerm utility included with FactoryFloor. See the Troubleshooting appendix of the *OptoControl User's Guide* for instructions on using this software to download firmware to a controller.

NOTE: If you have a non-flash controller, you need to contact Opto 22 Product Support for an EEPROM upgrade.

CHAPTER 1

Quick Start

Introduction

The quickest way to get familiar with OptoDisplay is by working through a simple example. Our example will use a cookie factory to show you how easy it is to use OptoDisplay. You'll learn how to start OptoDisplay, open and save a project, and assign an OptoControl strategy to the project. Then you'll bring in a bitmap, add some animation attributes, and watch your project in action. We'll repeat this process to fine-tune the visuals and we'll end up with a final "working" cookie factory.

NOTE: If you can't access a controller at the moment, you can still do everything in the Quick Start up to the point of running your project.

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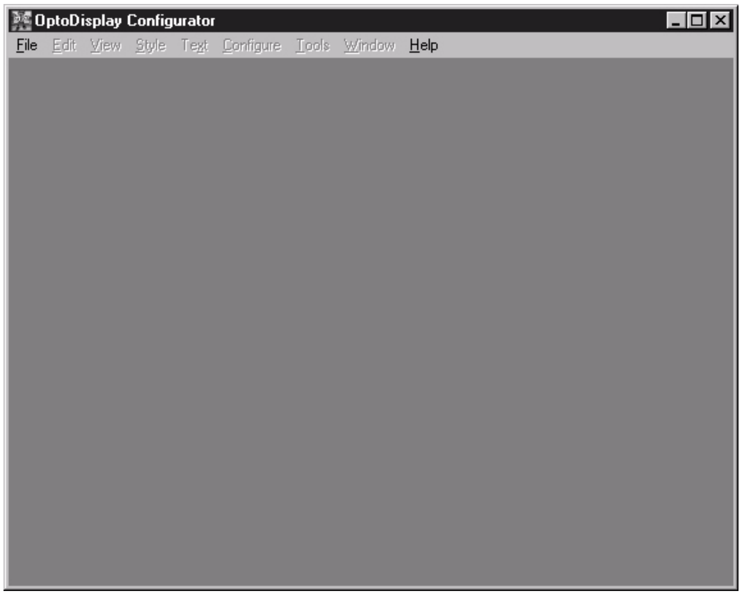
Opening the Project

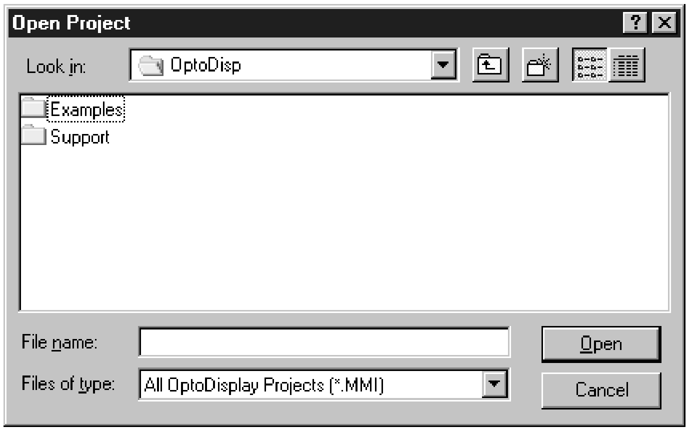
Let's start by opening our sample project. OptoDisplay projects contain windows, graphics, and other information needed to produce an animated operator interface.

1. To start OptoDisplay, click the Windows Start button and select Programs→Opto 22→FactoryFloor 4.1→OptoDisplay→OptoDisplay Configurator.

The OptoDisplay main window opens:



2. Select File→Open Project to open the sample project.



3. In the Open Project dialog box, navigate to Opto 22\Shared.

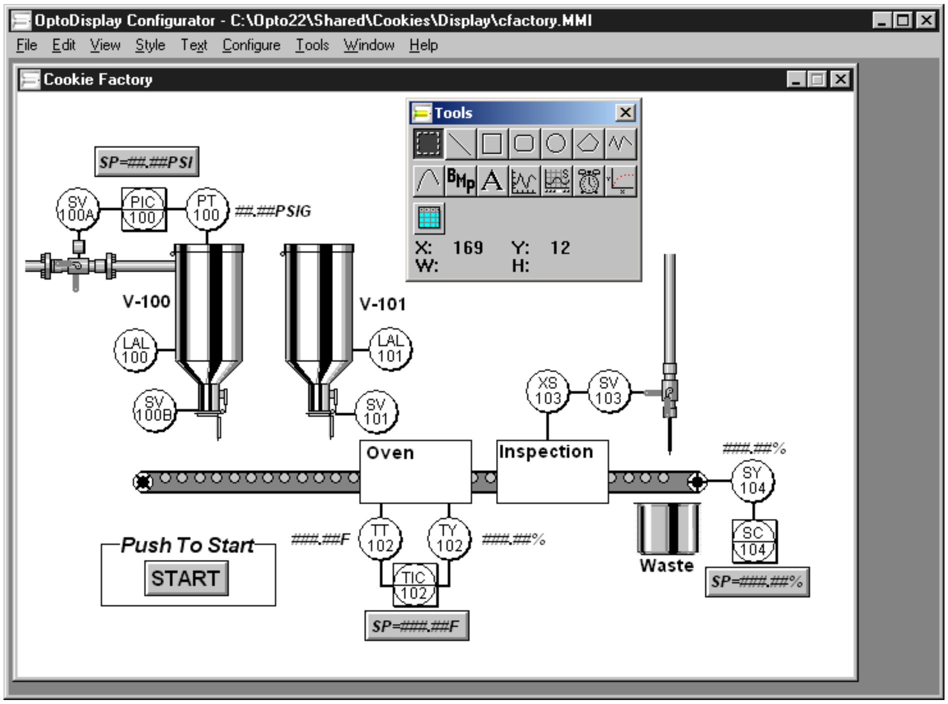
   NOTE: If your OptoDisplay directory does not contain a subdirectory named Shared, you may not have installed your sample projects and strategies. Run the OptoDisplay installation program again and select just the Example Files component of OptoDisplay. See "Installing OptoDisplay" on page iv for specific installation instructions.

4. In the Shared directory, double-click the Cookies subdirectory, and then double-click the Display subdirectory to reach the project file we will use.

5. Double-click the project file cfactory.mmi to open it.

6. Click the Maximize button □ at the top of the window to maximize the window.

The main window should now look like the example shown below.



Saving the Project

Now let's save the project. First we'll save the project to its original name in case any changes have been made, and then we'll save the project to a new name.

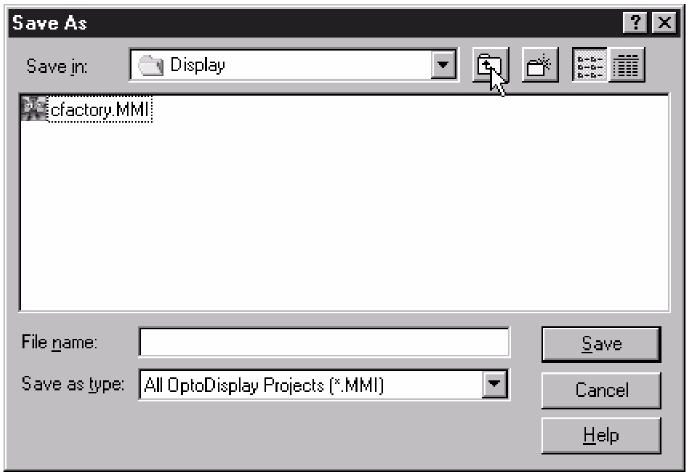
To save the project to its original name, select File→Save Project.

NOTE: If no changes have been made to the project since it was last saved, no messages appear when this save occurs.

Saving the project to a new name allows us to make changes to the project while leaving the original alone. To save the project to a new name, do the following:

1. Select File→Save Project As.

The Save As dialog box opens:



Save in: Display

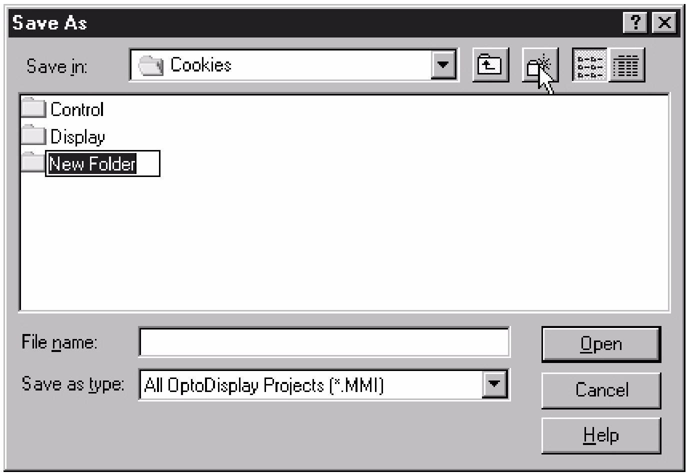
Save as type: All OptoDisplay Projects (*.MMI)

To easily organize the files that make up an OptoDisplay project, each project should be located in its own directory. This means the new project shouldn't simply be renamed and saved in the current directory.

2. Click the Up One Level button to move up to the Cookies folder.

3. Now click the Create New Folder button .

   A new folder appears in the list of folders and files.



Save in: Cookies

Save as type: All OptoDisplay Projects (*.MMI)

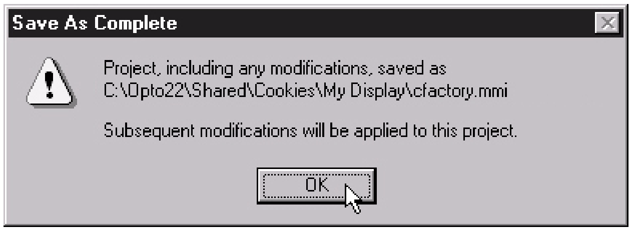
4. Type the name "My Display" to replace "New Folder," then press ENTER.

5. Double-click the folder to open it.

6. Now click once in the File name field, and type "cfactory" to name the project.

7. Click Save.

The project is saved as "cfactory.mmi" in the My Display directory, and a Save As Complete message box appears to let you know that any changes you make from now on are made to the new file in the My Display directory.



Project, including any modifications, saved as C:\Opto22\Shared\Cookies\My Display\cfactory.mmi

Subsequent modifications will be applied to this project.

8. To complete saving the project, use Windows Explorer to copy the bitmap file dough.bmp from our original Display directory to the new project directory My Display that we created earlier in step 3.

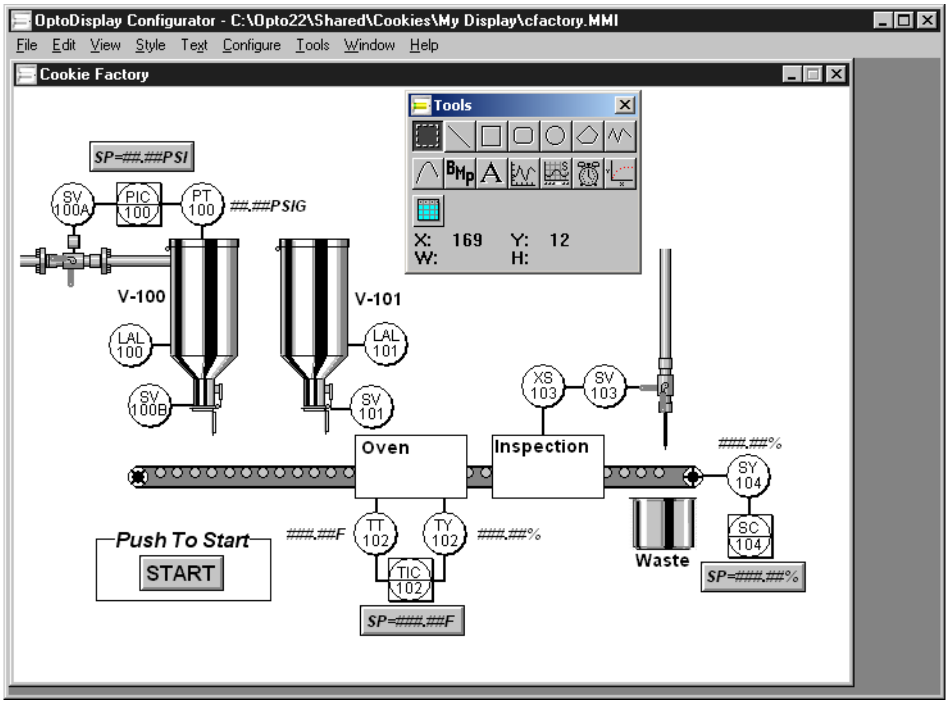
Examining the Project

This particular OptoDisplay project models a simple cookie factory that uses the following components:

- A tank of pre-mixed cookie dough
- A tank of chocolate chips
- An oven
- A visual inspection station
- Some plant air to blow out bad cookies
- A conveyor belt to move material between the different components.

At the start of the process, a measured amount of dough is dropped onto the conveyor belt. The dough moves first under the chip tank to receive some chips, and then into the oven to be baked. The next stop is an inspection station, where rejected cookies are blown off the belt. The good cookies go to shipping. Should anything go wrong, we also have some alarms built in to stop the process when necessary.

The window for the cookie factory project is shown below.



This window is called a *draw window,* because in OptoDisplay Configurator it's where you can create and position graphic objects and other elements for your operator interface. This is also where you assign animation characteristics, or *dynamic attributes,* to graphic objects. Floating on top of the window is a toolbox with all the tools you need to draw graphic objects.

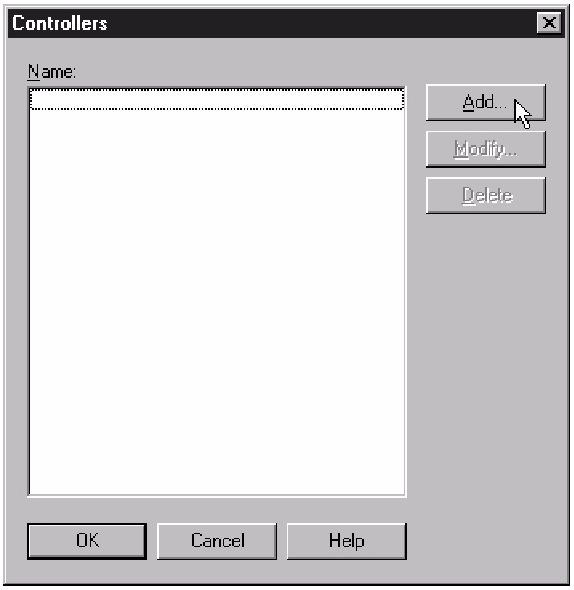
The Cookie Factory window shows two tanks (one for the dough and one for the chips), a conveyor, an oven and inspection station, a few valves, and a start button.

Configuring a Controller

We'll start out by configuring a controller so that our graphics are tied to actual I/O points in an OptoControl strategy. It's okay if you don't have the same I/O points as the ones configured in the strategy; you'll just need to configure your controller so that our example project will recognize it. The OptoControl strategy we mentioned will be downloaded to your controller later so we can actually see things running. We'll briefly go through the configuration process, but this process is covered in greater detail in Chapter 4, "Configuring Controllers & Tags."

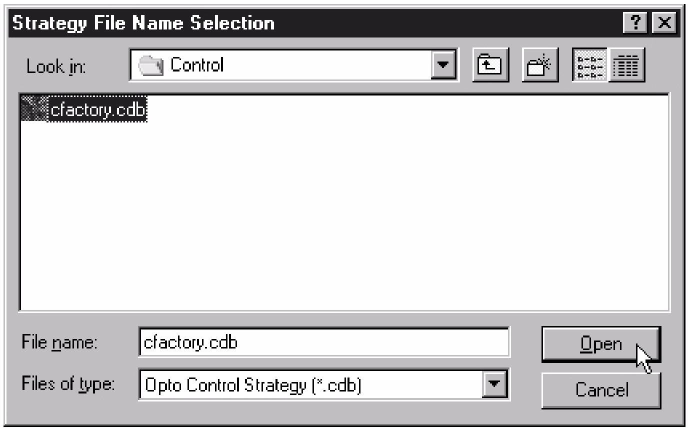
1. Choose the Configure➞Controller(s) command.

The Controllers dialog box appears:



2. Click the Add button.

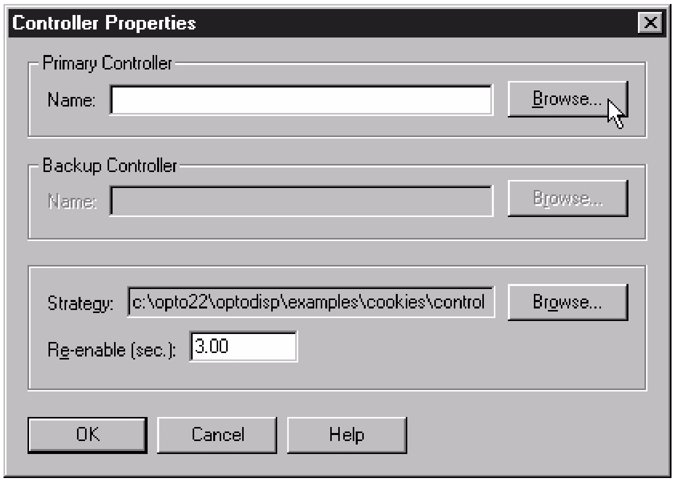
   The Strategy File Name Selection dialog box appears. This dialog box is much like the Open Project dialog box we used to find our cookie factory project.



3. Change directories to the C:\Opto22\Shared\Cookies\Control directory.

4. Select the cfactory.cdb file, and then click Open.

The Controller Properties dialog box appears. Notice that the OptoControl strategy you just picked is shown in the Strategy field.


Controller Properties

Primary Controller

Name:

Backup Controller

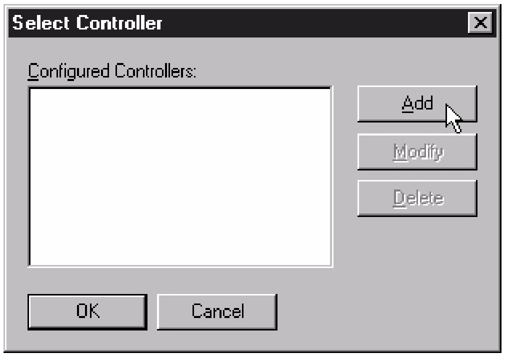
Name:

Strategy: c:\opto22\optodisp\examples\cookies\control

Re-enable (sec.): 3.00

5. To define your controller in the Primary Controller box, click the upper Browse button (in the Primary Controller group).

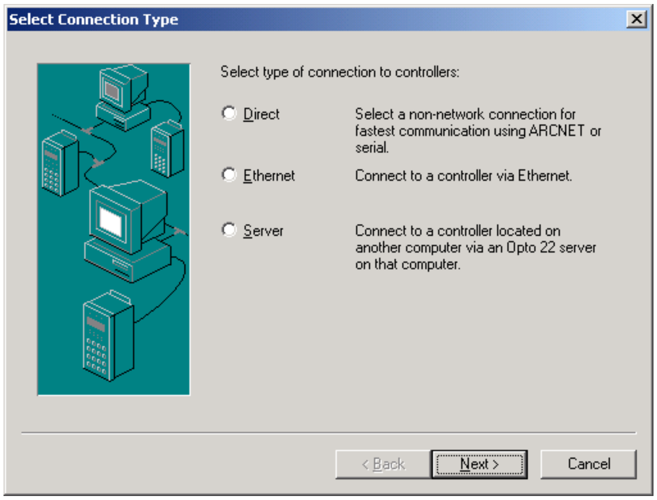
   The Select Controller dialog box opens:


Select Controller

Configured Controllers:

6. Click Add to add a controller.

The Select Connection Type dialog box appears. From this point in the setup you will need to make choices and enter data based on the controller you wish to access.



Select Connection Type

Select type of connection to controllers:

○ Direct — Select a non-network connection for fastest communication using ARCNET or serial.

○ Ethernet — Connect to a controller via Ethernet.

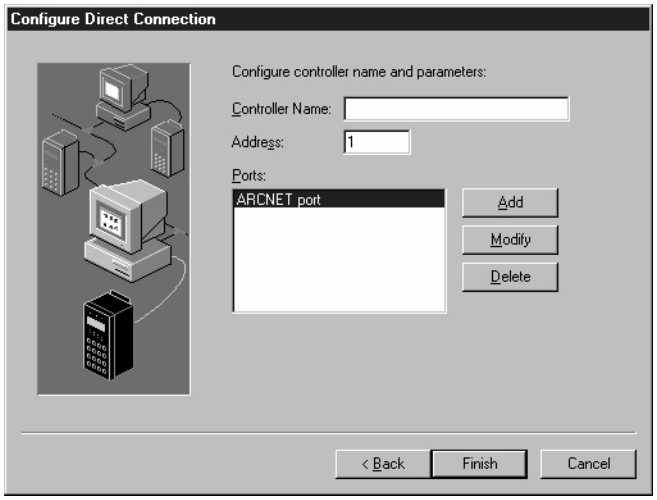
○ Server — Connect to a controller located on another computer via an Opto 22 server on that computer.

7. Select the appropriate connection type for the type of controller connected to your PC:
   - Direct, if the controller is connected directly to your computer
   - Ethernet, if the controller is connected via Ethernet
   - Server, if the controller is located on a network

   For this example, we will use a direct connection to the controller. If your PC is not directly connected to your controller, configure your controller as necessary to use one of the other connection types. See Chapter 4 in the *OptoControl User's Guide* for more information. You can also just follow along with our example, but you will not be able to connect to OptoDisplay Runtime if your hardware and settings differ.

8. Select Direct, and then click Next.

   The Configure Direct Connection dialog box opens:



Configure Direct Connection

Configure controller name and parameters:

Controller Name:

Address: 1

Ports: ARCNET port

9. Enter the name “Cookie Controller” for the controller.

   It’s usually a good idea to give the controller a descriptive name. Note that the controller name can contain letters, numbers, and spaces only.

10. Enter the controller’s address.

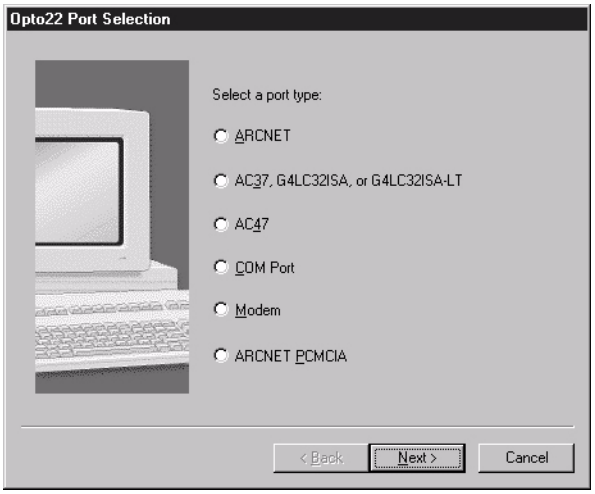
    You can read this from a display if your controller has one, or by examining its address jumper configuration if it doesn’t.

11. Select a port on your computer through which OptoDisplay will communicate with the controller.

    If you have already used OptoControl or OptoTerm, you may already have the correct port configured and listed in the Ports list. If this is the case, select this port, click Finish, and go to step 17. You can also click on the port name and click on Modify to view or change its configuration. See Chapter 4, “Configuring Controllers & Tags,” for more information on how to do this.

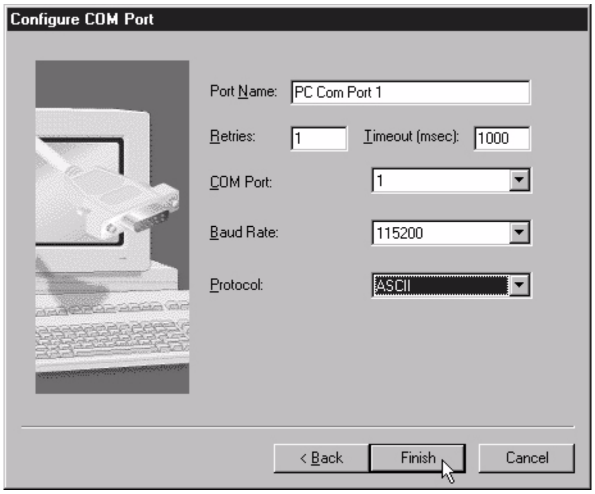
12. Assuming you do not already have your port configured, click Add.

    The Opto 22 Port Selection dialog box appears. In this dialog box, you will select the type of port through which your PC communicates to your controller. For this example, we are using the COM port, which is a serial connection.



13. Select COM Port, and then click Next.

The Configure COM Port dialog box appears:



Configure COM Port

Port Name: PC Com Port 1

Retries: 1 Timeout (msec): 1000

COM Port: 1

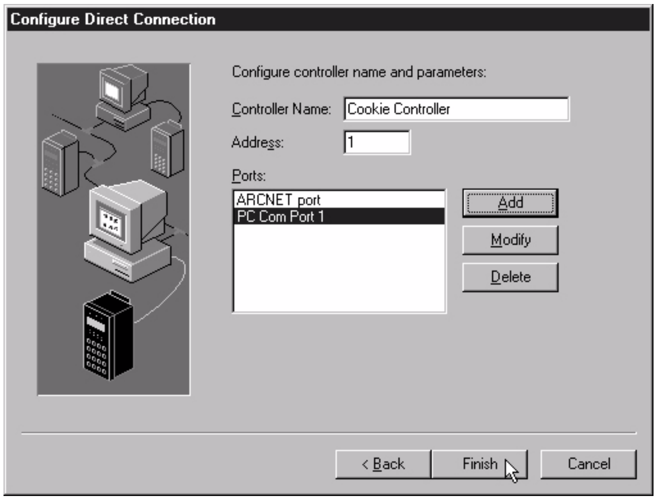
Baud Rate: 115200

Protocol: ASCII

14. Enter a descriptive name for this port and enter other communication data as required for your port type.

Due to the range of possible communication configurations, we can’t provide a universal answer that covers what to put in these fields. Do make sure, however, that the values you enter correspond to your actual communication configuration. Chapter 4, “Working with Controllers,” in the *OptoControl User’s Guide* for more information on adding, modifying, and deleting controllers. For this example, we use a value of 1 for the number of retries and a time-out value of 1000.

15. Enter information in all available fields, and then click Finish when done.



Configure Direct Connection

Configure controller name and parameters:

Controller Name: Cookie Controller

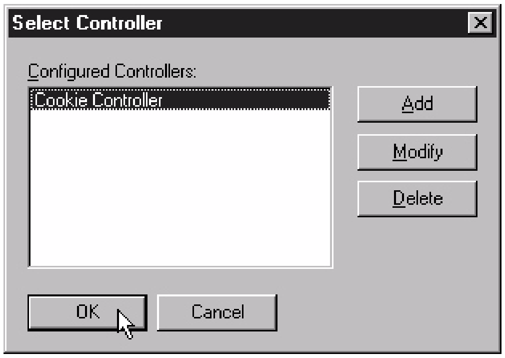
Address: 1

Ports:

ARCNET port
PC Com Port 1

16. Make sure the correct port is highlighted in the Configure Direct Connection dialog box, and then click Finish.

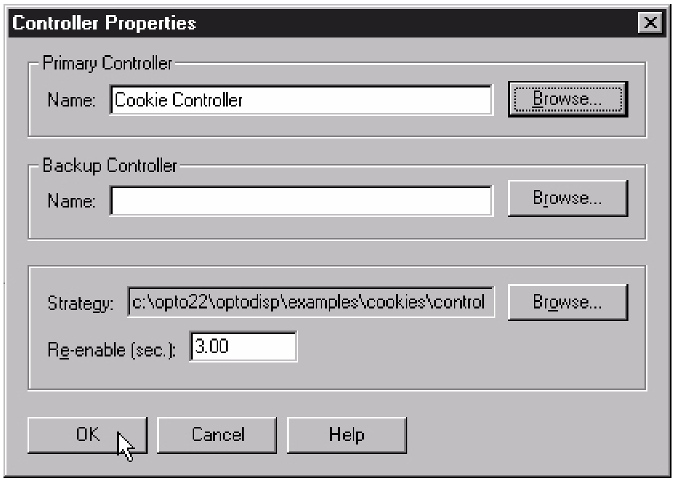
In the Select Controller dialog box that's open, the newly configured controller appears in the Configured Controllers list.



Configured Controllers: Cookie Controller

17. Select the new controller, and click OK.

The Controller Properties dialog box appears with the new controller listed in the Primary Controller group.



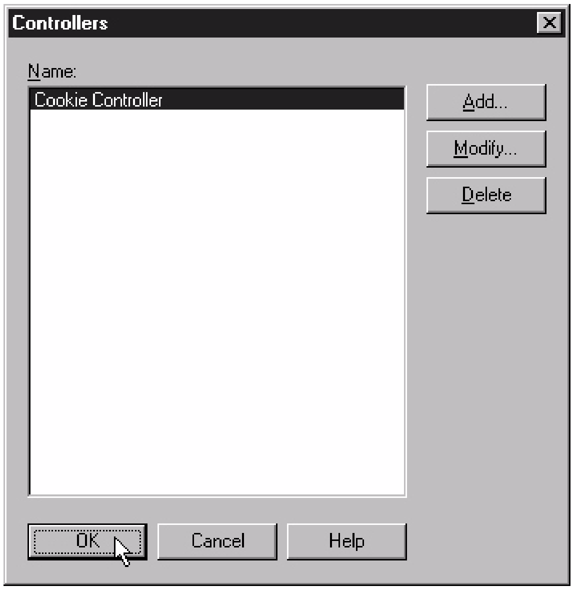
Primary Controller
Name: Cookie Controller

Backup Controller
Name:

Strategy: c:\opto22\optodisp\examples\cookies\control
Re-enable (sec.): 3.00

18. Click OK.

The Controllers dialog box appears with our new controller highlighted.

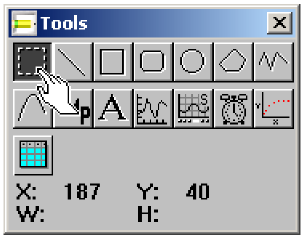


19. Click OK to finish configuring the controller.

Adding a Dynamic Attribute

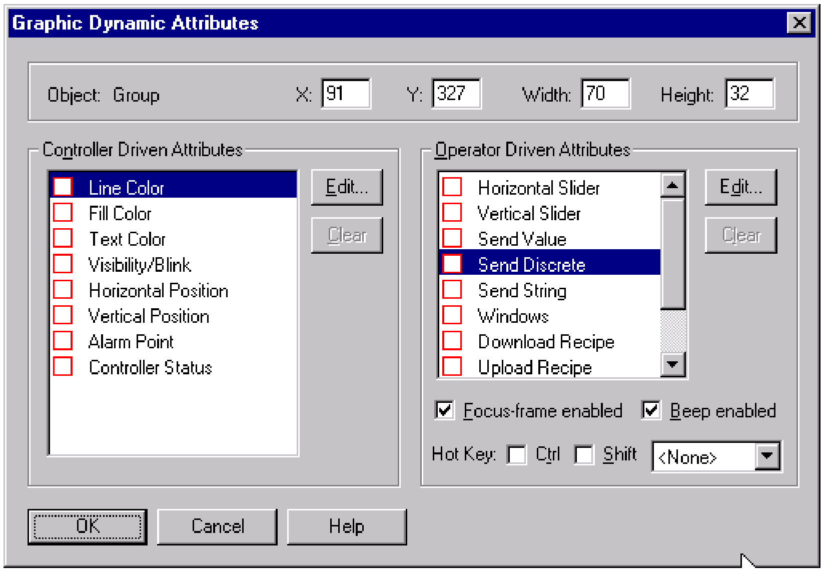
Let's assign an attribute to the Start button that will start the cookie factory display.

1. Click the Select tool in the OptoDisplay Configurator toolbox as shown below.



2. Now double-click the Start button in the Cookie Factory window.

Some small black boxes called *sizing handles* appear around the button. They indicate that the button is currently selected. The Graphic Dynamic Attributes dialog box also opens:



Object: Group X: 91 Y: 327 Width: 70 Height: 32

☑ Focus-frame enabled ☑ Beep enabled

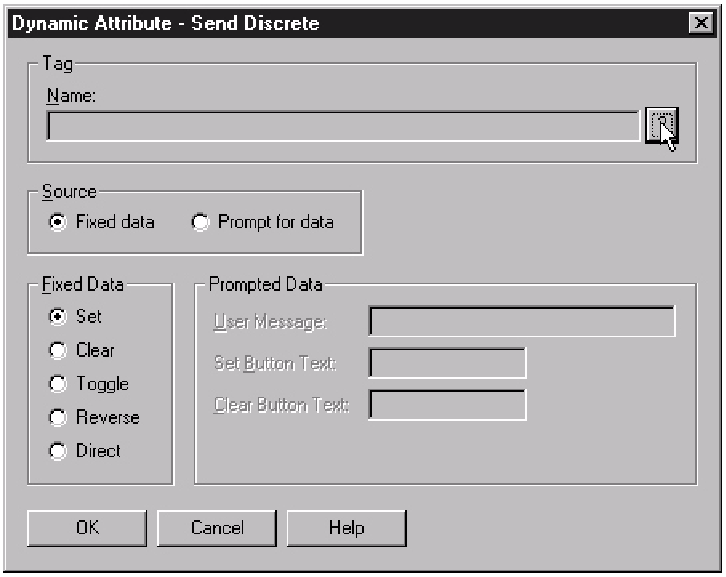
Hot Key: ☐ Ctrl ☐ Shift <None>

Notice that the dialog box has two separate groups of attributes: Controller Driven Attributes and Operator Driven Attributes. *Controller-driven attributes* are attributes that are driven by tag values from the OptoControl strategy we assigned to the project. *Operator-driven attributes* are driven by an operator's interaction with a graphic object in OptoDisplay.

We're going to choose the operator-driven attribute Send Discrete to send a discrete value to the controller. The OptoControl strategy interprets the value as a signal to start the cookie factory.

3. In the Graphic Dynamic Attributes dialog box, select Operator Driven Attribute→Send Discrete, and then click Edit.

The Dynamic Attribute - Send Discrete dialog box opens:



Tag

Name:

Source

● Fixed data ○ Prompt for data

Fixed Data

● Set
○ Clear
○ Toggle
○ Reverse
○ Direct

Prompted Data

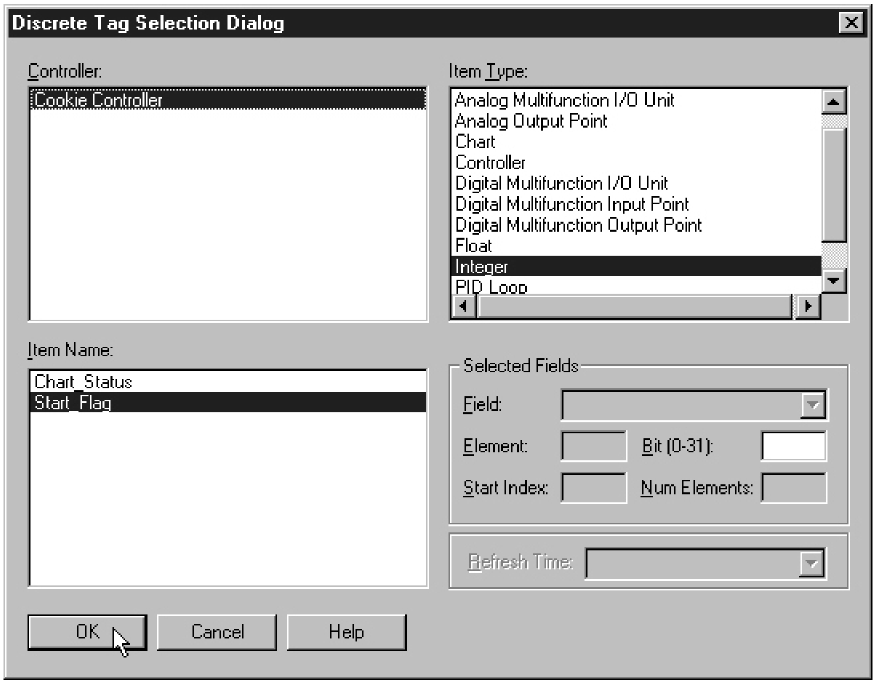
User Message:

Set Button Text:

Clear Button Text:

4. Click the Tag Selection button ? to configure the tag we want to connect to in the OptoControl strategy.

   The Tag Selection dialog box appears. Notice that the Cookie Controller is highlighted in the Controller list.



Controller:

Cookie Controller

Item Type:

Analog Multifunction I/O Unit
Analog Output Point
Chart
Controller
Digital Multifunction I/O Unit
Digital Multifunction Input Point
Digital Multifunction Output Point
Float
Integer
PID Loop

Item Name:

Chart_Status
Start_Flag

Selected Fields

Field:

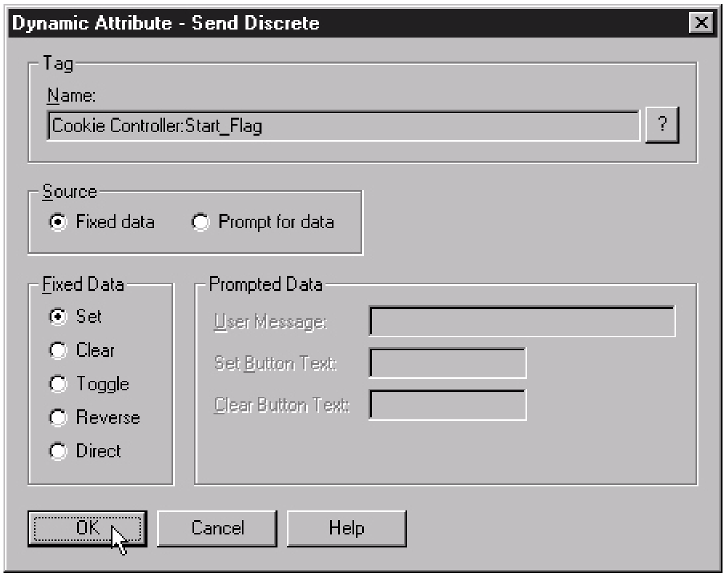
Element: Bit (0-31):

Start Index: Num Elements:

Refresh Time:

5. Select Integer in the Item Type group and Start_Flag in the Item Name group, and then click OK.

The Dynamic Attribute - Send Discrete dialog box appears with the new tagname listed in the Tag group.



Dynamic Attribute - Send Discrete

Tag

Name: Cookie Controller:Start_Flag

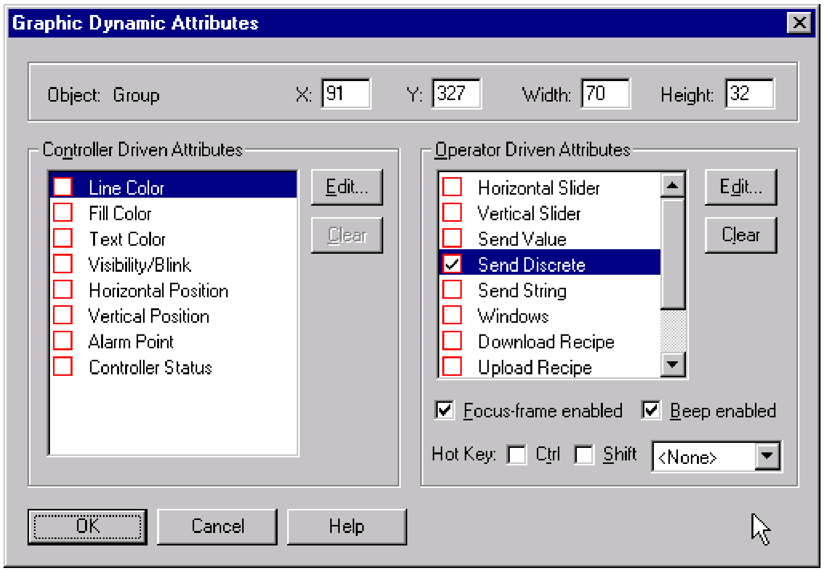
Source: ● Fixed data ○ Prompt for data

Fixed Data: ● Set ○ Clear ○ Toggle ○ Reverse ○ Direct

Prompted Data: User Message: Set Button Text: Clear Button Text:

6. Click OK.

The Graphic Dynamic Attributes dialog box appears with a check mark next to Send Discrete in the Operator Driven Attributes list.



Graphic Dynamic Attributes

Object: Group X: 91 Y: 327 Width: 70 Height: 32

Controller Driven Attributes:
□ Line Color
□ Fill Color
□ Text Color
□ Visibility/Blink
□ Horizontal Position
□ Vertical Position
□ Alarm Point
□ Controller Status

Operator Driven Attributes:
□ Horizontal Slider
□ Vertical Slider
□ Send Value
☑ Send Discrete
□ Send String
□ Windows
□ Download Recipe
□ Upload Recipe

☑ Focus-frame enabled ☑ Beep enabled

Hot Key: □ Ctrl □ Shift <None>

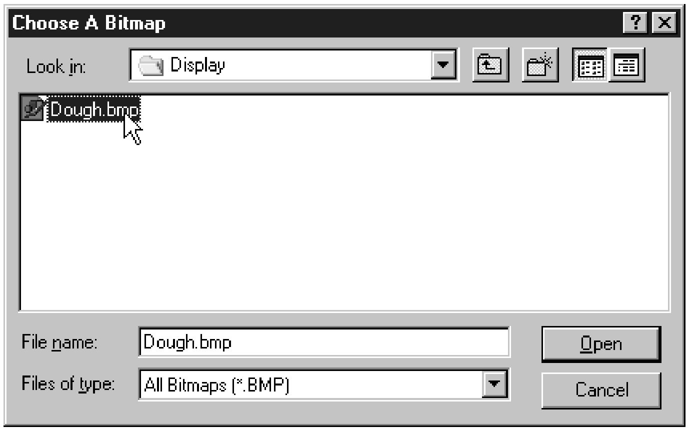
7. Click OK to complete adding the dynamic attribute and close the dialog box.

Adding a Graphic

Now let's add a portion of cookie dough underneath the first tank. Rather than drawing our cookie, we're going to use a drawing of a cookie saved as a bitmap graphics file (or bmp). This file is located in the My Display directory.

1. Select File→Choose Bitmap.

   The Choose A Bitmap dialog box appears:



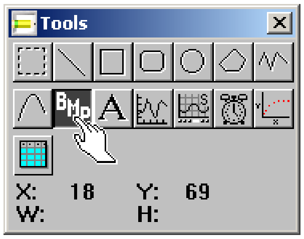
Dough.bmp

File name: Dough.bmp

Files of type: All Bitmaps (*.BMP)

2. Double-click the Dough.bmp file to select the cookie bitmap.

3. Now choose the Bitmap tool in the OptoDisplay Configurator toolbox as shown below.



X: 18 Y: 69
W: H:

4. Click the cursor right above the conveyor belt and underneath the first vessel.

   If the graphic is a little out of place, it can easily be moved to the correct position using the Select tool.

5. Choose the Select tool in the toolbox, and then click the bitmap graphic to select it.

   Nine square sizing handles appear around the graphic.

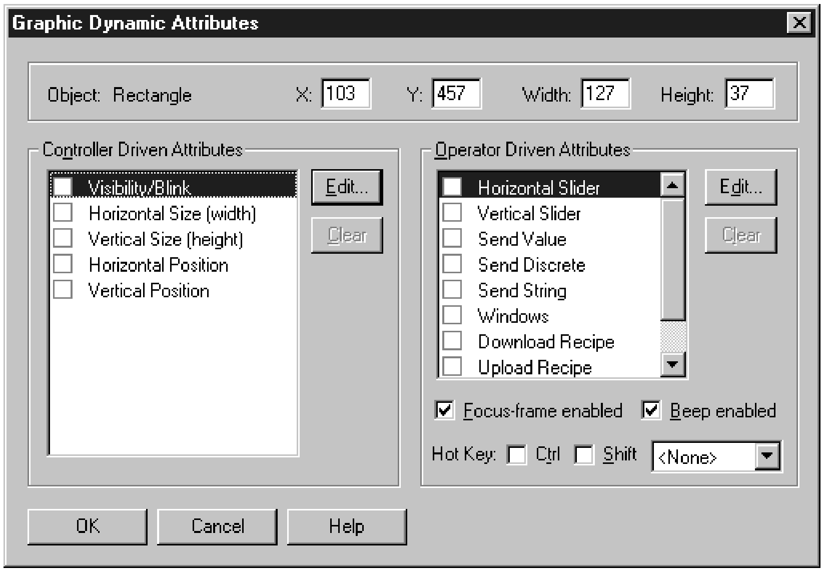
6. Put your cursor within the sizing handles, click your mouse, and drag the cookie to the correct position above the conveyor belt and underneath the first vessel.

   Besides visually placing the graphic, you can also use the arrow keys on the keyboard or use the X: and Y: coordinates displayed in the toolbox to help you place the cookie. We suggest coordinate locations X:135 and Y:284, but your coordinates may differ.

Now let's give the bitmap graphic some attributes to animate it. To make the cookie look like it's moving across the conveyor belt, we'll configure an attribute to affect its horizontal position.

7. Double-click the cookie bitmap graphic.

   The Graphic Dynamic Attributes dialog box opens:



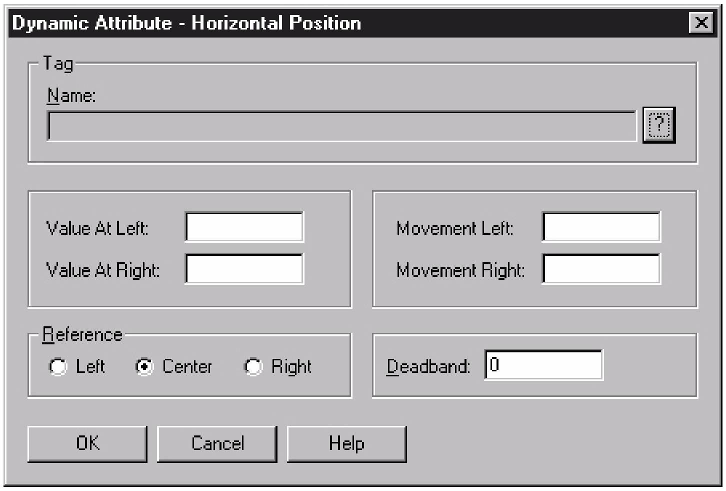
Object: Rectangle X: 103 Y: 457 Width: 127 Height: 37

☑ Focus-frame enabled ☑ Beep enabled

Hot Key: □ Ctrl □ Shift <None>

8. In the Controller Driven Attributes list, double-click Horizontal Position.

   The Dynamic Attribute - Horizontal Position dialog box appears. We need to configure a tag to which we will connect the cookie bitmap graphic. This time we'll connect it to a value OptoDisplay reads from the controller.

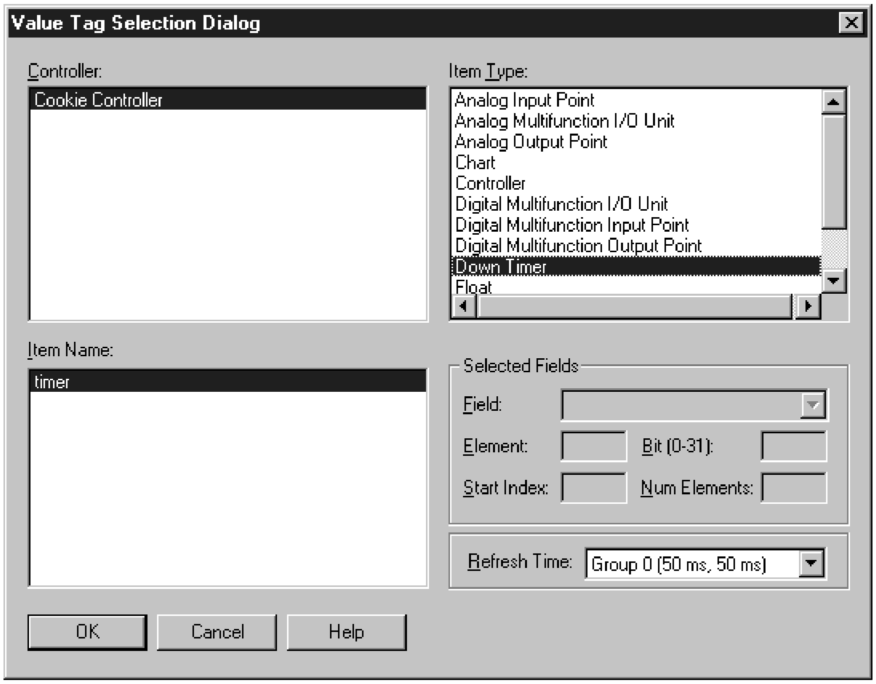


Reference: ○ Left ● Center ○ Right

Deadband: 0

9. Click the Tag Selection button ?.

The Tag Selection dialog box appears:


Value Tag Selection Dialog
Analog Input Point
Analog Multifunction I/O Unit
Analog Output Point
Chart
Controller
Digital Multifunction I/O Unit
Digital Multifunction Input Point
Digital Multifunction Output Point
Down Timer
Float
Selected Fields
Field:
Element:
Bit (0-31):
Start Index:
Num Elements:
OK
Cancel
Help

Controller: Cookie Controller

Item Type: Down Timer

Item Name: timer

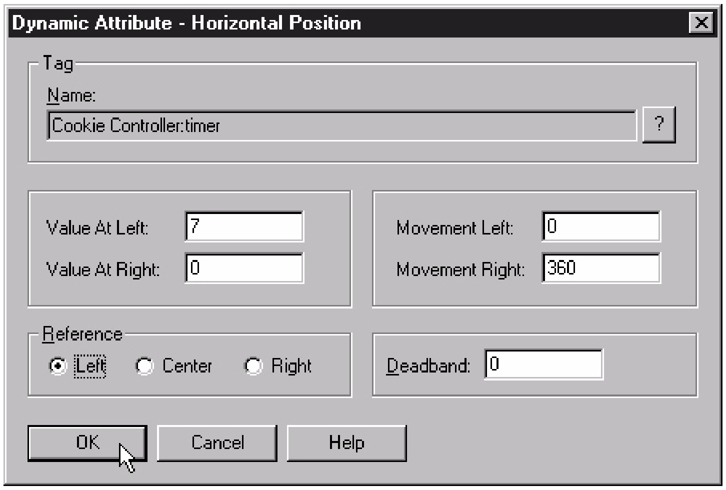
Refresh Time: Group 0 (50 ms, 50 ms)

10. Select Cookie Controller from the Controller group, Down Timer from the Item Type group, and timer from the Item Name group, and then click OK.

11. In the Dynamic Attribute - Horizontal Position dialog box, enter the following values, using the TAB key to move from field to field:

- Value At Left: 7
- Value At Right: 0
- Movement Left: 0
- Movement Right: 360
- Reference: Left
- Deadband: 0

When complete, the dialog box should look like the example below.



Name: Cookie Controller:timer

Value At Left: 7

Value At Right: 0

Movement Left: 0

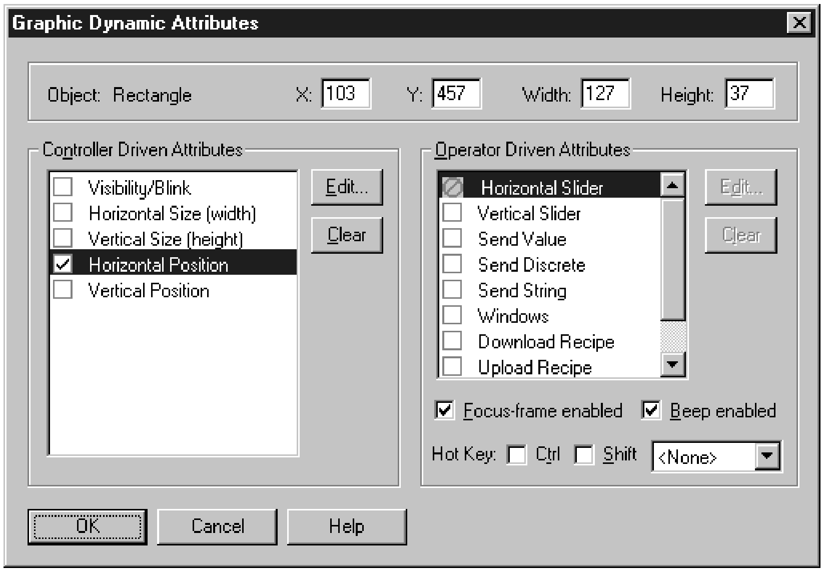
Movement Right: 360

Reference: ● Left ○ Center ○ Right

Deadband: 0

12. Click OK to close the dialog box.

The Graphic Dynamic Attributes dialog box appears:



Object: Rectangle X: 103 Y: 457 Width: 127 Height: 37

Controller Driven Attributes

□ Visibility/Blink
□ Horizontal Size (width)
□ Vertical Size (height)
☑ Horizontal Position
□ Vertical Position

Operator Driven Attributes

□ Horizontal Slider
□ Vertical Slider
□ Send Value
□ Send Discrete
□ Send String
□ Windows
□ Download Recipe
□ Upload Recipe

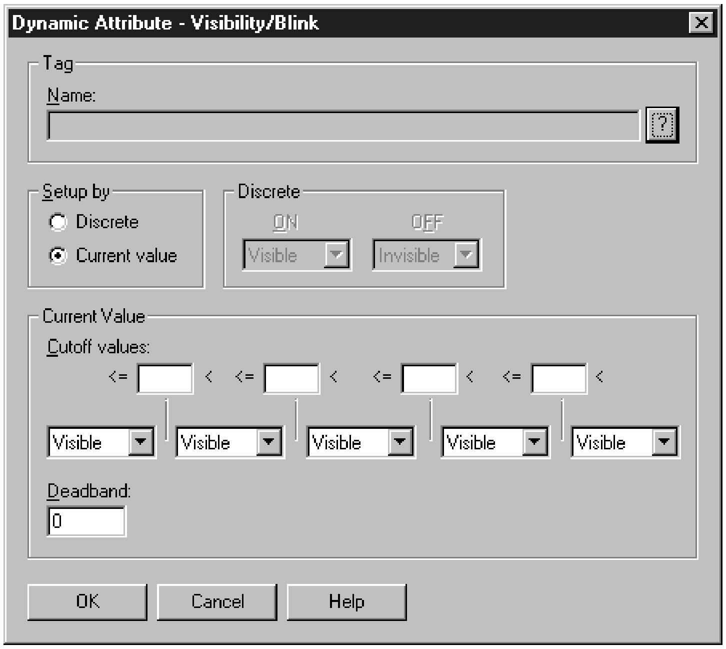
☑ Focus-frame enabled ☑ Beep enabled

Hot Key: □ Ctrl □ Shift <None>

Now we need to configure an attribute that will make the cookie dough appear to drop out of the first vessel.

13. Double-click Visibility/Blink in the Controller Driven Attribute list.

The Dynamic Attribute - Visibility/Blink dialog box opens:



Dynamic Attribute - Visibility/Blink

Tag

Name:

Setup by

○ Discrete

● Current value

Discrete

ON: Visible

OFF: Invisible

Current Value

Cutoff values:

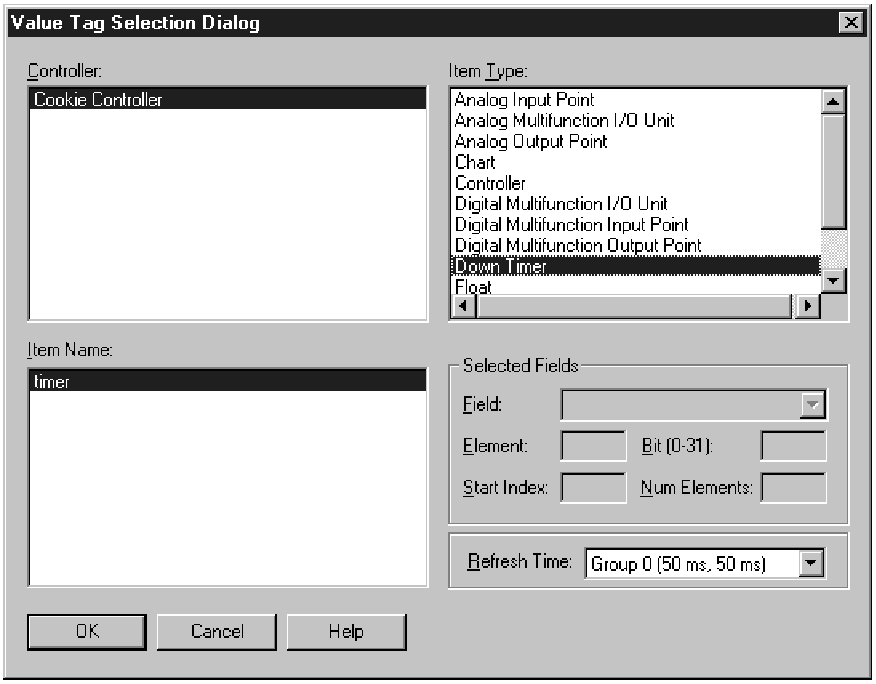
Visible <= Visible < <= Visible < <= Visible < <= Visible <

Deadband: 0

14. In the group Setup by, select Current Value.

15. Click the Tag Selection button ? .

The Value Tag Selection dialog box appears:



Value Tag Selection Dialog

Controller: Cookie Controller

Item Type:

- Analog Input Point
- Analog Multifunction I/O Unit
- Analog Output Point
- Chart
- Controller
- Digital Multifunction I/O Unit
- Digital Multifunction Input Point
- Digital Multifunction Output Point
- Down Timer
- Float

Item Name: timer

Selected Fields

Field:

Element:

Bit (0-31):

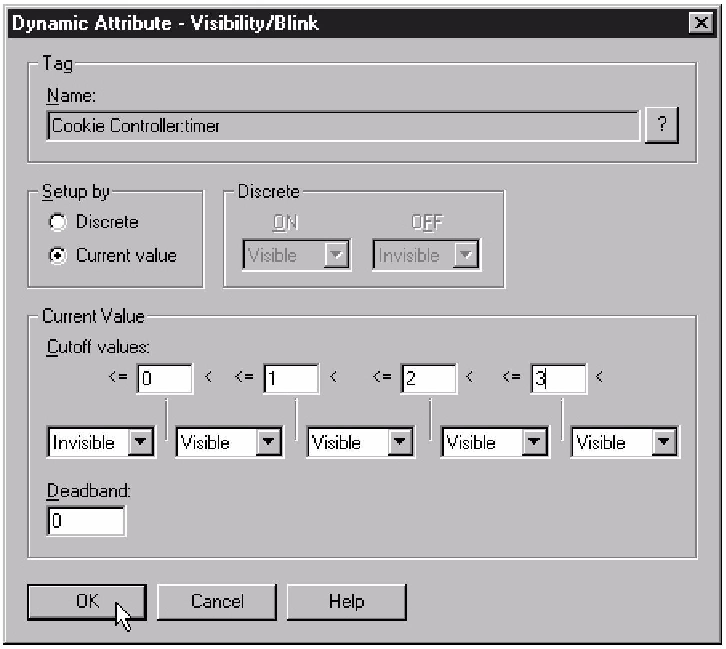
Start Index:

Num Elements:

Refresh Time: Group 0 (50 ms, 50 ms)

16. Select Down Timer as the Item Type and timer as the Item Name, and then click OK.

17. Fill in the remaining fields in the Dynamic Attribute - Visibility/Blink dialog box so that it looks like the example below:



Dynamic Attribute - Visibility/Blink

Tag

Name: Cookie Controller:timer

Setup by: ○ Discrete ● Current value

Discrete: ON Visible OFF Invisible

Current Value

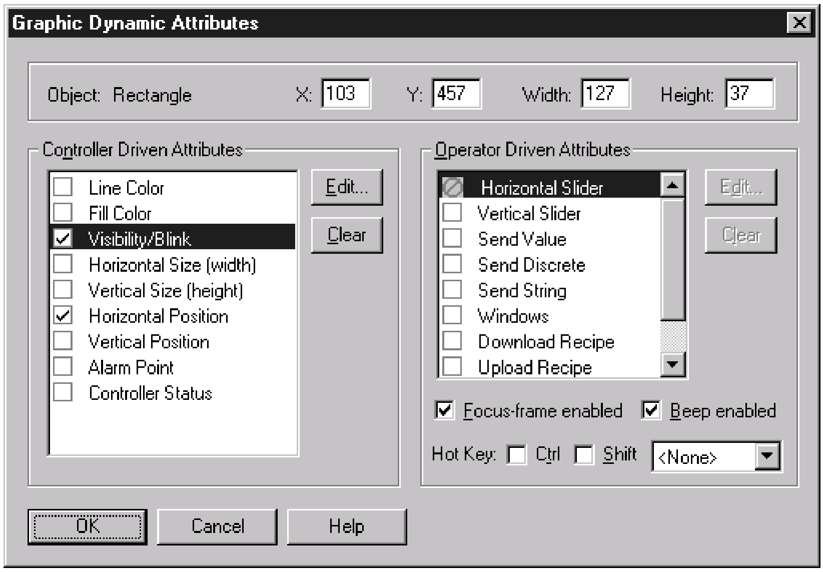
Cutoff values: <= 0 < <= 1 < <= 2 < <= 3 <

Invisible | Visible | Visible | Visible | Visible

Deadband: 0

18. Click OK.

In the Graphic Dynamic Attributes dialog box that appears, notice that the Visibility/Blink controller-driven attribute is checked. In the Operator-Driven Attributes list, a Not Available button ⊘ appears next to the Horizontal Slider attribute. This means that this attribute cannot be configured because other dynamic attributes that have already been configured will conflict with the attribute.



Graphic Dynamic Attributes

Object: Rectangle X: 103 Y: 457 Width: 127 Height: 37

Controller Driven Attributes

- □ Line Color
- □ Fill Color
- ☑ Visibility/Blink
- □ Horizontal Size (width)
- □ Vertical Size (height)
- ☑ Horizontal Position
- □ Vertical Position
- □ Alarm Point
- □ Controller Status

Operator Driven Attributes

- ⊘ Horizontal Slider
- □ Vertical Slider
- □ Send Value
- □ Send Discrete
- □ Send String
- □ Windows
- □ Download Recipe
- □ Upload Recipe

☑ Focus-frame enabled ☑ Beep enabled

Hot Key: □ Ctrl □ Shift <None>

19. Click OK to close the dialog box.

20. Save the project by selecting File➞Save Project.

21. Close OptoDisplay Configurator by clicking the Close Window button ☒ .

Downloading to the Controller

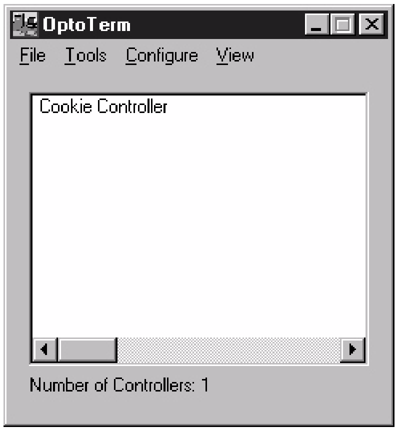
Let’s try running our project and see if there’s anything we need to change.

In order to see our animated display, we have to run the OptoDisplay Runtime program. But before we do that, we need to download our OptoControl strategy to the controller.

NOTE: OptoControl strategies are usually downloaded to a controller for convenience using the OptoControl application. However, we’ll download our OptoControl strategy using a FactoryFloor utility called OptoTerm. To learn more about downloading strategies to a controller, see the OptoControl User’s Guide.

1. Click the Windows Start button and select Programs➞Opto 22➞FactoryFloor 4.1➞OptoUtilities➞OptoTerm.

The OptoTerm window appears, displaying the name of our controller.

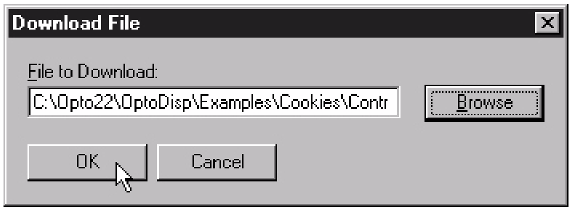


Cookie Controller

Number of Controllers: 1

2. Select Cookie Controller, and then choose File➞Download➞Download Forth Files to download the run file for our OptoControl strategy.

The Download File dialog box opens:



File to Download: C:\Opto22\OptoDisp\Examples\Cookies\Contr

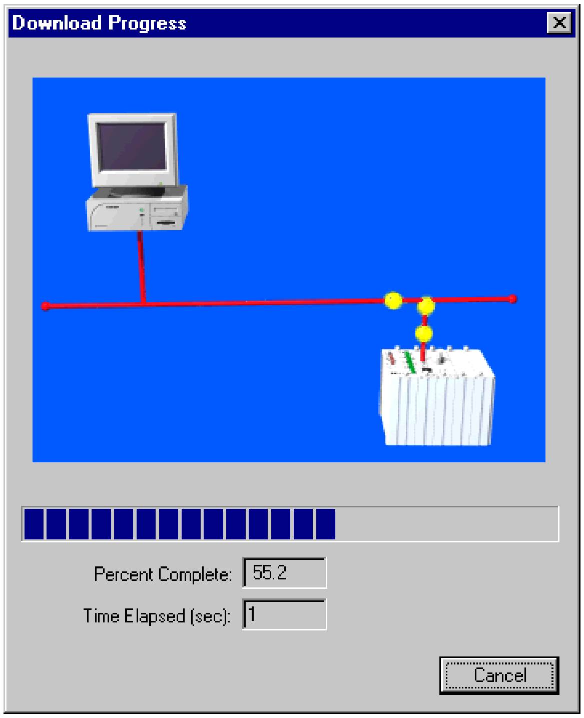
3. Click Browse and change directories to the C:\Opto22\Shared\Cookies\Control directory.

4. Select “cfactory.crn” and click Open.

   The file should be listed in the Download file dialog box. By clicking once in the File to Download text box, you can use your right arrow key to view the whole name of the file we’re downloading. Notice that the strategy file ends with a .crn extension. This type of file is known as an OptoControl run file.

5. Click OK to continue our download.

   A Download Progress screen appears briefly to display how the download of the strategy to the controller is proceeding.



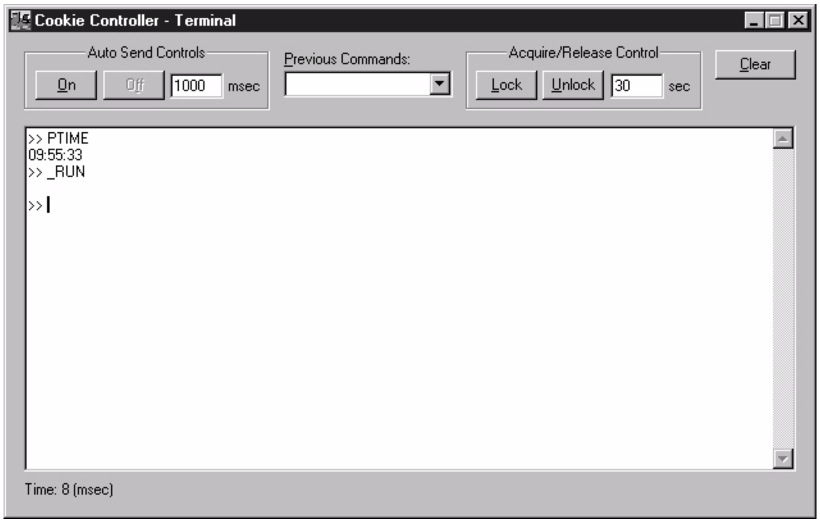
Percent Complete: 55.2

Time Elapsed (sec): 1

After the strategy has downloaded to the controller, we’ll start the strategy running on the controller. For convenience, we’ll stay in OptoDisplay Configurator and start the strategy by entering commands in OptoTerm’s terminal window. A more common method is to start the strategy while running OptoControl.

6. When the download is finished, select Tools→Start Terminal.

The terminal window appears. Notice that the window now has the same title as our controller, and is ready to accept any Forth commands we enter in the list area.



```
>> PTIME
09:55:33
>> _RUN

>>
```

Time: 8 (msec)

Let's type in a Forth command to verify that the controller is communicating properly. Commands are case-sensitive, so make sure you enter the commands exactly as shown below.

7. Click your cursor right next to the right-arrows >> and then type the following command:

   ```
   PTIME
   ```

8. Press ENTER.

   The time to which the controller's internal clock is set is displayed.

9. Next, type the following command:

   ```
   _RUN
   ```

10. Press ENTER.

    This time we'll only see the double-arrow prompt >> on the next line. The strategy in our controller is now running.

11. Close the OptoTerm window by clicking the Close Window button ☒ .

12. Close OptoTerm by clicking the Close Window button ☒ .

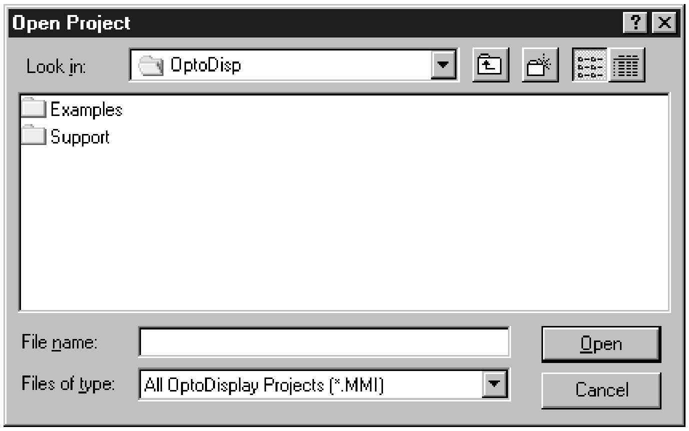
Running the Project

It's time to run the project and see what our display can do.

1. Click the Windows Start button and choose Programs→Opto 22→FactoryFloor 4.1→OptoDisplay→OptoDisplay Runtime.

The main window for OptoDisplay Runtime appears. The window is empty since we have not loaded our project yet.

2. In the Runtime window, choose File➞Open Project.

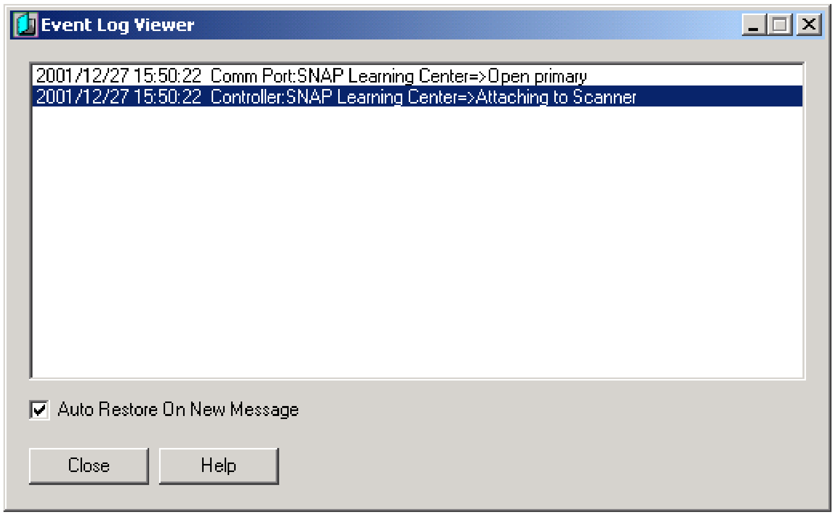


Look in: OptoDisp

Files of type: All OptoDisplay Projects (*.MMI)

3. In the Open Project dialog box that opens, navigate to the C:\Opto22\Shared\Cookies\Display\My Display directory, and then double-click the cfactory.mmi project.

The Event Log Viewer window should appear, displaying messages about the OptoDisplay Runtime session. You'll see a message showing that the controller is connecting to OptoDisplay's scanner.



```
2001/12/27 15:50:22  Comm Port:SNAP Learning Center=>Open primary
2001/12/27 15:50:22  Controller:SNAP Learning Center=>Attaching to Scanner
```

☑ Auto Restore On New Message

At the bottom of the window, you'll see the Auto Restore on New Message option selected. This means anytime OptoDisplay Runtime issues a message (that is, an error or status message), the Event Log Viewer will become the active, or topmost, window on the Windows desktop.

4. Click the Close button to close the Event Log Viewer window.

5. Start the cookie factory by clicking the on-screen Start button.

   Watch the cookie dough drop out of the first tank and move down the conveyor. Notice that the cookie appears to move outside of the oven and inspection stations. We also need to draw some chips coming out of the second tank as its flap opens.

   Now that you have an idea of what the attributes you configured actually can do, let’s go back to OptoDisplay Configurator and complete these details on the display.

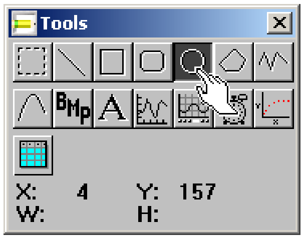
6. Close OptoDisplay Runtime by clicking the Close Window button ☒ .

Adding More Graphics

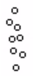
1. Click the Windows Start button and select Programs→Opto 22→FactoryFloor 4.1→OptoDisplay→OptoDisplay Configurator to open OptoDisplay Configurator.

2. Click the Circle tool in the Configurator toolbox as shown below.

   We’re going to use the Circle tool to draw some chips coming out of the second tank.



