



NATIONAL INSTRUMENTS™  
**Lookout**™

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# Lookout Evaluation Guide

## **Worldwide Technical Support and Product Information**

ni.com

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# Conventions

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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 on 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.

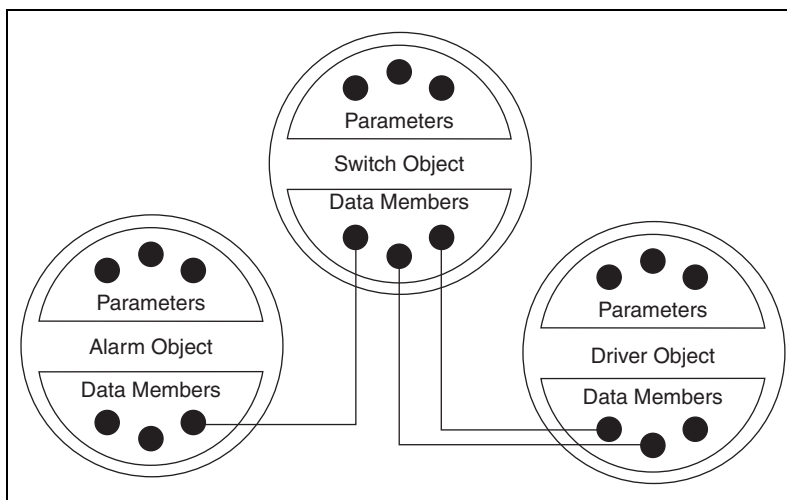
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## Why Choose Lookout?

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 can also 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 can also 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 e-mail 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 can also 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 is also possible to view HTML reports 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 and RTUs 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.

If you combine Lookout with National Instruments LabVIEW or LabVIEW Datalogging and Supervisory Control module software, you bring motion control and machine vision to your control processes, and access to a full spectrum of test, analysis, and measurement options.

## 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. Starter systems and a developer toolkit are also 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 the appendix of this guide, [Technical Support Resources](#), and at [ni.com/support](http://ni.com/support).

## Productivity Guarantee

The total cost of ownership of software includes development, maintenance, and training costs. With Lookout, you cut down on these costs and get faster return on your investment—guaranteed. If, after using a purchased copy of Lookout for 90 days, you do not find it to be the easiest-to-use software in the market, we will refund your money.

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# Installation

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

## System Requirements

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

- Pentium class PC running at 90 MHz or faster
- Monitor display setting of at least 800 × 600 pixels
- 32 MB RAM
- Windows NT version 4 or later, Windows 2000, or Windows Me/98/95
- Between 17 and 112 MB free disk space for Lookout (depending on your installation options), plus 100 MB or more for data logging (depending on how much data you intend to log to the Citadel database). You should also have approximately 50 MB of disk space for file swapping on Windows NT/2000 computers.
- If you want to experiment with Lookout networking capabilities, your computer must have TCP/IP installed and functioning. See the *Testing TCP/IP* topic of the Lookout online help for more information on this requirement.
- If you want to explore Lookout networking capabilities (as shown in the [Networking the Client Process](#) exercise in Chapter 3, *Try Out Lookout*), you need access to a second computer on your network that meets all of the above requirements.
- If you want to create a Web Client, your computer must have Microsoft Internet Explorer, version 3.2 or later.

## Software Installation

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Follow these instructions to install the Lookout software:

1. Before you install Lookout, make sure you have shut down all running applications.
2. Insert the Lookout CD into your CD drive.
3. Follow the prompts on the screen to complete the Lookout installation.

The Lookout CD has autorun capability. If the autorun feature is disabled on your computer, follow these instructions:

1. Click on the **Start** icon in the taskbar and select **Run**.
2. Enter `N:\SETUP`, where *N* represents your CD drive. Then, click **OK**.
  - Click **Browse** to enter the name of an alternate directory, or click **Next** to accept the recommended directory name.
  - Lookout lets you choose whether to install its online help. However, if you choose not to install the online help, the Lookout help buttons will not work.
  - Make sure you select the option to install Lookout's ODBC driver if you want to be able to access Lookout's internal Citadel database.
  - On a Windows NT system, if you want to be able to block authorized users from using <Alt-Tab> to gain access to applications other than Lookout, make sure you install the optional NT keyboard driver from the list of optional components.

## Limitations of the Evaluation Software

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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.

## 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.

The screenshot shows the Lookout application window titled "Lookout - [Eval\_Client \*]". It features a menu bar (11) with options like File, Edit, Insert, Object, Arrange, Change, Options, Alarms, Window, and Help. On the left is the Object Explorer (9) showing a tree view of objects under "paroikos.dy.natinst.com", including \$Keyboard, \$System, \$Eval\_Client, \$Alarm, HyperTrend1, Panel1, Pot1, Switch1, and Eval\_Server (10). The main area displays the Evaluation Client Control Panel (3) with a graph showing a red signal fluctuating around a 50% level. The graph has a vertical axis from 0 to 100 and a horizontal axis with time markers. Above the graph are controls for "ModbusSlave1.1" and "DO Switch". A status bar (8) at the bottom shows "2 alarms" (4) and navigation arrows (5). An alarm window (7) is open at the bottom, listing events with columns for Time, Process, Area, Priority, Object Name, and Description. The first alarm at 11:44:18.8 is "Edit mode ON" in the Lookout area. The second alarm at 11:44:18.4 is "Pot1 remotely adjusted" in the Lookout area.

