



NATIONAL INSTRUMENTS™
LabVIEW™

Getting Started with the LabVIEW Datalogging and Supervisory Control Module

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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.



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.

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Introduction to the LabVIEW Datalogging and Supervisory Control Module

The LabVIEW Datalogging and Supervisory Control module is an add-on to LabVIEW that adds features and capabilities to help you create high channel count applications. It provides solutions for supervisory control of a wide variety of distributed systems using the flexibility of graphical and LabVIEW programming.

Why Should I Use the LabVIEW Datalogging and Supervisory Control Module?

The LabVIEW Datalogging and Supervisory Control module adds the following features and capabilities to LabVIEW:

- Configuration utilities and wizards
- Real-time database
- Historical data collection and trending
- Alarm and event reporting and logging
- Security
- Connection to PLC and industrial device networks
- OPC server and client
- Connection to a wide selection of device servers

How Does the Datalogging and Supervisory Control Module Work?

You build applications with the LabVIEW Datalogging and Supervisory Control module the same way you build them in LabVIEW, with added controls, functions, and utilities that help you accomplish certain tasks more efficiently.

Controls and Indicators

The LabVIEW Datalogging and Supervisory Control module installs the following subpalettes on the **Controls** palette.

- **Vessels**—Several tanks, a hopper, and a bin. All objects on this subpalette are numeric.
- **Pipes, Pumps, & Valves**—Various Boolean pipe, pump, and valve objects.
- **Alarms and Events**—A set of displays, formatting tools, and summary tools for handling alarms and events.
- **Trends**—Historical trend XY graph and real-time trend waveform chart.
- **DSC Server Data Types**—Various server objects, including item spec, output queue data, input queue data, item access rights, and group spec.

Functions

The LabVIEW Datalogging and Supervisory Control module installs the following subpalettes on the **Functions** palette. Refer to the *LabVIEW Datalogging and Supervisory Control Module Help* for more information about the VIs and functions on these subpalettes.

- **Tags**—Use these VIs and functions to read the most recent value of a tag, write a new value to a tag, or obtain data for a real-time trend.
- **Alarms & Events**—Use these VIs to acknowledge alarms, display alarm summary or event history information, or obtain alarm summary status.
- **Tag Attributes**—Use these VIs to read and write tag configuration parameters programmatically.
- **Historical Data**—Use these VIs to read and write historical data about a tag, to resample trend data, compute statistical data for a historical trend, or convert historical trend data to a spreadsheet.

- **Historical Data»Data Set Logger**—Use these VIs to programmatically perform data operations that you perform interactively using the Citadel Historical Viewer.
- **System**—Use these VIs to obtain information about or monitor the access level of current operator, launch or shut down LabVIEW, and enable or disable event logging, historical datalogging, or printing.
- **System»Security**—Use these VIs to implement security in your application.
- **DSC Server Development**—Use these VIs to configure the server interface and server registration programmatically.

Utilities

The LabVIEW Datalogging and Supervisory Control module installs the following tools and utilities.

Tag Utilities Toolbar

Use the **Tag Utilities** floating toolbar to open other LabVIEW Datalogging and Supervisory Control module utilities without selecting them through the menus.

Tag Configuration Editor

Use the Tag Configuration Editor to create, edit, or delete all of the tags in the LabVIEW Datalogging and Supervisory Control module system and to configure Tag Engine parameters. The Tag Configuration Editor records all tag information and Tag Engine parameters and stores it in a configuration (.scf) file. The Tag Engine reads this file to determine all of the configuration parameters for execution.

Tag Monitor

Use the Tag Monitor to monitor the value, timestamp, alarm state, and connection status for selected tags in the system and to write the value to an output or input/output tag.

Tag Engine

The Tag Engine runs as a separate process, independent of the HMI application, communicating between device servers on one end and the HMI application at the other end.

The Tag Engine performs the main tasks for the LabVIEW Datalogging and Supervisory Control module, including the following:

- Communicates with device servers
- Scales and initializes data
- Processes alarms
- Logs alarms and events to the Citadel historical database
- Collects and trends historical data

Citadel Historical Database

Citadel is a National Instruments database used by the LabVIEW Datalogging and Supervisory Control module, Lookout, and other National Instruments products. It efficiently stores data acquired and processed by applications.

Historical Trend Viewer

Use the Historical Trend Viewer (HTV) to view the data stored in the Citadel database.

Real-Time Database

The real-time database (RTDB) is a snapshot of the state of all tags defined in the active `.scf` file. The RTDB stores the tag values, status, date, time, and alarm information.

