NATIONAL INSTRUMENTS™
Lookout™

Lookout Operator's Manual

Worldwide Technical Support and Product Information

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Conventions

The following conventions appear 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.

This icon denotes a tip, which alerts you to advisory information.

This icon denotes a note, which alerts you to important information.

This icon denotes a caution, which advises you of precautions to take to avoid injury, data loss, or a system crash.

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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Installing Lookout

This chapter explains how to install and configure the runtime Lookout software.

This manual explains how to install, configure, and use the Lookout runtime software. It assumes that you are already familiar with your operating system.

Hardware and Software Requirements

Lookout requires the following:

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

- At least 32 MB RAM

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

- Windows 98/95/Me, Windows NT version 4 or later, or Windows 2000

- Network card and TCP/IP networking installed on the computers you want to connect, if you intend to take advantage of Lookout networking

Because Lookout can run 24 hours a day, your computer should have some form of AC power surge protection. An uninterruptible power supply (UPS) provides the ultimate protection. A UPS provides complete isolation between the AC power source and the computer and has backup battery power if there are blackouts and brownouts. A quality surge protector will protect your computer from most electrical surges and spikes if you do not need battery backup.

TCP/IP Networking

You must be properly set up on a network with TCP/IP protocols installed if you want to use the networking capabilities of Lookout. If TCP/IP is not working properly on your computer, consult your system administrator.

Installing Lookout

Installing from the CD

1. Before installing, make sure you have shut down all applications that may currently be using ODBC. Such applications include spreadsheets, word processors, database programs, MS Query, and similar applications.

2. Insert the Lookout CD into your CD drive.

3. The Lookout CD-ROM has autorun capability. If for some reason the autorun fails to start the CD installation routine, click on the Start icon in the taskbar and select **Run**.

4. Enter *N*:\SETUP where *N* represents your CD-ROM drive. Then select **OK**.

   Lookout installs an ODBC driver as a part of its database capability.

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

Installing Lookout from Floppy Diskettes

If the computer you want to install Lookout on does not have a CD-ROM drive, follow these instructions for installing the software:

1. Prepare about two dozen blank diskettes: 3.5-inch, 1.4MB. Label each diskette as Disk1, Disk2, and so on.

2. On another computer with a CD-ROM drive and diskette drive, copy the files in the individual Disk*N* subdirectories on the CD onto the appropriately labeled 3.5-inch floppy diskette. Do not copy the Disk*N* directory itself onto your floppies. Copy only the contents of each directory.

3. On the computer where you want to install Lookout, insert the diskette labeled Disk1 and run the setup.exe program from the diskette.

4. Follow the installation instructions on the screen.

Registering Lookout

Be sure to register your Lookout package to receive your permanent unlock code. As an unregistered package, Lookout is limited to 50 I/O points and one client connection and only runs for 30 days.

If you are installing a free client run-time version of Lookout only, you do not have to register. If you are installing Lookout as an upgrade to an earlier version, you have already provided registration information, and Lookout opens with a request for you to log in.

In either of those cases you can skip the registration instructions.

If this is your first installation of a server or development version of Lookout on the computer you are using, or if you have any lost or corrupted your registration information, then the first time you launch Lookout, it prompts you for registration information.

Note   When you register Lookout, you unlock it for permanent use at your appropriate I/O count. If you do not register Lookout by the end of the 30 day period, it lapses to a demo system. You must complete the license agreement and mail or fax a copy of the agreement to National Instruments in order to register Lookout. Upon receipt of the registration form, National Instruments generates a key code to unlock Lookout and faxes or mails it to you.

Lookout requires a hardware key in some countries. Contact National Instruments if you are not sure whether your system requires a hardware key. If you were supplied a key with Lookout, be sure to plug it into the parallel port on your computer before activating Lookout.

Starting Lookout for the First Time

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

    A dialog box appears, asking you to register Lookout if you have not already done so. If you are ready to register Lookout, click on **OK**. The registration dialog box appears.

2. Enter your name in the **Name** field.

3. Enter the **Organization** name exactly as it appears on the key code fax sent in response to your registration, including punctuation marks. This text is used in combination with the key code, and so it must be exact.

   (If you have not yet received your key code from National Instruments, you can enter your registration data later. Select **OK** and Lookout will inform you that you have not registered your package yet. Select **OK** again until Lookout launches.)

4. Enter the **Serial Number** of your package. (This can be found on your registration form.)

5. Enter your 12-character **Keycode**. The key code is not case sensitive and you can leave the hyphens out if desired. Notice that there are no spaces near the hyphens.

Tip   You can get your keycode through the Internet by pointing your browser to `ni.com/keycode`. If you have not registered your copy of Lookout, you are guided through the registration. If you have not yet created your personal profile, you must do so before you can register Lookout.

6. After completing the entries, press <Enter> or select **OK**.

   If you enter the proper information correctly, Lookout appears on your screen with no process running.
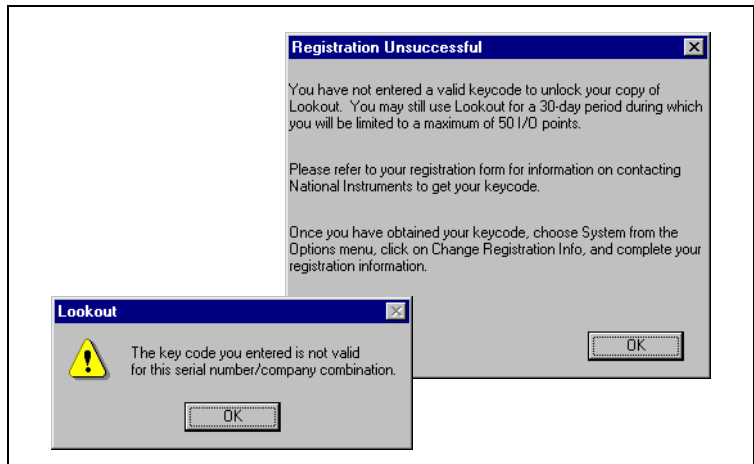
If you are certain that you typed the information correctly and Lookout does not accept it, call the National Instruments technical support line for help.

Changing Registration Information

If you want to change the number of Lookout I/O points you are using, or make other changes in system capabilities, National Instruments must send you a new Lookout keycode.

To change your registration information, select **Options»System»Change Registration Info**. Enter the new keycode in the appropriate field to unlock your additional Lookout functionality.

Adding Client Connections

You are limited in the number of client connections you are allowed to maintain in Lookout. Just as with your I/O license, you must enter a keycode.

Obtain your keycode by faxing your registration form to National Instruments, or by calling.

Unlike the I/O point registration, you can add and remove client licenses from any copy of Lookout. If you have a copy of Lookout running a server process with two clients connected and need to increase the number of client connections to three, you need only get a license for one more client connection, and enter that particular keycode in addition to the keycode that authorized your first two client connections.

To add or change client connection information in Lookout, Select
Options»System from the menu, and click on the **Change Client License**
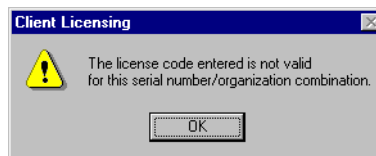button. The following dialog box appears.
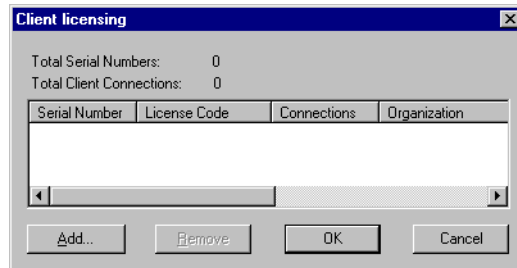
Click on the **Add** button. The following dialog box appears.
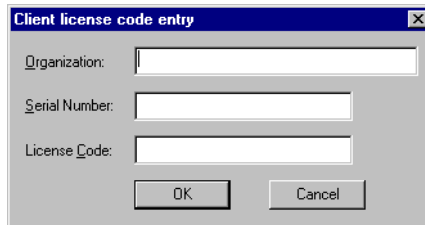
Enter your **Organization** name as you reported it in your registration
request for a client keycode. Enter the **Serial Number** of your copy of
Lookout, and the **License Code** your received. Click on **OK**.