Time	Process	Area	Priority	Object Name	Description
11:44:18.8	\\PAROIKOS\Eval_Server	Lookout	0		Edit mode ON
11:44:18.4	\\PAROIKOS\Eval_Server	Lookout	0	\\paroikos.dy.natinst.c...	Pot1 remotely adjusted

1 Active process name	4 Active alarm/event count	6 Status bar	9 Object Explorer
2 Title bar	5 Control panel navigation arrows	7 Alarm window	10 Root window
3 Control panel		8 Minimized control panel	11 Lookout menu

- ◆ 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

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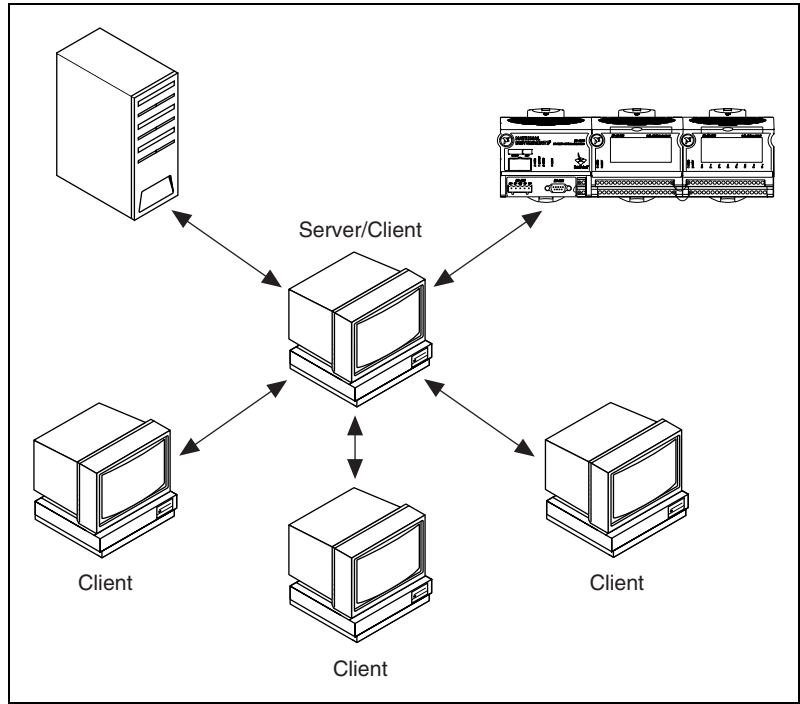
Lookout is used to brew beer, process food, run chemical plants, operate oil and gas pipelines, automate buildings, control energy management systems, bottle soft drinks, operate power plants, and operate municipal water supplies. The examples that install with Lookout demonstrate the kind of applications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

1. Launch Lookout by selecting **Start»Programs»National Instruments Lookout**.
2. Select **File»Open**, and in the `Examples` folder open `home2`.
3. Use the links in `home2` to browse the examples.
4. When you are done, select **File»Exit** and click **Yes** to close any processes that are running.

## Creating a Server Process and Client Process

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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.



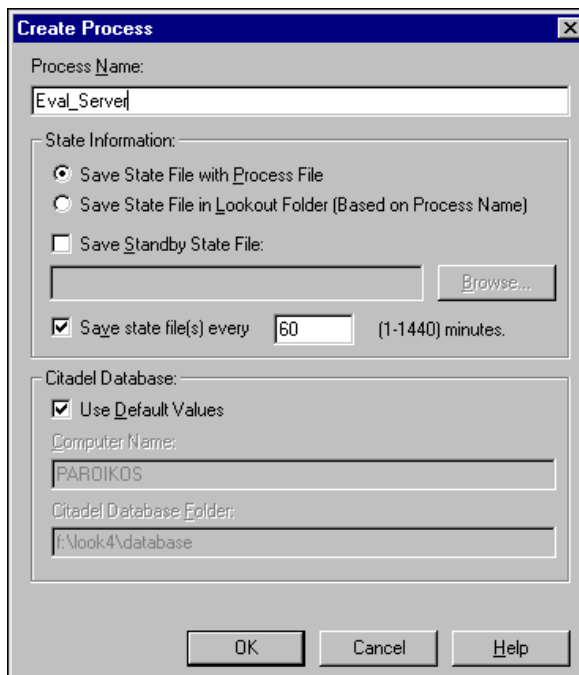
**Note** While *server* is a networking term, a Lookout server process does not necessarily need to be connected to a network.

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.

For more information on the Lookout Object Explorer, select **Help»Contents** from the Lookout menu, then view the *Object Explorer* topic.

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

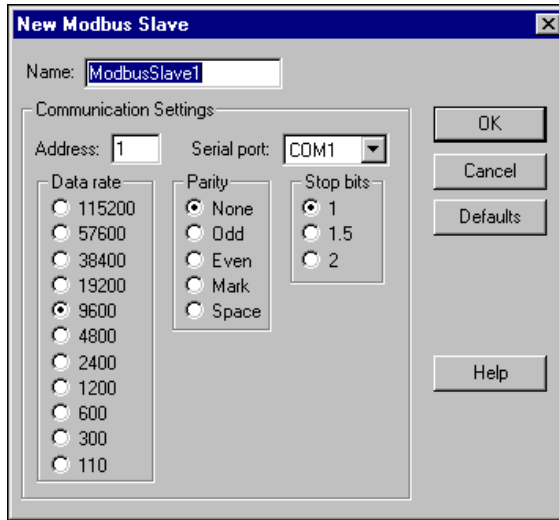
## Create a Server ModbusSlave Object



**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 Class** 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.

- 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.