User Account Manager

Use the User Account Manager to set up and edit individual accounts for users and groups of users who use either the LabVIEW Datalogging and Supervisory Control module or the applications you create with it. Use the User Account Manager to create an account for a user, assign a password, control how long the password is valid, set the security level for that user, and determine which security group or groups that user belongs to.

Server Browser

In the LabVIEW Datalogging and Supervisory Control module, a *device server* is an application that communicates with and manages I/O devices such as PLCs, remote I/O devices, remote Tag Engines, and data acquisition (DAQ) plug-in devices. These servers read selected input items and write to them on demand. Use the Server Browser to see the device servers in a computer and in other computers on the network. You can view

server information and display the front panel of VI servers (if the server is running), launch server configuration software for compatible servers, change OPC settings, and unregister a server.

Image Navigator

Use the Image Navigator to browse through a collection of images you can use to create front panels.

Where Do I Start?

If you are not familiar with LabVIEW, start with the LabVIEW documentation, tutorial, and examples. When you are familiar with LabVIEW, complete the activities in this manual. You can also refer to the *LabVIEW Datalogging and Supervisory Control Module Developer's Manual* and the LabVIEW Datalogging and Supervisory Control Help. For additional guidance, you can study the LabVIEW Datalogging and Supervisory Control module examples in the `LabVIEW 6\Examples\lvdsc` directory.

Graphical User Interface

This chapter teaches you how to create a graphical user interface using the LabVIEW Datalogging and Supervisory Control module.

You will learn to do the following:

- Open and run a VI to explore the functionality of the LabVIEW Datalogging and Supervisory Control module
- Build a front panel using LabVIEW Datalogging and Supervisory Control module features
- Connect front panel controls to a server

Open and Run a VI

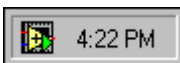
This activity helps you familiarize yourself with the functionality of the LabVIEW Datalogging and Supervisory Control module.



You can complete this activity in approximately 5 minutes.



1. Select **File»Open**, and open the **Manufacturing VI** in the LabVIEW 6.1\examples\lvdsc\apps\Manufacturing\Manufacturing.llb.
2. Click the **Run** button to run the VI.
3. Click the **Login** button on the front panel of the VI and type `Guest` in the **Username** field of the **User Login** dialog box. Click **OK**.
4. Click the **HMI** button on the front panel of the VI to view the Cable Assembly application that simulates controlling a manufacturing production line.
5. Click the labeled buttons on the Cable Assembly panel to view the various capabilities of the LabVIEW Datalogging and Supervisory Control module, such as historical datalogging.
6. Stop the VI.
7. Stop the Tag Engine by right-clicking the **Tag Engine** icon on the Windows taskbar and selecting **Stop**.



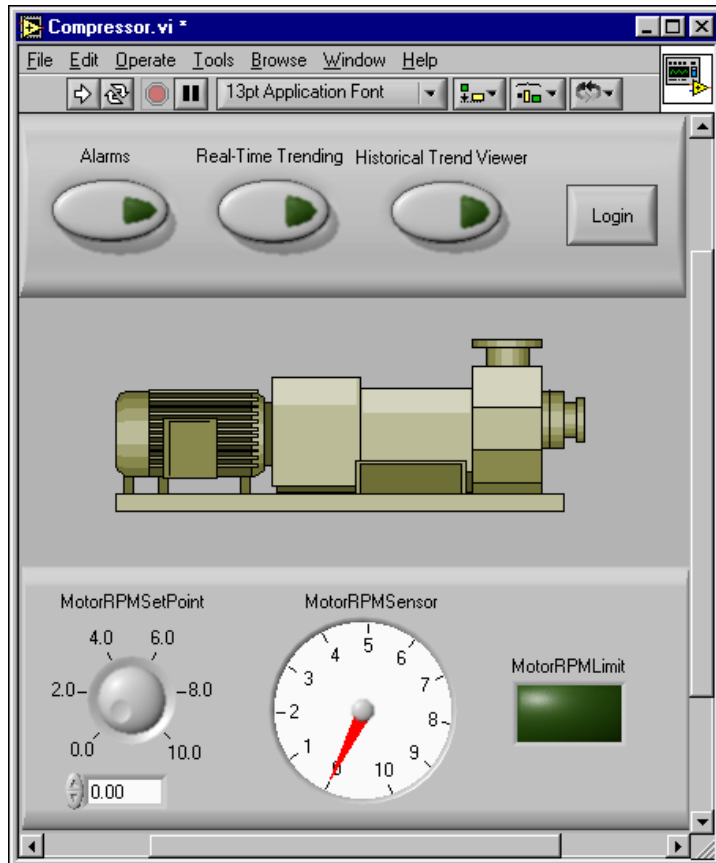
Build the Graphical User Interface

This activity teaches you how to build a simple front panel to interface with the OPC Demo server.