If your registration attempt fails, the following dialog box appears.

Check to make sure you entered your organization name, serial number,
and keycode correctly. Contact National Instruments if correcting these
entries does not fix the problem.

A newly installed version of Lookout will run with one client connection
for 30 days before reverting to demo program mode.

Setting System Options

The first time you open Lookout is a good time to set some of the Lookout system options.

In Lookout, select **Options»System** from the menu bar. The **System Options** dialog box appears as shown in the following illustration.
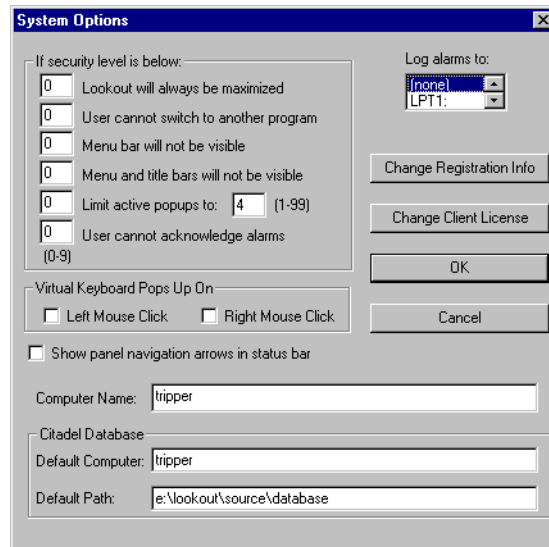

Figure 1-1. System Options Dialog Box

✎ **Note**   Only users logged on with security levels of 9 or greater can access the **System Options** dialog box.

Computer Name Setting

The computer name field shows the network name of the computer you are working on. If this field is blank, and you intend to use the networking capability of Lookout, you need to check your network settings to make sure your computer is properly named for network operations.

Citadel Database Settings

The **Citadel Database** fields set the default destination for Citadel data logged by Lookout. All processes running under a single instance of Lookout will use this data path to log data to Citadel, unless you override this setting when you create the process.

You set the **Default path** and the **Default computer** separately. Use the complete path name for the **Default path** setting, and the fully qualified computer name for the **Default computer** setting.

Virtual Keyboard Settings

Lookout features a virtual keyboard that you can access when in run mode by clicking on a control that accepts a text or numeric input. You can set whether a right-click or a left-click pops up this keyboard in the **Virtual Keyboard Pops Up On** field in the **System Options** dialog box.

Log Alarms Setting

If you have a printer directly connected to your computer, you can direct that all alarms can be printed when they occur. Set the **Log alarms to** box in the **System Options** dialog box to the communications port to which your printer is connected. You can also capture a network printer port on some Windows machines. Consult your operating system documentation for information on this procedure.

Panel Navigation Arrows

Select the **Show panel navigation arrows in status bar** checkbox if you want to use panel navigation arrows. These arrows, located in the right side of the status bar, activate control panels in the order in which you last accessed them. This feature is most convenient when you have a large number of control panels in a process and need to cycle through a subset of them several times in a short period of time.
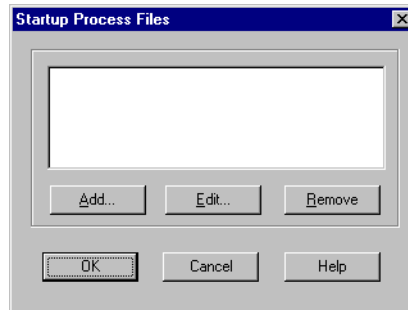
Security Level Settings

You may not have access to the security level settings. Consult your Lookout system administrator for information on these settings, if necessary.
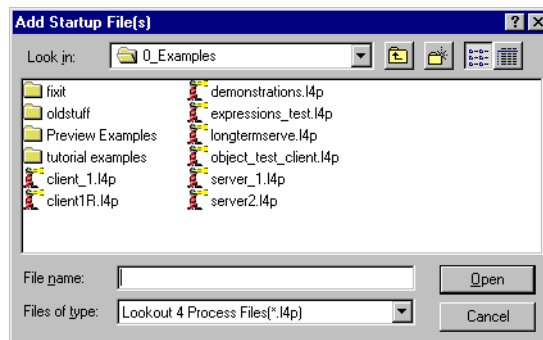
Startup Process File Setting

If your computer runs Lookout 24 hours a day, you may want to ensure that, if the computer temporarily loses power, it will automatically reboot and begin executing your processes when power returns.

To get startup processes, select **Options»Startup**, and the following dialog box appears.

Select the file you want to run when Lookout opens and click on **Open**.

You can add as many process files as you want. The files will open in the order in which they are entered in the **Startup Process Files** dialog box.

To edit a path name to a file, highlight the file name and click on the **Edit** button.

To make sure Lookout loads and runs when your computer boots or reboots, consult your operating system documentation instructions on how to set a default startup application.

2

Lookout Basics

This chapter explains how to start and get around within Lookout.

Basically, you use the mouse, keyboard, touch screens, and similar tools to manipulate controls on Lookout control panels. Most of what you do is as simple as throwing a switch or adjusting a control knob.

Some operations require you to use Lookout menu items, covered in Chapter 3, *Lookout Runtime Menu Commands*.

For specific information regarding the processes you are using, consult your Lookout administrator.

Starting Lookout

Logging on to Lookout

✎ **Note** If you are using Lookout outside of the United States, you may be required to use a hardware key. Be sure to plug the key into the parallel port on your computer before activating Lookout. If you do not, the program will not run.

Launch Lookout by selecting **Start»Programs»National Instruments Lookout»Lookout**, or double-click on the Lookout icon.

When you start or restart Lookout (after having provided registration information in your first startup), you are greeted by the log on dialog box, as shown in the following illustration.
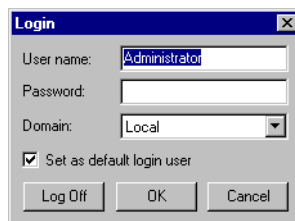
Your system administrator should have assigned you a user account name and password. Enter your user name and password.

The first time you start Lookout, you should see the following display if Lookout is not running any processes. In this illustration Lookout does not have a process file open. No monitoring or control is taking place.
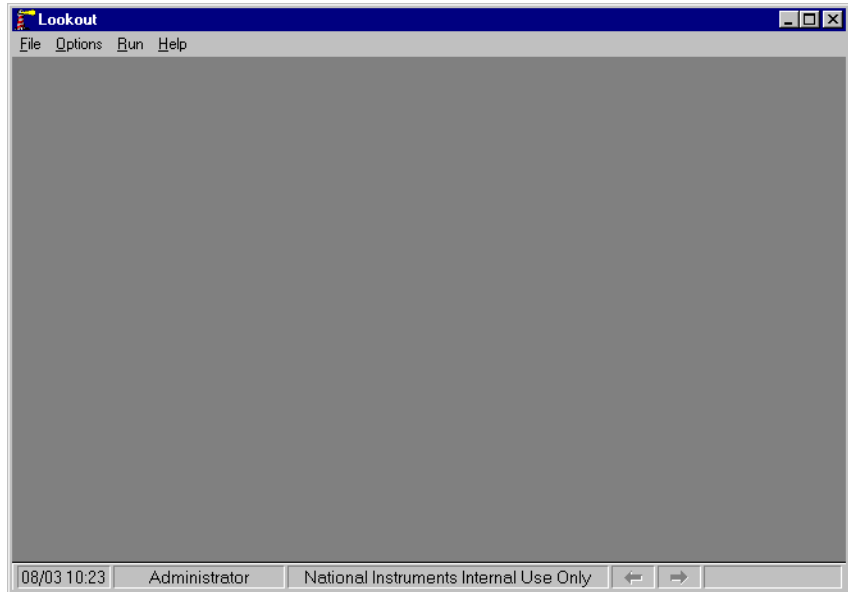
If your Lookout administrator has configured Lookout to open a process when it runs, your Lookout screen will probably contain your main control panel.

