Lookout™

Evaluation Guide

Worldwide Technical Support and Product Information

`ni.com`

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Conventions

The following conventions are used in this manual:

»	The **»** symbol leads you through nested menu items and dialog box options to a final action. The sequence **File»Page Setup»Options** directs you to pull down the **File** menu, select the **Page Setup** item, and select **Options** from the last dialog box.
♦	The ♦ symbol indicates that the following text highlights a specific benefit of Lookout.
	This icon denotes a tip, which alerts you to advisory information.
	This icon denotes a note, which alerts you to important information.
bold	Bold text denotes items that you must select or click in the software, such as menu items and dialog box options. Bold text also denotes parameter names.
italic	Italic text denotes variables, emphasis, a cross reference, or an introduction to a key concept. This font also denotes text that is a placeholder for a word or value that you must supply.
`monospace`	Text in this font denotes text or characters that you should enter from the keyboard, sections of code, programming examples, and syntax examples. This font is also used for the proper names of disk drives, paths, directories, programs, subprograms, subroutines, device names, functions, operations, variables, filenames and extensions, and code excerpts.
`monospace italic`	Italic text in this font denotes text that is a placeholder for a word or value that you must supply.

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Introduction to Lookout

National Instruments Lookout is a full-featured object-based HMI/SCADA software system that delivers unparalleled power and ease of use in demanding industrial measurement and automation applications.

Why Choose Lookout?

To develop any application in Lookout, you simply create objects and connect them—no programming, scripting, or compiling is required. Lookout offers a host of capabilities like multi-client/multi-server networking, Web monitoring and control, OPC server and client, security, and distributed logging and alarms.

Object-Oriented Architecture

With Lookout, you can create a process in three basic steps. First, you *select* the type of object you want to create from Lookout's large library of control, driver, display, and data manipulation objects. Second, you *configure* the object using Lookout's enhanced tools. Finally, you *connect* the objects. You can create direct connections, remote connections, or complex connections that test logical conditions or perform calculations.
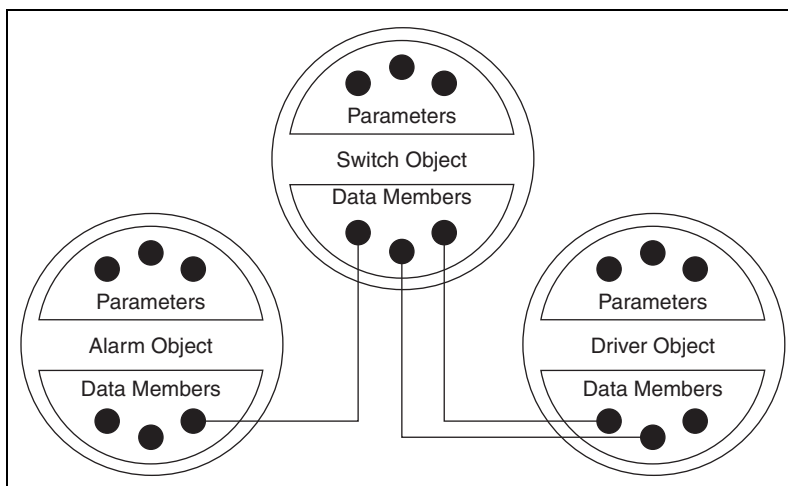
When you create objects, you choose from Lookout's extensive library of controls, displays, ActiveX controls, and hardware drivers. Each driver object you create is ready to read from and write to the field hardware connected to your computer. And with the Aggregate object, you can even create a basic process to reuse within other processes, which saves you time.

Event-Driven Performance

Events drive Lookout, which means that Lookout is notified *immediately* when a change occurs. Lookout reacts to events substantially faster than loop-based software.

Online Configuration

You can develop and modify a Lookout process while your application is running. This online configuration means that there are no gaps in your data, alarm, and event records when you do maintenance.

Multi-Server and Multi-Client Networking

You can connect any number of computers running Lookout server and client processes. The TCP/IP networking protocol integrated into Lookout makes networking as easy as dragging a data point to a control panel display or typing in a URL.

Redundancy Capabilities

Lookout comes with advanced objects that you can easily use to create emergency backup systems to take over in case of system failures. You also can use objects to create and run a multitude of processes from a single process template—all done the easy Lookout way.

Web Capabilities

With the Web Client feature of Lookout, you can monitor and control a Lookout process from any computer connected to the Internet. In seconds, you can create a basic HTML page by following the simple export procedure in Lookout. You can then access your client process through Microsoft's Internet Explorer. You also can create an HTML report page for viewing only.

Graphics and Visualization

You can use graphics to visually demonstrate the process on your control panels. Lookout includes an extensive library of graphics, including both static pictures and animated figures, which can enhance your processes by graphically representing your system and the changes that occur. For added customizing, you can import your own graphics such as AutoCad files or photographs. Lookout supports `.wmf` and `.bmp` files.

Security

Lookout lets you set up to ten security levels, with varying levels of read or write access based on those security levels. You can use the security features to restrict panel retrieval and viewing, individual object control, and whether Lookout can be closed or minimized. You have the flexibility to limit group and user access, as well as access to folders and specific objects. You can even restrict access on the basis of IP address.

Distributed Alarms and Events

Any computer running Lookout can monitor alarms and events generated by any Lookout process. You can use ten priority levels to group and filter alarms and events, which gives you the power to focus on what is most important in a given circumstance. A single keystroke acknowledges alarms from any computer on the network. In addition, Lookout includes the following alarm and event reporting capabilities:

- Play voice messages using `.wav` files
- Define alarm/event reporting for each object
- Print alarm/event reports
- Log distributed alarm/event information
- Send email or alert a pager on alarm conditions
- Create an audit trail using an event log

Distributed Data Logging

Lookout logs alarms, events, and data to its internal database, called Citadel. The Citadel historical database is the highest-performing real-time historical solution currently available in the market. The logging capabilities of Lookout allow you to do the following:

- Log data *from* any computer running Lookout on your network, *to* any other computer running Lookout on your network
- Log data to spreadsheet files or to other applications using Dynamic Data Exchange (DDE)
- Retrieve logged data using SQL queries into Citadel
- Execute any SQL statement on a third-party database with ODBC connectivity
- Log data at regular intervals, on demand, on occurrence of an event, or in any combination of these criteria
- Maintain the history of your processes accurately and automatically

Trends and Charts

Lookout allows you to display graphical data from a number of different sources at one time. You also can create groups, each one having its own data set and its own scaling and time constraints. You can plot as many numeric (analog) and logical values as you want, and even embed trend charts in a Web browser.

Report Generation

With Lookout, you can create custom reports using your favorite spreadsheet package. You can configure Lookout to create automatic scheduling and on-demand reports. It also is possible to view HTML reports generated by Lookout using a Web browser.

Telemetry

Lookout allows multiple protocols to share the same serial port and, therefore, the same radio frequency. For instance, you can have different manufacturers' PLCs (Programmable Logic Controllers) and RTUs (Remote Terminal Units) using different communications protocols on the same line using one modem.

Hardware Connectivity

Lookout offers seamless integration with National Instruments hardware, such as FieldPoint and Data Acquisition (DAQ) products. Lookout also has dozens of custom drivers to help you control PLCs and RTUs from a wide variety of manufacturers. Lookout is a fully-compliant OPC (OLE for Process Control) client and server, allowing full connectivity through the industry standard for open multivendor connectivity. Lookout is compatible with the OPC Data Access 1.0a and 2.03 specifications.

Flexible Purchase Options

For your convenience, Lookout software is available in development/runtime or runtime-only versions, with different options for the number of I/O connections. You can purchase client software (runtime-only client software is free) or add as many client licenses as you need. A developer toolkit also is available.

World-Class Technical Support

To ensure your success, we are committed to providing you with services around the globe to achieve the best results from our products for years to come. Our services and support options include hardware and software services, customer support, customer education, and professional services for consulting or integration. You can find detailed information about these resources in Appendix A, *Technical Support and Professional Services*, and at ni.com/support.

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Installation

This chapter describes the system requirements for the Lookout software and contains installation instructions.

System Requirements

Make sure you have the following minimum components in place before you attempt to install and use Lookout.

- Pentium class or equivalent PC running at 90 MHz or faster.

- At least 32 MB RAM.

- 95 MB free disk space, plus possibly 100 MB or more, depending on how much historical data you intend to log to the Citadel historical database; you also should have about 50 MB of disk space for file swapping on Windows 2000/NT/XP computers.

- Windows 2000, Windows NT version 4.0 or later, Windows XP, or Windows Me/98; National Instruments strongly recommends using Windows 2000/NT/XP for optimum stability.

- Monitor display setting of at least 800×600 pixels.

- If you want to create a Web Client, your computer must have Microsoft Internet Explorer, version 3.2 or later.

- If you want to explore Lookout networking capabilities (as shown in the *Networking the Client Process* exercise of Chapter 3, *Try Out Lookout*), you need a network card and TCP/IP networking installed on the computers you want to connect. You also need access to a second computer on your network that meets all of the above requirements.

Software Installation

Complete the following steps to install the Lookout software.

1. Shut down all applications that may currently be using ODBC such as spreadsheets, word processors, database programs, MS Query, and similar applications.

2. Run the Lookout setup program.

    •   If you have a CD, insert it into your CD drive. The Lookout CD-ROM has autorun capability. If for some reason the autorun fails to start the CD installation routine, click the **Start** icon in the taskbar and select **Run**. Enter `N:\Lookout\setup.exe` where `N` represents your CD-ROM drive. Then click **OK**.

    •   If you downloaded the software to your computer from the Internet, double-click the `lk50_eval.exe` file at that location on your computer.

    Choosing a custom installation provides you with certain installation options, including the following:

    •   Lookout allows you to choose whether to install its online help. Use **Browse** to enter the name of an alternate directory or click **Next** to accept the recommended directory name.