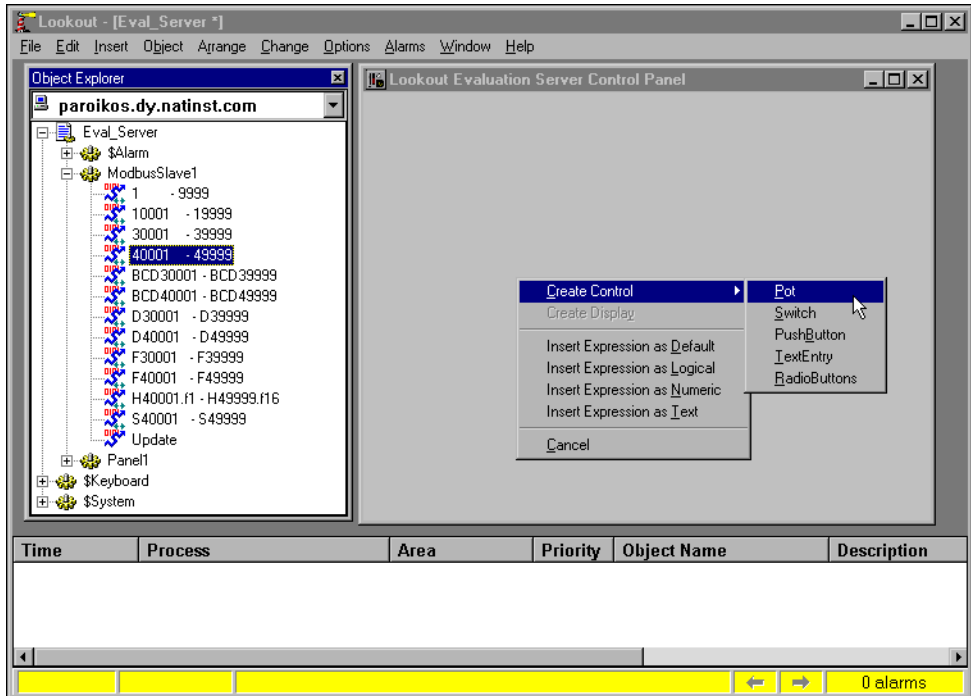
## Create and Connect a Server Pot Object to Your Modbus Slave

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 section [Create a Client Process](#), you will construct a more detailed user interface.

- 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.

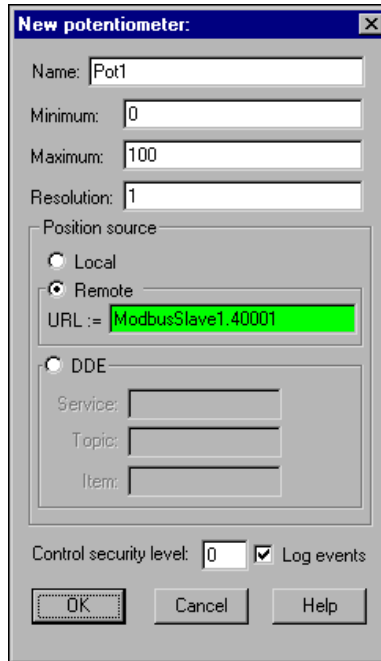
A data member is a data source or sink associated with a Lookout object. In the following steps you will display the `ModbusSlave`'s `40001` data member on your control panel. This data member might represent a particular hardware register.

- 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**.



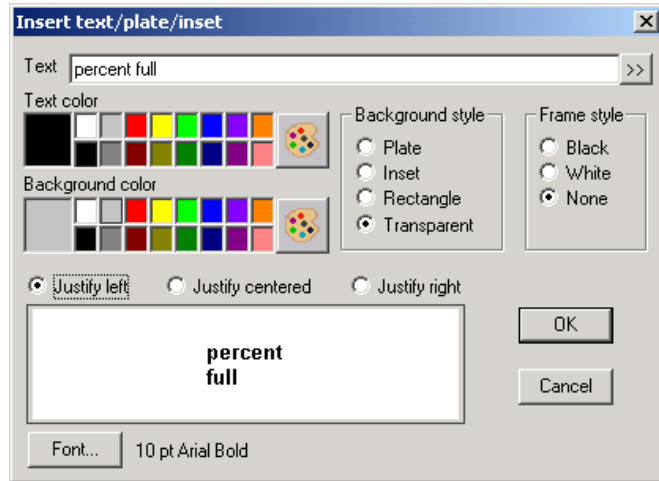
**Tip** Pot is an abbreviation for potentiometer. In Lookout, you use Pot objects to set or control analog outputs.

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.

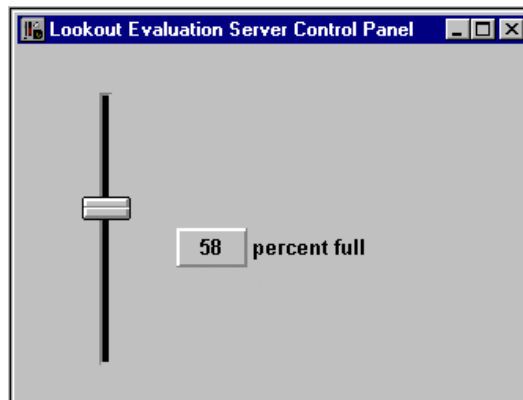


4. Accept the default values for Pot1. Click **OK**. The **Insert Pot** dialog box appears.
  5. Select the vertical slider (top row, second graphic).
  6. Select the **Use as Default** checkbox, then click **OK**. You can position your object anywhere on the control panel.
- ◆ *Lookout features easy-to-use 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 pointer to move the Pot slider up and down. Notice the number displayed in the expression changes as you move your Pot control, as shown in the following illustration. The Pot slider 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 online 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

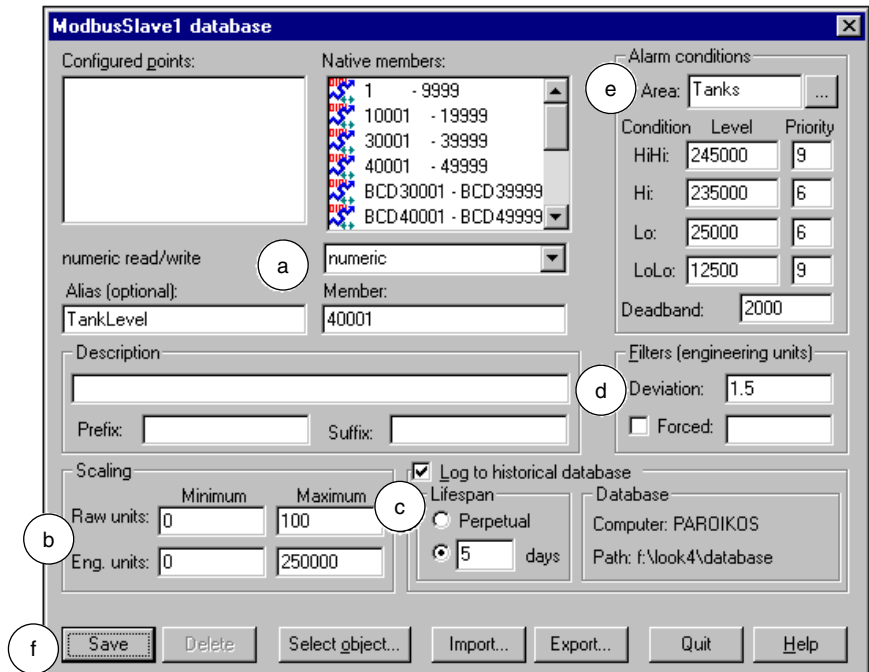
The following steps show how easy it is to configure logging, scaling, alarms, and more, for your data. You might want to show how many gallons of liquid the tank is holding, display information about the tank and its contents graphically, and trigger alarms when the tank is too full or almost empty. 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 Database**.
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 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 database editing will be used in the next exercise.)