X: 4 Y: 157
W: H:

3. With the Circle tool selected, use your cursor to draw little circles similar to this:  .

4. Choose the Select tool from the Configurator toolbox and select your group of chips.

   Nine sizing handles and several selection handles appear within the chips.

5. Group the separate chip circles by selecting Edit→Group, or by right-clicking the mouse and choosing Group from the pop-up menu.

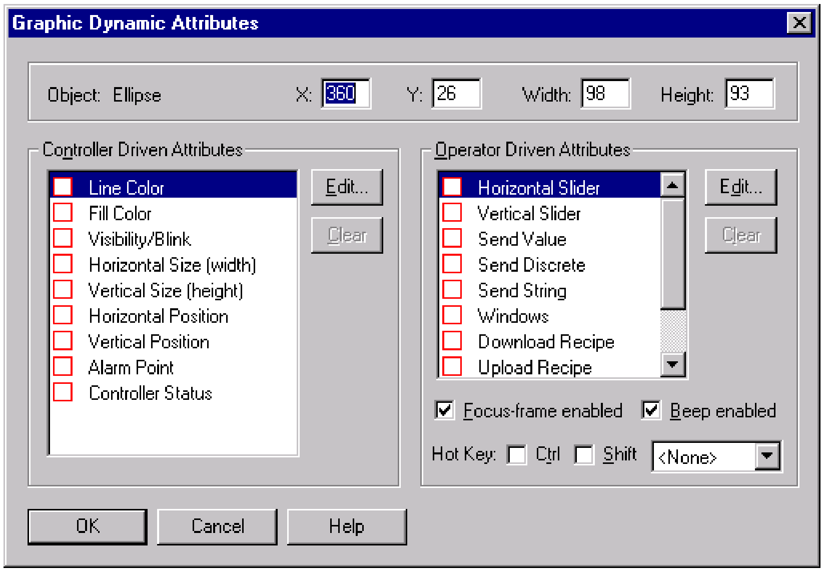
6. Click and drag the chips until they’re located below the second tank and above the conveyor belt.

7. If your chip graphic is too big, place the cursor over the bottom right corner sizing handle, click on the handle, and shrink the size of the graphic by moving it diagonally to the upper left.

Now we will assign a graphic attribute to the chips so they appear to fall out of the second tank when its flap opens.

8. Double-click the chips graphic object.

The Graphic Dynamic Attributes dialog box opens:



Graphic Dynamic Attributes

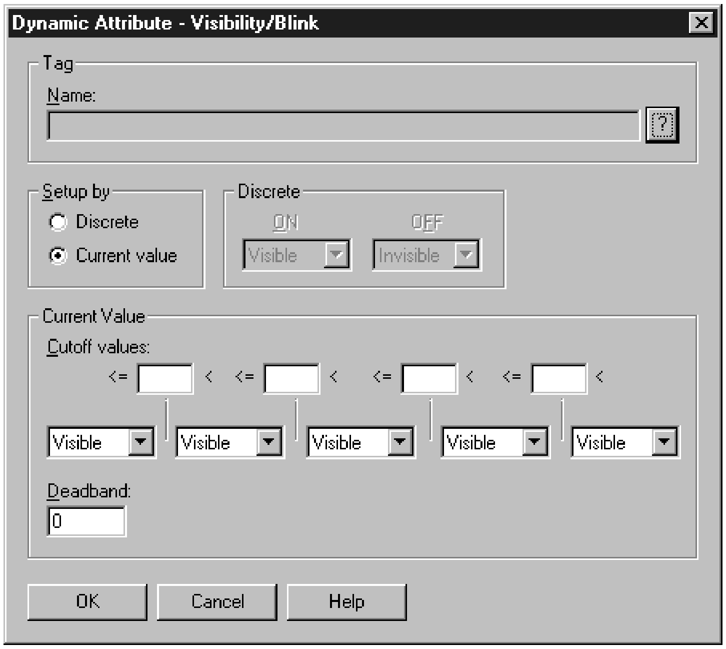
Object: Ellipse X: 360 Y: 26 Width: 98 Height: 93

☑ Focus-frame enabled ☑ Beep enabled

Hot Key: □ Ctrl □ Shift <None>

9. Double-click the Visibility/Blink attribute from the Controller Driven Attributes list.

The Dynamic Attribute - Visibility/Blink dialog box appears:



Dynamic Attribute - Visibility/Blink

Tag Name:

Setup by: ○ Discrete ● Current value

Discrete: ON Visible OFF Invisible

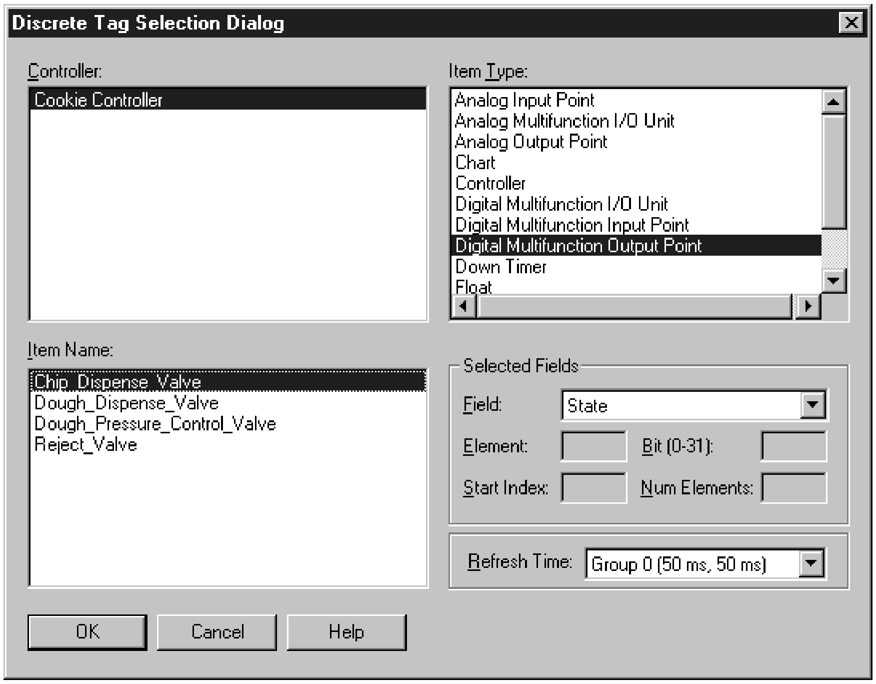
Current Value Cutoff values: Visible <= < Visible <= < Visible <= < Visible <= < Visible

Deadband: 0

10. Select Discrete in the group Setup by.

11. Click the Tag Selection button ? to choose the tag to be connected to this attribute.

The Discrete Tag Selection dialog box opens:



Discrete Tag Selection Dialog

Controller:
Cookie Controller

Item Type:
Analog Input Point
Analog Multifunction I/O Unit
Analog Output Point
Chart
Controller
Digital Multifunction I/O Unit
Digital Multifunction Input Point
Digital Multifunction Output Point
Down Timer
Float

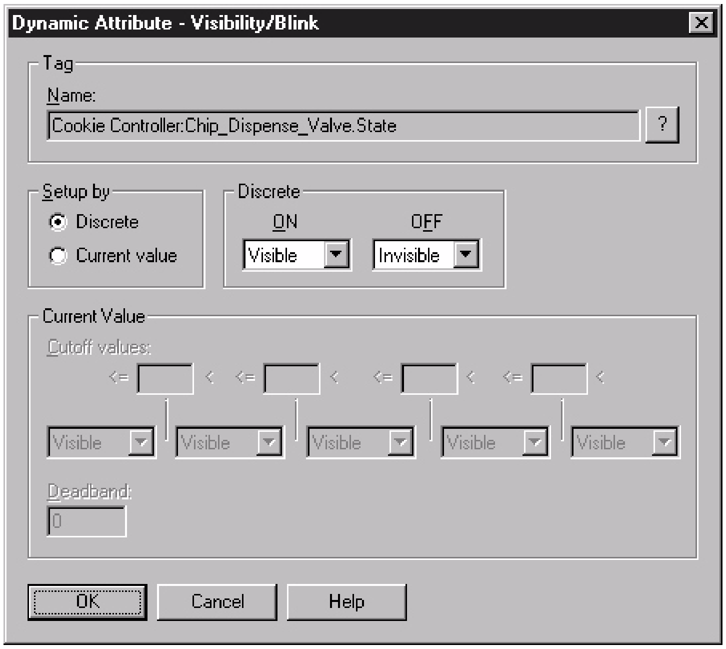
Item Name:
Chip_Dispense_Valve
Dough_Dispense_Valve
Dough_Pressure_Control_Valve
Reject_Valve

Selected Fields
Field: State
Element:
Bit (0-31):
Start Index:
Num Elements:

Refresh Time: Group 0 (50 ms, 50 ms)

12. Select Digital Multifunction Output Point as the Item Type and Chip_Dispense_Valve as the Item Name, and then click OK.

The Dynamic Attribute - Visibility/Blink dialog box appears. Your dialog box should look like the example shown below:



Dynamic Attribute - Visibility/Blink

Tag
Name: Cookie Controller:Chip_Dispense_Valve.State

Setup by
● Discrete
○ Current value

Discrete
ON: Visible
OFF: Invisible

Current Value
Cutoff values:
<= < <= < <= < <= <
Visible Visible Visible Visible Visible
Deadband: 0

13. Click OK to close the dialog box.

14. Click OK again to close the Graphic Dynamic Attributes dialog box.

Fine-Tuning the Visuals

Remember how the cookie looked traveling outside the oven and inspection stations? We'll quickly fix that by making the cookie bitmap graphic the rearmost graphic on the screen. This way, when it travels by the stations, it will appear to go through them.

1. With the Select tool, click the portion of dough on the conveyor belt.
2. Right-click the mouse, and from the pop-up menu that appears choose Edit→Z-Order→Send to Back.

   The graphic will now appear to travel through the oven and inspection stations, not in front of them.
3. To save the project and start OptoDisplay Runtime to see the display working properly, select File→Save Project and Load Runtime.

There are a few more things you can explore on your own. Notice that when you pass your cursor over the setpoint boxes (SP), a black outline appears. Click on one of the boxes and an attribute dialog box appears. You can go back to the Configurator and see how this attribute was set up. You might also want to look at the tank flap attributes.

What's Next?

After stepping through this chapter, you should have a handle on how simple it is to use OptoDisplay. By taking the time up front to step through our short demo, you're now ready to explore the many possibilities available.

Proceed to Chapter 2, "What Is OptoDisplay?" to learn more about planning and designing an operator interface. You'll also find out more about the windows and menus that make up OptoDisplay Configurator and OptoDisplay Runtime.

At some point you may also want to take a look at the projects Example1 and Example2, found in the "Examples" folder under OptoDisp. You'll get ideas for various graphics you can use within your own OptoDisplay projects.

CHAPTER 2

What Is OptoDisplay?

Introduction

This chapter provides a general overview of using OptoDisplay, including information on what it's used for, project structure and design, and general terms you'll encounter.

In This Chapter

About OptoDisplay 2-1
Planning a Project.................................. 2-3
OptoDisplay Windows 2-5

About OptoDisplay

OptoDisplay is a software package used to create human-machine interfaces (HMIs), or operator interfaces, for monitoring control systems. You can use OptoDisplay to create an HMI that will monitor an OptoControl strategy running on an Opto 22 industrial controller, providing real-time and historical information to the operator about the performance of different parts of a control system.

OptoDisplay is one component of the FactoryFloor suite of Windows 32-bit software for industrial automation. Other components include OptoControl, the visual control language for writing control applications, and OptoServer, which provides networking and DDE/OPC capability.

Configurator and Runtime Applications

Two primary software applications make up OptoDisplay: OptoDisplay Configurator and OptoDisplay Runtime.

OptoDisplay Configurator—Use OptoDisplay Configurator to create a project that contains graphics that appear on the computer monitor to represent your control process. The project also contains information on how these graphics are connected to data in an OptoControl strategy running on a controller, and defines how the graphics' attributes change as this data changes.

OptoDisplay Runtime—Use OptoDisplay Runtime to run the project created in OptoDisplay Configurator. Running the project means that the attributes of the graphics on the computer monitor (such as size, position, or color) are continuously updated based on data provided by the controller. If controls such as buttons and sliders are part of the OptoDisplay project, the operator can use on-screen controls to change values that appear. This is how OptoDisplay is used to control processes as well as monitor them.

FactoryFloor also includes a separate "monitor-only" version of the OptoDisplay Runtime application. This version of OptoDisplay Runtime is functionally identical to the regular Runtime application, except that it cannot be used to send values to a controller. This can be useful for industrial projects where no operator intervention is required.

The **Event Log Viewer**, which is part of OptoDisplay Runtime, starts automatically when OptoDisplay Runtime is started. The Event Log Viewer displays a window that posts messages about OptoDisplay communication activity. Typically, it pops up above all other windows when a message is posted, but this feature can be disabled.

OptoDisplay Terminology

Project—A collection of draw windows, historic logs, sounds, recipes, graphics, and all their attributes that has been developed with the OptoDisplay Configurator. When the project is saved, several files are created.

- The *main project file,* which has an .mmi extension.
- *Draw window files* are created automatically for each draw window used to display graphics in a project. These files have sequentially numbered file extensions starting with an uppercase .W (for example, .W01, .W02, and so on).

These project files, together with OptoDisplay Runtime, present an animated graphics interface for a control system. See Appendix C, "OptoDisplay Files" for a complete list of the files that make up an OptoDisplay project.

Windows—OptoDisplay projects have one or more draw windows inside the OptoDisplay main window. A *draw window* is essentially a blank page on which you place, draw, or edit graphics and other elements that will make up your operator interface. A draw window has static attributes of position, size, and color. It also has visual states of open, closed, or iconified.Your project design determines the number of draw windows and their contents.

A *main window* is the area of the display where you can view your application. Following the conventions used in most Microsoft Windows applications, a *main window* contains a menu bar that allows you to select various command options, and a title bar that displays the full project path.

Objects—Objects include draw windows, graphics, alarm triggers, and trends (or graphs). There are two types of objects: *static* and *dynamic*. Static objects do not change while OptoDisplay Runtime is running. Dynamic objects change appearance, or cause the appearance of other OptoDisplay objects to change while the project is running.

Tags—A *tag* refers to data items, such as variables, I/O points, or PID loops, from an OptoControl strategy. To access tags in a project, select the OptoControl strategies for the project. All tags in the selected strategies are then available to OptoDisplay. Tags are used to animate your operator interface through connections to graphic objects and their dynamic attributes. As the values of tags change through controller- or operator-driven attributes, the appearance of the graphics change. Tags are also used as triggers to initiate system events such as sounds, historic logging, and window configurations.

Connections—A connection is made in OptoDisplay when an OptoControl tag is selected as either the source that will change a graphic, or as the tag destination for any data changes entered by the operator.

Planning a Project

An OptoDisplay project is made up of a collection of windows and other elements you create and configure in the OptoDisplay Configurator. You add graphics to the windows to create an operator interface, and then connect to I/O data and variables in the tagname database of the associated OptoControl strategy.

NOTE: The OptoControl strategy is the program running on your Opto 22 industrial controller. See the OptoControl User's Guide *for complete instructions for creating OptoControl strategies.*

Once the windows and attributes of the OptoDisplay project have been configured using OptoDisplay Configurator, the project can be viewed in action with OptoDisplay Runtime. When OptoDisplay Runtime is started, the project communicates with a controller. As the control program runs on the controller, values and states of tagnames in the OptoControl strategy database are continuously updated. This changing data in turn modifies the attributes (such as size and position) of the graphics that are connected to the tagnames. The end result is an animated, continually updated display that shows the status of a control process.

Project Design

The usefulness of your OptoDisplay project ultimately depends on how effective the display, or operator interface, is. To create an effective operator interface, you may want to consider these tips when you're designing your project:

- Know your control process. If possible, be familiar with both the theoretical operation of the process and the "hands-on" tasks required of the operator.
- Find out what the end user of your project, the operator, needs to know at different points in time. Use this information to determine the information that will appear on the display.
- Consider the following ways to use and organize windows in a display:
  - A *single window* can display an overall picture of the control process, and is helpful in quickly assessing the general state of all operations.

  - *Individual windows* can display a closer look at the operations associated with different stations. The individual windows can contain detailed information and provide controls that would be difficult to present in a single window.

Project and Operator Interface Security

OptoDisplay supports several important security features, including operator authentication, encrypted logging of operator actions, and password protection for the project files. You can configure your OptoDisplay project to do the following:

- Allow or deny operator access to the HMI, as well as the use of individual on-screen controls, based on users and groups defined in a Microsoft Windows network. (See "Security Settings for Graphics and Dynamic Attributes" on page 6-4.)
- Log all HMI use and operator actions to an encrypted archive. (See "Security Settings" on page 9-8.)
- Assign a password to the OptoDisplay project to prevent unauthorized users from opening it in the OptoDisplay Configurator authoring application. (See "Protecting a Project with a Password" on page 3-3.)
- Assign a password to individual windows in an OptoDisplay project to prevent unauthorized users from opening them. (See "Modifying Draw Windows" on page 5-2.)

Window Design

When you create a new project, a project window and one or more draw windows will be available in the OptoDisplay main window. After deciding which windows you will use for your project, consider the design of individual windows and how they interact with other windows. This is where the organization of your windows comes into play. For example, you could have the operator use the Runtime menu commands to view different windows, or you could design buttons to let an operator jump directly to related windows.

Keep in mind that the visual state of a window can affect the performance of OptoDisplay and the controller. The more windows that are open or iconified, the slower the response from the controller, because it needs to update the I/O point information associated with those windows. Window states, listed below, also affect how the OptoDisplay Runtime software application scans the controller and updates graphics.

- An *open* window causes Runtime to scan the controller for data for that window.
- An *iconified* window causes Runtime to scan for data, but graphics in the iconified window are not updated.
- A *closed* window causes Runtime to not scan for data for that window.
- *Trends* within a window can be configured to have Runtime scan or not scan for data.

Other choices you will have to make are whether a window should be pop-up or full-screen, and whether a window's visual state is affected by another window. We will cover these and other aspects of configuring windows in Chapter 5, “Working with Graphics,” and Chapter 9, “Using OptoDisplay Runtime.”

Using Multiple Monitors

An additional project planning decision is whether to design your OptoDisplay project to use more than one monitor. The additional display space gained from using multiple monitors offers advantages such as being able to keep numerous windows open permanently. However, you should consider the additional hardware cost and extra desktop space a multiple monitor setup requires.

An important factor to also consider is that each window in an OptoDisplay project requires computer memory (RAM). If you plan to display several windows on multiple monitors, the computer running the OptoDisplay project may need to have additional memory installed.

Hardware and software requirements for using multiple monitors are described in “System Requirements” on page -iv. For steps to set up an OptoDisplay project to use multiple monitors, see “Extending a Project Across Multiple Monitors” on page 3-3.

OptoDisplay Windows

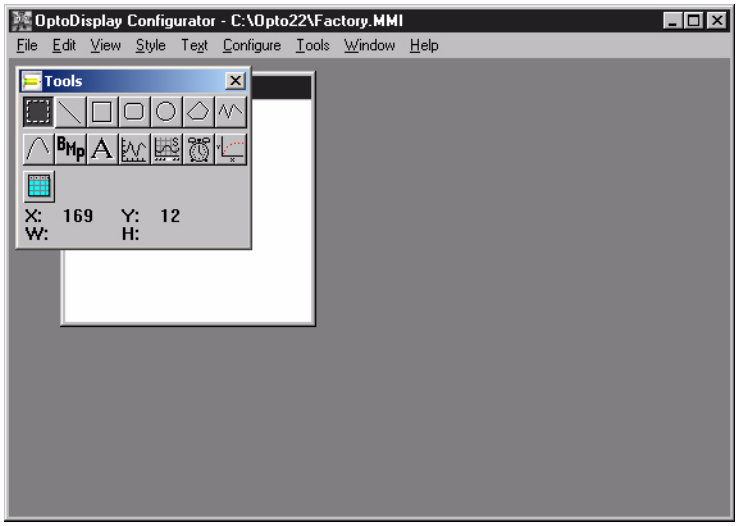
As mentioned previously in “About OptoDisplay,” OptoDisplay is composed of two software applications, Configurator and Runtime. This means there are two environments in which you will use OptoDisplay. In learning about the windows that make up OptoDisplay, we will first discuss the main components of the Configurator environment, and then explore the Runtime environment.

OptoDisplay uses standard Microsoft Windows conventions, so as you use Configurator and Runtime, you’ll recognize familiar window elements such as title bars and the menu bar, as well as controls such as the minimize, maximize, and close buttons.

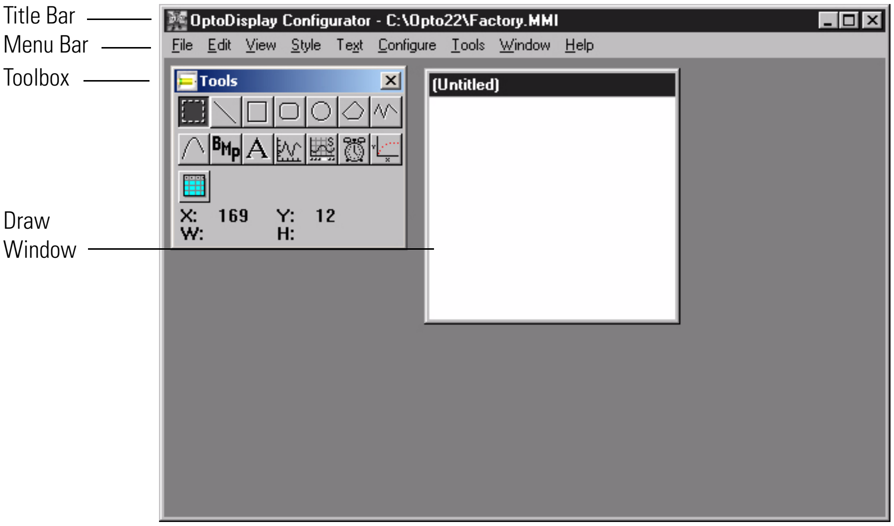
NOTE: If you need more information on working with Microsoft Windows, refer to the documentation from Microsoft and your computer manufacturer.

OptoDisplay Configurator Main Window

When you first start OptoDisplay Configurator and create a new project, your screen should look similar to this:


OptoDisplay Configurator - C:\Opto22\Factory.MMI
File Edit View Style Text Configure Tools Window Help
Tools
X: 169 Y: 12
W: H:

The Configurator main window consists of a title bar and a menu bar, along with other standard Windows elements, and contains the toolbox and one or more draw windows.


Title Bar
Menu Bar
Toolbox
Draw Window
OptoDisplay Configurator - C:\Opto22\Factory.MMI
File Edit View Style Text Configure Tools Window Help
Tools
(Untitled)
X: 169 Y: 12
W: H:

Hiding the Menu Bar

If you need additional space to position draw windows, you can hide the menu bar to use the space it occupies. If you do this, note that you won't be able to access commands on the menu bar.

To hide the menu bar, do one of the following:

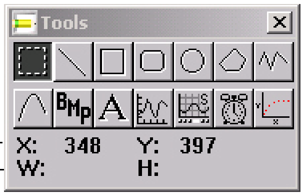
- Select View➞Hide Menu Bar

- Press ESC on the keyboard.

To view the menu bar again, press ESC on the keyboard.

Toolbox

The toolbox contains a set of graphical icons that represent tools you can use in the Configurator. Click any tool to select it, and then use it in the draw window. Also, below the graphical icons, the toolbox displays coordinates and object dimensions to aid you in your drawing tasks.



X: 348 Y: 397
W: H:

Toolbox Coordinates
Object Dimensions

If you want to use the space the toolbox occupies, you can hide the toolbox by selecting View➞Hide Toolbox. To open the toolbox again, select View➞Show Toolbox.

Tool Definitions

Each tool in the toolbox, arranged from left to right across the top of the toolbox, and then across the bottom, is described below. For more details about any tools available in the toolbox, see Chapter 5, “Working with Graphics.”

Use the following tools as described below:

Select tool—select, move, and size text and graphics.

Line tool—draw lines.

Rectangle tool—draw rectangles and squares.

Round rectangle tool—draw rectangles and squares with rounded corners.

Ellipse tool—draw ellipses and circles.

Polygon tool—draw multi-sided objects.

Polyline tool—draw multiple-line-segment objects.

Curve tool—draw single curved lines or multiple-line-segment curved lines.

BMP tool—place a bitmap.

Text tool—add text to draw windows.

Trend tool—place trend charts in draw windows.

SuperTrend tool—place real-time and historic trends in draw windows.

Alarm tool—place alarm graphics in draw windows.

XY Plot tool—place x- and y-axis plots in draw windows.

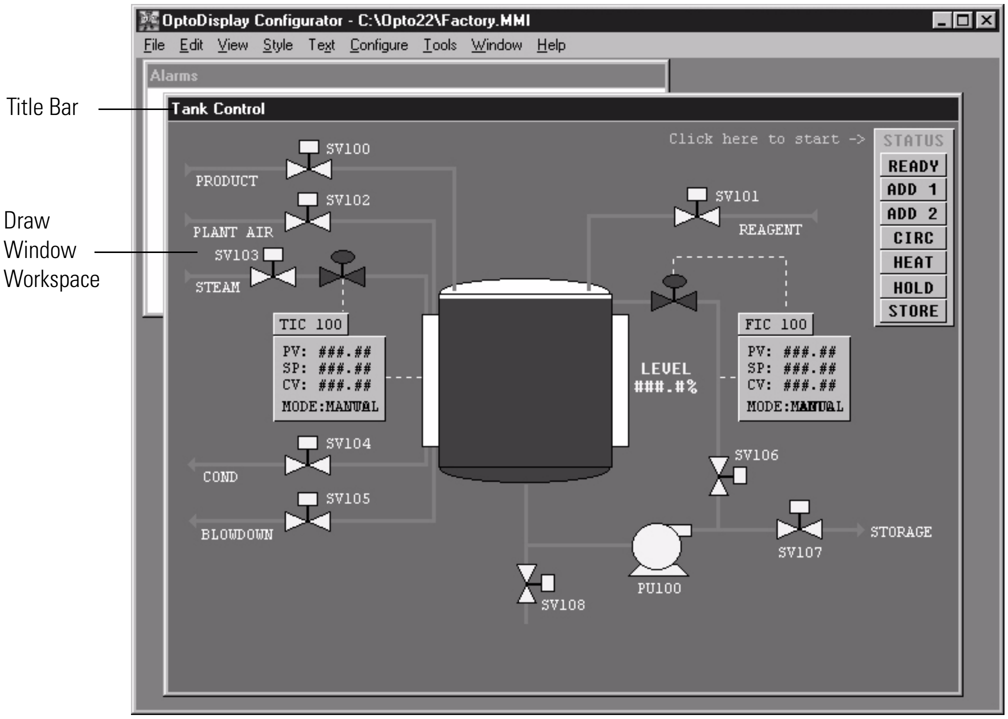
Numeric table tool—place numeric tables in draw windows.

Toolbox Coordinates and Object Dimensions

Just underneath the tools, you can see the toolbox coordinates and object dimensions. The coordinates show the cursor's position (in pixels) when it is over a draw window. The X: and Y: coordinates are read with the axis zero-points at the top-left corner of the draw window. If you create an object, the object's dimensions (width and height) are shown next to W: and H:, respectively.

Configurator Draw Windows

Configurator draw windows are where all graphics for your OptoDisplay project are drawn and edited. They contain the graphics and other elements you work with to create your display.

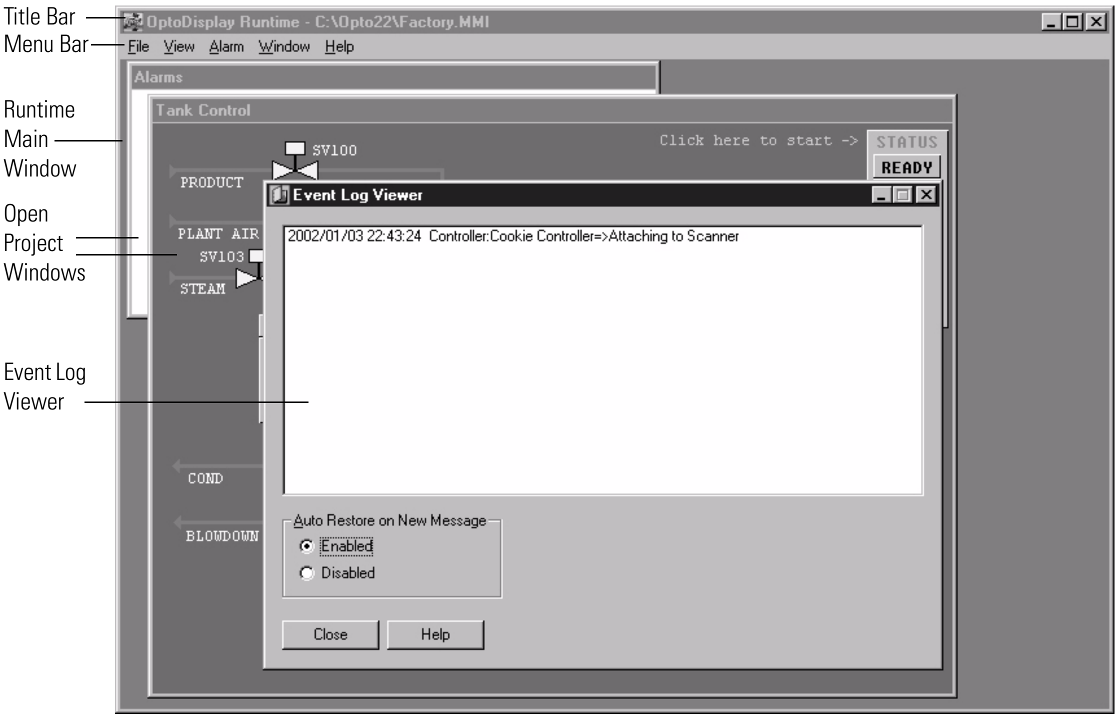


Redrawing an Active Draw Window

You can redraw an active draw window in OptoDisplay Configurator by selecting View→Redraw. Incomplete graphics (such as an incomplete polygon) in the draw window are removed when you select this command.

OptoDisplay Runtime Main Window

When you start OptoDisplay Runtime, what appears on screen should look similar to this:



2002/01/03 22:43:24 Controller:Cookie Controller=>Attaching to Scanner

Auto Restore on New Message
● Enabled
○ Disabled

The Runtime main window consists of a title bar, a menu bar, other standard Windows elements, project windows, and the Event Log Viewer. Much like a frame, Runtime's main window contains all the elements and actions that occur during Runtime use.

If you need additional space to position project windows and other windows in Runtime, you can hide the menu bar to use the space it occupies. If you do this, note that you won't be able to access commands on the menu bar.

Changing How the Main Window Appears in Runtime

You can configure the main window so that it appears without a title bar or menu bar, and also change several other settings. See "Setting up Runtime" on page 9-2 to learn how to configure elements of the main window.

Hiding the Menu Bar

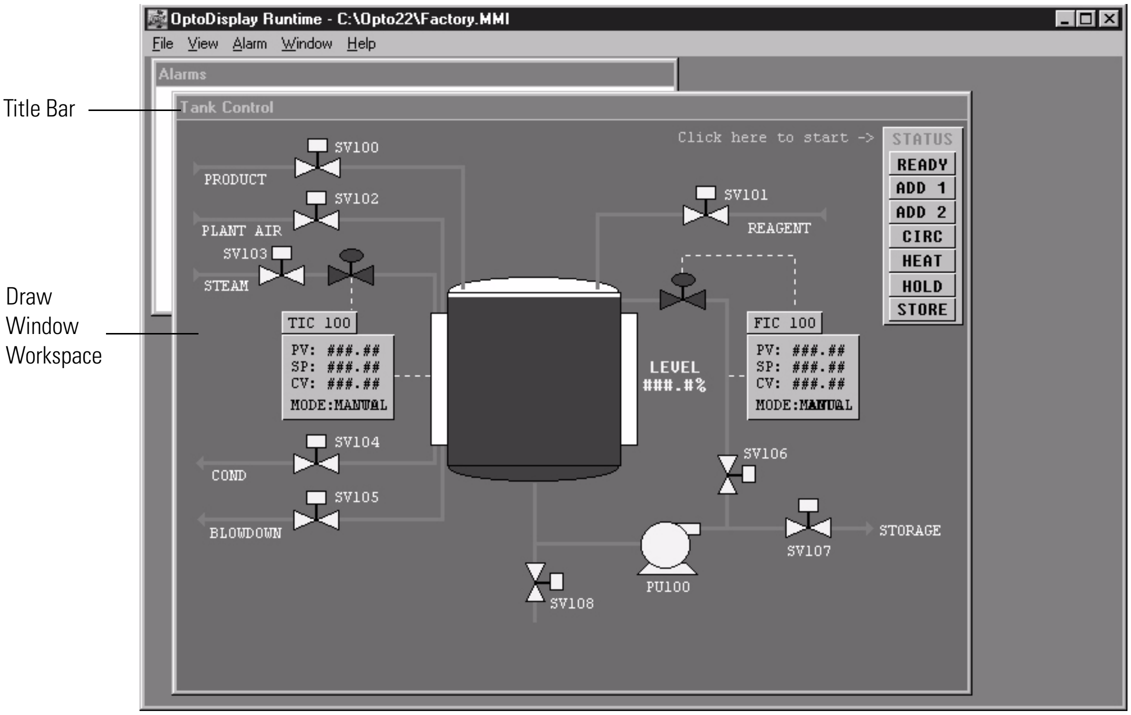
While working with an OptoDisplay project in Runtime, you can gain additional space on your screen by hiding the menu bar. To hide the menu bar, do one of the following:

- Select View→Hide Menu Bar
- Press ESC on the keyboard.

To view the menu bar again, press ESC on the keyboard.

Runtime Project Windows

After you've opened a project in Runtime, you see the project windows.



Project windows are the Configurator draw windows that you created for the project. Notice that when you launch your project in Runtime, these windows are the same size and in the same relative position as when you closed the Configurator project. (Depending on certain configuration options, the relative positions of the windows may differ slightly from those in the Configurator project.)

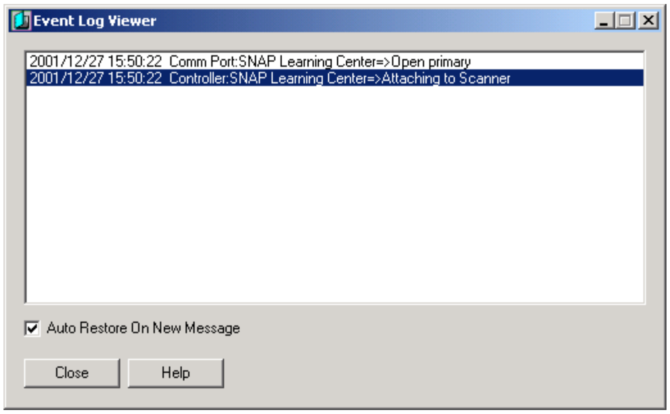
Project windows are composed of a title bar and a workspace. The title bar displays the name of the window, and the workspace contains all of the graphics work you did in the Configurator.

Configuring How Draw Windows Appear in Runtime

You can define how a draw window appears in OptoDisplay Runtime, including its visual state (closed, iconified, or open), relative position, and other settings. See "Using Draw Windows" on page 5-1 for instructions and more information.

Runtime Event Log Viewer

The Event Log Viewer contains a list of system errors and messages that occur during Runtime. The most recent messages appear in the list, but when there are more messages than can reasonably fit, scroll bars appear so that you can view older messages.



```
2001/12/27 15:50:22  Comm Port:SNAP Learning Center=>Open primary
2001/12/27 15:50:22  Controller:SNAP Learning Center=>Attaching to Scanner
```

☑ Auto Restore On New Message

You can also double-click any message to view its entire contents, if they are not already completely visible. The Event Log Viewer can be manipulated like any other standard window.

There is only one significant option available with this window, and that is the group marked Auto Restore on New Message. Select Enabled or Disabled to configure how the Event Log Viewer appears during Runtime. If “Auto Restore on New Message” is enabled, the Event Log Viewer dialog box automatically jumps to the foreground when a new event message is received.

Working with Projects

Introduction

This chapter explains how to work with projects. You'll find out how project files are organized, and then learn how to create, open, and save a project. An optional, advanced procedure for customizing how OptoDisplay Configurator starts is also presented.

In This Chapter

How Projects Are Organized 3-1
Creating a Project 3-2
Protecting a Project with a Password 3-3
Opening a Project 3-3
Saving a Project 3-4
Closing a Project 3-5
Customizing a Project 3-6

How Projects Are Organized

An OptoDisplay *project* is a collection of all the files created in OptoDisplay Configurator that define one operator interface. The project includes the windows you create, bitmaps that appear in them and their attributes, and any other elements you set up. See Chapter 2, "What Is OptoDisplay?" to learn more about the various components of an OptoDisplay project. Also see Appendix C, "OptoDisplay Files" for a complete list of files associated with OptoDisplay.

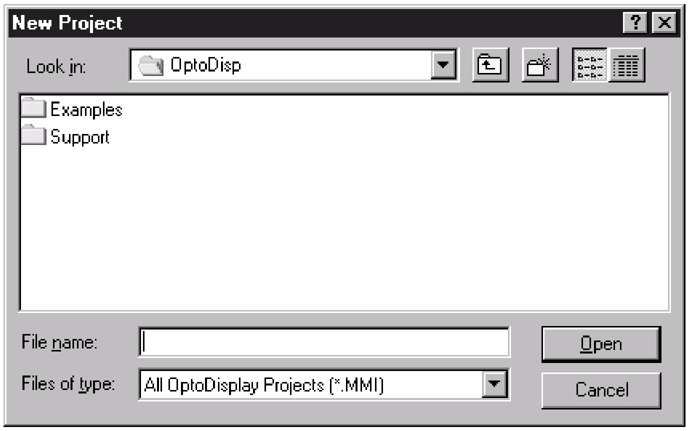
Each OptoDisplay project should be located in its own directory. You'll find that separate directories make keeping track of any one project's files easier, especially when you back up the project or copy the files to disk. Though not recommended, multiple projects can be stored in the same directory if necessary.

Creating a Project

To create a new project in OptoDisplay Configurator, follow these steps:

1. Select File➞New Project.

   The New Project dialog box that appears should look similar to the example below.

   Dialog boxes in OptoDisplay follow common Microsoft Windows conventions, so you'll recognize familiar items such as the file list, the Up One Level button, and the File name field.

   NOTE: If you need more information on how to use dialog boxes or other common parts of Microsoft Windows, refer to the documentation from Microsoft and your computer manufacturer.

2. Type a project name in the File name field.

   When you're done creating the new project file, this name is automatically appended with the suffix .mmi, indicating an OptoDisplay project file.

3. If you want to save your project in a new directory, follow the sub-steps below, and then continue with step 4.

   a. Click the Create New Folder button.

      The new folder you created appears in the list of files and folders. The name of the new folder should be highlighted, meaning you can enter a new name for the folder.

   b. Type a new name for the folder, preferably one that includes the project name.

   c. Double-click the new folder to open it.

4. Click Open to create the project.

   If you have selected a directory that already includes a project, a warning message appears, and you'll be allowed to try again.

When you click Open, the project is created, and a draw window and toolbox appear within the Configurator's main window. The untitled draw window is where you will begin drawing your operator interface. The toolbox contains several icons representing graphic drawing tools. We will discuss the toolbox more in Chapter 5, "Working with Graphics."

Extending a Project Across Multiple Monitors

If you are designing your OptoDisplay project to use multiple monitors connected to the same computer, after creating the project simply extend OptoDisplay Configurator's main window across the monitors you want to use. For hardware and software requirements for using multiple monitors, see "System Requirements" on page iv.

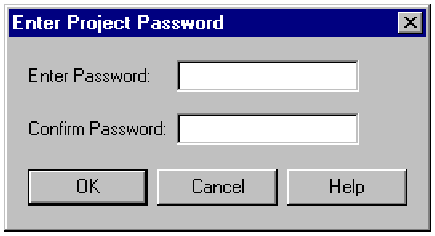
Protecting a Project with a Password

You can protect your OptoDisplay project with a password to prevent others from opening and modifying the project using OptoDisplay Configurator. The project can still be opened and run in OptoDisplay Runtime.

To protect your project with a password, do the following:

1. Select File➞Password Protect Project.

   The Enter Project Password dialog box opens.



2. Type a password in the Enter Password field.
3. Type the same password a second time in the Confirm Password field.
4. Click OK.

Your OptoDisplay project now cannot be opened in OptoDisplay Configurator without entering the password.

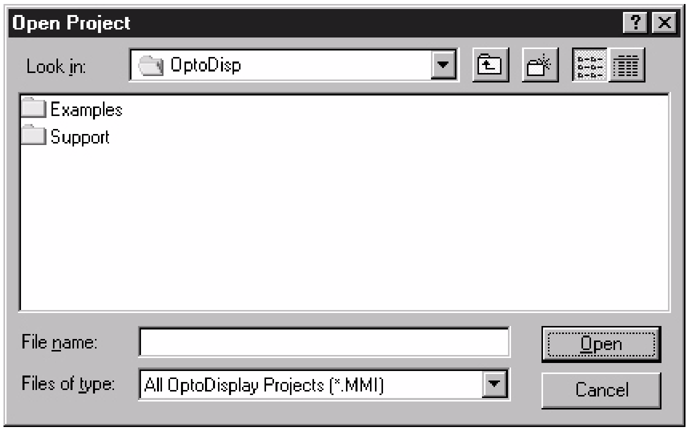
Opening a Project

To open an existing project in OptoDisplay Configurator or OptoDisplay Runtime, follow these steps:

1. Select File➞Open Project.

(Configurator only) If you already have an open project, you will be asked if you want to save it. Click Yes or No, or click Cancel to close the Save Project dialog box.

The Open Project dialog box appears.



2. Navigate to the folder where your project is located.

3. Double-click the file in the list to open the project. (You can also select the file, and then click Open.)

   The project opens with any windows positioned just as you last left them.

   NOTE: If the project has been protected with a password, the Enter Password dialog box appears. Type the password for this project and click OK to open the project.

Saving a Project

There are three options for saving a project in OptoDisplay Configurator: Save Project, Save Project As, and Save Project and Load Runtime.

Save Project

To save your project to the same file name you opened or created, Select File→Save Project. If there have been no changes to the project since you last saved it, no messages appear when this save occurs.

Save Project As

1. To save the project with a new name, select File→Save Project As.

2. In the Save As dialog box, type a project name in the File name field.

When you're done saving the project file with a new name, this name is automatically appended with the suffix .mmi, indicating an OptoDisplay project file.

3. If you want to save your project in a new directory, follow the sub-steps below, and then continue with step 4.
   a. Click the Create New Folder button.

      The new folder you created appears in the list of files and folders. The name of the new folder should be highlighted, meaning you can enter a new name for the folder.
   b. Type a new name for the folder, preferably one that includes the project name.
   c. Double-click the new folder to open it.
4. Click Save to save the project with a new file name.

Save Project and Load Runtime

To save your project to the same file name you opened or created, and then start the project in OptoDisplay Runtime, select File→Save Project and Load Runtime. This option is particularly useful when you are testing a project and switch often between the Configurator and Runtime components.

Saving Versions of a Project

When developing an OptoDisplay project, you can save progressively numbered versions of the project files (for example, MyProject_01, MyProject_02, etc.). Having these "snapshots" of your project as you develop it can be valuable if you need to return to an earlier version, or need to trace the steps you took while building the OptoDisplay project.

To automatically create a numbered version of modified OptoDisplay project files each time you save the project, select File→Auto Increment Version. Project (.MMI) and window (.WXX) files will be copied, renamed with a version number, and placed in the same directory as the current project. Other project files such as background bitmap images and similar graphics are not copied.

Closing a Project

To close the current project you have open, select File→Close Project. If you've modified the project since it was last saved, you will be asked if you want to save those changes before closing the project.

Only one project can be open at any one time in OptoDisplay. Creating or opening a project automatically closes any currently open project first. When this happens, you will be asked if you want to save changes if they haven't been already saved.

Customizing a Project

NOTE: The following section presents advanced procedures for customizing how OptoDisplay starts up and opens a project. ***These procedures are not required to run OptoDisplay Configurator or Runtime, or to open projects.***

Modifying Default Project Properties

After you've loaded a project for the first time, you'll notice that every time you start OptoDisplay Configurator, the application knows which project to load, what sizes the windows are, and several other startup conditions. At some point, you may want to change these initial OptoDisplay conditions. To do so, you can run the Windows system Registry Editor utility to modify these conditions.

WARNING: *Use the Windows Registry Editor carefully. It is strongly recommended that you make a backup copy of your Windows Registry before continuing with this procedure. Without a backup copy, if you delete the wrong properties and cannot return the Registry to its original state, application and system files can become unusable and will have to be reinstalled.*

1. From the Windows Start menu, select Run.

   The Run dialog box appears.

2. Enter the following command in the Open field and press ENTER:

   ```
   regedit
   ```

   The Registry Editor window appears. You should see several folders listed under My Computer.

3. Open the HKEY_CURRENT_USER folder, and then continue to open each of the following sub-folders as they appear:

   – Software

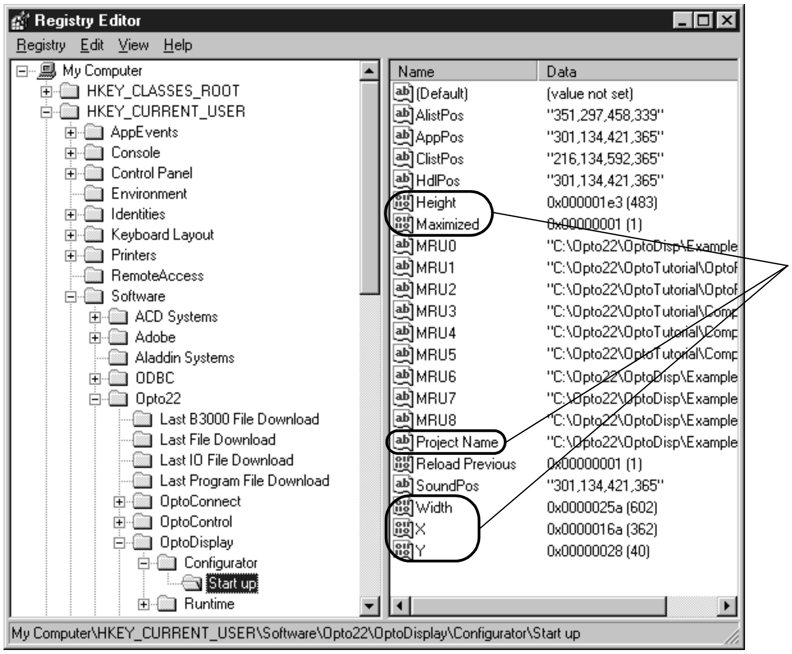
   – Opto22

   – OptoDisplay

   – Configurator or Runtime

   – Start up

In the Start up folder you'll see several properties defined, as shown below.



Name	Data
(Default)	(value not set)
AlistPos	"351,297,458,339"
AppPos	"301,134,421,365"
ClistPos	"216,134,592,365"
HdlPos	"301,134,421,365"
Height	0x000001e3 (483)
Maximized	0x00000001 (1)
MRU0	"C:\Opto22\OptoDisp\Example
MRU1	"C:\Opto22\OptoTutorial\Optof
MRU2	"C:\Opto22\OptoTutorial\Optof
MRU3	"C:\Opto22\OptoTutorial\Comp
MRU4	"C:\Opto22\OptoTutorial\Comp
MRU5	"C:\Opto22\OptoTutorial\Comp
MRU6	"C:\Opto22\OptoDisp\Example
MRU7	"C:\Opto22\OptoDisp\Example
MRU8	"C:\Opto22\OptoDisp\Example
Project Name	"C:\Opto22\OptoDisp\Example
Reload Previous	0x00000001 (1)
SoundPos	"301,134,421,365"
Width	0x0000025a (602)
X	0x0000016a (362)
Y	0x00000028 (40)

My Computer\HKEY_CURRENT_USER\Software\Opto22\OptoDisplay\Configurator\Start up

Delete these properties to reset OptoDisplay's startup configuration.

4. Select the following properties:
   - Height
   - Maximized
   - Project Name
   - Width
   - X
   - Y

   Do not select the (Default) property.

5. Select Edit→Delete, or press DEL on the keyboard.

6. Select Registry→Exit to close the Registry Editor.

OptoDisplay has now been initialized to its original startup conditions, and will open as if no project had ever been loaded.

Creating an MS-DOS Batch File

You can use an MS-DOS batch file to have OptoDisplay Runtime open and run a project. The batch file you create can be associated with an icon on the Windows desktop. This is a convenient way for an operator to quickly start an OptoDisplay project without having to search for the project file in a dialog box.

To create a batch file to open a project in OptoDisplay Runtime, do the following:

1. Open an empty text file using Windows Notepad or another text editor.
2. Enter specific commands to perform the following tasks:
   - Change drives to the drive containing the project.
   - Change directories to the directory containing the project.
   - Start OptoDisplay Runtime.
3. Now save the file using the .bat file extension.

Once you have created the batch file, you can make a Windows shortcut of this file and place it on the Windows desktop for easy access. Alternately, you could place the shortcut in the Windows Start Up folder so the project starts to run when the computer starts up.

Batch File Example

Here's an example of a batch file that opens a project in OptoDisplay Runtime:

```
E:
cd “\strategies\first strategy”
\Opto22\OptoDisp\OptoDisR “first strategy.MMI”
```

Here's what each line of the batch file does:

- The first line changes drives to the E: drive.
- The second line changes directories to the directory “\strategies\first strategy.”
- The last line starts OptoDisplay Runtime, located in \Opto22\OptoDisp, using the project called “first strategy.MMI.”

CHAPTER 4

Configuring Controllers & Tags

Introduction

This chapter shows how to define the connections to Opto 22 controllers and I/O points, or "tags," that OptoDisplay requires.

In This Chapter

Configuring Controllers 4-1
Configuring Tags 4-5
Optimizing Controller Communications 4-9
Correcting Tags from a Strategy 4-10

Configuring Controllers

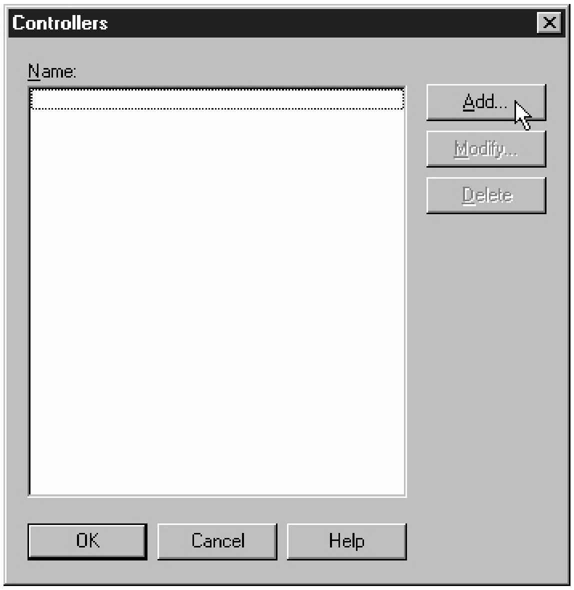
OptoDisplay uses the data values a controller receives from I/O points and integer, float, and string variables to change the attributes of on-screen graphics. (I/O points are defined when you create an OptoControl strategy; for more information, see the *OptoControl User's Guide*.) For an OptoDisplay project to receive this information on individual I/O points (called *tags*), you must first define a connection to an Opto 22 controller.

Follow these steps to select and configure a controller:

1. Start OptoDisplay Configurator and open a project that will be associated with the controller.

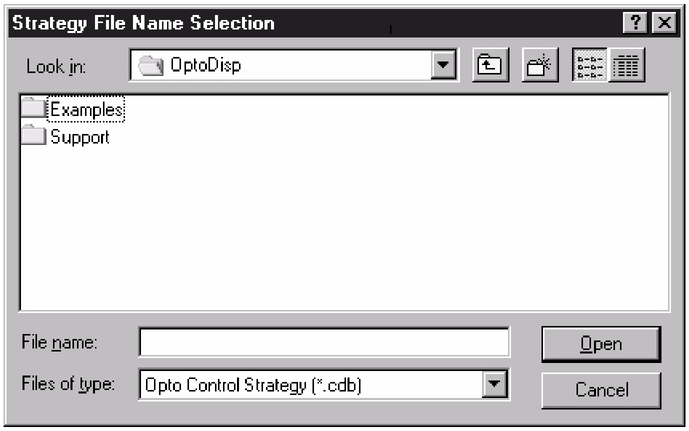
2. Select Configure→Controllers.

The Controllers dialog box opens:



If you have not previously configured a controller for the OptoDisplay project you opened, the Name list is empty and only the Add button is available.

3. To locate an OptoControl strategy running on the controller you want to connect to, click Add.

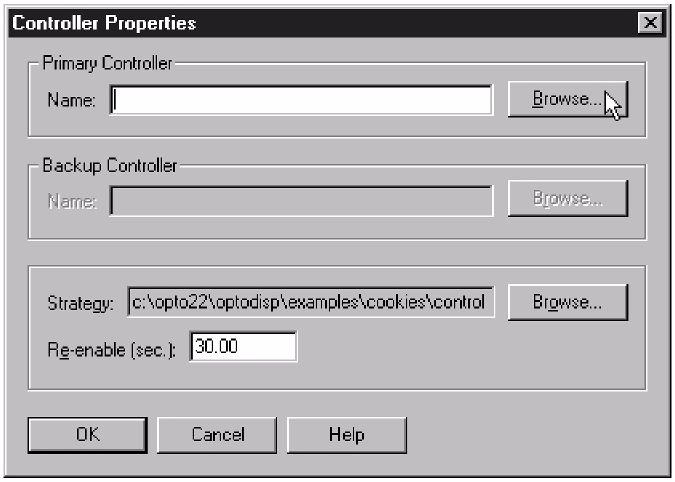


4. In the Strategy File Name Selection dialog box that opens, navigate to the OptoControl strategy that is running on the controller you plan to select.

NOTE: You can also connect to a controller that is running an Opto 22 Cyrano strategy. To view available Cyrano strategies, select "OptoControl and Cyrano" from the Files of type drop-down menu.

5. Select the strategy file and click Open.

The OptoControl strategy you selected appears in the Strategy field of the Controller Properties dialog box:



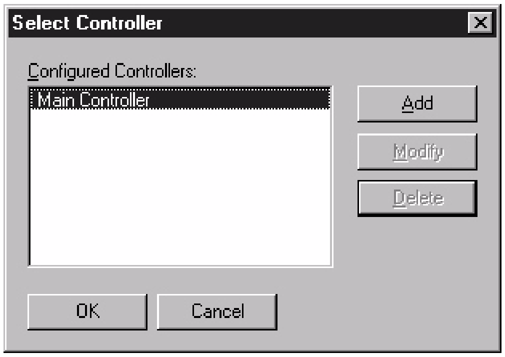
Strategy: c:\opto22\optodisp\examples\cookies\control

Re-enable (sec.): 30.00

Now you need to enter the name of the primary controller from which OptoDisplay will receive I/O point information. *Remember that this controller must be running the OptoControl strategy you selected.*

6. Click the Browse button in the Primary Controller group.

The Select Controller dialog box appears:



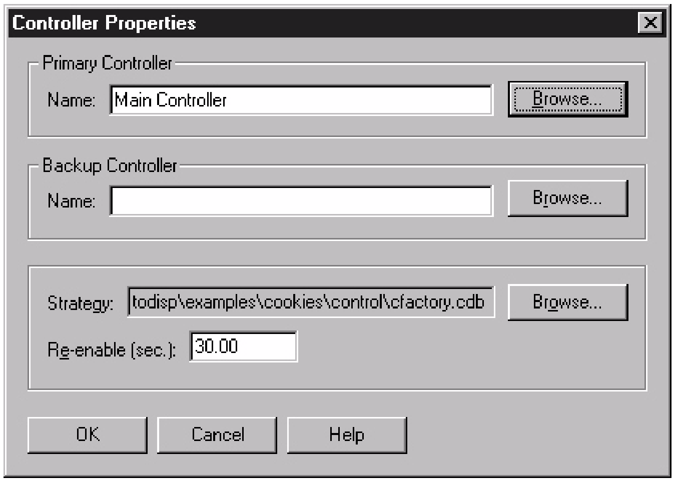
Configured Controllers: Main Controller

All controllers that have been configured to connect to your PC are listed, whether or not they are associated with your strategy. If you previously configured a controller for use with OptoControl, for example, it would appear here, even if it didn't appear earlier when you opened the Controllers dialog box.

NOTE: If the controller you want to use doesn't appear in the Select Controller dialog box, you must connect and configure this controller to make it available. Instructions for adding, modifying, and deleting controllers appear in Chapter 4, "Working with Controllers," in the OptoControl User's Guide.

7. To choose a controller that connects with OptoDisplay, select its name and click OK.

The controller you have added appears in the Controller Properties dialog box:



Name: Main Controller

Name:

Strategy: todisp\examples\cookies\control\cfactory.cdb

Re-enable (sec.): 30.00

8. In the Re-enable field, enter the number of seconds OptoDisplay waits before checking for a response from a controller.

   Increasing this delay, called the re-enable time, allows the computer running OptoDisplay to perform other tasks during this waiting period. The default re-enable time is 30.00 seconds. See "Optimizing Controller Communications" on page 4-9 for detailed information on selecting a re-enable time for your project.

Adding a Backup Controller

OptoDisplay lets you designate a backup controller that is used automatically in case your primary controller fails or becomes unavailable. Control is returned to the primary controller when it becomes available again. Like the primary controller, the backup controller must be connected to the PC that is running OptoDisplay. The type of connection (such as direct or Ethernet), does not have to be the same as the connection type to the primary controller.

Configuring the backup controller is identical to configuring the primary controller.

1. If necessary, first start OptoDisplay Configurator and open a project that is associated with the controller.

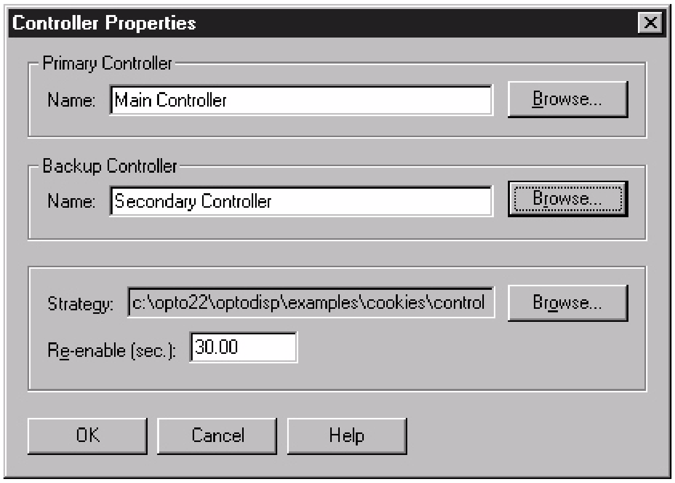
2. Select Configure→Controllers, then double-click the controller for which you will designate a backup controller.

3. In the Controller Properties dialog box, click the Browse button in the Backup Controller group.

   NOTE: If you need to add a new controller to the list of available controllers, see Chapter 4, "Working with Controllers," in the OptoControl User's Guide. *When done, continue with step 4 below.*

4. In the Select Controller dialog box that appears, choose a backup controller from the list and click OK.

   The name of the backup controller you added now appears in the Controller Properties dialog box:



Controller Properties

Primary Controller

Name: Main Controller

Backup Controller

Name: Secondary Controller

Strategy: c:\opto22\optodisp\examples\cookies\control

Re-enable (sec.): 30.00

5. When all the parameters are correct, click OK.

   The Controllers dialog box appears with the controller you have configured in the Name list.

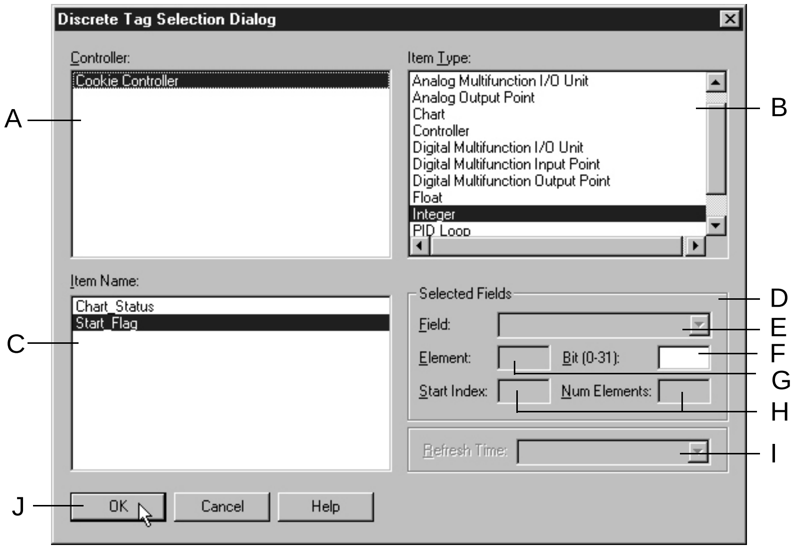
6. At this point, you can:
   - Click Add to configure another controller.
   - Click Modify to change the configuration of a selected controller.
   - Click Delete to remove a selected controller.
   - Click OK to close the Controllers dialog box and finish configuring controllers.

Configuring Tags

Graphics in OptoDisplay can be linked directly to the values of OptoControl tags, so you will configure tags quite often as you develop OptoDisplay projects. Tags are configured using the Tag Selection dialog box, which you can access from many dialog boxes in OptoDisplay Configurator by clicking the Tag Selection button ? .

The tags that appear in the Tag Selection dialog box are actively filtered; rather than display all possible item types and item names, only the item types available for the selected controller appear in the Item Type list, and only the item names available for a selected item type appear in the Item Name list. For detailed information on item types and names in OptoControl strategies, see the *OptoControl User's Guide.*

To select a tag, complete the fields as follows:



Discrete Tag Selection Dialog

Controller: Cookie Controller

Item Type: Analog Multifunction I/O Unit, Analog Output Point, Chart, Controller, Digital Multifunction I/O Unit, Digital Multifunction Input Point, Digital Multifunction Output Point, Float, Integer, PID Loop

Item Name: Chart_Status, Start_Flag

Selected Fields

Field:

Element:

Bit (0-31):

Start Index:

Num Elements:

Refresh Time:

A Select the controller that contains the tag you wish to use. If only one controller is available, it is automatically selected. Choosing a controller updates the Item Type list (B) so that it displays only the “Value” or “Discrete” OptoControl data types in that controller’s OptoControl strategy.

B Select the type of data you wish to use. The list contains only the “Value” or “Discrete” data types defined in the selected controller’s OptoControl strategy. (The data types that appear depend on which data type was selected in the “Setup by” field in the preceding dialog box.) When you select a specific item type, a list of all the tags of that selection type appears in the Item Name list box (C). Your Item Type selection also determines the options available in the Selected Fields group (D).

C This is an alphabetical list of the available OptoControl tags of the type specified in the Item Type list. Select the tag you want to use from this list.

D The item type of the tag you select determines which of these fields, if any, need to have contents specified. If an entry is not needed, then the option is not available.

E Specifies the data that is associated with the selected tag. For example, if the selected tag is of Item Type PID, then the available fields are Error, Enable, A/M, Input, Output, Setpoint, etc. If the tag Item Type is Digital Multifunction Input Point, the available field is State. If the tag Item Type is Float, the Field list box is disabled.

F If the base type is Integer, a specific bit in the range specified may be selected from the integer.

G If the selected Item Type is one of the Table types and only a single element of the table is desired, enter the index of that element in this field.

H To select multiple elements from Item Type Table, use the Start Index to specify the first element and Num Elements to specify how many.

I If a controller-driven attribute is being edited, select the refresh time group to be used for scanning. All tags that are defined as part of the same refresh time group are scanned at the same time. A time group with a refresh time of 0 seconds is scanned as quickly as the speed of the communication link permits.

J Click OK to save your settings. (Click Cancel to close the dialog box without making any changes.)

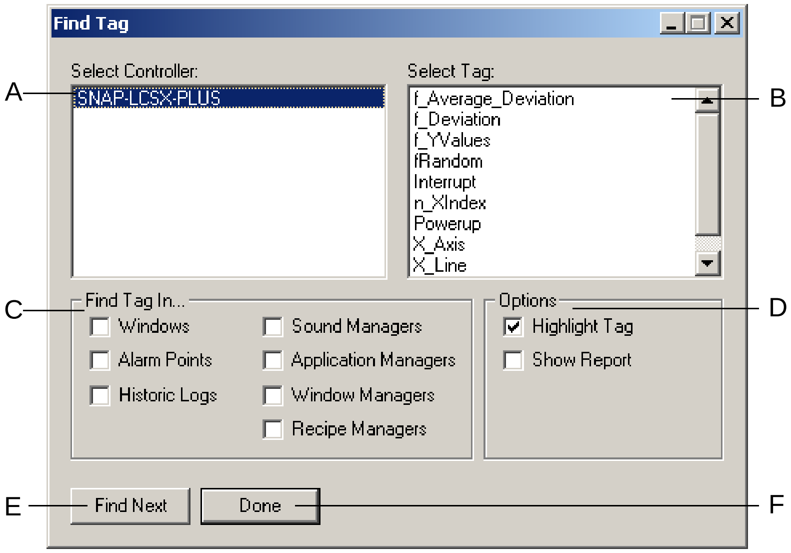
NOTE: For the item type PID, the fields Input and Setpoint function identically.

Searching for Tags in an OptoDisplay Project

You can search an OptoDisplay project to find where an OptoControl tag has been used.

1. Select View→Find Tag

The Find Tag dialog box appears.



Select Controller:
SNAP-LCSX-PLUS

Select Tag:
f_Average_Deviation
f_Deviation
f_YValues
fRandom
Interrupt
n_XIndex
Powerup
X_Axis
X_Line

Find Tag In...
☐ Windows
☐ Alarm Points
☐ Historic Logs
☐ Sound Managers
☐ Application Managers
☐ Window Managers
☐ Recipe Managers

Options
☑ Highlight Tag
☐ Show Report

A Select the controller that contains the tag you wish to find. Choosing a controller updates the Select Tag list (B) so that it displays only the tags available in that controller's OptoControl strategy.

B Select the tag you wish to find. The list contains only the tags defined in the selected controller's OptoControl strategy.

C Select one or more OptoDisplay objects to search for the tag selected in (B). For example, if Windows is selected, then any graphic in a project window will be searched for the selected tag.

D Format and display your search results using the following options:

- Select Highlight Tag to automatically select the object containing the tag being searched for.
- Select Show Report to automatically open in Windows Notepad a report listing all tags found. The report is displayed after the search is complete.

E Click Find Next to start searching for a tag. After a tag is located, click Find Next again to continue searching. When no more tags are found, the Find Tag dialog box will close. If Show Report in (D) is selected, the report of tags found will be displayed in Windows Notepad.

F Click Done to close the Find Tag dialog box.

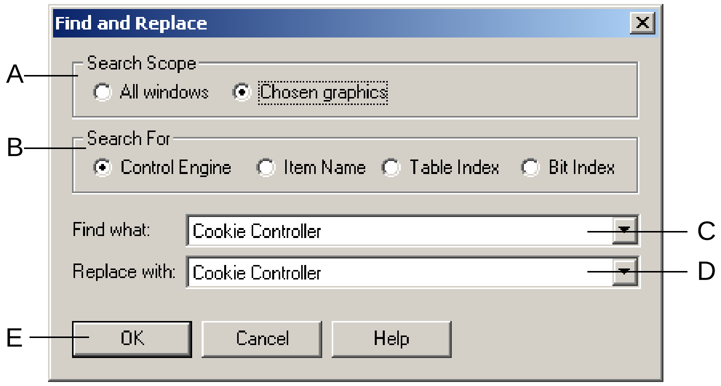
Finding and Replacing Tags in an OptoDisplay Project

You can find and replace tags in an entire OptoDisplay project, or just in one or more selected graphics. This find and replace feature works with tags for a control engine, item name, table index, or bit index.

1. In a draw window in OptoDisplay Configurator, select the graphics you want to search and replace tags in. To search graphics in the entire OptoDisplay project, select at least one graphic on the screen.

2. Select Edit➞Replace. (You can also right-click on a graphic and select Replace from the pop-up menu.)

   The Find and Replace dialog box appears.



Find and Replace

Search Scope

○ All windows ● Chosen graphics

Search For

● Control Engine ○ Item Name ○ Table Index ○ Bit Index

Find what: Cookie Controller

Replace with: Cookie Controller

A Select “All windows” to search and replace in all windows in the OptoDisplay project, or select “Chosen graphics” to search and replace tags in just the graphics you’ve selected.

B Select the type of tag to search and replace.

C Enter the name of the tag to find. If “Control Engine” is selected in (B), you can choose the name of the control engine from a drop-down menu. For the other tag types, enter the name of the tag exactly as it appears in the ioControl strategy.

D Enter the name of the tag to replace the tag found in (C). **The replacement item must be the same kind of item as the item being searched for.** If “Control Engine” is selected in (B), you can choose the name of the control engine from a drop-down menu. For the other tag types, enter the name of the tag exactly as it appears in the ioControl strategy.

E Click OK to start the search, or click Cancel to close the dialog box without any changes.

Optimizing Controller Communications

Your OptoDisplay project will communicate frequently with the controller to update the tag information. Before you set up your OptoDisplay project—or if you encounter communication problems when running the project—review the following information about how OptoDisplay communicates with a controller. For detailed information about adding, modifying, or deleting a connection to a controller, see Chapter 4, "Working with Controllers," in the *OptoControl User's Guide.*

Polling and Time-Out Errors

OptoDisplay polls controllers sequentially, which means that it sends out a command and waits for the response. Under normal conditions, the controller will respond immediately. OptoDisplay then sends the next command and waits for the response.

There are some situations when a controller may not respond, perhaps due to a power loss at the controller or to a break in the communications link. When this happens, a time-out error is generated in the following sequence:

- If the controller does not respond within the time specified by the time-out parameter, and if the retries parameter is set to a value of one or more, then OptoDisplay will try to send the same command to the same controller and wait for a response. This time-out/retry cycle will continue until OptoDisplay has made the original attempt plus the number of additional attempts specified by the retries parameter.
- If all attempts to communicate with the controller fail, then a time-out error occurs and OptoDisplay disables communications with that controller for a period specified by the re-enable parameter. At the end of the re-enable period, OptoDisplay will again attempt to communicate with the controller. If it is not successful, the time-out/retry/re-enable cycle will occur again.

Time-Out and Retries Parameters

During the time-out/retry cycle described above, OptoDisplay will not communicate with any other controllers. The computer running the OptoDisplay project may also become sluggish or unresponsive, making it difficult to access menu options and other applications. If the time-out period is long or the number of retries is high, computer performance may suffer when a communication problem occurs.

Select the time-out, retries, and re-enable parameters carefully. Optimum values will depend on the specifics of each particular system. You can change the time-out and retires parameters when adding or modifying a connection to a controller; specifically, you do this when configuring the computer port that OptoDisplay will use to communicate with the controller. The re-enable parameter is set when adding a controller to your OptoDisplay project.

See "Re-Enable Period" below for more information about selecting the re-enable period. For detailed information about adding, modifying, or deleting a controller connection, see Chapter 4, "Working with Controllers," in the *OptoControl User's Guide.*

Re-Enable Period

The re-enable period (that is, the period of time during which communication is disabled to the controller that caused the time-out error) has two purposes:

- It allows the computer running the OptoDisplay project to continue to operate correctly while communication problems are occurring.
- It allows OptoDisplay to automatically re-establish communications when the controller comes back online.

During the re-enable period, OptoDisplay continues to poll any other configured controllers. Meanwhile, the computer running the OptoDisplay project returns to normal operation.

Choosing a Re-Enable Time

Re-enable times are set when you add a controller to your OptoDisplay project, or modify a controller already associated with the project. See "Configuring Controllers" on page 4-1 for specific instructions on how to enter a re-enable time.

When selecting a re-enable time, do not select a value that is too low. If the re-enable time is too short, the computer running the OptoDisplay project may become unresponsive when communication problems occur. The re-enable parameter should be set to a fairly high value (30 seconds, for example, which is the default setting). For an OptoDisplay project that references multiple controllers, the re-enable period for each controller should be set long enough to allow for normal polling when one controller goes off-line.

Refresh Times and Freshness Values

For information on configuring refresh times, freshness values, and other settings used for updating graphics in an OptoDisplay project, see "Scanning to Update Graphics" on page 6-34.

Correcting Tags from a Strategy

When you select an OptoControl strategy to use with your OptoDisplay project, OptoDisplay automatically imports that strategy's tagname database. This is unlike most other HMI software applications, which require you to create a separate SCADA database in addition to the strategy or control program itself.

This tight connection with the strategy's tagname database, however, can sometimes cause problems when the current OptoControl strategy used by an OptoDisplay project is modified. OptoDisplay may incorrectly read the tags associated with the resulting strategy. OptoDisplay Configurator includes a feature called AutoCorrect Tags that fixes most tag errors that may occur this way.