Opening a Process File

1. If you have a Lookout process file available, select the **File»Open** menu item from the Lookout menu bar.

2. In the **File name** data field, enter the name of a Lookout process file (they have a `.l4p` file extension), or choose a process file from the list and select **OK**.

If you select a valid process file, Lookout opens the file and immediately begins executing the process.

When a process file opens, Lookout makes additional menu selections available and displays control panels and the alarm window.

You can open and run as many process files at one time as you want in Lookout, and close them individually or all together. While there is no theoretical upper limit to how many process files you can run on one computer, in practical terms you may begin to see degraded performance with a very large number of processes, depending on your computer's hardware resources and other variables. Running multiple instances of Lookout on one computer, or distributing Lookout processes on networked computers can increase performance.

The Lookout Screen

Lookout first appears on your screen maximized, taking up the entire screen.

Lookout has both edit and run modes. As an operator, you will be using Lookout in Run mode only. Figure 2-1 shows a Lookout screen with process in place in run mode.
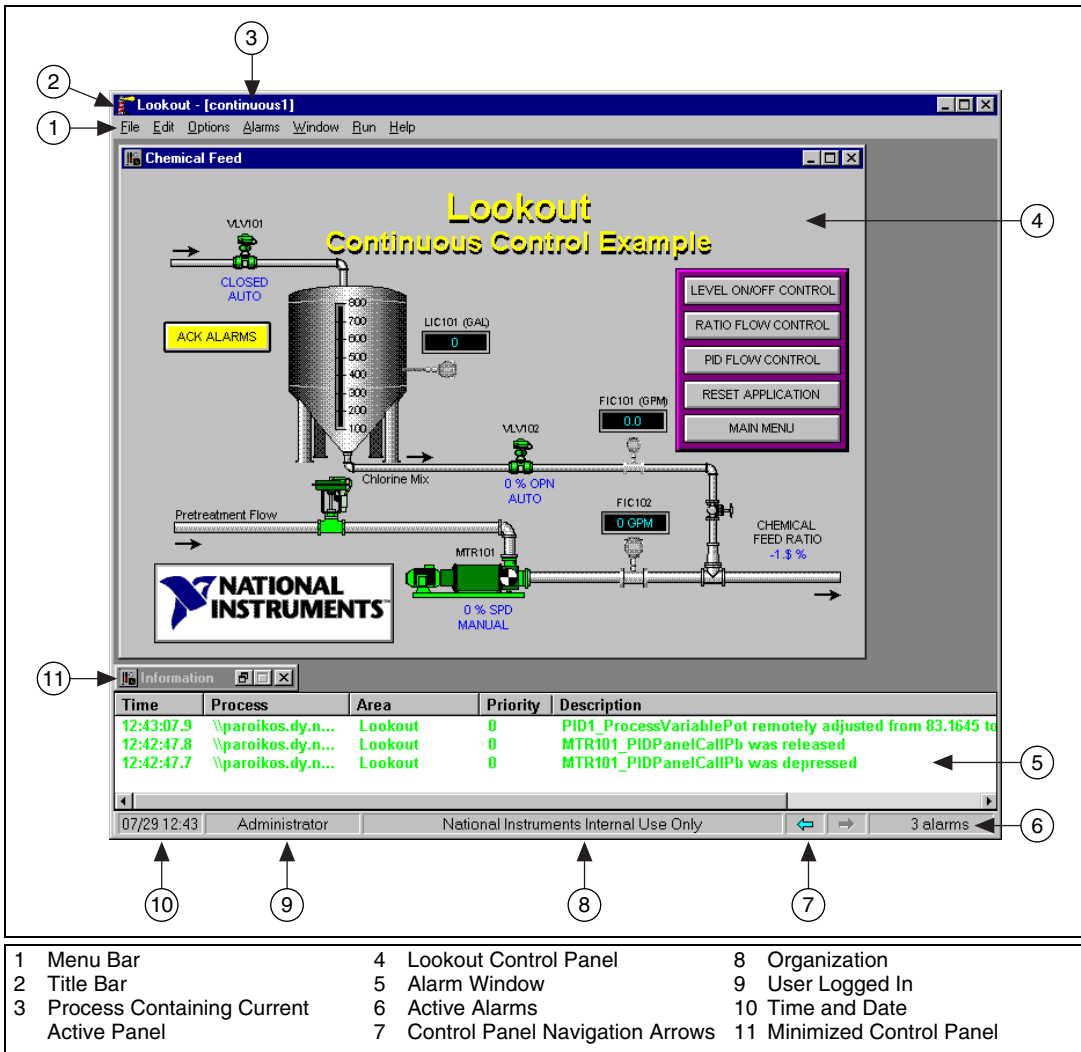
Figure 2-1. The Lookout Screen

1	Menu Bar	4	Lookout Control Panel	8	Organization

1 Menu Bar   4 Lookout Control Panel   8 Organization
2 Title Bar   5 Alarm Window   9 User Logged In
3 Process Containing Current   6 Active Alarms   10 Time and Date
   Active Panel   7 Control Panel Navigation Arrows   11 Minimized Control Panel

Title Bar

The title bar at the top of the Lookout window displays the program name and the name of the currently active process. If a control panel is maximized, the control panel name appears in the title bar.

Menu Bar

The menu bar displays the currently available menu commands. Some of these commands may or may not be available to you, depending on your security level.

Status Bar

The status bar is at the bottom of the Lookout window. When in run mode, the status bar is gray and the time and date are displayed on the left end of the bar. The account name of the currently logged on operator comes next. The company name as entered during registration appears in the middle, and the alarm status is on the right end of the status bar.

| 07/26 14:58 | Administrator | National Instruments Internal Use Only | ← | → | 0 alarms |
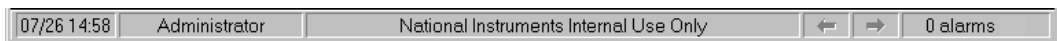
Lookout Workspace

The Lookout workspace is the area between the menu bar and the status bar. The workspace is the area in which you view and operate control panels. The alarm window also appears within the workspace. You organize and arrange control panels in this workspace area.

The visible workspace on your screen is only a window into the Lookout virtual workspace. If control panels or their associated icons are partially or completely outside the visible workspace, Lookout automatically displays horizontal and vertical scroll bars along the right side and bottom of the visible workspace. If scroll bars are visible, you can scroll around in the virtual workspace to see all of your control panels.

Control Panels

Control panels provide the display area for any collection of switches, knobs, bar graphs, digital displays, trend graphs, and other components that you want to use to visually monitor and control your operations. Panels can be full-screen, minimized, or any size in between. You can move the panels around the screen by grabbing the title bar of a panel with the mouse cursor and dragging it to a new location. Control panels can also "pop up" when an event occurs such as when a pushbutton is pressed or when an alarm is activated.

There are three types of control panels: normal, pop-up, and pop-up with no icon. A normal control panel can be maximized, normal size, or minimized within the Lookout workspace. A pop-up control panel in either

a pop-up state or minimized. When a pop-up control panel is displayed, it remains on top of all other panels until you minimize it.

Control panels do not have a standard appearance. Some control panels may only display information, while others combine control and display information. The information displayed always represents the most current values available to Lookout through its communications with your I/O devices.

Control panels are windows into your process you use to control equipment by flipping switches, pressing buttons, and turning knobs. Individual controls, as well as entire control panels may have a security level assigned to them. If your security level is below that needed to operate a control or a panel, you will not be able to make changes to that control or in that panel.