You can complete this activity in approximately 10 minutes.

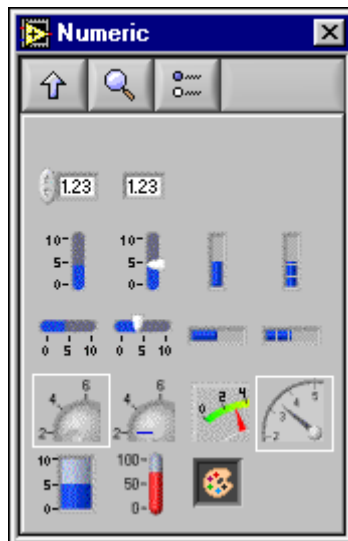
Build the front panel as shown in the following figure.



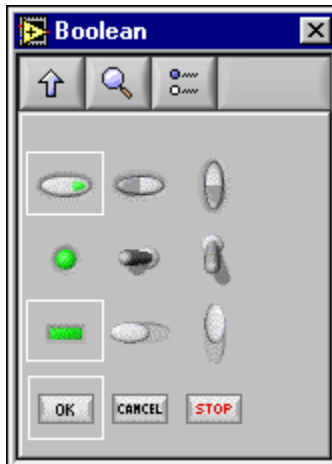
1. Create a new VI by selecting **New VI** from the LabVIEW dialog box, or by selecting **File»New VI** from the front panel or block diagram. Make sure to display the **Tools** palette by selecting **Windows»Show Tools Palette**, and Tag Utilities toolbar by selecting **Tools»Datalogging & Supervisory Control»Show Toolbar**.



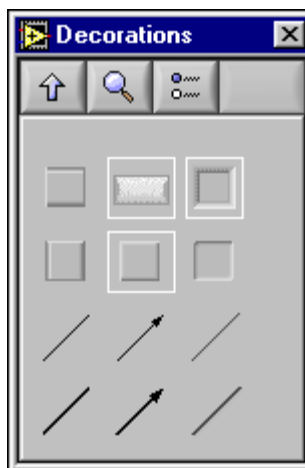
2. Click the **Image Navigator** button on the Tag Utilities toolbar to launch the Image Navigator, a feature of the LabVIEW Datalogging and Supervisory Control module.
3. Select **Pumps** from the **Categories** list of the Image Navigator. Select the **Heavy-duty plastic centrifugal pump** from the **Symbols** box. Click **Options** if you want to change the color and orientation.
4. Click **Copy** and close the Image Navigator.
5. Select **Edit>Paste** to place the graphic on the front panel.
6. Navigate to the **Numeric** subpalette of the **Controls** palette, as shown in the following figure.



7. Select and place a **Knob** on the front panel. To show the digital display, right-click the Knob and select **Visible Items>Digital Display**. Select and place a **Gauge** on the front panel.
8. Navigate to the **Boolean** subpalette of the **Controls** palette.



9. Select and place the **Square LED** from the **Boolean** subpalette on the front panel, and label it `MOTORRPLimit`. Select and place three **Push Button** controls on the front panel. Select and place the **OK Button** on the front panel, and label it `Login`. Use the Text tool to change the button text.
10. Navigate to the **Decorations** subpalette of the **Controls** palette.



11. Add decorations to the front panel to recreate the front panel shown at the beginning of the exercise. Use tools from the **Tools** palette to resize and label front panel objects. Refer to the LabVIEW Help for more information about the **Tools** palette.



Note If the label is not present, right-click the object and select **Show Label** from the shortcut menu.

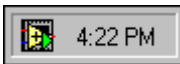
12. When your front panel matches the front panel shown in step 1, select **File»Save** and save as `Compressor.vi` in the `LabVIEW 6.1\examples\lvdsc` folder.

Connect the Front Panel Controls to the OPC Demo Server

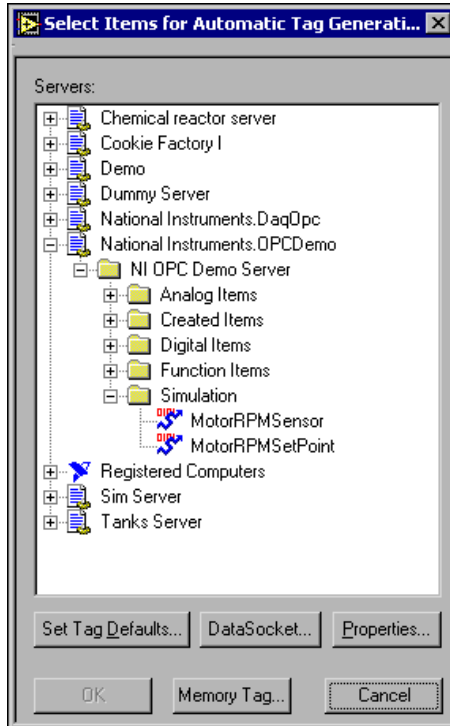
This activity demonstrates how to connect the OPC Demo server I/Os with the controls and indicators on the front panel of the **Compressor VI** created in the previous section.