    •   During installation, Lookout can install its ODBC driver. Make sure you select the **Citadel ODBC** option if you want to be able to access Lookout's Citadel database.

    •   When installing Lookout on a Windows 2000/NT/XP system, you are presented with a list of options on what you may install. Make sure you install the optional **NT keyboard driver** under Windows NT if you want to be able to block unauthorized users from using certain keyboard commands such as <Alt-Tab> to switch out of Lookout.

3. Follow the remaining instructions to complete the Lookout installation.

Limitations of the Evaluation Software

The evaluation copy of Lookout allows you to have up to ten I/O points and two client connections. You can run evaluation copies of Lookout on as many computers on your network as you like. Your evaluation copy will run for two hours at a time. Before Lookout shuts down, you will be given the opportunity to save your process. The Lookout evaluation software has no expiration date.

3

Try Out Lookout

This chapter introduces you to example applications and guides you through the following Lookout activities: creating a server process and client process, experimenting with the Web Client, and networking the client process. The following illustration shows how your Lookout screen might look when you complete the exercises.
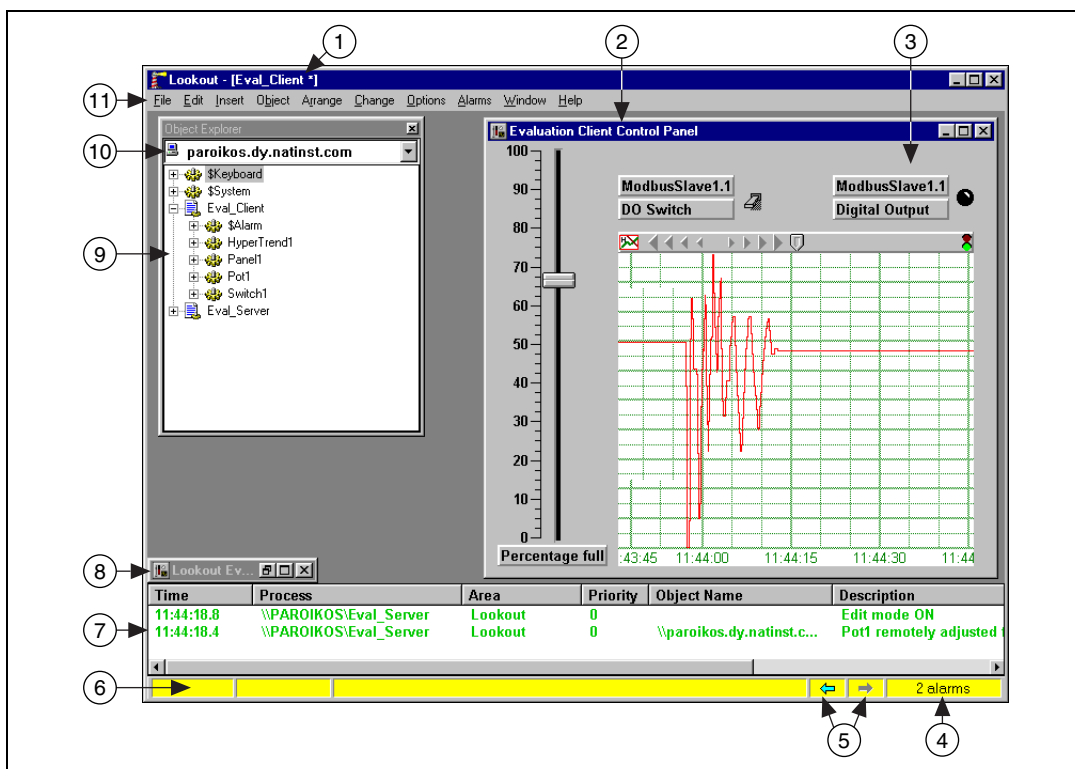
1	Active Process Name	5	Control Panel Navigation Arrows	9	Object Explorer
2	Title Bar	6	Status Bar	10	Root Window
3	Control Panel	7	Alarm Window	11	Lookout Menu
4	Active Alarm/Event Count	8	Minimized Control Panel		

♦ *Lookout handles discrete, batch, and continuous processes.*

♦ *Lookout can handle an unlimited number of objects, I/O points, and graphic panels.*

Viewing the Application Examples

Lookout is used to brew beer, process food, run chemical plants, operate oil and gas pipelines, automate buildings, control energy management systems, bottle soft drinks, operate power plants, and operate municipal water supplies. The examples that install with Lookout demonstrate the kind of applications Lookout is capable of producing. Complete the following steps to view the examples.

1. Launch Lookout by selecting **Start»Programs»National Instruments Lookout**.

2. Select **File»Open**, and open home2 in the Examples folder.

3. Use the links in home2 to browse the Application Examples.

4. When you are done, select **File»Exit** and click **Yes** to stop any processes that are running.

Creating a Server Process and Client Process

A typical Lookout application is developed with a client/server design for strength and flexibility. The server process uses direct connections from the computer running it to the hardware it is controlling and monitoring. It runs on one computer all the time; it is not intended to be mobile. Client processes connect to a server process and are capable of running on any computer on your network, even the server computer. The following illustration shows an example of a client/server configuration.
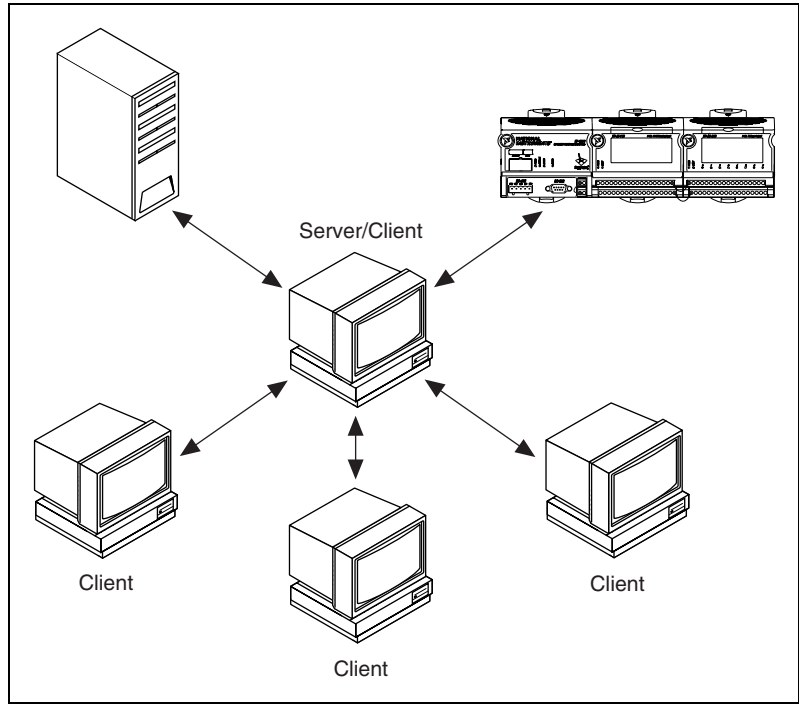
Create a Server Process

In this exercise, you simulate connections to hardware. You will use this process as the server process in later exercises.

✎ **Note**   While *server* is a networking term, a Lookout server process does not necessarily need to be connected to a network.

This exercise shows how easy it is to create and configure Lookout objects, make and edit connections between those objects, and configure data for logging.

1.   Start Lookout by selecting **Start»Programs»National Instruments Lookout**. Lookout launches and displays a dialog box describing the evaluation version. Even though the evaluation software runs for only two hours at a time, you can always save your work and open your files again if Lookout shuts down.

2.   Browse the information offered in the default process by clicking the topic links.

3. Close the default process by selecting **File»Close All**. Click **Yes** to stop the process.

4. Select **File»New** to create a new Lookout process.

    Notice that the status bar at the bottom of the Lookout workspace is now yellow. This signals that Lookout is in edit mode. If you have trouble completing any of the steps in the evaluation exercise, check to see whether Lookout is in edit or run mode. You can change modes by pressing <Ctrl-Space> or selecting **Edit»Edit Mode**.

5. In the **Create Process** dialog box, name your process Eval_Server, as shown. Leave the rest of the fields with their default settings.
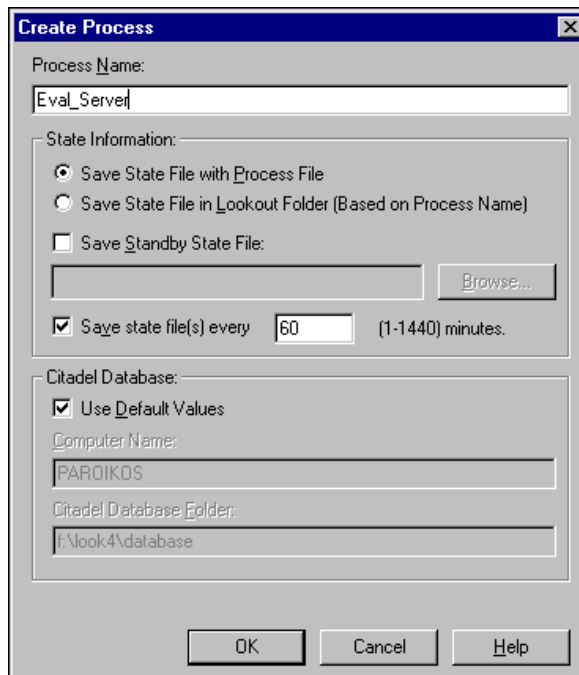
6. Click **OK**.

7. In the **New Control Panel** dialog box that appears, change the **Title** (not the **Name**) to Lookout Evaluation Server Control Panel.