If you have permission to access the object, the mouse cursor changes into a hand when positioned over the object and the you can adjust and control the object.
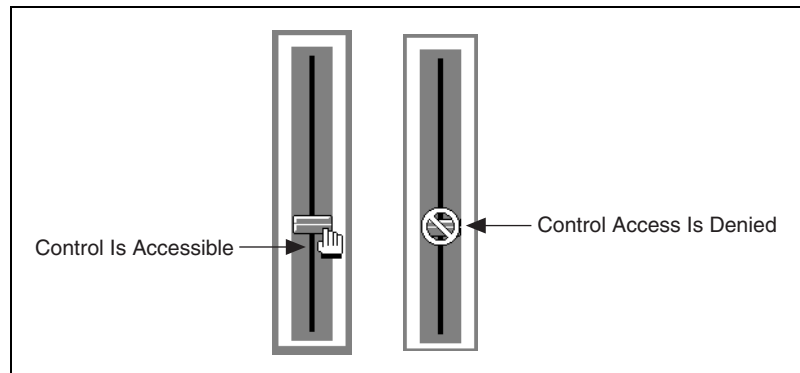
If your security level is lower than that of the object, or if you do not have permission to work in that process, the cursor changes into the symbol for forbidden, and you cannot control the object.

Lookout can place copies of a control on many different control panels. For example, when you turn a knob in one location, all copies of that knob turn at the same time, in each place that control is used. The same control object may appear differently in each location. A potentiometer may appear as a horizontal slide on one panel, a pair of increment/decrement buttons on another panel, and a knob on yet another panel.

You can have the same sort of synchronous operation between controls in different processes running on your computer, or between controls running in processes on different computers in your network. Lookout networking makes this possible.

Alarm Window

In Figure 2-1 the alarm window is at the bottom of the screen. You can choose how the alarm window is displayed by selecting **Alarms»Display Options**. In Figure 2-1 the alarm window is set to display at the bottom of the workspace.

Operator Input and Navigation

There are numerous methods for you to make setpoint adjustments or switch from one control panel to another. These include mouse, trackball, touchscreen, and keyboard activated commands.

When the cursor moves over a controllable object, the cursor turns into a hand, indicating you now have control of the object. Controllable objects include such things as switches, Pots, and pushbuttons.

When using a keyboard, the arrow keys move the cursor around the screen. The <Tab> key jumps the cursor from one controllable object to another, and the <Space> bar acts as the left mouse button, so you can click on a controllable object without actually using a mouse.

You can also use keyboard function keys to control panels and other objects, so you can switch between control panels or issue control commands just by pressing a function key.

Your Lookout administrator can provide you with any special instructions you need to work with a particular Lookout control panel.

Virtual Keypad

When you are in operating mode, you can click on a digital pot control and bring up a virtual numeric keypad to enter numeric values, either with a mouse or a touch-sensitive screen.

Virtual Keyboard

Lookout also has a virtual keyboard you can use with a touch-sensitive screen or a mouse.

To enable the virtual keyboard, select **Options»System** and then check **Left Mouse Click** or **Right Mouse Click** in the **Virtual Keyboard Pops Up** section of the dialog box.

When this feature is enabled, clicking in a data entry field or touching the field on a touch-sensitive screen displays the virtual keyboard.

Lookout Application Files

Lookout has four unique files for every application: a process file, a source code file, a state file, and a security file.

For Lookout to run a process properly, you must have the process (.l4p) and security (.lka) files for that process in your computer.

If you do not have the source and state files, Lookout can recreate these files from the other two.

Process File

A *process file* is a compiled file that contains the Lookout process you want to run. Process files are binary files with an .l4p (Lookout Process) file name extension.

Source Code File

Lookout compiles a *source code file* to create an .l4p file. Source code files have an .lks (Lookout Source) file name extension.

Because the binary format of Lookout process files both past and future is subject to change for efficiency reasons, you should always keep your .lks source files backed up. This is the file you will recompile to open a process created in an older version of Lookout with any new version of Lookout released in the future.

You can recompile Lookout source files through the **Open** command.

To compile a source file inside Lookout, select **File»Open**. The following dialog box opens.
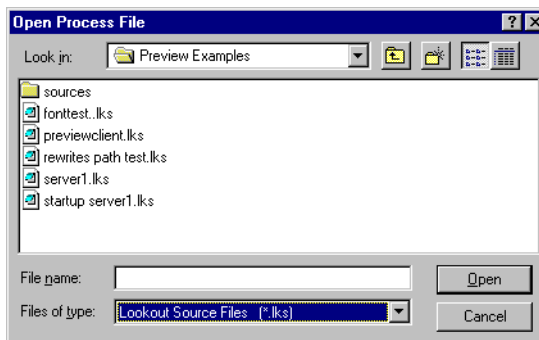
Set the **Files of type** to Lookout Source Files (*.lks) and select the source file you want to compile.

State File

The *state file* contains the actual values of object data members. These values include setpoints and other important data held within and used by objects. You might think of the state file as permanent memory for Lookout setpoints and real-time trends. Lookout uses the state file to store the position of switches, potentiometers, and trend lines. When Lookout first loads an application, it reads the appropriate state file to determine what state the pots, switches, trend lines, and so on should be in upon startup.

The state file updates any time you save, close or exit the Lookout application file. It can also update on a periodic basis as defined in the **System Options** dialog box. You invoke this dialog box by selecting the **Options»System** menu command. State files have an .l4t (Lookout State) file name extension.

Other Files

Lookout also requires security files, a lookout.ini file, and may require one or more .l4p process files that are used by other processes. Consult your Lookout administrator if you experience difficulties with these other Lookout files.
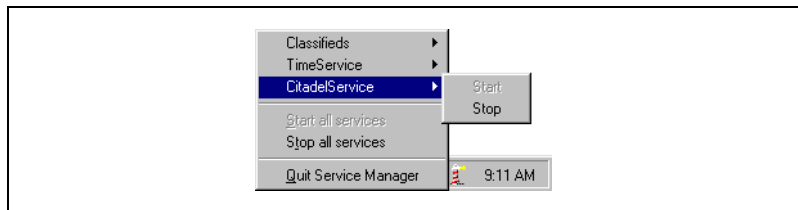
Lookout Windows Services

Lookout requires three background services that run in Windows outside of the Lookout application itself to be running on your computer while it is running: Lookout Citadel Server, Lookout Classified Ads, and Lookout Time Synchronization. In your Windows NT task manager, these services appear as *Classifieds*, *TimeService*, and *CitadelService.* Under Windows NT, these services run automatically as NT services. If you need to interact with these services, use the NT Services utility, found in **Start»Settings»Control Panel»Services**.

In Windows 98/95/Me, Lookout installs a *services manager* during installation, denoted by a small lighthouse icon at one end of your Windows task bar, as shown in the following illustration.

When you right-click on this icon you will see the following menu.

You can start or stop any of the Lookout Windows services using this tool.

3

Lookout Runtime Menu Commands

This chapter describes Lookout menu bar pull-down commands available in run mode. Some menu items may be disabled, depending on your security level.

Every menu command has a predetermined security level associated with it. Only operators whose security levels are equal to or greater than that of a particular command can access that menu command. Contact your Lookout administrator to find out what security level you have.

File Commands

File»New

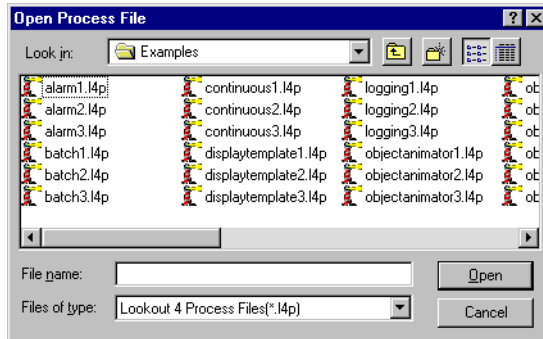Security Level: 9
Shortcut Keys: <CTRL+N>

The **File»New** command is the first step in creating a new process file. It is important to notice that you must use the **File»Save** or **File»Save As** command to save your work and create a new process file.

File»Open

Security Level: 8 or member of System Operator group
Shortcut Keys: <CTRL+O>

Use the **File»Open** command to open a process file for execution.