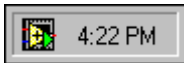
You can complete this activity in approximately 5 minutes.



1. Make sure that the Tag Engine is not running when you open the Compressor VI. If it is, right-click the **Tag Engine** icon in the Windows taskbar and select **Stop**.
2. Open the **Compressor VI** and display the **Controls** palette, **Tools** palette, and Tag Utilities toolbar.
3. Click the **Start Tag Configuration Editor** button, on the Tag Utilities toolbar, to launch the Tag Configuration Editor. Select **File»New** to create a new `.scf` file.
4. Save the file as `Compressor.scf` in the `LabVIEW 6.1` folder. Click **OK** in the **SCF Logging Paths** dialog box. Close the Tag Configuration Editor.
5. Right-click the Knob and select **HMI Wizard**. The **HMI Wizard for Analog Control** dialog box appears.
6. Use tags to create and maintain a connection to a real-world I/O point. Click the **Create New Tag** button in the **HMI Wizard for Analog Control** dialog box to select the item you want to connect to.
7. Select **National Instruments OPCDemo»NI OPC Demo Server»Simulation»MotorRPMSetPoint**, as shown in the following figure. Click **OK**.



8. Click **OK** again. The configuration file is saved. Click **OK**.
9. Repeat steps 5 through 7 for the Gauge, selecting **MotorRPMSensor** from Simulation this time. The LED will be connected later.
10. Click the **Run** button to run the VI. This launches the Tag Engine.
11. Turn the MotorRPMSetPoint knob and notice that the MotorRPMSensor adjusts accordingly.
12. Click the **Stop** button to stop the VI. Save and close the VI.
13. Right-click the **Engine Manager** icon and select **Stop** to stop the Tag Engine.



Note When you build your application, you can also use the Tags VIs and the Tag Attribute VIs on the Functions palette to read tag values, write to tags, access their attributes, and perform other tag operations.

Real-Time Trending

This chapter teaches you how to view data values using the LabVIEW Datalogging and Supervisory Control module Real-Time Trend capabilities.

View Real-Time Data

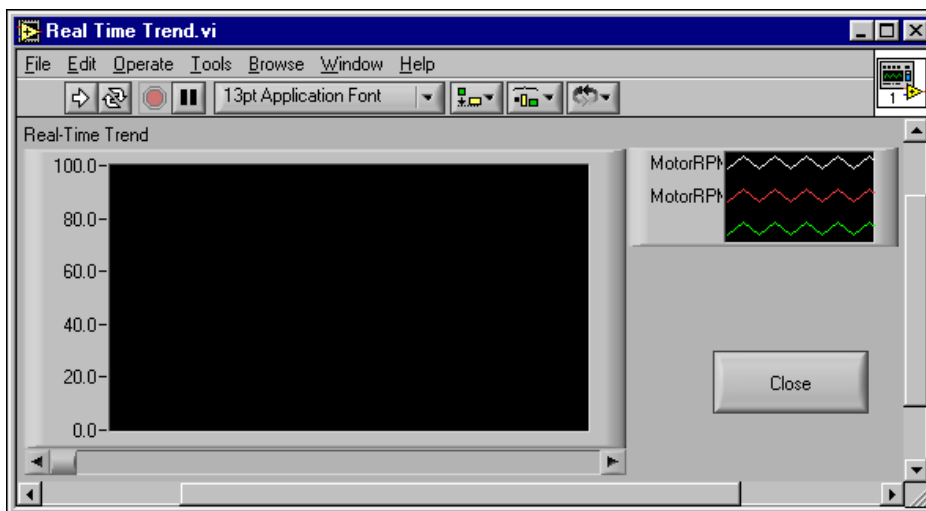
This activity demonstrates how to view real-time data using a Real-Time Trend.



You can complete this activity in approximately 7 minutes.

Create the Real-Time Trend Viewing Panel

Build the following front panel.



1. Select **File»New** from any open window or click the **New File** button on the Tag Utilities toolbar.
2. Display the **Tools** palette by selecting **Windows»Show Tools Palette** and the **Controls** palette by right-clicking anywhere on the front panel.