8. Click **OK**.

9. Select **Object»Object Explorer**.

    Use the Lookout Object Explorer to examine Lookout processes running on any Lookout computer on your network, create new objects, arrange objects in hierarchical folders, make connections, edit data members, and register computers running Lookout on your network.

10. Arrange your Lookout workspace so that you can see both your control panel and the Object Explorer.

Create a Server ModbusSlave Object

Note   These exercises use the ModbusSlave driver object because it does not return errors if it cannot locate hardware connected to your serial port. Use the ModbusSlave driver object as you would any PLC or RTU driver object.

1. Right-click the Eval_Server process in the Object Explorer, and select **New Object** from the menu. The **Select Object** dialog box appears.

2. Open the **Drivers** folder and select the **ModbusSlave** object. Notice that a description of this object appears in the field to the right of the list of objects.

3. Click **OK**. The **New Modbus Slave** dialog box appears, as shown in the following illustration. For this example, accept the default values for the object ModbusSlave1 by clicking **OK**.
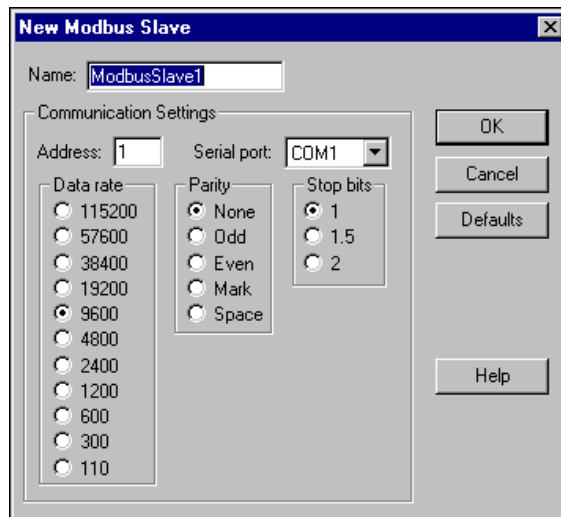
The Modbus Slave object, `ModbusSlave1`, appears under your `Eval_Server` process in the Object Explorer.

Create and Connect a Server Pot Object to Your Modbus Slave

Typically, you do not need to develop the user interface for a server process, except for perhaps a few displays to help you verify and troubleshoot connections to hardware. The following steps show how to add some simple displays. In the *Create a Client Process* section, you will construct a more detailed user interface.

1. Expand the tree view of your newly created `ModbusSlave1` object by clicking the **+** sign to the left of it in the Object Explorer, as shown in the following illustration. This lets you view the data members available for you to use.

   A data member is a data source or sink associated with a Lookout object. In the following steps you will display the ModbusSlave `40001` data member on your control panel. This data member might represent a particular hardware register.

2. Right-click the `40001-49999` data member range in Object Explorer and drag it to your control panel. Release the mouse button and select **Create Control»Pot**.
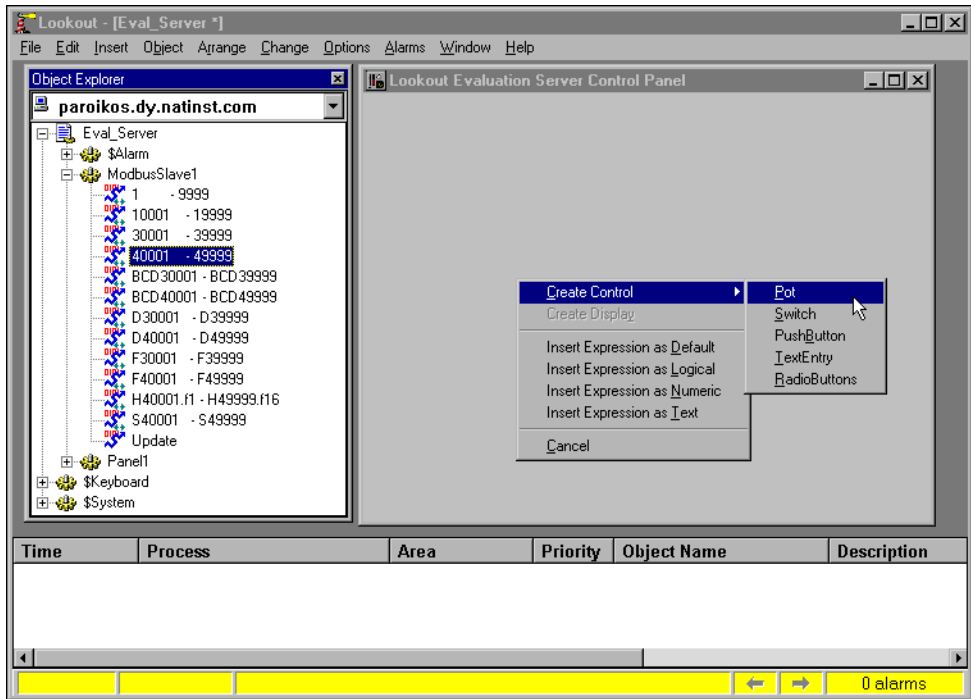
Tip   Pot is an abbreviation for potentiometer. In Lookout, you use Pot objects to set or control analog outputs.

> 3. The **New Potentiometer** dialog box appears, as shown in the following illustration. It is connected to 40001 because the first available data member is used by default when you select a range.
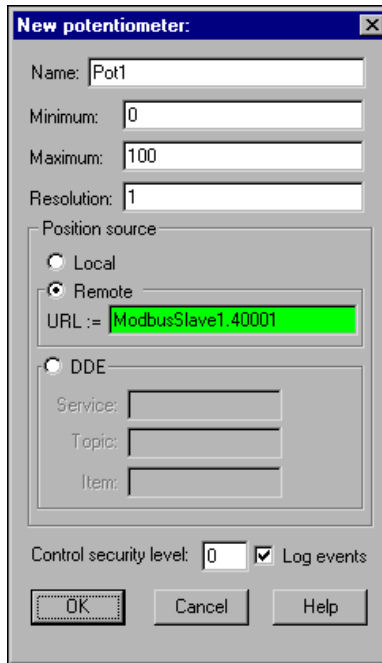
4. Accept the default values for `Pot1`. Click **OK**. The **Insert Pot** dialog box appears.

5. Select the vertical slider (top row, second graphic).

6. Select the **Use as Default** checkbox and then click **OK**. You can position your object anywhere on the control panel.

♦ *Lookout features easy-to-use drag-and-drop project development.*

7. To check that your connection works, place a digital display of the `ModbusSlave1.40001` data member on your control panel by left-clicking `40001-49999` in the Object Explorer and dragging it to your control panel.

8. Use the sizing handles around the number to make the display large enough to show three digits.

9. Select **Insert»Text/Plate/Inset** and type a `percent full` label for your digital display with a transparent background, as shown in the following illustration. Click **OK** and position the label next to the digital display.
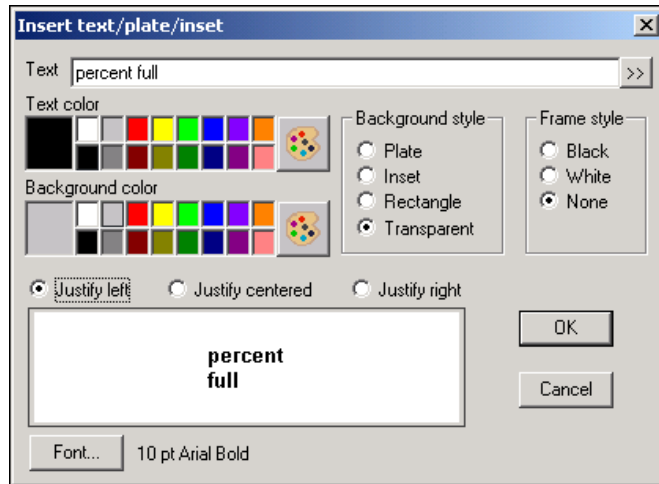
10. View your process in action. Press <Ctrl-Space> to leave edit mode, then use your mouse to move the Pot slider up and down. Notice the digital display changes as you move your Pot control, as shown in the following illustration. The Pot object output is connected to the `ModbusSlave1` data member `40001`, and the value the Pot sets for that data member is shown in the digital display.
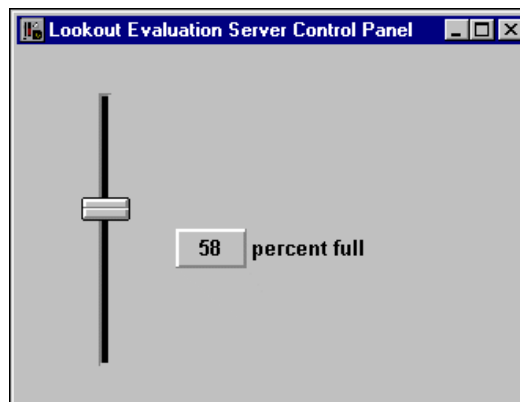
♦ *In just a few minutes, you have created and configured a driver object to communicate with field hardware, connected a control to that driver object, displayed the value of a register, and tested the process.*

11. Toggle back to edit mode by pressing <Ctrl-Space>.

12. Select **Object»Connection Browser**. In the **Objects** column, double-click your computer name, then Eval_Server, then Pot1 to see the Pot's connection to the Modbus Slave `40001` data member in the **Inputs** column. Click **Close**.

The connection between your Pot control and the Modbus Slave driver is an example of a reciprocal (remote source) connection. This connection makes the Pot an indicator as well as a control. To have the Pot hold the value you set even if something changes the value in your hardware, you would use a direct connection. For more information about the various types of connections, refer to the *Lookout Help*.

The digital display is an example of an expression. To learn more, right-click the digital display, choose **Object Properties**, then click the **Help** button in the **Revise expression** dialog box that appears.