The AutoCorrect Tags feature works by comparing all tagnames, IDs, and table index references that are used with dynamic attributes in the OptoDisplay project. If discrepancies are found between the items in the tagname database and the OptoDisplay project, the errors that can be corrected are fixed. Both corrected tags as well as those that could not be corrected are listed in the results report AutoCorrect Tags generates.

When To Use AutoCorrect Tags

It's generally advisable to use the AutoCorrect Tags option after making any changes to the OptoControl strategy associated with your OptoDisplay project. You should also run AutoCorrect Tags if you use an OptoControl strategy that was converted from an earlier Cyrano strategy.

There are some tag errors in an OptoDisplay project that AutoCorrect Tags cannot fix. These errors include if you do either of the following:

- Delete a tag from a strategy
- Shorten the length of a table in a strategy

You may also get unreliable results if you delete a tag from a strategy, and then create a new tag with the same name.

Using AutoCorrect Tags

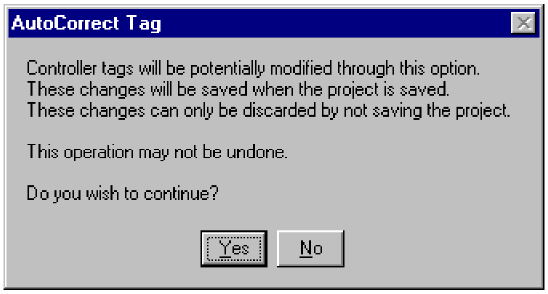
IMPORTANT: Always save changes to your OptoDisplay project before using the AutoCorrect Tags option.

If you don't want to use the corrections made by AutoCorrect Tags, simply close the project without saving. Remember that not saving the project means you will lose any other changes you have made to the project.

Follow these steps to correct tags in your OptoDisplay project:

1. Select Tools→AutoCorrect Tags.

   The following warning appears:



AutoCorrect Tag

Controller tags will be potentially modified through this option.
These changes will be saved when the project is saved.
These changes can only be discarded by not saving the project.

This operation may not be undone.

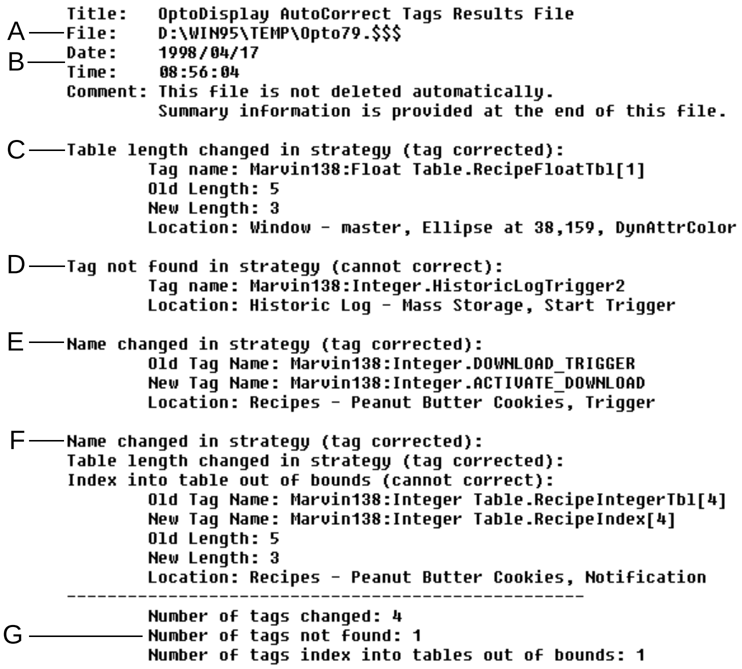
Do you wish to continue?

   If OptoDisplay finds any problems with the tags and can fix them, it will do so. The changes, however, won't become a permanent part of your project until you actually save the project.

2. To correct tags, click Yes. (Click No to close the window and not make any changes.)

The Windows application WordPad launches, displaying a results file that describes any problems AutoCorrect Tags may have found with the tags from the strategy. The results file has a name of the form Opto**n**.$$$, where **n** is an arbitrary number.

The following illustration shows a sample results file created by AutoCorrect Tags:




```
Title:   OptoDisplay AutoCorrect Tags Results File
File:    D:\WIN95\TEMP\Opto79.$$$
Date:    1998/04/17
Time:    08:56:04
Comment: This file is not deleted automatically.
         Summary information is provided at the end of this file.

Table length changed in strategy (tag corrected):
        Tag name: Marvin138:Float Table.RecipeFloatTbl[1]
        Old Length: 5
        New Length: 3
        Location: Window - master, Ellipse at 38,159, DynAttrColor

Tag not found in strategy (cannot correct):
        Tag name: Marvin138:Integer.HistoricLogTrigger2
        Location: Historic Log - Mass Storage, Start Trigger

Name changed in strategy (tag corrected):
        Old Tag Name: Marvin138:Integer.DOWNLOAD_TRIGGER
        New Tag Name: Marvin138:Integer.ACTIVATE_DOWNLOAD
        Location: Recipes - Peanut Butter Cookies, Trigger

Name changed in strategy (tag corrected):
Table length changed in strategy (tag corrected):
Index into table out of bounds (cannot correct):
        Old Tag Name: Marvin138:Integer Table.RecipeIntegerTbl[4]
        New Tag Name: Marvin138:Integer Table.RecipeIndex[4]
        Old Length: 5
        New Length: 3
        Location: Recipes - Peanut Butter Cookies, Notification
---------------------------------------------------
        Number of tags changed: 4
        Number of tags not found: 1
        Number of tags index into tables out of bounds: 1
```

Here's an explanation of what the results file contains:

A Name and location of the results file created by AutoCorrect Tags.

B Date and time the file was created.

C Warning message that reports that the table length of RecipeFloatTbl changed from an old length of five elements to a new length of three elements. "Location" shows where the tag was used in the OptoDisplay project. In this example, it was found in a window called "master," attached to an ellipse at x: and y: coordinates of 38 and 159, with the color dynamic attribute.

D Error message that the tag "HistoricLogTrigger2" is no longer part of the OptoControl strategy, and this could not be corrected by the AutoCorrect Tags tool. The tag was used as the start trigger for a historic log called "Mass Storage."

To fix this error, you'll have to assign another tag in your OptoDisplay project to use as the start trigger for this historic log. (Note that OptoDisplay won't recreate the connection to the tag if you open your OptoControl strategy and add the old tagname again. Internally, OptoDisplay can't correlate the old tagname and the new, similarly named tag.)

E Warning message that the tagname "DOWNLOAD_TRIGGER" changed to "ACTIVATE_DOWNLOAD" in the strategy. The old and new tagnames are reported, and the OptoDisplay project is corrected to use the new tagname. The tag was used in a recipe called “Peanut Butter Cookies” as its trigger.

F Warning message that multiple errors have been found for one tagname:

- The table name “RecipeIntegerTbl” changed to “RecipeIndex,” and its length changed from five elements to three elements. The OptoDisplay project is updated with this change.
- An “index into table out of bounds” error was detected and couldn’t be corrected. Specifically, the project tried to use the fifth element of the table (RecipeIntegerTbl[4]), but the fifth element no longer exists. To correct this problem you must specify a valid index. The tag was used in a recipe called “Peanut Butter Cookies.” When the recipe is successfully downloaded, OptoDisplay writes a value to this notification tag.

G The final tally of all the warnings and errors found by AutoCorrect Tags is reported here.

Note that if you run AutoCorrect Tags again, you will see only those errors that were reported as “cannot correct.” The other reported errors have been corrected.

When you no longer need the Opto**n**.$$$ file, you can delete the file from your hard drive.

CHAPTER 5

Working with Graphics

Introduction

This chapter describes how to use OptoDisplay Configurator to create and edit graphic objects, and how to import images. It also describes how to configure the windows in which these items appear.

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Using Draw Windows

Draw windows in OptoDisplay Configurator are “blank pages” where you place, create or edit all the graphics for your OptoDisplay project. These windows also contain trend, SuperTrend, and alarm objects. When you create a draw window, you can define its size, position, and color, as well as its state (open, closed, or iconified) in which it appears when the project opens in OptoDisplay Runtime.

Draw windows can be protected with a password, and be set up to open when an alarm is triggered. You can also configure whether menus, borders, and other standard window elements appear.

Creating and Deleting Draw Windows

When you create a new OptoDisplay project, one draw window appears in the main project window. To create additional draw windows, you can create a new window, or copy an existing draw window and its attributes.

Making a New Draw Window

1. Select Windows→New.

   The Window Properties dialog box opens.

2. Enter a name for the window, and configure other settings as necessary.

   See "Modifying Draw Windows" below for instructions on configuring draw windows.

3. Click OK when done.

   The new draw window appears in the project window.

Copying an Existing Draw Window

1. Select Windows→Copy.

   The Window Properties dialog box opens.

2. Enter a new name for the window, and configure the existing settings if necessary.

   See "Modifying Draw Windows" below for instructions on configuring draw windows.

3. Click OK when done.

   The new draw window appears in the project window.

Deleting an Existing Draw Window

1. Using the Select tool, click on a draw window to select it.

2. Select Windows→Delete.

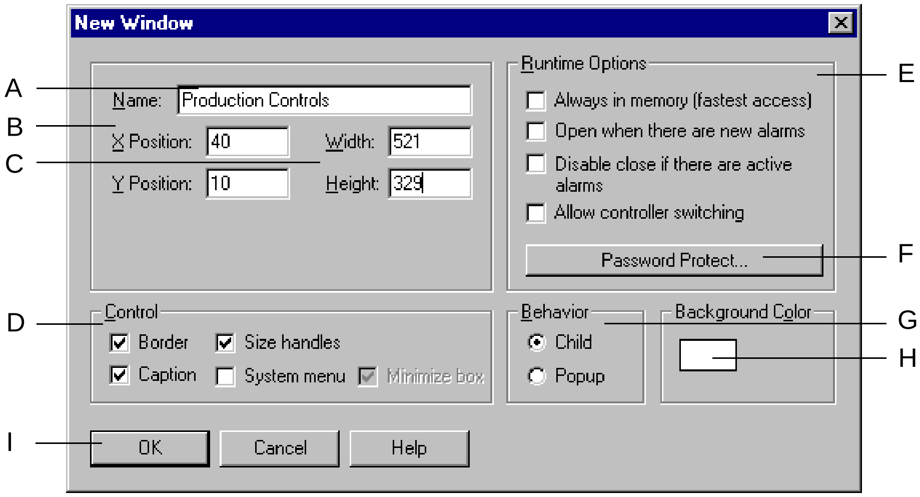
3. Click Yes in the message box that appears to confirm the deletion.

Modifying Draw Windows

You can change many properties of a new or existing draw window, such as the window's position, color, and behavior, among other properties. These properties are set in the Windows Properties dialog box. To open this dialog box, do one of the following:

- Create a new draw window or copy an existing one.
- Click on a draw window to select it, and then choose Windows→Properties.

The Window Properties dialog box appears.



New Window

Name: Production Controls

X Position: 40 Width: 521

Y Position: 10 Height: 329

Runtime Options

□ Always in memory (fastest access)

□ Open when there are new alarms

□ Disable close if there are active alarms

□ Allow controller switching

Control

☑ Border ☑ Size handles

☑ Caption □ System menu ☑ Minimize box

Behavior

● Child

○ Popup

Background Color

A Enter the name of the draw window. This name appears in the window's title bar unless the title bar is hidden by deselecting the "Caption" option in the Control group (D) .

B Enter the X and Y coordinates where the window appears in the project window. The X and Y coordinates indicate the location, in pixels, of the draw window's upper-left corner; the upper-left corner of the project window has X and Y coordinates of 0.

C Enter the width and height of the draw window. Width and height are measured in pixels.

D Use the options in the Control group to configure the appearance of the draw window. Select or deselect the following options:

Border—Hides or displays the narrow edge of the window. This option must be selected for the other options in the Control group to be available.

Caption—Hides or displays the bar at the top of the window where the window name appears. This option must be selected to move the window within the larger project window.

Size handles—If selected, lets you resize the window by clicking and dragging an edge or corner of the window.

System menu—Hides or displays the small system menu icon and the Close Window button located at the top of the window. This option is unavailable if the Caption option has not been selected.

Minimize box—Hides or displays the standard Windows close box in the upper-right corner of the window. This option is unavailable if the System menu option has not been selected.

E Use the items in the Runtime Options group to configure how the window opens when the project is run in OptoDisplay Runtime. Select or deselect the following options:

Always in memory (fastest access)—If selected, the window's information is loaded and saved in the computer's memory when the project runs. Use this option for a window that you know will be opened and closed often. This option is selected automatically if you place an alarm graphic in a window.

Normally, only windows that have been opened or iconified are saved in memory. If you use this option with many windows, more computer memory is required, and your OptoDisplay project will require more time to start up. Using this option with fewer windows uses less memory, and your project will start up more quickly.

Open when there are new alarms—If selected, a closed or iconified window that contains an alarm graphic will open when the alarm is triggered. This option is only available if a window contains an alarm graphic that is set to summary or detailed view. For more information on configuring alarms, see "Adding Alarm Graphics" on page 8-37.

Disable close if there are active alarms—If selected, prevents an open window that contains one or more active alarms from being closed. All active alarms in a window must be acknowledged before the window can be closed. For more information on working with alarms, see "Working with Alarms" on page 9-19.

Allow controller switching—If selected, all graphics in the window can use data from the same OptoControl strategy running on a different controller. The operator switches between controllers in Runtime. For more information on using data from multiple controllers, see "Switching between Controllers" on page 9-14.

F To assign a password to a window, click here and then enter a password in the dialog box that appears. When a password is assigned to a draw window, a closed window cannot be opened without first entering the password. (Open windows that are iconified or hidden are not affected.)

You cannot assign a password to a window that both contains an alarm and has the Runtime option "Open when there are new alarms" selected.

G Use the options in the Behavior group to set how the window appears on-screen when the project is run in OptoDisplay Runtime. Select one of the following options:

Child—prevents the window from being moved or minimized outside the boundaries of the main project window.

Popup—lets the window be moved or minimized outside of the main project window.

H To set the background color of a window, click the color square and then select a color in the dialog box that appears.

I Click OK to save your settings.

Opening and Closing Draw Windows

To open or close a draw window in your OptoDisplay project, do the following:

1. From the Windows menu, select Open or Close.

   The Open Windows or Close Windows dialog box appears.

2. Click the name of the window you want to open or close, and then click OK.

   See "Working with Multiple Windows" on page 5-5 to learn how to select or deselect multiple window names.

Other ways of opening and closing windows include the following:

- To open a window that has been opened previously, select its name from the bottom of the Windows menu.
- To close a window in which the system menu appears, click the Close Window button ☒ in the upper-right corner.

Working with Multiple Windows

There are several ways to select or deselect multiple window names in the Open Windows or Close Windows dialog box.

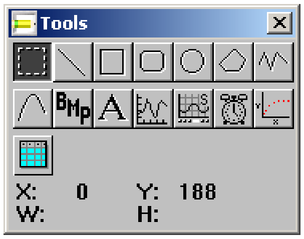
- To select individual window names, hold down the SHIFT key and click each window name.
- To highlight all names in the list, click Select All.
- To not select any name in the list, click Deselect All.
- To easily close or open all but one window, click on a single name and then click Inverse.

Drawing Graphic Objects

Once you've opened a project in OptoDisplay Configurator, you can use the drawing tools in the OptoDisplay toolbox to create graphic objects in your active window.

Follow these general steps to draw a graphic object:

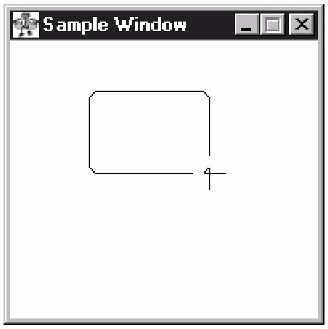
1. If your toolbox is not visible, select View→Toolbox to see the toolbox as it appears below. (You can close the toolbox by selecting View→Hide Toolbox.)



2. Select a drawing tool from the toolbox by clicking on it.

   The cursor will turn into a crosshair.

3. Click the crosshair in a window, then drag it in any direction to create a graphic.



In the example above, the Round Rectangle tool ▢ was selected.

Using Key Combinations

By pressing various key combinations when using a drawing tool, you can alter the appearance of the graphic object you draw. The table below shows key combinations that can be used with various drawing tools:

Tool	Description	Use
⬚	Select tool	Used to select, move, and resize graphic objects.
⧅	Line tool	Draws straight lines.
	CTRL+Line tool	Draws constrained straight lines at angles of 90 degrees.
□	Rectangle tool	Draws squares and rectangles.
	CTRL+Rectangle tool	Draws squares with the reference point in the top left corner.
	SHIFT+Rectangle tool	Draws rectangles with the reference point in the center.
	SHIFT+CTRL+Rectangle tool	Draws squares with the reference point in the center.
▢	Round Rectangle tool	Draws squares and rectangles with rounded corners.
	CTRL+Round Rectangle tool	Draws squares with rounded corners with the reference point in the top left corner.
	SHIFT+Round Rectangle tool	Draws rectangles with rounded corners with the reference point in the center.
	SHIFT+CTRL+Round Rectangle tool	Draws squares with rounded corners with the reference point in the center.

Tool	Description	Use
○	Ellipse tool	Used to draw circles and ellipses.
	CTRL+Ellipse tool	Draws circles with the reference point in the top left corner.
	SHIFT+Ellipse tool	Draws ellipses with the reference point in the center.
	SHIFT+CTRL+Ellipse tool	Draws circles with the reference point in the center.
⬠	Polygon tool	Used to draw polygons as follows: • Drag and click to form vertex points. • Double-click the last vertex to close the polygon. Sizing handles appear around the object. If you can't select the polygon later with the Select tool, the polygon is not complete. Refresh the window (View→Redraw) to remove incomplete graphics.
∿	Polyline tool	Used to draw connected lines as follows: • Drag and click to draw connected lines. • Double-click on the last line drawn to finish the polyline. Sizing handles appear around the object. If you can't select the polyline later with the Select tool, the polyline is not complete. Refresh the window (View→Redraw) to remove incomplete graphics.
∩	Bezier Curve tool	Used to draw curves as follows: • Click at least four points in the draw window to draw a curve. • Thereafter, click points one at a time in groups of three to continue drawing the curve. • Double-click the last point to finish the curve. Sizing handles appear around the object. If you can't select the curve later with the Select tool, the curve is not complete. Refresh the window (View→Redraw) to remove incomplete graphics.
BMp	Bitmap tool	Used to place bitmap graphic files selected with File→Choose Bitmap. Once the bitmap has been chosen, just click to place the bitmap in the window.
A	Text tool	Used to write text. Put your cursor where you want the text to start. Type your text. When finished, click the mouse away from the text you just typed. Modify text by selecting it with the Select tool and by using Edit→Edit Text.

Tool	Description	Use
	Trend tool	Used to draw graphs that display real-time data against time. See Chapter 7, “Working with Trends” for more information.
	SuperTrend tool	Used to draw graphs that display both real-time and historical data against time. See Chapter 7, “Working with Trends” for more information.
	Alarm tool	Used to draw objects that display alarms and other status information. See Chapter 8, “Configuring Trigger-Based Events” for more information.
	XY Plot tool	Used to draw graphs that display data plotted on x and y axes. See Chapter 7, “Working with Trends” for more information.
	Numeric Table tool	Used to display data from up to four numeric tables. See “Working with Numeric Tables” on page 5-22 for more information.

Selecting Graphic Objects

You can use the Select tool to choose one or more graphic objects in a draw window.

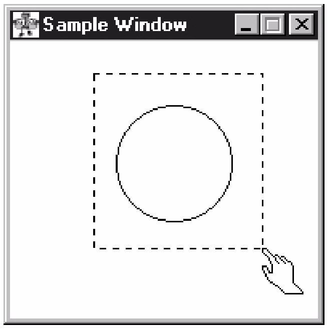
Selecting One Object

The simplest way to select a graphic object in a window is to just click on it with the Select tool. You can also select a graphic by clicking and dragging.

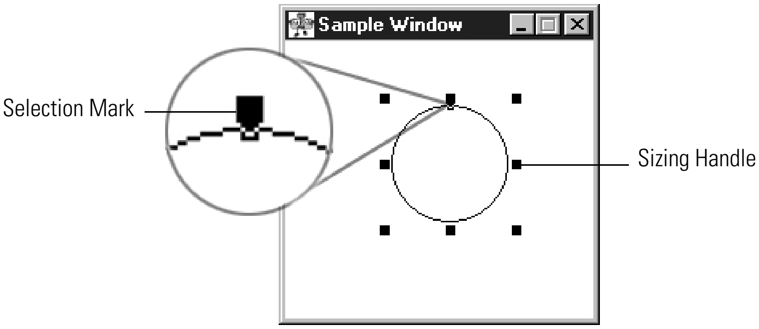
1. Choose the Select tool from the toolbox.

2. Click the cursor just outside the graphic object you want to select and drag the cursor completely over the object.

A selection box should appear as shown below:



After you release the mouse button, several sizing handles and one selection mark appear around the selected object.



Handles and Selection Marks

When a graphic object is selected, several solid black sizing handles appear, along with one transparent selection mark. The selection mark shows you whether you've selected a single graphic object or several objects in a group. Each graphic object in a group has a selection mark. Sizing handles can be used to resize the graphic, which we'll talk about a little later in this chapter.

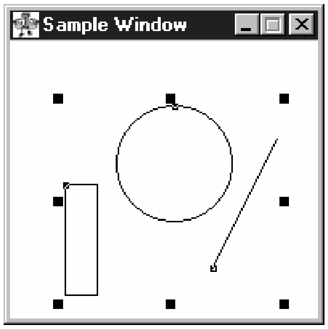
Selecting Several Objects

There are a few ways to select multiple graphic objects. The simplest way is to click and drag.

1. Choose the Select tool ⬚ from the toolbox.
2. Click the pointer just outside the objects you want to select and drag the pointer across the group of objects you want to select.

   Make sure that you include all the objects within the selection box that appears.

After you release the mouse button, several sizing handles and one selection mark will appear around the selected objects.



Another way to select several objects is to choose the first graphic using the Select tool, then hold down the SHIFT key and click on each additional object you want included in the selection group. Notice that a selection handle appears on each object you add to your group of objects.

Selecting All Objects

To select all the graphic objects that appear in your active window, choose Edit→Select All (ALT+E+S). You can also right-click and choose Select All from the pop-up menu.

Deselecting One or More Objects

The easiest way to deselect one or all graphics is to click anywhere outside the sizing handles. All of the handles disappear and no graphics are selected.

From a selected group of objects, you may need to pick some graphics you actually want as part of a final selection group. You can do this using key combinations.

- To deselect an object within a group of selected objects, hold down the SHIFT key and click on the object you don't want to include.
- To select only one object within a group of selected objects, hold down the CTRL key and click on the object. This deselects all other objects.

Grouping and Locking Graphics

You can combine two or more graphic objects into a group so that they are handled as one object. You can then manipulate the graphic as one unit. As a unit, the grouped graphics can be selected, moved, resized, and have dynamic attributes assigned. You can also lock the position of a graphic in a draw window so it can't be moved.

CAUTION: *If you group objects, OptoDisplay Runtime processes only the dynamic attributes assigned to the group. Dynamic attributes assigned to individual members of a group are ignored.*

If a group is later ungrouped, any previously configured dynamic attributes of the individual graphics will be recognized and processed in Runtime.

Grouping Objects

1. Select two or more graphics.
2. Choose Edit→Group. (You can also right-click and choose Group from the pop-up menu.)

   There will be no visible change, but the objects are collected into one group.

Ungrouping Objects

1. Select a set of graphics that were previously grouped.
2. Choose Edit→Ungroup, or right-click and choose Ungroup from the pop-up menu.

   You will see the sizing handles still appear around the former group. Click off the graphics and then click on an individual graphic. You will see it's not part of the group anymore.

Locking Objects in a Draw Window

After you've arranged several objects in a draw window, sometimes it can be useful to lock the position of one or more items so they aren't accidentally moved. To lock one or more objects, select the item(s) and choose Edit→Lock Position. To unlock objects, select the item(s) and choose Edit→Unlock Position.

Changing Lines and Fills

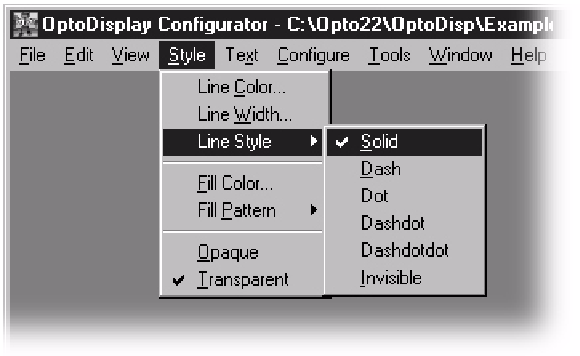
You can change the line and fill style of objects you've already drawn, or set the default for objects you're about to draw.

NOTE: If you select more than one object and the graphics have different line or fill attributes, no attributes will appear in the menus and dialog boxes for each attribute. However, you can still select new attributes for all selected lines.

Applying or Changing Line Attributes

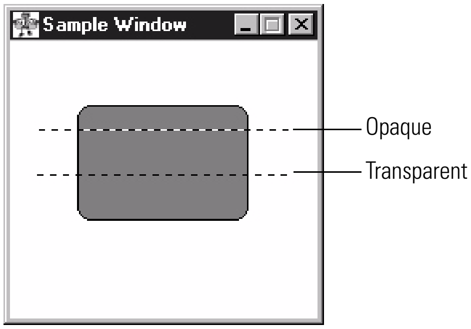
1. Do one of the following:
   - To change attributes for one or more existing objects, select the object(s) using the Select tool.
   - To set attributes for subsequent graphics that you create, do not select any object.

2. Choose the line attributes you want to apply to the selected object(s):
    - To change the line color, select Style→Line Color, then choose a color from the Color dialog box and click OK. (You can also right-click the object, then choose Line→Color from the pop-up menu.)
    - To change the line width, select Style→Line Width, then enter a pen width in the Pen Width dialog box and click OK. Pen widths are measured in pixels. (You can also right-click the object, then choose Line→Width from the pop-up menu.)
    - To change the line style, select Style→Line Style, then choose a line style from the list that appears (shown below). (You can also right-click the object, choose Line→Style from the pop-up menu, then select a line style from the list that appears.)



- To change the opaque or transparent attributes of a line, select the appropriate attribute from the Style menu. Note that these attributes can be applied only to non-solid lines with a line width of one pixel.

  The transparent attribute lets an object's color show between the dashes in a line, and the opaque attribute lets the background color of the window show between the dashes in a line. Samples of opaque and transparent line attributes are shown in the example below.



Applying or Changing Fill Attributes

1. Do one of the following:
    - To change attributes for one or more existing objects, select the object(s) using the Select tool.

- To set attributes for subsequent graphics that you create, do not select any object.

2. Choose the fill attributes you want to apply to the selected object(s):
   - To change the fill color, select Style→Fill Color, then choose a color from the Color dialog box and click OK. (You can also right-click, choose Fill→Color from the pop-up menu, choose a color from the Color dialog box, and click OK.)
   - To change the fill pattern, select Style→Fill Pattern and choose a fill attribute. A fill color other than white needs to be in effect in order to see the new fill pattern. (You can also right-click, choose Fill→Pattern from the pop-up menu, and choose a pattern.)
   - To change the background color used behind a fill pattern, select Style→Background Color, then choose a color from the Color dialog box and click OK. (You can also right-click, choose Background→Color from the pop-up menu, choose a color from the Color dialog box, and click OK.)

Importing Graphics

You can easily import bitmap graphics, Windows metafile graphics, and JPEG images into an OptoDisplay window to enhance or add detail to your operator interface. For your convenience, OptoDisplay also includes the Symbol Factory, a large library of graphics designed especially for industrial applications.

A bitmap graphic is a picture, drawing, or other image saved in Microsoft Windows BMP file format. Bitmap graphic files have the file extension .bmp. If you'd like to use bitmap graphics in your project which have been saved in another graphic file format, such as TIFF (file extension .tif), you must first convert the file to BMP format. Commercial and shareware applications that can do this are widely available; two popular commercial image editing and conversion applications for Microsoft Windows are Paint Shop Pro from Jasc Software, and Photoshop from Adobe Systems Incorporated.

A Windows metafile is a drawing saved in the Microsoft Windows metafile (WMF) format. Metafile graphics have the file extensions .wmf or .emf. Unlike a bitmap graphic, a metafile maintains its resolution when resized and will not appear jagged or blurred. There is a variety of clip art and other graphics available in WMF format; for example, Microsoft Office often includes an assortment of clip art in WMF format.

The Joint Photographic Experts Group (JPEG) file format is a highly compressed format commonly used for photographs. This format is often used for displaying images in a Web browser.

Importing a Bitmap Graphic

To import a bitmap graphic into your OptoDisplay project, first choose the bitmap image you want to use, and then use the Bitmap tool to place the bitmap in the window.

1. Select File→Choose Bitmap.

2. In the Choose A Bitmap dialog box that appears, navigate to the folder that contains the bitmap graphic you want to use, and then select the file name and click Open.

3. Select the Bitmap tool BMP in the toolbox and click the pointer in the desired location in the window.

   The bitmap is centered at the location you have clicked.

Importing a Metafile or JPEG Graphic

To import a Windows metafile or JPEG graphic into your OptoDisplay project, do the following:

1. Select Edit→Paste from File→Import (Metafile or JPEG). (You can also right-click and select Import Metafile or Import JPEG from the pop-up menu.)

2. In the Import dialog box that appears, navigate to the folder that contains the graphic you want to use, and then select the file name and click Open.

   The selected file is placed in the active draw window.

You can also import a metafile or JPEG graphic used in another program by copying or cutting the graphic to the Windows clipboard, and then pasting it in the project draw window.

Importing a Graphic from the Symbol Factory

To import a graphic as a metafile graphic from the Symbol Factory into your OptoDisplay project, do the following:

1. Select Edit→Paste from File→Symbol Factory. (You can also right-click and select Symbol Factory from the pop-up menu.)

   The Symbol Factory window opens.

2. Browse through the categories and thumbnails of graphics until you find the graphic that you want to use.

3. Click the graphic and drag it into the OptoDisplay draw window.

   You can also select Edit→Paste as Picture (.wmf) Only.

The selected graphic is now available as a metafile graphic in the active draw window. The Symbol Factory window will remain open until you close it, or until you exit OptoDisplay Configurator.

Bitmap Graphics in Symbol Factory

Although Symbol Factory graphics are provided as metafiles, you can also import these graphics as bitmaps. To import a graphic as a bitmap graphic from the Symbol Factory into your OptoDisplay project, do the following:

1. Select Edit➞Paste from File➞Symbol Factory. (You can also right-click and select Symbol Factory from the pop-up menu.)

   The Symbol Factory window opens.

2. Browse through the categories and thumbnails of graphics until you find the graphic that you want to use.

3. Click the graphic and then select Edit➞Copy.

4. Switch to the OptoDisplay draw window and select Edit➞Paste.

The selected graphic is now available as a bitmap graphic in the active draw window. The Symbol Factory window will remain open until you close it, or until you exit OptoDisplay Configurator.

Saving Objects as Bitmaps

After creating one or more objects in a draw window, you may want to save the object as a bitmap graphic file. This is useful, for example, if you want to document your operator interface.

NOTE: Saving a graphic object as a bitmap graphic file is not the same as copying an object, then pasting it into another window. When an object is saved as a bitmap, it loses all dynamic attributes and other properties it has been configured with.

1. Use the Select tool to select the graphic you want to save as a bitmap.

   If you don't select a graphic, the entire active window will be saved as a bitmap file.

2. Select File➞Save as Bitmap.

3. In the Save As Bitmap dialog box that appears, navigate to the desired folder and enter a file name. (You can enter a three-letter extension other than .bmp, but the file will still be saved as a bitmap image.)

4. Click Save to save the image.

Copying, Duplicating, and Pasting

There are two ways that you can make copies of graphics you've created or added to a window. You can copy one or more graphics to the Windows clipboard, or duplicate the selected graphic(s) in the same window without affecting the contents of the clipboard.

Copying and Pasting an Object

1. Select one or more graphic objects.

2. Choose Edit→Copy. (The keyboard shortcut for this command is CTRL+C or CTRL+INS. You can also right-click and choose Copy from the pop-up menu.)

   The selected objects are copied to the Windows clipboard.

3. Click on the window where you want to paste the object(s).

4. Choose Edit→Paste. (The keyboard shortcut for this command is CTRL+V or CTRL+INS. You can also right-click and choose Paste from the pop-up menu.)

   The clipboard contents are pasted in the center of the active window.

Duplicating an Object

1. Select one or more objects.

2. Choose Edit→Duplicate. (The keyboard shortcut for this command is CTRL+D. You can also right-click and choose Duplicate from the pop-up menu.)

   A copy of the graphic is placed immediately below the selected graphic. Note that the contents of the Windows clipboard are not affected by duplicating an object.

Moving and Resizing Graphics

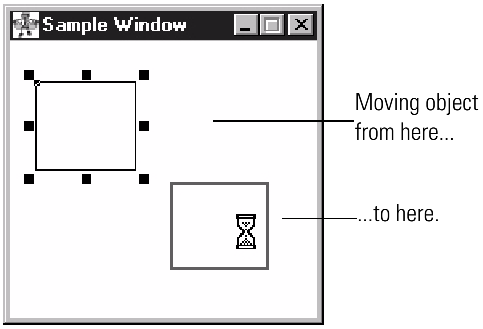
To build your operator interface, you will need to be able to position, resize, and reshape graphic objects. This is done using the Select tool with different options. (Objects can also be positioned and resized by entering values in the Graphic Dynamic Attributes dialog box; see Chapter 6, "Using Animated Graphics," for more information.)

Moving Graphics

1. Choose one or more objects to move using the Select tool ⬚ .

2. To move an object, click the object (but not on a sizing handle) and drag it to the new position.

You can't drag objects from one window to another. You must copy or cut objects to move them between windows.

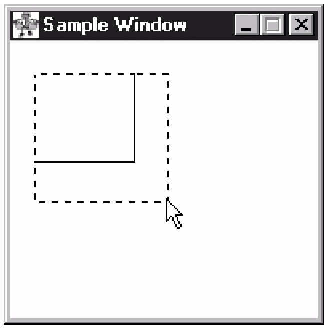


Resizing Graphics

1. Select one or more objects to resize using the Select tool .

2. To resize an object, position the pointer over a square handle, click, and drag.

   As illustrated below, the pointer turns into an arrow, and the size of the object changes relative to the sizing handle you're dragging.



3. When the object(s) are the size you want, release the mouse button.

Resizing Multiple Graphics to Equal Dimensions

When multiple graphics are selected, they can be resized equally so that all the graphics have the same height and width.

1. Using the Select tool , choose two or more objects to resize.

2. Select Edit→Size, then one of the following options:

   - **Grow to Largest Height**—All selected objects are resized to the height of the tallest object selected.
   - **Grow to Largest Width**—All selected objects are resized to the width of the widest object selected.

- **Shrink to Smallest Height**—All selected objects are resized to the height of the smallest object selected.
- **Shrink to Smallest Width**—All selected objects are resized to the width of the least wide object selected.

You can also select these options by right-clicking on the selected objects, selecting Size from the pop-up menu, then choosing a Grow or Shrink option.

Reshaping Graphics

You can adjust the individual points that make up a polyline, polygon, or Bezier curve object.

1. Using the Select tool ⬚ , select a polyline, polygon, or Bezier curve object.

2. Select Edit→Edit Points, or right-click and choose "Edit Points" from the pop-up menu.

3. Move the cursor over a point on the selected object.

   When the cursor is over a point on the object, the point is highlighted with a small black square.

4. Click the highlighted point, drag it to the desired location, and then release the mouse button.

   The highlighted point will appear in the new location.

5. When you are done adjusting points on the object, click outside of the object to deselect it.

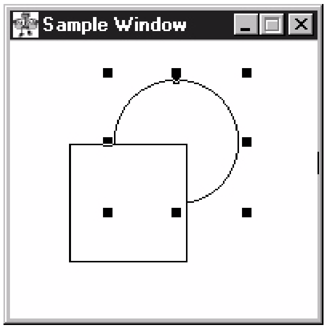
Changing Stacking Order

As objects are placed in draw windows, they're assigned a stacking order (or "Z-order") to define which object appears in front of or in back of another object. The position of objects in this stacking order can be modified as follows:

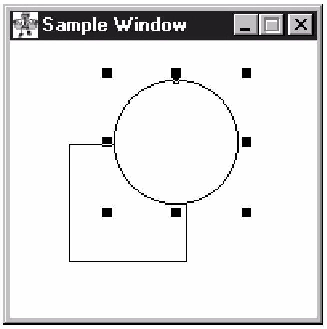
1. Select one object, or multiple objects that have been grouped together.

2. Choose Edit→Z-Order and select Bring to Front or Send to Back. (You can also right-click, choose Z-Order from the pop-up menu, and select Bring to Front or Send to Back.)

As shown below, if you select Bring to Front, the graphic is moved to the front of other graphics. Likewise, if you select Send to Back, the graphic is moved behind other graphics.



Before Bring to Front



After Bring to Front

Deleting Objects

There are several ways to delete an object in a window. Depending on the commands you use, the method you choose may affect the contents of the Windows clipboard.

1. Select one or more objects. (Use Edit→Select All to select all objects.)

2. Delete the graphics using one of the following methods:

   - To cut an object and save it in the Windows clipboard so you can use it elsewhere, choose Edit→Cut, or press SHIFT+DEL, or press CTRL+X, or right-click and choose Cut from the pop-up menu.

     You can paste the object into another window or elsewhere in the same window.

   - To permanently delete an object, choose Edit→Delete, or press the DEL key, or right-click and choose Delete from the pop-up menu.

     The objects are *not* copied to the clipboard and cannot be retrieved.

Aligning Graphics

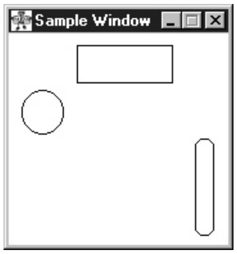
You can align selected objects based on common edges, or based on common centers through objects. You can also adjust the space between objects.

1. Select the objects you want to align.

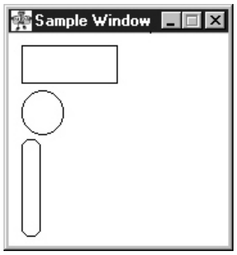
   You have to select at least two objects to enable this command.

2. Select the Edit→Align command and choose an option to base the alignment on. (You can also right-click and choose Align from the pop-up menu.)

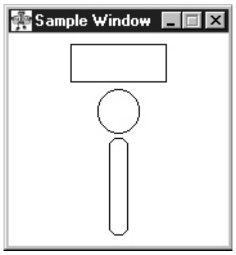
The following illustration shows the results of applying the different alignment options:



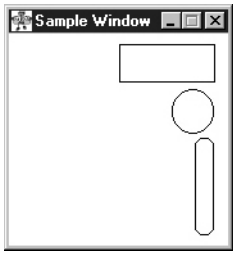
Before Alignment



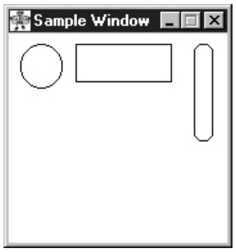
After Left Align



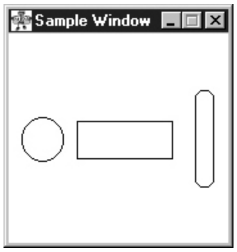
After Center Align



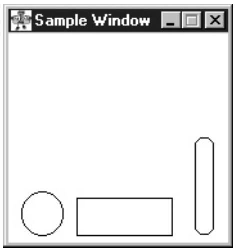
After Right Align



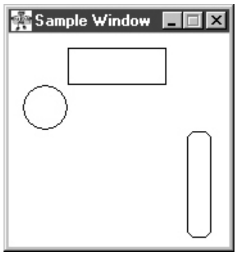
After Top Align



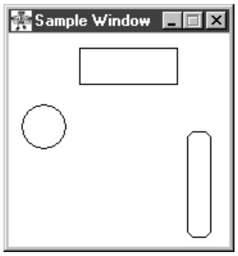
After Middle Align



After Bottom Align



After Space Evenly Vertically



After Space Evenly Horizontally

Rotating and Flipping Graphics

You can rotate objects in 90° increments, or flip graphics around a central horizontal or vertical axis.

1. Select one or more objects.

2. Choose Edit➞Flip/Rotate and select an option, or right-click and choose Flip/Rotate from the pop-up menu.
    - To flip a graphic from right to left (or vice versa), choose Flip Horizontal.
    - To flip a graphic from top to bottom (or vice versa), choose Flip Vertical.
    - To rotate a graphic clockwise 90°, select Rotate Clockwise.
    - To rotate a graphic counterclockwise 90°, select Rotate CounterClockwise.

Working with Text

The Text tool is a convenient way to label, title, and add impact to your graphics. Text that you add to a graphic can be changed at any time, and formatted using different fonts, font sizes, and colors.

Adding Text

1. Choose the Text tool from the toolbox, or right-click and select Text from the pop-up menu.

2. Click the cursor where you want to place your text.

    You can also choose to place the text somewhere other than its final location, work on the text until it's ready to use, and then move it to the desired location.

3. Type the text.

4. When you're done with the text you want to type, click outside the text area.

    The text you've just typed is now an object, and you can select it and manipulate it like other objects.

Editing Text

1. With the Select tool, choose the text object you want to modify.

2. Choose Edit➞Edit Text, or right-click and choose Edit Text from the pop-up menu.

3. Enter the new text in the Edit Text dialog box that appears, then click OK.

    The text object is now modified with the new text.

Formatting Text

1. With the Select tool, choose the text object you want to modify.

2. Choose a formatting option from the Text menu, or right-click the text object and select an option from the pop-up menu. The following formatting options are available:
   - **Font**—Changes the font family used for the text in a text object. You can use any fixed or TrueType font family installed on the computer.
   - **Size**—Changes the size of the characters in a text object.
   - **Color**—Defines the color in which the text appears.
   - **Background**—Defines the color of the area directly behind a text object. This formatting option is only visible when the Opaque attribute is selected.
   - **Style**—Changes the weight, italicization, and other characteristics of the characters in a text object. Styles available are Normal, **Bold**, *Italic,* Underline, and ~~Strikeout~~.

   The text object is now modified with the format changes.

See“Text Menu” on page D-12 of Appendix D, “OptoDisplay Menu Reference” for additional information on creating and formatting a text object.

Working with Numeric Tables

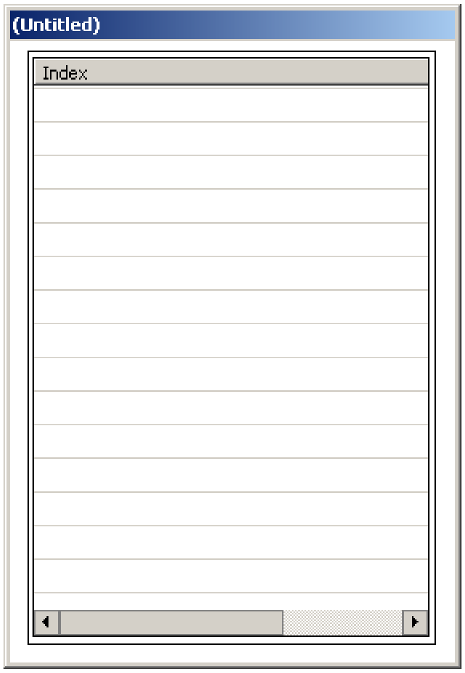
Using ioDisplay’s Numeric Table tool ▦ , you can add an object to display the contents of numeric tables used in an ioControl project. In a single onscreen object, you can display the contents of up to four separate numeric tables. The tables can contain either 32-bit integers or floating point values.

Creating a Numeric Table

1. Select the Numeric Table tool in the toolbox.

2. Click the mouse button, drag the mouse to the desired size, and then release the mouse button.

The numeric table object that appears should resemble the example below:

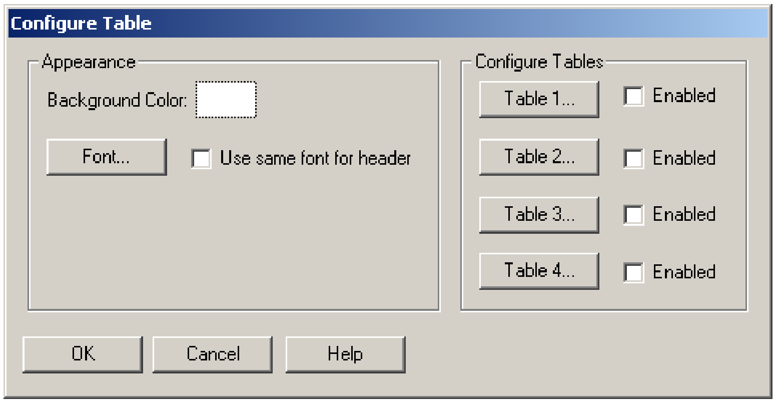


Configuring a Numeric Table

After creating a numeric table object in a draw window, you must specify which table(s) will be displayed. For each table, you can optionally specify which table elements will be displayed.

1. Double-click the numeric table object with the Select tool.

   The Configure Table dialog box appears.



2. In the Appearance section, choose the background color and font used in the numeric table object.

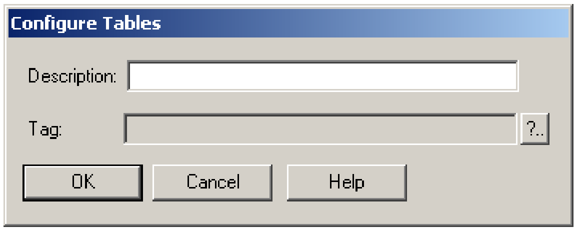
   – To select background color, click the white square next to Background Color, select a color in the Windows color selector that appears, and then click OK.

– To select the font used, click Font, select a font in the Windows font selector that appears, and then click OK. If you want the header of each table column to use the font you selected, select “Use same font for header.”

3. In the Configure Tables window, do the following for each table you want to display:

a. Click Table.

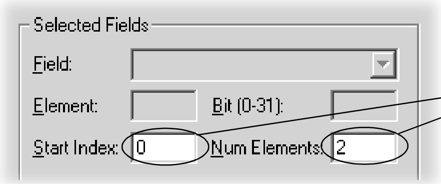
The Configure Tables dialog box appears.



b. Enter a description for the table.

c. Click the Tag Selection button ? and in the Tag Selection dialog box that appears, select a table to display. To learn more about configuring tags in your project, see “Configuring Tags” on page 4-5.

d. To display a range of elements in the table you select, enter a start index and the number of elements to be displayed.



Start Index: 0
Num Elements: 2

For a selected numeric table, enter a starting index (usually 0) and the number of table elements to use (500 maximum).

e. Click OK to exit the Tag Selection dialog box.

f. Click OK to exit the Configure Tables dialog box.

g. If you want to display another table in the numeric table object, click another Table button, otherwise click OK to complete configuration.

Printing Graphics

To print the displayed windows, select File➞Print to display the Print dialog box. If the settings are correct for your printer, click OK.

If you need to change printer settings, click the Properties button in the Print dialog box. You can also change the printer settings without printing the Configurator screens by selecting the File➞Printer Setup command.

CHAPTER 6

Using Animated Graphics

Introduction

This chapter describes how to animate graphics to show how I/O data and other values change in real time. It also describes how OptoDisplay scans data from controllers to update its graphics, and how you can adjust this scanning to optimize your OptoDisplay project for best performance.

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Adding Dynamic Attributes to Graphics. 6-2

Copying and Deleting Dynamic Attributes6-31

Viewing Dynamic Attributes........................6-34

Scanning to Update Graphics 6-34

About Animated Graphics

As your OptoControl strategy runs on the controller, values and states of tags in the OptoControl strategy database are continuously updated. OptoDisplay uses this changing data to modify attributes (such as size, position, and color) of the graphics that you have connected to the tags. The end result is an animated, continually updated display that shows status information about a control process.

To animate graphics, you must assign *dynamic attributes* to objects you've drawn. These are attributes that make the graphic object change based on the values read from or sent to controllers, based on events that happened, or based on how the operator interacts with the interface.

Two types of dynamic attributes can be assigned to a graphic object: controller-driven attributes and operator-driven attributes.

Controller-driven attributes are always assigned to a particular tag (I/O point, value, etc.) in an OptoControl strategy running on an attached controller. This type of attribute changes a graphic as tags are read from a controller. For example, if a tag reflects a lower-level alarm condition for a process, the attached graphic can change color to red to alert the operator.

Operator-driven attributes are assigned to a graphic object. These attributes change the graphic as an operator interacts with the interface. As a result, events may be triggered, or new tag values may be sent to an attached controller. For example, if an operator clicks a graphic that looks like a button, a valve is closed.

Adding Dynamic Attributes to Graphics

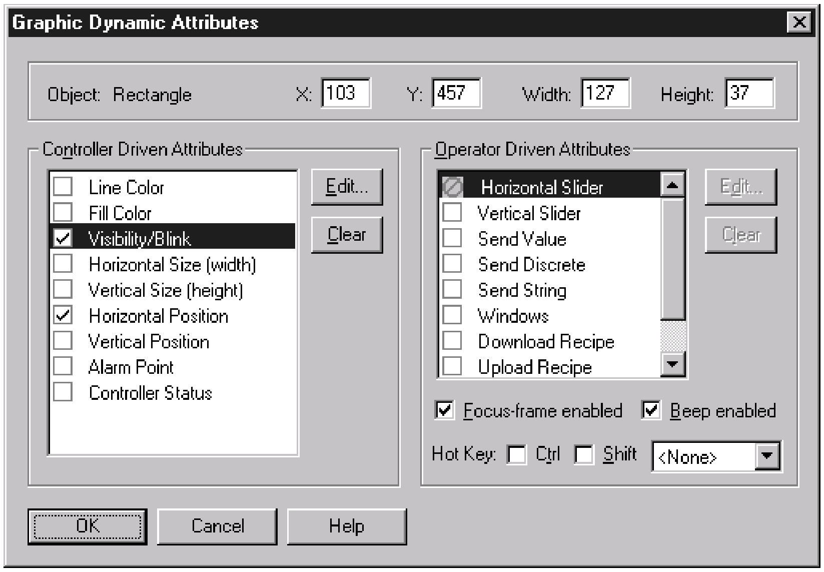
As you finish drawing your operator interface, you can start assigning dynamic attributes to some of the on-screen graphics. We will begin by explaining the general process you'll use to assign dynamic attributes to an object, and then give detailed explanations of each attribute that can be assigned.

Assigning a Dynamic Attribute

1. Choose the Select tool from the toolbox and double-click the graphic to which you want to assign a dynamic attribute. (You can also click the graphic once and select Edit→Edit Dynamic Attributes.)

   NOTE: Dynamic attributes can only be assigned to one object at a time. If you want several objects to have the same attributes, select the objects, and then choose Edit→Group to make them one object. (You can also right-click on the selected graphics and choose Group from the pop-up menu.) Remember that if you ungroup the objects, the attributes you configured when they were a group aren't retained.

   The Graphic Dynamic Attributes dialog box appears:



Graphic Dynamic Attributes

Object: Rectangle X: 103 Y: 457 Width: 127 Height: 37

Controller Driven Attributes
- □ Line Color
- □ Fill Color
- ☑ Visibility/Blink
- □ Horizontal Size (width)
- □ Vertical Size (height)
- ☑ Horizontal Position
- □ Vertical Position
- □ Alarm Point
- □ Controller Status

Operator Driven Attributes
- ⊘ Horizontal Slider
- □ Vertical Slider
- □ Send Value
- □ Send Discrete
- □ Send String
- □ Windows
- □ Download Recipe
- □ Upload Recipe

☑ Focus-frame enabled ☑ Beep enabled

Hot Key: □ Ctrl □ Shift <None>

   At the top of the dialog box is a brief description of the item selected, including its location (x and y coordinates) and dimensions (width and height) in the draw window. You can change the location and dimensions of the graphic by entering new values in place of the current ones. (You can’t change the dimensions of a text graphic.)

2. Choose an attribute you want to configure in either the Controller-Driven Attributes or Operator-Driven Attributes list, and then click the Edit button for that list.

   The dialog box that appears will differ depending on the attribute you selected. The options and features of each attribute are covered in detail in “Available Dynamic Attributes,” which starts on page 6-6.

3. Configure the attribute as required, and then click OK to return to the Graphic Dynamic Attributes dialog box.

4. If you made any changes to operator-driven attributes, complete these options:

   - **Focus-frame enabled**—If this option is checked, a light border will appear around the graphic in Runtime when the operator moves the cursor over it. This border can be used as a visual aid to let the operator know that an event will occur when the graphic is clicked. (You must still configure additional dynamic attributes for the graphic so these events can occur.)
   - **Beep enabled**—If this option is checked, the operator will hear a beep when the graphic is clicked. Use this as an audio confirmation.
   - **Hot Key**—This feature associates a keystroke sequence with a graphic that has a dynamic attribute assigned and configured. A *hot key* is a key on the keyboard that, when pressed (sometimes in combination with an optional CTRL or SHIFT key), will activate the associated graphic’s operator-driver attributes. This lets the operator use a keystroke sequence instead of using the mouse to click on the graphic, allowing OptoDisplay Runtime to be operated without a mouse or similar device.

     NOTE: The hot key will work only for graphics that are in an opened or minimized window; closed windows will not be affected.

5. To clear an attribute you’ve configured, simply highlight the attribute and click Clear.

   You should see an empty checkbox beside the attribute. Sometimes after you configure an attribute and return to the Graphic Dynamic Attributes dialog box, the Not Available indicator ⊘ appears in the checkbox for another attribute. This symbol means that you cannot configure that type of dynamic attribute for this object as a result of the attribute you just configured.

6. When you’re done configuring dynamic attributes for this object, click OK to save your settings and close the dialog box.

Assigning Multiple Dynamic Attributes to a Graphic

If you assign more than one dynamic attribute to a graphic object, the attributes will execute in the order in which they were assigned when you run the project in OptoDisplay Runtime. For example, if you assign a button the Send Discrete dynamic attribute, and then assign the same button the Send Value dynamic attribute, that is the order in which the attributes will execute when the operator clicks the button.

Security Settings for Graphics and Dynamic Attributes

Your application requirements and the environment in which it is used may require strict control over accessing and using the operator interface you create in OptoDisplay. You can configure your OptoDisplay project to provide this level of security by defining user authentication permissions for individual onscreen graphic objects. This authentication is based on the users and groups defined in a Microsoft Windows network.

When the OptoDisplay project is run in OptoDisplay Runtime, an operator who clicks on an object with security permissions is prompted to enter a Windows network username and password. If the login information is incorrect, or if the operator is not permitted to use that object, an alert message is displayed. If runtime operator logging is active for the project, the login attempt—successful or not—will be added to the runtime operator log.

Important Considerations for User- and Group-Level Security Settings

There are several important considerations to keep in mind when configuring user- and group-level authentication for a graphic object.

- By default, *all* operators have permission to use an object. It isn't necessary to configure security if all operators will have permission to change the tag value for the object.
- Security permissions cannot be configured for the Send Discrete dynamic attribute when it is configured as "Direct" or "Reverse".
- When the project is running in OptoDisplay Runtime and an object is clicked, "Deny Access" security permissions have priority over "Grant Access" permissions. This means that if a user has been granted access, but is a member of a group that has been denied access, the user will not be able to use the onscreen object.

Configuring Security Permissions for a Graphic Object

To assign user- and group-based security permissions to a graphic object, do the following:

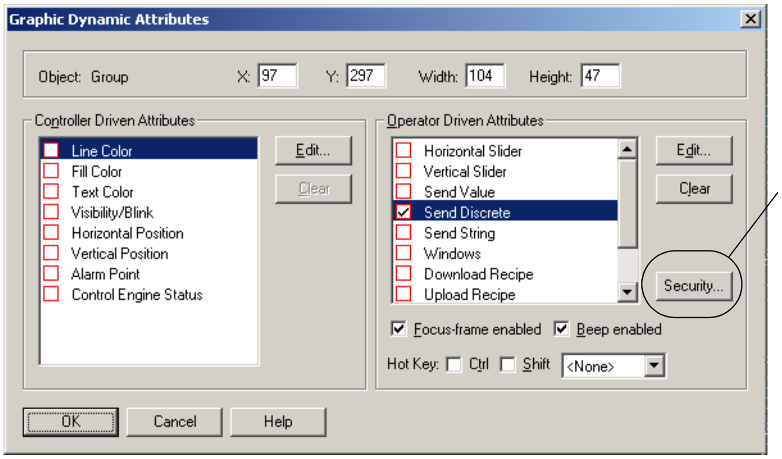
1. Double-click the graphic object to which you will assign one or more operator-driven dynamic attributes.

   The Graphic Dynamic Attributes dialog box opens. Note that the Security button on the right side is not active.

2. Double-click an operator-driven attribute that you want to use, configure it as needed, and then click OK.

   NOTE: Security permissions are not applied to individual dynamic attributes, but are applied to all dynamic attributes selected ***before*** *you click the Security button. If a graphic object needs to have multiple dynamic attributes, make sure to select and configure all attributes before configuring security settings.*

In the Graphic Dynamic Attributes dialog box that is again visible, the Security button is now active.



Graphic Dynamic Attributes

Object: Group X: 97 Y: 297 Width: 104 Height: 47

Controller Driven Attributes

- □ Line Color
- □ Fill Color
- □ Text Color
- □ Visibility/Blink
- □ Horizontal Position
- □ Vertical Position
- □ Alarm Point
- □ Control Engine Status

Operator Driven Attributes

- □ Horizontal Slider
- □ Vertical Slider
- □ Send Value
- ☑ Send Discrete
- □ Send String
- □ Windows
- □ Download Recipe
- □ Upload Recipe

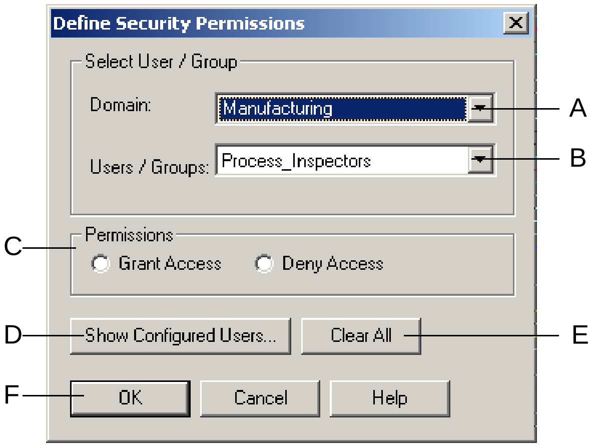
☑ Focus-frame enabled ☑ Beep enabled

Hot Key: □ Ctrl □ Shift <None>

After configuring one or more operator-driven dynamic attributes, click Security to configure user- and group-level authentication for the graphic object.

3. Click Security.

The Define Security Permissions dialog box opens.



Define Security Permissions

Select User / Group

Domain: Manufacturing

Users / Groups: Process_Inspectors

Permissions

○ Grant Access ○ Deny Access

A Select the Windows network domain that contains the users and/or groups to whom you want to grant or deny access to the graphic object.

B Select the Windows user or group to whom you want to grant or deny access to the object.

C For the selected user or group, select Grant Access or Deny Access.

D Click Show Configured Users to view all permissions currently assigned for the graphic object.

E Click Clear All to erase all configured permissions for the graphic object.

F Click OK to save changes, or keep Cancel to close the dialog box without any changes being made.

Available Dynamic Attributes

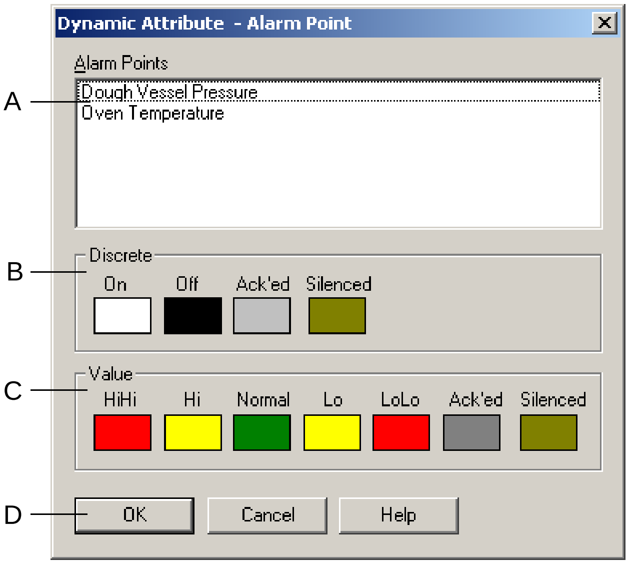
You can add the dynamic attributes listed below to a graphic. Note that not all attribute types are available for all types of graphics; only attributes that can be used with a particular graphic type appear in the Dynamic Attributes dialog box.

Dynamic Attribute	Type	See Page
Alarm Point	controller-driven	6-6
Controller Status	controller-driven	6-7
Display Controller Status	operator-driven	6-8
Download Recipe	operator-driven	6-9
Execute Menu Item	operator-driven	6-9
Fill Color	controller-driven	6-10
Horizontal Position	controller-driven	6-12
Horizontal Size (Width)	controller-driven	6-13
Horizontal Slider	operator-driven	6-14
Launch Application	operator-driven	6-15
Line Color	controller-driven	6-16
Rotate	controller-driven	6-17
Send Discrete	operator-driven	6-18
Send String	operator-driven	6-19
Send Value	operator-driven	6-20
Text Color	controller-driven	6-21
Text In (from Controller)	controller-driven	6-22
Upload Recipe	operator-driven	6-24
Vertical Position	controller-driven	6-25
Vertical Size (Height)	controller-driven	6-26
Vertical Slider	operator-driven	6-27
Visibility/Blink	controller-driven	6-28
Windows	operator-driven	6-29

Alarm Point

Use this attribute to change the color of a graphic object based on the state of an alarm point. You can use this attribute with circles, rectangles, and polygons. By default, the color of the graphic corresponds to the Normal, or unalarmed, state. For more information about configuring alarm points and using alarms in a project, see “Alarming” on page 8-28.

Double-click Alarm Point in the Graphic Dynamic Attributes dialog box to display the following:



A The names of the alarm points configured for the project appear here. Click an alarm point in the list, and then set the colors that will be used for the graphic object in the Discrete group (B) or the Value group (C).

Alarm points that monitor digital points are configured as *discrete* alarm points, and have only two states: On and Off. Alarm points that monitor analog points are configured as *value* alarm points have the states HiHi, Hi, Normal, Lo LoLo, Ack'ed, and Silenced. See "Configuring Alarm Points" on page 8-28 for more information about setting up alarm points.

B To select colors for a discrete alarm point's On and Off states, click the color box for each state and then choose a color in the dialog box that appears. If you have selected an alarm point for a digital I/O point, only the Discrete group will appear in the Dynamic Attribute - Alarm Point dialog box.

C To select colors for a value alarm point's HiHi, Hi, Normal, Lo LoLo, Ack'ed, and Silenced states, click the color box for each state and then choose a color in the dialog box that appears. If you have selected an alarm point for an analog I/O point, only the Value group will appear in the Dynamic Attribute - Alarm Point dialog box.

D Click OK to save your settings.

Controller Status

Use this attribute to change the color of a graphic object based on the status of one or more controllers. You can use this attribute with circles, rectangles, and polygons.

NOTE: When the Controller Status dynamic attribute is selected, all other input dynamic attributes are disabled.

If the Controller Status attribute is used to monitor multiple controllers, the graphic object will display the status color for the controller that is in the most critical condition. Least critical to most critical status is shown below:

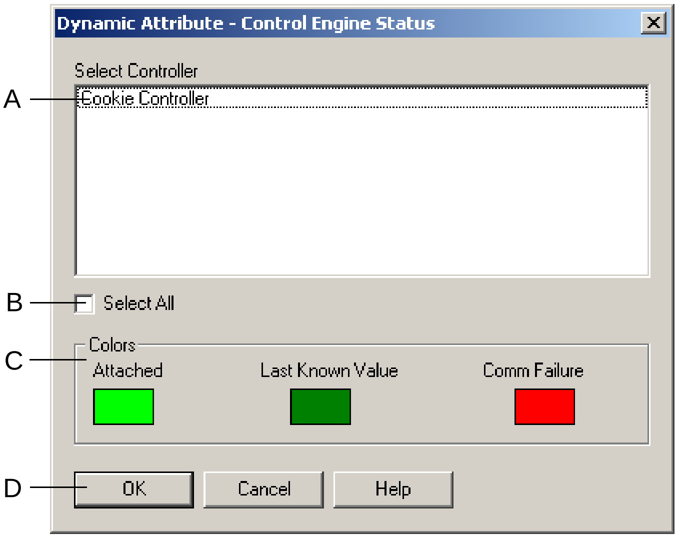
Least Critical ◄────────────► **Most Critical**

Attached

Last Known Value

Comm Failure

Double-click Controller Status in the Graphic Dynamic Attributes dialog box to display the following:



A The names of the controllers configured for the project appear here.

Select a controller. To select multiple controllers, hold down the CTRL key and click each one you want to select.

B To select all controllers in the list, click Select All.

C To select colors for a controller's state, click the color box for the state and then choose a color in the dialog box that appears.

D Click OK to save your settings.

Display Controller Status

Use this attribute to display status information about a controller, or manually attach or detach it, by clicking on a graphic object. You can use this attribute with circles, rectangles, and polygons.

To configure this attribute, do the following:

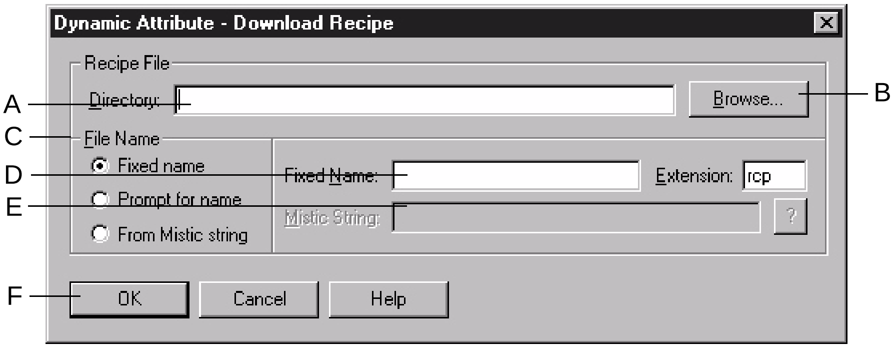
1. Double-click Display Controller Status in the Graphic Dynamic Attributes dialog box.
2. Select a controller from the list that appears.

3. Click OK to save your settings.

Download Recipe

Use this attribute to download a recipe file to a controller when a graphic is clicked. This is an operator-driven attribute and is available for rectangles, round rectangles, ellipses, polygons, bitmaps, and text. For more information about recipes, see "Recipes" on page 8-19.

Double-click Download Recipe in the Graphics Dynamic Attributes dialog box to display the following:



Recipe File
Directory:
File Name
● Fixed name
○ Prompt for name
○ From Mistic string
Fixed Name:
Extension: rcp
Mistic String:

A Enter the directory location of the recipe file. Use the Browse button B to quickly enter a directory name.

B Click to quickly find the recipe file directory for A. Use the Select Download File Directory dialog box that appears to navigate to the desired directory, and then click OK.

C Choose the source of the recipe file name:

- If you choose Fixed Name, D is highlighted.
- If you choose Prompt for name, the operator will be prompted for the recipe file name.
- If you choose From Mistic string, E is highlighted.

D If Fixed Name was selected in C, enter the name of the recipe file located in Directory (A). Notice the file extension is .rcp.

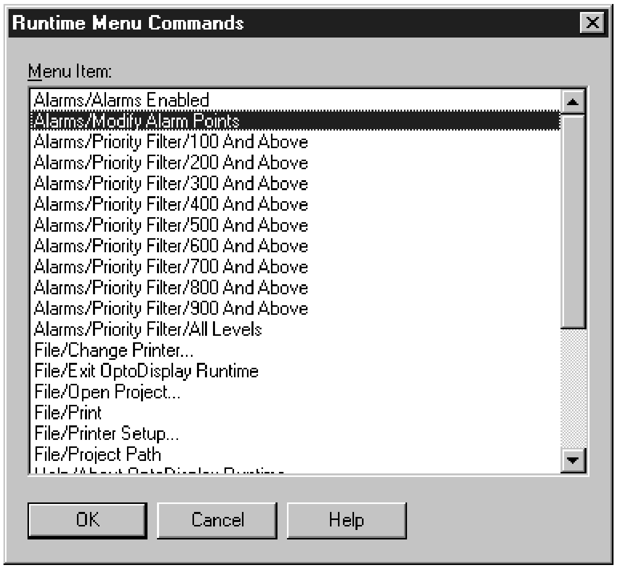
E If From Mistic String was selected in D, use the Tag Selection button ? to enter a tagname of type string that contains the recipe file name. The Tag Selection dialog box is displayed so you can select a tag. See "Configuring Tags" on page 4-5 for more information about this dialog box.

F Click OK to save your settings.

Execute Menu Item

Use this attribute to run a single Runtime command when an object is clicked. This is useful if you want to hide the menu bar and only allow limited access to certain items. This is an operator-driven attribute and is available for rectangles, round rectangles, ellipses, polygons, bitmaps, and text.

Double-click Execute Menu Item in the Graphics Dynamic Attributes dialog box to display the following:



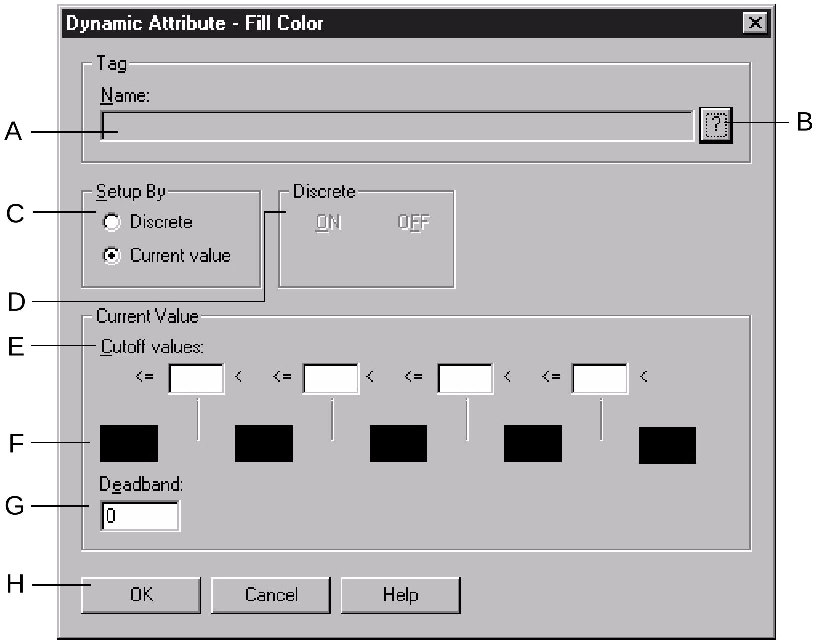
Alarms/Alarms Enabled
Alarms/Modify Alarm Points
Alarms/Priority Filter/100 And Above
Alarms/Priority Filter/200 And Above
Alarms/Priority Filter/300 And Above
Alarms/Priority Filter/400 And Above
Alarms/Priority Filter/500 And Above
Alarms/Priority Filter/600 And Above
Alarms/Priority Filter/700 And Above
Alarms/Priority Filter/800 And Above
Alarms/Priority Filter/900 And Above
Alarms/Priority Filter/All Levels
File/Change Printer...
File/Exit OptoDisplay Runtime
File/Open Project...
File/Print
File/Printer Setup...
File/Project Path

Select a command from the Menu Item list and click OK. (Click Cancel to close the dialog box without making any changes.)

Fill Color

Use this attribute to change a graphic’s fill color based on a tag value from the controller. This is a controller-driven attribute and is available for rectangles, round rectangles, ellipses, and polygons.

Double-click Fill Color in the Graphics Dynamic Attributes dialog box to display the following:



Setup By
○ Discrete
● Current value

Deadband: 0

A Enter an OptoControl tagname here by clicking the Tag Selection button B. As the tag value changes in the OptoControl strategy, the graphic's fill color will change.

B To enter a tagname in A, click here. The Tag Selection dialog box is displayed so you can select a tag. See "Configuring Tags" on page 4-5 for more information about this dialog box.

C Choose whether the tag you're configuring is a discrete value (with a value of ON or OFF), or whether it's a current value you're looking for. If you choose Discrete, the D group is highlighted; if you choose Current value, the E group is highlighted. The choice you make in this selection must match the tag choice you can made in A.

D Select the color you want for the ON state by clicking on the color field below ON. The Color dialog box appears; choose a color and then click OK. Repeat this step for the OFF state.

E Enter a value in each Cutoff Value field to specify the range of values for each color group configured in the color fields. Values entered must be in increasing order. Each Cutoff value field must have a numeric value entered or you will get a warning to enter one. After the warning, the cursor blinks in the first Cutoff value field requiring a value.