When you select F**ile»Open**, a dialog box pops up that you can use to select the current disk drive/directory and scroll through a list of process files. Once you find the process file you want to open, click on the file name in the file listbox or type the file name and click on the **OK** button, or just double-click on the file name in the listbox.

If for some reason Lookout refuses to load a .l4p process file, you can attempt to recompile by opening a Lookout .lks file. Select **Lookout Source Files (*.lks)** in the **Files of Type** combo box.

File»Reopen

Security Level: 8
Shortcut Keys: none

The **File»Reopen** command reloads the currently executing process from disk. This in turn clears all alarms from the alarm window. All trends and setpoints, however, retain their previous values.

File»Close

Security Level: 8
Shortcut Keys: none

The **File»Close** command halts execution of a currently loaded process file. If you are running more than one process, Lookout prompts you to select the process you want to close. You can only close one process at a time with this command.

If you made changes to your process file (such as opening the state file to recompile) and have not saved your work, Lookout first prompts you to do so before letting you close your process.

If you made no changes, or after you have chosen to save or discard any changes you may have made, Lookout then prompts you to make sure you want to close the process.

The process continues to execute until you answer **Yes**.

⚠️ **Caution**   The **File»Close** command shuts down process execution—be sure that this is what you want to do before selecting this command. Your Lookout application may be controlling critical processes, and shutting it down could cause serious problems.

File»Close All

Security Level: 8
Shortcut Keys: none

The **File»Close All** command halts execution of all currently loaded processes. Except that it closes all open processes, it works the same way the **File»Close** command does.

File»Save

Security Level: 9
Shortcut Keys: none

The **File»Save** command saves the currently executing process to disk. Lookout replaces the old process file on disk with a new version that reflects all changes made: new or deleted objects, different display characteristics, new or modified I/O connections, setpoint adjustments, and so on. This includes saving changes to the `.l4p`, `.lks`, `.l4t`, and `.lka` files. See Chapter 2, *Lookout Basics*, for more information about these files.

File»Save All

Security Level: 9
Shortcut Keys: none

Operates the same way the **File»Save** command does, except that it saves all open process files.

File»Print»Alarms and Events
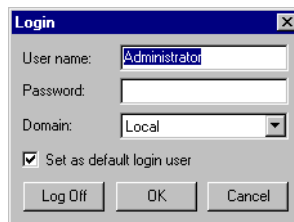
Security Level: 1
Shortcut Keys: none

Use the **File»Print** commands to print alarm and event reports. When you select one of these commands, a dialog box appears, prompting you to specify the time span to be printed. Use the **Print Range** option to specify any arbitrary time span. See the **Alarms** menu items for more details on filtering and printing alarms and events.
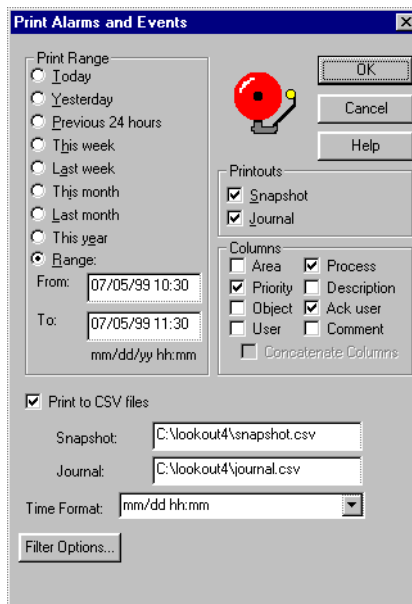
File»Log on

Security Level: 1
Shortcut Keys: <CTRL+L>

Use the **File»Log on** command to log on to Lookout as the current
operator/integrator with your predefined account name and password.

Only one person can log on at a time. You can also initiate this command
by clicking on the account box in the status bar near the bottom left corner
of the screen, where the account name appears.

File»Log off

Security Level: 1
Shortcut Keys: <CTRL+L>

The **File»Log off** command instantly logs off the current account name and leaves (nobody) logged onto the system. You can also initiate this command by clicking on the account box near the bottom left corner of the screen, where the account name appears. When the **Welcome to Lookout** dialog box appears, click on the **Log Off** button.

File»Exit

Security Level: 8
Shortcut Keys: none

The **File»Exit** command halts the executing process and exits Lookout. After you select **File»Exit**, Lookout gives you the opportunity to save the process files and asks you to verify that you want to stop the current processes.

⚠ **Caution**   The **File»Exit** command shuts down process execution—be very sure that this is what you want to do before selecting this command. Your Lookout application may be controlling critical processes, and shutting it down could cause serious problems.

Edit Command

Edit»Edit Mode

Security Level: 9
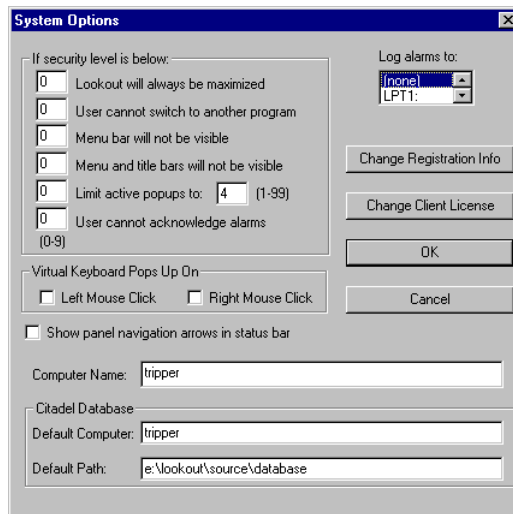Shortcut Keys: <CTRL+SPACE>

The **Edit** menu commands are only available when Lookout is in edit mode. You can use edit mode to create and/or modify a process file. Only people with a security level of 9 or membership in the Administrator group can enter edit mode. Edit mode is not available in run-time only packages.

Option Commands

Options»System

Security Level: 9
Shortcut Keys: none

The **Options»System** command is used to configure various system-level operating parameters. See the **Setting System Options** section of Chapter 1, *Installing Lookout*, for further information on configuring Lookout.

Options»User Manager

Security Level: 10
Shortcut Keys: none

Use the **Options»User Manger** command to create, revise, and delete system user accounts. This option is only available to members of the Administrator security group.

Options»Serial Ports

Security Level: 9
Shortcut Keys: none

Use the **Options»Serial Ports** command to configure your computer serial port communication topology. Each serial port can have a unique setting: **Hardwired**, **Dial-up**, or **Radio (RTS/CTS)**. Configure your serial port using the following instructions.
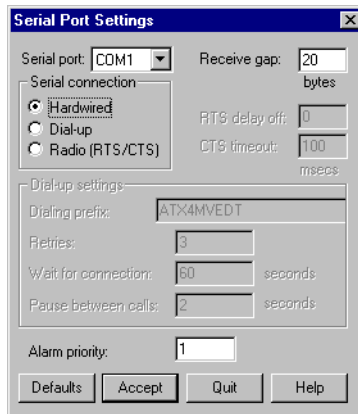
Figure 3-1. Serial Port Settings Dialog Box

1. In the **Serial port** data field, select the communication port you are defining (in this example, COM1).

2. Define the serial port parameters for the appropriate communication port. Refer to the remaining sections in this chapter for complete descriptions of the parameters.

3. Click on **Accept** to save the parameter changes for the serial port.

4. Click on **Quit** to exit the dialog box.

Selecting the Serial Port

The **Serial port** data field is a drop-down listbox. Use it to select the communication port you are defining. While software may allow many serial ports, most computers support only two serial ports without additional hardware.

Setting Receive Gap

The **Receive gap** setting is available for all serial connection types. This number specifies the number of empty bytes (or amount of time) a driver receives from a controller before the driver recognizes the end of a message frame and asks for another message. Normally, you should leave this at the default setting of 20. However, if you are experiencing garbled communication alarms, you might try increasing this number to allow more time before Lookout decides it has received a complete message. For example, with a slow baud rate of 1200, you might have to increase the **Receive gap** setting to approximately 30.