Configure Data for Logging, Scaling, and Alarms

The following steps show how easy it is to configure logging, scaling, alarms, and more, for your data. You might want to show how many gallons of liquid the tank is holding, display information about the tank and its contents graphically, and trigger alarms when the tank is too full or almost empty. To keep track of this data and to make it easier to handle, Lookout uses the internal Citadel database. Each time you create a Lookout object, every one of its data members is a potential entry in this database.

Assume your tank holds 250,000 gallons. You can configure a database entry for your tank to track how full the tank is (in gallons), convert the percentage measurement to a volume measurement, and handle your logging and alarming.

1. Right-click the `ModbusSlave1` object in the Object Explorer. Select **Edit Data Member Configuration**.

2. Using the following illustration for help, enter these values in the dialog box.

   a. Select the `40001` data member you connected your Pot object to by clicking on `40001-49999` in the **Native members** list. Assign it an **Alias** of `TankLevel`.

b. In the **Scaling** section of the dialog box, set the **Raw units** at 0 for the **Minimum** and 100 for the **Maximum**. These are the raw numeric values connected to the 40001 data member, indicating what percentage of the tank is currently full. Set the **Eng. units** to 0 for the **Minimum** and 250000 for the **Maximum**.

Lookout now automatically scales the 0–100 input to a value between 0–250,000 that you can display it using the alias value TankLevel.
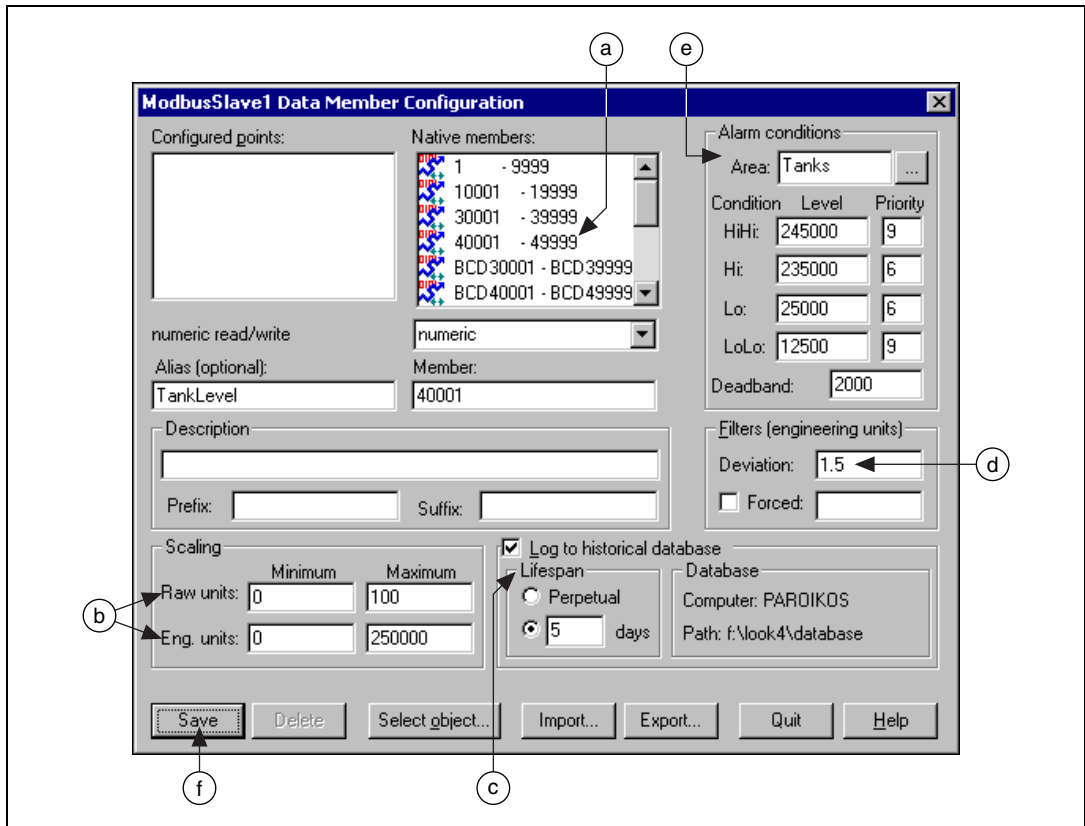

c. Check **Log to historical database**, and set the **Lifespan** to 5 days.

d. Set the **Deviation** to 1.5. This part of the configuration will be used in the *Create a Client Process* exercise.

e. Set your **Alarm conditions** as shown. Notice that Lookout lets you divide alarms into groups, called alarm areas. In this case, our alarm **Area** is `Tanks`.

Tip   For more detailed information on editing data member configuration, click the **Help** button in this dialog box.

f. Click the **Save** button (or the **Update** button if you saved earlier in the process), then click the **Quit** button to exit the dialog box.

♦ *Set alarm points, login values, and scaling in one easy dialog box.*

3. If necessary, expand the `ModbusSlave1` object in the Object Explorer by clicking the +, and drag the scaled data member `TankLevel` to your control panel. This digital display reports the contents of your tank in gallons.

4. Select **Insert»Text/Plate/Inset**, and type a `gallons` label for this digital display, choose a transparent background, and click **OK**. Position the label next to the scaled tank level display.

Your control panel should now look similar to the following illustration.
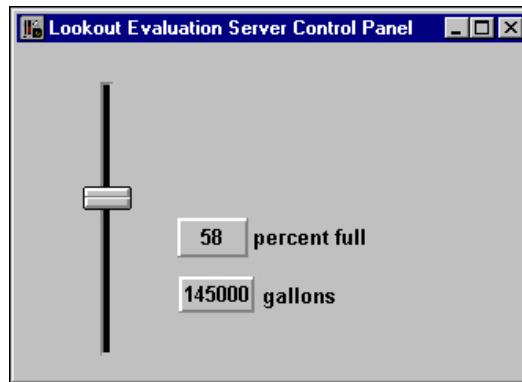
5. Press <Ctrl-Space> to exit edit mode, then move the Pot slider up and down. Moving the Pot to the upper and lower limits of its range triggers the alarms you set for `TankLevel` in step 2e. Notice that the alarms appear in the Alarms Window. If you can't see the Alarms Window, select **Alarms»Show**.

6. Right-click an alarm in the Alarms Window and select **Acknowledge All** to acknowledge the alarms. You can click **OK** without entering a comment.
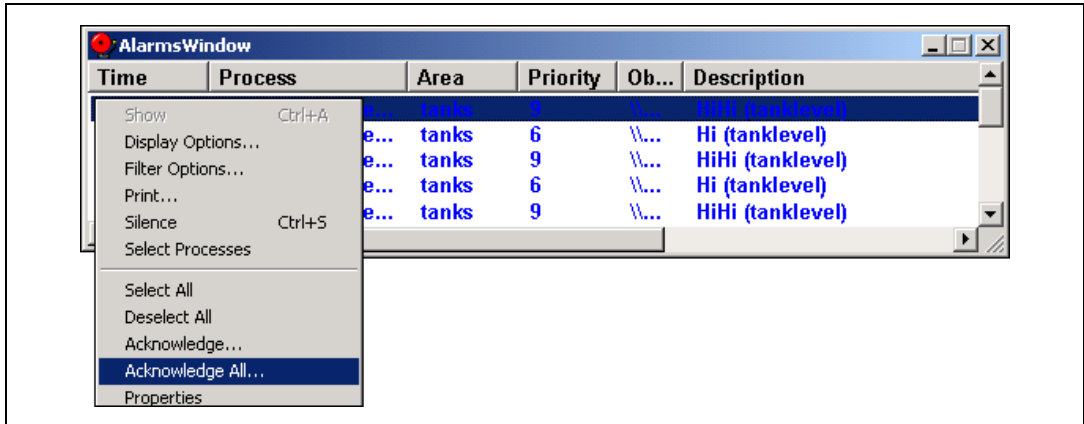
7. Save your server process by selecting **File»Save**. You will be accessing it with the client process you create next.

♦   *View and acknowledge alarms from any computer on the network.*

Tip   If you want to change the size and location of the Alarms Window, select **Alarms» Display Options**. To control what is displayed in the Alarms Window, select **Alarms» Filter Options**.

Review—Creating a Server Process

A Lookout server process runs on the computer that has direct or physical connections to your industrial automation hardware. Configure the data for logging, alarms, scaling, and so on in the server process. A server process provides data for clients, and does not need an elaborate user interface.

Tip   You can add network and local security to this server process. To learn more about using the Lookout security features, refer to the *Lookout Help*.

Create a Client Process

In this exercise, you build a simple Lookout client process to interact with the server you built in the *Create a Server Process* exercise.

The instructions for this exercise assume you are developing your client process on the same computer that is running your server process. In the *Networking the Client Process* section, you will have a chance to move the client to a second computer, add a feature, and fix a simulated data quality problem.

1. Launch Lookout if it is not already running and load your `Eval_Server` process using the **File»Open** command.

2. Minimize your server process control panel by clicking the minimize box in the upper-right corner of the control panel.

3. Select **File»New** to create a new Lookout process.

4. In the **Create Process** dialog box that appears, name your new process `Eval_Client`. Click **OK**.

5. In the **New Control Panel** dialog box that appears, change the **Title** to `Evaluation Client Control Panel` and click **OK**.

Create a Client Pot Object

1. In the Object Explorer under `Eval_Server` and `ModbusSlave1`, right-click and drag the `40001–49999` data member range to your `Eval_Client` control panel. Release the mouse button and select **Create Control»Pot**.

    The remote connection is defined by a URL, which directs Lookout to the target value. Properly configured, this connection works on any computer running Lookout on your network.