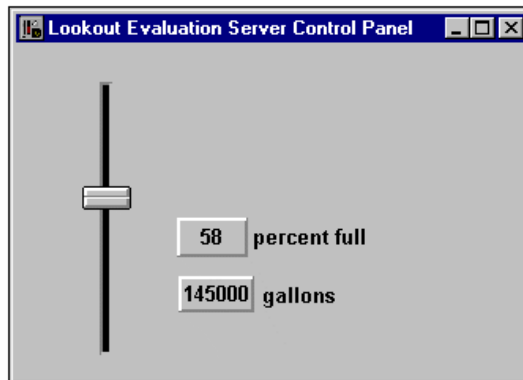
- e. Set your **Alarm conditions** as shown. Notice that Lookout lets you divide alarms into groups, called alarm areas. In this case, the alarm **Area** is Tanks.



**Tip** For more detailed information on editing the Citadel database, click the **Help** button in any Edit Database dialog box. Refer to the *Alarms and Events* topic in the Lookout help for more information on alarms.

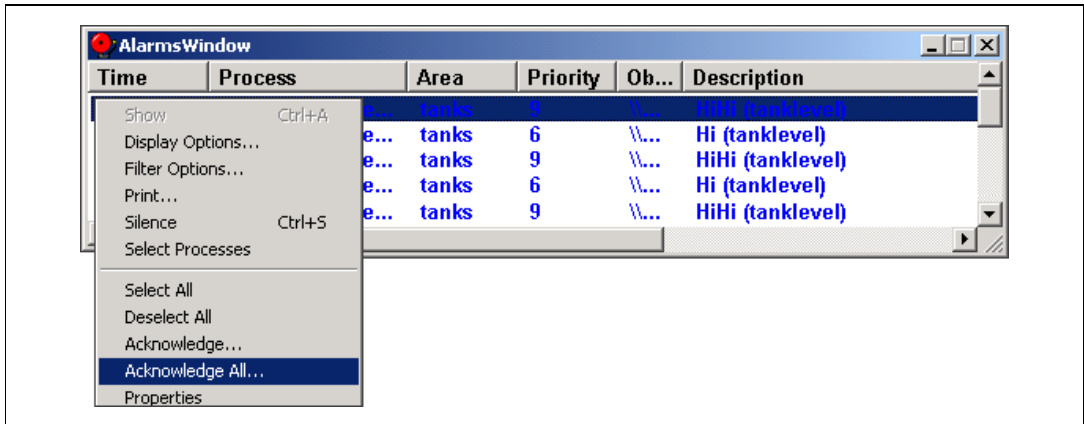
- f. Click the **Save** button (or the **Update** button if you saved earlier in the process), then click the **Quit** button to exit the database editing dialog box.
- ◆ *Set alarm points, login values, and scaling in one easy dialog box.*
    - 3. Expand the ModbusSlave1 object in the Object Explorer 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**.

- Right-click an alarm in the Alarms Window and select **Acknowledge All** to acknowledge the alarms. You can click **OK** without entering a comment.



- 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**. For a more detailed description of alarms and alarming, refer to the *Alarms and Events* topic in the Lookout Help.

## 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, view the *Security* topic in 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.

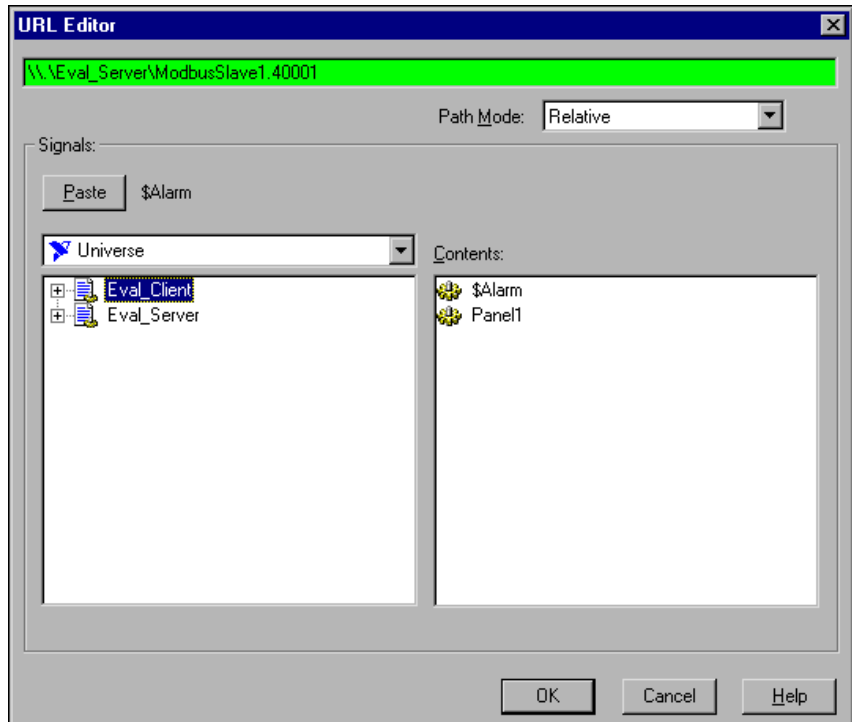
1. Launch Lookout if it is not already running, and load your `Eval_Server` process using the **File»Open** command.  
If you did not save your server process from the previous example, you can use the `Eval_Server` sample process, found in the `Examples` folder installed with your evaluation copy of Lookout.
2. Minimize your server process control panel by clicking the minimization 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 the 40001 data member in the **Contents** list. The assembled URL string `\\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.