3. Select and place the **Real-Time Trend** from the **Trends** subpalette on the front panel and label it Real-Time Trend.



4. Right-click the **Real-Time Trend** and select **HMI Wizard**. Select **MotorRPMSensor** and click **Add** to add it to the **Tag List**. Repeat for **MotorRPMSetPoint**. Click **OK** to close.
5. Select and place an **OK Button** from the **Boolean** subpalette on the front panel.



6. Save this VI as Real Time Trend.vi in the LabVIEW 6\examples\lvdsc folder.
7. Right-click the **OK** button and select **Panel Wizard**. Select **Close this Panel** from the **With this Control** pull-down menu. Click **OK** to close the **Panel Wizard** dialog box.
The button text changes from OK to Close.
8. Save the VI.

Connect the Viewing Panel to the Application

1. Open the **Compressor VI** that you created in Chapter 2, *Graphical User Interface*. You will use this VI to make a connection to the Real-Time button.
2. Right-click the **Real-Time Trending** button and select **Panel Wizard**.
3. Select the **VI** radio button on the **Panel** tab. Click **Browse** then navigate to, and double-click **Real Time Trend.vi**. Click **OK** to close the Panel Wizard.

Notice that the button text has changed to Real Time Trend.vi.



4. Click the **Run** button to run the Compressor VI. To view the real-time trends, click the **Real-Time Trending** button. Now, you can see the real-time trend of the tags. Move the knob on the front panel and notice the movement of the gauge.
5. Stop and save the Compressor VI and the Real Time Trend VI.

Historical Logging

This chapter teaches you how to log and view data values with the LabVIEW Datalogging and Supervisory Control module special features.

You will learn to do the following:

- Specify which items to log
- Use a Historical Trend Viewer to view logged data

Log I/O to the Database

This activity demonstrates how to specify which items are logged by the LabVIEW Datalogging and Supervisory Control module. By default, all data is logged to the Citadel database. If you do not want to log the data of a specific tag, you can change its configuration.



You can complete this activity in approximately 3 minutes.



1. Open the **Compressor VI**. Display the **Controls** Palette, **Tools** Palette, and Tag Utilities toolbar.
2. Click the **Start Tag Configuration Editor** button on the Tag Utilities toolbar to open the Tag Configuration Editor.
3. Double-click **MotorRPMSetPoint**.
4. Click the **Operations** tab and deselect **Log Data**. Click **OK**.
5. Select **File»Save**. If the Tag Engine is still running, you are asked to update the `.scf` file. Click **Yes** to update it. Close the Tag Configuration Editor.

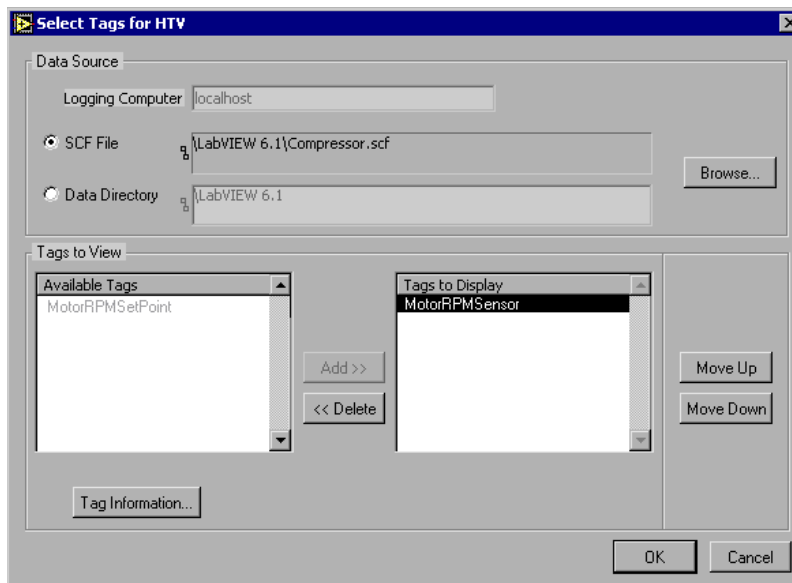
View Logged Data Using the Historical Trend Viewer (HTV)

This activity demonstrates how to view the data being logged, using the Historical Trend Viewer (HTV).



You can complete this activity in approximately 5 minutes.

1. Open the **Compressor VI** if it is not already open.
2. Right-click the **Historical Trend Viewer** button and select **Panel Wizard**.
3. Select **Historical Trend Viewer** and click **OK**.
4. Click the **Run** button. To view the historical data, click the **Historical Trend Viewer** button.
5. Select **MotorRPMsensor** from the list of **Available Tags** and click **Add**, as shown in the following figure. Click **OK**.