2. Right-click in the green **URL** field in the **New potentiometer** dialog box. The following dialog box appears.
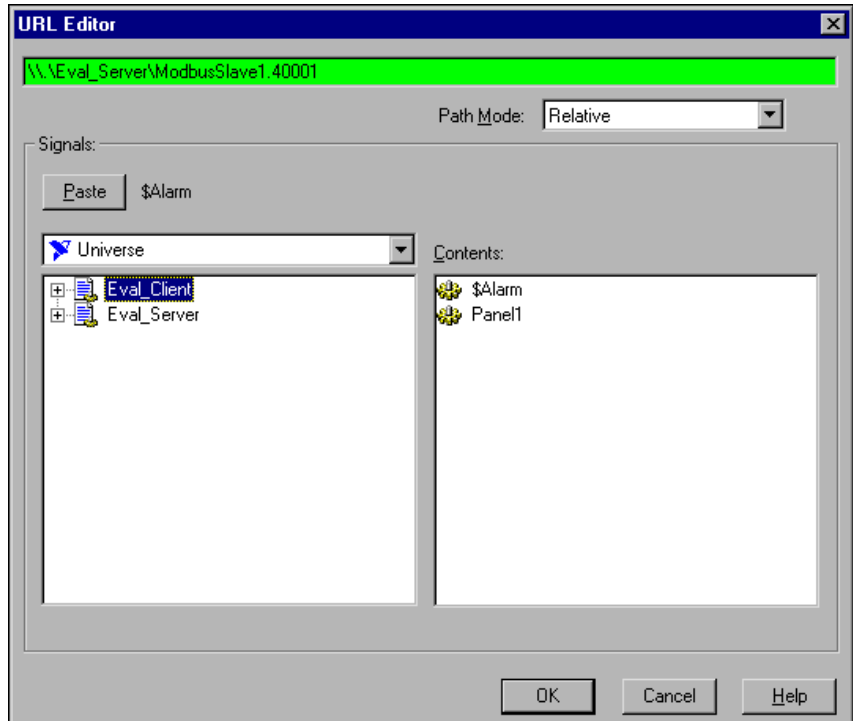
The path \\.\Eval_Server\ModbusSlave1.40001 should work as long as your client is running on the same computer you used to create your client process—but your goal is to create a process that runs from any computer on your network that has Lookout installed. For this to be true, you must change the path.

3. Delete the URL string, then assemble a new URL by making the following selections in the URL Editor dialog box:

   a. Set **Path Mode** to **Absolute**. This ensures that your client process can locate the data member you are connecting to, no matter what computer the client process is run on.

   b. Open the Eval_Server process in the left tree view, under your computer name, and click ModbusSlave1.

   c. Select 40001-49999 in the **Contents** list. The assembled URL *yourcomputer*\Eval_Server\ModbusSlave1.40001 is displayed next to the **Paste** button.

          d.   Click **Paste** to insert the URL string into the green URL field.

💡 **Tip**   For more detailed information on creating and editing URLs, click the **Help** button in this dialog box.

          e.   Click **OK**.

4.   Click **OK** in the **New potentiometer** dialog box to create the new Pot vertical slider object.

5.   Press <Ctrl-Space> to leave edit mode. Activate your server process control panel by selecting **Window»Lookout Evaluation Server Control Panel**.

6.   Arrange your two control panels so you can see both. Operate the Pot control in the *client* process control panel. Notice that on the server process control panel, both the Pot control and digital displays respond.

7.   Operate the Pot control in your *server* process. Notice that the Pot control in your client process changes to reflect movement of the server values.

Connect a Client Switch Object to Your Modbus Slave

1.   Press <Ctrl-Space> to return to edit mode (the status bar at the bottom of the Lookout workspace should turn yellow).

2.   Right-click your `Eval_Client` process in the Object Explorer, and select **New Object**.

3.   From the **Control** folder, select **Switch** and click **OK**. The following dialog box appears.
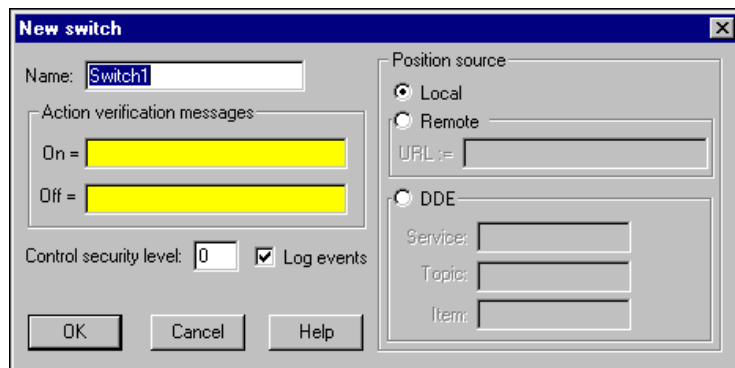
4. For **Position Source**, select the **Remote** option, and right-click in the green **URL** field. The **URL Editor** dialog box appears.

   When you created your Pot object for your client, you used a path mode to make sure the URL would work from any computer on your network. Another way you can ensure portability for this control is to change the root of the **Signals** list box.

5. Expand the Network node in the tree that appears, expand your computer under the Network node, then expand the Eval_Server process. Select the ModbusSlave1 object as shown in the following illustration.
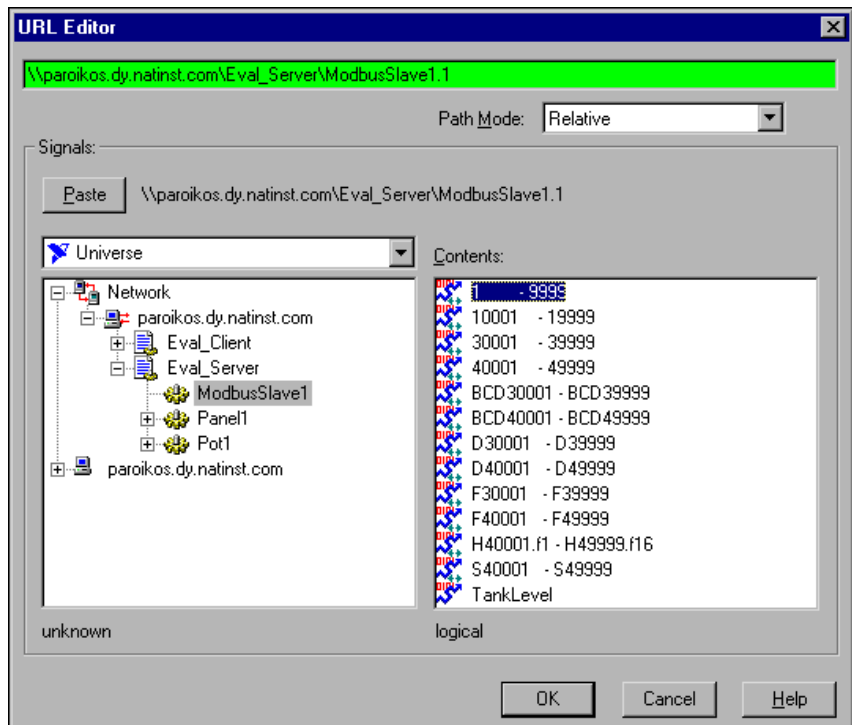
6. Select the 1-9999 data member in the **Contents** list and click **Paste** to insert the URL string into the green URL field.

7. Click **OK**.

8. Click **OK** in the **New Switch** dialog box to finish creating your Switch object.

9. Drag the Switch object from the Object Explorer to your client control panel. Select the standard switch on the far right, as shown in the following illustration, and click **OK**.
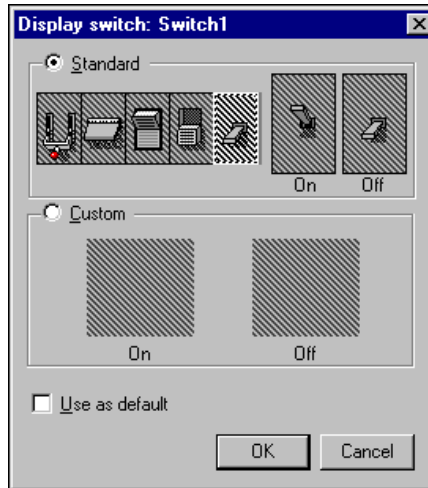
10. In the Object Explorer, expand the `ModbusSlave1` object under `Eval_Server`, and drag and drop the `1-9999` data range to your client control panel. This inserts an LED display to reflect operation of the switch you made.

✎ **Note**   The display you created on the client control panel has a relative path to the Modbus Slave data member, a connection that will not work properly if you move the client to another computer on your network. Leave it as a relative path so that you can see how Lookout monitors data quality and alerts you if the data quality goes bad. You can correct the path later in the *Correct Problems with Data Quality* section.

11. Press <Ctrl-Space> to leave edit mode, and operate the switch you placed on your client control panel.

♦ *Connecting to an I/O point across a network is as easy as connecting it from the same computer.*

Create a HyperTrend Object

In the *Configure Data for Logging, Scaling, and Alarms* section, you configured the `TankLevel` data member in your server process for scaling, and set it to be logged to Lookout's Citadel database. As long as your server process is running, Lookout is keeping track of this value in Citadel.

1. Make note of the current time on your computer, then change the position of the Pot slider on your client or server process a number of times in large increments. Later, you will view the changes you made on the HyperTrend chart.

2. Press <Ctrl-Space> to return to edit mode.

3. Right-click your `Eval_Client` process in the Object Explorer and choose **New Object**. Select **HyperTrend** from the **Logging** folder and click **OK**.