Selecting the Serial Connection

Hardwired Settings

Hardwired serial connections require no hardware handshaking for line control. Use this setting for all serial communication types except dial-up telephone and remote radio transceivers. You should also use this setting when directly connecting Lookout to the Master Repeater on a radio system or through a leased-line modem. Because a Master Repeater is a full duplex device that does not require keying and unkeying of the frequency, it acts much like a physically hardwired network. Other hardwired connection types include RS-232, RS-422, RS-485, and leased telephone lines.

Radio RTS/CTS Handshaking Settings

RTS/CTS is a local hardware handshaking mechanism between the local computer and the local communication device. Use the **Radio (RTS/CTS)** serial connection when connecting the serial port to a device that requires RTS/CTS hardware handshaking, such as a radio transceiver that must be keyed up during data transmission and unkeyed during data reception. Other half-duplex communication media such as RS-485 may require RTS/CTS hardware handshaking. Although the RTS/CTS scheme works identically for other RTS/CTS communication schemes, assume that you are communicating via radio for this discussion.

When you select RTS/CTS hardware handshaking, Lookout controls the RTS, or request-to-send pin, and monitors the CTS, or clear-to-send pin, during data transmission (pins 4 and 5 on a 25-pin RS-232 connector). Therefore, you must have at least the RTS pin (pin 4) wired *straight through* on your RS-232 cable. The CTS pin (pin 5) is optional.

Lookout initiates a serial transmission on an RTS/CTS port by first asserting RTS to key the radio. Lookout then begins monitoring the state of the CTS pin. When the radio transmitter is fully keyed and ready to transmit, the radio asserts CTS and Lookout immediately begins data transmission. If the radio does not assert CTS within the **CTS timeout** setting (default is 100 ms), Lookout assumes the radio is ready to transmit and transmits anyway.

The **CTS timeout** setting is the maximum amount of time that Lookout waits after asserting RTS for CTS before transmitting. Most radios typically take between 10 and 80 ms to key up. Consult your radio specifications and DIP switch settings to determine the key-up delay on your radio.

If your radio can assert CTS when it is ready to transmit, add about 50 ms to the radio key-up delay specification and use this total value for the **CTS timeout**. If your radio does not assert CTS, you should begin by adding about 20 ms to your radio key-up time. Then increase this value in 10 ms increments until the remote radio begins to correctly receive the first bytes of the message.

Some radios may assert CTS before they are actually ready to transmit. In this case, disconnect the CTS line (pin 5 on a 25-pin RS232 connector) and set the **CTS timeout** to a value high enough to let the radio fully key before transmission.

After it transmits the last byte of data, Lookout continues to assert RTS, keeping the radio keyed until the **RTS delay off** time period expires. You should set this value to the default of 0 ms, so that Lookout unkeys the radio as soon as possible to prepare to receive the response.

When unkeyed, most radios generate an audible squelch tail that the remote device might decode as unexpected garbage bytes. Some remote devices reject the entire message instead of just decoding the valid data and ignoring the extra garbage bytes. In this case, keep the radio keyed for several milliseconds using the **RTS delay off** setting. This time period delays the squelch tail long enough for the remote device to recognize the last data frame as valid before receiving garbage bytes caused by the squelch tail.

If you set the **RTS delay off** setting too high, the remote device begins transmitting its response before the local radio is unkeyed, causing a communication alarm in Lookout.

Dial-Up Modem Settings

Use the **Dial-up** serial connection when you use a modem in conjunction with a switched telephone line (not leased line). You can customize the dial-up settings for your particular modem and phone line.

The default **Dialing prefix** settings are based on the Hayes Corporation AT command set, which is an industry standard for data modems. The following table explains the Lookout default settings. For additional commands, refer to your modem operation manual.

Table 3-1. Dialing Prefix Default Settings

Prefix	Description
AT	Attention code that must precede all commands
X4	Result code and dialing options: X4 waits for dial tone before dialing, and recognizes busy signal
M	Speaker on or off: M for speaker always off
V	Verbal or numeric result codes: V for numeric result codes
E	Local echo mode: E for no echo
DT	Dial phone number with these modifiers: P for pulse; T for tone

When you use an external dial-up modem with Lookout, the DTR line in your cable between the modem and the computer must be wired straight through. This line is pin 20 on a 25-pin RS-232 connector and pin 4 on a 9-pin connector. Lookout uses the DTR line to command the modem to disconnect (hang up) and return to the command mode.

Some factory modems are not configured to respond to the DTR line. After Lookout first successfully dials out to a remote modem and finishes the polling cycle, it drops the DTR line, but the modem remains connected. If the modem does not respond after several seconds of Lookout attempting to raise and drop the DTR line, Lookout generates an alarm stating that the modem is not responding. If you receive this alarm message, your modem is not configured to monitor the DTR line.

The Hayes Corporation standard command for configuring the modem to hang up and enter command mode upon loss of DTR is &D2. You can use a terminal program to make this setting permanent on most modems by entering the modem command AT&D2&W to store the setting permanently in nonvolatile modem memory. Or you can just add &D2 into the **Dialing prefix**. The default **Dialing prefix** is ATX4MVEDT, so you might change it to AT&D2X4MVEDT.

Retries specifies the number of times Lookout dials the specified phone number and attempts to connect to the modem at the other end of the line. If Lookout fails to connect after the specified **Retries**, it generates an alarm and moves on to the next phone number in the polling queue (if a queue has formed).

Wait for connection specifies the length of time Lookout waits to receive a connect signal back from the modem it is calling. The time period begins when Lookout first sends the local modem the dialing prefix command. The time should be long enough for the local modem to receive a dial tone, dial the phone number, allow the remote modem to pick up the line, and send back a connect message. If the specified time is too short, your system could be operating correctly but never make a connection.

Pause between calls is the length of time Lookout waits after hanging up before it sends the local modem the next dialing prefix signal. If the specified time is too brief, your system may not hang up the existing call but instead attempt to call the next number.

Note   Your specific modems, radios, and local phone lines may operate faster or slower than the default settings. You may need to use a trial-and-error approach to find the best settings for your system.

Options»Import APT Database

The **Options»Import APT Database** command only appears if a Tiway object exists in the currently executing process file. Choose this command to import an APT tag file and create new database members for the selected Tiway object.

Options»Modbus

When you create a Modbus object, Lookout adds the **Options»Modbus** item. Selecting this item displays Modbus statistics.

# Alarm Commands

Alarms»Show

Security Level: 1
Shortcut Keys: <CTRL+A>

The **Alarms»Show** command instantly displays the alarm window as a floating style window if it is not already being displayed. You can select this command when you want to quickly and easily locate the alarm window from any location on any control panel. Notice the shortcut keystroke, <CTRL+A>. You can also call the alarm window by clicking on the alarm box in the far right end of the status bar at the bottom of the screen.

Alarms»Display Options

Security Level: 1
Shortcut Keys: none

The **Alarms»Display Options** command changes the display style of the alarm window (top, bottom, floating). You can also use this command to modify internal alarm display formats such as font, header, and various alarm information.
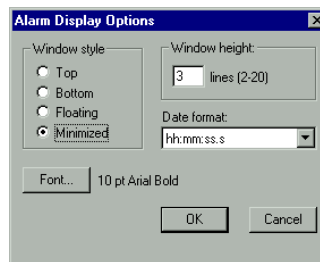
The **Window style** determines the position of the alarms window in the Lookout workspace. If you select **Floating**, the alarms window appears as a pop-up style control panel that you can resize and move on the screen. You can minimize a floating alarms window at any time. You can use the **Date format** to set how dates appear in your alarm window.

If you use either the **Top** or **Bottom** window type, the **Window height** specifies the number of alarms Lookout can display in the alarms window. The actual height of the alarms window adjusts automatically depending on the selected font and **Window height** setting. You can resize a floating alarms window at any time with the sizing border. If more alarms occur

than can be displayed in the alarms window at once, a scroll bar appears along the right side of the window.

The following illustration shows an alarms window with **Window style** set to **Bottom**, and **Window height** set to 4.