F To configure a color for the range set up in E, click on a color field. The Color dialog box appears; choose a color and then click OK. Repeat this step for each color field you want to change.

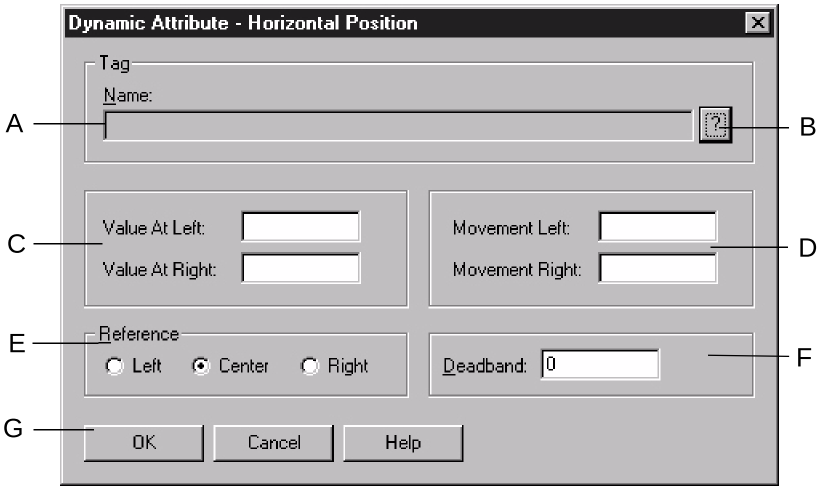
G Enter a value to be added and subtracted from each Cutoff value to determine the actual value at which the color will change to the next color field. For example, let's say the Cutoff values are 1, 10, 20, and 30, and the color fields are red, yellow, green, blue, and black. The Deadband is 3. A tag with a value of 9 is read. The next tag value read is 11. The graphic color remains yellow because the value read is within the deadband range, even though a value of 11 is in the green range.

H Click OK to save your settings.

Horizontal Position

Use this attribute to adjust the horizontal position of a graphic based on a tag value from the controller. This is a controller-driven attribute and is available for lines, rectangles, round rectangles, ellipses, and polygons, polylines, curves, bitmaps, and text.

Double-click Horizontal Position in the Graphics Dynamic Attributes dialog box to display the following:



Reference: ○ Left ● Center ○ Right

Deadband: 0

A Enter an OptoControl tagname here by clicking the Tag Selection button B. As the tag value changes, the graphic's horizontal position is changed.

B To enter a tagname in A, click here. The Tag Selection dialog box is displayed so you can select a tag. See "Configuring Tags" on page 4-5 for more information about configuring this dialog box.

C Enter the leftmost and rightmost value for the tagname in A. For example, if you know your tag values will be from 0 to 100, you may wish to enter a range of 0 to 100 or a subset of this range, such as 0 to 50.

D Enter the leftmost and rightmost movement the object can change. The movement units are in pixels. Suppose your left and right values are 0 and 100, and your left and right movements are 0 and 200. When the tag value is 50, the object will be moved 100 pixels to the right.

E Select the reference point for the object. The choices are left, center, and right. The Horizontal Size (Width) dynamic attribute must also be configured in order for this option to affect the graphic.

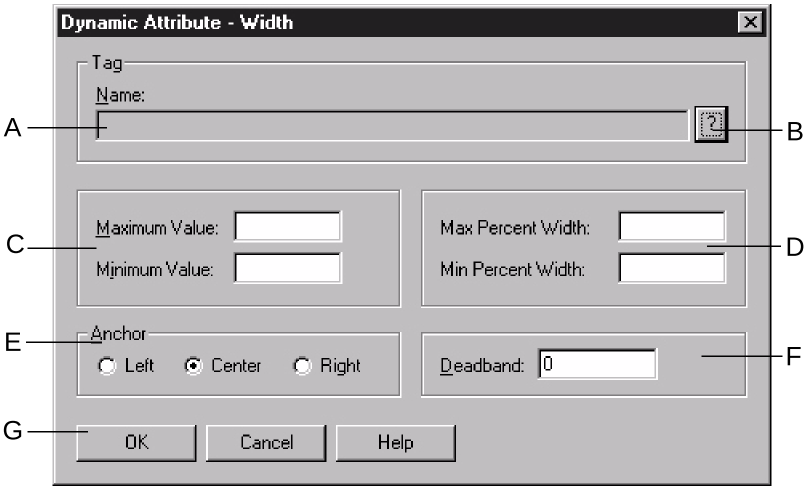
F Enter a value to be added and subtracted from the previously read tag value to determine if the graphic's movement will actually change. Using our previous example in D, let's say the deadband is 5. A tag is read and has a value of 50. The next tag reading must be greater than 55 in order for the graphic to move.

G Click OK to save your settings.

Horizontal Size (Width)

Use this attribute to adjust the width of a graphic based on a tag value from the controller. This is a controller-driven attribute and is available for lines, rectangles, round rectangles, ellipses, polygons, polylines, and curves.

Double-click Horizontal Size (Width) in the Graphics Dynamic Attributes dialog box to display the following:



A Enter an OptoControl tagname here by clicking the Tag Selection button B. As the tag value changes in the OptoControl strategy, the graphic's width is changed.

B To enter a tagname in A, click here. The Tag Selection dialog box is displayed so you can select a tag. See "Configuring Tags" on page 4-5 for more information about this dialog box.

C Enter the maximum and minimum value for the tagname in A. For example, if you know your tag values will be from 0 to 100, you may wish to enter a range of 0 to 100 or a subset of this range, such as 0 to 50.

D Enter the maximum and minimum percentage the object can change. The percentage range is from 0 to 1,000 percent. Suppose your minimum value is 0 and your maximum value is 10, and the minimum and maximum percentages range is 0 to 200. When the tag value is 10, the object will be twice as big as you've originally drawn it. When the tag value is 5, the object will be the same size you've drawn it, which is 100 percent.

E Enter the anchor point for the object. This is the reference point on the object from which the graphic changes. The choices are left, center, and right.

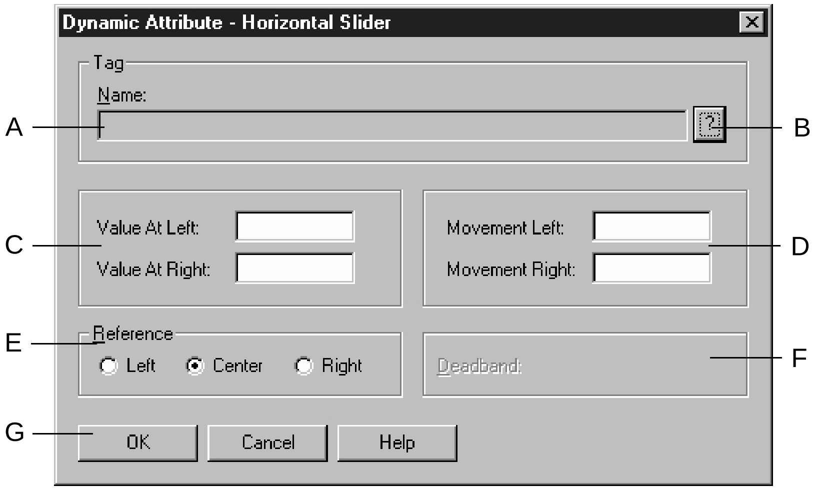
F Enter a value to be added and subtracted from the previously read tag value to determine if the graphic's width will actually change. For example, let's say the values are 0 to 100, the percentages are 0 to 100, and the deadband is 5. A tag is read and has a value of 10. The next tag reading must be greater than 15 in order for the graphic to change.

G Click OK to save your settings.

Horizontal Slider

Use this attribute to configure a horizontal slider when a graphic is clicked. This is an operator-driven attribute and is available for lines, rectangles, round rectangles, ellipses, polygons, and bitmaps.

Double-click Horizontal Slider in the Graphics Dynamic Attributes dialog box to display the following:



Reference: ○ Left ● Center ○ Right

A Enter an OptoControl tagname here by clicking the Tag Selection button B. The distance the horizontal slider is moved affects the value sent to the tag in the controller.

B To enter a tagname in A, click here. The Tag Selection dialog box is displayed so you can select a tag. See "Configuring Tags" on page 4-5 for more information about this dialog box.

C Enter the leftmost and rightmost value for the tagname in A. For example, if you know your tag values can be from 0 to 100, you may wish to enter a range of 0 to 100 or a subset of this range, such as 0 to 50.

D Enter the leftmost and rightmost movement the object can change. The movement units are in pixels. Suppose your left and right values are 0 and 100, and your left and right movements are 0 and 200. If you move the tag 100 pixels to the right, the tag value sent will be 50.

E Select the reference point for the object. The choices are left, center, and right. Note that you must also separately configure the Horizontal Size (Width) dynamic attribute to use this option.

F Enter a value to be added and subtracted from the previously read tag value to determine whether the tag value should be changed.

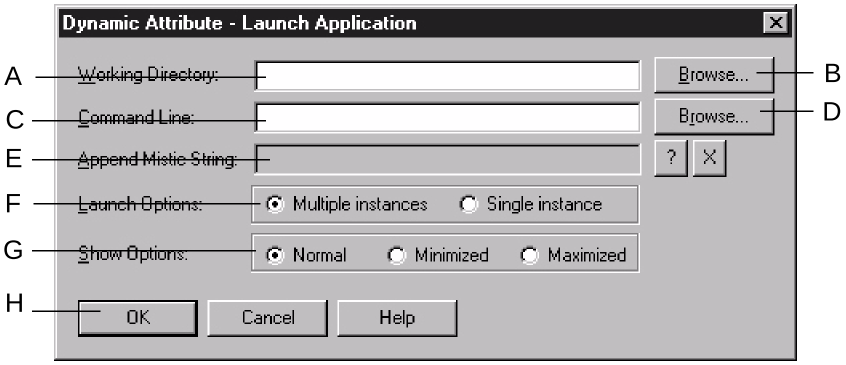
Using our previous example in D, let's say the deadband is 5. A tag is read and has a value of 50. The next graphic movement must be greater than 55 in order for the tag value to change.

G Click OK to save your settings.

Launch Application

Use this attribute to start an application when a graphic is clicked. This is an operator-driven attribute and is available for rectangles, round rectangles, ellipses, polygons, bitmaps, and text.

Double-click Launch Application in the Graphics Dynamic Attributes dialog box to display the following:



Dynamic Attribute - Launch Application

Working Directory:

Command Line:

Append Mistic String:

Launch Options: ● Multiple instances ○ Single instance

Show Options: ● Normal ○ Minimized ○ Maximized

A Enter the working directory you want to be in when you start the application. Use the Browse button B to quickly enter a directory name.

B Click to find the directory for A. The Working Directory Selection dialog box appears. Use it to navigate to the desired directory and click OK when you're done.

C Enter the complete path and file name of the application you want to launch. Use D to quickly enter the path.

D Click to find the path and application name for C. The Application Manager Executable File Selection dialog box appears. Use it to select an application and click Open when you're done.

E (Optional) Enter the name of a string tag to use to append to the path entered in C. The string appended may be a file name the launched application should open. Use the Tag Selection button ? to choose the tagname. The Tag Selection dialog box is displayed so you can select a tag. Use X to clear an entry you may have made in this field.

F Select Single Instance to have OptoDisplay Runtime check whether the graphic has previously launched an application that is currently running. If the graphic has not previously started a currently running application, the application will be launched. Select Multiple instances to allow the graphic to start more than one instance of an application.

Note that the Single Instance option doesn't limit the number of active sessions of an application that is launched by other graphics and triggers. For example, if the graphic launches a Microsoft Word session, that graphic can't launch any other application until the Word session ends. However, a trigger-based event can launch a second, separate session of Word, so two Microsoft Word sessions will be running concurrently.

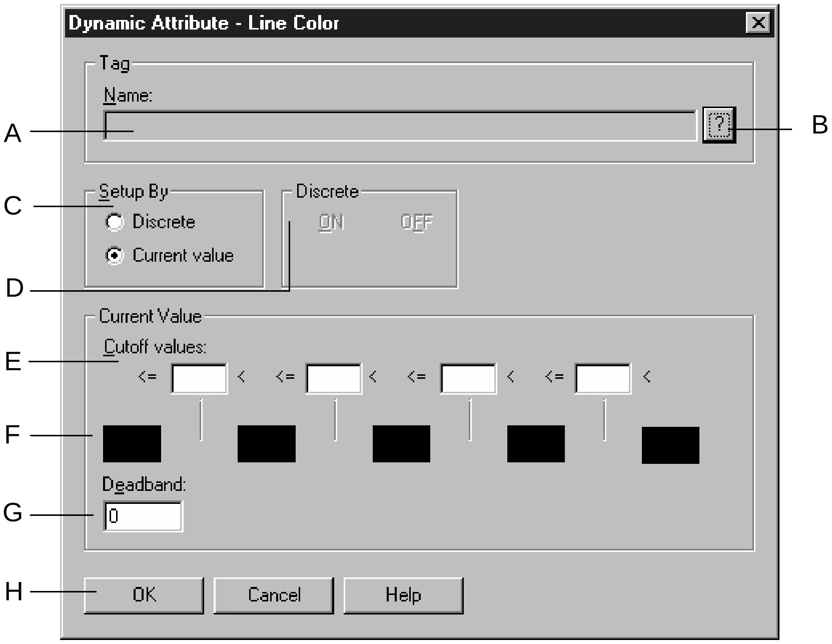
G Click here to configure how the application window will appear. Your choices are Normal, Minimized, and Maximized.

H Click OK to save your settings.

Line Color

Use this attribute to change a line color or the line color around a graphic based on a tag value from the controller. This is a controller-driven attribute and is available for lines, rectangles, round rectangles, ellipses, polygons, polylines, and Bezier curves.

Double-click Line Color in the Graphics Dynamic Attributes dialog box to display the following:



A Enter an OptoControl tagname here by clicking B. As this tag value changes in the OptoControl strategy, the graphic's line color changes.

B To enter a tagname in A, click here. The Tag Selection dialog box is displayed so you can select a tag. See "Configuring Tags" on page 4-5 for more information about this dialog box.

C Choose whether the tag you're configuring is a discrete value (with a value of ON or OFF), or whether it's a current value you're looking for. If you choose Discrete, the D group is highlighted; if you choose Current value, the E group is highlighted.

D Select the color you want for the ON state by clicking on the color field below ON. The Color dialog box appears; choose a color and click OK. Repeat this step for the OFF state.

E Enter a value in each Cutoff Value box to specify the range of values for each color group configured in the color fields. Values entered must be in increasing order. Each Cutoff value box must have a numeric value entered or you will get a warning to enter one. After the warning, the cursor blinks in the first Cutoff Value box requiring a value.

F To configure a color for the range set up in E, click on a color field. The Color dialog box appears from which you can choose a color and then click OK to accept. Repeat this step for each color field you want to change.

G Enter a value to be added and subtracted from each cutoff value to determine the actual value at which the color will change to the next color field.

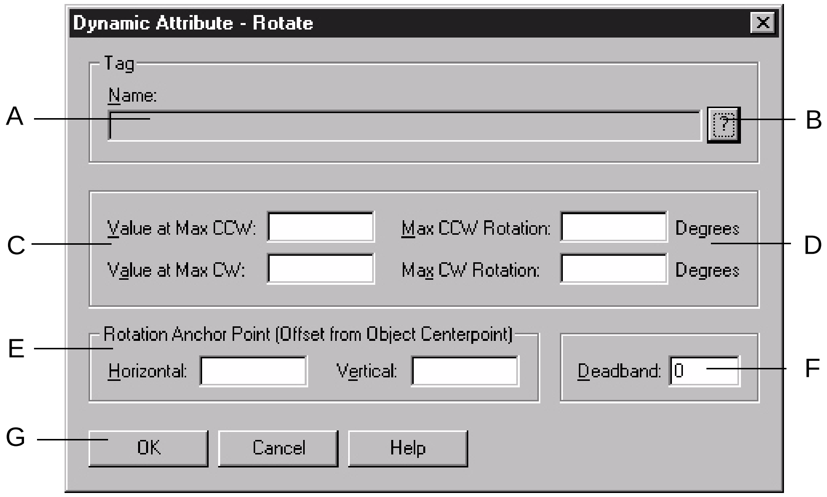
For example, let's say the cutoff values are 1, 10, 20, and 30, and the color fields are red, yellow, green, blue, and black. The deadband is 3. A tag with a value of 9 is read. The next tag value read is 11. The graphic's color remains yellow because the value read is within the deadband range, even though a value of 11 is in the green range.

H Click OK to save your settings.

Rotate

Use this attribute to rotate a line based on a tag value from the controller. This is a controller-driven attribute and is available for lines only.

Double-click Rotate in the Graphics Dynamic Attributes dialog box to display the following:



Deadband: 0

A Enter an OptoControl tagname here by clicking the Tag Selection button B. As this tag value changes in the OptoControl strategy, the graphic's line rotates.

B To enter a tagname in A, click here. The Tag Selection dialog box is displayed so you can select a tag. See "Configuring Tags" on page 4-5 for more information about this dialog box.

C These fields are used to specify the return data from the tag that will produce the maximum counterclockwise (CCW) and maximum clockwise (CW) rotation. The Value at Max CCW may be either less than or greater than the Value at Max CW, so that rotation may proceed in either direction as the data from the tag increases or decreases. Therefore, the term "exceeds" is used below to indicate a value that may be either greater than or less than the CCW or CW Max value.

When the tag returns data that is equal to or exceeds the Value at Max CCW to OptoDisplay, the graphic will rotate counterclockwise as far as possible, as specified by the Max CCW Rotation value explained below. When the tag returns data that is equal to or exceeds the Value at Max CW Rotation to OptoDisplay, the graphic will rotate clockwise as far as possible, as specified by the Max CW Rotation value explained below.

D These fields are used to specify the maximum counterclockwise and clockwise rotation angle that the graphic may undergo (in degrees from its configured location). The entered values must be non-negative numbers. The Max CCW Rotation angle is achieved when the tag returns data that is equal to or exceeds the Value at Max CCW, as explained above. The Max CW Rotation angle is achieved when the tag returns data that is equal to or exceeds the Value at Max CW, as explained earlier in this section.

E The rotation anchor point is used to specify the fixed location that the graphic rotates around. This location is specified in terms of an offset (in units of pixels) from the centerpoint of the graphic at its configured location.

In the Horizontal field, enter a negative value to specify a position that is to the left of the configured location or enter a positive value to specify a position that is to the right of the configured location. In the Vertical field, enter a negative value to specify a position that is above the configured location or enter a positive value to specify a position that is below the configured location. If a value of zero is specified for both fields, then the graphic will rotate about its centerpoint.

F Enter a value to be added and subtracted from the previously read tag value to determine if the line's rotation angle should change.

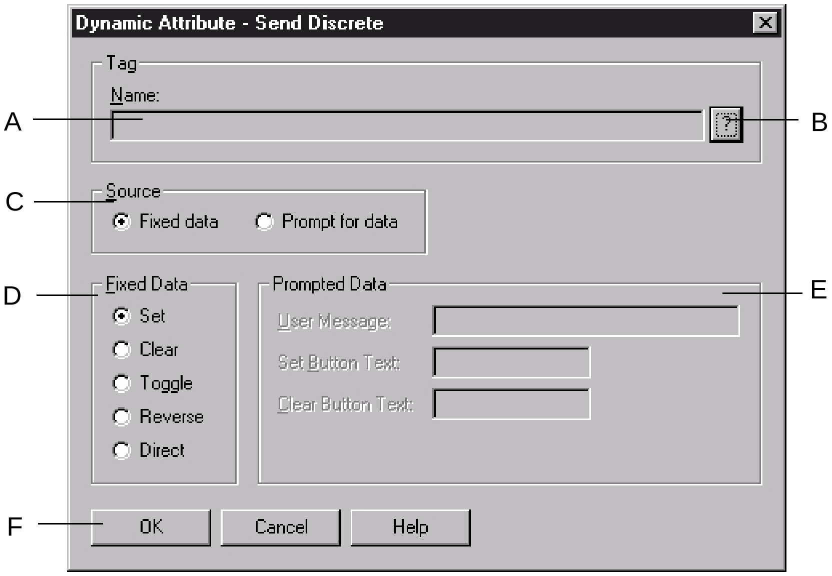
For example, let's say the deadband is 2. A tag with a value of 50 is read. The next tag value read is 51. The line does not rotate because the value read is within the deadband range.

G Click OK to save your settings.

Send Discrete

Use this attribute to send a discrete value to a tag in the controller when a graphic is clicked. This is an operator-driven attribute and is available for rectangles, round rectangles, ellipses, polygons, bitmaps, and text.

Double-click Send Discrete in the Graphics Dynamic Attributes dialog box to display the following:



Dynamic Attribute - Send Discrete

Tag
Name:

Source
● Fixed data ○ Prompt for data

Fixed Data
● Set
○ Clear
○ Toggle
○ Reverse
○ Direct

Prompted Data
User Message:
Set Button Text:
Clear Button Text:

A Enter an OptoControl tagname here by clicking the Tag Selection button B. This tag will receive the tag value entered by the operator or configured in this dialog box.

B To enter a tagname in A, click here. The Tag Selection dialog box is displayed so you can select a tag. See "Configuring Tags" on page 4-5 for more information about this dialog box.

C Select the source of the value to be sent to the tag. If you select Fixed data, the setting selected in field D is sent to the tag. If you select Prompt for data, the field in E is activated and you can enter a message that will prompt the operator to select a discrete state for the tag.

D If Fixed Data was selected in C, enter the setting to be sent to the tag. The Set option turns the tag on; Clear turns the tag off; Toggle changes the tag to the opposite of its current state (from on to off, or from off to on); Reverse changes the tag's state to off when the mouse is clicked on the graphic, and on when the mouse button is released; Direct changes the tag state to on when the mouse is clicked on the graphic, and off when the mouse is released.

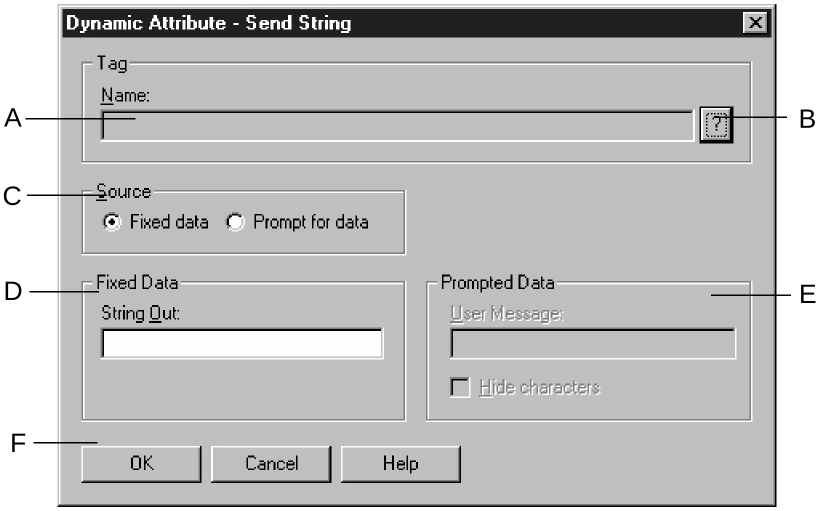
E If Prompt for Data was selected in C, enter a message here that will prompt the operator to select a tag state. Two buttons will be displayed to the operator. Enter the labels for the Set Button and the Clear Button. The Set Button sends a discrete value to set the tag to the on state, and the Clear Button sends a discrete value to set the tag to the off state.

F Click OK to save your settings.

Send String

Use this attribute to send a string to the controller when a graphic is clicked. This is an operator-driven attribute and is available for rectangles, round rectangles, ellipses, polygons, bitmaps, and text.

Double-click Send String in the Graphics Dynamic Attributes dialog box to display the following:


Dynamic Attribute - Send String

Source: ● Fixed data ○ Prompt for data

☐ Hide characters

A Enter an OptoControl tagname here by clicking the Tag Selection button B. This tag will receive the string tag entered by the operator or configured in this dialog box.

B To enter a tagname in A, click here. The Tag Selection dialog box is displayed so you can select a tag. See "Configuring Tags" on page 4-5 for more information about this dialog box.

C Select the source of the value to be sent to the tag. If you select Fixed data, the setting selected in field D is sent to the tag. If you select Prompt for data, the field in E is activated and you can enter a message that will prompt the operator to enter a string to send to the tag.

D If Fixed Data was selected in C, enter the string to send to the tag.

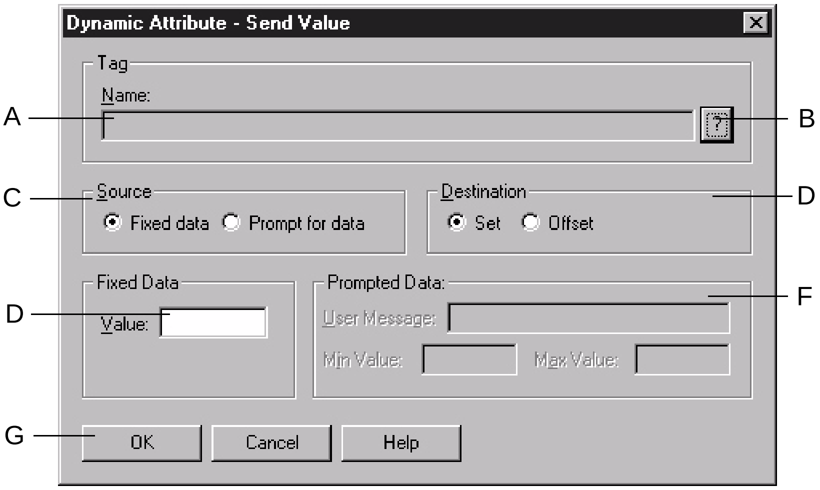
E If Prompt for Data was selected in C, enter a message to prompt the operator to enter a string. Choose the Hide characters option if you don't want the text entered by the operator to be displayed.

F Click OK to save your settings.

Send Value

Use this attribute to send a value to a tagname in the controller when a graphic is clicked. This is an operator-driven attribute and is available for rectangles, round rectangles, ellipses, polygons, bitmaps, and text.

Double-click Send Value in the Graphics Dynamic Attributes dialog box to display the following:


Source: ● Fixed data ○ Prompt for data

Destination: ● Set ○ Offset

A Enter an OptoControl tagname here by clicking the Tag Selection button B. This tag will receive the tag value entered by the operator or configured in this dialog box.

B To enter a tagname in A, click here. The Tag Selection dialog box is displayed so you can select a tag. See "Configuring Tags" on page 4-5 for more information about this dialog box.

C Select the source of the value to be sent to the tag. If you select Fixed data, the value entered in field E is sent to the tag. If you select Prompt for data, the field in F is activated and you can enter a message that will prompt the operator to input a value to send to the tag.

D Choose Set to assign the sent value to the tag equal, or choose Offset to add the value to the tag.

E If Fixed Data was selected in C, enter the value to send to the tag.

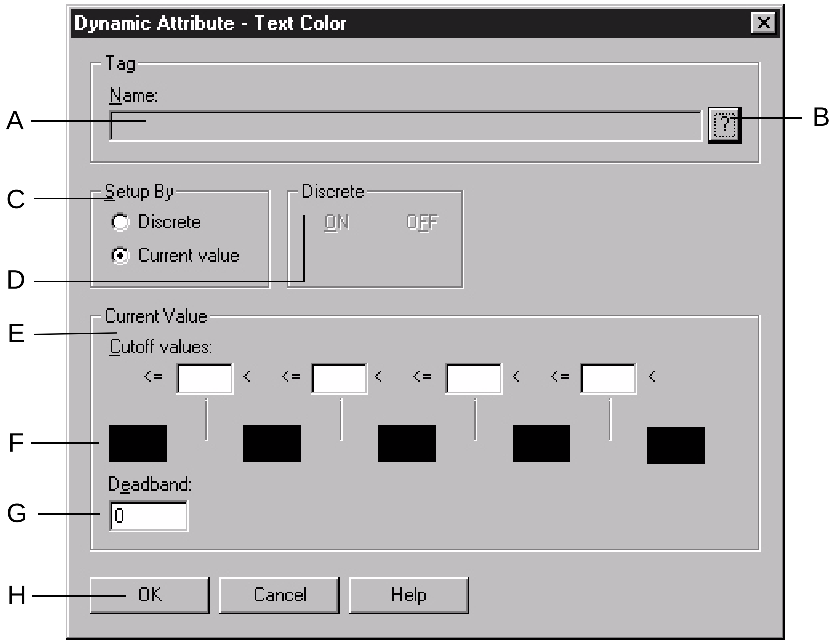
F If Prompt for Data was selected in C, enter a message to prompt the operator for a value. Enter a minimum and maximum value the entered data should be within.

G Click OK to save your settings.

Text Color

Use this attribute to change the color of text in the interface based on a tag value from a controller. This is a controller-driven attribute and is available for grouped objects and text.

Double-click Text Color in the Graphics Dynamic Attributes dialog box to display the following:



Dynamic Attribute - Text Color

Tag

Name:

Setup By
○ Discrete
● Current value

Discrete
ON OFF

Current Value

Cutoff values:
<= [ ] < <= [ ] < <= [ ] < <= [ ] <

Deadband: 0

A Enter an OptoControl tagname here by clicking the Tag Selection button B. As this tag changes value in the OptoControl strategy, its value will determine the color of the text.

B To enter a tagname in A, click here. The Tag Selection dialog box is displayed so you can select a tag. See "Configuring Tags" on page 4-5 for more information about this dialog box.

C Choose whether the tag you're configuring is a discrete value (with ON and OFF values), or whether it's a current value you're looking for. If you choose Discrete, the D group is highlighted; if you choose Current value, the E group is highlighted. The choice you make in this selection must match the tag choices you made in A.

D If you selected Discrete in C, this field is activated and you can select the color you want for the ON state by clicking on the color field below ON. The Color dialog box appears; choose a color and then click OK to accept. Repeat this step for the OFF state.

E Enter a value in each Cutoff value field to specify the range of values for each color group configured in the color fields. Values entered must be in increasing order. Each Cutoff value field must have a numeric value entered or you will get a warning to enter one. After the warning, the cursor blinks in the first Cutoff value field requiring a value.

F To configure a color for the range set up in E, click on a color field. The Color dialog box appears; choose a color and click OK. Repeat this step for each color field you want to change.

G Enter a value to be added and subtracted from each Cutoff value to determine whether any changes in color should occur.

For example, let's say the Cutoff values are 1, 10, 20, and 30, and the color fields are red, yellow, green, blue, and black. The Deadband is 3. A tag with a value of 9 is read. The next tag value read is 11. The text color remains yellow because the value read is within the deadband range, even though a value of 11 is in the green range.

H Click OK to save your settings.

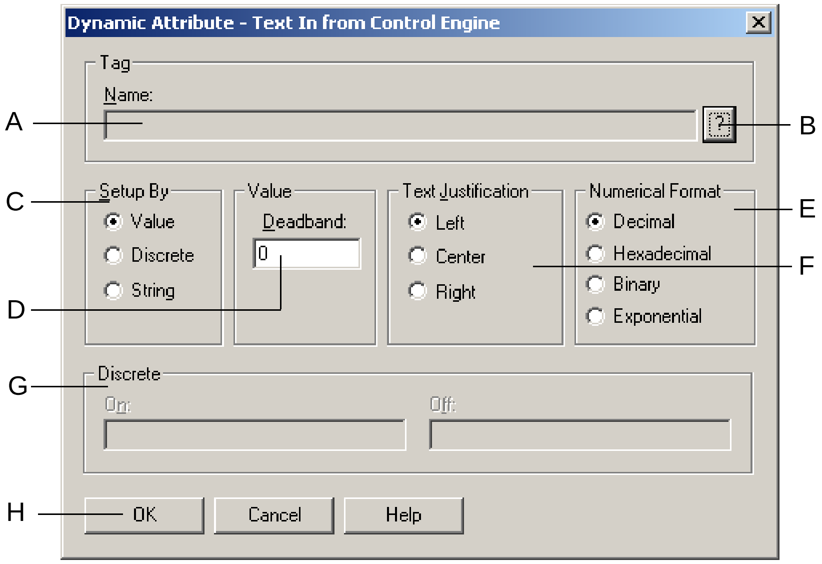
Text In (from Controller)

Use this attribute to read a tag from a controller and display various strings to the operator. You can read in a numeric value, a string, or a discrete value, and set up a string that will be displayed based on what was received. This is a controller-driven attribute that is available for a text object.

The # character in the text object indicates where the text string should be displayed. Only one # is needed to display an entire string. If there's no # sign within the text object, then the string will be appended to the end of the text object.

You can configure how a floating point number is displayed by using a decimal point along with the # signs. For every decimal place you want displayed after a decimal point, use a # sign. For example, your text object could say: "Low level reading: ###.#." Your tag value is 200.55, so your displayed string is: "Low level reading: 200.6." The extra # signs to the left of the decimal point aren't required, but are useful for determining how much space the text will require in your display.

Double-click Text In (from controller) in the Graphics Dynamic Attributes dialog box to display the following:



Tag
Name:

Setup By: ● Value ○ Discrete ○ String

Value
Deadband: 0

Text Justification: ● Left ○ Center ○ Right

Numerical Format: ● Decimal ○ Hexadecimal ○ Binary ○ Exponential

A Enter an OptoDisplay tagname here by clicking the Tag Selection button B. As this tag changes value in the OptoDisplay strategy, its value will determine the effects on the graphic. The tagname you enter is affected by C.

B To enter a tagname in A, click here. The Tag Selection dialog box is displayed so you can select a tag. See "Configuring Tags" on page 4-5 for more information about this dialog box.

C Choose whether the tag you're reading is a numeric value, a discrete value (with ON and OFF values), or a string. If you choose Value, fields D and E are activated. If you choose Discrete, the F group is activated. The choice you make in this selection must match the choice you made in A.

If you choose Value, the value read will be converted into a string based on the rules mentioned at the beginning of this "Text In" section.

If you choose Discrete, use F to enter the strings that will be displayed for the ON and OFF states. If you choose String, the text string from the controller is displayed.

D If you selected Value in C, enter the value to be added and subtracted from the previously read tag value to determine whether the new value is displayed.

E Select the format in which numeric values will be displayed: decimal, hexadecimal, binary, or exponential. Hexadecimal numbers are prefixed with "0X" and appear in uppercase letters. Float values may not be displayed as hexadecimal or binary.

F Select the text justification for the string from the controller.

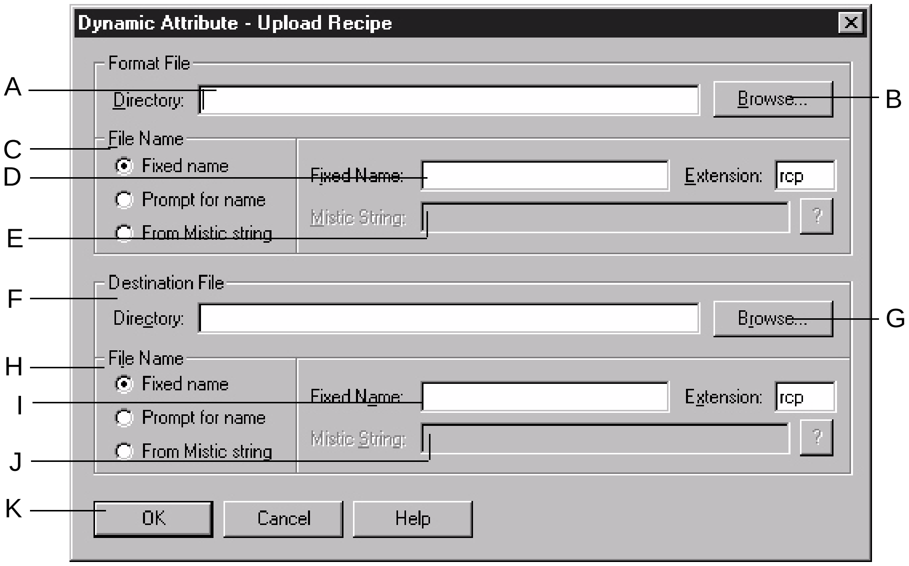
G This section is highlighted if Discrete was chosen in C. Enter the string to be displayed if the tag's discrete value is ON, and enter the string to be displayed if the tag's discrete value is OFF.

H Click here to save your settings. (Click Cancel to close the dialog box without making changes.)

Upload Recipe

Use this attribute to upload a recipe file from a controller when graphic is clicked. This is an operator-driven attribute and is available for rectangles, round rectangles, ellipses, polygons, bitmaps, and text. For more information about recipes, see “Recipes” on page 8-19.

Double-click Upload Recipe in the Graphics Dynamic Attributes dialog box to display the following:



A Enter the directory location of the recipe format file. Use the Browse button B to quickly select a directory name. The recipe format file is used to tell the controller what data to read. Often, it’s the original downloaded recipe. For example, the number of lines with data values represents how many values should be read from the controller.

B Click to quickly find the recipe format file directory for A. The Select Format File Directory dialog box appears. Use it to navigate to the desired directory and click OK when you’re done.

C Choose the source of the recipe format file name:

- If you choose Fixed name, D is highlighted.
- If Prompt for name is selected, the operator is prompted for the recipe format file name.
- If From Mistic string is selected, E is highlighted.

D If Fixed Name was selected in C, enter the name of the recipe format file located in directory A. Notice the file extension is .rcp.

E If From Mistic string was selected in C, use the Tag Selection button ? to enter a tagname of type string that contains the recipe format file name. The Tag Selection dialog box is displayed so you can select a tag. See “Configuring Tags” on page 4-5 for more information about this dialog box.

F Enter the directory location of the recipe file that will receive the information. Use G to quickly enter a directory name.

G Click to quickly find the recipe file directory for F. The Select Destination File Directory dialog box appears. Use it to navigate to the desired directory and click OK when you're done.

H Choose the file name for the recipe data that will be read from the controller.

- If you choose Fixed Name, I is highlighted.
- If Prompt for Name is selected, the operator is prompted for the recipe file name.
- If From Mistic string is selected, J is highlighted.

I If Fixed Name was selected in H, enter the name of the file to receive the information. This file will be located in F. Notice the file extension is .rcp.

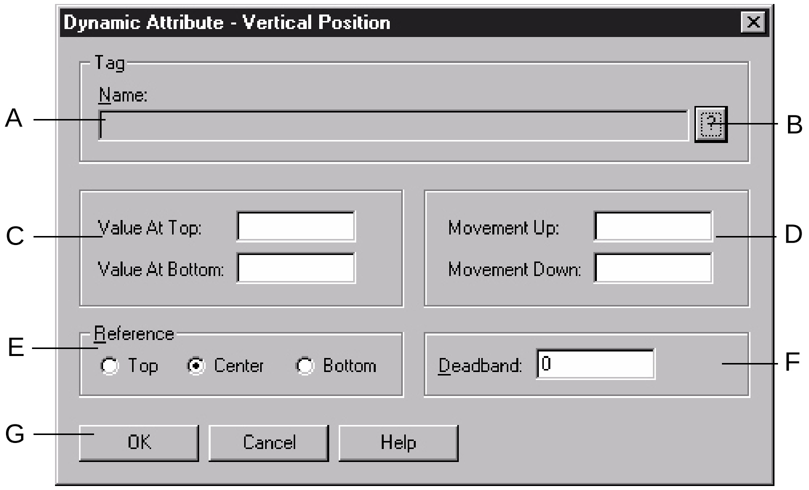
J If From Mistic string was selected in H, use the Tag Selection button ? to enter a tagname of type string that contains the file name. The Tag Selection dialog box is displayed so you can select a tag.

K Click OK to save your settings.

Vertical Position

Use this attribute to adjust the vertical position of a graphic based on a tag value from the controller. This is a controller-driven attribute and is available for lines, rectangles, round rectangles, ellipses, and polygons, polylines, curves, bitmaps, and text.

Double-click Vertical Position in the Graphics Dynamic Attributes dialog box to display the following:


Dynamic Attribute - Vertical Position

Tag

Name:

Value At Top:

Value At Bottom:

Movement Up:

Movement Down:

Reference ○ Top ● Center ○ Bottom

Deadband: 0

A Enter an OptoControl tagname here by clicking the Tag Selection button B. As this tag changes value in the OptoControl strategy, its value will determine the effects on the graphic.

B To enter a tagname in A, click here. The Tag Selection dialog box is displayed so you can select a tag. See "Configuring Tags" on page 4-5 for more information about this dialog box.

C Enter the top and bottom values for the graphic. For example, if you know your tag values will be from 0 to 100, you may wish to enter a range of 0 to 100 or a subset of this range such as 0 to 50.

D Enter the maximum top and bottom movement the object can change. The movement units are in pixels. For example, if your bottom and top values are 0 and 100, your bottom and top movements are 0 and 200, and your point of reference (E) is from the bottom when the tag value is 50, the object will be moved 100 pixels from the bottom.

E Enter the reference point for the object. This is the reference point from which the object will move. The choices are top, center, and bottom. The Vertical Size (Height) dynamic attribute must also be configured in order for this option to affect the graphic.

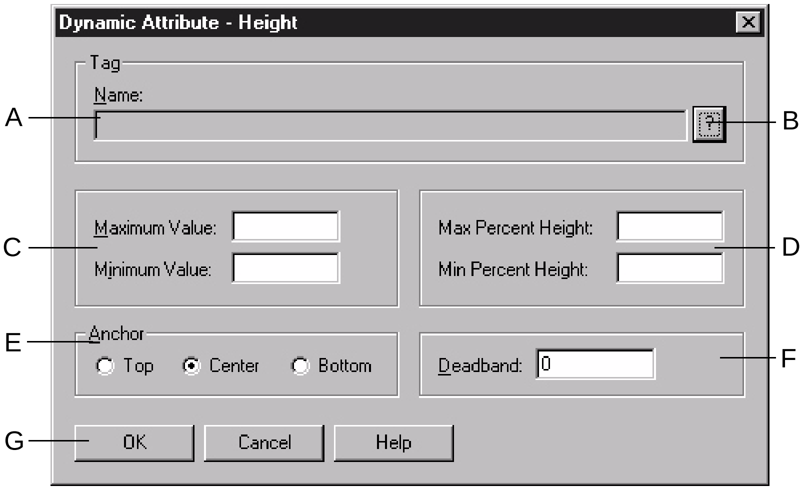
F Enter a value to be added and subtracted from the previously read tag value to determine whether the graphic's position will actually change. Using our previous example in D, let's say the deadband is 5. A tag is read and has a value of 50. The next tag reading must be greater than 55 in order for the graphic to move.

G Click OK to save your settings.

Vertical Size (Height)

Use this attribute to change the height of a graphic based on a tag value from the controller. This is a controller-driven attribute and is available for lines, rectangles, round rectangles, ellipses, and polygons.

Double-click Vertical Size in the Graphics Dynamic Attributes dialog box to display the following:



A Enter an OptoControl tagname here by clicking the Tag Selection button B. As this tag changes value in the OptoControl strategy, its value will determine the effects on the graphic.

B To enter a tagname in A, click here. The Tag Selection dialog box is displayed so you can select a tag. See "Configuring Tags" on page 4-5 for more information about this dialog box.

C Enter the maximum and minimum value for the tagname in A. For example, if you know your tag values will be from 0 to 100, you may wish to enter a range of 0 to 100 or a subset of this range, such as 0 to 50.

D Enter the maximum and minimum percentage the object can change. The percentage range is from 0 to 1,000. Suppose your minimum value is 0 and your maximum value is 10, and the minimum and maximum percentages range from 0 to 200. When the tag value is 10, the object will be twice as big as you've originally drawn it. When the tag value is 5, the object will be the same size you've drawn it, which is 100 percent.

E Enter the anchor point for the object. The choices are top, center, and bottom.

F Enter a value to be added and subtracted from the previously read tag value to determine whether the graphic's height will actually change.

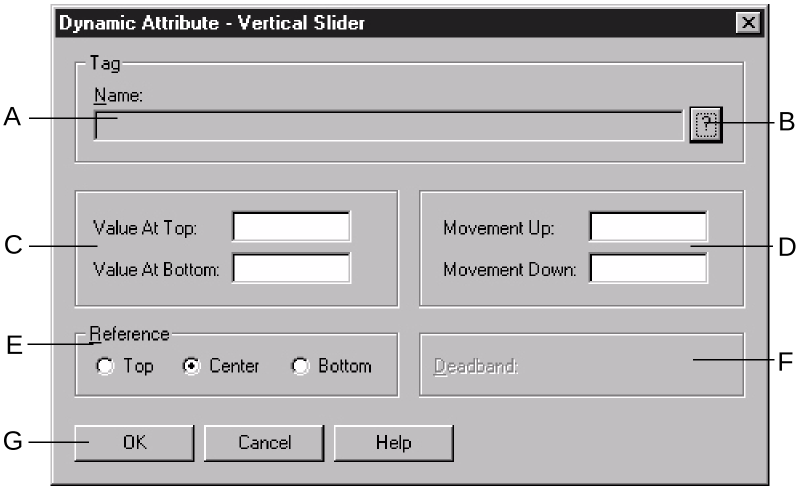
For example, let's say the values are 0 to 100, the percentages are 0 to 100, and the deadband is 5. A tag is read and has a value of 10. The next tag reading must be greater than 15 in order for the graphic to change.

G Click OK to save your settings.

Vertical Slider

Use this attribute to configure a vertical slider when a graphic is clicked. This is an operator-driven attribute and is available for lines, rectangles, round rectangles, ellipses, polygons, and bitmaps.

Double-click Vertical Slider in the Graphics Dynamic Attributes dialog box to display the following:



A Enter an OptoControl tagname here by clicking the Tag Selection button B. The amount of movement the vertical slider makes affects the value sent to the tag in the controller.

B To enter a tagname in A, click here. The Tag Selection dialog box is displayed so you can select a tag. See "Configuring Tags" on page 4-5 for more information about this dialog box.

C Enter the top and bottom values for the tagname in A. For example, if you know your tag values can be from 0 to 100, you may wish to enter a range of 0 to 100 or a subset of this range, such as 0 to 50.

D Enter the maximum top and bottom movement the object can change. The movement units are in pixels. This means if your bottom and top values are 0 and 100, and your bottom and top movements are 0 and 200, if you move the tag 100 pixels toward the bottom, the tag value sent will be 50.

E Select the reference point for the object. The choices are top, center, and bottom. Note that you must also separately configure the Vertical Size (Height) dynamic attribute to use this option.

F Enter a value to be added and subtracted from the previously read tag value to determine whether the tag value should be changed.

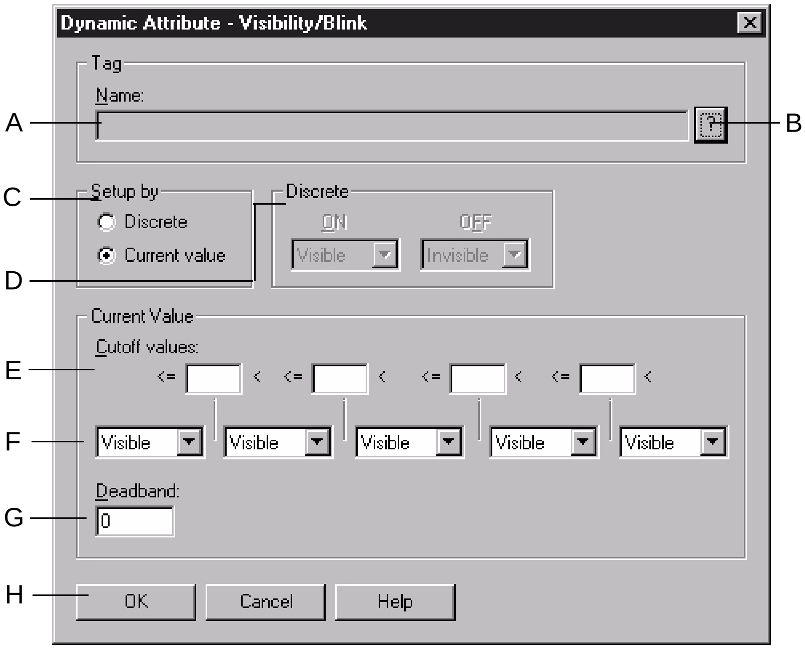
Using our previous example in D, let's say the deadband is 5. A tag is written and has a value of 50. The next graphic movement must be greater than 55 in order for the tag value to change.

G Click OK to save your settings.

Visibility/Blink

Use this attribute to make a graphic visible or invisible or to cause it to blink based on a tag value from the controller. This is a controller-driven attribute and is available for lines, rectangles, round rectangles, ellipses, and polygons, polylines, curves, bitmaps, and text.

Double-click Visibility/Blink in the Graphics Dynamic Attributes dialog box to display the following:



Dynamic Attribute - Visibility/Blink

Tag

Name:

Setup by

○ Discrete

● Current value

Discrete

ON: Visible

OFF: Invisible

Current Value

Cutoff values:

<= < <= < <= < <= <

Visible | Visible | Visible | Visible | Visible

Deadband: 0

A Enter an OptoControl tagname here by clicking the Tag Selection button B. As this tag changes value in the OptoControl strategy, its value will determine the effects on the graphic.

B To enter a tagname in A, click here. The Tag Selection dialog box is displayed so you can select a tag. See "Configuring Tags" on page 4-5 for more information about this dialog box.

C Choose whether the tag you're configuring is a discrete value (with ON and OFF values), or whether it's a current value you're looking for. If you choose Discrete, the D group is highlighted; if you choose Current value, the E group is highlighted. The choice you make in this selection must match the tag choices you made in A.

D Select the visibility state you want for the ON state from the drop-down list options. Your choices are Invisible, Visible, Slow Blink, Med. Blink, and Fast Blink. In the same manner, choose the visibility state for the OFF state.

E Enter a value in each Cutoff Value field to specify the range of values for each visibility group configured in the visibility fields. Values entered must be in increasing order. Each Cutoff Value field must have a numeric value entered or you will get a warning to enter one. After the warning, the cursor blinks in the first Cutoff Value field requiring a value.

F To configure a visibility state for the ranges set up in E, click a visibility field's drop-down button. Your choices are Invisible, Visible, Slow Blink, Med. Blink, and Fast Blink. In the same manner, choose the visibility state for each range of values.

G Enter a value to be added and subtracted from the previously read tag value to determine whether the graphic's visibility will actually change.

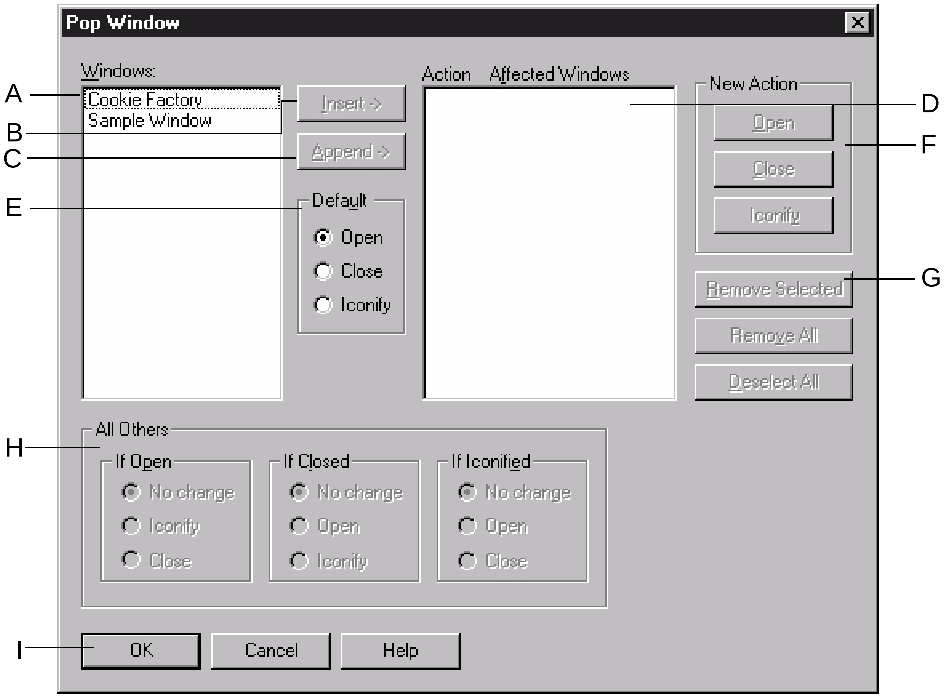
For example, let's say the Cutoff values are 1, 10, 20, and 30, and the visibility fields are Invisible, Visible, Slow Blink, Med. Blink, and Fast Blink. The Deadband is 2. A tag is read with a value of 10. The next value read must be greater than 12 in order for the graphic to change.

H Click OK to save your settings.

Windows

Use this attribute to change window states when a graphic is clicked. This is an operator-driven attribute and is available for rectangles, round rectangles, ellipses, polygons, bitmaps, and text.

Double-click Windows in the Graphics Dynamic Attributes dialog box to display the following:



A Initially, this list shows all the windows available for the project. Select the window that has the window state you want to change. You can also select more than one window by using a couple of key combinations. One way is to select a window, press SHIFT, and click on another window name in the list. This selects all the windows in between the two window names. Another way is to select a window name, press the CTRL key, and click on each window name you want selected.

B Use to insert the selected window(s) in D. The window name will be inserted above the highlighted window(s) in D.

C Use to add the selected window(s) to the bottom of the window list in D. The window name will be inserted after the last window in D.

D Lists the windows and what window state they will go to when the graphic is clicked.

E Use this group as a handy window state assignment key for the windows you've highlighted in A. When the windows are copied over to D, you will see they all have the default window state you've assigned. The window state choices are Open, Close, and Iconify.

F Use this group to change any window states listed in D. Highlight one or more windows and select the new window state action. Your choices are Open, Close, and Iconify.

G Use this group to modify the window name list in D. The Remove Selected option removes only those windows you've highlighted; the Remove All option removes all windows from the list; and the Deselect All option deselects and quickly unhighlights all window names.

H For all windows left in A, use this grouping to affect their window states. For example, if a window state is open and the graphic is clicked, the window state can stay the same, be iconified, or be closed. Likewise, you can alter the window states of closed and iconified windows.

- Click OK to save your settings.

Copying and Deleting Dynamic Attributes

Once a dynamic attribute has been added to an on-screen graphic object, you can easily assign those attributes to other graphics using copy and paste. You can also quickly delete all dynamic attributes from a graphic.

Copying Dynamic Attributes to a Graphic

To copy a set of dynamic attributes from one object to another, do the following:

1. With the Select tool , click the graphic whose dynamic attributes you want to copy.

   Choose Edit→Copy Dynamic Attributes to copy the attributes to the Windows clipboard.

   You can now assign these dynamic attributes to another graphic using Edit→Paste Dynamic Attributes.

Pasting Dynamic Attributes to a Graphic

To paste a set of dynamic attributes that were copied to the Windows clipboard, do the following:

1. With the Select tool , choose one or more graphics to which you want to paste the dynamic attributes.

2. Choose Edit→Paste Dynamic Attributes, and then do one of the following:

   - To delete any existing dynamic attributes the object may already have, choose Delete Existing.
   - To add the copied attributes to existing attributes and replace any that might be of the same type, select Replace Duplicates.
   - To add the attribute to existing attributes and not change any attributes that might be of the same type, select Ignore Duplicates.

Deleting Dynamic Attributes from a Graphic

To delete all dynamic attributes from a graphic, do the following:

1. With the Select tool , choose one or more graphics that have dynamic attributes you want to delete.

2. Choose Edit➞Delete Dynamic Attributes.

Viewing Dynamic Attributes

As you develop or document an OptoDisplay project, it can be useful to know about the dynamic attributes and tags used by the objects in the project's windows.

Dynamic Attributes for Individual Objects

To view the dynamic attributes configured for an individual graphic object or a group of objects, select one or more objects in a window and then do one of the following actions:

- Right-click the mouse, and select Dynamic Attributes from the pop-up menu.
- Press CTRL-A
- Press CTRL and then right-click the mouse.

The dynamic attributes assigned to that object or objects will be shown in the Dynamic Attributes window.

Viewing Tags for One or More Objects

To view the tags that a particular object or objects is connected to, click the object (or group of objects), and move the cursor over it. The tags used will be shown next to the cursor.

Dynamic Attributes for All Objects

To generate a report that lists the dynamic attributes for all objects in all project windows, as well as all the alarm points configured for a project, do the following:

1. In OptoDisplay Configurator, select View➞Dynamic Attributes.
2. In the dialog box that opens, select one or more windows whose dynamic attributes you want to view and click OK.

   The Microsoft Windows Notepad application opens and displays a report similar to the following example:

```
Project Name: C:\Opto22\OptoDisplay\Examples\Cookies\Display\cfactory.mmi

-----------------------------------------------------------------------
                        Window: Cookie Factory
                        **********************
Group            X = 530   Y = 332   W =  86   H =  28

Operator-Driven Dynamic Attribute Tags
Send Value:
Cookie Controller:Conveyor_Speed_Control.Value
Refresh Group: Group 0
  Source     : Prompt for Data
  Destination: Set
  Message    : Enter Conveyor Speed
  Min. Value : 0.00
  Max. Value : 100.00

Group            X = 133   Y = 213   W =  21   H =   3

Controller-Driven Dynamic Attribute Tags
Visibility/Blink:
Cookie Controller:Dough_Dispense_Valve.State
Refresh Group: Group 0
  Setup By : Discrete
  On       : Invisible
  Off      : Visible
```

Using the TagInfoView Utility Program

After you have selected View➞Dynamic Attributes, you can use a small utility program called TagInfoView to sort and view the tag information in greater detail. The tag information is displayed in Windows Notepad.

1. Select View➞Launch TagInfoView Utility.

2. In the Tag Information Viewer dialog box that opens, verify that the TagInfo.txt file appears in the file field at the top.

3. In the Sort By sections, select how you want the tag information sorted.

4. Click Display Results.

Scanning to Update Graphics

As you configure your project and connect OptoControl tags to OptoDisplay objects, you're setting up the connections that will animate your graphics in OptoDisplay Runtime as the tag data changes. OptoDisplay acquires this tag data using an internal scanner that monitors one or more controllers. Understanding how the scanner works and how it gets its data will help you optimize your system's performance.

Scanning is OptoDisplay's process of requesting data about I/O points and variables from the Opto 22 controller. When the controller receives this request, it must first determine if its data for the requested tags is current. If the data is not current, the controller will access the I/O units connected to it and request the latest readings. This tag information is then sent back to OptoDisplay. Depending on the data and how it is connected to objects in your OptoDisplay project, graphic objects then change their attributes.

Because the controller must determine if its readings are current (and in some cases actually retrieve the information from I/O points), and then process this information and return it to OptoDisplay, a noticeable delay may occur. This is why it is important to optimize your control system and your operator interface by making the scanning process as efficient as possible.

How Window States Affect Scanning

In OptoDisplay, you can define three states for windows that appear in a project: open, iconified, and closed. The state of a window determines how tags for that window will be scanned and whether or not the display is updated. See "Window Design" on page 2-4 for more information on defining window states in a project.

To ensure best performance, consider the following points when designing your OptoDisplay project:

- Have only a few windows open in Runtime to reduce the chance the scanner will overrun. Open windows always have their tags scanned, so having fewer open windows reduces the work required of the OptoDisplay scanner. (An open window is any window that's open on the screen, not just the active, or topmost, window.)
- Present windows in their reduced, or iconified, state. Iconified windows scan their tags, but don't update the display, thus reducing the heavy Windows graphics overhead.

  Since the iconified window does not update the display, that time can be used by other open windows. However, keep in mind that since an iconified window still scans its data, the communication overhead is unchanged.
- Present closed windows that can be opened on demand by the operator. Closed windows do not update the display or scan values unless there's a trend in the window. If a window has a trend, OptoDisplay always scans for data, unless the trend was configured with scanning disabled. (See Chapter 7, "Working with Trends" for more information on configuring trends.)

  A window should be closed if the information in the window is no longer needed. This greatly reduces the communication and graphic burden on the system.

Scan Groups

When OptoDisplay scans the controller for data, it combines data items into scan groups. This is because sending data in one large group is faster than sending several smaller data requests. OptoDisplay uses four different types of scan groups: window, trigger, trend, and historic log.

- **Window scan groups** contain all the tags connected to objects displayed in a window. The tags in a window's scan group are scanned based on the state of the window. If the window is closed, then no scanning occurs for that window, unless it contains a trend.
- **Trigger scan groups** contain all tags connected to a trigger-based event, such as starting an application or playing a sound. You can configure trigger scan groups to scan based on the state of a window.
- **Trend scan groups** contain all tags connected to a basic trend or SuperTrend. You can configure trend scan groups to always scan, to scan only when specific events occur, or to scan based on the state of a window.
- **Historic log scan groups** contain all tags connected to a historic log. You can configure historic log scan groups to always scan, to scan only when specific events occur, or to scan based on the state of a window. Historic log scan groups can be configured with start and stop trigger options to start and stop scanning tags.

NOTE: Keep in mind that the number of points configured in trends and in historic logs can dramatically impact system speed.

For more information on how window states affect scanning, see "How Window States Affect Scanning" on page 6-34.

Refresh Time Groups

Each tag connected to an OptoDisplay graphic belongs to a refresh time group that determines how often the tag is scanned. You define the characteristics of refresh time groups by setting a scan rate and a freshness value. See "Configuring Scan Rates and Freshness Values" on page 6-36 to learn how to set these values.

System performance is directly affected by how a refresh time group is set up, so it's important to define refresh time groups carefully. Follow these guidelines when configuring refresh time groups for your project:

- To minimize scanner overrun errors, avoid using scan rates of less than 0.5 second on a large number of points.
- Select scan rates that reflect the rate at which the process variables change. For example, the outside air temperature changes slowly, and could be scanned every 15 minutes or so.
- As a good engineering practice, select the slowest possible scan rate that is acceptable for each scan group. This will help prevent the system from being overloaded by needlessly scanning too much information too quickly.
- Use multiple scan groups, and stagger the scan interval for the groups by selecting scan times that are not even multiples of each other. This prevents the OptoDisplay project from

periodically scanning data from multiple scan groups at the same time. Try to use prime numbers (numbers only divisible by 1 or themselves) whenever possible.

- If the amount of data being scanned is too much for the selected scan rate, decrease the scan rate to better match what the actual throughput will allow.

  If doing this does not improve scanning, then there may be too much data being requested from one controller, or there may be too much data being scanned by one computer, or both. To eliminate the bottlenecks, you may need to add more controllers, divide the OptoDisplay projects over multiple computers, or both.

Freshness Values and How They Affect Scanning

In addition to the scan rate, another parameter that you must set for a refresh time group is its freshness value. A freshness value is the time difference between when a tag was last read from an I/O unit by the controller and the time OptoDisplay requests the data. A freshness value is smaller than or equal to a scan rate because a scan rate is the regular scanning interval for a tag.

The following steps occur when a point is scanned:

1. When OptoDisplay requires a tag update, the OptoDisplay scanner requests the data from the controller.
2. The controller checks the “age” of its current tag value.
   - If it’s less than or equal to the freshness value, this value will be sent back to OptoDisplay when the controller is ready to send its information to OptoDisplay.
   - If it’s greater than the freshness value, the controller will request a data update from the I/O unit for that tag.

Note how the freshness value affects the system’s throughput. The longer the controller must wait for responses from I/O units to provide “fresh” data, the longer it takes to respond to OptoDisplay with the information. This waiting time can impact your system’s performance.

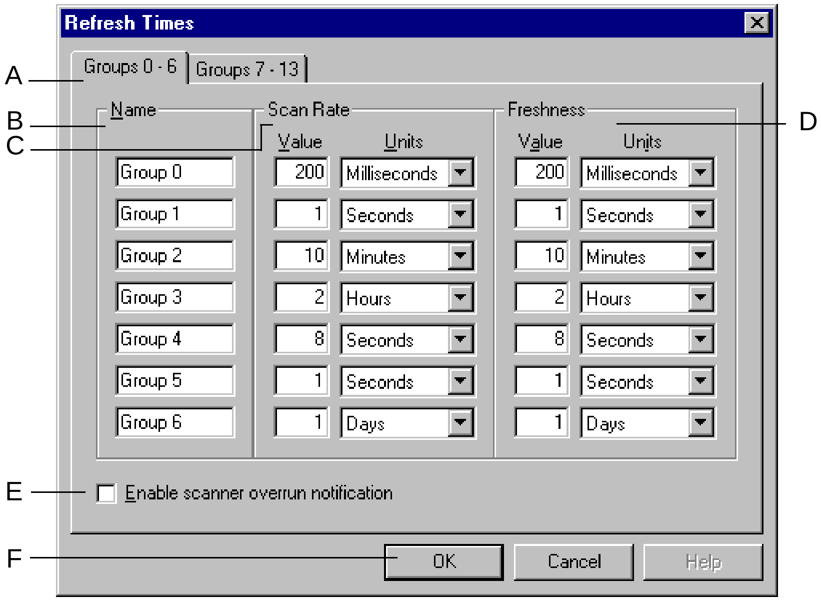
Having a longer freshness value (that is, a value closer to the value of the scan rate) helps improve performance. The communication overhead (the communication time between OptoDisplay and the controller) isn’t affected by the freshness value, but the controller’s waiting time is. The scan rate does, however, affect the communication overhead because it defines how often OptoDisplay will ask the controller for new data.

Configuring Scan Rates and Freshness Values

You assign refresh time groups whenever you configure a tag based on how often you think it makes sense to update the tag. (Note that the same refresh time group is usually used by several tags.) For example, an analog point reading an outside temperature would use a longer scan rate since the temperature isn’t likely to change suddenly. On the other hand, a digital point that’s monitoring the on/off state of a valve would need a shorter scan rate to accurately reflect whether a valve is open or closed.

To configure scan rates and freshness values, choose Configure➞Refresh Times.

The Refresh Times dialog box appears:



Name	Scan Rate Value	Scan Rate Units	Freshness Value	Freshness Units
Group 0	200	Milliseconds	200	Milliseconds
Group 1	1	Seconds	1	Seconds
Group 2	10	Minutes	10	Minutes
Group 3	2	Hours	2	Hours
Group 4	8	Seconds	8	Seconds
Group 5	1	Seconds	1	Seconds
Group 6	1	Days	1	Days

□ Enable scanner overrun notification

A Up to fourteen refresh time groups are available, divided between two tabs in the Refresh Times dialog box.

B In the Name column, you will see the refresh time group names. By default, their names are “Group 0", “Group 1", and on up to “Group 6." You can change these default names if you wish.

Names can be up to 15 characters long, but avoid using the ! and | characters in the name. Spaces are also valid characters, but when referencing names with spaces, don’t omit the spaces or substitute the “_” character for spaces.

C In the Value field of the Scan Rate column, enter a number from 1 to 9999. In the Units field, select a unit of time from the Units drop-down list. (Unit options are milliseconds, seconds, minutes, hours, days, and months.)

The greater the value, the more time between I/O readings and the fewer times the controller is scanned. The scan rate must be greater than or equal to the value in the Freshness field.

D The Freshness column has similar fields to those in the Scan Rate column. In the Value field, enter a number from 1 to 9999. In the Units field, select a unit of time from the Units drop-down list. The unit options are: milliseconds, seconds, minutes, hours, days, and months. The freshness value must be less than or equal to the value in the Scan Rate field.

E Select the Enable scanner overrun notification check box to post scanner overrun warning messages in the Event Log during Runtime. If this box is unchecked, scanner overrun warning messages will be ignored by OptoDisplay Runtime.

F Click OK to save your settings.

CHAPTER 7

Working with Trends

Introduction

This chapter describes how you can create and configure graphs that display real-time and historical information about selected I/O points.

In This Chapter

About Trends.. 7-1
Working With Basic Trends.................... 7-2
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Using SuperTrend Log Files 7-15
Using XY Plots... 7-21

About Trends

OptoDisplay *trends* are graphical objects that visually plot controller values, including I/O points and . Using a trend, you can show how real-time and historical data changes over time, or how one set of data relates to another one. In OptoDisplay Runtime, trends are created when active I/O point values, or tags, are read from an OptoControl strategy running on a controller and visually plotted.

Tag values are graphed on a two-dimensional x-axis and y-axis coordinate system. Depending on the type of trend used, the x-axis can represent time or a set of tag values. The y-axis can represent either the range of values for a tag or a set of tag values. You can set features for each trend line used, and there is no limit to the number of trends that can be displayed in a window. For trends that graph data over time, the maximum time span supported is 14 days.

You can easily set or modify the following elements in a trend:

- X- and y-axis ranges and the major and minor divisions that appear on the chart
- Graph backgrounds and border colors
- Pen colors for trend lines
- Tag value scanning, which can be turned on or off for a specific trend.

Types of Trends

There are three types of trends that you can use in an OptoDisplay project: basic trends, SuperTrends, and XY plots. Basic trends and SuperTrends graph controller values over time, but support different numbers of trend lines and have other differences. XY plots graph data from two numeric tables, using one set of data for x-axis values and the other for y-axis values.

- **Basic Trends**—Using a basic trend, up to four trend lines can be displayed on any one trend chart. Unlike a SuperTrend (described below), which can graph historical data, basic trends can only graph real-time data. See "Working With Basic Trends" below for more information.
- **SuperTrends**—Using a SuperTrend, up to 16 trend lines can be displayed on any one trend chart. SuperTrends can graph both real-time and historical data. See "Working with SuperTrends" on page 7-6 for more information.
- **XY Plots**—Using an XY plot, up to six individual trend lines can be displayed on any one XY plot. XY plots can only graph data in numeric tables. See "Using XY Plots" on page 7-21 for more information.

Working With Basic Trends

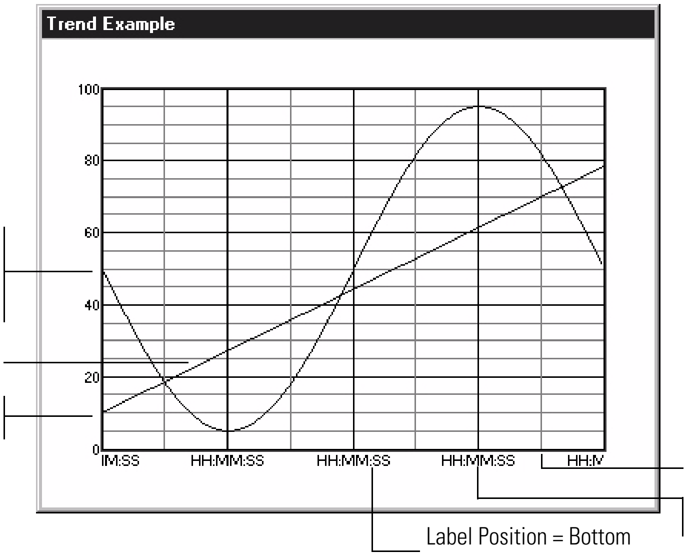
You can use basic trends to graph real-time tag information using up to four pens.

Creating a Basic Trend

1. Select the basic trend tool from the toolbox and position the cursor where you want the trend to begin in the window.

2. Click the mouse button, drag the mouse to the desired size, and then release the mouse button.

The trend that appears should resemble the example below:



Y-axis Layout

- Label Position = Left
- Label Range:
  - Max Val = 100
  - Min Val = 0
- Minor Divisions = 4
- Major Divisions = 5
- Label Intervals = 1

X-axis Layout

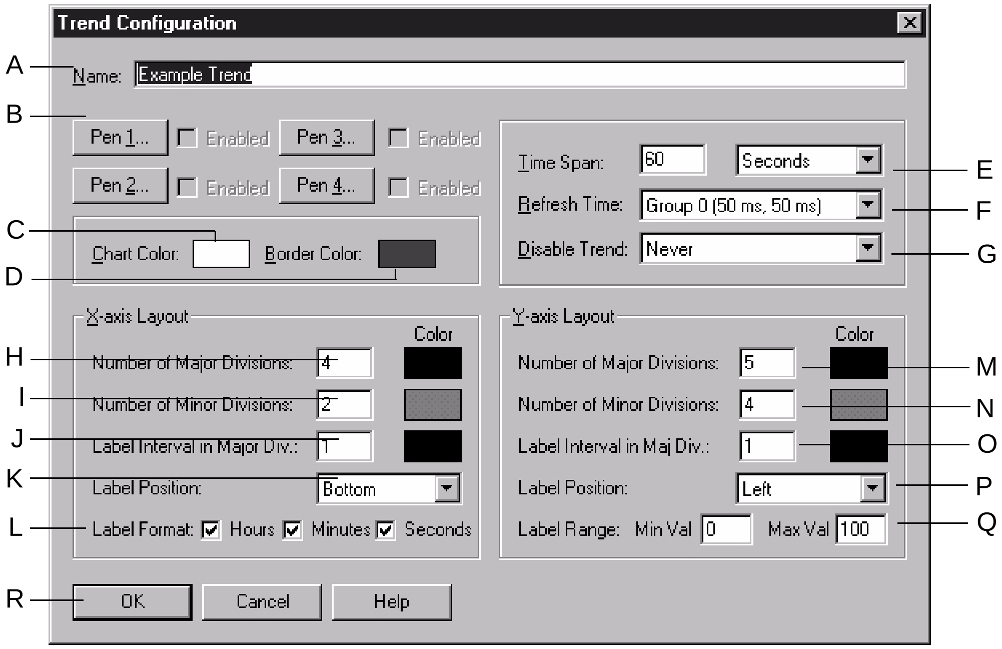
- Minor Divisions = 2
- Major Divisions = 4
- Label Intervals = 2

Label Position = Bottom
Label Format = Hours, Minutes, and Seconds

Modifying a Basic Trend

Choose the Select tool and double-click the trend.