4. In the **Create HyperTrend** dialog box, click the **Add Group** button. The following dialog box appears.
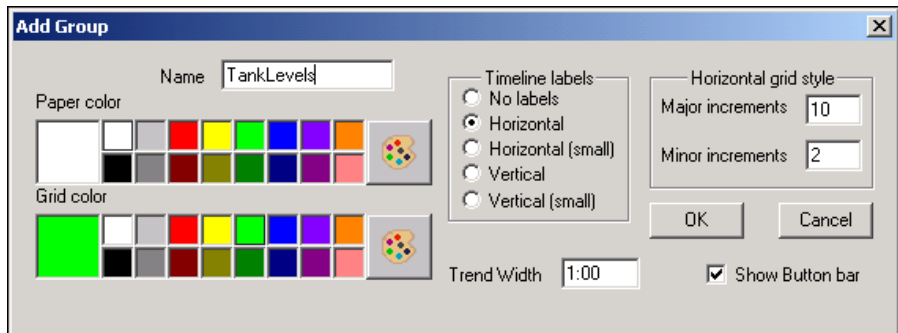
5. Name the group `TankLevels`. The default trend width is one minute; accept this and the other defaults.

6. Click **OK**. Lookout returns you to the **Create HyperTrend** dialog box. Make sure your new TankLevels group is highlighted and then click the **Add Item** button. The following dialog box appears.
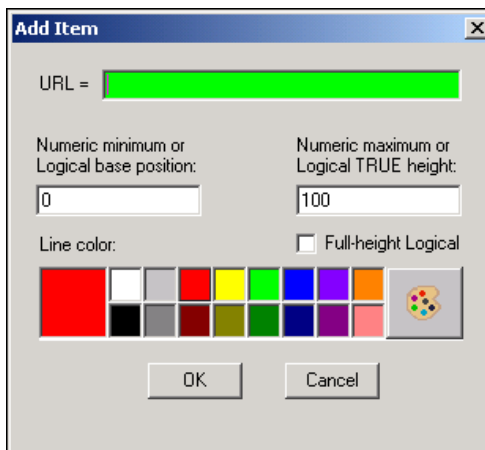
7. Set **Numeric maximum** to 250000 to match the scaled value of the data point you are about to display.

8. Right-click in the green **URL** field to activate the **URL Editor**.

9. Set **Path Mode** to **Absolute**, then under your computer name in the left tree view, select the ModbusSlave1 object in your Eval_Server process. Select the TankLevel data member in the **Contents** list. Click the **Paste** button. The path in the green field should be *yourcomputer*\Eval_Server\ModbusSlave1.TankLevel. Click **OK**.

10. Click **OK** in the **Add Item** dialog box and again in the **Create HyperTrend** dialog box.

11. Drag your new HyperTrend object from the Object Explorer to your client process control panel. Use the sizing handles to adjust the size of the chart. Arrange your client process control panel to resemble the following illustration. You can add the scale shown by selecting **Insert»Scale**. You can add the Percentage full label by selecting **Insert»Text/Plate/Inset**.

| 1 | Modbus Slave 1.1 Switch | 2 | Modbus Slave 1.1 LED Indicator | 3 | HyperTrend Cursor |
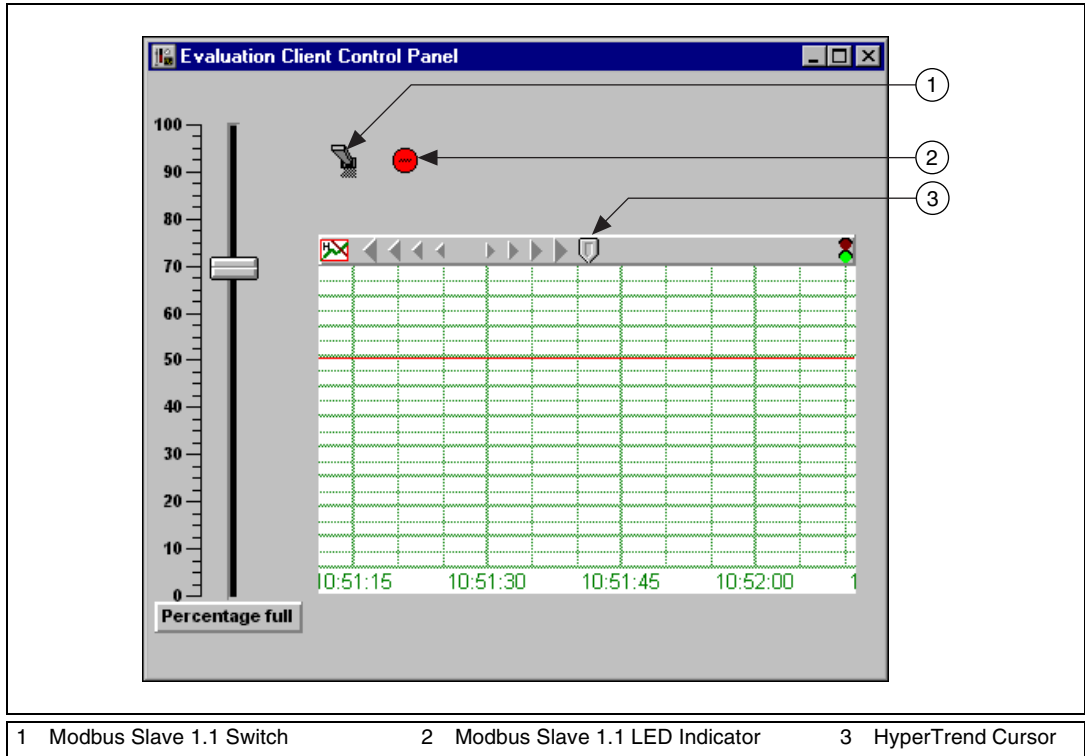
View Your HyperTrend Data

1. Press <Ctrl-Space> to toggle out of edit mode. Move the Pot slider up and down and notice the trace change on the graph.

2. Click the HyperCursor icon in the center of the top of the HyperTrend object. The HyperCursor icon is replaced by a solid line down the center of the chart, and the **HyperTrend1 Cursor** dialog box appears, as shown in the following illustration.
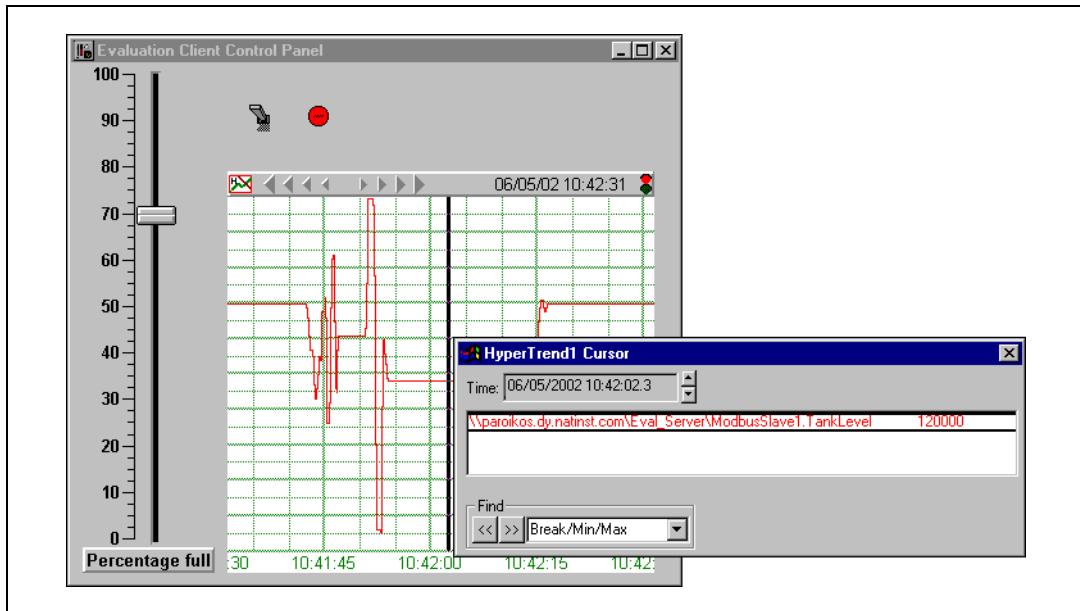
3. Use the **Time** control on the dialog box to scroll back to the time you noted when you changed TankLevel values.

4. Select **File»Save All** from the Lookout menu to save both your processes. Make sure that your client process is saved in the Lookout folder, so that you can successfully export it as a Web Client.

♦ *You can define as many HyperTrend objects as you want. Each object can plot as many numeric (analog) and/or logical values as you want.*

Tip Lookout includes another powerful way to view and manage historical data, the Historical Data Viewer, which runs in the MAX environment. To explore its capabilities, select **Options»Historical Data Viewer** in Lookout, then click **Historical Data** in MAX.

Review—Creating a Client Process

A Lookout client process interacts with Lookout servers. It should be capable of running on any Lookout computer on your network without modification. To ensure this portability, a Lookout client application should not include driver objects, and it should always use remote connections (or connections through a symbolic link) to a server process.

Create a Web Client or HTML Report

Lookout offers two choices for making your process data available in HTML format. You can generate an HTML report or a Web Client.

With an HTML report, a Web browser can be used to access the information you choose to report. The data on a report page is not live; it shows a snapshot of the data that is periodically updated according to your settings. No downloading is necessary, and operators viewing the data are prevented from manipulating the Lookout control objects.
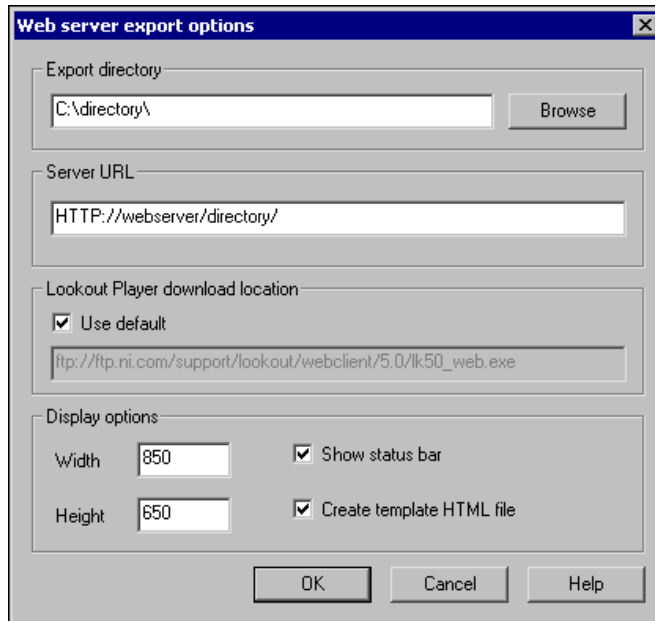
A Web Client is accessible using a Web browser and the Lookout Player. Unlike an HTML report, a Web Client allows you to display *and* control data as any other client process. The data is live and interactive, as you can allow operators to manipulate the control objects.