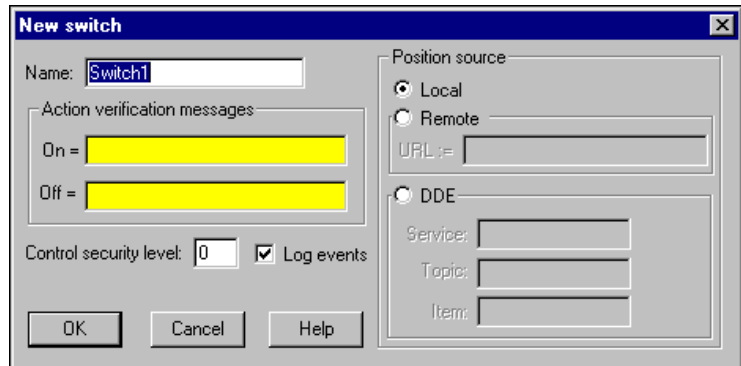
**Tip** For more detailed information on creating and editing URLs, click the **Help** button in any **URL Editor** dialog box. For more information on Lookout paths and path relativity, refer to the *Path Names in Lookout* in the Lookout Help.

- 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**.

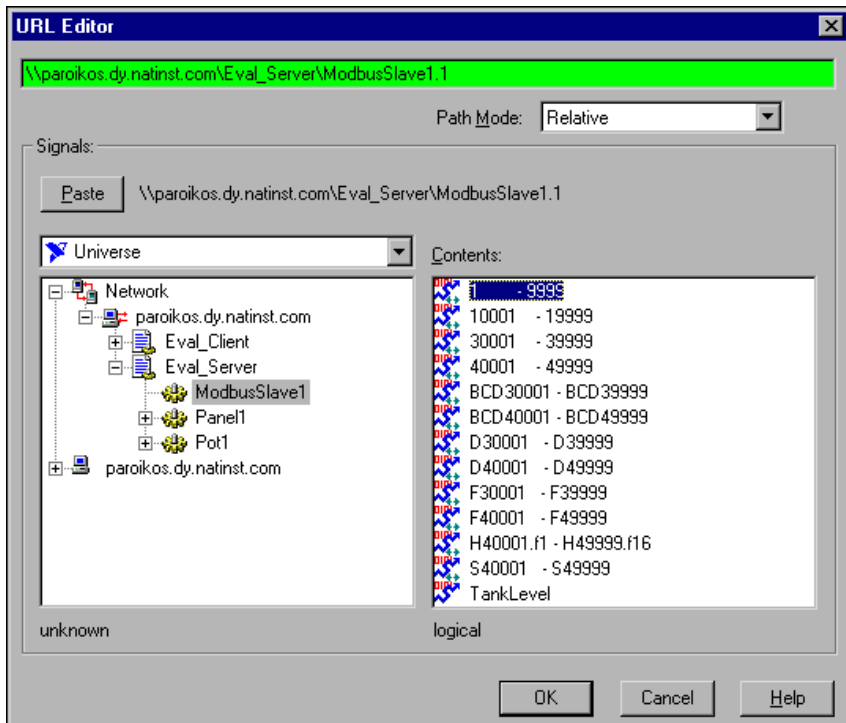
- From the **Control** folder, select **Switch** and click **OK**. The following dialog box appears.



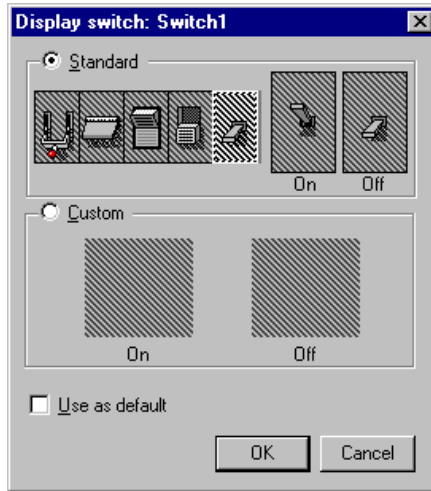
- For **Position Source**, select the **Remote** option, and right-click in the green **URL** field. The **URL Editor** dialog box appears.

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.

- 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.

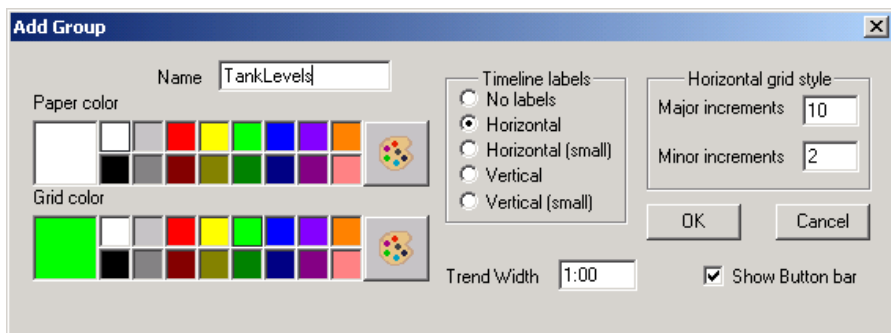
11. Press <Ctrl-Space> to leave edit mode, and operate the switch you placed on your client control panel.
- ◆ *Connecting to an I/O point across a network is as easy as connecting it from the same computer.*



## Create a HyperTrend Object

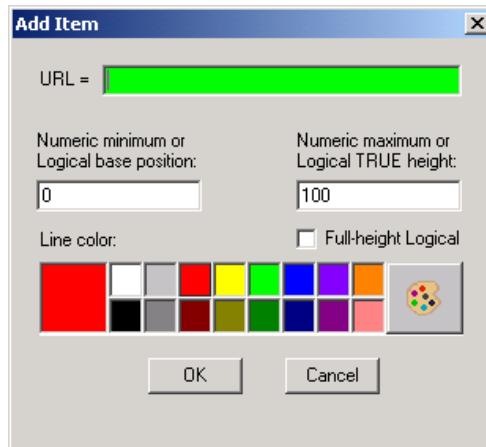
In the *Configure Data for Logging, Scaling, and Alarms* section you configured the `TankLevel` data member in your server process for scaling, and set it to be logged to Lookout's Citadel database. As long as your server process is running, Lookout is keeping track of this value in Citadel.