Note The selected tag appears on the right side. You can show a maximum of eight tags in the HTV at a time.

The logged data for the tags appears in the Historical Trend Viewer.



6. Click the magnifying glass icon and select a setting to zoom into a section of the data.
7. Move the triangular cursors at the bottom of the graph. Note that the changing corresponding values and timestamps appear in the **Data Display**.



8. Click the **Skip** button to view the end of the data set.
9. Select **Viewer»Preferences** and change the **Scroll time** to 1.00 second.



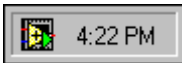
10. Click the **Live** button.

Now, the Historical Trend Viewer is performing as a real-time trend viewer. New values are updated in the display as they are logged. Turn the knob on the front panel to view the trend.



Note You can also call the Historical Trend Viewer programmatically with the Call HTV VI in the **Functions»Historical Data** palette. Use other VIs in this palette to extract and decimate data from the database, obtain a list of tags that have logged data, and convert the data into spreadsheet format.

11. Close the **Historic Trend Viewer**.
12. Stop the VI. Note that the Tag Engine keeps running and logging data by the Engine Manager icon in the Windows taskbar. Save and close the VI.



Alarms

This chapter teaches you how to use the basic alarm capabilities of the LabVIEW Datalogging and Supervisory Control module.

You will learn to do the following:

- Configure, view, and acknowledge alarms
- Add alarm functionality to an existing VI

Set and View Alarms

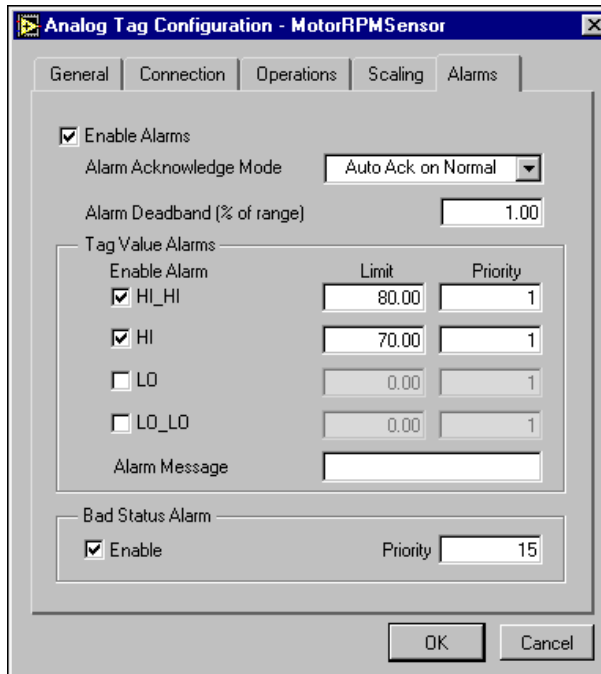
This activity demonstrates how to configure, view, and acknowledge alarms using utilities of the LabVIEW Datalogging and Supervisory Control module.



You can complete this activity in approximately 5 minutes.



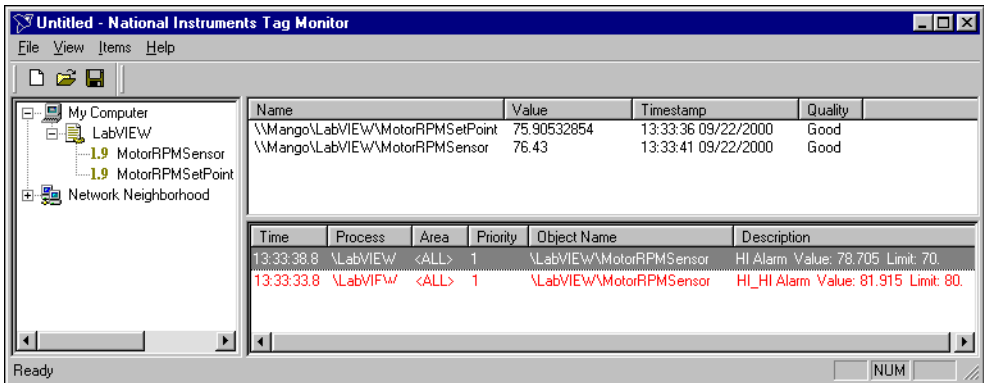
1. Open the **Compressor VI**. Display the **Controls** palette, **Tools** palette, and Tag Utilities toolbar.
2. Click the **Start Tag Configuration Editor** button on the Tag Utilities toolbar to open the Tag Configuration Editor.
3. Double-click **MotorRPMsensor** and select the **Alarms** tab. Configure the alarm characteristics as shown in the following figure. Click **OK**.