The Trend Configuration dialog box appears:



Name: Example Trend

□ Enabled □ Enabled □ Enabled □ Enabled

Chart Color: Border Color:

Time Span: 60 Seconds

Refresh Time: Group 0 (50 ms, 50 ms)

Disable Trend: Never

X-axis Layout

Number of Major Divisions: 4

Number of Minor Divisions: 2

Label Interval in Major Div.: 1

Label Position: Bottom

Label Format: ☑ Hours ☑ Minutes ☑ Seconds

Y-axis Layout

Number of Major Divisions: 5

Number of Minor Divisions: 4

Label Interval in Maj Div.: 1

Label Position: Left

Label Range: Min Val 0 Max Val 100

A Enter the name of the trend here.

B Use these pen configuration buttons to associate each pen with one OptoControl tag, to define its pen color and width, and to specify a range of values for the tag. You can configure up to four pens per trend. See "Configuring Basic Trend Pens" on page 7-5 for more information.

C Click here to enter the chart's background color. In the Color dialog box that appears, choose a color and click OK.

D Click here to enter the chart's border color. In the Color dialog box that appears, choose a color and click OK.

E Enter the time span the trend represents. (Remember that the time span is indicated on the x-axis). Choose the time units from the drop-down list. Your choices are seconds, minutes, or hours. The maximum time span is 14 days, or 336 hours.

F Select the refresh time here. Choose from one of seven refresh time groups. The scan rate and freshness values appear in parentheses alongside the refresh group number. All tags associated with the pens in B are scanned at the same rate.

You can find out more about refresh times in "Scanning to Update Graphics" on page 6-34. Also see "Optimizing Pen Settings" on page 7-6 to learn how pen settings affect how OptoDisplay communicates with a controller.

G Choose whether to disable a trend based on the state of its window. If you disable the trend, the tags associated with the pens in B won't be updated with new data from the OptoControl strategy until the trend is enabled again. Disabling a trend saves the controller processing time, since it doesn't have to respond to regular requests from OptoDisplay for tag updates.

NOTE: Trends that are enabled are always updated, regardless of the window's visual state (normal, iconified, etc.). This means OptoDisplay continually requests data from the controller to update its trends. Keep this in mind when you're considering the number of enabled trends you are including in the project. The more enabled trends you have, the more the controller has to spend time reading its I/O to update the data.

H Enter the number of major x-axis divisions for the trend. This is the number of main sections the trend is divided into. You can also choose a color for the major divisions by clicking the Color field. In the Color dialog box that appears, choose a color and click OK.

NOTE: For both x- and y-axis divisions, the lines dividing the major divisions appear thicker than the minor divisions.

I Enter the number of minor x-axis divisions for the trend. This will be the number of sections the major divisions are divided into. The minimum number of divisions is one.

You can also choose a color for the minor x-axis divisions by clicking the Color field. In the Color dialog box that appears, choose a color and click OK.

J Enter how often you want the major x-axis labeled.

NOTE: For both x- and y-axis labels, if you enter 1, every major division is labeled; if you enter 2, every other major division is labeled.

K Enter the label position for the x-axis. By default, the x-axis is labeled at the bottom, but you can choose to label the top, top and bottom, or have no labeling at all.

L Enter the label format by checking off any combination of hours, minutes, and seconds. The label appears in the following format: HH:MM:SS, where HH is hours, MM is minutes, and SS is seconds.

M Enter the number of major y-axis divisions for the trend. This is the number of main sections the trend is divided into. You can also choose a color for the major divisions by clicking the Color field. In the dialog box that appears, choose a color and click OK.

N Enter the number of minor y-axis divisions for the trend. This will be the number of sections the major divisions are divided into. The minimum number of divisions is one.

You can also choose a color for the minor y-axis divisions by clicking the Color field. In the Color dialog box that appears, choose a color and click OK.

O Enter how often you want the major y-axis labeled.

P Enter the label position for the y-axis. By default, the y-axis is labeled on the left, but you can choose to label the right, left and right, or have not labeling at all.

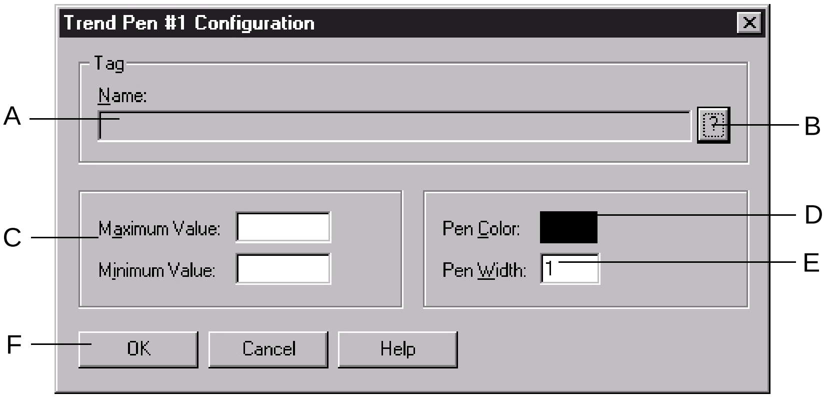
Q Enter the minimum and maximum values for the y-axis.

R Click OK to save your settings.

Configuring Basic Trend Pens

Click a pen configuration button in the Trend Configuration dialog box.

The Trend Pen Configuration dialog box appears:



A Enter an OptoControl tagname here by clicking B.

B To enter a tagname in A, click here. The Tag Selection dialog box is displayed so you can select a tag. See “Configuring Tags” on page 4-5 to learn more about configuring tags in your project.

C Enter the maximum and minimum value the tag selected in A can be.

D Click here to choose a pen color. In the Color dialog box that appears, choose a color and click OK.

E Enter the width of the line you want created by the pen. The width is specified in pixels.

F Click OK to save your settings.

Optimizing Pen Settings

The scan rates you select when configuring a pen can impact the speed and performance of your OptoDisplay project and the controller. When selecting scan rates for long trends, you should choose optimal scan times for the pens as follows:

1. Determine the trend width in pixels by using the X: value in the Coordinates window.

   a. Subtract the X: value of the left trend border from the X: value of the right trend border.

   b. Divide the trend width in seconds by the trend width in pixels.

   For example, an eight-hour trend that is 500 pixels wide yields a number of 57.6 seconds (8 x 3600/500).

2. Round this to the nearest increment of 10.

   In the example, the value would be rounded up to 60 seconds. This means that for optimum OptoDisplay performance, the trend should not be updated more frequently than every 60 seconds.

   NOTE: A small compromise to increase the accuracy of the trend is to divide the result by four. In our example, this would result in a scan time of every 15 seconds. Using a 15-second scan time allows a maximum of four readings per pixel on the trend. Updating any faster than that is counterproductive; the excess data is discarded, and the extra requests for data from the controller add overhead to the control system.

Working with SuperTrends

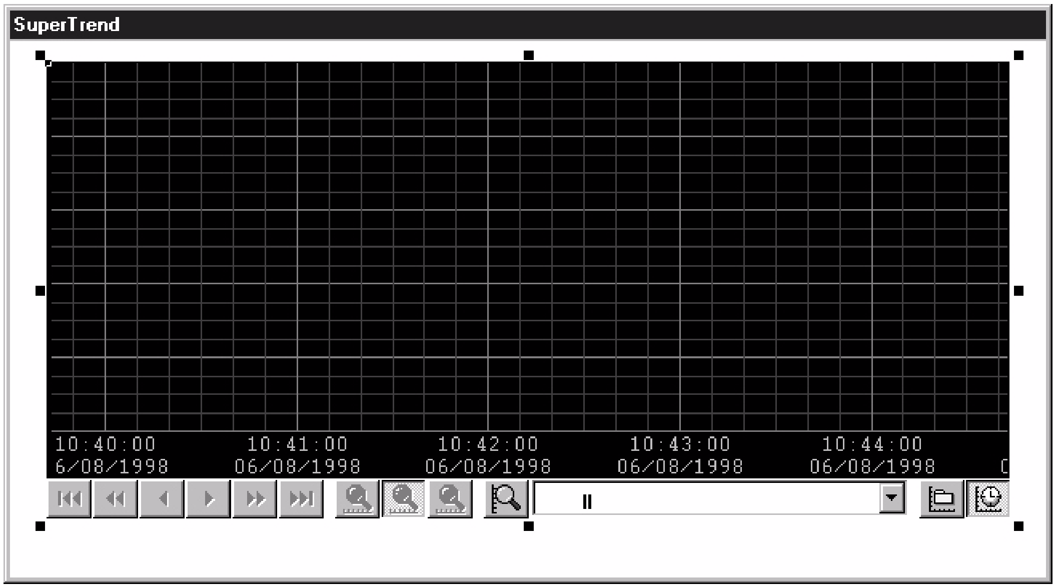
SuperTrends are trends that can track both real-time and historical data. You can also use up to 16 pens with a SuperTrend; basic trends support only four pens. SuperTrends are drawn and configured in OptoDisplay Configurator, like any other on-screen object, but the charts can also be manipulated by the operator in OptoDisplay Runtime. See "Using Runtime" on page 9-13 to learn how to use SuperTrend options in Runtime.

Creating a SuperTrend

1. Select the SuperTrend tool from the toolbox and position the cursor where you want the trend to begin in the window.

2. Click the mouse button, drag the mouse to the desired size, and then release the mouse button.

The SuperTrend that appears should resemble the example below:

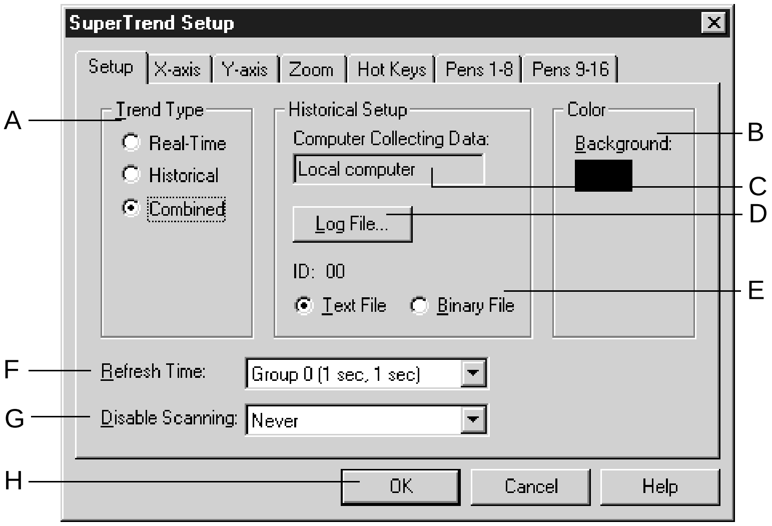


If you do not draw the SuperTrend wide enough, some of the command buttons will be placed in a second row.

Modifying a SuperTrend

Choose the Select tool and double-click the trend.

The SuperTrend Setup dialog box appears:



Trend Type
○ Real-Time
○ Historical
● Combined

Historical Setup
Computer Collecting Data: Local computer
ID: 00
● Text File ○ Binary File

Color
Background: ■

Refresh Time: Group 0 (1 sec, 1 sec)
Disable Scanning: Never

A Choose the trend type here. If you select Combined, you can switch between real-time and historical trending when the project is running.

B Click here to enter the chart’s background color. In the Color dialog box that appears, choose a color and click OK.

C This field shows which computer will collect SuperTrend data. If “Local Computer” appears, SuperTrend data is collected by the computer running OptoDisplay Runtime. If the name of another computer appears, it is a remote computer that has been previously selected. See “Using SuperTrend Log Files” on page 7-15 to learn how to choose this remote computer.

D Click here to set up the historical log file. (You don’t need a historical log for real-time trends.)

E Select whether the historical log will be saved to a file in text or binary format. When the SuperTrend data is saved in ASCII text format, the file includes a header that contains information about tags assigned to the SuperTrend pens. When the data is saved in binary format, the file does not include this header. Historical trend information saved in a binary file is usually graphed more quickly than trend information that is saved in a text file.

If there are existing data files for a SuperTrend and the file format is switched between text and binary, the Select Log File To Convert To dialog box will appear. In this dialog box, you can select a log file to convert to the appropriate format. See “Saving a Log in Text or Binary Format” on page 7-19 to learn more about switching between text and binary file formats.

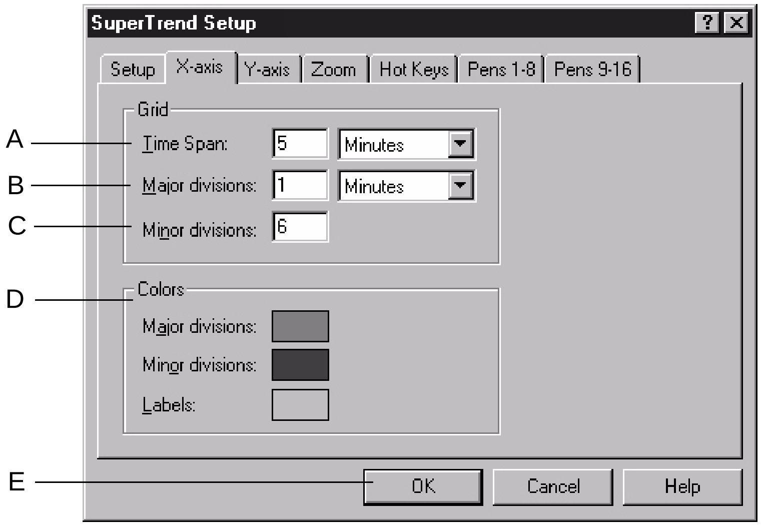
F Select the refresh time here. You can choose from one of seven refresh time groups. The scan rate and freshness values appear in parentheses alongside the refresh group number. You can find out more about refresh times in “Scanning to Update Graphics” on page 6-34. All tags associated with the pens in this trend will be scanned at the same rate.

G Choose whether to disable a trend based on its window’s state. If you disable the trend, the tags associated with the pens won’t be updated with new data from the OptoControl strategy until the trend is enabled again. Disabling a trend saves the controller processing time by not having to respond to regular requests from OptoDisplay for tag updates.

H Click OK to save your settings.

Configuring X-Axis Parameters

Click the X-axis tab to configure x-axis parameters for the SuperTrend.



Grid

Time Span: 5 Minutes

Major divisions: 1 Minutes

Minor divisions: 6

Colors

Major divisions:

Minor divisions:

Labels:

A Enter the time span (x-axis) the trend represents. Choose the time units from the drop-down list. Your choices are seconds, minutes, hours, and days. The maximum time span is 49 days, or 1,176 hours.

B Enter the number of major x-axis divisions for the trend. The trend will be divided into this number of main sections. You can choose a color for the main section dividers in D. The lines dividing the main sections will appear thicker than the lines dividing the minor sections.

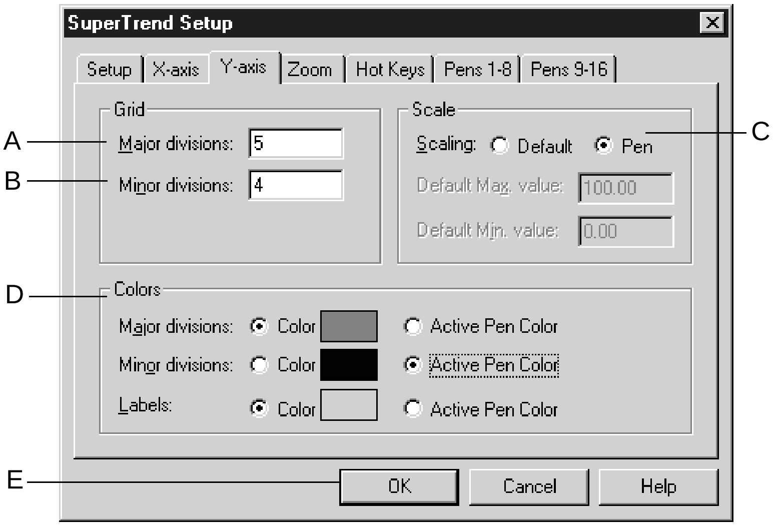
C Enter the number of minor x-axis divisions for the trend. The major sections will be divided into this number of minor sections. The minimum number of divisions is one. You can choose a color for the minor section dividers in D.

D Click on the boxes to set the colors for the major divisions, minor divisions, and labels. In the Color dialog box that appears for each item, choose a color and click OK.

E Click OK to save your settings.

Configuring Y-Axis Parameters

Click the Y-axis tab to configure y-axis parameters for the SuperTrend.



Grid
Major divisions: 5
Minor divisions: 4

Scale
Scaling: ○ Default ● Pen
Default Max. value: 100.00
Default Min. value: 0.00

Colors
Major divisions: ● Color ○ Active Pen Color
Minor divisions: ○ Color ● Active Pen Color
Labels: ● Color ○ Active Pen Color

A Enter the number of major y-axis divisions for the trend.

B Enter the number of minor y-axis divisions for the trend.

C Click here to select the scaling.

- If you choose Default, the trend will always have the same fixed scale. You must enter values for the Default Max. Value and Default Min. Value. These values specify the range of pen tag values. This scaling is static and cannot be changed in Runtime.
- If you choose Pen, the trend will have the scale of the active pen.

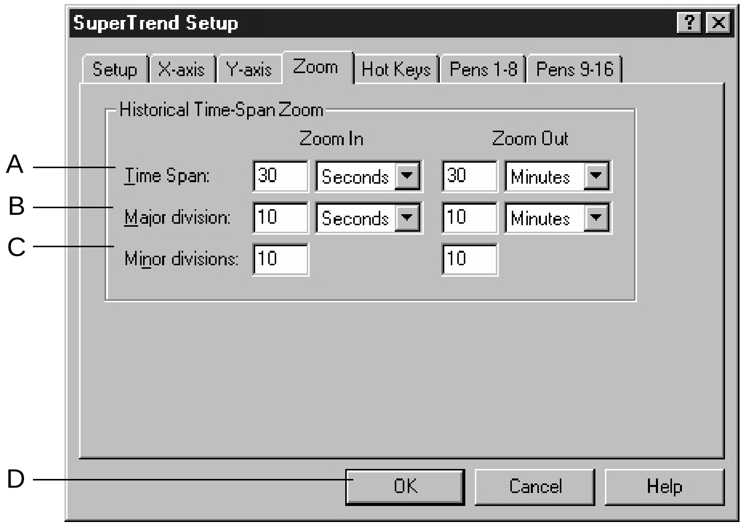
D Click on the boxes to set the colors for the major divisions, minor divisions, and labels in the trend. If you want the y-axis to use the color of the pen that's currently active, select Active Pen Color.

In the Color dialog box that appears for each item, choose a color and click OK.

E Click OK to save your settings.

Configuring Zoom Parameters

When a SuperTrend is in historical mode, the operator can zoom in to view a more detailed section of the trend, or zoom out to view a less detailed section of the trend. Click the Zoom tab to set magnification levels. The Zoom page, shown below, configures the zoom levels by defining scales for the x-axis.



Historical Time-Span Zoom

	Zoom In		Zoom Out	
Time Span:	30	Seconds	30	Minutes
Major division:	10	Seconds	10	Minutes
Minor divisions:	10		10	

A Enter the amount of time to display on the trend while in zoom in/zoom out mode. Unit choices, selected from the dropdown box, are seconds, minutes, hours, or days.

B Enter the amount of time that constitutes one major division while in zoom in/zoom out mode. Unit choices, selected from the dropdown box, are seconds, minutes, hours, or days.

C Enter the number of minor divisions per major division while in zoom in/zoom out mode. This number must be 1 or greater.

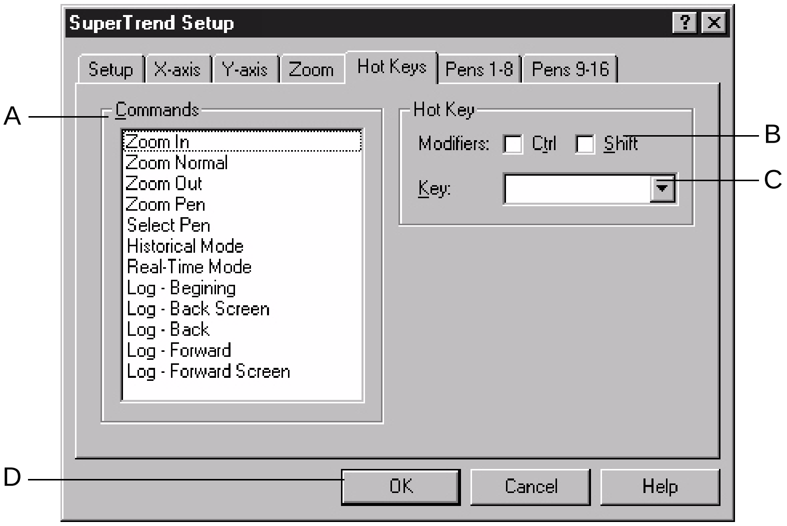
D Click OK to save your settings.

Configuring Hot Keys

All of the buttons that appear at the bottom of a SuperTrend can be associated with a combination of keystrokes called a *hot key.* If a button has a hot key configured, the operator can either click on the button or press the hot key combination. This way the operator can use the SuperTrend without needing a mouse.

NOTE: If a command is only available in historical mode, its associated hot key will also work only in historical mode.

To configure hot keys, click the Hot Keys tab.



A This field displays the Runtime commands that may be associated with a hot key. Highlight a command to configure a hot key for it, or to view the existing hot key settings.

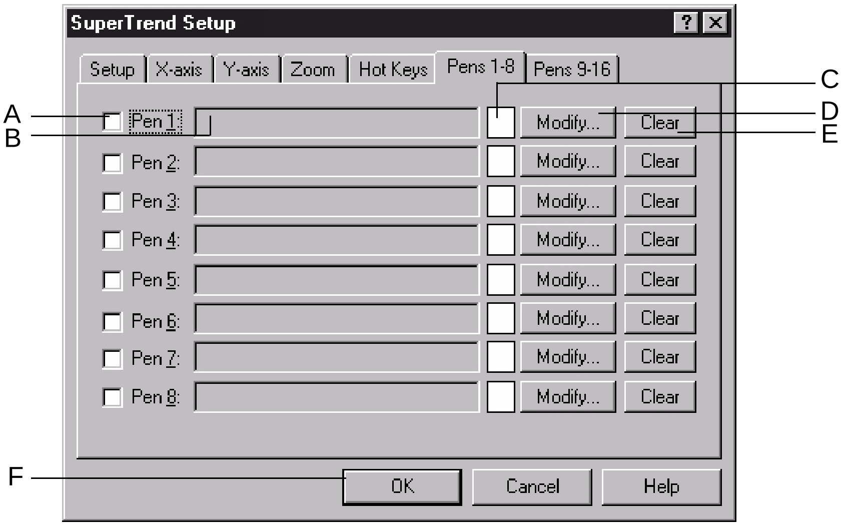
B Check the box labeled Ctrl if you want the CTRL key to be part of the hot key. Check the box labeled Shift if you wish the SHIFT key to be part of the hot key. You may select none, one, or both.

C This drop-down box lists all available keys that can be hot keys. Make sure that you do not assign a hot key to more than one SuperTrend command.

D Click OK to save your settings.

Configuring SuperTrend Pens

Unlike a basic trend, a SuperTrend can plot trend lines for up to 16 tag values (pens). Pens 1 through 8 are configured under the “Pens 1-8” window shown below. Pens 9 through 16 are configured identically under the tab “Pens 9-16.” There is one row for each pen.



A Check this box to enable the pen in this row (uncheck the box to disable the pen). The pen is enabled automatically when it is first created.

B Once a pen is configured, its name appears here.

C Click here to select the pen color. In the Color dialog box that appears, choose a color and click OK.

D Click here to configure a pen or to modify its configuration. The SuperTrend Pen # configuration dialog box appears. Configure the pen and click OK. The pen name will be listed in B.

E Click here to clear the pen configuration.

F Click OK to save your settings.

Memory Requirements for SuperTrend Pens

When several SuperTrends, each using several pens, are used in an OptoDisplay project, the memory requirements for the PC running the project can become very high. Keep this in mind when developing your OptoDisplay project. Use the following formula to determine the amount of RAM required for each pen in a SuperTrend:

$$\text{RAM required per pen (bytes)} = \frac{19.2 \cdot \text{SuperTrend's x-axis time span (sec.)}}{\text{SuperTrend's scan rate (sec.)}}$$

As an example, the memory required for each pen in a SuperTrend having a six-hour scan time (21,600 sec.) and a 500 msec. scan rate (0.5 sec.) would be calculated as follows:

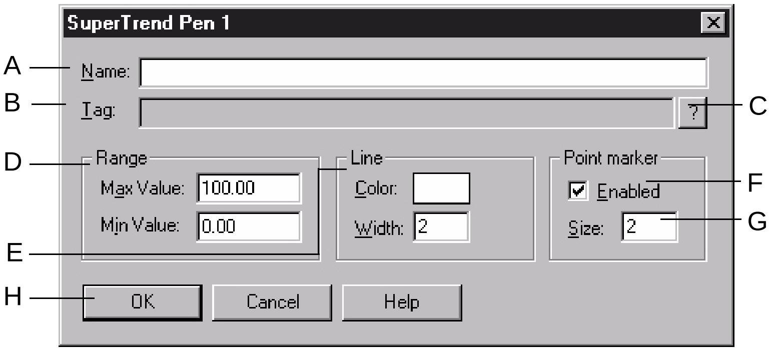
$$\frac{19.2 \cdot 21600 \text{ sec.}}{0.5 \text{ sec.}} = 829{,}400 \text{ bytes}$$

This is approximately 800 KB for each pen. If this SuperTrend contained five pens, for example, it would use 4,000 KB of RAM, or just under 4 MB.

Setting an Individual Pen

Click the Modify button for a pen in the SuperTrend Setup dialog box.

The SuperTrend Pen dialog box appears. (The number of the pen to be configured is shown in the title bar.)



A Enter a SuperTrend pen name, if desired. By default, when a tag is selected in B, the name will be the same as the tagname. In Runtime, this name is displayed in the SuperTrend's Active Pen drop-down list.

B Enter an OptoControl tagname here by clicking the Tag Selection button in C.

C To enter a tagname in B, click here and select a tag in the Tag Selection dialog box that appears. See "Configuring Tags" on page 4-5 for more information about selecting and configuring tags.

D These fields configure the range of displayed data points:

- The Max Value, or maximum value, is the tag value that will position the pen at the top of the trend. If a scanned value of the tag is greater than the Max Value, the point will be plotted but will not be visible on the trend.
- The Min Value, or minimum value, is the tag value that will position the pen at the bottom of the trend. If a scanned value of the tag is less than the Min Value, the point will be plotted but will not be visible on the trend.

E Click in the box next to Color to choose a pen color. In the Color dialog box that appears, choose a color and click OK. Enter the width of the line you want created by the pen. The width is specified in pixels.

F Click here to have point markers displayed for every scanned point. Point markers make it easy to identify scanned data. In historical mode, you can click on a scanned point to display its data (value, time scanned, etc.).

G Choose a point marker width, which is measured in pixels.

H Click OK to save your settings.

Using SuperTrend Log Files

Tag value data that is graphed in the SuperTrend chart can be saved to historic log files for later viewing. Using the buttons and other controls on a SuperTrend chart, the operator can open and view these log files while the project is running in OptoDisplay Runtime. This section shows how to configure SuperTrend settings in your project to define how and where SuperTrend log files are saved. To learn how to use SuperTrend controls, see "Using SuperTrends in Runtime" on page 9-21.

NOTE: SuperTrend historic log files are similar to historic data logs, but are created and saved as separate files due to the additional pen information that a SuperTrend can collect.

Configuring SuperTrend Logging

Two steps occur when a SuperTrend log file is created:

- **Data is collected**—Data for the SuperTrend historic log is first collected from the controller being monitored. If the same OptoDisplay project is running on more than one computer, each computer collects data from the controller.
- **Data is saved**—After the log data is collected, it is saved as either binary files or ASCII text files. These files can be saved automatically on the local computer's hard drive or on another computer that is accessible over a network.

The first item, data collection, occurs automatically and cannot be changed. You can, however, specify how and where SuperTrend log data is saved.

What Is Remote SuperTrend Logging?

Remote SuperTrend logging is a way to select a single computer that will save SuperTrend log data to a file. When you designate a computer to save SuperTrend log data, other computers running the same OptoDisplay project no longer save this data to a file. These other computers, however, will continue to collect SuperTrend information and display it on-screen.

Designating a remote computer to save SuperTrend data prevents the problem of multiple computers saving the same SuperTrend data to the same location, which results in duplicate data and slower graphing of log information. Remote SuperTrend logging also prevents file access problems that may occur when more than one computer tries to open a data file at the same time.

Choosing a Computer to Save SuperTrend Log Files

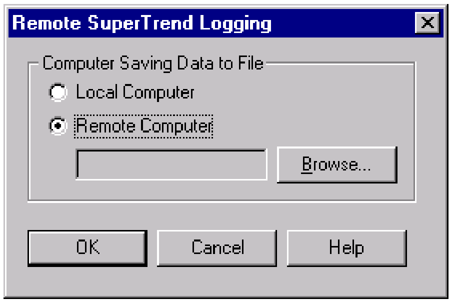
Follow the steps below to choose a local or remote computer that will save the SuperTrend log files. If you select a remote computer, it must be running the same OptoDisplay project as the local computer.

NOTE: Choosing a computer to save SuperTrend log files does ***not*** *select the location where these files are saved; it only designates the computer that will do the work of saving the file.*

If you plan to run the same OptoDisplay project on multiple computers *and* these computers will save SuperTrend data to the same location, it is recommended that you select a remote computer—also running the project—to improve the performance of SuperTrend graphing and file access.

1. Select Configure→Remote SuperTrend Logging.

   The Remote SuperTrend Logging dialog box appears.



2. Do one of the following:

   - To have the local computer save SuperTrend data to a file, select Local Computer and click OK.

     The Local Computer setting will apply to each computer that is running this OptoDisplay project, which means that each computer will save a SuperTrend log file.

   - To have a remote computer running the OptoDisplay project save SuperTrend data to a file, do the following:

     i. Select Remote Computer and click Browse.

     ii. Navigate in the file tree that appears (similar to Windows Explorer) until you find the computer that will save SuperTrend data.

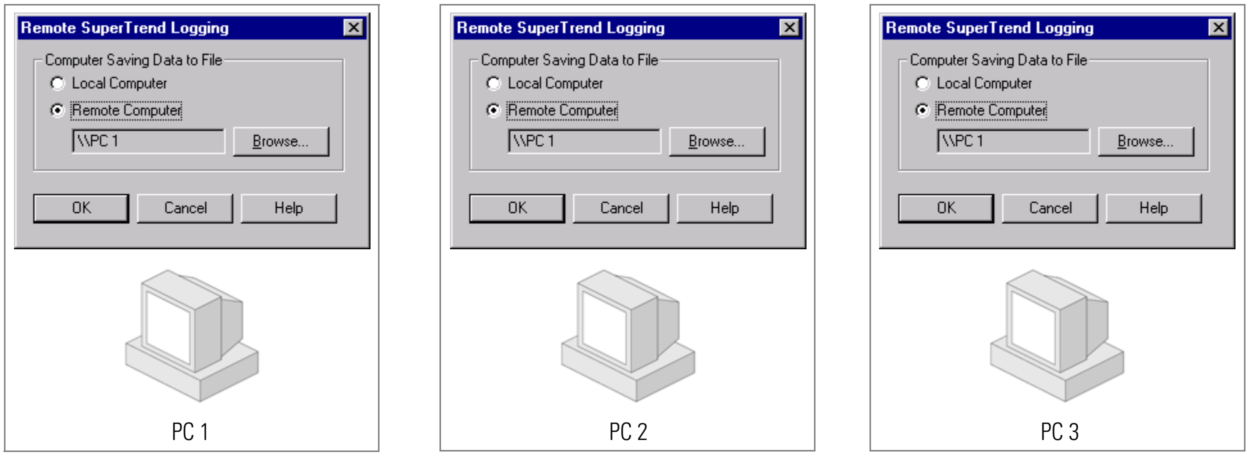
     iii. Select that computer in the list and click OK.

     When your project is running, only that remote computer will save SuperTrend data to the log file. The Remote Computer setting will apply to each computer that is running this OptoDisplay project. With this setting selected, each computer will display the data, but will **not** save it to a file.

Remote SuperTrend Logging Example

The following example shows one way that remote SuperTrend logging might be configured for multiple computers running the same OptoDisplay project.

The illustration below shows the required settings to have the computer PC 1 save SuperTrend log files. With these settings, computers PC 2 and PC 3—all running the same OptoDisplay project—would display SuperTrend data on-screen, but would not save SuperTrend log files.



Remote SuperTrend Logging

Computer Saving Data to File

○ Local Computer
● Remote Computer

\\PC 1

Remote SuperTrend Logging

Computer Saving Data to File

○ Local Computer
● Remote Computer

\\PC 1

Remote SuperTrend Logging

Computer Saving Data to File

○ Local Computer
● Remote Computer

\\PC 1

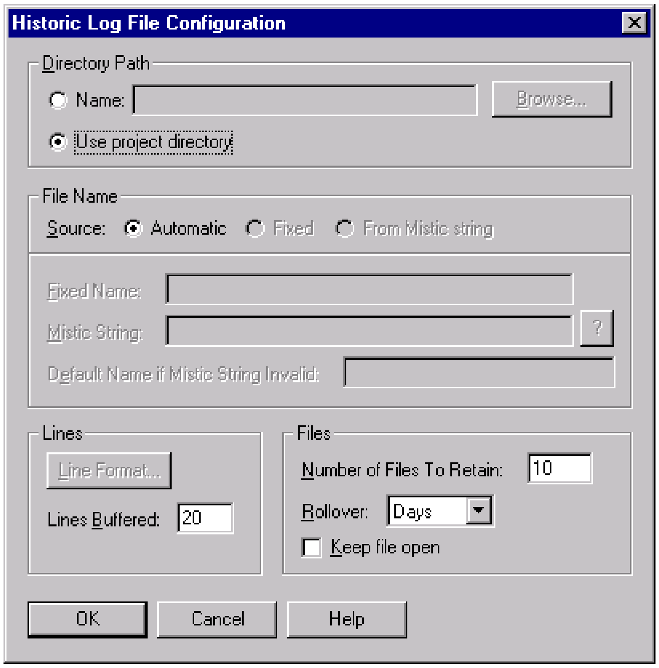
Choosing a Location for SuperTrend Log Files

After selecting a local or remote computer that will save SuperTrend log files, you must select the location where these files will be saved. SuperTrend log files can be saved in the project directory of the computer running the OptoDisplay project, or in a remote directory (for example, on a network server).

To choose where SuperTrend log files will be saved, do the following:

1. Double-click on a SuperTrend to open the SuperTrends Setup dialog box.
2. Click the Log File button.

The Historic Log File Configuration dialog box appears.



Historic Log File Configuration

Directory Path

○ Name:

● Use project directory

File Name

Source: ● Automatic ○ Fixed ○ From Mistic string

Fixed Name:

Mistic String:

Default Name if Mistic String Invalid:

Lines

Lines Buffered: 20

Files

Number of Files To Retain: 10

Rollover: Days

□ Keep file open

3. Do one of the following:

- To save SuperTrend log files locally in the OptoDisplay project directory, select Use Project Directory and click OK.

  SuperTrend log files will now be saved locally in the same directory as your OptoDisplay project. The Use Project Directory setting will apply to each computer that is running this OptoDisplay project, which means that each computer will save SuperTrend log files in its local project directory.

  NOTE: If you have selected a remote computer to save SuperTrend log files, the Use Project Directory option will not be available. You must click Browse and select a directory from the list of network directories that appears, even if the directory you select is the same as the project directory.

- To save SuperTrend log files in a location other than the OptoDisplay project directory, follow these steps:

  i. Select Name and click Browse.

  If you have selected remote SuperTrend logging, the Choose Remote Logging Location dialog appears. Otherwise, the Select Directory dialog box appears.

  ii. Navigate in the file dialog box that appears until you find a computer and directory (Choose Remote Logging dialog box) or mapped local or network drive and directory (Select Directory dialog box) where you want to save SuperTrend log files.

  iii. Select the directory where the files will be saved and click OK.

  When your project is running, SuperTrend log files will be saved in the remote directory you specified. This setting will apply to each computer that is running this OptoDisplay project; each computer will save SuperTrend log files in the remote directory you selected.

Saving a Log in Text or Binary Format

When you configure the SuperTrend object, you can choose to save a SuperTrend historic log file in either text or binary format.

Text—When saved as an ASCII text file, a SuperTrend historic log file includes a header with information about tags assigned to the SuperTrend pens. One advantage of saving a log file in text format is accessibility—the file can be opened and viewed using any text editor, such as Windows Notepad. The disadvantage to this file format is that when a large amount of historical trend information is opened and graphed in a SuperTrend chart, the chart may be drawn slowly.

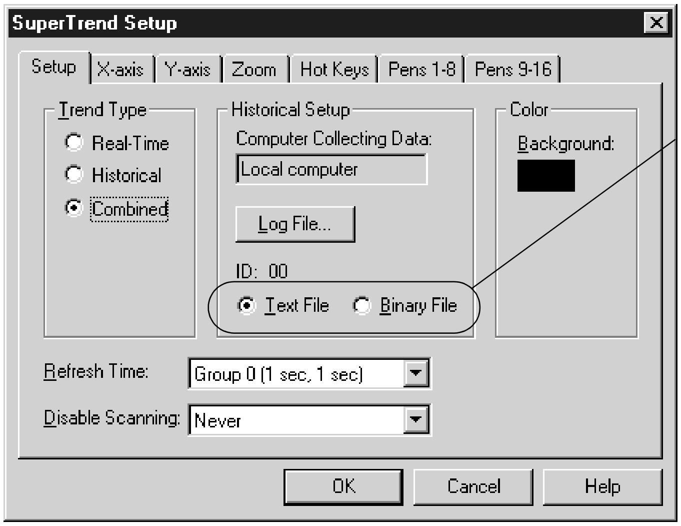
Binary—When a SuperTrend historic log file is saved in binary format, the file does not include a header containing information about tags assigned to the SuperTrend pens. A major advantage to saving a log file in binary format is speed—historical trend information from a binary file is usually graphed much more quickly than when using the same information from a text file. A disadvantage to binary file format is that the data cannot be opened and read using a text editor.

Changing Log File Formats

To change the file format of an existing SuperTrend historic log file between text and binary in OptoDisplay Configurator, perform the steps listed below. (You will need to have previously run your OptoDisplay project and collected historical data for log files to be present.)

1. Double-click a previously configured SuperTrend object that has generated one or more historic log files.

   The SuperTrend Setup dialog box appears with either Text File or Binary File selected, depending on how you originally configured the SuperTrend.



Trend Type: ○ Real-Time ○ Historical ● Combined

Historical Setup
Computer Collecting Data: Local computer
ID: 00
● Text File ○ Binary File

Color
Background: ■

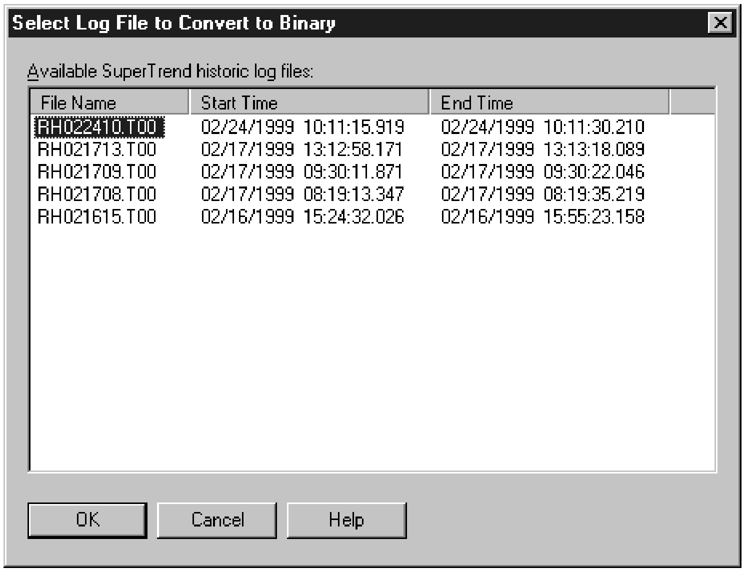
Refresh Time: Group 0 (1 sec, 1 sec)

Disable Scanning: Never

Options to choose the file format of a SuperTrend historic log file

2. If Text File is selected, choose Binary File; if Binary File is selected, choose Text File.

   The Select Log File to Convert to dialog appears. In the example below, text files that can be converted to binary format appear in the list:


Select Log File to Convert to Binary
Available SuperTrend historic log files:
OK
Cancel
Help

File Name	Start Time	End Time
RH022410.T00	02/24/1999 10:11:15.919	02/24/1999 10:11:30.210
RH021713.T00	02/17/1999 13:12:58.171	02/17/1999 13:13:18.089
RH021709.T00	02/17/1999 09:30:11.871	02/17/1999 09:30:22.046
RH021708.T00	02/17/1999 08:19:13.347	02/17/1999 08:19:35.219
RH021615.T00	02/16/1999 15:24:32.026	02/16/1999 15:55:23.158

3. Highlight a log file to convert and then click OK.

4. Now click OK to close the SuperTrend Setup dialog.

Viewing Binary Log Files

While you can't view the contents of a SuperTrend historic log file saved in binary format, a simple software utility (including source code) is included with OptoDisplay that lets you convert binary log files to text format in order to view their contents. (The utility can also convert text files to binary format.) Once you have converted a binary SuperTrend historic log file to text format, you can easily view its contents using a text editor or other application.

NOTE: This utility creates a separate, new file in text (or binary) format that is not used by OptoDisplay. The format of the original SuperTrend historic log file is not changed. If you want to change the format in which this original log file is saved, see "Changing Log File Formats" on page 7-19.

Important Guidelines for Using This Utility

- *Do not rename or modify any original SuperTrend historic log files.* These are files with the file extension .T*nn* (for example, .T00, .T02, etc.; the number depends on how many SuperTrends are saving historic data).
- If you rename the new files that are created by the utility, *do not use the name or file extension of the original SuperTrend historic log file.*

- *If you convert a text file to binary format, the header information in the text file will be removed.* This information cannot be recovered, even if you convert the binary file back to text format.

Converting a SuperTrend Log File for Viewing

To convert a SuperTrend historic log file, open a DOS window and at the command prompt enter:

```
STRNDCVT.EXE [log file]
```

where [log file] is the name of the SuperTrend historic log file to be converted. For example, to convert a log file named RH021615.T00, you would enter:

```
STRNDCVT.EXE RH021615.T00
```

The format change occurs automatically: If the log file is in binary format, it will be converted to text; the new text file has the extension .txt. If the file is in text format, it will be converted to binary; the new binary file has the file extension .bin.

Using XY Plots

You can use XY plots to graph real-time tag information. XY plots do not graph data over time, but instead plot points on a two-dimensional graph using data from two float or integer numeric tables in the OptoControl strategy. (See Opto 22 form 724, the *OptoControl User's Guide,* for information on using numeric tables in a strategy.)

The value in each element of the numeric tables defines the coordinates for a single point on the x-axis and y-axis coordinate system. The example below shows how two numeric tables, each having three elements, would be used to draw three consecutive points on an XY plot.

Table Element	Numeric_Table_1	Numeric_Table_2	XY Coordinates
0	3	8	(3,8)
1	5.25	10	(5.25,10)
2	2	3.3	(2,3.3)

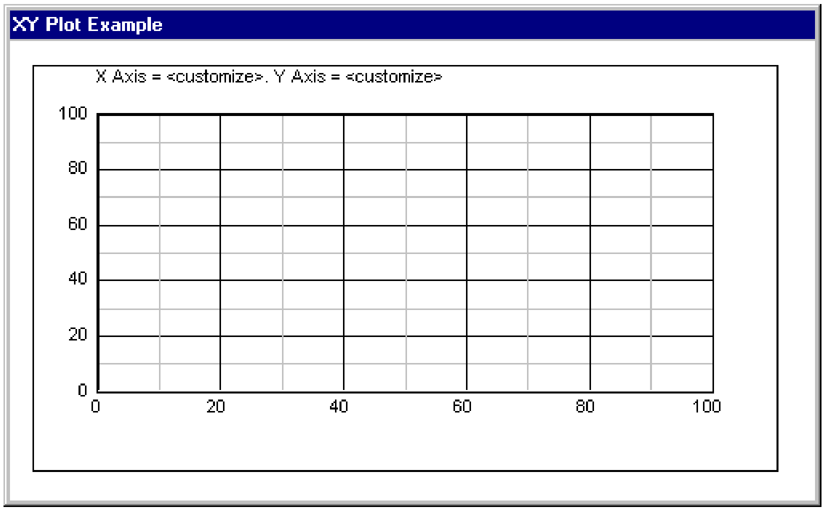
An XY plot is useful in applications where one value must be graphed against another value. Common examples in industrial settings include graphing temperature versus pressure, displacement versus input, or voltage versus current.

Creating an XY Plot

1. Select the XY Plot tool from the toolbox and position the cursor where you want the XY plot object to begin in the window.

2. Click the mouse button, drag the mouse to the desired size, and then release the mouse button.

The XY plot that appears should resemble the example below:



Y-Axis Layout

- Label Position = Bottom
- Max. Val = 100
- Min. Val = 0
- Major Divisions = 5
- Minor Divisions = 2

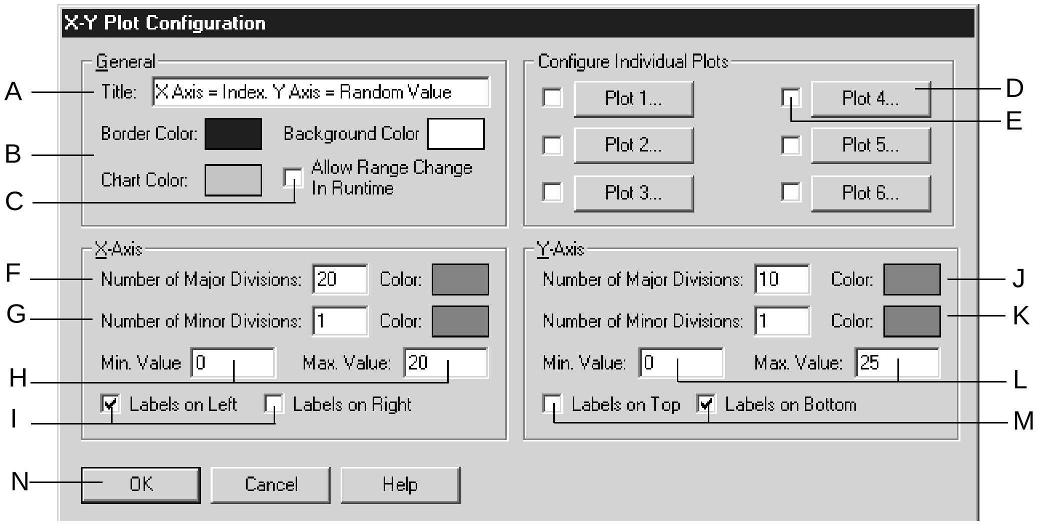
X-Axis Layout

- Label Position = Left
- Min. Val = 0
- Max. Val = 100
- Major Divisions = 5
- Minor Divisions = 2

Modifying an XY Plot

Choose the Select tool and double-click the XY plot.

The XY Plot Configuration dialog box appears:



Title: X Axis = Index, Y Axis = Random Value

Border Color: ■ Background Color: □

Chart Color: ▨ □ Allow Range Change In Runtime

□ Plot 1... □ Plot 4...

□ Plot 2... □ Plot 5...

□ Plot 3... □ Plot 6...

Number of Major Divisions: 20 Color: ▨

Number of Minor Divisions: 1 Color: ▨

Min. Value: 0 Max. Value: 20

☑ Labels on Left □ Labels on Right

Number of Major Divisions: 10 Color: ▨

Number of Minor Divisions: 1 Color: ▨

Min. Value: 0 Max. Value: 25

□ Labels on Top ☑ Labels on Bottom

A Enter the title of the XY plot here.

B Click a color button to enter the color for the chart, the chart's background, and the chart's border. In the Color dialog box that appears, choose a color and click OK.

C Select the Allow Range Change in Runtime checkbox to allow the user to change the x-axis and y-axis range values in OptoDisplay Runtime.

D Use the plot configuration buttons to define up to six individual plotted points in the XY plot. Each individual plot uses x-axis and y-axis coordinates from two OptoControl tags. You can also define the plotted point's color and width, and specify line style and whether a legend should appear. See "Configuring Individual Plots in an Object" on page 7-23 for more information.

E Check this box to display a configured individual plot (uncheck the box to hide the plot).

F Enter the number of major x-axis divisions for the XY plot. This is the number of main sections the graph is divided into. You can also choose a color for the major divisions by clicking the Color field. In the Color dialog box that appears, choose a color and click OK.

NOTE: For both x- and y-axis divisions, the lines dividing the major divisions appear thicker than the minor divisions.

G Enter the number of minor x-axis divisions for the XY plot. This will be the number of sections the major divisions are divided into. The minimum number of divisions is one.

You can also choose a color for the minor x-axis divisions by clicking the Color field. In the Color dialog box that appears, choose a color and click OK.

H Enter the minimum and maximum values for the x-axis.

I Enter the label position for the x-axis. By default, the x-axis is labeled on the left, but you can also choose to have the label on the right or on both sides.

J Enter the number of major y-axis divisions for the XY plot. This is the number of main sections the graph is divided into. You can also choose a color for the major divisions by clicking the Color field. In the Color dialog box that appears, choose a color and click OK.

NOTE: For both x- and y-axis divisions, the lines dividing the major divisions appear thicker than the minor divisions.

K Enter the number of minor y-axis divisions for the XY plot. This will be the number of sections the major divisions are divided into. The minimum number of divisions is one.

You can also choose a color for the minor y-axis divisions by clicking the Color field. In the Color dialog box that appears, choose a color and click OK.

L Enter the minimum and maximum values for the y-axis.

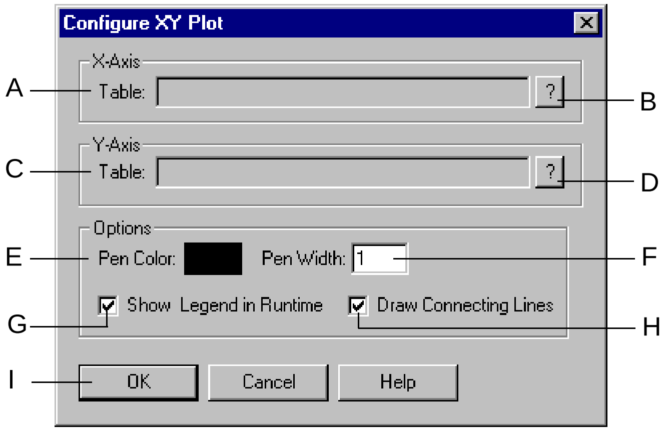
M Enter the label position for the y-axis. By default, the y-axis is labeled at the bottom, but you can also choose to have the label at the top, or at both top and bottom.

N Click OK to save your settings.

Configuring Individual Plots in an Object

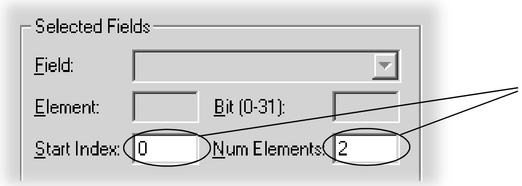
Click the configuration button for an individual plot in the XY Plot Configuration dialog box.

The Configure XY Plot dialog box appears:



A Enter an OptoControl tagname here that will provide the x-axis values. Click B to open the Tag Selection dialog box.

B To enter a tagname in A, click here. The Tag Selection dialog box is displayed so you can select a tag for a numeric table. For the table you select, also enter the starting index (usually 0) and the number of table elements to be used in the plot. The fields for these values are shown in the illustration below. Up to 50 table elements can be used for an individual plot. To learn more about configuring tags in your project, see “Configuring Tags” on page 4-5.



For a selected numeric table, enter a starting index (usually 0) and the number of table elements to use (50 maximum).

C (Same as A above, but sets the tag used for the y-axis.)

D (Same as B above.)

E Click here to choose a pen color. In the Color dialog box that appears, choose a color and click OK.

F Enter the width of the line you want created by the pen. The width is specified in pixels.

G Select the Show Legend in Runtime checkbox to have the names of the tags used appear under the graph’s x-axis.

H Select Draw Connecting lines to have lines connect each x-y coordinate.

I Click OK to save your settings.

Configuring Trigger-Based Events

Introduction

In this chapter, you will learn how to make different types of events occur based on the value of a tag in an OptoControl strategy. These events include saving a historic data log, launching an application, playing a sound, changing a window's state, downloading and uploading a recipe to the controller, and starting an alarm.

In This Chapter

What's a Trigger-Based Event? 8-1
Historic Data Logs 8-2
Launching Applications 8-11
Sounds 8-15
Window States 8-17
Recipes 8-19
Alarming 8-28

What's a Trigger-Based Event?

In OptoDisplay, you can make things happen based on the value of a tag in an OptoControl strategy. When the tag equals a specific value or falls within a defined range of values, it starts, or *triggers,* an event that you have specified.

You can use trigger-based events in many different ways. Here are a few examples:

- **Monitoring temperature**—Play a recorded warning sound to indicate an alarm condition if a tag exceeds a value.
- **Changing control system parameters for different products**—Download a new recipe (series of values) to a controller when a tag reaches a set value.
- **Logging non-standard conditions or errors**—Print a log whenever monitored tags fall outside a previously defined range of values.

Historic Data Logs

A historic data log lets you collect and store data from your control process to a file on your computer, or on a remote computer on a network. Once it is saved in a file, historic data about your control process can be used by applications such as Microsoft Excel to generate reports, or the data can be archived for later reference.

NOTE: To ensure that the correct time and date information appear in a historic data log, make sure to set the time and date on your PC prior to starting OptoDisplay.

By default, historic data logging begins when OptoDisplay starts scanning the controller for data, and ends when OptoDisplay stops scanning the controller for data. (Scanning starts when the OptoDisplay project is opened in Runtime, and stops when the project is closed.) You can use a start or stop trigger, however, to start or stop historic data logging only when a tag, for example, is within a range of preset values, or a preconfigured number of samples have been taken. Start and stop triggers may be attached to any controller variable.

Tag Types You Can Save to a Historic Log

You can record the following types of tags in a historic data log:

- Integers and integer tables
- Floats and float tables
- Strings
- Discretes.

With integer tables and float tables, you can select individual elements, groups of elements, or all elements in the table. See the *OptoControl User's Guide* for more information on working with tables in an OptoControl strategy.

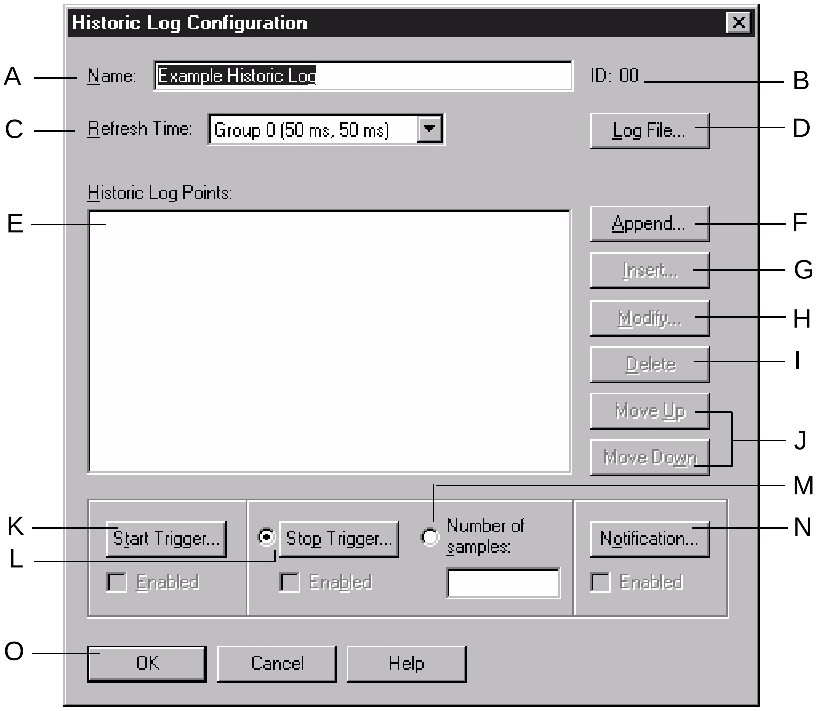
NOTE: To save data from more than one controller, you must create a separate historic log file for each controller that will be monitored. Data from multiple controllers cannot be saved in the same historic log file.

Configuring a Historic Data Log

To configure a historic data log in your OptoDisplay project, choose Configure➞Historic Data Log. In the Historic Logs dialog box that appears do the following:

- Click Add to create a new historic data log.
- Highlight an existing log and click Modify to change it.
- Highlight an existing log and click Delete to remove it.

If you are creating or changing a historic log file, the Historic Log Configuration dialog box will appear.



A Enter the name of the historic log here. Use this name to refer to the historic log group you're configuring. (This name does not affect the name of the historic log *file* that is saved to disk.)

NOTE: The name in this field must be different from all historic logs within the project or you will get an error message when you exit the dialog box.

B This field shows a unique numeric identifier for the historic log. This identifier, which starts out at 00 and increases sequentially, is used as the last two characters of the three-character file name extension for a historic log file. The first character of this file name extension is an uppercase "H", so with the identifier, a typical file name extension for a historic data log would be ".H00"

C Select a previously configured refresh time group to scan the historic log point tags. This scan rate applies to every log point configured within this historic log. For more information on setting up refresh time groups, see "Refresh Time Groups" on page 6-35.

D Click to specify the directory where the historic log file should be saved, the file name and format, and, if applicable, the rollover parameters for the file. See "Defining the Historic Data Log File" on page 8-4 for more information.

E This list shows all configured historic log points for this log file. The order of the points in the list (top to bottom) is the order in which the points will be logged. To change the order of the list, select a point, and then choose one of the Move buttons in J.

F Click to add a historic log point to the end of the historic log point list (E). See "Configuring a Historic Log Point" on page 8-7 for more information.

G Click to insert a historic log point above a highlighted historic log point.

H Lets you modify the highlighted historic log point.

I Deletes the highlighted historic log point from the list (E).

J Highlight the log point you want to move, and then click Move Up or Move Down to change the position of the point in the historic log point list.

K Click to configure the OptoControl tag that will start scanning the listed historic log points. Check the Enabled box to make the start trigger active. See "Configuring a Start or Stop Trigger" on page 8-7 for more information.

Since the start trigger can be activated only from a non-triggered state, you must also configure a stop trigger at L or a number of scan times at M.

L Click to configure the OptoControl tag that will stop scanning the listed historic log points. Check the Enabled box to make the stop trigger active. A stop trigger is required only when you have configured a start trigger. Additionally, a stop trigger is edge-sensitive and only activates on a false-to-true state transition. See page 8-7 for more information on setting up a stop trigger.

M Another way to stop scanning the historic log points is to set the number of samples, or times the points are scanned. Select Number of Samples, and then enter a discrete number of samples to take once the start trigger occurs.

N Click this button to assign a value to a tag when historic log sampling has stopped. Check the Enabled box to make notification active. See "Notification When a Trigger Has Stopped" on page 8-8 for more information.

O Click OK to save your settings and close the dialog box.

Now we'll look at the additional steps needed to complete the settings in the Historic Log Configuration dialog box.

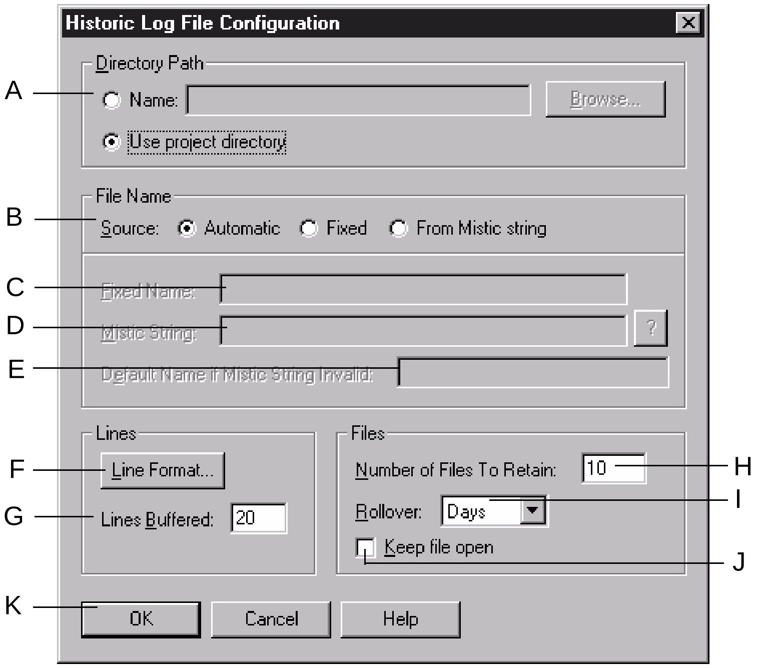
Defining the Historic Data Log File

You can name the historic data log file, determine where it will be located, configure how the data lines will appear, and define its rollover parameters in the Historic Log File Configuration dialog box.

NOTE: The historic data log file is not the same log file used to record data from a SuperTrend. A SuperTrend historic log file contains different data about log points, and is configured separately from a historic data log file. See "Using SuperTrend Log Files" on page 7-15 for more information. Alarm log files, which contain data about alarms that have been triggered, are also different from historic data log files. See "Alarm Logging Options" on page 8-42 for more information.

If you want to save data from more than one controller, you should create a separate historic log file for each controller that will be monitored. If data from multiple controllers is saved in the same historic log file, it is difficult to identify data that corresponds to a specific controller.

To define a historic data log file, click the Log File button in the Historic Log Configuration dialog box and enter information in the Historic Log File Configuration dialog box that appears.



Historic Log File Configuration

Directory Path

○ Name:

● Use project directory

File Name

Source: ● Automatic ○ Fixed ○ From Mistic string

Fixed Name:

Mistic String:

Default Name if Mistic String Invalid:

Lines

Lines Buffered: 20

Files

Number of Files To Retain: 10

Rollover: Days

□ Keep file open

A Choose the directory where the historic log file will be saved. Click Name and enter the directory path in the field next to it, or click Browse to find a directory path. Click Use Project Directory to save the historic log file to the OptoDisplay project directory. (This occurs by default if you don't specify a location.)

B Select Automatic, Fixed, or From Mistic string to determine how the historic log file name will be created, and then fill in additional information as needed for that option.

If the Automatic option is used, log files are named based on the rules described in "About Data Log File Names and Formats" on page 8-9. If you select this option, files are named using the rollover convention if required; this is described on page 8-10. If rollover is not used, the file is named "histlog.H*nn*," where *nn* is the two-digit historic log ID number. The Automatic option is used by default if you do not select another option.

C If you selected the Fixed option in B, enter a file name here. The file name can be any valid, eight-character DOS file name and doesn't require a three-character file extension. Note that if you don't specify an extension, one is *not* added automatically.

You must configure and enable a Start Trigger for this type of file (see page 8-16). When the trigger starts the historic data log, the new data is appended to the file if the file already exists. If the file doesn't already exist, it is created. The rollover naming convention doesn't apply to this type of file name.

D If you selected the From Mistic string option, enter an OptoControl string tagname here. Use the Tag Selection button ? to quickly enter the tag containing the name of the historic log file. You must configure and enable a Start Trigger for this type of file (see page 8-16). When the trigger starts the historic log, the string containing the file name is read, and the new data is appended to the log file if the file already exists. If the file doesn't already exist, it is created. The rollover naming convention doesn't apply to this type of file name.

If the Mistic string in D is an invalid file name, the default name of the log file is created using the following rules:

- If the Mistic string is empty, the project directory is added to E and the extension is an uppercase "H" followed by the historic log ID number.
- If the Mistic string is not empty and a project directory is not specified as the directory path, the Name in A is added to E.
- If the project directory is specified as the path, or the previous step failed, the project directory is added to E and the extension is an uppercase "H" followed by the historic log ID number. If the project directory is read-only or there is not enough room left on the drive containing the project directory, an error message indicates the file could not be created.

E Enter a default file name in E in case the file name in D is invalid. The file name can be any valid, eight-character DOS file name. The three-character file extension is assigned by OptoDisplay, and will start with an uppercase "H" followed by the historic log's ID (for example: .H00 if the ID is 00).

F Click to configure the character, or delimiter, used to separate the data in the log file, to choose the type of quotes used for each data line, and where to insert carriage returns. You configure these parameters in the Line Format dialog box that appears. See page 8-9 for more information.

G Enter the number of lines of data your PC will save to a memory buffer before writing the information to the historic log file. When choosing a number, keep in mind that the lower the number of buffered data lines, the more frequently the computer has to write to the file. Alternately, the higher the number of data lines buffered in memory, the more data that will be lost if your PC loses power or has a system failure. A valid entry is any number between 0 and 999; the default is 20 lines.

H Enter the maximum number of historic log files that can be created using rollover before the oldest file is overwritten. For example, if you enter 10 and your rollover time period is set to hours, you will have 10 historic log files created for 10 hours of data before the oldest file is overwritten with new data. See page 8-10 for more information on rollover settings.

I Choose the rollover time period here. Select None to have all logged data placed in a single data file named HISTLOG.H*nn*, where *nn* is the two-character identifier assigned to the historic log. Logging begins when the Start Trigger is activated, and data collected will be appended to the existing data file. The size of the file is limited only by available disk space.

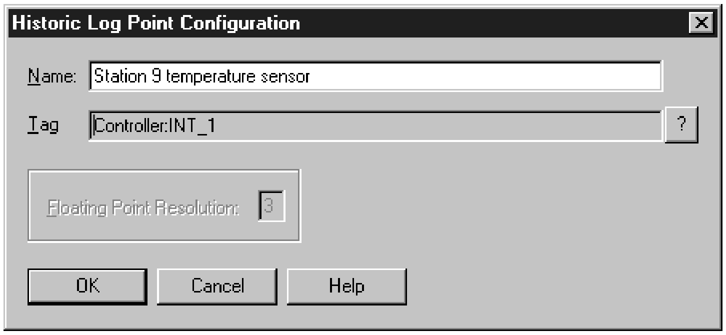
J Select Keep file open to leave the log file open to allow data to be appended to the historic log file more quickly. If you leave this box unchecked (the default setting), the file is closed after each time data is written to it. This provides greater data integrity than leaving the file open.

K Click OK to save your settings and close the dialog box.

Configuring a Historic Log Point

1. To add or change a historic log point in the Historic Log Configuration dialog box, click Append or Insert to add a point, or click Modify to change a point.

   The Historic Log Point Configuration dialog box appears:



Historic Log Point Configuration

Name: Station 9 temperature sensor

Tag Controller:INT_1

Floating Point Resolution: 3

2. (Optional) Enter a user-defined name for the historic log point.

3. Click the Tag Selection button ? and select an OptoControl tag to be a historic log point. See "Configuring Tags" on page 4-5 for more information about selecting tags.

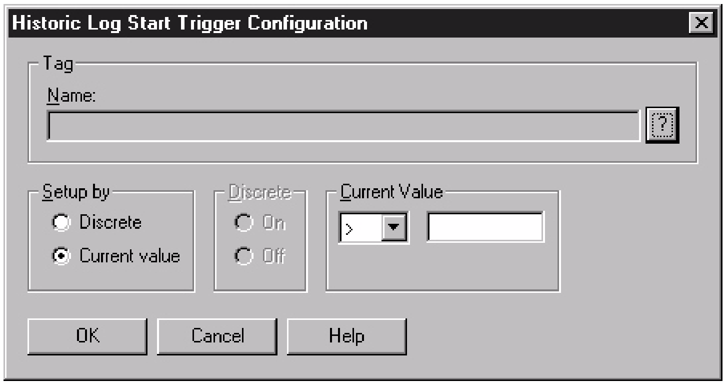
4. (Optional) If you picked a tag of type float, enter a number in the Floating Point Resolution box to specify how many places after the decimal point you want recorded.

5. Click OK to save your settings and close the dialog box.

Configuring a Start or Stop Trigger

1. To configure which tag and value will start or stop historic logging, click Start Trigger or Stop Trigger in the Historic Log Configuration dialog box.

   The Historic Log Configuration dialog box for either Start Triggers or Stop Triggers appears. These dialog boxes are identical. (The Historic Log Start Trigger Configuration dialog box is shown below.)



Historic Log Start Trigger Configuration

Tag

Name:

Setup by
○ Discrete
● Current value

Discrete
○ On
○ Off

Current Value
>

2. Click the Tag Selection button ? and select an OptoControl tag to be a Start or Stop Trigger.

   See "Configuring Tags" on page 4-5 for more information about selecting tags.

3. Select Discrete or Current Value in the Setup By group.

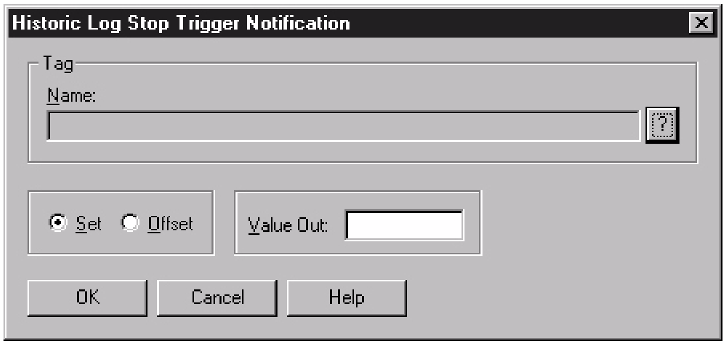
   Discrete makes the tag's on or off state trigger the historic log. Current Value sets the tag value that will trigger the historic log. To set a Current Value, select an operator in the drop-down menu, and then enter a value to compare the tag to.

Notification When a Trigger Has Stopped

When historic logging has stopped, you can set a tag to a given state or value. This tag setting will act as a flag to indicate data isn't being added to the log file anymore.

1. Click Notification in the Historic Log Configuration dialog box.

   The Historic Log Stop Trigger Notification dialog box appears:

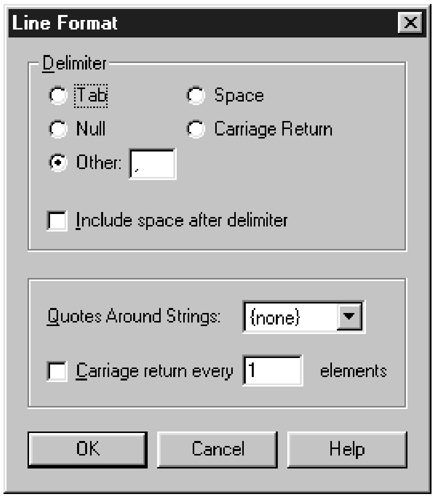


2. Click the Tag Selection button ? to quickly select an OptoControl tagname. See "Configuring Tags" on page 4-5 for more about the Tag Selection dialog box.

3. Select Set or Offset and enter the appropriate value in the Value Out field. Choose Set to replace the tag's current value with the number in the Value Out field. Choose Offset to add that number to the tag's current value.

Setting Log File Line Format

1. To define how lines of data are stored in the historic log file, click Line Format in the Historic Log File Configuration dialog box. The Line Format dialog box appears:



Line Format

Delimiter

○ Tab ○ Space

○ Null ○ Carriage Return

● Other: ,

□ Include space after delimiter

Quotes Around Strings: (none)

□ Carriage return every 1 elements

2. In the Line Format dialog box, select from the choices in the Delimiter group a character (delimiter) that will separate data in the log file. To use a delimiter that's not listed, choose Other and enter the character you want to use. Select Include space after delimiter to put a space after each delimiter.

3. From the choices in the drop-down list "Quotes Around Strings," select the quotes that will appear around each string in the log file.

4. To insert a carriage return after a certain number of data elements, select the check box "Carriage return every" and enter the number of data elements.

   The maximum number of elements that can be entered is 99,999. This option is intended for historic logs with very long data lines which are read by programs that cannot handle long data lines. The date and time information at the beginning of a data line are not counted as data elements. See "About Data Log File Names and Formats" below for more information about data elements in log files.

About Data Log File Names and Formats

Naming Log Files

There are three ways you can name a historic log file: by using a fixed name, by building the name using a string tag, or by letting the file name be created automatically. If you let OptoDisplay create the file name automatically, the file name will be histlog.H##, where ## is the two-character identifier assigned to the historic log by the Configurator. The .H## is the common extension that identifies all historic log files.

Naming Files Using Rollover

File rollover is used to divide historic log information among several data files. You can configure how often a new data file is created; after the time limit has expired, another historic log file is created and data is rolled into the new file.

Historic log files with names determined automatically by OptoDisplay use the rollover format (see "Naming Log Files" on page 8-9). The rollover format does not apply to files with fixed names or file names constructed from OptoControl strategy string tagnames.

Historic log files using file rollover follow this naming pattern:

- Months: RMyymm.H##
- Days: RDyymmdd.H##
- Hours: RHmmddhh.H##

where yy= year, mm= month, dd= day, hh= hour, and ## represents the two-character historic log ID number.