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.



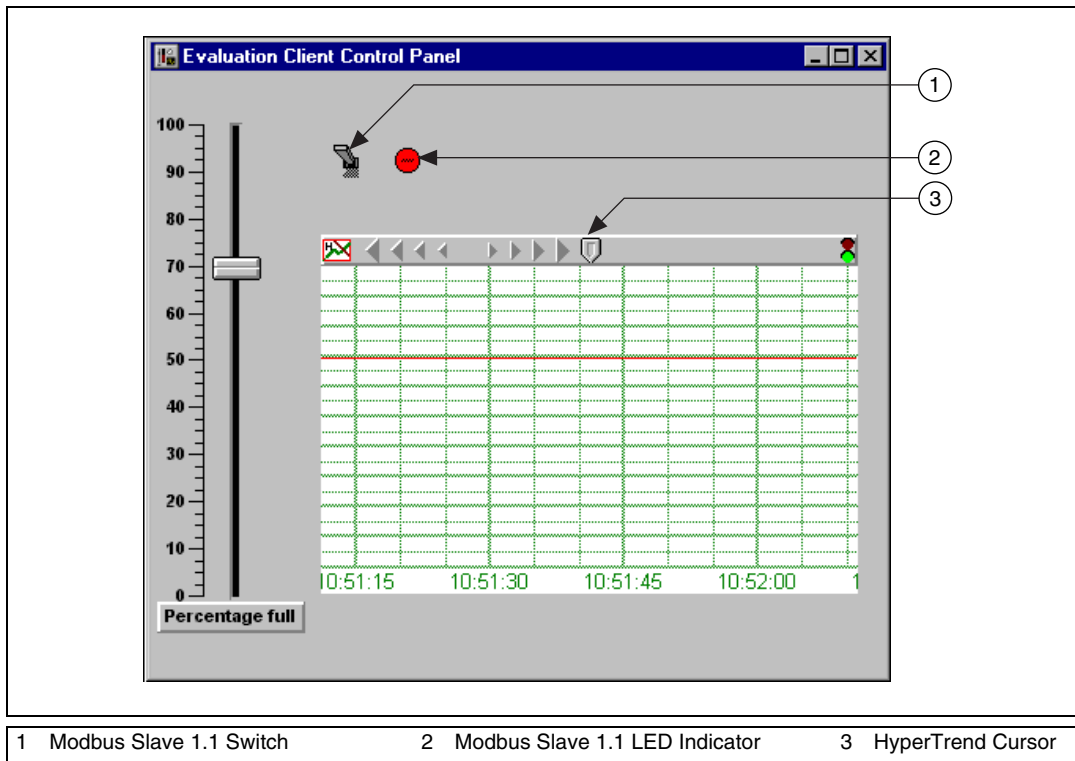
5. Name the group `TankLevels`. The default trend width is one minute; accept this and the other defaults.

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.



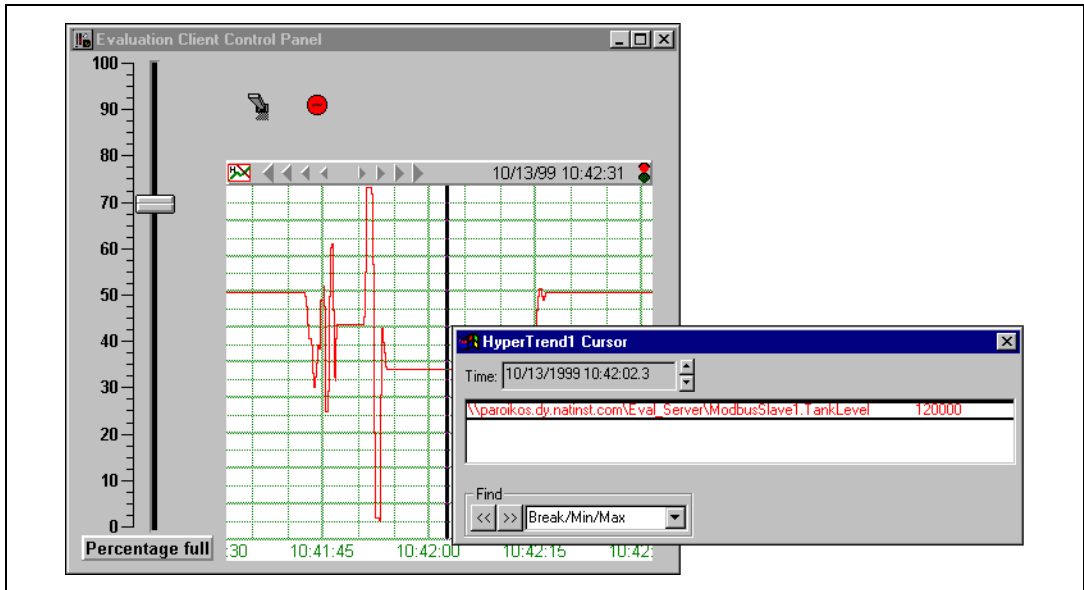
7. Set **Numeric maximum** to 250000 to match the scaled value of the data point you are about to display.
8. Right-click in the green **URL** field to activate the **URL Editor**.
9. Set **Path Mode** to **Absolute**, then under your computer name in the left tree view, select the ModbusSlave1 object in your Eval\_Server process. Select the TankLevel data member in the **Contents** list. Click on 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**.