Alarms»Filter Options

Security Level: 2
Shortcut Keys: none

Use the **Alarms»Filter Options** command to filter the alarms displayed in the alarm window by group, priority, and occurrence. The following dialog box appears.

To monitor alarms with specific priorities, set the **Min** and **Max** values of the **Priority** criterion.

Setting **User Name** restricts your alarm monitoring to alarms generated while that particular user is logged on. You can only select one user name at a time, but you can use wild card characters to widen the scope of the alarms reported.

Setting **Object Name** restricts your alarm monitoring to alarms involving the name you enter. You can only enter one name at a time, but you can use wild card characters to widen the scope of those objects reported.

Setting **Description** restricts your monitoring alarms that meet your criteria. You can only choose one description category at a time, but you can use wild card characters to widen the scope of the alarms reported. The Lookout categories HiHi, Hi, Lo, or LoLo are added as a prefix to any descriptions, and are transparent to description filtering.

Setting **Area Name** restricts your monitoring to the alarm area you choose. You can only enter one alarm area at a time. (Alarm areas are the same thing as Lookout 3.*xx* alarm groups.)

Use the **Browse Areas** button to locate and select the alarm area you want to use as a filter.

You can choose to have the Lookout alarm window show alarms only, events only, or both alarms and events by checking the appropriate box in the **Show** section of this dialog box.

Use the parameters in the **Old Alarms** section to display alarms after they have been acknowledged.

Selecting **Audible Alarms** enables a sound alert when an alarm takes place. The sound depends on your Windows system setting for error sounds.
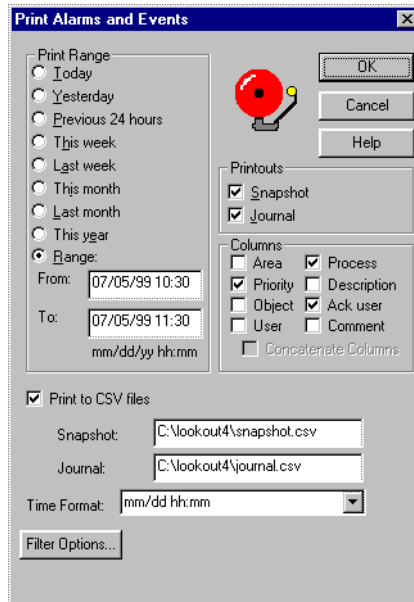
The **Alarm Alert** box in the right corner of the status bar displays the number of alarms currently visible in the alarm window.
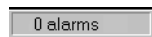
Alarms»Print

Security Level: 1
Shortcut Keys: none

The **Alarms»Print** command invokes a dialog box you can use to specify the time period of the alarms you want to print.

Select the time range you want to print alarms and events from with the items in the **Print Range** section of the dialog box. When defining your own range, you use month and day followed by hour and minute.

The **Printouts** selections determine the exact alarm information included in your printout. **Snapshot** only prints the status of alarms at the beginning of the specified **Range** but does not indicate what happened during the time span. **Journal** creates a printout of everything that happened during the time span from the beginning of the **Range**.

Specific information about each alarm is presented in columnar format. Lookout prints only the information you designate. Select which columns you want printed in the **Columns** section of the dialog box.

To print to a comma-separated file (.csv), select the **Print to CSV file** option. Enter the filenames for **Snapshot** and **Journal** files, including the path to where you want the files written. A relative path will be relative to the Lookout directory. If you enter the filename only, Lookout saves this file to your Lookout directory.

Set the format for printing times in the **Time Format** list.

You can adjust your alarm filters for printing by clicking on the **Filter Options** button to access the alarm filter options

✎ **Note**   You can print alarms as they happen by specifying a printer port in the **Log alarms to** field of the **System Options** dialog box, accessed by selecting **Options»System** from the menu bar. This works well for a printer directly connected to your computer. To print alarms directly to a network computer, you must capture a port in the network printer driver and link it to your networked printer. Consult your operating system documentation for detailed instructions on how to capture a port for a printer driver.

Alarms»Select Processes

Security Level: 1
Shortcut Keys: none

The **Alarms»Select Processes** command is a shortcut method for selecting the Lookout processes to monitor for alarms. Consult your Lookout administrator for help in selecting processes.

Alarms»Select All

Security Level: 2
Shortcut Keys: none

The **Alarms»Select All** command is a shortcut method for selecting all visible or non-filtered alarms for acknowledgment. Alarms that are not visible because of filtering or because the alarm window is minimized will not be selected. This is especially useful if your process is experiencing high numbers of alarms. Selecting each alarm individually can be very time consuming.

Alarms»Deselect All

Security Level: 2
Shortcut Keys: none

This command is a shortcut method for deselecting all alarms that are currently selected for acknowledgment. If you want to deselect only specific alarms, click on the individual alarm line.

Alarms»Acknowledge

Security Level: 2
Shortcut Keys: none

Operators select the **Alarms»Acknowledge** command to acknowledge alarms that are currently selected for acknowledgment.

If you select one or more alarms for acknowledgment, a dialog box appears for you to enter a comment concerning the alarm. Comments are optional, and you can click on **OK** to finish acknowledging alarms without entering a comment. You can search the database for alarms or print out the day's alarms based on comments, so using certain standard comments (in addition to circumstantial comments) can make the filtering process easier.
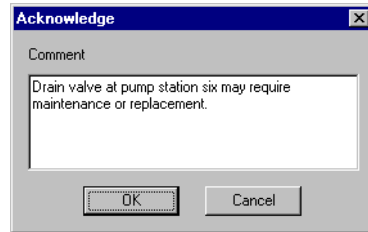
Alarms»Acknowledge All

Security Level: 2
Shortcut Keys: none

Select the **Alarms»Acknowledge All** command to acknowledge all currently active alarms.

Alarms»Properties

Security Level: 2
Shortcut Keys: none

Select the **Alarms»Properties** to see detailed information about a selected alarm. This option is also available when you right-click on an alarm in the alarm window.

Right-click on an alarm and select **Properties**. The following dialog box listing specific information about the alarm or event appears.

Alarm Properties	
Event Or Alarm:	Alarm
User at activation:	EnsignMorn
Activated:	1999-07-07 14:18:19
De-Activated:	still active
Acknowledged:	1999-07-07 14:19:19
Ack User:	MajorTom
Priority:	9
Process:	\\kali\Saturn_5_Station
Object Name:	\\kali\Saturn_5_Station\ConveyorAlarm_9_Sector_4
Area:	Saturn\Station5\Sector4\Conveyers
Ack Comment:	One of the bearing keeps jamming, and needs to be replaced. I sent Ensign Morn to rig something up until we get the parts from central.
Description:	Conveyor 9 is jammed

‹-- Previous   Next --›   Done

You can scroll through alarms and events using the **Previous** and **Next** buttons of this dialog.

Window Commands

Window»Arrange Icons

Window»Arrange Icons arranges the control panel icons across the bottom of the Lookout workspace in neat columns and rows. Lookout spaces them according to the setting for icon spacing in the Microsoft Windows Control Panel.

Window»Minimize All

Window»Minimize All minimizes all control panels and displays their icons across the bottom of the Lookout workspace.

Window»*nTitle*

The titles of all control panels appear at the bottom of the **Window** menu, each with a number you can use when selecting panels with the keyboard instead of the mouse. You can locate a particular panel by finding its title in this list and selecting it. Lookout then displays the panel in the workspace. Of course, if the panel is outside of the visible workspace, you may have to scroll around in the workspace to make the panel visible.