4. Select **File»Save**. If the Tag Engine is still running, you are asked to update the .scf file. Click **Yes** to update. Close the Tag Configuration Editor.
5. Right-click the **Alarms** button on the front panel of the Compressor VI and select **Panel Wizard**.
6. Select the **Tag Monitor** radio button on the **Panel** tab. Click **OK**. The Alarms label text changes to Tag Monitor. Use the Text tool to change it back to Alarms.
7. Click the **Run** button to run the VI. To view the alarms, click the **Alarms** button, which launches the Tag Monitor.



8. Drag and drop the **MotorRPMsensor** and **MotorRPMSetPoint** items from the left tree view to the right side of the window. The alarms will display in the bottom list of the **Tag Monitor** dialog box, as shown in the following figure.



9. To acknowledge the alarms, right-click any alarm and select **Acknowledge** from the shortcut menu. You can enter comments. Close the Tag Monitor.
10. Stop the VI and save any changes, then close the VI.



Note You can also filter the alarms by right-clicking an alarm and selecting **Filter Options**.

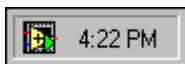
Add Alarm Functionality to an Existing VI

This activity demonstrates how to add alarm functionality to an existing VI using the HMI Wizard of the LabVIEW Datalogging and Supervisory Control module. This activity demonstrates how to turn on the MotorRPMLimit LED when MotorRPMSensor is in alarm.



You can complete this activity in approximately 7 minutes.

1. Open the **Compressor VI**. Display the **Controls** palette, **Tools** palette, and Tag Utilities toolbar.
2. Right-click **MotorRPMLimit** and select **HMI Wizard**.
3. Select **Alarm** from the shortcut menu and click **OK**. LabVIEW generates the block diagram automatically.
4. Turn the **MotorRPMSetPoint** knob on your front panel. Notice that the MotorRPMLimit lights up when MotorRPMSensor is in alarm.
5. Stop the VI. Save and close the VI.
6. Right-click the **Engine Manager** icon in the Windows task bar and select **Stop** to stop the Tag Engine.



Security

This chapter teaches you how to use some of the security features included in the LabVIEW Datalogging and Supervisory Control module.

You will learn to do the following:

- Create user accounts
- Implement security on a front panel

Add Security to Your System

This activity demonstrates how to create user accounts and implement security for your front panel. A Login button will limit access to front panel objects based on the password-based user accounts.



You can complete this activity in approximately 10 minutes.

1. Open the **Compressor VI**.
2. Create user accounts by selecting **Tools»Datalogging & Supervisory Control»Security»Edit User Accounts**.

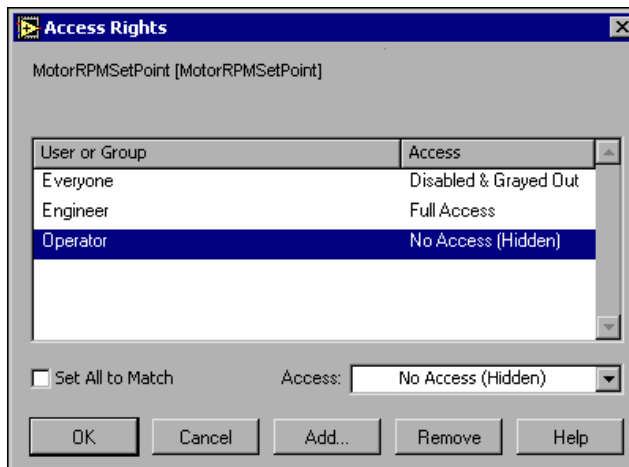


Note If you were not previously logged in, the **User Login** dialog box appears. Select **Administrator** from the **Accounts** pull-down menu of the **User Login** dialog box.

3. Select **User»New User Account** in the **User Account Manager** window.
4. Create the following two new accounts. Click **OK** after filling out the account information for each user. Close the **User Account Manager** window.

User Name	Password	Security Level
Engineer	Eng	7
Operator	Oper	5

5. After creating the accounts, right-click the **MotorRPMSetPoint** button on the Compressor VI front panel and select **Security**.
6. Click **Add**. Double-click **Engineer**, and **Operator**. Click **OK**.
7. Configure each user's access using the **Access** pull-down menu, as shown in the following figure. Click **OK**.



8. Right-click the **Login** button and select **Panel Wizard**.
9. Select **Login prompt**. Click **OK**.
10. Click the **Run** button to run the VI.
11. Click the **Login** button on the front panel and log in as Operator. The MotorRPMSetPoint knob does not appear because the Operator user is not authorized to access it.