## 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.

## 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.

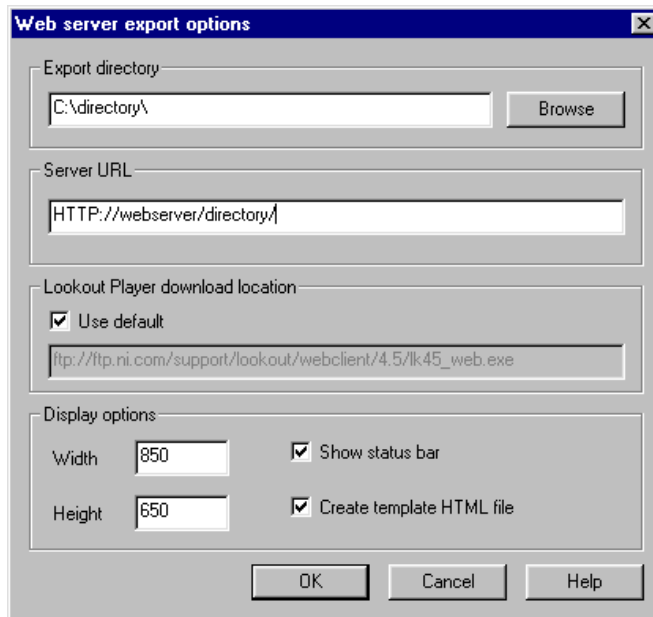
To see how you might create a Web Client, follow the steps in the next section, *Create a Web Client*. The following section, *Create an HTML Report*, shows how easy it is to create an HTML report.

### 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.



- ◆ *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 are also 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, or choose to install it from the evaluation software CD (Lookout Player directory). You need the Lookout player for any computer without Lookout installed. It will be automatically downloaded from the source you specify.
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. If you want to access the Web Client using network sharing, make sure your export directory on the server computer is shared.
12. If you want to launch the Web Client from a computer that does not have Lookout version 4.5.1 installed, install the Lookout Player version 4.5.1 from your Lookout Evaluation CD and reboot.
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. Follow these 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\continuous2 process.
2. Press <Ctrl-Space> if necessary to switch to edit mode, and create a Report object by selecting **Object»Create**, choosing **Report** (in 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 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.



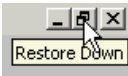
```
Report1.Display1=Global_ChemicalFeedPanel.graphic
```

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.

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



7. Click the **Restore Down** button in the top right corner of the panel, and resize the panel so that it appears as you want it to for the HTML report.
8. Save the process as `continuous_report.l4p`.
9. 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\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.l4p`, `Eval_Client.l4t`, `Eval_Client.lks`, and `Eval_Client.lka`.



**Note** For more information about Lookout file types, refer to the Lookout Help.

3. On your second computer, launch Lookout, select **File»Open**, and open `Eval_Client`. The Lookout default is to open 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.

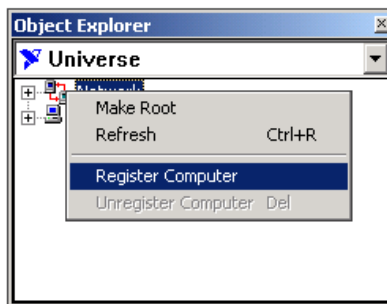
## Register Your Network Computers

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.

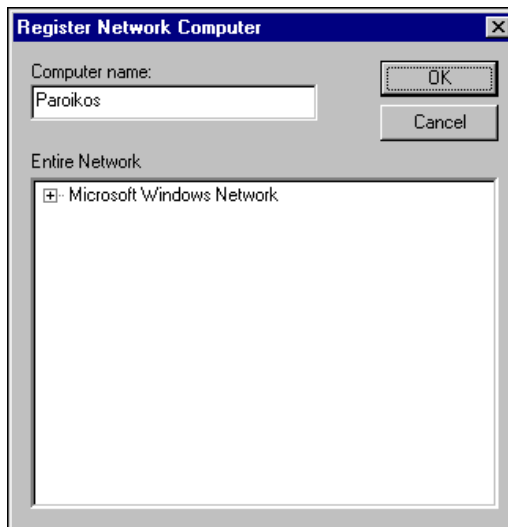
1. On the second computer, press <Ctrl-Space> to put Lookout in edit mode. Select **Object»Object Explorer** if the Object Explorer is not already running.
2. Click the name of your second computer in the window at the top of the Object Explorer, and select **Universe** from the pull down list.

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

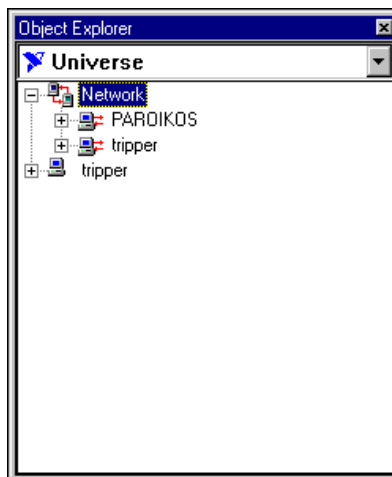
3. Register your server computer (the one running your server process) by right-clicking **Network** and selecting **Register computer**.



- In the **Register Network Computer** dialog box that appears, type 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.



- Click **OK**.
- 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 figure.