The rollover time period for historic log files can be based on months, days, or hours.

Hours If hours are selected as the rollover period, a new data file is created at the top of every hour. For example, if data logging were triggered at 8:30 a.m., the first data file would contain data from 8:30 a.m. to 9:00 a.m. Thereafter, data files will contain one hour's worth of data for every hour thereafter, 9:00 a.m. to 10:00 a.m., 10:00 a.m. to 11:00 a.m., etc.

Days If days are selected as the rollover period, a new data file is created every day at midnight. For example, if data logging were triggered at 7:00 p.m. on the 5th, the first data file would contain data from 7:00 p.m. to 12:00 a.m. on the 5th. Thereafter, data files will contain data from midnight the 5th to midnight the 6th, midnight the 6th to midnight the 7th, etc.

Months If months are selected as the rollover period, a new data file is created on the first day of every month at midnight. For example, if data logging started on January 27th, the first data file would contain data from the 27th of January to the 31st of January. Thereafter, data files will contain data from the 1st of February to the end of February, the 1st of March to the 31st of March, etc.

Data Log Elements

Historic data logs consist of header lines and data lines.

Header Line The first line of the file, a header line shows the name of each data field. Lines of data samples then follow the header line. Every time OptoDisplay is closed and restarted, a new header line is appended to the log file, so a log file may have more than one header line.

Here's an example:

```
Date,Time,CNTR1:Float.TEMP208,CNTR1:Float.PRES209,CNTR1:Float.LEVEL218
```

Date and **Time** show where timestamp information will appear in the data lines.

CNTR1:TEMP208, CNTR1:PRES209, and **CNTR1:LEVEL218** show that information will be recorded for three OptoControl tags: TEMP208, PRES209, and LEVEL218. These tags are all on the controller named CNTR1.

Data Lines Data lines follow a header line, and have the following format:

Date<delimiter>**Time**<delimiter>**TAG1**<delimiter>**TAG2**. . .**TAG1000**<crlf>

Date is the current system date with the format: YYYY/MM/DD, where YYYY=year, MM=month, DD=day.

Time is the current system time with the format: hh:mm:ss, where hh=hour, mm=minute, ss=seconds.

TAG1...TAG1000 are valid OptoControl tags with the format: Controller_Name:Item_Type.Tag.

<delimiter> is any printable ASCII character.

<crlf> is a carriage return, line feed.

Here's an example of what the file may look like:

```
Date,Time,Cookie:Float.TEMP208,Cookie:Float.PRES209,Cookie:Float.LEVEL218
1996/03/01,17:00:00,120.02,14.96,12.09
1996/03/01,18:00:00,120.06,14.98,12.03
1996/03/01,19:00:00,120.03,14.99,12.02
1996/03/01, 20:00:00,120.04,15.01,12.05
```

In this sample file, data is being sampled every hour from a controller named "Cookie," and a temperature (TEMP208), pressure (PRES209), and tank level (LEVEL218) are being recorded.

Launching Applications

You can use OptoDisplay to start, or launch, other applications in two ways:

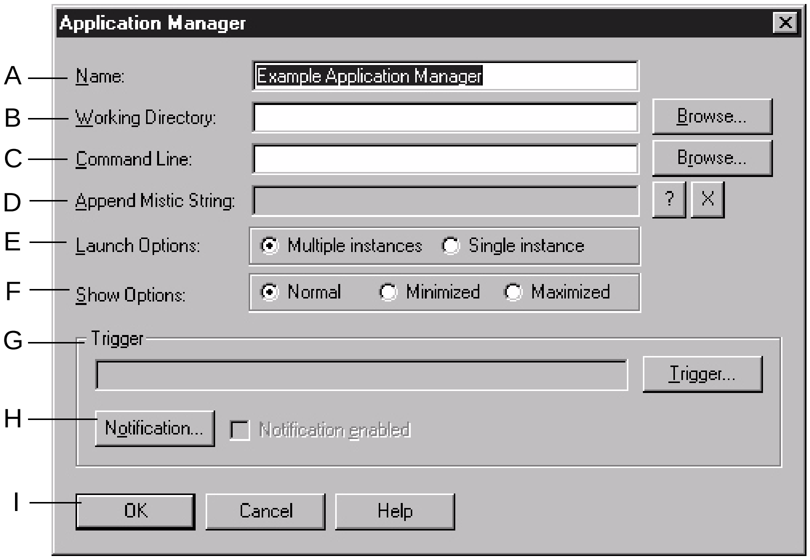
- By configuring a dynamic attribute for a graphic, and then selecting the graphic during Runtime. See Chapter 6, "Using Animated Graphics" to learn how to do this in OptoDisplay Configurator.
- By configuring an application manager to associate a tag with an application, and then launching the application using triggers. This is the method of starting an application we will cover in this section.

Configuring an Application Launch

To use OptoDisplay Configurator to configure an application launch using a trigger, choose Configure→Applications, and in the Application Managers dialog box that appears do the following:

- To create a new application manager, click Add. You can configure up to 1,000 application managers per project.
- To change an existing application manager, highlight it and click Modify.
- To remove an existing application manager, highlight it and click Delete.

If you are creating or changing an application manager, the Application Manager dialog box will open:



Application Manager

Name: Example Application Manager

Working Directory: Browse...

Command Line: Browse...

Append Mistic String: ? X

Launch Options: ● Multiple instances ○ Single instance

Show Options: ● Normal ○ Minimized ○ Maximized

Trigger — Trigger...

Notification... □ Notification enabled

OK Cancel Help

A Enter the name of the application manager here. This name refers to this application launch setup, and must be different from all application managers within the project.

B Enter the path name of the working directory to use after launching the application. If a working directory isn't specified, the current project directory is used. Click Browse to quickly choose a directory path in the Working Directory Selection dialog box (see page 8-13).

C Enter the path and file name of the program you want to run when the trigger condition occurs. Click Browse to quickly choose the path and file name in the standard Windows file selection dialog box.

D (Optional) Select a string tag from the OptoControl strategy to be appended to the Command Line string in C. If the appended string is a command line option, a space must be included in the Command Line string to separate it from the main command line

Use the Tag Selection button ? to select the string tagname. See"Configuring Tags" on page 4-5 for more information on tags. Click the Clear button X to quickly remove an entry from D.

E Select Single instance to have OptoDisplay Runtime check whether the trigger has already launched a session, or instance, of an application. If the trigger hasn't already launched the application, it will be started. Select Multiple instances to let the trigger start any number of sessions of the same application.

The Single Instance option doesn't prevent an application from being launched by other graphics and triggers, so multiple instances of an application can still occur. For example, if a trigger launches a Microsoft Word session, it can't launch any other application until this Word session ends. A toggled graphic or another trigger, however, could launch another session of Word, so two instances of the same application would be running concurrently.

Caution: *Running multiple instances of the same application on your PC is not recommended. Just like running several different applications at the same time, running multiple instances of the same application requires additional memory and other system resources. This may slow your PC's performance, as well as that of OptoDisplay Runtime.*

F Select how the application's window will appear on-screen: Normal, Minimized, or Maximized.

G Click Trigger to select the OptoControl tag used to trigger the application launch. The trigger is edge-sensitive and only activates from a non-triggered state. See "Selecting a Trigger to Launch an Application" on page 8-14 for more information.

H Click Notification to assign a value to a tag when an application is successfully launched. See "Notification When an Application Has Been Launched" on page 8-15 for more information. A check mark in the Notification enabled box indicates a notification tag is configured.

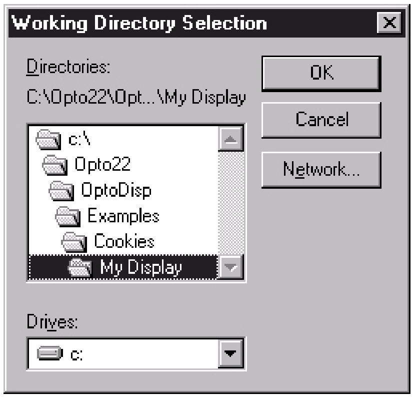
I Click OK to save your settings and close the dialog box.

Now we'll look at the additional steps needed to complete the settings in the Application Manager dialog box.

Selecting a Working Directory for a Launched Application

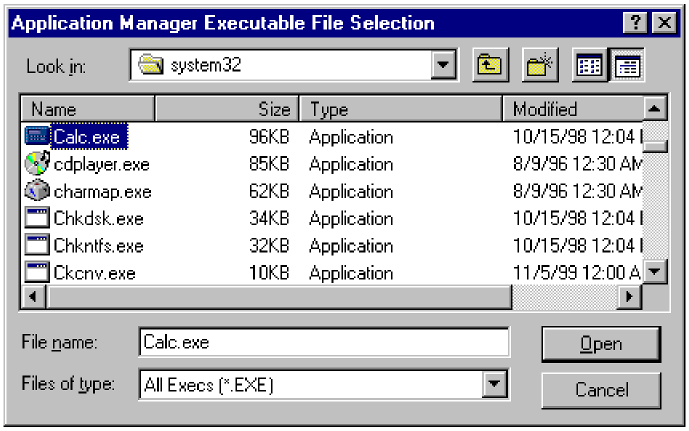
1. To set up the working directory the launched application should use, click Browse in the Application Manager dialog box.

2. In the Working Directory Selection dialog box that appears, navigate to the working directory path and click OK. (Click Network to select a network drive.)



Selecting the Application File to Run

1. To choose the application you want to run, in the Application Manager dialog box click the Browse button next to the Command Line field.
2. In the Application Manager Executable File Selection dialog box that appears, navigate to the application you'd like to run, highlight it, and click OK.



Application Manager Executable File Selection

Look in: system32

Name	Size	Type	Modified
Calc.exe	96KB	Application	10/15/98 12:04 I
cdplayer.exe	85KB	Application	8/9/96 12:30 AM
charmap.exe	62KB	Application	8/9/96 12:30 AM
Chkdsk.exe	34KB	Application	10/15/98 12:04 I
Chkntfs.exe	32KB	Application	10/15/98 12:04 I
Ckcnv.exe	10KB	Application	11/5/99 12:00 A

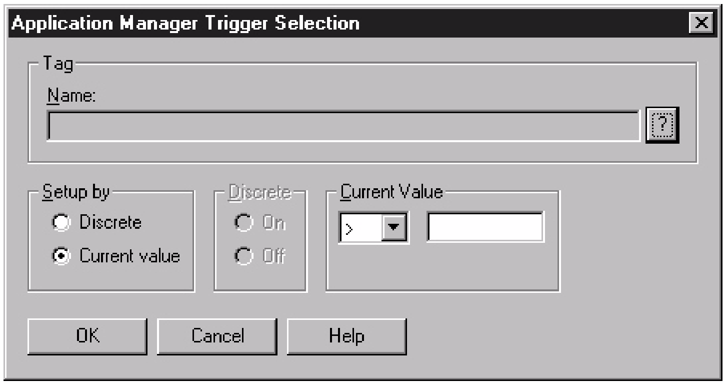
File name: Calc.exe

Files of type: All Execs (*.EXE)

Selecting a Trigger to Launch an Application

1. To select the trigger that will launch an application, click Trigger in the Application Manager dialog box.

   The Application Manager Trigger Selection dialog box appears:



Application Manager Trigger Selection

Tag

Name:

Setup by

○ Discrete

● Current value

Discrete

○ On

○ Off

Current Value

>

2. Enter the name of the trigger in the Name field. Use the Tag Selection button ? to quickly choose a tag from the Tag Selection dialog box.
3. Select Discrete or Current value in the Setup by group.

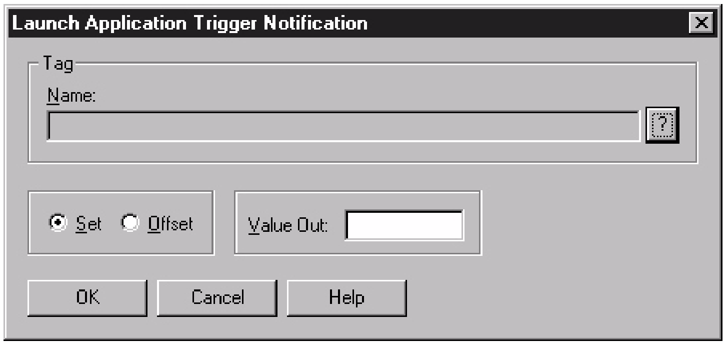
   Discrete makes the tag's on or off state trigger the application. Current Value sets the tag value that will trigger the application. To enter a value in the Current Value field, select an operator in the drop-down menu, and then enter a value to compare the tag to.

Notification When an Application Has Been Launched

You can set a tag to a given state or value when an application has been successfully launched by a trigger.

1. Click Notification in the Application Manager dialog box.

   The Launch Application Trigger Notification dialog box appears:



2. Click the Tag Selection button ? to quickly select an OptoControl tag as the flag to indicate the application was launched successfully. See "Configuring Tags" on page 4-5 for more information about configuring tags.

3. Select Set or Offset, and then enter the value that will be sent to the tag in the Value Out field. Choose Set to replace the tag's current value with the number in the Value Out field. Choose Offset to add that number to the tag's current value.

Sounds

Sounds can provide important feedback, such as alerts or warnings, for the operator using your OptoDisplay project. You can add sounds to your OptoDisplay project by configuring triggers to start and stop standard Windows sound files. To use this capability, the PC running the project must have a properly configured sound card and corresponding system software, as well as a set of speakers. You can use both digitized sound (.WAV) and MIDI music (.MID) files in your project.

Sounds can also be used with project alarms. If both an event and an alarm occur, causing multiple sounds to play, the sounds will alternate. See page 8-45 for more information on setting up sounds to work with alarms.

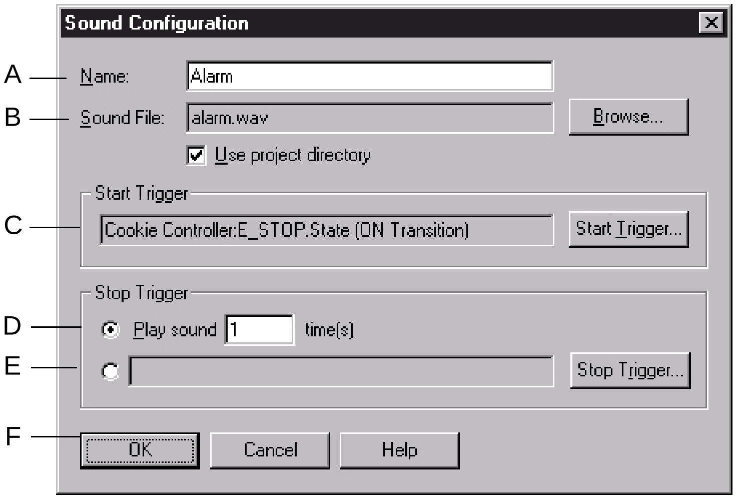
Configuring a Sound

To configure a sound, choose Configure→Sounds, and in the Sounds dialog box that appears:

- Click Add to add a new sound event. You can configure up to 1,000 sound events per project.
- Highlight an existing sound event and click Modify to change it.

- Highlight an existing sound event and click Delete to remove it.

If you are creating or changing a sound event, the Sound Configuration dialog box will appear:



Sound Configuration

Name: Alarm

Sound File: alarm.wav [Browse...]

☑ Use project directory

Start Trigger

Cookie Controller:E_STOP.State (ON Transition) [Start Trigger...]

Stop Trigger

● Play sound 1 time(s)

○ [Stop Trigger...]

[OK] [Cancel] [Help]

A Enter a name for the sound event. No two sound events in a project may have the same name.

B Click Browse and select the sound file you want to play in the standard Windows file selection dialog box that appears. If the Use project directory option is checked, you can only choose sound files located in your project directory.

C Click Start Trigger to configure a trigger to start playing the sound. See "Configuring Start and Stop Triggers for Sounds" below to learn how to configure this trigger.

D Select the Play sound option if you want the sound to play a specific number of times before stopping. Enter the number of times the sound will play in the field next to the option. The default value is one.

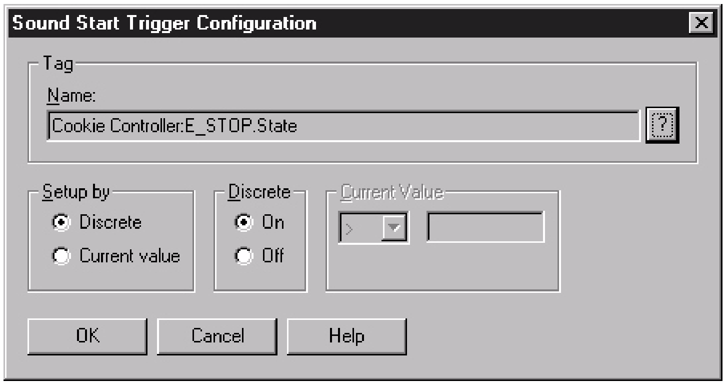
E Click Stop Trigger to configure a trigger to stop the sound that is playing. See "Configuring Start and Stop Triggers for Sounds" below to learn how to configure this trigger.

F Click OK to save your settings and close the dialog box.

Configuring Start and Stop Triggers for Sounds

1. To configure the tag and value that will start or stop a sound, click Start Trigger or Stop Trigger in the Sound Configuration dialog box

The Sound Trigger Configuration dialog box for either Start Triggers or Stop Triggers appears. These dialog boxes are identical. (The Sound Start Trigger Configuration dialog box is shown below.)



Sound Start Trigger Configuration

Tag

Name: Cookie Controller:E_STOP.State

Setup by: ● Discrete ○ Current value

Discrete: ● On ○ Off

Current Value

2. Use the Tag Selection button ? to quickly choose a tag from the Tag Selection dialog box.

3. Select Discrete or Current Value in the Setup by group. Current value sets the tag value that will trigger the sound. Select an operator in the drop-down menu, and then enter a value to compare the tag to. Discrete makes the tag's on or off state trigger the sound.

Window States

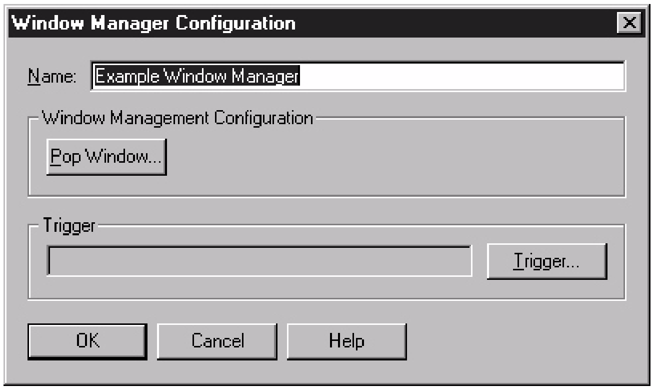
You can use a trigger to modify the appearance of windows that appear in Runtime. Changing the appearance of windows can be effective when you want to immediately attract an operator's attention, or to prompt operators to take the next action.

Configuring Trigger-Based Window States

To configure a window state, choose Configure→Window States, and in the Window Managers dialog box that appears:

- Click Add to add a new window manager. You can configure up to 1,000 window managers per project.
- Highlight an existing window manager and click Modify to change it.
- Highlight an existing window manager and click Delete to remove it.

If you are creating or changing a window manager, the Window Manager Configuration dialog box will appear:

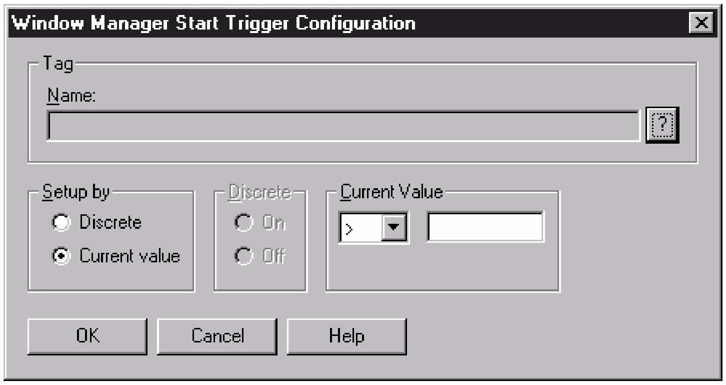


Name: Example Window Manager

To set up a window manager, do the following:

1. Enter the name of the window manager in the Name field.
2. Click Pop Window to configure window states for one or more windows. See “Windows” on page 6-29 for more information about changing window states.
3. Click Trigger to configure the trigger that will change the window state.

   The Window Manager Start Trigger Configuration dialog box appears:



Setup by: ○ Discrete ● Current value

Current Value: >

4. Use the Tag Selection button ? to quickly choose a tag from the Tag Selection dialog box.
5. Select Discrete or Current Value in the Setup By group. Current Value sets the tag value that will trigger the change in window state. Select an operator in the drop-down menu, and then enter a value to compare the tag to. Discrete makes the tag’s on or off state trigger the change in window state.

Recipes

Recipes are ASCII text files used to download data to a control engine and to upload data back to a PC running OptoDisplay. Recipes are very useful for batch processes where system variables are pre-determined and vary between runs or product types. You can also use recipes to save critical process settings and then create more recipes, or to restore a system after a failure.

Recipe *download* files are used to send process data and chart control instructions to a control engine (see "Recipe Download File" on page 8-20). Recipe *upload* files record values currently being used in table elements on a particular table (see "Recipe Upload File" on page 8-22). To create either a download or upload file, first see "Basic Recipe File Format" below.

This section contains the following topics:

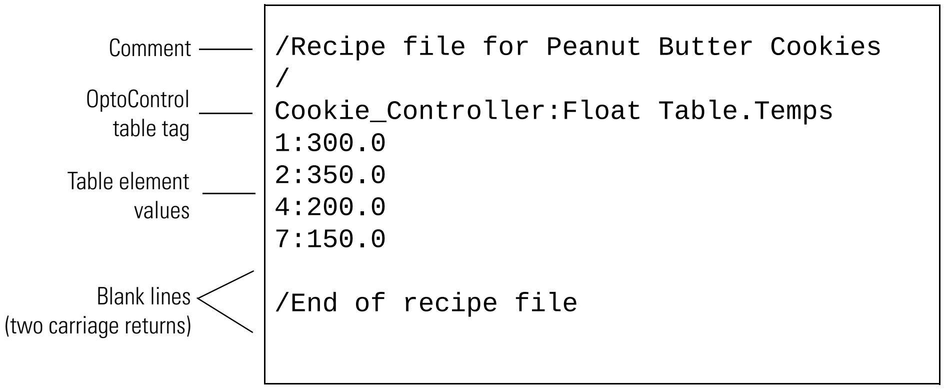
- "Basic Recipe File Format"
- "Recipe Download File" on page 8-20
- "Recipe Upload File" on page 8-22
- "Activating Recipe Downloads and Uploads" on page 8-23
- "Configuring a Recipe Download" on page 8-23
- "Recipe Upload File" on page 8-22

Basic Recipe File Format

Download and upload recipe files both use the basic recipe format described here. To create a recipe file, first read this section and then see either "Recipe Download File" on page 8-20 or "Recipe Upload File" on page 8-22.

A recipe text file contains one or more OptoControl integer, float, or string table tags and values. You can create or modify a recipe file using any text editor or word processor that can save files in ASCII format.

As shown in the example, each recipe file contains at least one OptoControl table tag followed by data values and blank lines. Recipes may also contain comments, and a download recipe might include chart control instructions as well.



```
/Recipe file for Peanut Butter Cookies
/
Cookie_Controller:Float Table.Temps
1:300.0
2:350.0
4:200.0
7:150.0

/End of recipe file
```

Comment Line—Any line that starts with a / (forward slash) is a comment, and is ignored by OptoDisplay. Use comments to explain the recipe and to make notes.

OptoControl Tag—Identifies the table tag in the OptoControl strategy that the recipe uses. Only integer, float, and string tags are valid tag types. The tag is in the following format:

<Control Engine Name>:<Table Type>.<Table Name>

- **<Control Engine Name>** is the Opto 22 control engine name.
- **<Table Type>** includes one of the following keywords: Integer Table, Float Table, or String Table. They identify the variable type and are separated from <Control Engine Name> by a colon (:).
- **<Table Name>** is the OptoControl table tagname. It must be of the type specified by <Table Type>. A period (.) separates it from <Table Type>.

Element values—These are the values downloaded to the control engine or uploaded to the PC.

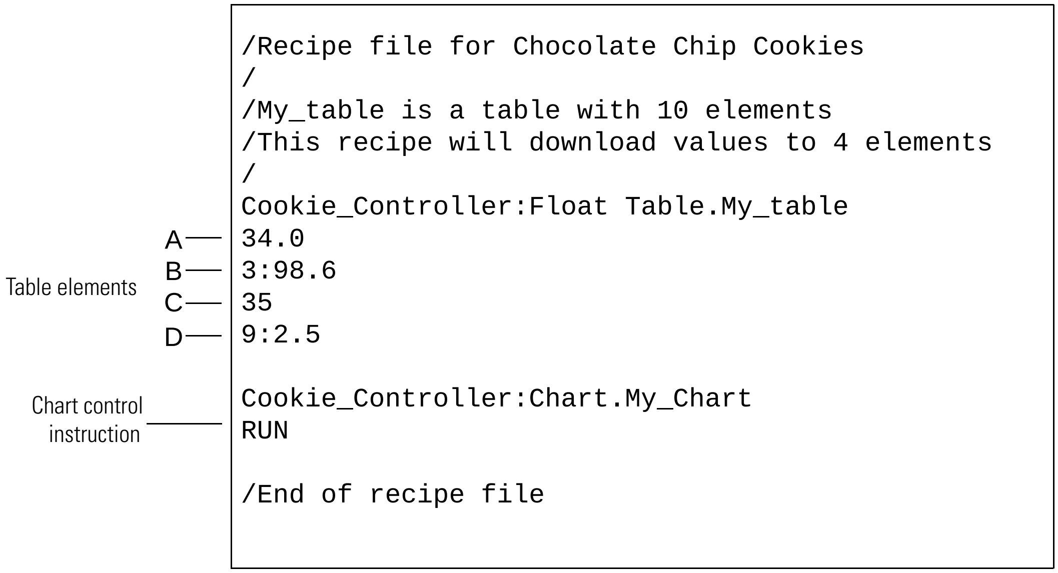
Blank line—This is a required element of a recipe file. Make sure to create a blank line at the end of a data list and at the end of the file by entering *two* carriage returns.

Recipe Download File

This section describes how to create a recipe download file. Before you begin, see "Basic Recipe File Format" on page 8-19. For a description of how to configure OptoDisplay for a recipe download, see "Configuring a Recipe Download" on page 8-23

A download file provides an efficient method for making changes to program variables without having to manually enter the data. For example, let's say you have a cookie factory that makes chocolate chip cookies in the morning and peanut butter cookies in the afternoon. After making the chocolate chip cookies you can download a recipe to the control engine that contains new values for the peanut butter cookies.

This example has four table elements and one chart control instruction:



```
/Recipe file for Chocolate Chip Cookies
/
/My_table is a table with 10 elements
/This recipe will download values to 4 elements
/
Cookie_Controller:Float Table.My_table
34.0
3:98.6
35
9:2.5

Cookie_Controller:Chart.My_Chart
RUN

/End of recipe file
```

Table elements
A
B
C
D
Chart control instruction

The **table elements** in the example are used as follows:

A No index reference is indicated for the first data value, 34.0. Therefore, by default it is assigned to zero or My_table[0].

B The next line, 3:98.6, has an index reference of 3. This means the value 98.6 would be sent to My_table[3], the fourth element of the table.

C The next value, 35, would be sent to My_table[4].

D The last data line, 9:2.5, would send 2.5 to the tenth element, My_table[9]. Make sure to leave the next line blank by entering two carriage returns after the last data line. The blank line indicates that all the data for that particular table has been specified. Do not put blank lines between lines that contain data for the table.

Chart control instructions such as RUN, STOP, SUSPEND, and CONTINUE control the execution state of one or more OptoControl charts when a recipe file is downloaded. You can use a chart control instruction to start a chart that can then move downloaded table values to other program variables.

Chart control instructions have the following format:

<Control Engine Name>:Chart.<Chart Name>
<Chart State>

- **<Control Engine Name>** is the name of the Opto 22 control engine.
- **Chart** identifies the keyword identifying this line as a chart instruction. “Chart” is separated from <Control Engine Name> by a colon (:).
- **<Chart Name>** is the OptoControl strategy chart name, and is separated from Chart by a period (.).
- **<Chart State>** is the chart instruction, and must include one of the following keywords: STOP, RUN, SUSPEND, or CONTINUE. This instruction must be on the line following the

<Chart Name>. The last line in a chart control instruction must be a blank line and contain only a carriage return.

Recipe Upload File

This section describes how to create a *format file* for a recipe upload. Before you begin, see "Basic Recipe File Format" on page 8-19. For a description of how to configure OptoDisplay for a recipe upload, see "Configuring a Recipe Upload" on page 8-25

A recipe upload records the values currently being used in table elements on a particular table. You can use these values to improve the production process. For example, using the cookie factory analogy, if after downloading the peanut butter cookie recipe and starting the cooking process, you then decide to add more sugar or cook the cookies longer, you can modify one or more of the table values (either by an OptoDisplay SendValue, or from OptoControl debugger) and then upload the new recipe. The next time you make peanut butter cookies, you can re-download the new recipe.

An upload format file tells OptoDisplay which table elements to upload to a *destination file* (or *results file*) on the PC. The format file has the basic recipe file format, but does not usually contain data.

For a format file to be valid, there must be at least one table element index (e.g., 2:), and there must be an index for every table element to be uploaded, even if starting at element zero.

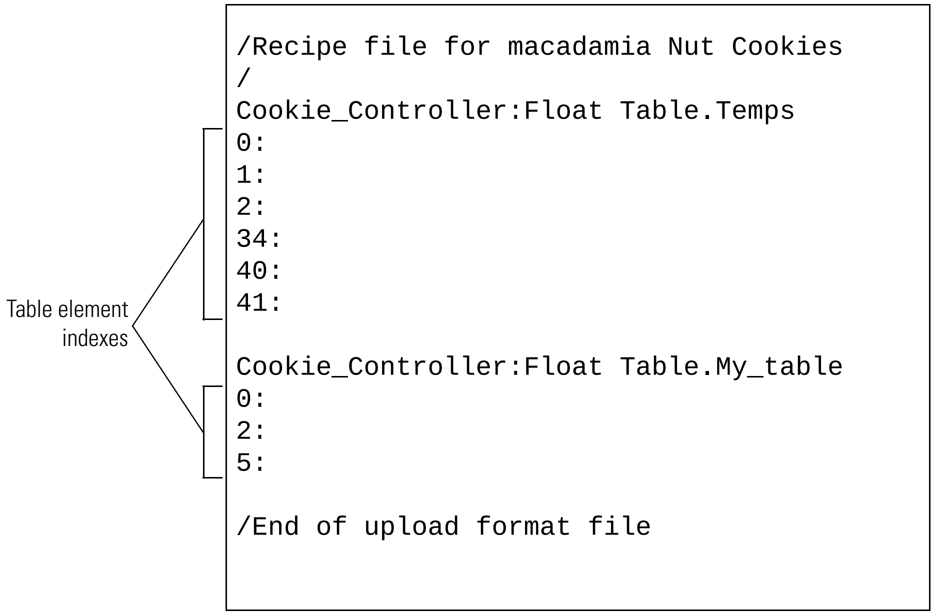


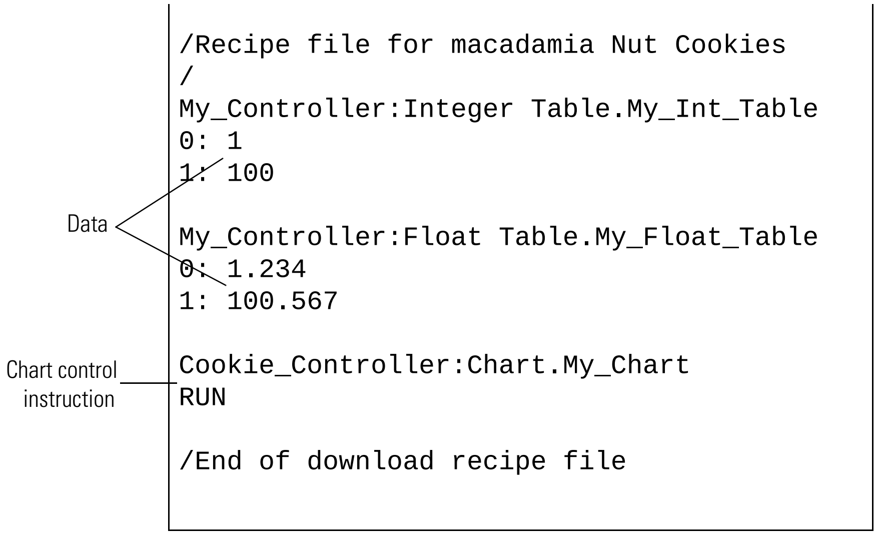
Table element
indexes

```
/Recipe file for macadamia Nut Cookies
/
Cookie_Controller:Float Table.Temps
0:
1:
2:
34:
40:
41:

Cookie_Controller:Float Table.My_table
0:
2:
5:

/End of upload format file
```

As shown in the example, you can include table element indexes for multiple tables. Remember to put a blank line before each new section of data and at the end of the file by entering *two* carriage returns at the end of the line.

Re-using a Destination File

After an upload, the destination file (or results file) contains data, and it may contain chart control instructions. If you re-use a destination file as a format file, the data and any control instructions are ignored by the control engine. Therefore, you can also use the destination (or results) file as a recipe download file.



```
/Recipe file for macadamia Nut Cookies
/
My_Controller:Integer Table.My_Int_Table
0: 1
1: 100

My_Controller:Float Table.My_Float_Table
0: 1.234
1: 100.567

Cookie_Controller:Chart.My_Chart
RUN

/End of download recipe file
```

Data
Chart control instruction

Activating Recipe Downloads and Uploads

You can configure a recipe to download or upload to a control engine in two ways:

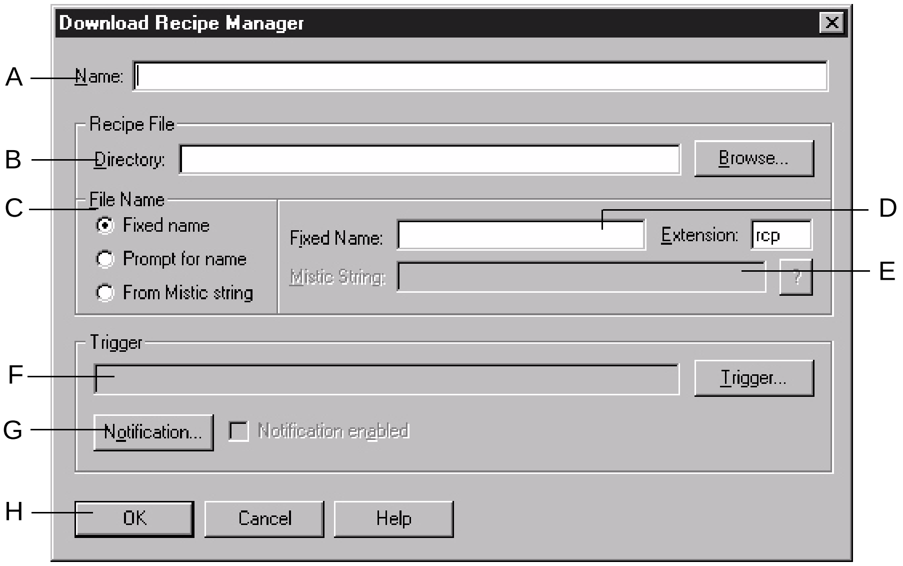
- **Animated Graphic**—By configuring a dynamic attribute for a graphic—when the operator selects the graphic, the recipe action will occur. See Chapter 6, "Using Animated Graphics" to learn how to do this.
- **Trigger**—By configuring a trigger that associates a tag with a recipe action—when the tag value meets a defined value, the recipe action will be triggered. We will cover this method of starting a recipe action in the next two sections, "Configuring a Recipe Download" and "Configuring a Recipe Upload."

Configuring a Recipe Download

To configure a recipe to download using a trigger (or "download recipe manager"), choose Configure→Recipes, and in the Download Recipes section of the Recipe Managers dialog box that appears, do the following:

- To create a new download recipe manager, click Add.
- To change an existing download recipe manager, highlight it and click Modify.
- To remove an existing download recipe manager, highlight it and click Delete.

If you are creating or changing a download recipe manager, the Download Recipe Manager dialog box appears:



File Name: ● Fixed name ○ Prompt for name ○ From Mistic string

Extension: rcp

□ Notification enabled

A Enter the name of the download recipe manager. This name is used to refer to the recipe group you're configuring in the Configurator. The name in this field must be different from all recipe managers in this project.

B Choose the directory the recipe file resides in. You can type the directory in the edit box or click Browse to quickly find and enter the path.

C Choose the source of the recipe file name.

- If you choose Fixed name, D is highlighted.
- If you choose Prompt for name, the operator will be asked for the name of the recipe file to be downloaded.
- If From Mistic string is selected, E is highlighted.

D If Fixed name was selected in C, enter the name of the recipe file located in directory B. Notice the file extension is .rcp.

E If From Mistic string was selected in C, click the Tag Selection button ? to enter a tagname of type string that contains the recipe file name. See "Configuring Tags" on page 4-5 for more information about using tags.

F Click Trigger to select an OptoControl tagname that will trigger the download recipe action. The trigger can be activated only from a non-triggered state. See "Selecting a Trigger to Start the Recipe Upload/Download" on page 8-27 to learn how to configure this trigger.

G Click Notification to assign a value to a tag when a recipe has successfully downloaded. Check the Enabled box to make notification active. See "Notification When Recipe Has Been Downloaded/Uploaded" on page 8-27 for more information.

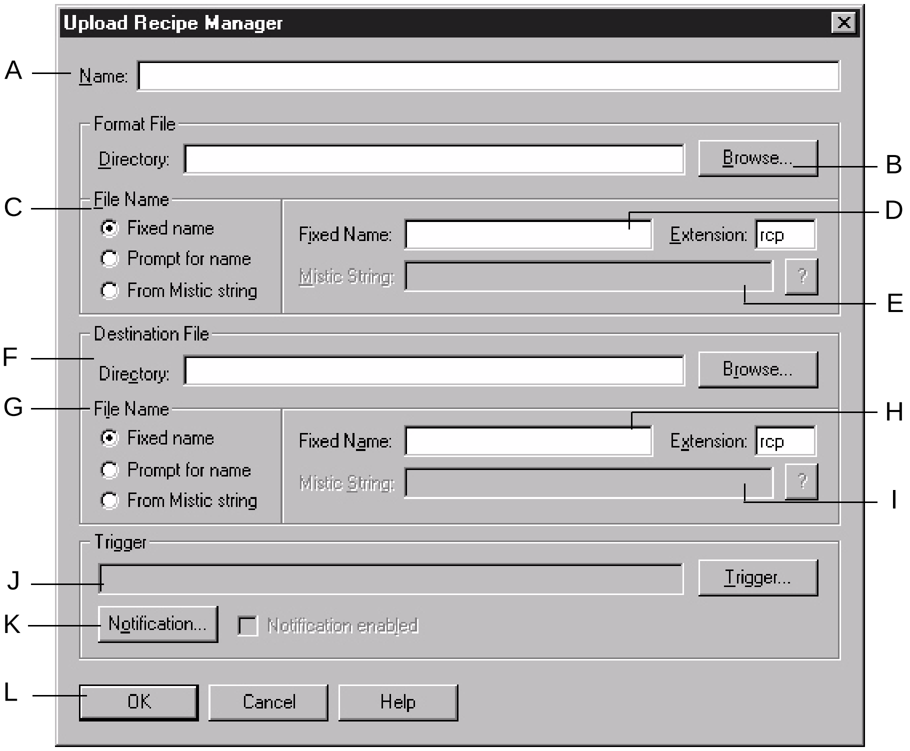
H Click OK to save your settings and close the dialog box.

Configuring a Recipe Upload

To configure a recipe to upload using a trigger (or "upload recipe manager"), choose Configure→Recipes, and in the Upload Recipes section of the Recipe Managers dialog box that appears, do the following:

- To create a new upload recipe manager, click Add.
- To change an existing upload recipe manager, highlight it and click Modify.
- To remove an existing upload recipe manager, highlight it and click Delete.

If you are creating or changing an upload recipe manager, the Upload Recipe Manager dialog box appears:



A Enter the name of the upload recipe manager. This name is used to refer to the recipe group you're configuring in the Configurator. The name in this field must be different from all recipe managers in this project.

B Choose the directory the recipe file resides in. You can type the directory in the edit box or click Browse to quickly find and enter the path.

C Choose the source of the recipe file name.

- If you choose Fixed name, D is highlighted.
- If you choose Prompt for name, the operator will be asked for the name of the recipe file to be uploaded.
- If From Mistic string is selected, E is highlighted.

D If Fixed name was selected in C, enter the name of the recipe file located in directory B. Notice the file extension is .rcp.

E If From Mistic string was selected in C, click the Tag Selection button ? to enter a tagname of type string that contains the recipe file name. See "Configuring Tags" on page 4-5 for more information about using tags.

F Click Browse and choose the directory location of the recipe file that will receive the information.

G Choose the source of the recipe file name.

- If you choose Fixed name, D is highlighted.
- If you choose Prompt for name, the operator will be asked for the name of the recipe file to be uploaded to.
- If From Mistic string is selected, E is highlighted.

H If Fixed name was selected in C, enter the name of the recipe file located in directory B.

I If From Mistic String was selected in C, click the Tag Selection button ? to enter a tagname of type string that contains the recipe file name. See "Configuring Tags" on page 4-5 for more information about using tags.

J Click Trigger to select an OptoControl tagname that will trigger the upload recipe action. The trigger can be activated only from a non-triggered state. See "Selecting a Trigger to Start the Recipe Upload/Download" on page 8-27 to learn how to configure this trigger.

K Click Notification to assign a value to a tag when a recipe has successfully uploaded. Check the Enabled box to make notification active. See "Notification When Recipe Has Been Downloaded/Uploaded" on page 8-27 for more information.

L Click OK to save your settings and close the dialog box.

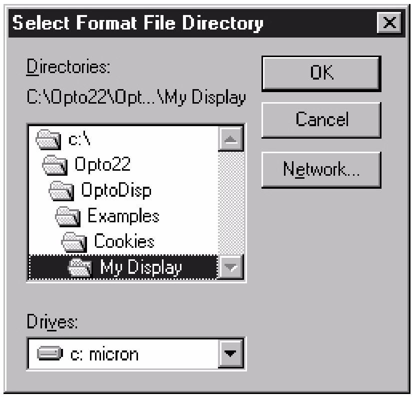
Now we'll look at the additional steps needed to complete the settings in the Download/Upload Recipe Manager dialog boxes.

Selecting a Download/Upload Recipe File Directory

1. To set up the directory that the recipe will be uploaded to or downloaded from, click Browse in the Download/Upload Recipe Manager dialog box.

   You will need to do this when you choose the directory for the download recipe file, the upload format file, or the destination upload file. Since all three options show very similar dialog boxes, we will only discuss one of them.

2. In the Upload Recipe Manager dialog box, click Browse.



Directories:
C:\Opto22\Opt...\My Display

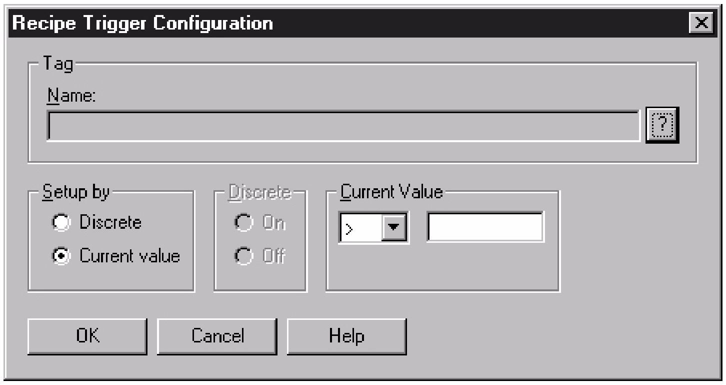
Drives: c: micron

3. In the Select Format File Directory dialog box that opens, navigate to the working directory path and click OK. (Click Network to select a network drive.)

Selecting a Trigger to Start the Recipe Upload/Download

1. To select the trigger that will start a recipe upload or download, click Trigger in the Download/Upload Recipe Manager dialog box.

   The Recipe Trigger Configuration dialog box appears:



Name:

Setup by
○ Discrete
● Current value

Discrete
○ On
○ Off

Current Value
>

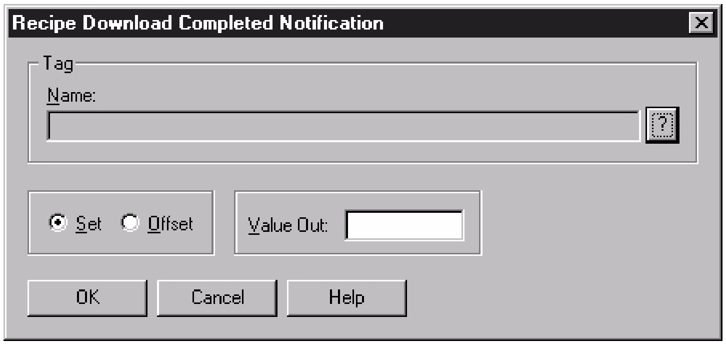
2. Enter the name of the trigger in the Name field. Use the Tag Selection button ? to quickly choose a tag from the Tag Selection dialog box. See "Configuring Tags" on page 4-5 for more information about tags.

3. Select Discrete or Current value in the Setup by group. Current value sets the tag value that will trigger the recipe download/upload. Select an operator in the drop-down menu, and then enter a value to compare the tag to. Discrete makes the tag's on or off state trigger the application.

Notification When Recipe Has Been Downloaded/Uploaded

1. Click Notification in the Download/Upload Recipe Manager dialog box.

The Recipe Download Completed Notification dialog box opens:



2. Click the Tag Selection button ? to quickly select an OptoControl tag as the flag to indicate the recipe upload or download was successful. See "Configuring Tags" on page 4-5 for more information about configuring tags.

3. Select Set or Offset, and then enter the value that will be sent to the tag in the Value Out field. Choose Set to replace the tag's current value with the number in the Value Out field. Choose Offset to add that number to the tag's current value.

Alarming

You can incorporate alarm features into your operator interface by adding an OptoDisplay alarm graphic. In a project, alarm graphics monitor alarm points associated with OptoControl tags, and alert the operator when pre-defined alarm conditions are reached. Alarm information can be logged to a file or sent to a printer.

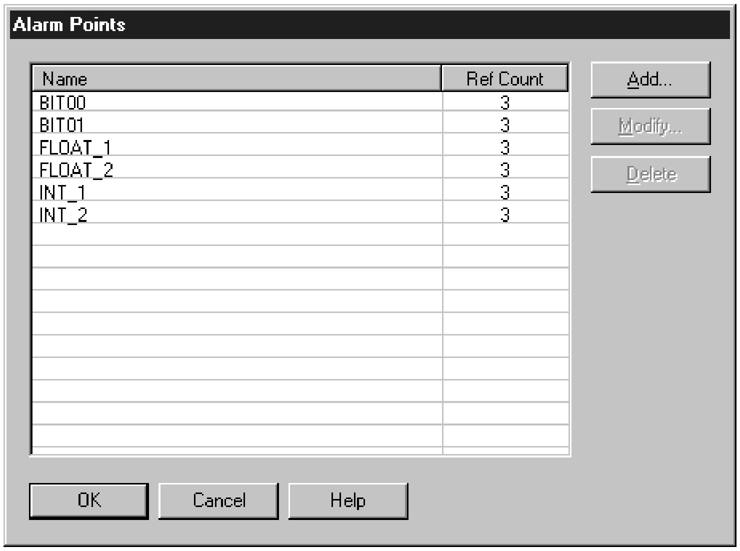
Configuring Alarm Points

Like a historic log point, an alarm point is linked to an OptoControl tag. When an alarm point matches a defined alarm state, it is displayed on all alarm graphics that include that alarm point. If configured to do so, an alarm point can also be sent to any configured file or printer log.

Once it is set up, an alarm point can be included in any number of alarm graphics in an OptoDisplay project. (Data for an alarm point can still be collected if the alarm point has not been included in a graphic.) You can easily generate a report that lists all the alarm points for a project; see "Viewing Dynamic Attributes" on page 6-32 for more information.

1. To configure an alarm point, choose Configure→Alarm Points.

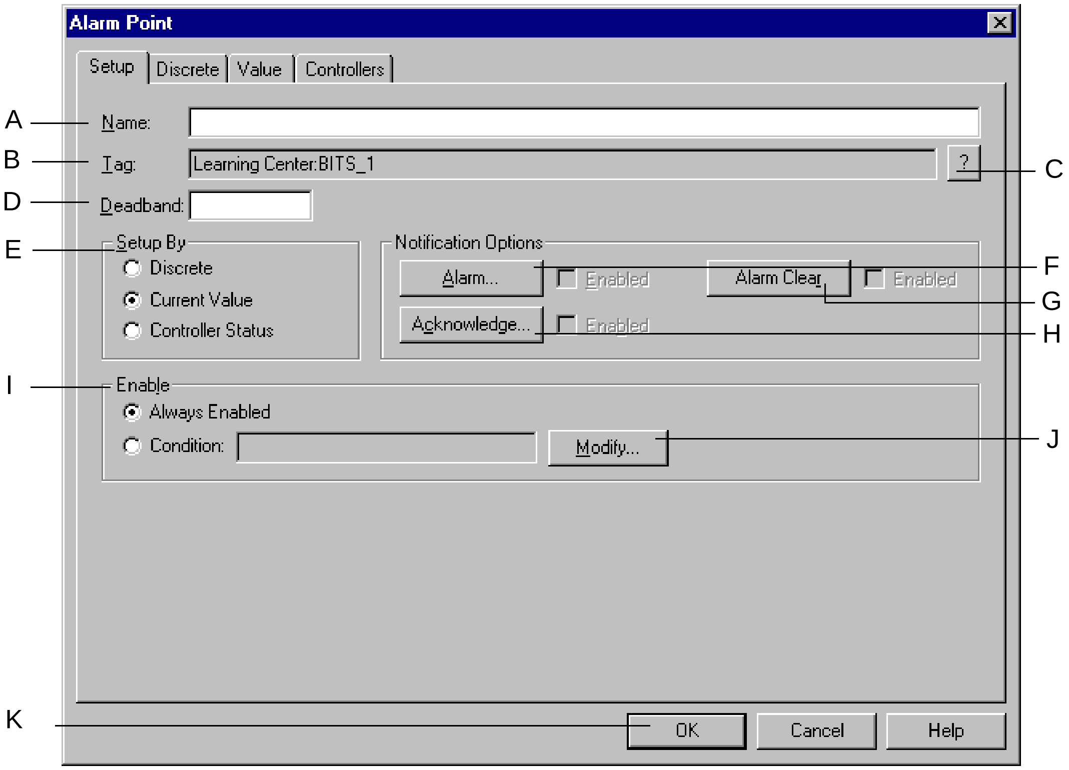
The Alarm Points dialog box that opens lists configured alarm points. The “Ref Count” column shows the number of alarm windows in which each alarm point is used.



Name	Ref Count
BIT00	3
BIT01	3
FLOAT_1	3
FLOAT_2	3
INT_1	3
INT_2	3

2. Do one of the following:
   - Click Add to create a new alarm point.
   - Highlight an existing alarm point and click Modify to change it.
   - Highlight an existing alarm point and click Delete to remove it.

If you are creating or changing an alarm point, the Alarm Point dialog box appears:



Name:

Tag: Learning Center:BITS_1 ?

Deadband:

Setup By
○ Discrete
● Current Value
○ Controller Status

Notification Options
□ Enabled
□ Enabled
□ Enabled

Enable
● Always Enabled
○ Condition:

A Enter a name for the alarm point here. The name of each alarm point in a project must be unique and must be less than 128 characters. The OptoControl tagname appears by default.

B Displays the name of the OptoControl tag that you select with C.

C Click the Tag Selection button ? to select an OptoControl tag for the alarm point. Note that the choice of tags available is determined by the type of tag you select in E.

D Enter a deadband value to be added to or subtracted from the previously read tag value. This value adds a buffer, or deadband, that the next value read must be above or below to trigger the alarm point. For example, let's set the deadband at 5. If a tag is read and has a value of 50, the next tag reading must be greater than 55 or less than 45 for the alarm point to be triggered.

E Select the type of tag to be linked to the alarm point.

- Choose Discrete for discrete tags, such as a digital input. Selecting this option enables the Discrete page in the Alarm Point dialog box. See "Entering Discrete Alarm Conditions" on page 8-34 for configuration information.
- Choose Value for analog points, floats, or similar values. Selecting this option enables the Value page in the Alarm Point dialog box. See "Entering Alarm Values" on page 8-35 for configuration information.
- Choose Controller Status to link the status of a controller to the alarm point. The alarm will be triggered whenever the linked controller is not in Attached state. See

"Setting Controller Status Alarm Points" on page 8-36 for configuration information.

F Click here to display the Alarm Notification dialog box, where you can have a specified value written to a selected tag when the alarm point enters an alarm condition. See "Alarm, Acknowledge, and Alarm Clear Notifications" below for information on setting up alarm notification.

Select Enabled to make Alarm Notification active. (You can't select Enabled until Alarm Notification is configured.)

G Click here to display the Alarm Clear Notification dialog box. Use this dialog box to have a tag value be set or cleared when the current alarm returns to Normal from an alarmed state. See "Alarm, Acknowledge, and Alarm Clear Notifications" below for information on setting up alarm notification.

Select Enabled to make Alarm Clear Notification active. (You can't select Enabled until Alarm Clear is configured.)

H Click here to display the Acknowledge Notification dialog box, where you can have a specified value written to a selected tag when the alarm point is acknowledged by the operator. See "Alarm, Acknowledge, and Alarm Clear Notifications" below for information on setting up acknowledge notification.

Select Enabled to make Acknowledge Notification active. (You can't select Enabled until Acknowledge Notification is configured.)

I Choose Condition to make the alarm point dependent on the value of another tag. Click the Modify button (I) to select the tag and define the conditions it needs to meet.

Select Always Enabled for the alarm point **not** to be dependent on the value of another OptoControl tag.

J If you've selected Condition in H to make the alarm point dependent on the value of another tag, click Modify and configure the tag and conditions in the Alarm Point Conditional Enabling Setup dialog box that appears. See "Setting Conditional Alarm Points" on page 8-32 for configuration information.

K Click OK to save your settings and close the dialog box.

Now we'll look at the additional steps needed to complete the settings in the Setup, Discrete, and Value pages of the Alarm Point dialog box.

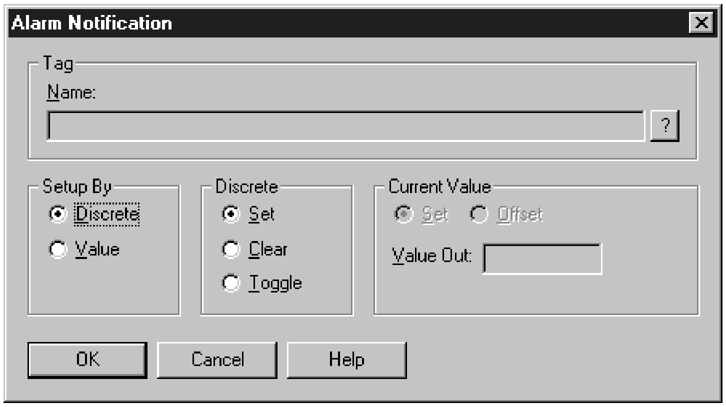
Alarm, Acknowledge, and Alarm Clear Notifications

You can have a value sent to a tag when any of the following alarm events occur:

- An alarm occurs
- An active alarm is acknowledged
- An active alarm returns to Normal from an alarmed state

To configure an alarm point for these events, click Alarm, Alarm Clear, or Acknowledge in the Alarm Point dialog box.

The Alarm Notification, Alarm Clear, or Acknowledge Notification dialog box appears. These dialog boxes are identical. (The Alarm Notification dialog box is shown below.)



1. Click the Tag Selection button ? to select an OptoControl tagname. See "Configuring Tags" on page 4-5 for more about selecting tags.

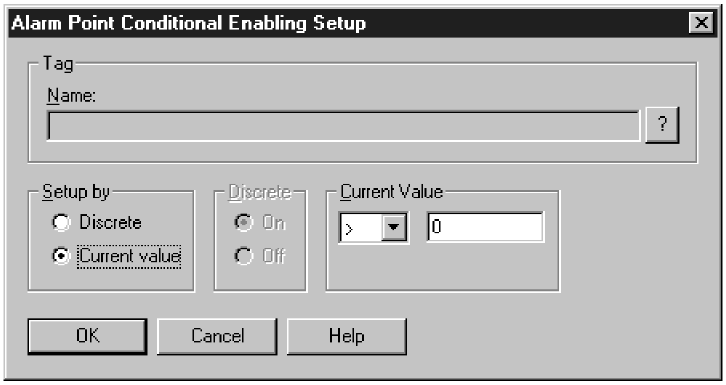
2. In the Setup By group, select Discrete or Value.
   - **Discrete** specifies an on/off trigger state for the selected tag. (The tag must have a discrete basetype.) After you select Discrete, define the trigger value by choosing one of the following options:
     - Set—Switches the trigger state to On.
     - Clear—Switches the trigger state to Off.
     - Toggle—Switches the trigger state from its current condition to the opposite (for example, On is switched to Off).
   - **Value** defines the floating point or integer value that is written to the tag. After you select Value, define the value by choosing one of the following options, then entering a value in the Value Out field:
     - Set—Replaces the tag's current value with the value you enter in the Value Out field.
     - Offset—Adds the value you enter in the Value Out field to the tag's current value.

3. Click OK to save your settings and close the dialog box.

Setting Conditional Alarm Points

1. To make the alarm point dependent on the value of another tag, select Condition in the Alarm Point Setup page, then click Modify.

The Alarm Point Conditional Enabling Setup dialog box opens:



Alarm Point Conditional Enabling Setup

Tag

Name:

Setup by

○ Discrete

● Current value

Discrete

● On

○ Off

Current Value

> 0

2. Configure the tag and conditions.

3. Click the Tag Selection button ? and select an OptoControl tag. This tag's value will be compared to a value you define.

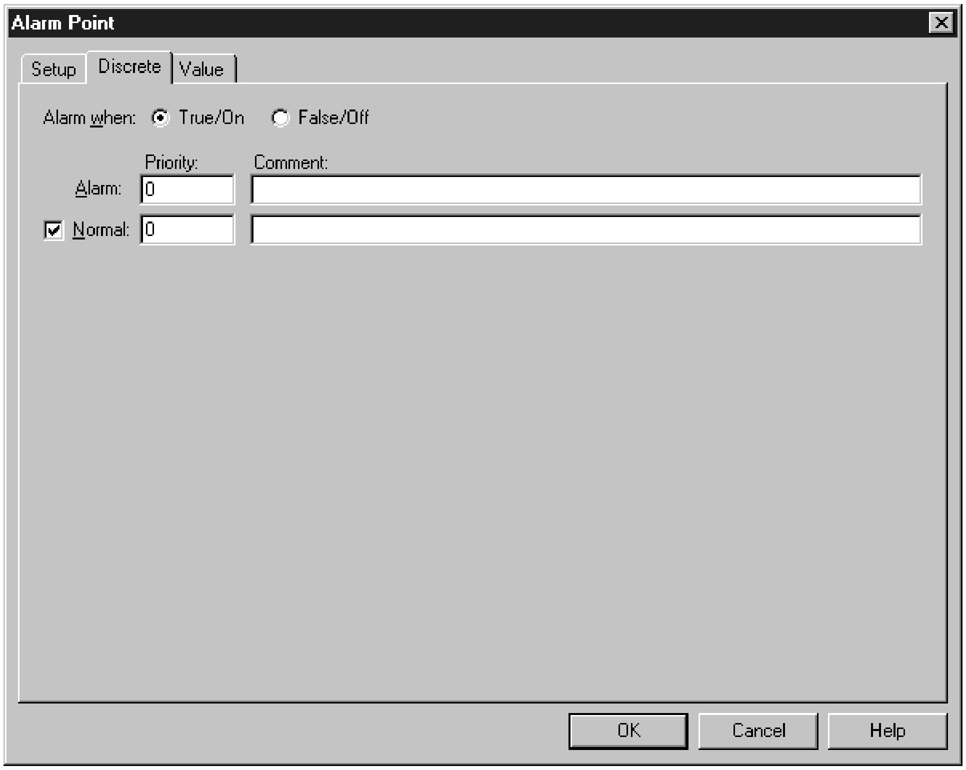
4. Select Discrete or Current value in the Setup by group. Current Value sets the tag value that will trigger the alarm point. Select an operator in the drop-down menu, and then enter a value to compare the tag to. Discrete makes the tag's on or off state trigger the alarm point.

   NOTE: Triggers are edge sensitive, and only activate on a positive transition from a non-triggered state.

5. Click OK to save your settings and close the dialog box.

Entering Discrete Alarm Conditions

If you selected Discrete in the Setup by field on the Alarm Point Setup page, complete the alarm point setup by configuring the alarm's state in the Discrete page.



Alarm when: ● True/On ○ False/Off

	Priority:	Comment:
Alarm:	0	
☑ Normal:	0	

1. To select the state of the alarm condition tag, select True/On to have the alarm point be in the alarm state when the associated tag is "on" for discretes, or "true" for integer bits. Select False/Off to have the alarm point be in the alarm state when the associated tag is "off" for discretes or "false" for integer bits.

2. Select the check box next to Normal to have the normal state displayed in history windows and logs. The normal state is the opposite of the alarm state.

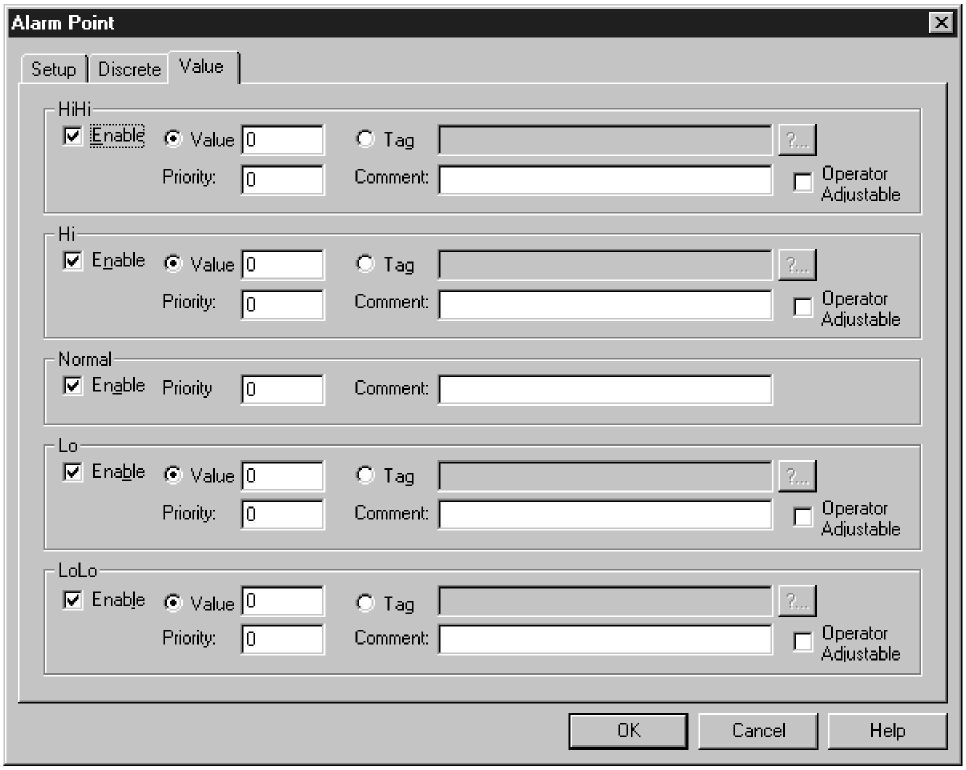
3. Enter an integer value between 0 and 999 in the Priority fields to define an alarm value for each alarm level. The highest priority is represented by 999, and 0 represents the lowest. Priority values can be useful in Runtime for displaying the relative importance of alarm points, and for filtering out alarms with lower priorities.

4. (Optional) In the Comment fields, enter text that will be displayed in alarm graphics for each alarm level. The comment can have a maximum of 256 characters. This comment can display information about the alarm point, for example, or provide instructions to the operator.

5. Click OK to save your settings and close the dialog box.

Entering Alarm Values

If you selected Value in the Setup by field on the Alarm Point Setup page, complete the alarm point setup by configuring the alarm's state in the Value page.



HiHi: ☑ Enable ● Value 0 ○ Tag Priority: 0 Comment: ☐ Operator Adjustable

Hi: ☑ Enable ● Value 0 ○ Tag Priority: 0 Comment: ☐ Operator Adjustable

Normal: ☑ Enable Priority 0 Comment:

Lo: ☑ Enable ● Value 0 ○ Tag Priority: 0 Comment: ☐ Operator Adjustable

LoLo: ☑ Enable ● Value 0 ○ Tag Priority: 0 Comment: ☐ Operator Adjustable

You must define values for each alarm level that will be used with the alarm point. The following alarm levels are available:

- **HiHi** alarms occur when the tag value is greater than or equal to the HiHi value.
- **Hi** alarms occur when the tag value is greater than or equal to the Hi value and less than the HiHi value.
- **Normal** is between the Hi and Lo values.
- **Lo** alarms occur when the tag value is less than or equal to the Lo value and greater than the LoLo value.
- **LoLo** alarms occur when the tag value is less than or equal to the LoLo level.

For each alarm level you want to use with the alarm point, do the following:

1. Select Enable to use an alarm level that you have configured. At least one alarm level (HiHi, Hi, Lo, or LoLo) must be enabled. If a level is enabled, it will be displayed in alarm graphics and logs.

2. To set an alarm level to a constant value, select Value and enter a number in the Value field.

3. To define the relative importance of an alarm point, enter an integer value between 0 and 999. (The highest priority is represented by 999, and 0 represents the lowest.)

   Priority values can be useful in Runtime for displaying the relative importance of alarm points. Additionally, in Runtime, you can filter out alarms with lower priorities.

4. When an alarm point value is reached, you can define how long it must continue at that value (the *persistence time*) before the alarm point is triggered. Click More and enter the Persistence Time in milliseconds or seconds.

5. When an alarm point value remains at a triggering level *after* the alarm has been triggered and acknowledged, you can define how much time must elapse before the alarm point is re-triggered. Click More and enter the Re-Alarm Time in milliseconds or seconds.

6. To set an alarm level to the current value of a tag, select Tag and click the Tag Selection button ? .

7. (Optional) In the Comment field, enter text that will be displayed in alarm graphics for each alarm level.

   The comment can have a maximum of 256 characters. This comment can display information about the alarm point, for example, or provide instructions to the operator.

8. Select the Operator Adjustable check box to allow the operator to modify the conditions of this alarm point. See "Alarm Runtime and User Options" below to learn how to define these conditions.

9. Click OK to save your settings and close the dialog box.

Setting Controller Status Alarm Points

If you selected Controller Status in the Setup by field on the Alarm Point Setup page, complete the alarm point setup by selecting a controller from the list on the Controllers page. Only controllers that have been added to the OptoDisplay project are available. See "Configuring Controllers" on page 4-1 for more information on adding primary and backup controllers to an OptoDisplay project.

NOTE: When the Controller Status option is selected, no other feature in the Alarm Point dialog box is available.

To configure an alarm point based on controller status, do the following:

1. Click the Controllers tab in the Alarm Point dialog box.

2. In the list of available controllers, select the controller that will be linked to the alarm point.

3. If you want to change the Detached by User or Detached on Error priority levels, enter a new value in the corresponding field.

Using the default settings, these priority levels cannot be filtered out by the user since they are higher than 999. If you want the user to be able to filter out controller status alarms, set either—or both—values to 999 or less.

4. Click the Setup tab and enter a name for the alarm point in the Name field.

5. Click OK to close the dialog box and save your settings.

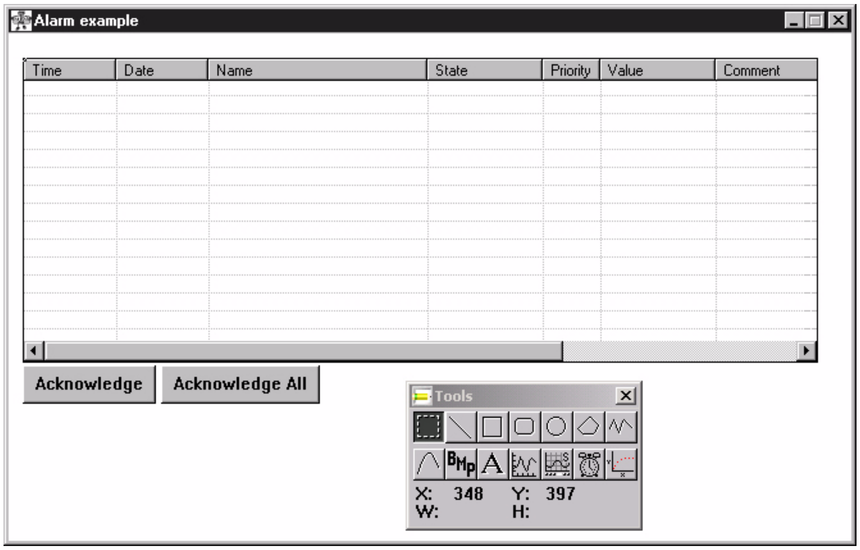
Adding Alarm Graphics

Alarm graphics can be placed and resized just like a trend or any other graphic object. You can place multiple alarm graphics in any window.

1. To create an alarm graphic, select the Alarm tool from the Toolbox.

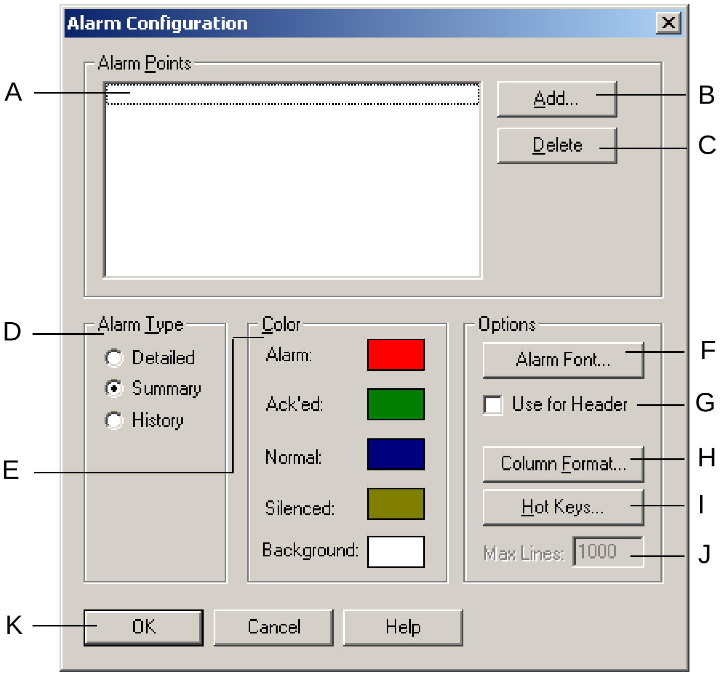
2. Click and drag a large rectangle, and release the mouse.

   An alarm graphic similar to the example below appears:



3. To configure alarms for this graphic, choose the Select tool and double-click on the graphic.

The Alarm Configuration dialog box opens:



Alarm Type: ○ Detailed ● Summary ○ History

□ Use for Header

Max Lines: 1000

A The Alarm Points list shows configured alarm points that are associated with the alarm graphic. To add an alarm point to the list, click B. To remove an alarm point from the list, click C.

B Click Add to add an alarm point to the ioDisplay project. In the Alarm Points dialog box that appears, you can select previously configured alarm points or configure new points as needed. To select more than one alarm point at a time, press and hold the OPTION key and then click each point you want to add. See "Configuring Alarm Points" on page 8-28 for information on adding and configuring alarm points.

C Select an alarm point in the list and click Delete to remove it from the alarm graphic. The alarm point is not deleted from the ioDisplay project or from any other alarm graphic.

D Choose the type of the alarm graphic by selecting Detailed, Summary, or History.

- **Detailed alarms** treat each alarm point state as a separate alarm condition. The operator must acknowledge each alarm point before its name is cleared from the alarm graphic.

  For example, if an alarm is in the Lo state and changes to the LoLo state, alarms for both states are listed in the graphic. Alarm points can be selected and acknowledged from a detailed alarm.

- **Summary alarms** display only the state of the current alarm.

  For example, if an alarm is in the Lo state and changes to the LoLo state, only the LoLo state alarm is listed in the graphic. Alarm points can be selected and acknowledged from a summary alarm.

- **History alarms** list each change of state for each alarm point. Alarm points cannot be acknowledged from a history alarm.

E For each of the following items, click a color square and select a color in the Color dialog box that appears.