Note The passwords are case-sensitive.

12. Click the **Login** button again and log in as Engineer. Notice that the MotorRPMSetPoint knob reappears because the Engineer is authorized to adjust it.
13. Stop the VI. Save and close the VI.



Note You can also use the Security VIs, located on the **Functions»System»Security** palette, to perform security operations.

Networking

This chapter teaches you about networking a LabVIEW Datalogging and Supervisory Control module application.

You will learn to do the following:

- Register network computers
- Import tags over the network



Note To complete these activities, you must have two computers connected by a network to act as client and server.

Access I/O over the Network

To set up a client-server system you must register all of the network computers, then import tags from the server machine and view them on the client machine.

Registering the Server Computer on the Client Machine

This activity demonstrates how to register a network computer with the LabVIEW Datalogging and Supervisory Control module.



You can complete this activity in approximately 5 minutes.



Note To register or unregister a computer, you *must* be logged in as Administrator, or with administrator privileges.

1. On the computer that will act as a client, select **Tools»Datalogging & Supervisory Control»Options**, select the **Advanced** tab, then click **Registered Computers**.
2. Click **Add**, select the server computer and click **Register**. Click **OK** to close the **Register Computer** dialog box. Click **OK** again.

Importing Tags to the Client Computer

This activity demonstrates how to access tags over the network. Configuring the client involves adding tags from a configuration (.scf) file from one or more server machines to a .scf file on the client.



You can complete this activity in approximately 7 minutes.

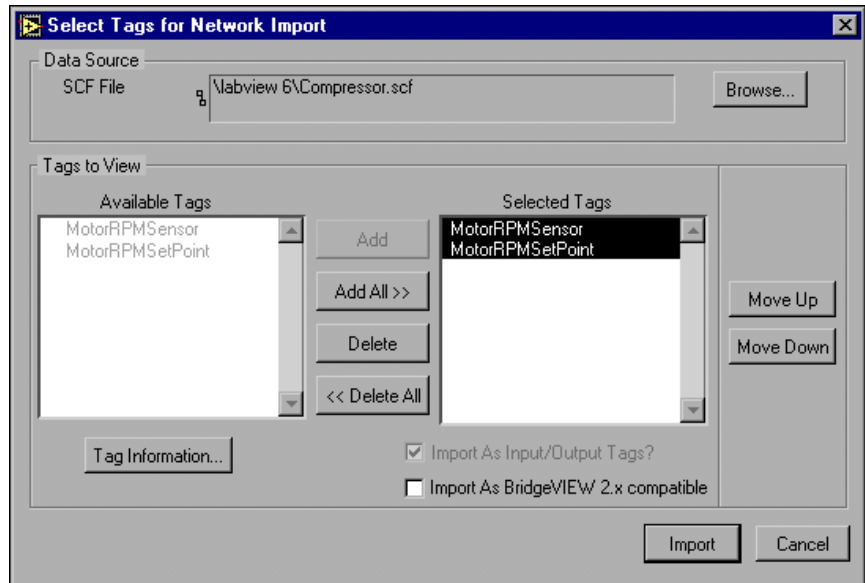


1. Select **Tools»Datalogging & Supervisory Control»Show Toolbar** to display the Tag Utilities toolbar.
2. On the client computer, click the **Tag** button to invoke the Tag Configuration Editor.
3. Select **File»New** and then **File»Import Network Tags**. The **Select Tags for Network Import** dialog box prompts you for the network path to the server .scf file.



Note File sharing *must* be enabled on the server computer to view files from the client computer.

4. Click the **Browse** button in the **Data Source SCF File** field and navigate to the server computer and the .scf file that contains the tags you want to import.
5. Select the tags to import to the client computer .scf file and click **Add All**. Click **Import**.



6. Select **File»Save** and save the file as `NetworkTags.scf`. Click **OK** in the **SCF Logging Paths** dialog box. Close the Tag Configuration Editor.
7. Copy the **Compressor VI** from the server computer to the client computer and open the VI.
8. Click the **Run** button to run the VI. Notice the server tags are displayed on the client computer.



Tip Refer to the *LabVIEW Datalogging and Supervisory Control Module Developer's Manual* for information about creating and developing successful network applications.



System Requirements

Platform	Media and System Requirements
All Windows Platforms	Distributed on CD-ROM. LabVIEW Datalogging and Supervisory Control module requires LabVIEW version 6.0 or later. Refer to the installation instruction that appears on your screen for information about the size of the LabVIEW components you are installing.

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

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. 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.