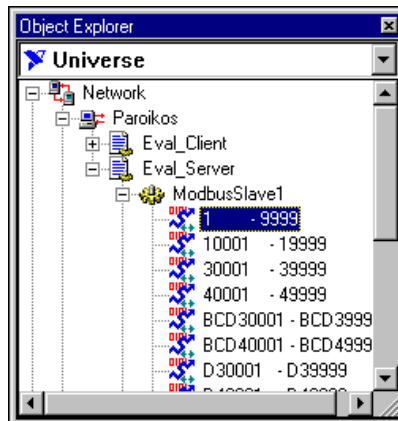


- ◆ *With Lookout you can log data to any computer on your network, and retrieve data from any computer.*

## 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 these 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.

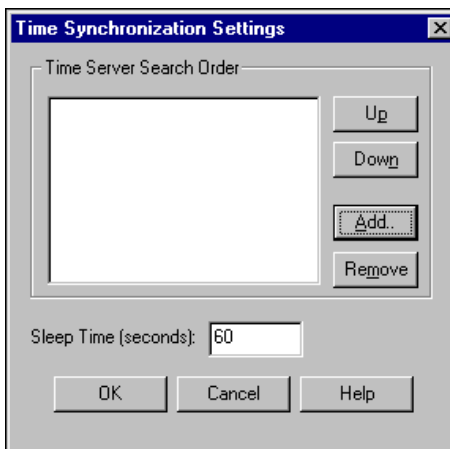


3. Drag the 1-9999 data member under the Eval\_Server Modbus Slave object to your client control panel. Notice that the new display object no longer shows the data quality alert (red X).
  4. Press <Ctrl-Space> to exit edit mode and operate your switch. If you can see your server computer, you should 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, follow these 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.

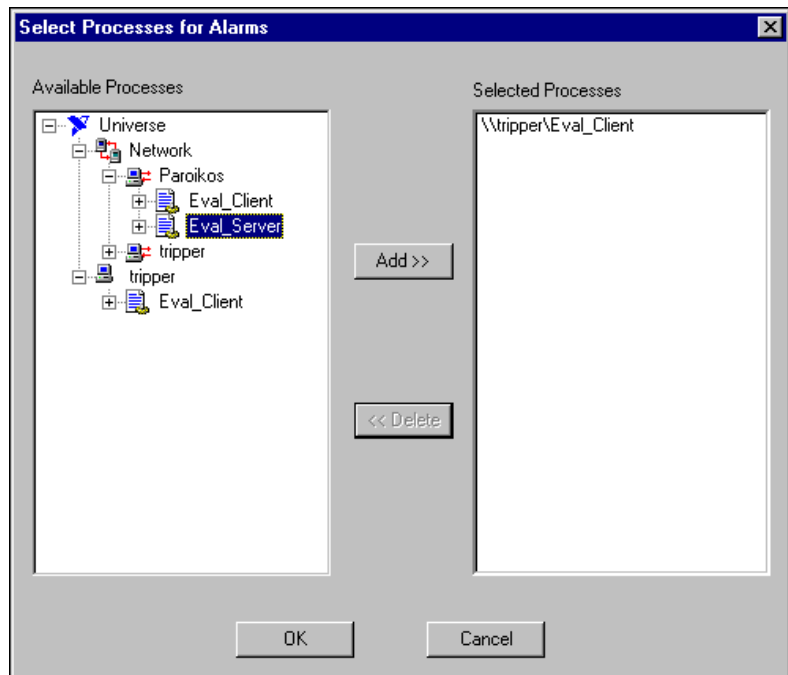


2. Click **Add**. The **Add Time Server** dialog box appears.
3. Enter the name of your server computer in the **Computer name** field. You can also browse for your computer in the **Entire Network** list.
4. Click **OK**. The **Time Synchronization Settings** dialog box reappears.
5. Set **Sleep time** 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 can now 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.

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## 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

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There are many more features in Lookout than the ones covered in this guide. Some of the other major capabilities of Lookout are SPC, 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. Lookout Help also includes a developer tour with a brief tutorial that you might want to try after completing the demonstration steps in this guide.

If you haven't yet explored the application examples, you can do so by selecting **File»Open** and in the `Examples` folder opening `home2.14p`. That process file links to each application example.

### Uninstalling the Lookout Evaluation Software

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To uninstall your evaluation copy of Lookout, select **Start»Settings»Control Panel»Add/Remove Programs**, highlight the Lookout entry, and choose to remove it. 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

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For more information about Lookout and other National Instruments industrial automation products, visit the National Instruments Web site at [ni.com/automation](http://ni.com/automation). The Lookout configurator at [ni.com/config](http://ni.com/config) can help you determine the correct software options, pricing, and part numbers to suit your application needs. You can also e-mail your questions to [info@ni.com](mailto: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 512 794 0100 to have your questions answered.

Thank you for your interest in Lookout.



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# Technical Support Resources

## Web Support

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National Instruments Web support is your first stop for help in solving installation, configuration, and application problems and questions. Online problem-solving and diagnostic resources include frequently asked questions, knowledge bases, product-specific troubleshooting wizards, manuals, drivers, software updates, and more. Web support is available through the Technical Support section of [ni.com](http://ni.com).

## NI Developer Zone

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The NI Developer Zone at [ni.com/zone](http://ni.com/zone) is the essential resource for building measurement and automation systems. At the NI Developer Zone, you can easily access the latest example programs, system configurators, tutorials, technical news, as well as a community of developers ready to share their own techniques.

## Customer Education

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National Instruments provides a number of alternatives to satisfy your training needs, from self-paced tutorials, videos, and interactive CDs to instructor-led hands-on courses at locations around the world. Visit the Customer Education section of [ni.com](http://ni.com) for online course schedules, syllabi, training centers, and class registration.

## System Integration

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If you have time constraints, limited in-house technical resources, or other dilemmas, you may prefer to employ consulting or system integration services. You can rely on the expertise available through our worldwide network of Alliance Program members. To find out more about our Alliance system integration solutions, visit the System Integration section of [ni.com](http://ni.com).

## Worldwide Support

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National Instruments has offices located around the world to help address your support needs. You can access our branch office Web sites from the Worldwide Offices section of [ni.com](http://ni.com). Branch office Web sites provide up-to-date contact information, support phone numbers, e-mail addresses, and current events.

If you have searched the technical support resources on our Web site and still cannot find the answers you need, contact your local office or National Instruments corporate. Phone numbers for our worldwide offices are listed at the front of this manual.