To see how you might create a Web Client, follow the steps in the *Create a Web Client* section. The *Create an HTML Report* section shows how easy it is to create an HTML report.

Create a Web Client

You can create a version of any Lookout process to access using Microsoft Internet Explorer. It requires a Windows operating system with Internet Explorer 3.2 or later, Lookout software or the Lookout Player installed on the client machine, and possibly adjustments for access through a firewall. In this exercise you will find out how easy it is to set up a Web Client to access and control your process from anywhere in the world.

1. Open Lookout and run your Eval_Client and Eval_Server processes. Make sure that your client process is saved in the Lookout folder.

2. Press <Ctrl-Space> to put Lookout in edit mode.

3. Select **File»Web Server Export Options**. The following dialog box appears.

Web server export options

Export directory

C:\directory\   Browse

Server URL

HTTP://webserver/directory/

Lookout Player download location

☑ Use default

ftp://ftp.ni.com/support/lookout/webclient/5.0/lk50_web.exe

Display options

Width   850   ☑ Show status bar

Height 650   ☑ Create template HTML file

OK   Cancel   Help

♦   *Creating a Web Client is just as easy as exporting your process file.*

4. In the **Export directory** field, enter the complete path to the directory
    on the server computer in which you want to create your Lookout Web
    Client HTML page. All the necessary support files also are placed in
    this directory. If no directory exists on the path you enter, Lookout will
    create one.

    •   The default root directory for Microsoft Personal Web Server 4.0
        (available on the Windows 98 CD) and Internet Information
        Services 5.0 (shipped with Windows 2000) is `C:\Inetpub\`
        `wwwroot`. The default root directory for Apache Web Server 1.3
        is `C:\Program Files\Apache Group\Apache\htdocs`.

    •   If your computer is *not* set up as a Web server, you can use
        Microsoft networking to access the Web Client from the remote
        computer. In that case, choose any directory that you can share,
        for example `c:\temp`.

5. In the **Server URL** field, enter the URL for your HTML page.

    • If your computer is running Web server software, enter the
      complete Web server path to the page, but do not include the page
      itself. For example, if the complete URL to your page is
      `http://webserver/directory/client.html`
      enter `http://webserver/directory/`.

    • If your computer is *not* set up as a Web server, you can use
      Microsoft networking and access the Web Client from the remote
      computer with a fully qualified URL. For example,
      `\\`*`server_computer`*`\`*`shared_folder`*`\`.

6. Accept the default source for the Lookout Player, the National
   Instruments FTP site at `ftp://ftp.ni.com/support/`
   `lookout/webclient/5.0/lk50_web.exe`. You need the Lookout
   player for any computer without Lookout installed. You will be
   prompted to download it when you attempt to connect to your process
   in Internet Explorer.

7. Click **OK**.

8. Select **File»Export Web Server Files**.

9. Select your `Eval_Client` process for export. Click **OK**.

   You now have an HTML page you can access with a browser. To access
   the page, complete the following steps.

10. Make sure Lookout is running your server process so the Web Client
    has a server to access.

11. If you want to launch the Web Client on the same computer where
    your client process is saved, make sure your client process is closed.
    Lookout cannot open two processes with the same name on a single
    computer.

12. If you want to access the Web Client using network sharing, make sure
    your export directory on the server computer is shared.

13. Open Internet Explorer on the computer that you want to use to access
    the Web Client.

14. Set the security level option in Internet Explorer to **Medium** by
    choosing **View** (or **Tools**)**»Internet Options»Security»Intranet**
    if your server is on the same LAN, or **Internet** if your server is on the
    Internet. If you don't see the slider with the security levels, click the
    Default Level button. Click **OK**.

15. Use Internet Explorer to open the Web Client file. In the URL address field, enter the server URL you specified earlier. Open the `Eval_Client`. Click **Yes** if prompted.

16. When the Web Client launches, maximize the client control panel and operate the controls. If you can see your server computer, notice that your Web Client controls the server process.

♦   *With Lookout, you can easily monitor and control your process using any Web browser, without any programming.*

Create an HTML Report

You can view an HTML report on any operating system running Internet Explorer or Netscape (Netscape does not support Lookout graphic formats), without any required adjustments for access through a network security firewall. Complete the following steps to make an HTML report for one of the examples included with Lookout.

1. On your server computer, select **File»Open** and open the `Examples\Applications\continuous2` process.

2. Press <Ctrl-Space> if necessary to switch to edit mode, and create a Report object by selecting **Object»Create**, choosing **Report** from the Logging category folder, and clicking **OK** twice.

   Enter `"Continuous Report"` as the **Title** and the Web server root directory as the **Output directory** (for example, `"C:\Inetpub\ wwwroot\"` for Personal Web Server). If you do not have Web server software, you can use folder sharing to expose the report to other machines. In that case, enter the path to the shared folder as the **Output directory**, and make sure that folder is shared on the network. Include the quotes with these entries, so that the yellow expression fields will interpret the information as text.

3. Enter `"default.htm"` as the **Output file**. Include the quotes.

4. Click **OK**.

5. Select **Object»Edit Connections** and under `continuous2` on your computer, choose the **Report** object. Click **OK**.

6. In the **Report connections** dialog box that appears, make the following connections:

   `Report1.HTML1="<META HTTP-EQUIV=""REFRESH"" CONTENT=5>"`

   Choose `HTML1-HTML100` in the **Writable members** field, click **Select**, enter the right side of the equation in the yellow field, then click

Accept. This connection makes the browser automatically refresh the report page every five seconds.

```
Report1.Display1=Global_ChemicalFeedPanel.graphic
```

Choose `Display1-Display100` in the **Writable members** field, click **Select**, enter the right side of the equation in the yellow field, then click **Accept**. This connection puts the main panel on the report page.

```
Report1.Generate=Pulse(1,0:5,0:1)
```

Choose `Generate` in the **Writable members** field, click **Select**, enter the right side of the equation in the yellow field, then click **Accept**. This connection regenerates the report every five seconds.

7. Click **Quit** to exit the dialog box.

8. Click the **Restore Down** button in the top right corner of the panel, if necessary, and resize the panel so that it appears as you want it to for the HTML report.

9. Save the process as `continuous_report.14p`.

10. Open your Web browser and point it to the generated page. In the address field enter `http://server/` or `http://server/default.htm`. If you are using folder sharing, enter `\\server_oomputer\shared_folder\default.htm`.

Review—Creating a Web Client or HTML Report

Lookout allows you to create either a Web Client or HTML report for your server process. A Web Client allows you to display *and* control data. An HTML report displays a snapshot of the data that is periodically updated according to your settings.

Networking the Client Process

If you have access to a second computer on your network, you can run your new client on that computer and try out Lookout's easy-to-use networking. This exercise shows how a client process developed in a server computer can be distributed across any machine in a network. The client process works with absolutely no development.

1. Install the Lookout evaluation software on the second computer.

2. Copy your client process files from your first computer to the Lookout directory on your second computer. If you did not change the name of your process when saving, you should have the following four files that comprise your client process: `Eval_Client.14p`, `Eval_Client.14t`, `Eval_Client.1ks`, and `Eval_Client.1ka`.

3. On your second computer, launch Lookout, close the default process, select **File»Open**, and open Eval_Client. By default, Lookout opens a process with the control panels minimized, so activate the control panel by clicking the activate button on the minimized menu bar at the bottom of the Lookout workspace.

4. Operate the Pot object slider on your second computer. The Pot controls in your server and original client processes (running on your server computer) should respond.

5. Notice the red X over the LED indicator, which indicates a data quality problem. This will be explained later in the *Correct Problems with Data Quality* section.

Note   If you do not see any traces on your HyperTrend, you may need to synchronize your computers. This will be explained later in the *Synchronize Computer Clocks* section.

Register Your Network Computers

While Lookout processes can communicate with each other across the network without any special preparations, you must register all other computers running Lookout if you want to browse across the network for development purposes.

1. On the second computer, press <Ctrl-Space> to put Lookout in edit mode. Select **Object»Object Explorer** if the Object Explorer is not already running.

2. Click the name of your second computer in the window at the top of the Object Explorer, and select **Universe** from the pull down list.

    You now can browse every computer registered as running Lookout on your network.

3. Register your server computer (the one running your server process) here by right-clicking **Network** and selecting **Register computer**.
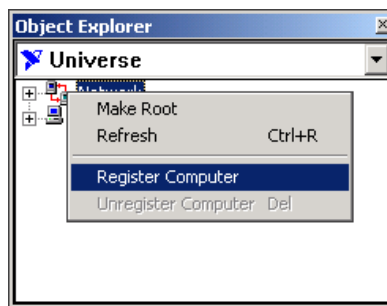
4. In the **Register Network Computer** dialog box that appears, enter the name of your server computer into the **Computer name** field, as shown. If you prefer, you can browse for your computer name in the network tree view available in the **Entire Network** field.