- Alarm points in an alarm condition
- Alarm points that have been acknowledged
- Alarm points that have returned to their normal state
- Alarm points that have been silenced
- Background color of an alarm graphic

F Click Alarm Font to select the font used in the alarm graphic.

G Select Use for Header to have the alarm font you selected appear in the alarm graphic's column headers.

H Click Column Format to set the information that appears on the alarm graphic. In the Alarm Format dialog box that appears, select the information the alarm graphic will display, and the width alarm graphic columns will appear on screen. See "Setting the Alarm Format" below for configuration information.

I Click Hot Keys to configure keys on the keyboard that the operator can use to acknowledge alarms. In the Alarm Hot Keys dialog box that appears, select keys or key combinations the operator can use to acknowledge one or more alarms. Only detailed and summary alarm graphics can have hot keys. See "Assigning Alarm Hot Keys" on page 8-40 for more information.

J Enter a number to set the maximum number of alarm point lines a history alarm graphic can contain. When this number is exceeded, the oldest alarm point is removed to make room for the new point. The History alarm type must be selected for this option to be available.

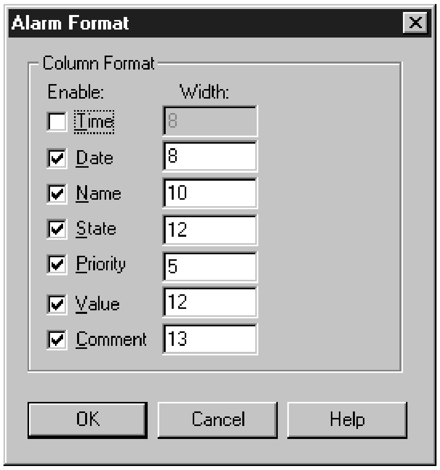
K Click OK to save your settings and close the dialog box.

Now we'll look at the additional steps needed to complete the settings in the Alarm Configuration dialog box.

Setting the Alarm Format

You can customize the alarm information that appears when an alarm graphic is displayed on screen, or when an alarm log file is sent to a printer.

1. In the Alarm Format dialog box, shown below, select the check box next to the name of each column that you want to appear in the alarm graphic or printed alarm log:



Alarm Format

Column Format

Enable:	Width:
□ Time	8
☑ Date	8
☑ Name	10
☑ State	12
☑ Priority	5
☑ Value	12
☑ Comment	13

2. For each column name that you want to use, enter the desired column width (in pixels) in the Width field.

   For alarm graphics, the widths are an approximate guideline for how wide the columns will appear on screen. For printed alarm logs, the widths are absolute values. If a number or text cannot fit into a printer column, it will be truncated.

Assigning Alarm Hot Keys

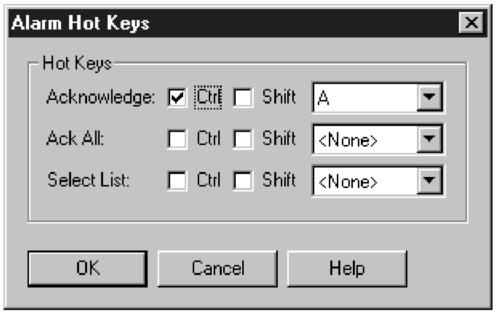
Alarm hot keys are keystrokes or keystroke combinations that the operator can quickly use to respond to alarms. When a hot key is defined for an alarm, pressing a key on the keyboard (along with an optional CTRL or SHIFT key) performs the same action as clicking the mouse on an object.

NOTE: Hot keys can also be defined for dynamic objects in an OptoDisplay project, but these hot keys are defined separately from alarm hot keys. See "Adding Dynamic Attributes to Graphics" on page 6-2 to learn how to set up hot keys for a dynamic graphic.

You can define hot keys for the Acknowledge, Acknowledge All, and Select List functions.

- **Acknowledge** and **Acknowledge All** have the same effect as clicking those buttons on an alarm graphic.
- **Select List** is used to highlight the alarm point list on the display. Once the alarm point list is highlighted, cursor keys can be used to select alarm points for acknowledgment.

Alarm hot keys are configured in the Alarm Hot Keys dialog box, which is shown below:



Alarm Hot Keys

Hot Keys

Acknowledge: ☑ Ctrl □ Shift A

Ack All: □ Ctrl □ Shift <None>

Select List: □ Ctrl □ Shift <None>

To configure hot keys for an alarm, select a key in the drop-down list for the function you want to use. If you want to use the CTRL and/or SHIFT keys in combination with the key you've chosen, select Ctrl, Shift, or both.

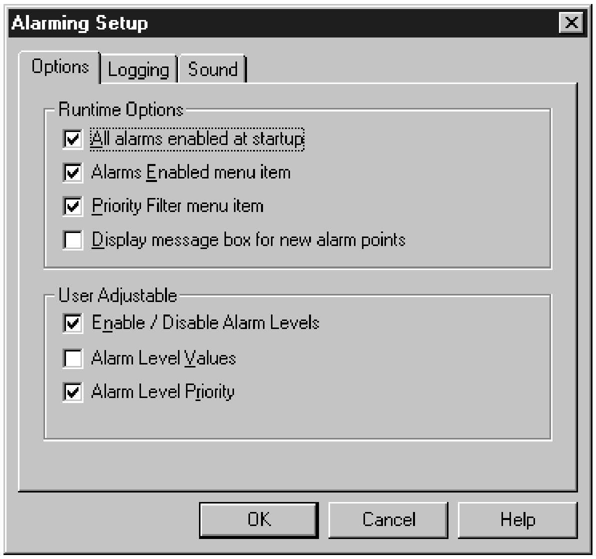
Configuring Project Alarms

To configure alarm features for the whole project, select Configure→Alarming Setup and configure the following settings as needed in the Alarming Setup dialog box:

Alarm Runtime and User Options

1. To set options for how an alarm appears in OptoDisplay Runtime as well as how a user can work with alarms in an OptoDisplay project, click the Options tab.

   The Options page appears. (This page appears by default when this dialog box opens.)



Alarming Setup

Runtime Options

☑ All alarms enabled at startup

☑ Alarms Enabled menu item

☑ Priority Filter menu item

□ Display message box for new alarm points

User Adjustable

☑ Enable / Disable Alarm Levels

□ Alarm Level Values

☑ Alarm Level Priority

2. To set how an alarm appears in OptoDisplay Runtime, select one or more of the following options in the Runtime Options group:

- All alarms enabled at startup—Enables all alarms when the project starts in Runtime.
- Alarms Enabled menu item—Makes the Alarms Enabled menu available for the user to enable and disable all alarms.
- Priority Filter menu item—Makes the Priority Filter menu available for the user to control whether to view all alarms, or only alarms exceeding a specified priority value.
- Display message box for new alarm points—Makes a dialog box appear containing information about the alarm point. The user can acknowledge the alarm in this dialog box, or close it and acknowledge the alarm at a later time.

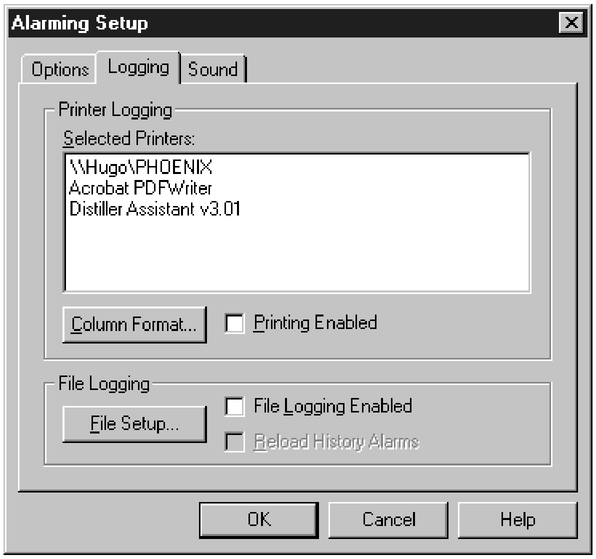
3. To define the changes a user can make to an alarm in OptoDisplay Runtime, select one or more of the following options in the User Adjustable group:
   - Enable/Disable Alarm Levels—Allows the user to enable or disable alarm points
   - Alarm Level Values—Allows the user to change alarm point values
   - Alarm Level Priority—Allows the user to change alarm point priorities.

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

Alarm Logging Options

1. To set options for how alarm data is sent to a printer or saved in a file, click the Logging tab.

   The Logging page appears:



Selected Printers:
\\Hugo\PHOENIX
Acrobat PDFWriter
Distiller Assistant v3.01

□ Printing Enabled

□ File Logging Enabled

□ Reload History Alarms

2. To choose a printer to send alarm data to, select Printing Enabled and then choose a printer from the Selected Printers list. If you want to use a printer that does not appear on the list, you will need to install the printer so that it can be accessed from your PC. Refer to the documentation from Microsoft and your computer manufacturer if you are not sure how to do this.

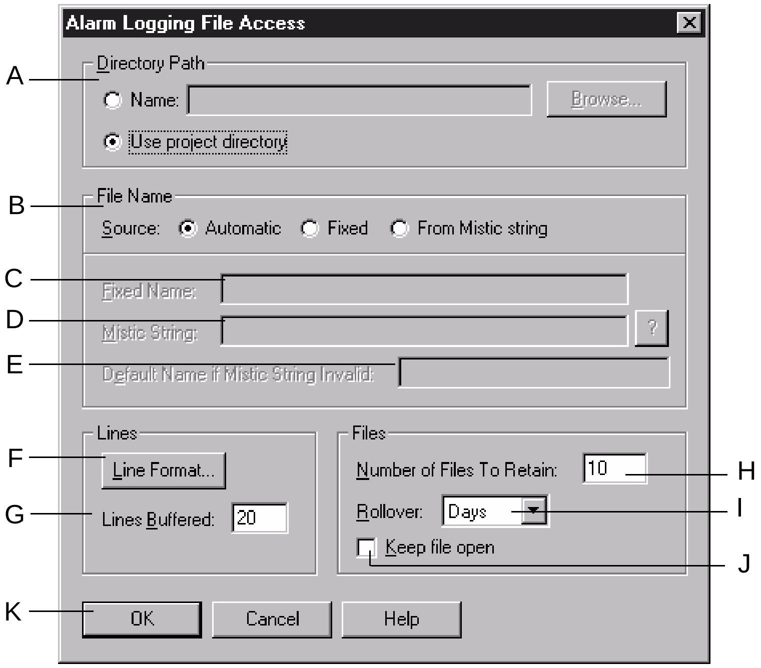
Note that if you move the OptoDisplay project from one Windows operating system to another, you must reselect the printers.

3. To choose the alarm information that appears on the printed alarm log, click the Column Format button. In the Alarm Format dialog box that appears, set the format in which the alarm graphic will appear on screen and the information it will contain. See “Setting the Alarm Format” on page 8-39 for configuration information.

4. If you want History Alarm windows to be refreshed (have their contents updated) each time they open, select Reload History Alarms. This option is only available when file logging has also been enabled.

5. To save a log file of alarm data to disk, select File Logging Enabled and click File Setup.

   In the Alarm Logging File Access dialog box that opens, you can configure the name, location, line format, and other settings for the log file where the alarm data will be saved.



Alarm Logging File Access

Directory Path
○ Name:
● Use project directory

File Name
Source: ● Automatic ○ Fixed ○ From Mistic string
Fixed Name:
Mistic String:
Default Name if Mistic String Invalid:

Lines
Lines Buffered: 20

Files
Number of Files To Retain: 10
Rollover: Days
□ Keep file open

A Choose the directory where the alarm log file will be saved. Click Name and enter the directory path in the field next to it, or click Browse to find a directory path. Click Use Project Directory to save the alarm log file to the OptoDisplay project directory. (This occurs by default if you don’t specify another location.)

B Select Automatic, Fixed, or From Mistic string to determine how the alarm log file name will be created, and then fill in additional information as needed for that option.

If the Automatic option is used, log files are named based on the rules described in “About Data Log File Names and Formats” on page 8-9. If you select this option, files are named using the rollover convention if required; this is described in more detail on page 8-10. If rollover is not used, the file is named “alarmlog.alm.” The Automatic option is used by default if you do not select another option.

C If you selected the Fixed option in B, enter a file name here. The file name can be any valid, eight-character DOS file name and doesn't require a three-character file extension. Note that if you don't specify an extension, one is *not* added automatically.

D If you selected the From Mistic string option in B, enter an OptoControl string tagname here. Use the Tag Selection button ? to quickly enter the tag containing the name of the alarm log file. When the trigger starts the alarm log, the string containing the file name is read, and the new data is appended to the log file if the file already exists. If the file doesn't already exist, it is created. The rollover naming convention doesn't apply to this type of file name.

If the Mistic string in D is an invalid file name, the default name of the log file is created using the following rules:

- If the Mistic string is empty, the project directory is added to E and the extension .alm is used.
- If the Mistic string is not empty and a project directory is not specified as the directory path, the Name in A is added to E.
- If the project directory is specified as the path, or the previous step failed, the project directory is added to E and the extension .alm is used. If the project directory is read-only or there is not enough room left on the drive containing the project directory, an error message indicates that the file could not be created.

E Enter a default file name here in case the file name used in D is invalid. The file name can be any valid, eight-character DOS file name. The three-character file extension .alm is assigned by OptoDisplay.

F Click to configure the character, or delimiter, used to separate the data in the log file, to choose the type of quotes used for each data line, and where to insert carriage returns. You configure these parameters in the Line Format dialog box that appears. See page 8-9 for more information.

G Enter the number of lines of data your PC will save to a memory buffer before writing the information to the alarm log file. When choosing a number, keep in mind that the lower the number of buffered data lines, the more frequently the computer has to write to the file. Alternately, the higher the number of data lines buffered in memory, the more data that will be lost if your PC loses power or has a system failure. A valid entry is any number between 0 and 999; the default is 20 files.

H Enter the maximum number of alarm log files that can be created using rollover before the oldest file is overwritten. For example, if you enter 10 and your rollover time period is set to hours, you will have 10 alarm log files created for 10 hours of data before the oldest file is overwritten with new data. See page 8-10 for more information on rollover settings.

I Choose the rollover time period here. Select None to have all logged data placed in a single data file named alarmlog.alm. Logging begins when the OptoDisplay project is loaded, and data collected will be appended to the existing data file. The size of the file is limited only by available disk space.

J Select Keep file open to leave the log file open to allow data to be appended to the alarm log file more quickly. If you leave this box unchecked (the default setting), the file is closed after each time data is written to it. This provides greater data integrity than leaving the file open.

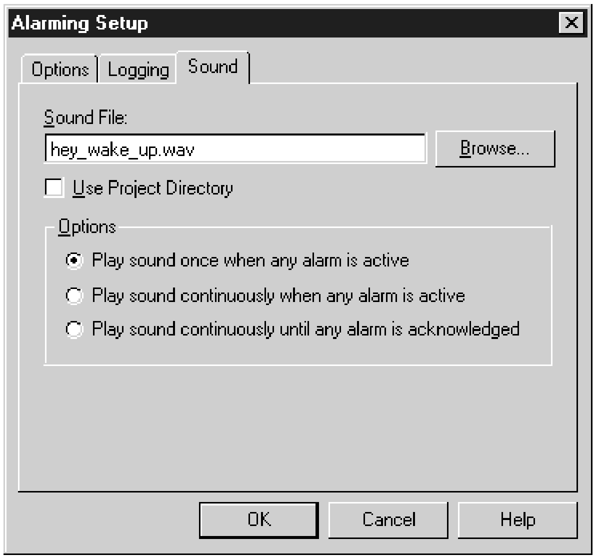
K Click OK to save your settings and close the dialog box.

Alarm Sound Options

NOTE: To play sound files, the PC running the project must have a properly configured sound card and corresponding system software, as well as a set of speakers. You can use both digitized sound (.wav) and MIDI music (.mid) files in your project.

1. To define an alarm sound and the conditions when it is played, click the Sound tab.

   The Sound page appears:



Sound File: hey_wake_up.wav

□ Use Project Directory

Options

● Play sound once when any alarm is active

○ Play sound continuously when any alarm is active

○ Play sound continuously until any alarm is acknowledged

2. To enter the name of the sound you want played, click Browse and locate the sound file.

   If you select Use Project Directory, the sound file must reside in the project directory. This option is useful if the project directory might be moved to a different location.

   NOTE: Only one sound file can be selected in the Alarming Setup dialog box, but OptoDisplay has other ways of playing sounds. See "Configuring a Sound" on page 8-15 for more information.

3. Select an option to determine how many times the sound will play when a new alarm occurs:

   - Play sound once when any alarm is active—The sound plays once, then stops.
   - Play sound continuously when any alarm is active—The sound continues to play until the operator acknowledges all active alarms.
   - Play sound continuously until any alarm is acknowledged—The sound continues to play until the operator acknowledges at least one active alarm.

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

CHAPTER 9

Using OptoDisplay Runtime

Introduction

This chapter describes the versions of OptoDisplay Runtime that can be used, and explains how to customize features that are available when your project runs in OptoDisplay Runtime. It also explains how to use features that an operator sees and works with when using Runtime.

In This Chapter

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Setting up Runtime................................. 9-2
Using Runtime.. 9-13

Runtime Versions

Two versions of OptoDisplay's Runtime application are provided with OptoDisplay: the regular version and a monitor-only version. The primary difference between these two versions is that the monitor-only version of OptoDisplay Runtime does not allow values to be sent to a controller. This can be a useful feature for OptoDisplay projects where operator intervention is not required or must be prohibited.

The monitor-only version of OptoDisplay Runtime has the following features:

- The File and Help menus are the only menu items displayed. If the OptoDisplay project has been configured to hide the menu bar, however, even these menus are not visible. See "Restricting the Operator" on page 9-8 for information on configuring the menu bar in Runtime.
- The only operator-driven dynamic attribute that can be used in the Runtime monitor-only version is opening or closing windows. Keep this in mind when developing the OptoDisplay project; if there is a window that you do not want the operator to see, for example, do not use the open/close dynamic attribute with a graphic object.

Using Monitor-Only Runtime and Configurator

OptoDisplay Configurator's feature Save Project and Load Runtime lets you switch quickly from Configurator to Runtime, and is a convenient way to test an OptoDisplay project as you develop it. The Save Project and Load Runtime feature uses the regular version of OptoDisplay Runtime. To use the monitor-only version of Runtime with this feature, you must change the file name of the application.

1. In Windows Explorer, change the file name of the regular version of OptoDisplay to a temporary name.

   For example, change "OptoDisR.exe" to "orig_OptoDisR.exe" or something similar.

2. Now change the file name of the monitor-only Runtime application to the original name of the regular version. This is done by changing "OptoDsRX.exe" to "OptoDisR.exe".

After making these changes, the monitor-only version of Runtime will start when you select Save Project and Load Runtime in OptoDisplay Configurator. To use the regular version of Runtime again, reverse the steps above.

Setting up Runtime

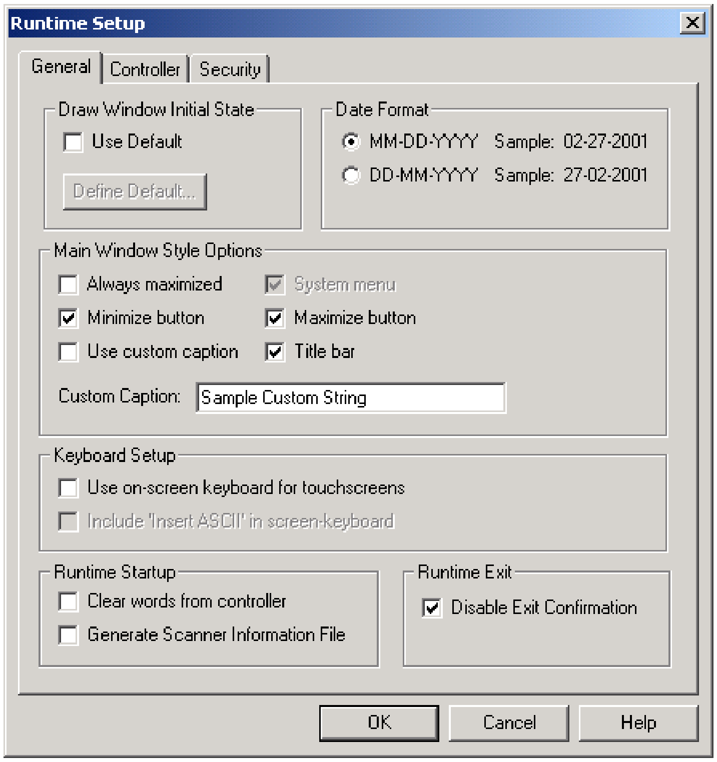
You can configure some of the ways that an OptoDisplay project appears in Runtime. Using OptoDisplay Configurator, you can specify which windows are open or closed, whether the menu is displayed, and whether or not the operator can exit the program. You can also customize options for the Event Log Viewer, a window that displays messages about the status and other characteristics of an OptoDisplay project.

NOTE: If you want to run your OptoDisplay project on a computer with multiple monitors, in OptoDisplay Configurator simply extend the project's main window across the monitors you want to use. When you open the project in Runtime, the main window will appear the way you positioned it over the monitors. For more information on using multiple computer monitors, see "System Requirements" on page -iv and "Using Multiple Monitors" on page 2-5.

To set up a project for Runtime, select Configure→Runtime from the OptoDisplay Configurator, then configure the settings in the Runtime Setup dialog box.

General Settings

Refer to the table below for instructions on configuring a particular option group under the General tab in the Runtime Setup dialog box.



Draw Window Initial State
☐ Use Default
Define Default...

Date Format
● MM-DD-YYYY Sample: 02-27-2001
○ DD-MM-YYYY Sample: 27-02-2001

Main Window Style Options
☐ Always maximized
☑ System menu
☑ Minimize button
☑ Maximize button
☐ Use custom caption
☑ Title bar
Custom Caption: Sample Custom String

Keyboard Setup
☐ Use on-screen keyboard for touchscreens
☐ Include 'Insert ASCII' in screen-keyboard

Runtime Startup
☐ Clear words from controller
☐ Generate Scanner Information File

Runtime Exit
☑ Disable Exit Confirmation

For the Option Group	See
Draw Window Initial State	"Setting Up the Initial State of Windows" on page 9-3
Date Format	"Setting Date Format" on page 9-4
Main Window Style Options	"Setting Up the Main Window" on page 9-4
Keyboard Setup	"Configuring On-Screen Keyboard" on page 9-4
Runtime Startup	"Setting Up Startup Events" on page 9-5
Runtime Exit	"Setting Up Runtime Exit" on page 9-6

Setting Up the Initial State of Windows

To configure how the project's windows will look when the project is first opened in Runtime, check the Use Default check box, and then click Define Default to set the default options. In the Pop Window dialog box that opens, select windows and configure whether the window is opened, closed, or iconified. See "Using Draw Windows" on page 5-1 for additional options for configuring window states in Runtime.

Setting Date Format

Use the Date Format options to change how the date appears in Alarm windows, SuperTrend objects, and historic log files. When you switch from one date format to another, any SuperTrends placed in a window are immediately updated to reflect the selected date format.

You can select one of two date formats:

- **MM-DD-YYYY** displays the date as month, day, and year.

  For example, October 31, 1999 would be displayed as 10-31-1999.

- **DD-MM-YYYY** displays the date as day, month, and year.

  For example, October 31, 1999 would be displayed as 31-10-1999.

Setting Up the Main Window

To choose the elements that appear in a project's main window, select any of the following options in the Main Window Style Options group:

- **Always Maximized** keeps the main window completely open, covering the entire screen.

  When this option is selected, the minimize and maximize button options are not available; deselect Always Maximize if you want to choose the minimize or maximize options.

- **Use Custom Caption** lets you enter a title that will appear in the title bar of the main window. Enter the title in the Custom Caption field.

  If a customized caption ends with a hyphen (-), the project file name is added to the caption.

- **Title Bar** displays the Windows title bar for the main window. If space is limited on your operator interface, deselect this option to slightly increase the viewable area that's available.

  If you deselect the Title Bar option, note that all options within the group except for Always Maximized are unavailable.

Configuring On-Screen Keyboard

To set up your OptoDisplay project to run on a touchscreen terminal, select Use On-Screen Keyboard for Touchscreens in the Keyboard Setup group. When this option is selected, you can use an on-screen keyboard for graphics that are configured using dynamic attributes to send strings and values.

NOTE: You cannot enter a project password on an on-screen keyboard.

Additionally, when Use On-Screen Keyboard for Touchscreens is selected, you can choose the option Include 'Insert ASCII' in Screen-Keyboard. With this second option selected, if a graphic has been configured using a dynamic attribute to send a string to the controller, the operator can enter any character value between 0 and 255.

Setting Up Startup Events

You can configure events to occur when an OptoDisplay project starts in Runtime, including clearing control words from memory and generating a diagnostic log file.

Clear control words—To define whether OptoDisplay control words are cleared from a controller's memory (RAM) when a project starts, select "Clear words from controller" in the Runtime Startup option group. OptoDisplay creates control words in a controller's memory to optimize communications throughput when scanning, but if a project is saved, run, and modified repeatedly, control words may use up available memory.

This option should be selected when a single OptoDisplay project is communicating with one or more controllers. You should **not** select the "Clear words from controller" option if two or more OptoDisplay projects are communicating with one or more controllers.

Generate Scanner Information File—When a project is running in OptoDisplay Runtime, information about the scan groups, refresh groups, and tags that are being scanned for the connected controllers can be recorded in a text file called a *scanner information file.* With the information in this file and the information generated using View➞Dynamic Attributes in OptoDisplay Configurator, you can diagnose scanner bottlenecks and/or provide the information to Opto 22 Product Support to help them diagnose possible problems with scanner throughput.

The scanner information file contains the following:

- Header describing how to correlate the information with a log generated by the OptoSnif utility.
- List of refresh groups configured for the project
- List of scan groups used internally by OptoDisplay
- For each configured controller, the name and total number of tags beings scanned for that controller
- For each configured controller, scan groups in descending order (based on the number of tags scanned by a group)
- For each configured controller, tags for each refresh group that are being scanned
- Total number of controllers and tags for the OptoDisplay project.

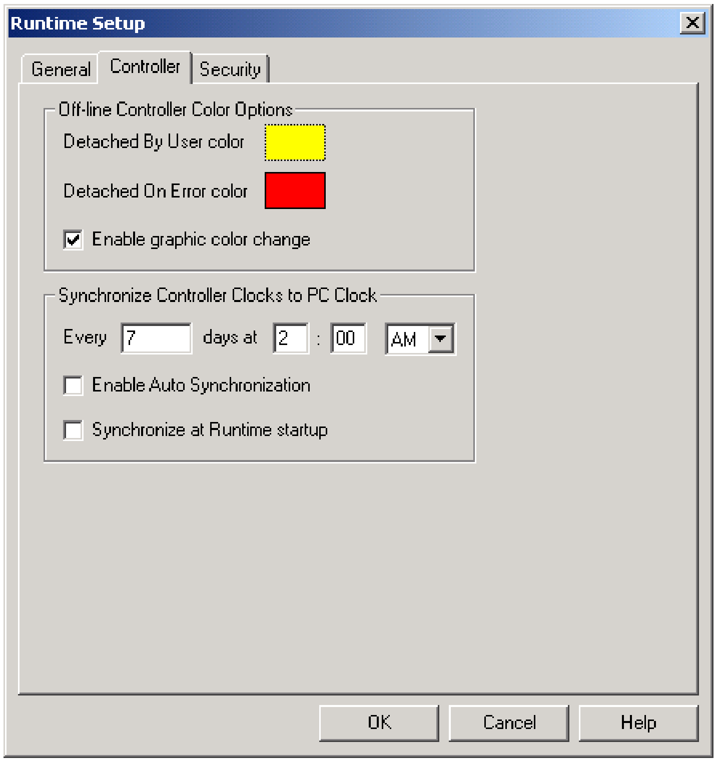
NOTE: When Generate Scanner Information File is selected, all windows in a project will be opened when the project starts in OptoDisplay Runtime. The windows will be closed or returned to their originally configured state after approximately two seconds. If a project's windows contain large bitmap and metafile graphics, or if a large number of SuperTrends are used in the project, problems may occur if opening all project windows simultaneously exceeds your PC's available memory.

Setting Up Runtime Exit

Each time you exit OptoDisplay Runtime, the program displays a small prompt to confirm that you really want to close the application. This confirmation message is shown by default. To not display the confirmation message, select the Disable Exit Confirmation option. This option can be useful if you run OptoDisplay Runtime as a service under Windows.

Controller Settings

Refer to the table below for instructions on configuring a particular option group under the Controller tab in the Runtime Setup dialog box.



Off-line Controller Color Options

Detached By User color 🟨

Detached On Error color 🟥

☑ Enable graphic color change

Synchronize Controller Clocks to PC Clock

Every 7 days at 2 : 00 AM

☐ Enable Auto Synchronization

☐ Synchronize at Runtime startup

For the Option Group	See
Off-line Controller Color Options	“Changing Global Controller Color Options” on page 9-7
Synchronize Controller Clocks to PC Clock	“Synchronizing Controller Clocks with a PC” on page 9-7
Null Pointer Color	“Changing Colors to Indicate a Null Pointer Variable” on page 9-7

Changing Global Controller Color Options

If a controller is detached by a user or detaches due to an error, you can have all graphics with dynamic attributes tied to that controller change color to indicate the controller's state. To do this, select a Detached by User color and a Detached on Error color, and then click the Enable Graphic Color Change checkbox.

If any graphic in the project uses the View Controller Status dynamic attribute, this graphic will still change color based on controller status. If the color used for this dynamic attribute is different from the offline controller color, a message confirms which color settings you want to use.

Synchronizing Controller Clocks with a PC

For projects that record historic data in a log file, it's a good practice to periodically synchronize the internal clock of a connected controller with that of the PC running the OptoDisplay project.

1. Enter how often the synchronization occurs (1–99 days).
2. Enter the time at which the synchronization occurs.
3. Select the Enable Auto Synchronization checkbox.

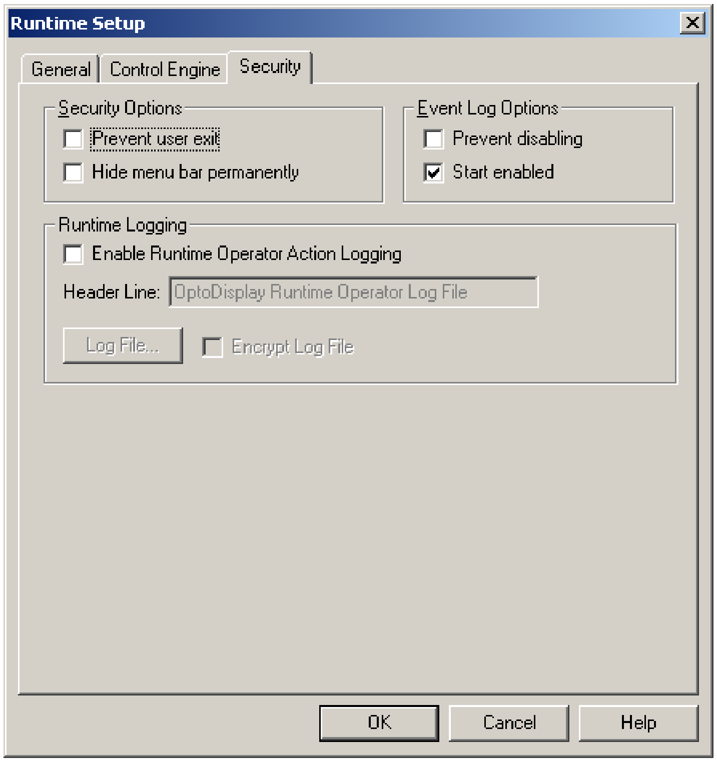
If you want to synchronize the controller clock with the PC's clock every time the project starts in OptoDisplay Runtime, select the Synchronize at Runtime Startup checkbox.

Changing Colors to Indicate a Null Pointer Variable

An OptoDisplay project can reference an OptoControl strategy that contains pointer variables. (For information on using pointer variables, see the *OptoControl User's Guide.*) To configure a graphic to change color if a pointer variable has a null value, select the Null Pointer Graphic color you want to use in the Null Pointer Color section.

Security Settings

Refer to the table below for instructions on configuring a particular option group under the Security tab in the Runtime Setup dialog box.



Security Options

□ Prevent user exit

□ Hide menu bar permanently

Event Log Options

□ Prevent disabling

☑ Start enabled

Runtime Logging

□ Enable Runtime Operator Action Logging

Header Line: OptoDisplay Runtime Operator Log File

Log File... □ Encrypt Log File

For the Option Group	See
Security Options	"Restricting the Operator" on page 9-8
Event Log Options	"Enabling the Event Log Viewer" on page 9-9
Runtime Logging	"Logging Operator Actions" on page 9-9

Restricting the Operator

There are a few ways to limit how the operator can use OptoDisplay Runtime:

- To prevent the operator from exiting OptoDisplay Runtime, select Prevent User Exit in the Security Option group. Once the project starts in Runtime, an operator won't be able to exit the OptoDisplay Runtime application.
- To hide the menu bar from the operator, select Hide Menu Bar Permanently. This restricts operator interaction with Runtime menu commands to only what you've defined in the project itself. The ESC key will not activate the menu bar, and pressing the F1 key won't invoke the Runtime online help system.

You can also configure a graphic so that Runtime commands execute when the graphic is clicked. This is done by assigning Runtime menu commands to the graphic using the Execute Menu Item dynamic attribute; see "Execute Menu Item" on page 6-9 for instructions.

Enabling the Event Log Viewer

The Event Log Viewer in OptoDisplay Runtime is a window that displays messages about system events and communication transactions of a project. This window has an option for the operator to choose whether the window is enabled or disabled during the Runtime session, and another option for the operator to choose whether to display startup error messages. By default, the Event Log Viewer is enabled when Runtime starts; deselect "Start enabled" in the Event Log options group to keep the window from opening.

To keep the Event Log Viewer from being disabled (not displayed), select the option Prevent Disabling in the Event Log options group.

See "Using the Event Log Viewer" on page 9-14 for information on using the Event Log Viewer in Runtime, and "Configuring the Event Log File" on page 9-11 to learn about setting the format in which Event Log files are saved.

Logging Operator Actions

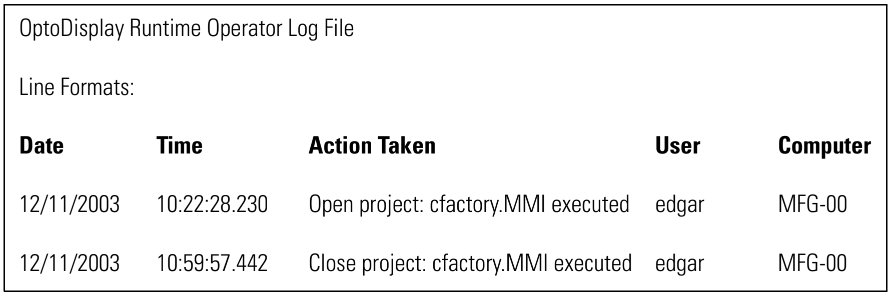
When an operator uses an OptoDisplay project in Runtime, general information about how and when the project is used can be recorded in the Runtime Operator Log File. Detailed information such as which onscreen controls were used and which values or states were changed can also be recorded in this log file. For security, the log file can be optionally encrypted.

NOTE: You can also configure security settings for an object to restrict its use to authenticated users and groups. See "Security Settings for Graphics and Dynamic Attributes" on page 6-4 to learn how to configure user and group authentication for a graphic object.

Data Recorded in the Runtime Logging File When the OptoDisplay project runs in OptoDisplay Runtime, the following information about operator actions is recorded:

- *Date*—Date of action (month/day/year)
- *Time*—Time of action (24-hour)
- *Action Taken*—Description of action and OptoDisplay project file used
- *Controller*—Controller running the OptoControl strategy that the OptoDisplay project is accessing
- *Tag*—Complete name of tag being modified
- *Old Value*—tag value before being modified
- *New Value*—tag value after being modified
- *User*—Name of user logged into computer running OptoDisplay project
- *Computer*—Computer running the OptoDisplay project

In this example, the log shows that the operator “edgar” opened and closed the OptoDisplay project “cfactory.MMI” using the computer “MFG-00”.

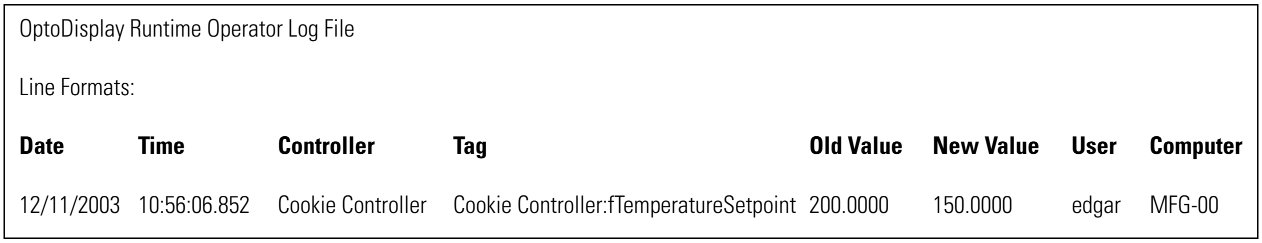


OptoDisplay Runtime Operator Log File

Line Formats:

Date	Time	Action Taken	User	Computer
12/11/2003	10:22:28.230	Open project: cfactory.MMI executed	edgar	MFG-00
12/11/2003	10:59:57.442	Close project: cfactory.MMI executed	edgar	MFG-00

The next example shows that the same operator “edgar” changed the setpoint value of “fTemperatureSetpoint” from 200 to 150 on the same project.



OptoDisplay Runtime Operator Log File

Line Formats:

Date	Time	Controller	Tag	Old Value	New Value	User	Computer
12/11/2003	10:56:06.852	Cookie Controller	Cookie Controller:fTemperatureSetpoint	200.0000	150.0000	edgar	MFG-00

Configuring the Runtime Operator Action Log File To record operator actions, open the Security tab of the Runtime Setup dialog box and do the following:

1. Select Enable Runtime Operator Action Logging.
2. If necessary, change the header line to meet your application’s requirements.
3. Click Log File.

   The Runtime Logging File Setup dialog box appears. Configuring a Runtime logging file is identical to configuring a Runtime event log; follow the instructions in “Configuring the Event Log File” on page 9-11 and then return to step 4 below.
4. Select Encrypt Log File if you want the log file saved as an encrypted document. See “Encrypting and Decrypting the Operator Action Log File” on page 9-10 for information on using encrypted files.

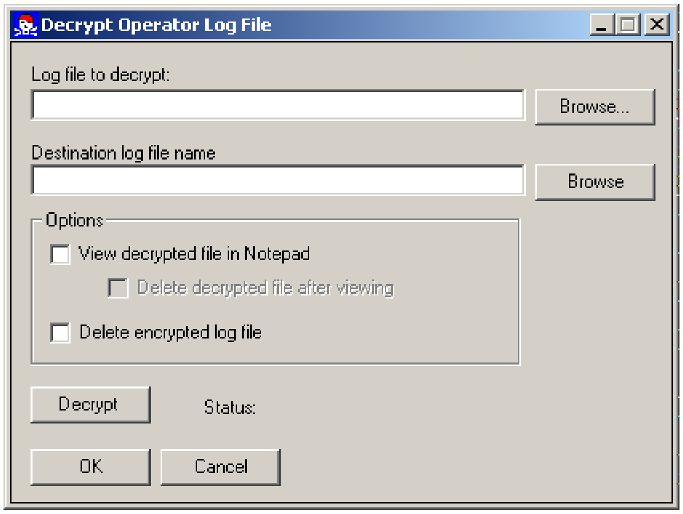
Encrypting and Decrypting the Operator Action Log File

To save a Runtime Operator Action log file in an encrypted format, select Encrypt Log File in the Security tab of the Runtime Setup dialog box.

To decrypt the log file, do the following:

1. In OptoDisplay Configurator, select View➞Decrypt Operator Log File.

The log file decryption window opens.


Decrypt Operator Log File
Log file to decrypt:
Browse...
Destination log file name
Browse
Options
□ View decrypted file in Notepad
□ Delete decrypted file after viewing
□ Delete encrypted log file
Decrypt
Status:
OK
Cancel

2. Click Browse next to the “Log file to decrypt” field and locate the encrypted operator action log file.
3. Click Browse next to the “Destination log file name” field and select a filename and location where the decrypted file will be saved.

   Skip this step if the default name and destination for the decrypted file is acceptable.
4. Select “View decrypted file in Notepad” to automatically open the file in Windows Notepad after it is decrypted.

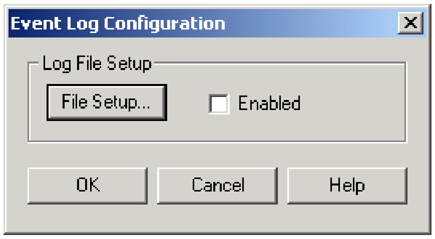
   When this option is selected, you can also select “Delete decrypted file after viewing” to have the file deleted automatically when Notepad closes.
5. Select “Delete encrypted log file” to have the encrypted log file deleted automatically after it is decrypted.
6. Click Decrypt to decrypt the file.
7. Click OK to close the log file decryption window.

Configuring the Event Log File

As events occur in a project in Runtime, messages with a date and time stamp are posted to the Event Log Viewer. These messages can be saved to an event log file so that the data can be used in other applications, such as Microsoft Excel or Microsoft Access. Event log files can also be archived to provide an operations record for an OptoDisplay project. A project can only have one event log file active (open) at a time.

You can determine where the event log file will be located, configure how the data lines will appear, and define its rollover parameters in the Event Log File Configuration dialog box.

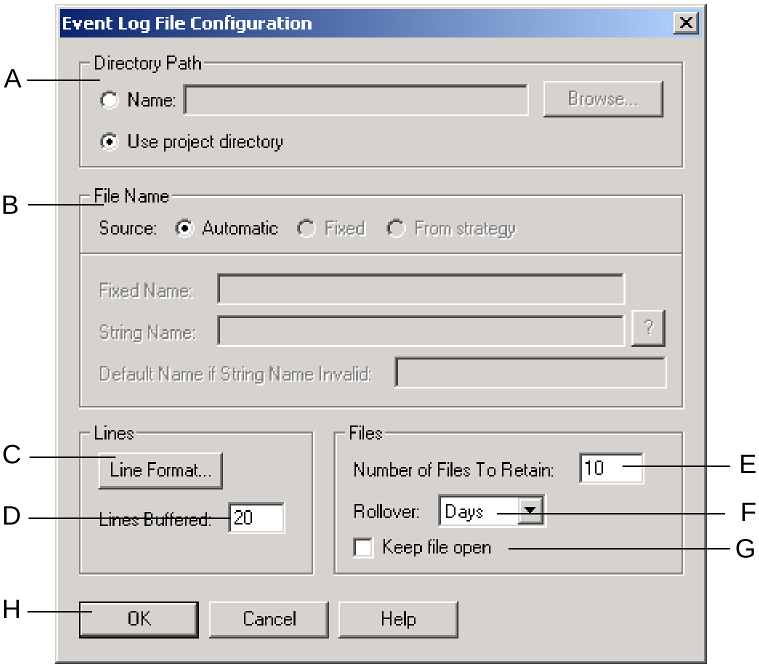
1. To configure an event log file, select Configure→Event Log.



2. Select Enabled in the Event Log Configuration dialog box to automatically create an event log file when you start the OptoDisplay project in Runtime.

3. Click File Setup to customize the event log file.

   The Event Log File Configuration dialog box appears:



A Choose the directory where the event log file will be saved. Click Name and enter the directory path in the field next to it, or click Browse to find a directory path. Click Use Project Directory to save the event log file to the OptoDisplay project directory. (This occurs by default if you don't specify a location.)

B Automatic is the only choice for creating the event log file name, and is selected by default.

C Click to configure the character, or delimiter, used to separate the data in the log file, to choose the type of quotes used for each data line, and where to insert carriage returns. You configure these parameters in the Line Format dialog box that appears. See "Setting Log File Line Format" on page 8-9 for more information.

D Enter the number of lines of data your PC will save to a memory buffer before writing the information to the event log file. When choosing a number, keep in mind that the lower the number of buffered data lines, the more frequently the computer has to write to the file. Alternately, the higher the number of data lines buffered in memory, the more data that will be lost if your PC loses power or has a system failure. A valid entry is any number between 0 and 999; the default is 20 files.

E Enter the maximum number of event log files that can be created using rollover before the oldest file is overwritten. For example, if you enter 10 and your rollover time period is set to hours, you will have 10 event log files created for 10 hours of data before the oldest file is overwritten with new data. See "Naming Files Using Rollover" on page 8-10 for more information on rollover settings.

F Choose the rollover time period here. Select None to have all logged data placed in a single data file named eventlog.msg. Logging begins as soon as the project starts running, and data collected will be appended to the existing data file. The size of the file is limited only by available disk space.

G Select Keep file open to leave the log file open to allow data to be appended to the event log file more quickly. If you leave this box unchecked (the default setting), the file is closed after each time data is written to it. This provides greater data integrity than leaving the file open.

H Click OK to save your settings and close the dialog box.

Using Runtime

Opening a Project

When your OptoDisplay project is complete and you're ready to run it, there are two ways you can start OptoDisplay Runtime and open a project:

- Click the Windows Start button, select Programs→Opto 22→FactoryFloor 4.1→OptoDisplay→OptoDisplay Runtime, and then select File→Open Project.

  In the Open Project dialog box that appears, select the OptoDisplay project you want to open.

- With a project open in OptoDisplay Configurator, select File→Save Project and Load Runtime.

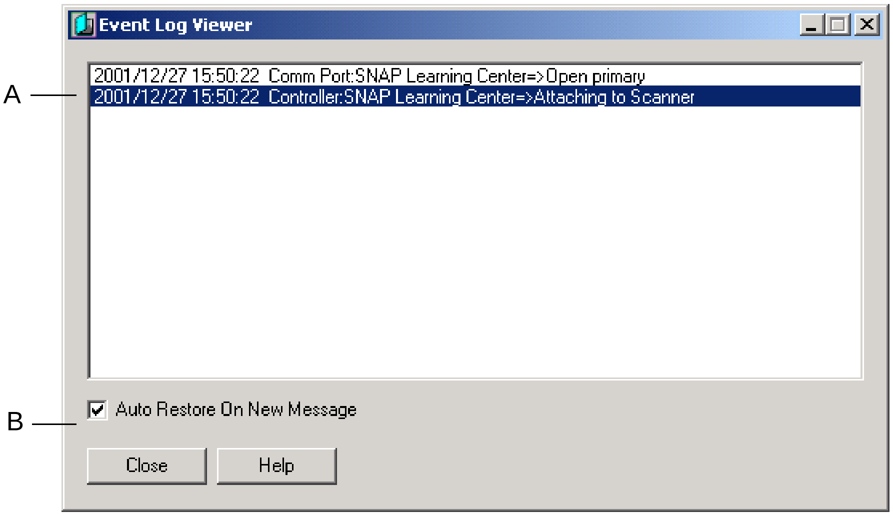
  Changes to the current project in OptoDisplay Configurator are saved, and the project is opened in Runtime.

When the project opens, it will start running and you'll see the operator interface created in OptoDisplay Configurator. The initial state of the draw windows that appear (open, closed, or iconified) is determined by the Runtime setup configuration. Unless you chose to hide the menu bar when you configured the project, the menu bar for the main window also appears.

Using the Event Log Viewer

The Event Log Viewer is started at Runtime by default. This window displays a list of communication transactions and error messages for a project.

If the event log viewer is not open, choose View→Event Log to open it. The window that appears will be similar to the following example:



```
2001/12/27 15:50:22  Comm Port:SNAP Learning Center=>Open primary
2001/12/27 15:50:22  Controller:SNAP Learning Center=>Attaching to Scanner
```

☑ Auto Restore On New Message

A The list area posts event messages as they occur. Messages will have a date and time stamp, and a brief message describing the communications event that occurred. These messages are described in the appendix "OptoDisplay Troubleshooting."

Messages posted to the Event Log can also be saved to a disk file. Refer to "Configuring the Event Log File" on page 9-11 for more information about doing this.

B To make the Event Log Viewer appear in the foreground whenever a new message is posted, select Auto Restore on New Message. This option won't be available if the Event Log Viewer was disabled when the project was set up in OptoDisplay Configurator.

After reviewing the message, you can keep the Event Log Viewer window open, or close it using the Close button.

Working with Controllers

While running an OptoDisplay project in OptoDisplay Runtime, there are several ways to view and work with one or more controllers that are running the OptoControl strategy the project uses.

Switching between Controllers

If a draw window's properties have been set to allow switching between controllers, you can access different controllers that are running the same OptoControl strategy. When you switch controllers in Runtime, graphics that display controller data will be updated to show data from the newly selected controller. If five controllers are all running the identical strategy, for example, you only have to create one draw window instead of making a separate window for each controller. For instructions on setting up a draw window, see "Modifying Draw Windows" on page 5-2.

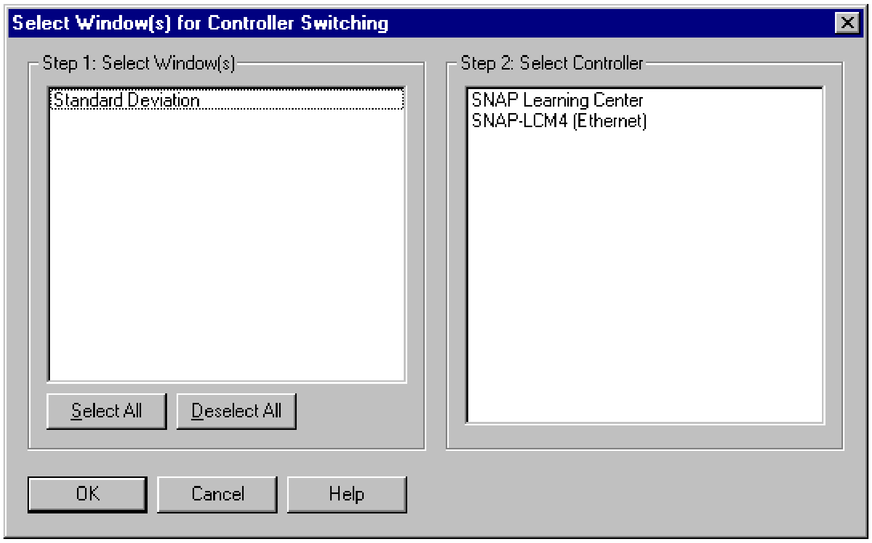
There are some important considerations to note when using this feature:

- Additional controllers that you want to switch between must be associated with the OptoDisplay project using the Configure→Controllers menu item.
- If you switch to a different controller and then exit OptoDisplay Runtime, when the project is restarted the default controller for the project—not the one you switched to earlier—will be selected.
- Trends and SuperTrends must have the Disable Scanning option set to either "When Closed" or "When Minimized and Closed."
- All tags for the graphics in the window must reference the same controller.
- Tagnames should not include the name of a controller. For example, in OptoControl you shouldn't name a variable "Controller1_flowrate" if the strategy uses a controller named "Controller1."
- Controller names must be at least three characters in length.
- The "Always in memory" windows property should not be selected.
- Alarms and graphics using the Alarm Point controller-driven attribute may not be used.
- Recipes cannot be used.

To switch between controllers, start the OptoDisplay project and do the following:

1. Select Window→Switch controllers.

   The Select Window(s) for Controller Switching dialog box appears.


Select Window(s) for Controller Switching
Step 1: Select Window(s)
Select All
Deselect All
Step 2: Select Controller
OK
Cancel
Help

Standard Deviation

SNAP Learning Center
SNAP-LCM4 (Ethernet)

2. Select the name of the window you want to view.

3. Select the name of the controller you want to view.

4. Click OK.

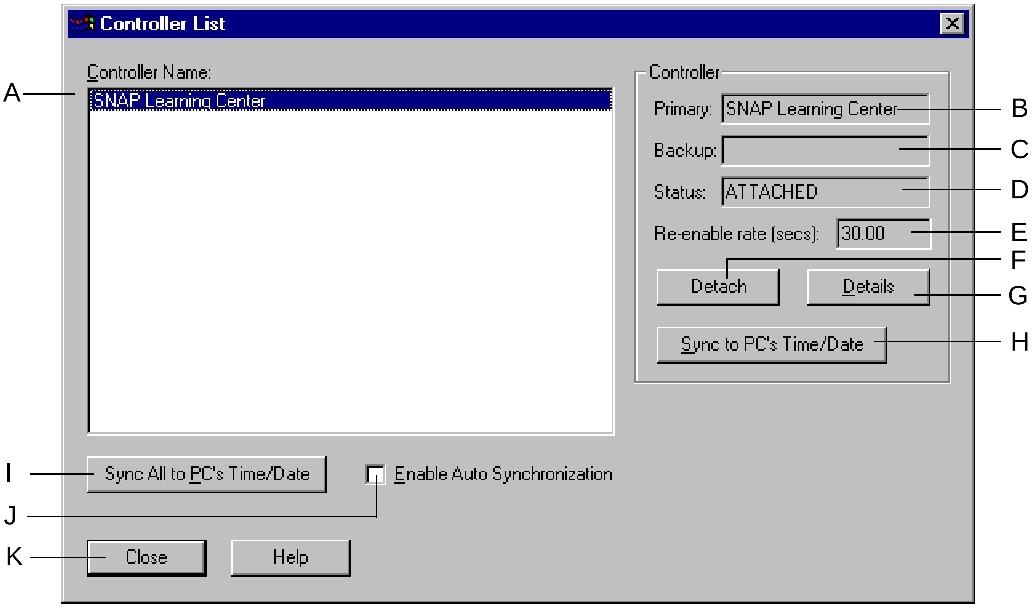
Graphics with dynamic attributes now use values from the controller you selected. The name of the currently connected controller appears in the window's title bar.

Checking Controller Status

To check the status, attach/detach, and synchronize the clock of one or more controllers used by a project, select View➞Controller(s).

NOTE: You can also check the status of a controller by clicking a graphic object that has been configured with the Controller Status dynamic attribute. See "Controller Status" on page 6-7 for more information.

The Controller List dialog box appears:



Controller List

Controller Name:

SNAP Learning Center

Controller

Primary: SNAP Learning Center

Backup:

Status: ATTACHED

Re-enable rate (secs): 30.00

☐ Enable Auto Synchronization

A The Controller Name list shows controllers that have been defined for the project. Highlight the name of a controller to see information about it in the Controller group in the dialog box.

B The name of the primary controller appears in the Primary field.

C If a backup controller has been configured for the primary controller, its name appears in the Backup field.

D The status of the controller, ATTACHED or DETACHED, appears here. See F for more information about this controller status.

E This shows the time interval OptoDisplay waits before attempting to reattach to a controller from which it detached after an error occurred.

F Click Detach to keep OptoDisplay from scanning the selected controller for data. If you detach the controller, OptoDisplay won't try to scan that controller for data and unnecessary error messages won't be posted to the Event Log Viewer and file. You may need to detach the controller if you need to physically replace the controller.

G Click Details to see complete information on a selected controller. Information appears in the Inspect Controller dialog box.

H Click Sync to PC's Time/Date to synchronize the selected controller's internal clock with that of the PC running the OptoDisplay project.

I Click Sync All to PC's Time/Date to synchronize the internal clocks of all listed controllers with that of the PC running the OptoDisplay project.

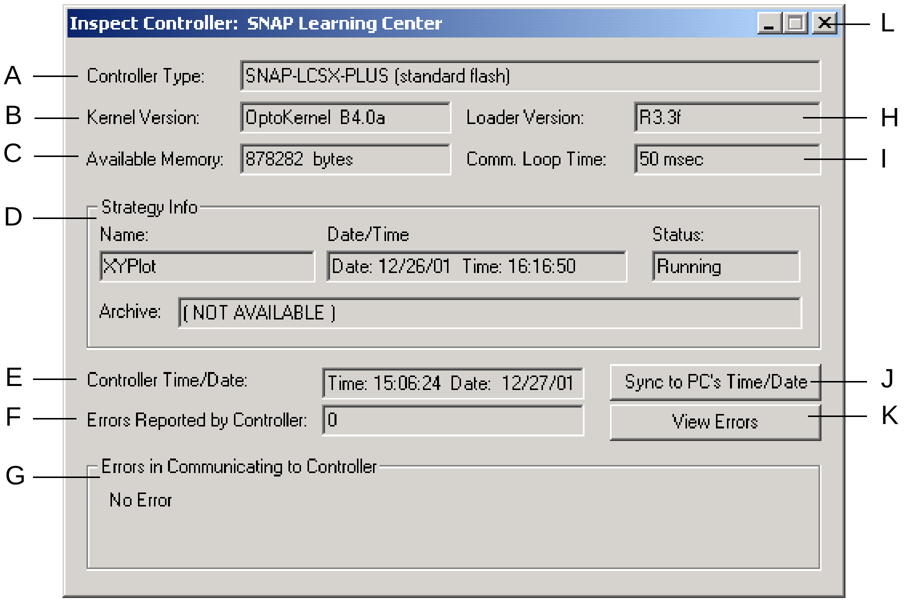
J If the Enable Auto Synchronization option was turned off in OptoDisplay Configurator, select the Enable Auto Synchronization checkbox to turn this option on.

Note that selecting this option only affects the OptoDisplay project while it is currently running in OptoDisplay Runtime. It does not change the project settings.

K Click Close to save your settings and close the dialog box.

To view detailed information about a controller, select a controller in the Controller List dialog box and click Details.

The Inspect Controller dialog box opens:



Inspect Controller: SNAP Learning Center

Controller Type: SNAP-LCSX-PLUS (standard flash)

Kernel Version: OptoKernel B4.0a

Loader Version: R3.3f

Available Memory: 878282 bytes

Comm. Loop Time: 50 msec

Strategy Info

Name: XYPlot

Date/Time: Date: 12/26/01 Time: 16:16:50

Status: Running

Archive: (NOT AVAILABLE)

Controller Time/Date: Time: 15:06:24 Date: 12/27/01

Errors Reported by Controller: 0

Errors in Communicating to Controller

No Error

A This shows the model of the Opto 22 controller.

B This shows the version of the controller's software kernel.

C The available RAM (memory) in the controller appears here.

D This section shows the name, time and date, and status of the OptoControl strategy loaded on the controller. If a strategy archive has been saved to the controller, the name of the archive is also listed here.

E This shows the current time and date set on the controller. If you want to synchronize the controller's date and time with the date and time of the PC running OptoDisplay, click J.

F If the controller reported any errors, the number of errors appears here. To view more information about the errors, click K.

G If there were any errors in OptoDisplay communicating to the controller, the error messages appear here.

H This shows the version of the controller's software loader.

I This displays the time it takes to send a request to the controller or receive information back from it.

J Click Sync to PC's Time/Date to have the controller's time and date match that of the computer running OptoDisplay.

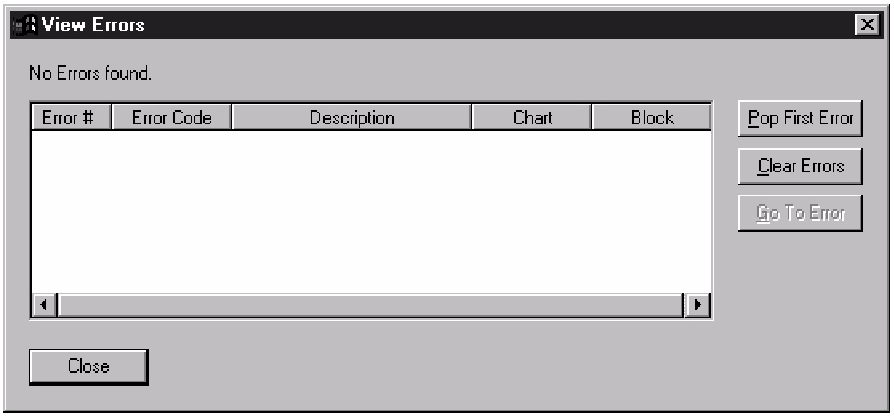
K Click View Errors to see more information about errors reported by the controller. See "Viewing Error Messages" on page 9-18 for details on the information shown in the dialog box that appears.

L Click the Close Window button ☒ to close the dialog box.

Viewing Error Messages

If any errors were reported by the controller in the Inspect Controllers dialog box, you can click View Errors to find out more about them.

The View Errors dialog box that appears shows the error number and its code, its description, and the chart and block the error occurred in. (You can easily look up the error code in the *OptoControl Command Reference,* Opto 22 form number 725.)



No Errors found.

Do one of the following:

- Click the Pop First Error button to remove the first error in the error list and in the controller.
- Click the Clear Errors button to clear all errors from the error list and the controller. (The Go To Error button is not available.)
- Click Close when you're finished inspecting the errors.

Viewing Average Scan Time

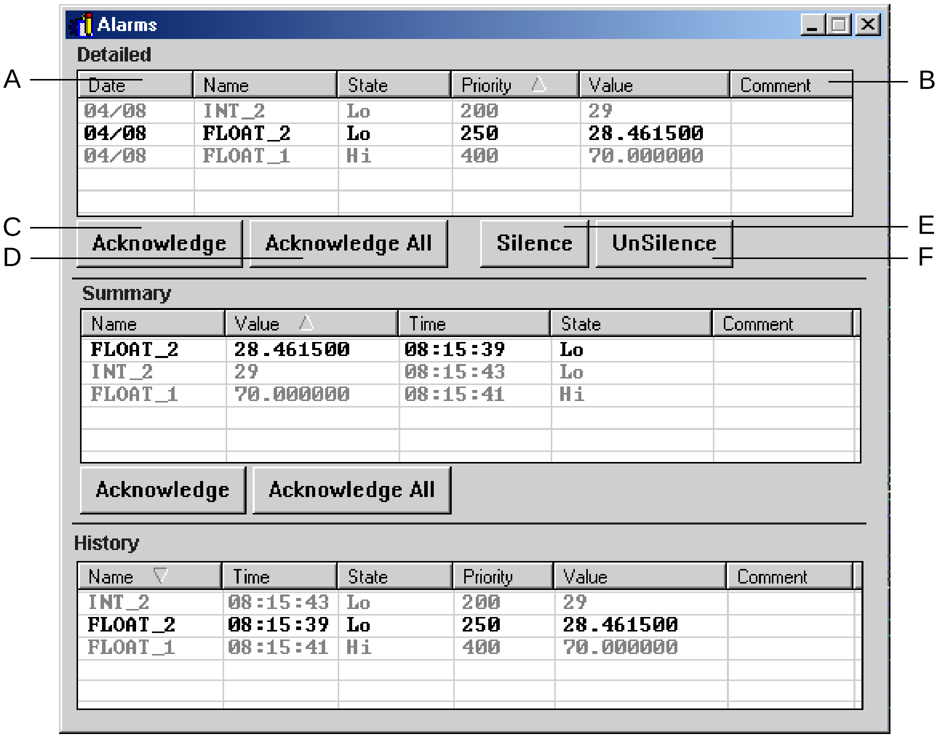
Select View→Average Scan Time to view the average scan time for each controller that is active and scanning. This information can help diagnose possible communication problems between the controller and OptoDisplay Runtime. At least ten scans must have been completed before an average scan time is provided.

Working with Alarms

If an alarm in an OptoDisplay project has been configured to let the operator do so, you can modify alarm points that appear, as well as change how the alarm information appears in the window.

You may see detailed, summary, and history alarms in an OptoDisplay project if it has been configured to let the operator do so. See "Adding Alarm Graphics" on page 8-37 to learn more about these types of alarms.

The sample alarm window below contains detailed, summary, and history alarm graphics.



Detailed

Date	Name	State	Priority △	Value	Comment
04/08	INT_2	Lo	200	29	
04/08	**FLOAT_2**	**Lo**	**250**	**28.461500**	
04/08	FLOAT_1	Hi	400	70.000000	

Summary

Name	Value △	Time	State	Comment
FLOAT_2	**28.461500**	**08:15:39**	**Lo**	
INT_2	29	08:15:43	Lo	
FLOAT_1	70.000000	08:15:41	Hi	

History

Name ▽	Time	State	Priority	Value	Comment
INT_2	08:15:43	Lo	200	29	
FLOAT_2	**08:15:39**	**Lo**	**250**	**28.461500**	
FLOAT_1	08:15:41	Hi	400	70.000000	

A To sort the information that is displayed, click the column name of the item you'd like to sort by. All the alarm data that appears will be sorted based on the values in that column. Click the column name again to reverse the sort order.

B To change the location where columns appear in an alarm graphic, click the name of a column and drag it to a new location.

C To acknowledge and turn off a single active alarm, select an alarm and click Acknowledge. When an alarm has been acknowledged, it changes color so it can be easily identified.

D To acknowledge and turn off all active alarms, click Acknowledge All.

E (Detailed alarms only) To silence a single active alarm, select an alarm and click Silence. Silencing an alarm is similar to acknowledging an alarm, and the alarm will not re-alarm until it has been unsilenced. When an alarm has been silenced, it changes color so it can be easily identified.

F (Detailed alarms only) To unsilence an alarm that has been silenced, select an alarm and click UnSilence.

Modifying Alarm Points

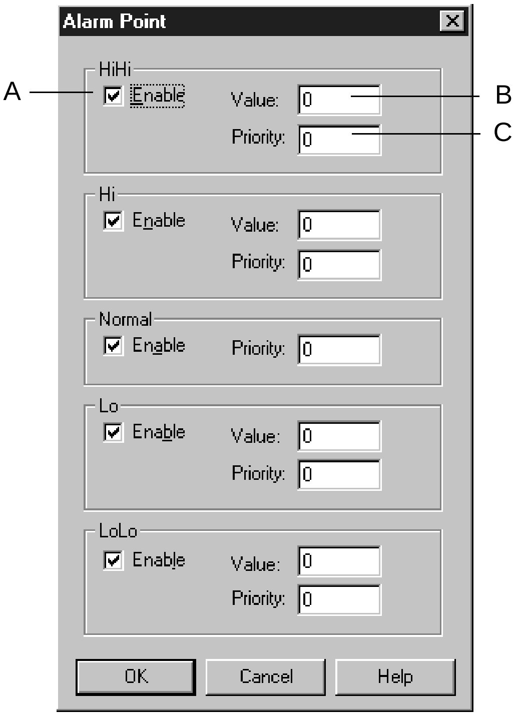
You may be able to modify alarm points in the OptoDisplay project if it has been configured to let the operator do so. See "Configuring Alarm Points" on page 8-28 to learn more about configuring alarm points. Also see "Configuring Project Alarms" on page 8-41 for information about setting alarm options in Runtime.

Alarm point settings can be changed in each one of the four alarm ranges available: HiHi, Hi, Normal, Lo, and LoLo. Each alarm point state has a value that defines its range:

- **HiHi** alarms are greater than or equal to the HiHi Value.
- **Hi** alarms are greater than or equal to the Hi value and less than the HiHi value.
- **Lo** alarms are less than or equal to the Lo value and greater than the LoLo value.
- **LoLo** alarm are less than or equal to the LoLo level.

The normal state is between the Hi and Lo values. Each level can enabled or disabled, but at least one alarm state (HiHi, Hi, Lo, or LoLo) must be enabled.

To view the alarm point settings, select Alarms→Modify Alarm Points.



HiHi
☑ Enable Value: 0
Priority: 0

Hi
☑ Enable Value: 0
Priority: 0

Normal
☑ Enable Priority: 0

Lo
☑ Enable Value: 0
Priority: 0

LoLo
☑ Enable Value: 0
Priority: 0

A Select this check box to enable the alarm level for an alarm range.

B Enter the value for an alarm level in the Value field.

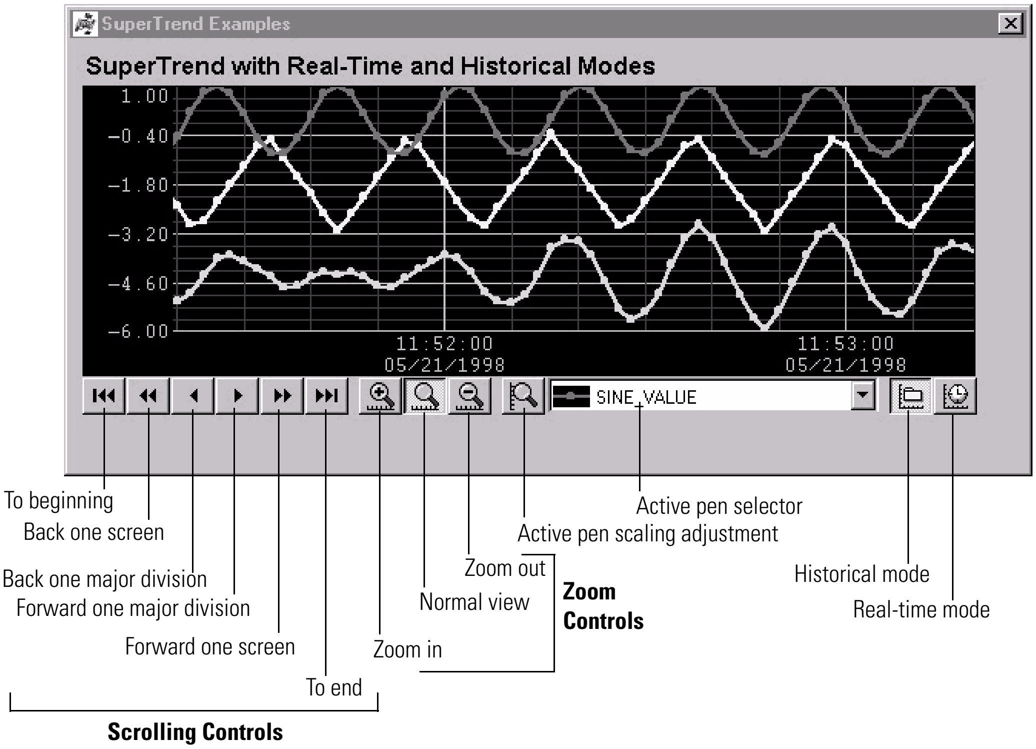
C To set a priority for an alarm point, enter an integer value between 0 and 999.

Priority fields define an integer value for each alarm level, and can be useful for displaying the relative importance of different alarm points. Additionally, you can filter out alarms with lower priorities.

Using SuperTrends in Runtime

If a SuperTrend graphic is included in an OptoDisplay project, you can control how you view the trend data that appears in the SuperTrend window. For example, you can zoom in to see a smaller slice of a trend line, or, if historical data is being collected, switch between views of real-time and historical data.

A sample SuperTrend window appears below. It shows the controls you can use to display SuperTrend information. Note that most of the controls that appear below are available only when historical mode has been selected.



- Use **scrolling controls** to move back and forth in a chart of historical data.
- Use **zoom controls** to magnify or demagnify your view of a chart.
- To **select an active pen**, click the drop-down list and select a pen from the names that appear. If the y-axis scaling was based on pens (see "Configuring Y-Axis Parameters" on page 7-10), the scale of the active pen will be displayed.

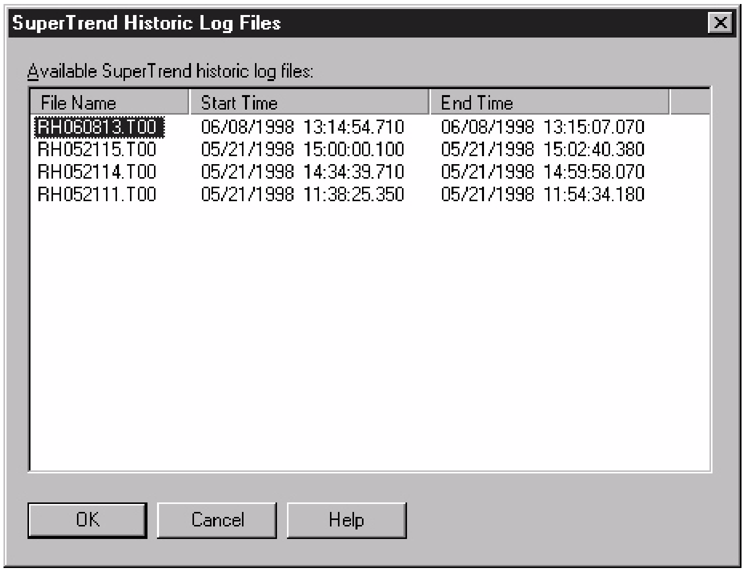
- To **change the scale of an active pen,** click the Active pen scaling tool and enter new minimum and maximum values in the dialog box that appears.

Switching between Historical and Real-Time Modes

If a SuperTrend is both a historical and a real-time trend (that is, historical data is being collected), you can easily change views to see real-time or collected historical data.

1. To switch between historical and real-time modes, click the Historical mode button or the Real-time mode button .

   When you switch from Real-time mode to Historical mode, the SuperTrend Historic Log Files dialog box opens, listing the names of SuperTrend historic log files and the time each log started and stopped recording.



SuperTrend Historic Log Files

Available SuperTrend historic log files:

File Name	Start Time	End Time
RH060813.T00	06/08/1998 13:14:54.710	06/08/1998 13:15:07.070
RH052115.T00	05/21/1998 15:00:00.100	05/21/1998 15:02:40.380
RH052114.T00	05/21/1998 14:34:39.710	05/21/1998 14:59:58.070
RH052111.T00	05/21/1998 11:38:25.350	05/21/1998 11:54:34.180

2. To view a SuperTrend historic log file, select a file and click OK. Note that you will need to select a log file each time you switch to historical mode.