Window»More Windows

If you have too many control panels to fit in the **Window** menu, the **More Windows** command appears at the bottom of the **Window** menu. The **Window»More Windows** command pops up a dialog box you can use to scroll through the control panel titles and select the window to display by double-clicking on the panel title.
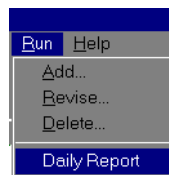
Run Commands

Run»Add

Security Level: 9
Shortcut Keys: none

The **Run»Add** command adds up to ten DOS-style commands to the run submenu list. Operators subsequently invoke these commands with a click of the mouse—without leaving Lookout. For instance, you might want to print a custom report on demand. The following example loads Excel and runs the macro daily.xlm, which pulls historical data off the hard drive, places it into a preconfigured report template, and sends it to the printer. Consult your Excel documentation for more information on writing your macros.
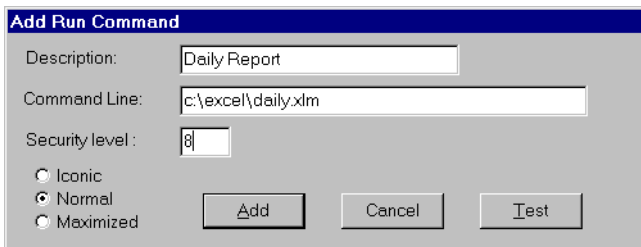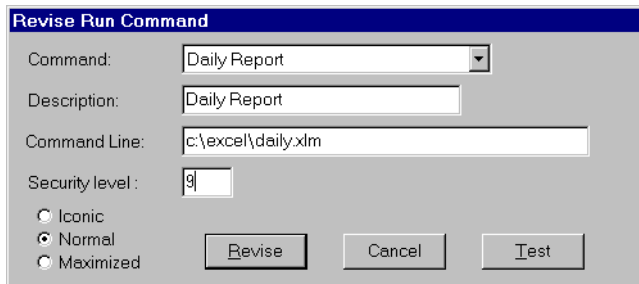
The **Security level** setting applies to any command you add or revise. This means you can configure multiple commands, some of which may only be invoked by high level operators. The following illustration shows the **Run** menu with the **Daily Report** item added.

Run»Revise

Security Level: 9
Shortcut Keys: none

Use the **Run»Revise** command to modify previously configured run commands.

Run»Delete

Security Level: 9
Shortcut Keys: none

Use the **Run»Delete** to remove previously configured run commands.

Help Commands

Help»Contents

Select **Help»Contents** to access the Lookout help system. Many of the topics in the help system apply to development of Lookout processes, but you can also find information that may be helpful for operational problems.

Help»About Lookout

Select **Help»About Lookout** to access information on the copy of Lookout you are running, the version of Windows you are running in, and the processes currently running on your version of Lookout.

A

Technical Support Resources

Web Support

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`

NI Developer Zone

The NI Developer Zone at `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

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` for online course schedules, syllabi, training centers, and class registration.

System Integration

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`

Worldwide Support

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Glossary

Prefix	Meaning	Value
m-	milli-	10^{-3}
k-	kilo-	10^3
M-	mega-	10^6

A

alarm   Software notification of a condition in a process. This alarm may call attention of a value that has exceeded or fallen below certain levels, set in the object database or in an Alarm object.

C

Citadel   The Lookout historical database that stores your data for access later.

client   A Lookout process that monitors a Lookout server process. Lookout clients should be computer independent so that they can be run from any computer on your network. Lookout server processes run on computers actually connected to your control hardware.

comm port   Term sometimes used for a serial port.

connection   Input to a Lookout object's writable data members.

control objects   Lookout objects you use to control a process, change a data value, adjust a register, and so on.

controllable objects   Lookout objects you can control with a Lookout control object.

CTS   Clear to Send. Part of a handshaking protocol for certain devices that connect the serial port of a computer.

D

data member	Data source or sink associated with a Lookout object. A readable data member, or source, may be used in expressions or as inputs to other objects. A writable data member, or sink, may have at most one connection into it, created using the **Object»Edit Connections** dialog box. A data member may be both readable and writable.
database	Collection of data stored for later retrieval, display, or analysis.
dialing prefix	Part of the Hayes AT command set for use with modems.
displayable objects	A Lookout object class that has a displayable component, such as a Pot, a Switch, or a Pushbutton.

E

edit mode	Lookout mode in which you can alter and create objects within a process. Switch in and out of edit mode by pressing <Ctrl-space> or by selecting **Edit»Edit Mode**.
Ethernet	A widely used, standardized local area networking technology, specified in the IEEE 802.3 standard.
event	Anything that happens can be an event. In Lookout, events include such things as adjusting a control value, entering or exiting edit mode, opening or closing a control panel, and logging in or logging out of the system.
expressions	Lookout expressions are often paths to a data member. They can also function like variables that, using a spreadsheet cell type formula, become capable of performing flexible, real-time math operations, condition testing, and other complex operations functions.

F

frame Sequence of bytes sent from a computer to a device or vice versa. The syntax of the frame depends on the protocol being used. A read frame contains enough information to specify a set of variables whose values the device should return. A write frame specifies a variable in the device and a new value to write into that variable. Some protocols support the writing of multiple variables in a single frame. A response frame is returned from the device to the computer, indicating whether the frame just sent to it was received successfully. If the frame just received was a read frame, the response frame contains a set of requested values.

H

hi and hihi Alarm settings. Both warn that a value has gone above some setpoint. Generally a Hi alarm is used to alert an operator of a need for intervention. A hihi alarm is usually used to alert an operator that the value has been exceeded by an even greater margin than a hi alarm indicates, and is usually used to indicate an urgent need for action.

historical logging The process of storing data in a database for use at another time, or from another location.

HOA Hand-Off-Auto control, used to set whether a value must be changed manually, is completely turned off, or functions automatically. You can use a Pot object and a complex expression to create this sort of control in Lookout, or you can use a RadioButton object, depending on the particular requirements of the task you need to accomplish.

I

I/O point Every read-only, write-only, or read-write connection Lookout makes to external hardware is counted as an I/O point. Lookout is licensed for use with a set number of I/O points. If you exceed the number you are licensed to use with your copy of Lookout, a warning message appears on your computer screen warning you to shut down one of your processes within a specified time before Lookout cuts back on I/O usage.

L

.l4p files   File extension for Lookout process files. These are the compiled files Lookout runs when it runs a process.

.l4t files   File extension for a Lookout state file, which stores the values for Lookout controls and other objects with state information.

.lka files   File extension for Lookout security files.

.lkp files   File extension for Lookout process files in versions of Lookout earlier than Lookout 4.

.lks files   File extension for a Lookout source file, which Lookout compiles to make a Lookout process file that Lookout can run. This is the file you should make sure you keep backed up in case you need to recreate a corrupted process file, or in case some future version of Lookout cannot run a process file compiled in an earlier version of Lookout.

O

ODBC   Open DataBase Connectivity, a standard application programming interface (API) for accessing a database. You can use ODBC statements to access files in a number of different databases, including Access, dBase, DB2, and Excel.

ODBC is compatible with the Structured Query Language (SQL) Call-Level Interface. ODBC handles SQL requests by converting them into requests an ODBC database can use.

P

process   In Lookout, process refers to a Lookout "program", used for industrial automation, control, monitoring, or reporting.

process file   The Lookout binary file Lookout executes when running a process. Carries the .l4p extension.

R

receive gap

A serial communications setting that determines the number of empty bytes (or amount of time) a driver receives before recognizing the end of a message frame and requesting another message.

RTS

Request to Send, part of a handshaking protocol for certain devices that connect the serial port of a computer.

S

security accounts

Also called user and group accounts, Lookout uses security accounts to define what users or group of users have different operation privileges in Lookout.

server

A process that provides data (services) to client processes. In Lookout, server processes are intended to be run on one computer only, with direct connections to field hardware. Client processes interact with field hardware through server processes.

source file

Lookout file that can be compiled to produce a binary Lookout process file that runs a process. Uses a `.lks` file extension.

state file

The Lookout file that stores the value of all Lookout control parameters and object data members in use in a process. Uses the file extension `.l4t`.

system objects

Lookout objects used to control other objects or process and analyze data.

T

TCP

Transmission Control Protocol, a method (protocol) for sending data between computers. Used with IP, the Internet Protocol.

TCP/IP

TCP/IP sends data as packets, with IP handling the delivery of data and TCP keeping track of the individual packets.

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