5. Click **OK**.

6. Expand the **Network** node of the tree view in the Object Explorer. You should see both your second computer (the computer you are currently working on) and the computer running your server process, as shown in the following illustration.
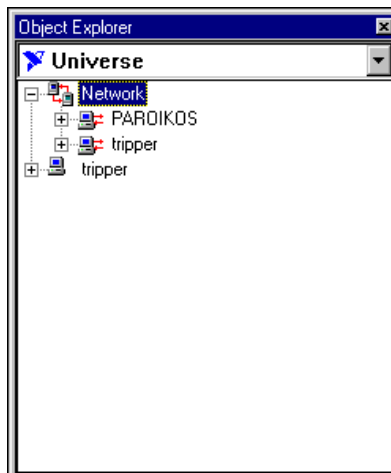
♦ *With Lookout you can log data to any computer on your network, and retrieve data from any computer.*

Correct Problems with Data Quality

The red X superimposed on the second computer's LED indicator is an example of the Lookout data quality feature, which alerts you when your process is receiving data that has some problem. Complete the following steps to fix the data quality problem.

1. On the second computer, delete the display with the data quality alert (red X) over it from your client control panel by clicking it and pressing the <Delete> key.

2. Expand the Object Explorer tree view so that you can see the processes running on your server computer and the ModbusSlave1 object, as shown in the following illustration.
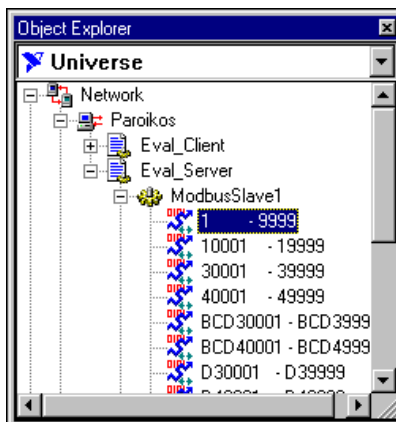

3. Drag the 1-9999 data member under the Eval_Server Modbus Slave object to your client control panel. Notice that the new display object no longer shows the data quality alert (red X).

4. Press <Ctrl-Space> to exit edit mode and operate your switch. If you can see your server computer, you should notice that the displays on the server computer control panels respond.

5. Select **File»Save** to save your changes.

♦ *With Lookout, networking is as easy as using Windows Explorer.*

Synchronize Computer Clocks

You might notice some time lag in operating your Pot control and seeing the change in your HyperTrend chart on your server computer, which can happen when your networked computers do not have their clocks synchronized. To provide for accurate data logging, complete the following steps to have Lookout synchronize your computers.

1. On the second computer, select **Options»Time Synchronization** from the Lookout menu bar. The following dialog box appears.
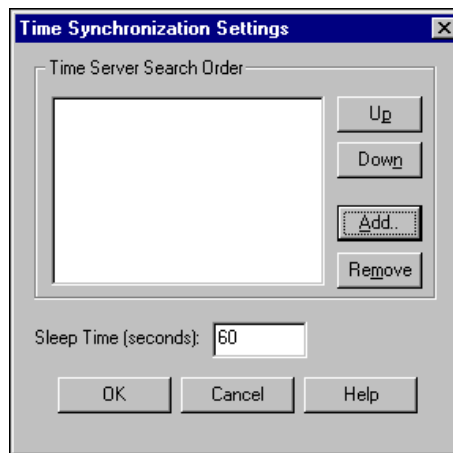
2. Click **Add**. The **Add Time Server** dialog box appears.

3. Enter the name of your server computer in the **Computer name** field. You also can browse for your computer in the **Entire Network** list.

4. Click **OK**. The **Time Synchronization Settings** dialog box reappears.

5. Set **Sleep Time** to 300. With this setting, your computers resynchronize every five minutes.

6. Click **OK**. Your computers are now synchronized.

7. Select **File»Save** to save your changes.

Show Networked Alarms and Events

If you operate your Pot slider on your server computer, you may notice that the alarms you trigger on your server computer do not appear in the **Alarms** window on your second computer. To monitor and acknowledge alarms from a networked computer, you must select the processes you want to monitor as follows.

1. On your second computer, select **Alarms»Select Processes** in Lookout. The following dialog box appears.
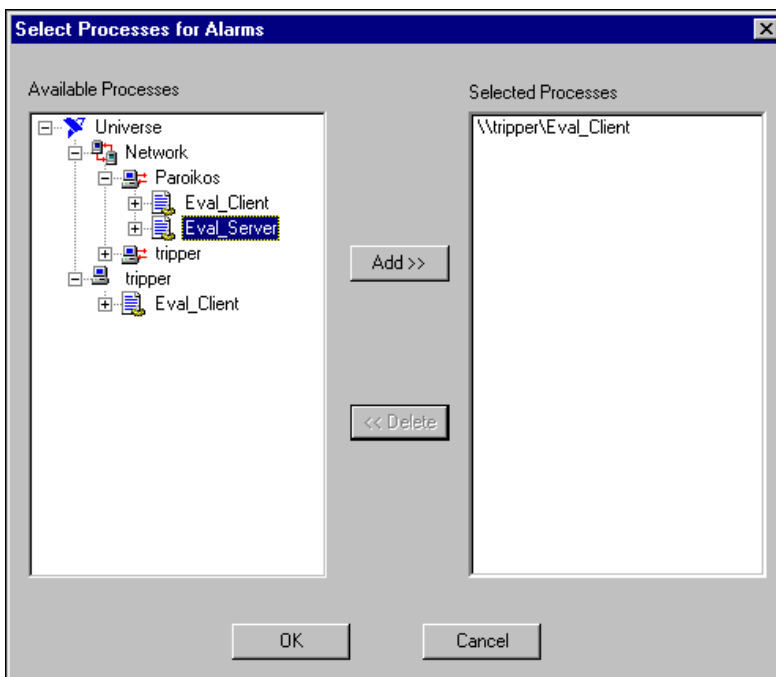
2. Expand the tree view to show the processes running on your server computer. Select the `Eval_Server` process, and click the **Add** button. Click **OK**.

   Your second computer now can monitor alarms from your server computer.

3. Select **File»Save** to save your changes.

♦ *Connect to alarms across a network in one easy step.*

Review—Networking

Networking a Lookout application is as easy as copying your client process files to any networked computer. Then you can use simple Lookout dialog boxes to resolve any data quality problems, synchronize your system clocks, register computers, and access alarm and event information.

4

Where to Go from Here

This chapter introduces you to the demonstration processes and additional features included with your Lookout software, and describes how to uninstall your Lookout evaluation software. It also includes information to help you contact National Instruments to learn more about Lookout and other National Instruments products.

Exploring Additional Lookout Features

There are many more features in Lookout other than the ones covered in this guide. Some of the other major capabilities of Lookout are statistical process control, batch management, sequential process management, complex expressions, data tables, animated graphics, Aggregate objects, advanced security across networks, and connectivity with other National Instruments software. These, along with a host of other capabilities that are beyond the scope of this guide, make Lookout one of the most powerful software packages available on the market.

The evaluation copy of Lookout comes with the full Lookout Help system, which contains information on all the Lookout objects, features, and services.

If you haven't yet explored the application examples, you can do so by selecting **File»Open** and browsing the `Examples` directory.

Uninstalling the Lookout Evaluation Software

To uninstall your evaluation copy of Lookout, first exit Lookout, then stop the NI Services by right-clicking the NI Service Manager icon in the task tray next to the computer clock and selecting **Stop all services**. Then select **Start»Settings»Control Panel»Add/Remove Programs**, highlight the NI Lookout entry, and choose to remove it.

Lookout also installs portions of NI software that may be shared. If you have other NI software installed, you may want to leave these shared components; otherwise, remove them individually.

• NI DSC Common Tools

• NI Historical Data Viewer

• NI Logos

• NI Measurement & Automation Explorer

• NI Server Explorer

When the uninstall process is complete, you might receive a message that some components could not be uninstalled. These files include database files for data you logged during the demonstrations and any process files you created. You can delete these files manually from your `Lookout` directory.

Purchasing Lookout

For more information about Lookout and other National Instruments industrial automation products, visit the National Instruments Web site at `ni.com/lookout`. You also can email your questions to `info@ni.com`.

Your local National Instruments representative can supply information tailored to your needs. If you are not already in contact with a representative for your area, call National Instruments at 512 683 0100 to have your questions answered.

Thank you for your interest in Lookout.

A

Technical Support and Professional Services

Visit the following sections of the National Instruments Web site at `ni.com` for technical support and professional services:

- **Support**—Online technical support resources include the following:
  - **Self-Help Resources**—For immediate answers and solutions, visit our extensive library of technical support resources available in English, Japanese, and Spanish at `ni.com/support`. These resources are available for most products at no cost to registered users and include software drivers and updates, a KnowledgeBase, product manuals, step-by-step troubleshooting wizards, conformity documentation, example code, tutorials and application notes, instrument drivers, discussion forums, a measurement glossary, and so on.
  - **Assisted Support Options**—Contact NI engineers and other measurement and automation professionals by visiting `ni.com/support`. Our online system helps you define your question and connects you to the experts by phone, discussion forum, or email.

- **Training**—Visit `ni.com/training` for self-paced tutorials, videos, and interactive CDs. You also can register for instructor-led, hands-on courses at locations around the world.

- **System Integration**—If you have time constraints, limited in-house technical resources, or other project challenges, NI Alliance Program members can help. To learn more, call your local NI office or visit `ni.com/alliance`.

If you searched `ni.com` and could not find the answers you need, contact your local office or NI corporate headquarters. Phone numbers for our worldwide offices are listed at the front of this manual. You also can visit the Worldwide Offices section of `ni.com/niglobal` to access the branch office Web sites, which provide up-to-date contact information, support phone numbers, email addresses, and current events.