   The information in the log file will be shown in the SuperTrend chart. Use the controls at the bottom of the chart to view the information. (These controls are described on page 9-21.)

3. When you are finished viewing the SuperTrend historic log file, click the Real-time Mode button to return to the real-time view of SuperTrend information.

Using XY Plots in Runtime

You can change the range of values used for the x-axis and y-axis of an XY plot object if this option has been set in OptoDisplay Configurator. To change range values, right-click on the XY plot and in the dialog box that appears enter new minimum and maximum values for each axis.

OptoDisplay Troubleshooting

This appendix provides tips and procedures for resolving problems you may encounter while creating or running your OptoDisplay project.

If you are having problems with creating an OptoControl strategy, see Appendix A, "OptoControl Troubleshooting," in the *OptoControl User's Guide.* For information about types of errors and lists of error messages that may appear in OptoDisplay Runtime, see Appendix B, "OptoDisplay Errors."

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Making an Empty String Visible A-4
User Permissions in Microsoft Windows A-5
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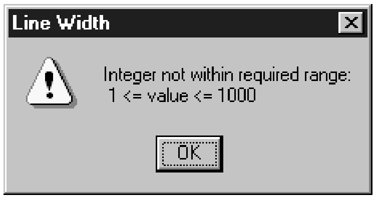
How to Begin Troubleshooting

Most errors that you encounter in OptoDisplay occur when you run your project in the Runtime component. Runtime errors can be the result of several factors: problems communicating with the controller, problems in communication between the controller and I/O, or problems in how an on-screen object is configured. Errors occurring in OptoDisplay Configurator, on the other hand, are usually due to incorrect values being entered in dialog boxes.

The following steps may help you track down the cause of an OptoDisplay error:

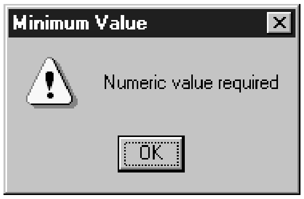
1. Read any Error Messages

Error messages in OptoDisplay Configurator appear in standard message windows. These messages usually indicate how to correct the reported problem, as shown in the examples below:



Line Width

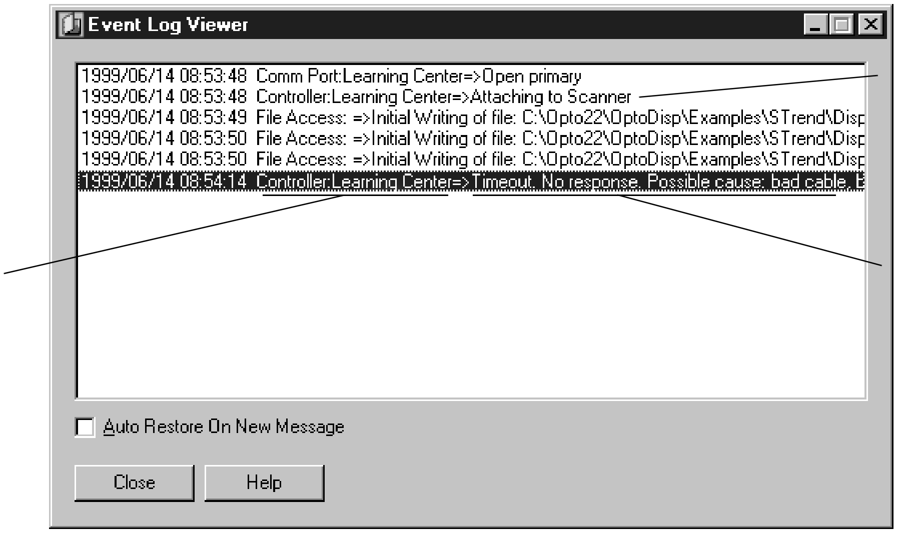
Integer not within required range:
1 <= value <= 1000



Minimum Value

Numeric value required

Error messages in OptoDisplay Runtime appear in the Event Log Viewer as the project runs. To open the Event Log Viewer window, select View➞Event Log. The error messages appear along with other diagnostic information related to your project, as shown in the example below:



Event Log Viewer

```
1999/06/14 08:53:48  Comm Port:Learning Center=>Open primary
1999/06/14 08:53:48  Controller:Learning Center=>Attaching to Scanner
1999/06/14 08:53:49  File Access: =>Initial Writing of file: C:\Opto22\OptoDisp\Examples\STrend\Disp
1999/06/14 08:53:50  File Access: =>Initial Writing of file: C:\Opto22\OptoDisp\Examples\STrend\Disp
1999/06/14 08:53:50  File Access: =>Initial Writing of file: C:\Opto22\OptoDisp\Examples\STrend\Disp
1999/06/14 08:54:14  Controller:Learning Center=>Timeout. No response. Possible cause: bad cable, b
```

☐ Auto Restore On New Message

Diagnostic information from the controller.

The controller reporting the error appears here.

The reported error appears here.

See Appendix B, “OptoDisplay Errors,” for information about error messages that may appear in OptoDisplay Runtime.

2. Check Communication with the Controller

If no error message appears, or the error indicates that there may be a communication problem, first check whether the PC running OptoDisplay is communicating with the controller. Next, check that communication settings specific to OptoDisplay are configured correctly.

a. Follow the communication troubleshooting procedure in Appendix A, “OptoControl Troubleshooting,” in the *OptoControl User’s Guide.* If this does not resolve the communication problem, return to this page and continue with the step below.

b. Check the following communication settings that are specific to OptoDisplay:

- **Refresh time(s)**—determines how frequently a tag on a controller is scanned by OptoDisplay.
- **Re-enable time**—determines how long OptoDisplay waits after a time-out error has occurred before it attempts to communicate with a controller.

See Chapter 4, “Configuring Controllers & Tags” and “Scanning to Update Graphics” on page 6-34 to learn how these settings are configured and optimized.

3. Review Other Sections in this Appendix

Check the other sections in this appendix for the following items:

- If the colors in on-screen graphics are incorrect or change repeatedly, see “Problems Displaying a Project” on page A-3.
- If you are having problems saving project files to your hard drive or other storage location, see “Problems Saving a Project” on page A-4.
- If an on-screen text string object disappears when you run the project, see “Making an Empty String Visible” on page A-4.
- If you are having problems accessing controllers on a computer running Microsoft Windows 2000 or Windows XP, see “User Permissions in Microsoft Windows” on page A-5.

4. Call Product Support

If you cannot find the help you need in this book or the *OptoControl User’s Guide,* call Opto 22 Product Support. See “Product Support” on page iii for contact information.

Problems Displaying a Project

When running an OptoDisplay project, you may encounter problems with how graphics appear on the monitor. (For example, alarm colors might not appear correctly, or might change as the project runs.) Bitmap graphics that you have imported into your project also might not appear correctly.

If these or similar errors occur, check the color depth of the monitor on which the OptoDisplay project is running. If the color depth of the display is set to 256 colors (or “8-bit”), change the setting to 65,536 colors (“16-bit”) or greater. The number of colors available depends on the video card installed in your PC, but most PCs can display at least 16-bit color.

Changing Monitor Color Depth

To change the color depth of your monitor in Microsoft Windows 2000 and Windows XP, follow these steps:

1. From the Windows Start menu, choose Settings→Control Panel.
2. In the Control Panel window, double-click the Display icon.
3. Click the Settings tab in the Display Properties dialog box that opens.
4. In the Colors group, click the drop-down menu and select the number of colors that you want to use.
5. Click OK to save your settings and close the dialog box.

For additional information on changing monitor settings in Windows, see the documentation from Microsoft and your computer manufacturer.

Problems Saving a Project

When trying to save a project in OptoDisplay Configurator, you may see an error message stating that no storage space is available on the computer’s hard drive. If this message appears, yet you know that there is enough storage space for the OptoDisplay project files, check to see if one or more files are marked “Read Only.”

To do this, open the OptoDisplay project folder in Windows Explorer, right-click on a project file, and select Properties from the pop-up menu that appears. If the file is marked Read Only, the check box “Read Only” at the bottom of the Properties window is checked. Clear this check box, click OK to close the Properties window, and try saving the project again in OptoDisplay Configurator.

For additional information on viewing file properties in Windows, see the documentation from Microsoft and your computer manufacturer.

Making an Empty String Visible

In an OptoDisplay project, if a text string object in a display sends an empty string to a controller, the text string object becomes invisible and can’t be selected again. This might happen, for example, if an operator accidentally cleared a field while entering values in a display.

This problem occurs because the controller’s string variable is empty, so when the text string object linked to this variable checks the controller, it has nothing to display.

To correct this condition, do the following:

1. Open the OptoDisplay project.
2. Draw or import a graphic object to be used as a push button.

   The graphic should be approximately the same size as the text string object.

3. Double-click on the new graphic object and, in the Graphic Dynamic Attributes dialog box that opens, double-click “Send String” from the Operator Driven Attributes list.

4. In the Dynamic Attributes - Send String dialog box that appears, select “Prompt for Data” in the Source group and click OK.

5. Click OK to close the Graphic Dynamic Attributes dialog box and save your changes.

6. Now place the new graphic object behind the text string object as follows:

   a. Using the Select tool, select the graphic object and move it until it’s directly over the text string object.

   b. With the graphic object still selected, choose Edit→Z-Order→Send to Back.

7. Save your project and run it in OptoDisplay Runtime.

   If you click in the area of the text string object and new push button graphic object, the Enter String dialog box should appear, even if an empty string has been sent to the controller.

User Permissions in Microsoft Windows

When you set up controllers on a computer running the Microsoft Windows 2000 or Windows XP operating systems, typically you are using the computer with top-level “administrator” privileges. If someone later uses this same computer to run a FactoryFloor application, but logs in to the computer with lower-level, non-administrator privileges, the FactoryFloor application may not recognize controllers that have been previously configured.

If this problem occurs, you can modify the Windows permissions to let specific users access previously configured controllers without having administrator access. This is done using the Registry Editor utility.

WARNING: *Use the Windows Registry Editor carefully. It is strongly recommended that you make a backup copy of your Windows Registry before continuing with this procedure. Without a backup copy, if you delete the wrong properties and cannot return the Registry to its original state, application and system files can become unusable and will have to be reinstalled.*

1. From the Windows Start menu, select Run.

   The Run dialog box appears.

2. Enter the following command in the Open field and press ENTER:

   ```
   regedt32
   ```

   The Registry Editor main window appears with several open windows inside it.

3. Select the HKEY_LOCAL_MACHINE window to make it active.

4. Double-click the Software folder in the HKEY_LOCAL_MACHINE window.

5. Select the Opto22 folder.

6. Select Security→Permissions.

   The Registry Key Permissions dialog box opens. Make sure that “Opto22” appears next to Registry Key at the top of the window.

7. Click Add.

8. In the Add Users and Groups dialog box, select the name of the appropriate group or domain from the List Names From drop-down list.

9. In the Names list, select the name of the user or group that will get controller access and then click Add.

10. If it is not already selected, choose “Full Control” from the Type of Access drop-down menu.

11. Click OK.

12. In the Registry Key Permissions dialog box, select the Replace Permission on Existing Subkeys checkbox and click OK.

13. Select Registry→Exit to close the Registry Editor.

14. Restart the computer.

The user or group you added can now use controllers without having administrator access.

Other Troubleshooting Tools

Checking File Versions for FactoryFloor

Sometimes problems may be caused by older or misplaced files. Product Support may ask you to run OptoVersion to check the versions and paths of your Opto 22 .DLL and .EXE files. Here’s how:

1. From the Start menu, choose Programs→Opto 22→FactoryFloor 4.1→OptoUtilities→OptoVersion.

2. In the OptoVersion window, click Find.

   The utility searches your hard drive and prints a list of Opto-related files found.

3. To see more information on any file, double-click its name. To sort the list in a different order, click any column heading.

4. To e-mail the information to Opto 22 Product Support, click E-mail.

The utility saves the list to a file named Version.bd in the same directory that contains OptoVersion.exe. If you use Microsoft Outlook as your e-mail program, a new message automatically appears addressed to Product Support, with the version file attached.

5. If you use Microsoft Outlook, add comments to the new message and click Send.

6. If you use another e-mail program, attach the Version.bd file to an e-mail message and address the message to **support@opto22.com**, along with an explanation of the problem you're experiencing.

Generate Scanner Information Files (SIFs)

When a project is running in OptoDisplay Runtime, information about the scan groups, refresh groups, and tags that are being scanned for the connected controllers can be recorded in a text file called a *scanner information file.* With the information in this file and the information generated using View→Dynamic Attributes in OptoDisplay Configurator, you can diagnose scanner bottlenecks and/or provide the information to Opto 22 Product Support to help them diagnose possible problems with scanner throughput.

The scanner information file contains the following:

- Header describing how to correlate the information with a log generated by the OptoSnif utility.
- List of refresh groups configured for the project
- List of scan groups used internally by OptoDisplay
- For each configured controller, the name and total number of tags beings scanned for that controller
- For each configured controller, scan groups in descending order (based on the number of tags scanned by a group)
- For each configured controller, tags for each refresh group that are being scanned
- Total number of controllers and tags for the OptoDisplay project.

NOTE: When Generate Scanner Information File is selected, all windows in a project will be opened when the project starts in OptoDisplay Runtime. The windows will be closed or returned to their originally configured state after approximately two seconds. If a project's windows contain large bitmap and metafile graphics, or if a large number of SuperTrends are used in the project, problems may occur if opening all project windows simultaneously exceeds your PC's available memory.

APPENDIX B

OptoDisplay Errors

This appendix lists error messages you may see while running a project in OptoDisplay Runtime. The cause of each error message is described, and, if possible, corrective action you can take to resolve the problem.

In This Section

Types of Errors B-1
Error Messages in OptoDisplay Runtime....... B-2

Types of Errors

While using the Configurator and Runtime components of OptoDisplay, several types of errors may occur due to incorrect equipment setup, out-of-date files, or equipment failure. These errors generally fall into three categories:

- **Runtime Errors**—These may occur while running a project in OptoDisplay Runtime. Most of these errors can be traced to controller configuration problems or configuration problems with the I/O unit(s) connected to the controller. Runtime errors can be further grouped into several subcategories based on the type of error that occurs; see "Error Messages in OptoDisplay Runtime" on page B-2 for lists of error messages in each subcategory.
- **Configurator Errors**—These may occur as you use OptoDisplay Configurator to create a project (for instance, adding a dynamic attribute to a graphic object). Errors most commonly occur when entering data into a dialog box; if an error occurs while doing this, simply re-enter an appropriate value and continue.
- **Windows Errors**—These may occur while using either the Runtime or Configurator components of OptoDisplay. The most common Windows errors occur when too many applications are running at the same time, reducing the amount of memory available for the operating system. These errors are issued by the Microsoft Windows operating system running on your computer; see the documentation from Microsoft and your computer manufacturer for more information about Windows errors.

Error Messages in OptoDisplay Runtime

Error messages that appear in OptoDisplay Runtime can be grouped into several categories, which appear in the table below. Messages for each category, as well as possible causes for the error and corrective actions to resolve it, are listed for each category.

NOTE: Many of these error messages also appear when running OptoControl. For additional troubleshooting information, see Appendix A, "OptoControl Troubleshooting," and Appendix B, "OptoControl Errors," in the OptoControl User's Guide.

Runtime Error Category	See
Controller Errors	page B-2
Communication Data Server Errors	page B-6
Ethernet Errors	page B-7
File Access Errors	page B-8
Historic Log Errors	page B-9
Launch Application Errors	page B-9
Port Errors	page B-9
Recipe Upload/Download Errors	page B-12
Scanner Errors	page B-13
Server Messages/Errors	page B-14
System Errors	page B-17

Controller Errors

The controller may report the following errors. The source of the error may be the controller, or one or more I/O units connected to the controller.

Error Message	Possible Causes
Bad character in controller name	Some of the characters that were once valid in Cyrano strategies are invalid characters in OptoControl. Check the controller name in the OptoControl or Cyrano strategy.
Bad length for controller name	Check the length of the controller name. Try setting up the controller name again.
Bad table index	The index for the specified table is out of range. Make sure you are not accessing an invalid range of table elements.

Error Message	Possible Causes
Buffer overrun error	This error occurs if the data returned from the I/O units is too long (>255 characters) or too short (data length is 0). Check for possible noise interference, proper termination, or other factors that may affect communication lines to the controller.
Bus error	This error is usually caused by a problem in the kernel or library. It could also be caused by a failure in the controller hardware. The failure may be due to a bad memory or port device. When this error occurs, the chart in the controller that caused the error is stopped. If this error occurs, make sure that all cards in the controller are properly seated.
Command not valid on specified board	This error indicates that an I/O unit received a command from the controller that it did not understand. A new command may have been added that is not supported by an older I/O unit. An update to the I/O unit's EPROM may be required.
Communications watchdog error	The communication link watchdog timer has timed out. The controller is unable to communicate with one or more I/O units. This error might be caused by improper wiring or termination.
Compile only error. A command or "word" was encountered that cannot be used when compiling.	A custom Forth word on the controller could not be compiled during scanning. Custom Forth words are used to accelerate scanning by collecting queries of several tags into one word.
Controller EPROM out of date	The controller EPROM version on the controller does not meet the minimum version requirements for this version of the software. The minimum required EPROM version is identified as the version in the Help→About dialog.
Controller strategy date stamp invalid	The date stamp for the current strategy was not currently obtained from the controller. Check connections with the controller.
Controller strategy date/time incompatible	The date and time stamp recorded on the controller for the current strategy does not match the date and time of the strategy file that was used to configure the OptoDisplay project. OptoDisplay Runtime operation will continue. Any tags that may have changed can cause scanning errors. The OptoDisplay Configurator should be run to update the internal strategy time stamp recorded in the OptoDisplay project and to verify connections to any tags that may have changed.

Error Message	Possible Causes
Controller strategy file name incompatible	This error commonly occurs when a new or modified strategy is downloaded to a controller and OptoDisplay Runtime is started. If OptoDisplay was configured with a strategy file that does not match the one in the controller, this error will be reported.
Controller strategy invalid	OptoDisplay did not find a strategy at the controller during the verification process. Make sure a strategy was downloaded to the controller before trying to run OptoDisplay.
Controller strategy time stamp invalid	The time stamp for the current strategy was not correctly obtained from the controller. Check connections with the controller.
Data field error	The I/O unit did not receive enough characters. This error indicates a problem between the controller and the I/O unit. It can be caused by different baud rate settings on the controller or I/O unit. Check the communications jumpers.
Definition not finished	An incomplete user-defined command was downloaded to the controller. This error can occur if a library file was downloaded with an incorrect Forth word definition.
Dictionary full error. Controller dictionary is full and no more “words” can be defined.	The controller has insufficient memory to compile a new Forth word used to accelerate scanning. Each custom word contains queries for several tags found in the same scan group. The increase in scanning efficiency is achieved by making a single query to the controller to obtain values for all the tags compiled into the custom Forth word. This reduces the overhead required when each tag is queried individually. If this error occurs, the software’s scanner will revert to querying each tag individually, which is called a “Slow Scan.”
Empty stack error. Controller attempted to perform an operation that expected data on the controller stack.	The controller generates this error during a download or while running. A command is requesting more items from the stack than are available. Example: An ENDIF (Forth “THEN”) without a corresponding IF.
Execute only error. A command or “word” was encountered that cannot be used when compiling.	The controller encounters a program instruction that it cannot execute. During Runtime, this error may indicate a corrupt program file.
First character in controller name must be alpha	Make sure the controller name in the OptoControl strategy or Cyrano strategy begins with an alphabetic character.
Invalid channel error	This error occurs when a command attempting to use an unconfigured channel is sent to the controller.

Error Message	Possible Causes
Invalid command error	The controller received an invalid command from the host.
Invalid delay error	This error occurs with digital I/O units when you try to start a square wave, generate *N* pulses, or generate a time-proportional output (TPO), with a delay time less than 10 milliseconds on more than eight output positions.
Invalid event error	This error occurs when you try to enable an event entry or define a reaction before the event has been defined.
Invalid kernel	The controller's kernel has been corrupted. Re-download the kernel.
Invalid limit error	An I/O unit receives data that contains an illegal value. The controller has sent a command to an I/O unit which contains out-of-range data. Check your controller program to see if calculated values are within module-configured ranges.
Invalid module error	This error occurs when a command is sent that requires a different channel configuration than the one presently in use. For example, you issued a command to turn on an output on a channel that's configured as an input.
Mistic kernel only supports Cyrano strategies (.gml)	OptoDisplay determined that the kernel running on the controller only supports Cyrano strategies. The strategy you've associated your project with is an OptoControl strategy.
OptoKernel only supports OptoControl strategies (.cdb)	OptoDisplay determined that the kernel running on the controller only supports OptoControl strategies. The strategy you've associated with your project is a Cyrano strategy.
Out of memory	The program and data in the controller have exceeded the available controller memory. This error usually occurs during program download. During Runtime, this error occurs when OptoDisplay is compiling custom Forth words for compressed scanning. These words may be compiled anytime an OptoDisplay Runtime window is initially opened.
Pointer was NULL	An invalid object type was passed in the OptoControl or Cyrano strategy. If you've written your own Forth words to the controller, make sure they are defined properly. Otherwise, contact Opto 22 Product Support.
Power-up clear expected because the controller has powered up. Expecting an "A" command.	After a power failure on an I/O unit, a Power-up Clear command is expected before any other command. The Controller will automatically send this command, and OptoDisplay will report the occurrence.

Error Message	Possible Causes
Receive error	The controller receives a message it does not understand. This error may be caused by wiring or noise problems between the host computer and the controller.
Return checksum error	This error indicates a problem with the communication link. A checksum error often occurs when the local bus or remote bus networks are not wired, terminated, or biased properly.
Stack full error. Controller stack has grown too big.	The stack on the controller cannot grow any further. This error may be caused by an error in a library file, an include file, or words downloaded by OptoDisplay.
Undefined command (from M4SENET)	An undefined command was received by the controller from the M4SENET card. Contact Opto 22 Product Support.
Warning word is already defined although a redefinition will be allowed	A Forth word already defined in the controller was received and will be redefined.
Word abort while port unlocked	This error was generated by the controller after the UNLOCK command was issued.

Communication Data Server Errors

The following Communication Data Server errors are generated if an error occurred while trying to communicate to the controller:

Error Message	Possible Causes
Cannot acquire lock	Access to the controller was attempted but unsuccessful. Wait and attempt to access the controller again, or try resetting the controller.
Connection handle invalid	Internal error. Wait and attempt to access the controller again, try resetting the controller, try rebooting the computer, or contact Opto 22 Product Support if the previous suggestions are unsuccessful.
Connection setup error	The controller connection setup is invalid. Contact Opto 22 Product Support.
Connection type invalid	The controller connection type is invalid. Wait and attempt to access the controller again, reset the controller, or contact Opto 22 Product Support.
Controller handle invalid	Internal error. Wait and attempt to access the controller again, try resetting the controller, try rebooting the computer, or contact Opto 22 Product Support if the previous suggestions are unsuccessful.

Error Message	Possible Causes
Controller setup error. Name may be bad.	A problem was detected with the controller name. Try setting up the controller again.
Invalid controller name. Controller not configured (name not in Registry). Make sure the controller name is not misspelled.	The controller name specified is invalid. Try configuring the controller again.
Invalid parameter in OptoCom.dll API call	This error may occur if you're using Opto 22's .dll files with a third-party application (such as Visual Basic) to communicate directly to the controller. Make sure you're using the call properly.
No controller in Registry	The controller was not found in the Windows Registry. Try configuring the controller again.
No port in Registry	The controller was not found in the Windows Registry. Try configuring the controller again.
Out of memory in OptoCom.dll	Contact Opto 22 Product Support.
RPC binding error. NetBIOS might not be running.	Make sure NetBIOS is running properly.
RPC call error	Make sure NetBIOS is running properly.

Ethernet Errors

The following Ethernet errors are generated if an error occurs while OptoDisplay is trying to connect to or operate with an Ethernet network:

Error Message	Possible Causes
Ethernet: Error with Registry entries	There was an error with the entries in the Windows Registry. Try setting up the controller again.
Ethernet: Function does not exist error	An Ethernet communication problem. Make sure TCP/IP is enabled.
Ethernet: Incorrect length of receive string	An Ethernet communication problem. Make sure TCP/IP is enabled.
Ethernet: Receive error	An Ethernet communication problem. Make sure TCP/IP is enabled.
Ethernet: Send error	An Ethernet communication problem. Make sure TCP/IP is enabled.
NetBios: Error creating own name in network	A session did not terminate properly. Try rebooting your computer.

Error Message	Possible Causes
NetBios: Error with Registry entries	Try setting up the controller name again.
TCP/IP: Cannot connect error	An Ethernet communication problem. Make sure TCP/IP is enabled.
TCP/IP: Invalid socket	An Ethernet communication problem. Make sure TCP/IP is enabled.

File Access Errors

The following File Access errors are generated by OptoDisplay if an error occurred while OptoDisplay is working with files or with historic logs:

Error Message	Possible Causes
Bad string, using default file name.	The tag name used as a source for a file name could not be used. The default file name will be used instead. The default file name was set up in the Configurator.
Can't make directory	A directory could not be created. Check if the directory is being created in a read-only directory. Change the protection to allow you to create it.
Directory now created.	Status message indicating that the directory was created.
Drive is full. Writing has been suspended.	A file was being written to a drive, but not enough free space was available to complete the transaction. Free up some space on the drive to continue.
Drive is no longer full. Writing has been resumed.	Status message indicating that the destination drive has enough space available to complete the file writing transaction.
Initial Writing of file: File name	Status message indicating that a file name is going to be created.
Invalid directory bad directory name. Using default.	The specified directory could not be used. The default directory will be used instead. The default directory was set up in the Configurator.

Historic Log Errors

The following error message may appear if an error occurs with a historic log:

Error Message	Possible Causes
Scan error: [Scanner Error] while accessing: tag name	A scanner error occurred while trying to access a tag name. Check the Scanner errors list for a complete description.

Launch Application Errors

The following error messages may appear if an error occurred while working with the Launch Applications feature of OptoDisplay:

Error Message	Possible Causes
File not found	The executable file specified for a launch application setup could not be found. Verify the directory where the file actually resides.
Path not found	The drive/directory path specified for the executable in a launch application setup does not exist. Verify the actual path of the executable file.
Scan error - [Scanner Error] while accessing: tag name	A scanner error occurred while trying to access a tag name. Check the Scanner Errors section for more details about the error.
WinExec error #	A Windows executable error occurred. Check Microsoft help sources for clarification about the error number.
Working directory invalid	The working directory specified for a launch application setup is incorrect. Verify the drive and path.

Port Errors

The following errors are generated by OptoDisplay if a port-related error occurred:

Error Message	Possible Causes
ARCNET could not transmit	The OptoCom.dll could not receive notification from the ARCNET adapter that it is ready to transmit data. Ensure the ARCNET adapter is installed properly and connected to the network.
Baud rate is not correct	The software baud rate setting does not match the hardware baud rate setting.

Error Message	Possible Causes
Checksum or CRC error	The computed CRC checksum does not match that in the received message. Check hardware connections to the controller.
Controller acquired by other process	Another host machine has the controller's host port locked. The host port is locked when any host machine is downloading new Forth words for either an OptoDisplay or OptoControl application. An OptoDisplay session downloads new Forth words during startup or when a window is opened for the first time in that session. During this period, all communication is suspended between other hosts running OptoDisplay sessions and the controller. Upon completion of the Forth word download, the port is unlocked and communication resumes with all OptoDisplay sessions connected to the controller. Verification of communications is provided by the "Attaching to Scanner" message.
Could not construct port. Open call failed.	The first call to this port failed because the host computer was out of memory.
Could not create or duplicate (cannot find) a handle	Contact Opto 22 Product Support.
Could not find other nodes in ARCNET	There are no other ARCNET nodes on the network.
Could not read value(s) from Registry	The registry could be corrupt. Contact Opto 22 Product Support.
Could not write new entry to Registry. If in Windows 2000 or Windows XP, make sure you have administrative rights.	There was a problem writing information to the registry. Contact your network administrator.
Invalid address error	The driver sent a command that included a controller address outside the limits of 0 and 255.
Invalid MwDriver handle	This is an internal OptoDisplay error. Contact Opto 22 Product Support.
Invalid port error. WinRT drivers might not have started.	This error occurs when a device, such as an AC37 or AC42, has been configured but does not exist at Runtime. Check your device configuration.
Invalid protocol error	This is an internal OptoDisplay error. Contact Opto 22 Product Support.
Out of handles to open. Close some controllers.	OptoServer ran out of DDE handles. Reduce the number of sessions you have connected. The maximum is 16 handles.
Out of space in the serial data global array	Reduce the serial communication sessions to OptoServer down to 16.

Error Message	Possible Causes
Please reboot for changes in the Registry to take effect	Reboot your computer so that changes to the registry are activated.
Port already locked on controller	The communication port configured to talk to one or more controllers is being used by another application. Check the Windows Program Manager to see what other applications are running. Programs that use the computer serial ports, such as modem programs, may be running and using the port.
Port setup failed	At Runtime, the OptoDisplay software was unable to initialize the I/O driver. This is probably caused by a memory allocation problem. Exit Windows and restart Runtime.
Send error. Possible cause for ARCNET: bad cable, bad address, power shut off, etc.	This error is usually caused by not having a Clear-to-Send (CTS) signal on the RS-232 port. No message will be sent. Check hardware connections with the controller.
Short on data error	The OptoCom.dll did not receive the required number of bytes from the controller. Check connections with the controller.
Timeout. No response. Possible cause: bad cable, bad address, power shut off, etc.	A response was not received from the controller in the Timeout period specified for the port. Check the Timeout settings for the port. If they're adequate, check hardware connections with the controller.
Undefined command. The controller did not understand the command	An internal OptoDisplay error occurred. The error that occurred is not recognized by OptoDisplay. Possibly, a tag doesn't exist in the controller strategy. Run the Tool➞AutoCorrect Tags command from the Configurator to try and find the invalid tag.
WinRT: Mutual exclusion could not be created	Information could not be written to the registry. Try rebooting the PC, or contact Opto 22 Product Support.
WinRT: Mutual exclusion could not be deleted	This is a warning message. No action is required; the Windows operating system will take care of this later.
WinRT: Registry entry already exists	The controller name and address already exist. Re-check the names of the configured controllers.
WinRT: Specified device could not be found in Registry	Configure the device again. Check port setup and addressing.

Recipe Upload/Download Errors

The following error messages are displayed if an error occurs while downloading or uploading a recipe:

Error Message	Possible Causes
A scanner error while accessing tag: tag name (tag name not found)	A scanner error was encountered while scanning a tag name. Check the Scanner Errors for more details about the error.
An unknown error occurred on the indicated line. (Recipe Upload)	An unknown error occurred during the upload. Check the recipe file at the indicated line number. If you need additional help to resolve the problem, contact Opto 22 Product Support.
Could not find the selected directory for the recipe destination file. Please check to ensure the path is correct. (Recipe Upload)	The path configured for the destination file of the uploaded recipe is invalid. Make sure the drive/directory path is correct.
Could not find the selected directory for the recipe format file. Please check to ensure the path is correct. (Recipe Upload)	The path configured for the format file of the uploaded recipe is invalid. Make sure the drive/directory path is correct.
Could not find the selected recipe format file. Please check to ensure the file name is correct.	The file name configured for the format file of the uploaded recipe was not found. Make sure you configured the correct tag name.
Could not make directory for Destination File: (Recipe Upload)	The path configured in the destination path could not be created. Check the drive specified in the path. Also check the read/write protection of the directory.
Invalid type specified. Valid types are: “Integer Table, Float Table, String Table, and Chart”	An invalid type was specified in the recipe. Only tags of types integer table, float table, string table, and chart are allowed in a recipe.
Scan error - scanner error while accessing: tag name	A scanner error occurred while trying to access a tag name. Check the Scanner Errors section for more details about the error.
String for destination file was empty: (Recipe Upload)	An OptoControl tag name was configured to contain the name of the destination file, but its contents were empty. Make sure you configure the correct tag name.
String for format file was empty	An OptoControl tag name was configured to contain the name of the format file, but its contents were empty. Make sure you configured the correct tag name.
The recipe file does not exist! (Recipe Upload)	The recipe upload file does not exist. Verify the spelling of the file.

Error Message	Possible Causes
The specified chart state is invalid. Valid states are Run, Stop, Suspend, or Continue.	Make sure the chart state sent in a chart control instruction was Run, Stop, Suspend, or Continue.
The specified controller does not exist in this project.	The controller specified in the recipe's OptoControl tag is not recognized by this project. Verify the controller name for the tag name requested. Check the controller's spelling.
The tag info is formatted incorrectly. Should be: "Controller:Tag Type.Tag Name"	The syntax for the OptoControl tag is incorrect. Make sure it follows this pattern: Controller Name:Tag Type.Tagname, where Controller Name is the name of the controller; Tag Type is "Integer Table," "Float Table," "String Table," or "Chart;" and Tagname is the name of an OptoControl tag or chart name of the type specified in Tag Type.
The tag value is formatted incorrectly. Should be: "Index (optional): Value"	Check the syntax of the tag value(s) specified for the indices. Make sure a colon separates the index from the actual value, and also verify that the index is within the table's range.
Uploaded/Downloaded to File: file name	Status message indicating file name was uploaded or downloaded.

Scanner Errors

The following Runtime error messages are displayed if a scanning error occurred:

Error Message	Possible Causes
Attaching to scanner	This message appears when trying to reestablish communications with the controller.
Controller ID not found	The controller ID used for the scan item cannot be found in the list that is maintained internally to OptoDisplay.
Detaching from scanner by user	This message appears during Runtime when the user has manually disconnected the host from the controller in the Controller Manager dialog.
Detaching from scanner on error	This message appears when the number of retries has been exceeded by the host when trying to reestablish communications with the controller.
Float value illegal. Value ignored.	An error occurred when converting data from a controller into a float variable used in OptoDisplay. The value is not used to update graphics during this scan period.

Error Message	Possible Causes
Incorrect packet size (switched to slow scan)	The response packet from the controller does not contain the correct amount of data during a compressed scan. This error may be due to a failure in the custom Forth word compiled for OptoDisplay to assist in scanning. If the Forth word fails, it is no longer used and the system reverts to scanning all tags separately. This mode is called "slow scan."
Internal sequence error (switched to slow scan)	An internal OptoDisplay error occurred when updating graphics with values obtained from a custom Forth word used during scanning. This custom Forth word is no longer used and the system reverts to scanning all tags separately. This mode is called "slow scan."
Receive error	The expected number of characters was not received from the controller.
Scanner overrun error	The internal OptoDisplay scanner is unable to scan all of the I/O data requests at the rate configured by the user. This error can occur if too many points have been configured at too fast a scan rate. Slow down the scan group times. This error can also occur if the controller takes too long to provide the data at the configured rate.
Task start failed	A task on the controller has failed to start as directed by OptoDisplay.
Unexpected controller response (out-of-sync)	Sequence IDs are placed in all commands to the controller from the host. Each ID is compared to the one found in the response from the controller to ensure that messages do not go out of synchronization. If this problem persists, run the OptoSniff utility to record communications between the controller and the host and report the problem to Opto 22 Product Support.

Server Messages/Errors

The following Runtime error messages are displayed if an OptoServer server error occurred:

Error Message	Possible Causes
Alternate server DOWN	The primary or backup server is down. If the primary OptoServer node was running, the backup node is down; if the backup node was running, the primary OptoServer node is down.
Alternate server UP	A status message indicating the backup/primary server is connected to OptoServer. If the primary OptoServer node was running, the backup node is up; if the backup node was running, the primary OptoServer node is up.

Error Message	Possible Causes
Both servers DOWN	The primary and backup servers are down. Verify that the OptoServer port configuration in OptoServer matches the actual physical configuration of the equipment. Also verify that the network is working.
Both servers UP [switched to primary]	The primary and backup servers are connected to OptoServer. The primary OptoServer node is connected to OptoDisplay.
Connecting to server (pinging server)	OptoDisplay is attempting to connect to OptoServer.
Controller name not found on server or network error	OptoDisplay attempted to verify that a controller is registered with OptoServer but the controller was not found. Make sure it was registered with OptoServer in the OptoServer Administrator. Verify the controller name is spelled correctly.
Controller not defined	OptoDisplay attempted to verify that a controller is registered with OptoServer, but the controller was not found. Make sure it was registered with OptoServer in the OptoServer Administrator. Verify that the controller name is spelled correctly.
Could not connect to server. OptoDisplay version too old for server.	OptoDisplay could not connect to OptoServer because the version of OptoDisplay is too old for OptoServer.
Could not connect to server. OptoServer version too old for server.	OptoDisplay could not connect to OptoServer because the version of the OptoServer program is too old for OptoDisplay.
Current server DOWN [no alternate]	The primary/backup OptoServer server is down and an alternate server was not configured. Make sure OptoServer is running.
Current server UP	Status message indicating that the primary or backup OptoServer server is up and running.
Disconnecting from server	Indicates that OptoDisplay is disconnecting from OptoServer. Possible causes are that a network communication error occurred, or OptoDisplay is simply terminating its connection to OptoServer.
Error connecting to server (ping FAILED)	OptoDisplay could not communicate or connect to OptoServer.
Internal Error - server improperly configured	Contact Opto 22 Product Support. The data collected after this error occurs is unreliable.
Network communication FAILED	OptoDisplay tried to communicate to OptoServer and OptoServer could not receive the message. Verify that OptoServer is running and the network connections are working properly.

Error Message	Possible Causes
Network error while configuring server (group add FAILED)	OptoDisplay was in the process of configuring OptoServer with a group when a failure occurred. Verify that OptoServer is running and the network connections are working properly.
Network error while configuring server (item add FAILED)	OptoDisplay was in the process of configuring the server with a tag name when a network error occurred. Verify that OptoServer is running and the network connections are working properly.
Network error while configuring server (project disable FAILED)	OptoDisplay was in the process of disabling a project from the server when a network error occurred. Verify that OptoServer is running and the network connections are working properly.
Network error while configuring server (project enable FAILED)	OptoDisplay was in the process of enabling a project to the server when a network error occurred. Verify that OptoServer is running and the network connections are working properly.
Network error while connecting to server (add FAILED)	OptoDisplay could not connect to OptoServer because of a network error. Verify that OptoServer is running and the network connections are working properly.
Network initialization FAILED	Connection to the network failed. Verify that NetBIOS protocol was configured for the network.
Server data overrun	OptoDisplay could not keep up with the data OptoServer is providing. This error could happen if the OptoDisplay PC is busy with CPU-intensive window operations and tasks. Increase the scan rates for these data items or alleviate the demands on the PC.
Server temporarily locked by another client (project lock FAILED)	The server is locked by an OptoDisplay project while the OptoDisplay project is built and established to OptoServer. This lock keeps another OptoDisplay project from building and taxing the OptoServer resources. OptoDisplay will try again later.
Switched to alternate server	Status message indicating that OptoDisplay switched to the backup server if it had been using the main server, or it switched to the main server if it had been using the backup server.
Verification of server configuration FAILED	OptoDisplay was verifying that OptoServer was scanning the correct number of items, and the verification failed. Try your project again. If the error repeats itself, contact Opto 22 Product Support. Any data returned may be invalid.

System Errors

The following error is displayed if a system error occurred:

Error Message	Possible Causes
System: Floating point error N caught by signal handler	The data returned from the controller was detected to have a floating point error. This error could have occurred during data manipulations at the controller. Verify that the data has been handled or cast properly according to its type.

APPENDIX C

OptoDisplay Files

This appendix lists the files used in an OptoDisplay project, including those created automatically when a project is saved. Use this information as a reference when you are looking through your OptoDisplay files or working directory.

OptoDisC.exe OptoDisplay Configurator executable program file.

OptoDisR.exe OptoDisplay Runtime executable program file.

OptoDsRX.exe OptoDisplay Runtime monitor-only version executable program file.

*.$$$ ASCII text file created by OptoDisplay Configurator using the AutoCorrect Tags option. The file displays any changes made by the AutoCorrect Tags tools to tagnames from Cyrano (.gml file extension) strategies that were incompatible with OptoDisplay. The file also lists tagname errors that could not be corrected.

*.alm Alarm log file.

*.bin SuperTrend log file saved in binary format.

*.bmp Bitmap file, created by other programs or by OptoDisplay. Graphics saved as bitmaps from OptoDisplay are not saved with any dynamic attributes that may have been configured.

*.cdb Main strategy file from an OptoControl program. Lists all objects and other global information used in a program, as well as controller configuration information.

*.gml Main strategy file for a Cyrano program. Lists all objects and other global information used in a program, as well as controller configuration information.

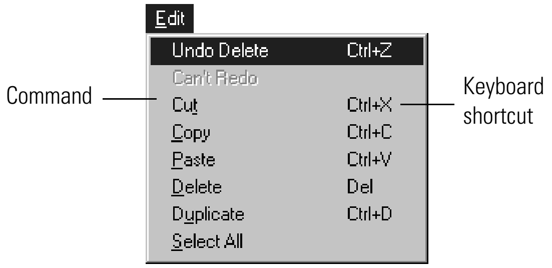
*.H## Historic log file, created by OptoDisplay Runtime.

*.ini The OptoDisplay initialization file created by OptoDisplay Configurator. Microsoft Windows typically names the file type as a Configuration Settings file.

*.mmi	Main project file for an OptoDisplay project.
*.msg	Event log file, created by OptoDisplay Runtime.
*.rcp	Recipe file, created by a text editor. Used to send a set of parameters or to read a set of parameters from a controller.
*.smb	Symbol file, created by OptoDisplay Configurator. Symbol files contain graphic objects and their configured attributes for use in OptoDisplay projects.
*.T##	SuperTrend historic log file, created by OptoDisplay Runtime.
*.txt	Dynamic attribute (or “tag info”) report file, created by OptoDisplay Configurator.
*.W##	Draw window file, generated by the OptoDisplay Configurator.

OptoDisplay Menu Reference

This appendix lists in detail the contents of OptoDisplay menus for both Configurator and Runtime components. Note that if a keyboard shortcut is available for a menu command, the shortcut is listed next to the command in the menu as shown in the example below:



Many menu commands can also be accessed by right-clicking on an object or in a window, and then choosing the command from the pop-up menu that appears.

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OptoDisplay Runtime Menus.......................D-17

OptoDisplay Configurator Menus

File Menu

New Project—Creates a new project. After selecting this menu option, choose a location and provide a name for the project in the dialog box that appears.

Open Project—Opens an existing project. After selecting this menu option, navigate to and select the project you want to open in the dialog box that appears. Only one OptoDisplay project may be open at a time.

Close Project—Closes the project that is currently open. If the project has been modified, you are prompted to save changes.

Save Project—Saves any modifications to the files for the current project.

Save Project As—Saves any modifications to the current project to a name and project directory. This menu option is similar to Save Project, except that you can specify a new name and location for the saved project in the dialog box that appears. This is a good way to make a copy or a backup version of a project.

You can also copy an OptoDisplay project to a different computer or drive without using the Save Project As menu option. To do this, create a directory on that computer or drive, then copy all the files from the original directory to the new directory using Windows Explorer. See Appendix C, "OptoDisplay Files," for a complete list of files associated with an OptoDisplay project.

Save Project and Load Runtime—Saves the current project and then opens it in OptoDisplay Runtime. This is a quick way of switching between Configurator and Runtime when you are developing a project.

Project Path—Displays the full directory path to the project's saved location. The project's path is also displayed in the title bar, but if it is too long to fit there, you can use this command to see the directory path.

Password Protect Project—Lets you protect your OptoDisplay project with a password to prevent others from opening and modifying the project using OptoDisplay Configurator. The project can still be opened and run in OptoDisplay Runtime.

Configurator Options—Sets a startup option that automatically opens the last project that was open the last time Configurator was run.

Choose Bitmap—Selects a bitmap file for use in the project. After selecting this menu option, in the dialog box that appears, navigate to and select the bitmap you want to include in the project. Use the Bitmap tool to place the selected bitmap in the project's draw window.

Save As Bitmap—Saves the selected graphic(s) as a bitmap. After selecting this menu option, in the dialog box that appears, specify a file name and location for the new bitmap. If no graphics are selected, then everything in the draw window is saved to the bitmap file name. Any dynamic attributes you have configured are not saved with the bitmap.

Printer Setup—Selects an available printer and sets its attributes.

Print—Prints the contents of any displayed main and draw windows. You can specify the number of copies to be printed and other options in the Printer Setup command.

(Previous File List)—Displays the names and directory paths of projects that had been previously opened in Configurator.

Exit—Closes the current Configurator windows and exits the application. If you modified the current project, you will be prompted to save it.

Edit Menu

Undo/Redo—(Available only when you have performed an action that can be undone or redone.) Reverses an earlier action you have performed, or repeats an action performed earlier. For example, if you have deleted a graphic object from a window, select Undo to restore the graphic. If, after restoring the graphic, you decide again to delete it, select Redo to repeat the earlier deletion. You can undo up to 50 actions.

Cut—(Available only when you have selected something.) Copies selected graphics onto the clipboard and removes them from the draw window. Cutting something replaces anything stored there previously.

Copy—(Available only when you have selected something.) Copies selected graphics onto the clipboard without removing them from the draw window. Copying something to the clipboard replaces anything stored there previously.

Paste—(Available only when something has been copied or cut into the clipboard.) Inserts a copy of the clipboard contents into the middle of the active draw window.

Delete—(Available only when you have selected something.) Removes selected graphic(s) from a draw window. Unlike the Cut command, Delete removes the selection without placing it in the clipboard; once you delete something, you cannot retrieve it.

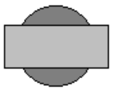
Duplicate—(Available only when you have selected something.) Creates a duplicate of the selected graphic(s). The duplicate is placed directly below the selected graphics. Duplicating a selected graphic does not use the clipboard.

Select All—Selects all the completed graphics in the active draw window. Anything that is not selected within the active draw window when you use this command may be incomplete. Incomplete graphics can be erased by using the Redraw command under the View menu.

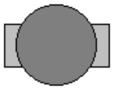
Replace—Modifies tagnames attached to a graphic or graphics. Allows you to link graphics to a different controller, item name, table index, or bit index. You can find and replace tags in the entire project, or just in the selected graphic(s).

Z-Order—(Available only when you have selected something.) Positions selected graphics in front of or in back of other graphics. The following choices are available:

- **Bring to Front**—(Available only when you have selected something.) Positions the selected graphics in front of any other objects in the window.

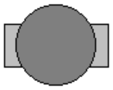


Before Bring to Front

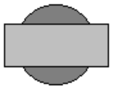


After Bring to Front

- **Send to Back**—(Available only when you have selected something.) Positions the selected graphics in back of any other objects in the window.



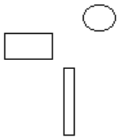
Before Send to Back



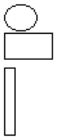
After Send to Back

Align—(Available only when you have selected more than one object.) Aligns selected objects in a variety of ways. The following choices are available:

- **Left**—Aligns the left edges of the selected graphics. All selected graphics are moved left to align with the left-most graphic in the group.

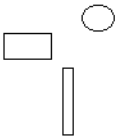


Before Left-Align

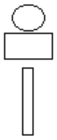


After Left-Align

- **Center**—Aligns the vertical centers of the selected graphics. All selected graphics are moved left or right to align their centers with an imaginary vertical line down the center of the selected graphics.

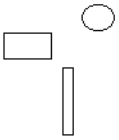


Before Center-Align

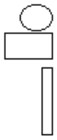


After Center-Align

- **Right**—Aligns the right edges of the selected graphics. All selected graphics are moved right to align with the right-most graphic in the group.

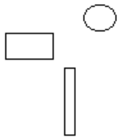


Before Right-Align

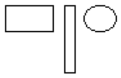


After Right-Align

- **Top**—Aligns the top edges of the selected graphics. All selected graphics are moved up to align with the top-most graphic in the group.

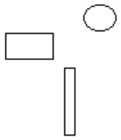


Before Top-Align

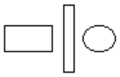


After Top-Align

- **Middle**—Aligns the horizontal centers of the selected graphics. All selected graphics are moved up or down to align their centers with an imaginary horizontal line running across the center of the selected graphics.

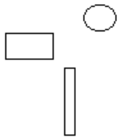


Before Middle-Align

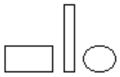


After Middle-Align

- **Bottom**—Aligns the bottom edges of the selected graphics. All selected graphics are moved down to align with the bottom-most graphic in the group.

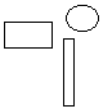


Before Bottom-Align

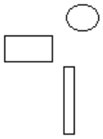


After Bottom-Align

- **Space Evenly Vertically**—Distributes the selected graphics so there is an equal amount of vertical space between each object.



Before Space Evenly Vertically



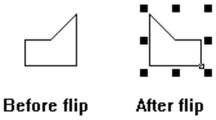
After Space Evenly Vertically

- **Space Evenly Horizontally**—Distributes the selected graphics so there is an equal amount of horizontal space between each object.

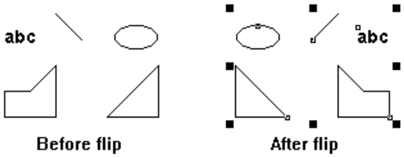
Before Space Evenly Horizontally After Space Evenly Horizontally

Flip/Rotate—(Available only when you have selected one or more objects.) Changes the orientation and rotation of objects. The following choices are available:

- **Flip Horizontal**—Removes selected graphics and replaces them with mirror images of the graphics flipped over a vertical center point. Text, trends, bitmaps, and metafiles have their positions changed but are not mirrored.

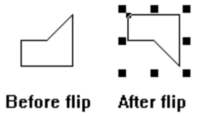


Horizontal Flip of a Single Graphic

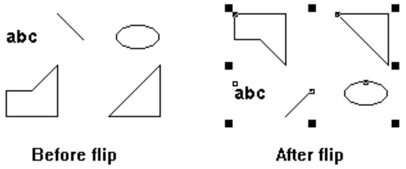


Horizontal Flip of Multiple Selected Graphics

- **Flip Vertical**—Removes selected graphics and replaces them with mirror images of the graphics flipped over a horizontal center point. Text, trends, bitmaps, and metafiles have their positions changed but are not mirrored.

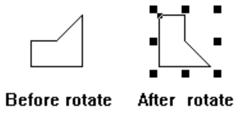


Vertical Flip of a Single Graphic

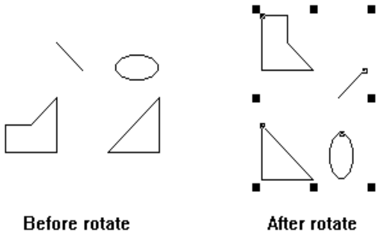


Vertical Flip of Multiple Selected Graphics

- **Rotate Clockwise**—Rotates the selected graphic 90 degrees clockwise. If more than one graphic is selected, the center of rotation is the center of the smallest rectangular area that contains all the graphics. Text, trends, bitmaps, and metafiles cannot be rotated, and any selection of multiple graphics that includes one of these cannot be rotated.

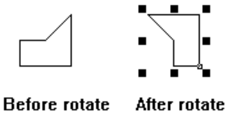


Clockwise Rotation of a Single Graphic

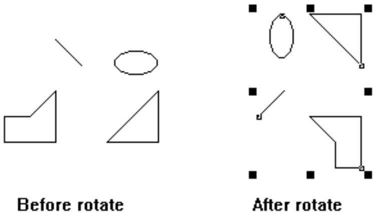


Clockwise Rotation of Multiple Selected Graphics

- **Rotate Counterclockwise**—Rotates the selected graphic 90 degrees counterclockwise. If more than one graphic is selected, the center of rotation is the center of the smallest rectangular area that contains all the graphics. Text, trends, bitmaps, and metafiles cannot be rotated, and any selection of multiple graphics that includes one of these cannot be rotated.



Counterclockwise Rotation of a Single Graphic



Counterclockwise Rotation of Multiple Selected Graphics

Group—(Available only when you have selected more than one object.) Gathers any combination of two or more graphics into a single graphic object. You can then select the object, move it, size it, or assign dynamic attributes to it as a single entity. In Runtime, only the dynamic attributes assigned to the grouped object are processed; any dynamic attributes assigned to individual objects that make up the group are ignored, including trends.

Ungroup—(Available only when you have selected a grouped object.) Splits a graphics object on which the Group command has been used into its original individual components. This allows each graphic object to be individually selected. If any of the graphics had individual dynamic attributes prior to grouping, those dynamic attributes will be restored, and then configured and processed at Runtime.

Copy to File—(Available only when you have something selected.) Saves the selected object(s) to a file and saves any dynamic attributes you've assigned to the object(s). Specify the file name, location, and file format when prompted. The default file name extension is .smb.

Save Metafile As—(Available only when you have a metafile graphic selected.) Saves a selected Windows metafile graphic to a file. Specify the file name, location, and file format when prompted. You can save the selected metafile graphic to the Windows 3.1-compatible Windows Metafile (WMF) format, or to the Enhanced Metafile (EMF) format used by later versions of Microsoft Windows. Note that Windows 3.1 cannot read graphics saved in EMF format. Windows metafiles have the file name extensions .wmf and .emf.

Paste from File—Retrieves graphics from a file or from an included library of industrial graphics. You can select a graphic using the following menu commands:

- **Built-in symbols**—Select this to choose a graphic that has been saved as an OptoDisplay symbol file. A dialog box prompts you for the file name, location, and file format of the file you'd like to open. (Symbol files have the file extension .smb.) Click the Open button to import the selected graphic.

- **Symbol Factory**—Select this to choose a graphic from a large library of graphics designed for industrial applications. These graphics are in Windows metafile (WMF) and other file formats. When the Symbol Factory window opens, browse through the categories and thumbnails provided to find an appropriate graphic, and then double-click the graphic to copy it to the Windows clipboard. (Another way to copy a graphic in the Symbol Factory is to select it and click the Copy button.)

  Now click on the OptoDisplay project draw window to make it active, and then select Paste from the Edit menu to add the copied graphic to the window. (You can also paste the graphic by pressing CTRL+V on the keyboard, or by right-clicking and selecting Paste from the pop-up menu.)
- **Import metafile**—Select this to choose a graphic that has been saved in either WMF or EMF (Enhanced Metafile) format. A dialog box prompts you for the file name, location, and file format of the file you'd like to open. (Metafiles have the file extensions .wmf and .emf.) Click the Open button to import the selected graphic.You are asked to navigate to and select an appropriate file.

Edit Dynamic Attributes—(Available only when you have something selected.) Connects a graphic to an OptoControl data item. After selecting this menu option, all applicable dynamic attributes are shown in the dialog box that opens. Select input dynamic attributes or output dynamic attributes when prompted. For example, you can set up connections so the value of a OptoControl tag changes the color and fill size of a graphic. With output dynamic attributes, you can change the value of a tag as you "slide" the graphic on the screen.

Many different combinations of dynamic attributes are possible, and different dialog boxes are used to assign dynamic attributes to a graphic. For example, when a trend is selected, the Trend Configuration dialog box is displayed.

Copy Dynamic Attributes—(Available only when you have a single graphic selected and a controller is configured.) Creates and stores in the clipboard a copy of the selected graphic's dynamic attributes.

Paste Dynamic Attributes—(Available only when you have something selected and have previously copied dynamic attributes to the clipboard.) Assigns copied dynamic attributes to a graphic. You can paste dynamic attributes to one or more selected graphics. You can delete existing attributes, or replace or ignore any duplicate attributes.

Delete Dynamic Attributes—(Available only when you have something selected.) Removes dynamic attributes of a selected graphic. You can delete the dynamic attributes of more than one selected graphic.

Edit Text—(Available only when you have a text object selected.) Changes text in a text object. Select the text with the Select tool, choose this menu item, and then edit the text in the dialog box that appears.

Edit Points—(Available only when you have a polygon, polyline, or Bezier curve selected.) Changes individual points in a polygon, polyline, or Bezier curve. Select the object with the Select tool, choose this menu item, and then click and move individual points on the object.

Lock/Unlock Position—(Available only when you have something selected.) Locks the position of one or more items in a draw window.

View Menu

Hide Menu Bar—Hides the menu bar. The ESC key toggles the menu bar on and off.

Hide/Show Toolbox—Hides or displays the Toolbox. The Toolbox shows the tools you need to create a project in OptoDisplay Configurator. If the Toolbox is hidden, the Show Toolbox command is displayed in this menu.

Configure Grid—Displays a Grid dialog box that prompts you to toggle on or off both the Grid and the Snap On feature. Grids can aid your work in the draw window. You can also enter a Grid size in the Grains/Units area of the dialog box. The Grid size refers to the spacing of Grid points, measured in pixels. For example, a Grid size of 10 means a grid point will appear every 10 pixels. Sometimes grids do not appear because the grid size is too big for the draw window. You cannot display the Grid without specifying a Grid size first.

Hide/Show Grid—(The Grid must first be displayed using the Grids menu item.) Hides or shows the Grid. If the Grid is hidden, the Show Grid command is displayed.

Turn Snap On/Off—(The Grid must first be displayed using the Grids menu item. Also activate the Snap On feature in the same dialog box.) Toggles the Snap On feature on or off. Snap On cannot work without an active Grid. If Snap On is enabled, the Turn Snap Off command is shown.

Redraw—Redraws the contents of the active draw window. Incomplete graphics (such as an incomplete polygon) in the draw window are removed when you select this command.

Dynamic Attributes—Generates a text file listing the dynamic attributes of objects in one or more draw windows. This report also lists the configured alarm points in the OptoDisplay project.

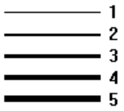
Style Menu

Use the Style Menu to control the drawing attributes of the graphic tools. Whenever a graphic such as a line or rectangle is drawn, the selected style attributes are applied. Combining different style settings allows you to draw an almost infinite variety of graphics. Text attributes, including font style, color, and size, are assigned in the Text menu.

NOTE: Trends and bitmaps are not affected by style settings.

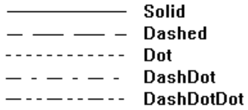
Line Color—Presents a color palette you can use to assign or change the line color of the selected graphic. If no graphic is selected, the color you choose is set as the default and is then applied as the line color to all graphics you subsequently draw.

Line Width—Assigns or changes the line width of the selected graphic. Line widths are shown in pixels. If no graphic is selected, the line width you choose is set as the default and is then applied to all graphics you subsequently draw.

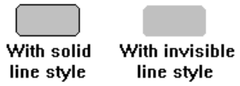


Sample Line Widths

Line Style—Assigns or changes the line style of the selected graphic. If no graphic is selected, the line style you choose is applied to all graphics you subsequently draw. Line styles other than solid apply only to objects with a line width of 1. Line widths greater than 1 are always solid. The Invisible line style is used with rectangles, round rectangles, ellipses, and polygons. If these objects are drawn with the invisible line style, the border line around the object is not displayed; in order to see them, you must apply a fill.



Sample Line Styles

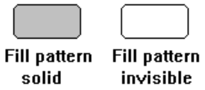


Example of Invisible Line Style

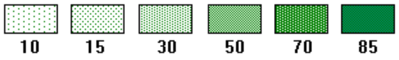
Fill Color—Assigns or changes the fill color of the selected graphic. If no graphic is selected, the fill color you choose is applied to all graphics you subsequently draw. Fill colors only affect rectangles, round rectangles, ellipses, and polygons.

Background Color—Assigns or changes the color used behind the fill pattern of the selected graphic. If no graphic is selected, the background color you choose is applied to the fill pattern of all graphics you subsequently draw. Background colors for fill patterns only affect rectangles, round rectangles, ellipses, and polygons.

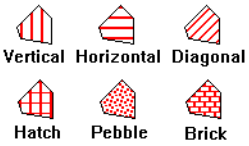
Fill Pattern—Assigns or changes the fill pattern of the selected graphic. If no graphic is selected, the fill pattern you choose is applied to all graphics you subsequently draw. Fill patterns only affect rectangles, round rectangles, ellipses, and polygons. If you select a Fill Pattern and your selected objects still remain unfilled, it may be that the Fill Color is set to white (or a color equal to its background), or that the Fill Pattern is set to Invisible. Also, you cannot apply more than one Fill Pattern to any graphic. This includes using a Percent fill, which fills an object with a percentage of black, creating levels of gray.



Example of Solid and Invisible Fill



Example of Percent Fills



Example Fill Patterns

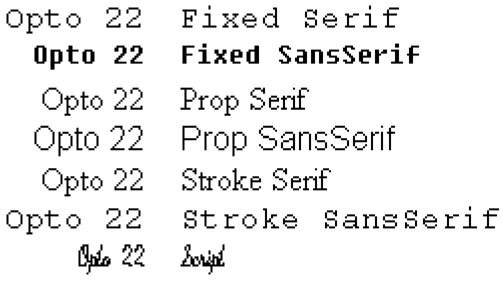
Opaque—Determines how non-solid primary graphics, such as dotted and dashed lines, interact with overlapping graphics and background colors. When the opaque style is set, overlapped graphics and background colors are overwritten.

Transparent—The opposite of Opaque, Transparent also determines how non-solid primary graphics, such as dotted and dashed lines, interact with overlapping graphics and background colors. When the transparent style is set, overlapped graphics and background colors are overwritten only by the solid portion of the line.

Text Menu

The Text menu items allow you to control text attributes. Text attributes may be set before the text is placed in the draw window, or changed after it is placed. Style attributes selected from the Style menu do not affect text.

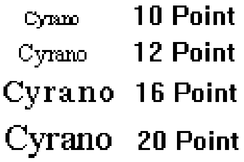
Font—Assigns or changes the font of the selected text. If no text is selected, the font you choose is set as the default and is then used for all text you subsequently place. OptoDisplay supports all TrueType fonts, as well as the ones shown below:



Opto 22 Fixed Serif
Opto 22 Fixed SansSerif
Opto 22 Prop Serif
Opto 22 Prop SansSerif
Opto 22 Stroke Serif
Opto 22 Stroke SansSerif
Opto 22 Script

Examples of Supported Fonts

Size—Assigns or changes the size of the selected text. If no text is selected, the size you choose is set as the default and is then used for all text you subsequently place. Specify the size of the text in points; any value between 5 and 500 may be used.



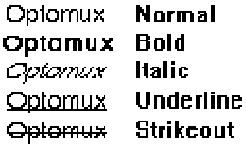
Cyrano 10 Point
Cyrano 12 Point
Cyrano 16 Point
Cyrano 20 Point

Examples of Prop Serif Font at Different Point Sizes

Color—Assigns or changes the color of the selected text. If no text is selected, the color you choose is applied to all text you subsequently place. OptoDisplay also supports custom color creation.

Background—Assigns or changes the background color of the selected text. If no text is selected, the background color you choose is applied to all text you subsequently place. Background colors only apply to opaque text; transparent text is not affected by this setting.

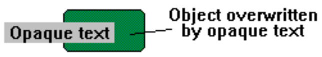
Text Style—Assigns or changes the style of the selected text. If no text is selected, the style you choose is applied to all text you subsequently place. OptoDisplay supports normal, bold, italics, underline, and strikeout text styles. You can apply multiple styles to text. For instance, you can apply both bold and italics to any text.



Optomux Normal
Optomux Bold
Optomux Italic
Optomux Underline
~~Optomux~~ Strikeout

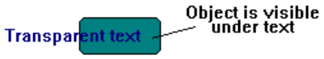
Examples of Text Style

Opaque—Determines how text appears when overlapping other objects. Opaque style is applied to text just like any other style. If the text is set to Opaque, objects under the text will be overwritten by the text background color.



Example of Opaque Text

Transparent—Determines how text appears when overlapping other objects. The opposite of opaque, if the text is set to transparent, objects under the text will remain visible and unaffected by the text background color.



Example of Transparent Text

Configure Menu

Controller(s)—Selects which OptoControl strategy (or strategies) are used for this project. The OptoDisplay Configurator uses the information from the strategy to connect the appropriate OptoControl data item to the dynamic attribute of a dynamic object. The Controller Properties dialog box prompts for the OptoControl strategy. If an OptoControl strategy is not configured for this project, dynamic attributes cannot be assigned to any dynamic objects.

Refresh Times—Changes the scan time and freshness values for a refresh time group. The Refresh Time dialog box prompts you for the new times. See Chapter 5, "Working with Graphics," for more information about configuring refresh times.

Alarm Points—Displays all configured alarm points by user-specified names. This dialog box also allows you to add, modify, or delete alarm points. See Chapter 8, "Configuring Trigger-Based Events," for more information about alarm points.

Alarming Setup—Configures alarming features. The Options page sets up various Runtime options, the Logging page sets up file and printer logging, and the Sound page sets up sound functions. See Chapter 8, "Configuring Trigger-Based Events," for more information.

Historic Data Log—Creates historic logs. A Historic Log List dialog box is displayed and lists the historic log files that have been created. This command allows you to modify which points are recorded and how frequently data is logged to the files. See Chapter 8, "Configuring Trigger-Based Events," for more information about historic data logs.

Event Log—Records a message caused by an event to a disk file. You can change parameters such as the number of messages saved, the delimiter used between messages, and the file rollover period. File name extensions are .msg. The number of files retained on disk for an event log is also set within the Event Log File Configuration dialog box. When the limit is reached during Runtime, the file with the oldest time stamp is deleted. See Chapter 9, "Using OptoDisplay Runtime," for more information about event logs.

SuperTrend Remote Logging—If the same OptoDisplay project is running on more than one computer, this menu item selects the local or networked computer that will save SuperTrend data. See "Working with SuperTrends" on page 7-6 for more information about configuring SuperTrends and collecting data from them.

Applications—Adds or modifies application managers for use in the project. The Application Manager List dialog box displays available application managers for the project. The Application Manager Configuration dialog box lets you select the program file, working directory, launch options, initial display view, and trigger for the application manager. See Chapter 8, "Configuring Trigger-Based Events," for more information about launching applications based on a trigger.

Sounds—Selects sounds and assigns their trigger for use in the project. The Sounds dialog box lists the available sounds for the project. The Sound Configuration dialog box lets you configure start and stop triggers with the Trigger dialog box. The Sound Configuration dialog box also prompts you for the sound file. See Chapter 8, "Configuring Trigger-Based Events," for more information about triggering sounds.

Window State—Adds or makes changes to existing window managers. The Window Manager List dialog box displays all currently configured window managers and allows access to the Window Manager Configuration dialog box. The Window Manager Configuration dialog box allows you to change triggers with the Window Manager Start Trigger dialog box and control the draw window visual state with the Pop Window dialog box. See Chapter 8, "Configuring Trigger-Based Events," for more information about trigger-based window states.

Recipes—Configures download or upload of recipes to a controller by a trigger. This method of recipe management does not require a graphic to be selected during Runtime for the recipe action to occur. See Chapter 8, "Configuring Trigger-Based Events," for more information about trigger-based recipe uploads and downloads.

Runtime—Defines the initial setup of the draw windows at Runtime. For example, you may want to have certain draw windows pop up and have others iconified when the project starts. This command can also be used to prevent the user from exiting OptoDisplay Runtime when this project is loaded. See Chapter 9, "Using OptoDisplay Runtime," for more information about configuring the Runtime session.

Tools Menu

AutoCorrect Tags—Run this tool when you first configure a strategy for your project. The tool verifies tagnames from a strategy for compatibility with OptoDisplay and changes the tagnames where necessary. Some characters that may have been used in the Cyrano tags, such as /, are illegal characters for a tagname in OptoDisplay. The tool creates a text file with the file extension .$$$ that summarizes the changes that were made by the tool to any tagnames. Refer to "Correcting Tags from a Strategy" on page 4-10 for more information about this command.

Window Menu

OptoDisplay Configurator allows you to configure several draw windows per project. The Window menu items control the number and properties of each draw window in a project. You can create draw windows, delete draw windows, copy draw windows, and change properties of existing draw windows.

New—Creates a new draw window and adds it to your project. You can specify the new window's name, size, behavior, and other attributes. You must provide a unique name for each draw window.

Open—Opens draw windows that are configured but are currently closed. Select which window to open from a list of all draw windows that are closed. Draw windows that are open when a project is saved are open when the project is started at Runtime. This can be modified using the Configure➞Runtime menu command.

Close—Closes draw windows that are currently open. Select which window to close from a list of all draw windows that are open. Draw windows that are closed when a project is saved are closed when the project is started at Runtime. This can be modified by using the Configure➞Runtime menu command.

Copy—Duplicates the active draw window. You must enter a unique name for the duplicate and specify any properties you wish to change. All graphics and their connections in the copied window remain the same in the new copy.

Delete—Removes the active draw window from the project. All graphics and their connections in the active draw window are also deleted. Use caution since deleted draw windows cannot be recovered.

Properties—Modifies the properties of the active draw window. You can change the window's name, size, behavior, position, color, and other attributes.

(Open Window List)—Displays the names of up to nine currently opened or iconified windows. Select a draw window's name from this list to display that draw window and bring it to the front. If more than nine windows are open, a menu item named More Windows is added, which you can use to select a window's name from a list to display it. A window must be open or iconified to be listed.

Help Menu

Contents and Index—Starts Help and displays help topics for OptoDisplay Configurator.

Manuals—Opens the online version of the printed *OptoDisplay User's Guide.* This document is in Adobe Acrobat format, and the Acrobat Reader application is required to view it.

Opto 22 on the Web—Lists useful links to information on the Opto 22 Web site. Your PC must have an installed Web browser and be connected to the Internet to access these links.

About OptoDisplay Configurator—Displays version information about OptoDisplay Configurator.

OptoDisplay Runtime Menus

Runtime menus provide access to the Runtime commands. These commands allow you to open and close projects, view the event log, and view the controller configurations.

File Menu

Open Project—Loads an existing project created by the OptoDisplay Configurator. You must navigate to and select the project you want to open. Scanning and animation begin immediately once the project is loaded.

Project Path—Displays the project's full directory path. You can also see the project's path displayed in the title bar, but if it's too long to fit there, you can use this command.

Printer Setup—Selects an available printer and sets its attributes.

Print—Prints the OptoDisplay Runtime window. You can specify the number of copies to be printed and also set up the options available in the Printer Setup command.

Exit OptoDisplay Runtime—Stops the scanner, closes all Runtime windows, and exits the OptoDisplay Runtime.

View Menu

Hide Menu Bar—Hides the menu bar. The ESC key toggles the menu bar on and off.

Controller(s)—Displays a list of all of the controllers that are configured for the project. Select a controller and press the Details button to display the Controller Status dialog box, which shows each controller's status and allows you to disconnect OptoDisplay from a controller. See Chapter 9, "Using OptoDisplay Runtime," for more information about Runtime controller status.

OptoCom—Displays the OptoCom.DLL version and path.

Event Log—Displays the Runtime system event log. This log contains system errors and messages received during Runtime. The list box contains the most recent system event messages generated by OptoDisplay. Each message consists of a date and time stamp, and message text. The message text describes events such as communications and I/O errors. Use the scroll bar to view prior messages. If the text of the message is too wide to completely fit in the list box area, you can double-click the message to display it all.

Alarm Menu

Modify Alarm Points—Allows the operator to change parameters for alarm points in the OptoDisplay project if it has been configured to let the operator do so. See "Setting up Runtime" on page 9-2 for more information about configuring Runtime options for the operator. Also see "Configuring Alarm Points" on page 8-28 to learn more about configuring alarm points.

Alarm point settings can be changed in each one of the five alarm ranges available: HiHi, Hi, Normal, Lo, and LoLo. Each alarm point state has a value that defines its range.

Alarms Enabled—Disables alarming, including all alarm graphics, sound, and logging. This can be useful when starting or stopping a process during which alarm conditions may be expected to happen. This menu item can be initially enabled or disabled through the Alarming Setup dialog box in the Configurator. It can also be permanently grayed out and made inaccessible by unchecking the Alarms Enabled menu item option in the Alarming Setup dialog box.

Priority Filter—The priority filter level menu items can be used to accept only those alarm points with a certain priority level. For example, during a startup or shutdown procedure, you may wish to receive only the most serious alarms. The priority for each alarm point is configured in the Alarm Point dialog box in the Configurator.

Window Menu

Open—Opens any Runtime window that is currently closed. An Open Window dialog box displays a list of closed windows from which you can select the window to open.

Close—Closes any currently open or iconified Runtime window. A Close Window dialog box displays a list of currently open windows from which you can select the window to close.

Switch Controllers—Use to connect to different controllers running the same OptoControl strategy. Select one or more project windows and then select a controller. All objects with dynamic attributes will now use tag values from that controller. See "Working with Controllers" on page 9-14 for more information.

Open Window List—Displays currently open or iconified windows. Up to nine window names are displayed. Select a window's name from this list to display that draw window and bring it to the front. If more than nine windows are open, a menu item named More Windows is added; use More Windows to select a window's name from a list to display it. A window must be open or iconified for it to be listed.

Help Menu

Contents and Index—Starts Help and displays help topics for OptoDisplay Runtime.

Manuals—Opens the online version of the printed *OptoDisplay User's Guide*. This document is in Adobe Acrobat format, and the Acrobat Reader application is required to view it.

Opto 22 on the Web—Lists useful links to information on the Opto 22 Web site. Your PC must have an installed Web browser and be connected to the Internet to access these links.

About OptoDisplay Runtime—Displays version information about OptoDisplay Runtime.

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