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DS800 Development Suite Quick Start Guide for the ROC800-Series

Remote Automation Solutions

EMERSON
Process Management

Revision Tracking Sheet

March 2009

This manual may be revised periodically to incorporate new or updated information. The revision date of each page appears at the bottom of the page opposite the page number. A change in revision date to any page also changes the date of the manual that appears on the front cover. Listed below is the revision date of each page (if applicable):

Page	Revision
Initial issue	Mar-09

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Introduction

The DS800 Development Suite software ("DS800") is an integrated development environment that allows you to build IEC 61131-3 compliant programs. You install DS800 on your PC and use the software to develop programs and download those programs (using an Ethernet connection) to the ROC800-Series device ("ROC800").

Note: For further technical information, refer to the specification sheet *DS800 Development Suite Software* (4.1:DS800).

This *Quick Start Guide* provides both a high-level overview and the detailed steps you need to install and configure the DS800 software on your PC. It also provides a very simple example of building an IEC 61131-3 compliant program.

The installation process requires you to:

1. Verify versions of ROCLINK 800 and the ROC800 firmware.
2. Install the DS800 Runtime License in the ROC800.
3. Verify the operation of the DS800 kernel in the ROC800.
4. Create a configuration file (which the DS800 software uses).
5. Save the ROC800 Flash configuration.
6. Install the DS800 Workbench software (DS800 Development Suite and LicenseManager) on your PC.
7. Verify the successful installation.

Note: To understand all the steps and system requirements, we suggest that you read through this **entire** guide **before** you begin the installation and configuration process.

After you have successfully installed the software, review *Creating a Sample Workbench Project* for a detailed example of building a simple IEC 61131-3 program.

1. Verify Versions of ROCLINK 800 and ROC800

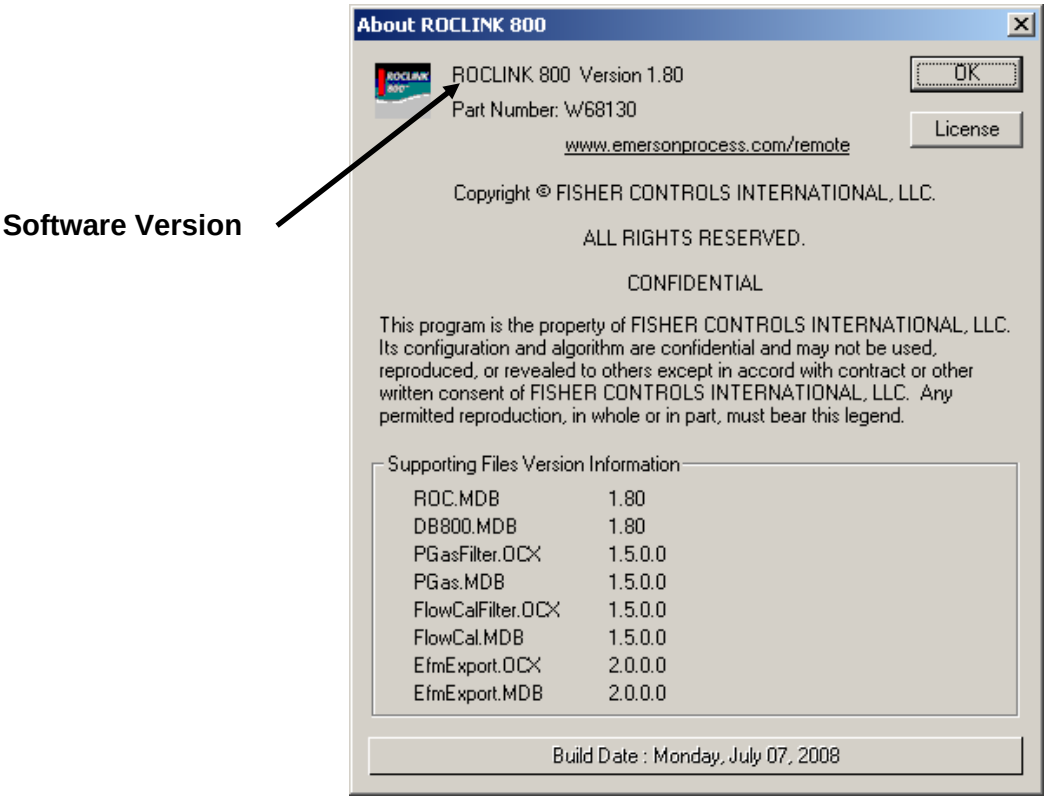
When using DS800 Development Suite software version 2.1 with the ROC800, the software requires:

- Version 1.80 (or greater) of ROCLINK 800.
- Version 2.10 (or greater) of ROC800-Series firmware.

To verify the versions:

1. Start ROCLINK 800.

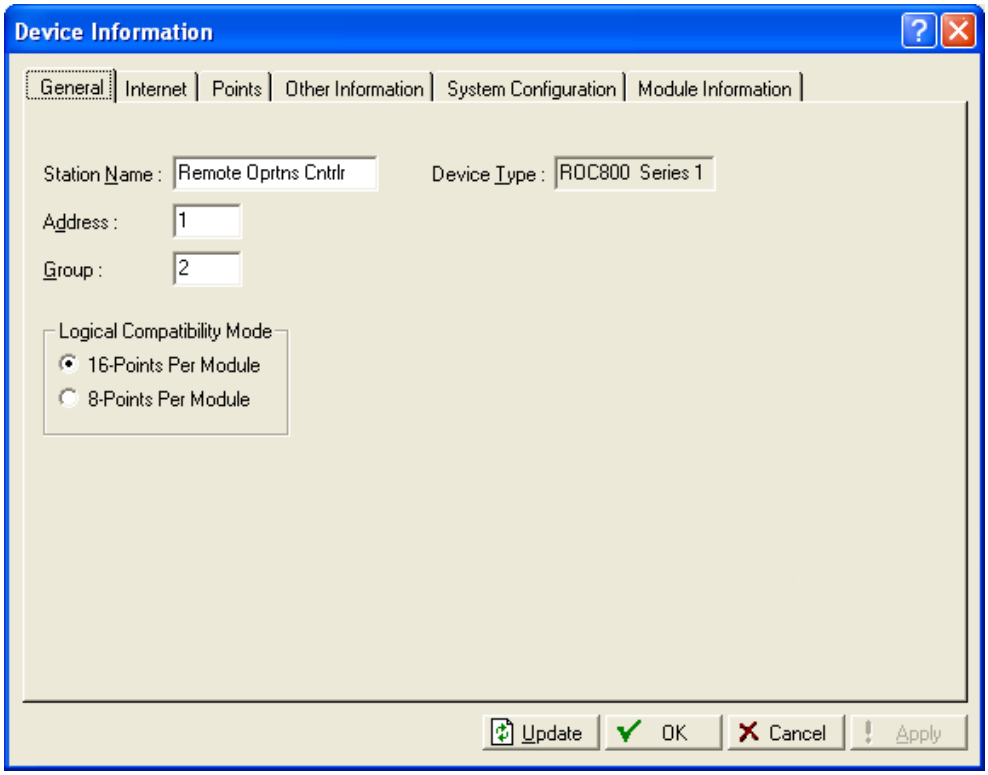
2. Click **Help** on the ROCLINK 800 tool bar and click **About ROCLINK 800** from the drop-down menu. The About ROCLINK 800 screen displays.



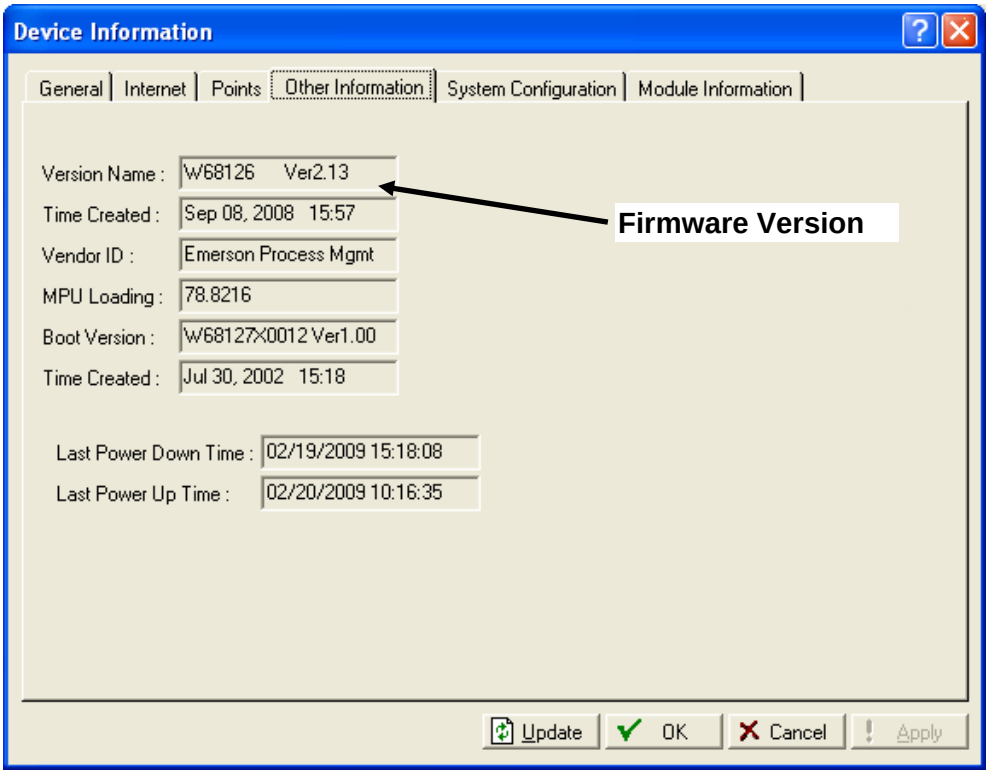
3. Verify that the version of ROCLINK 800 is **1.80** or greater.

Note: If the version is **not** at least 1.80, contact your Remote Automation Solutions representative to upgrade ROCLINK 800.

4. Click **OK**. The ROC800 graphic displays.
5. Click **ROC** on the ROCLINK 800 toolbar and click **Information** on the drop-down menu. The Device Information screen displays.



6. Select the **Other Information** tab. The Other Information screen displays.



7. Verify that the firmware version for your ROC800 is **2.10** or greater.

Note: If the version is **not** at least 2.10, contact your Remote Automation Solutions representative to upgrade the firmware.

8. Click **OK** to close the Device Information screen, but do not exit ROCLINK 800. Proceed to *Install the DS800 Runtime License*.

2. Install the DS800 Runtime License

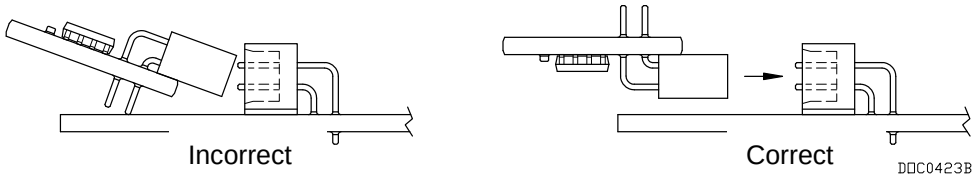
Caution

Failure to exercise proper electrostatic discharge precautions (such as wearing a grounded wrist strap) may reset the processor or damage electronic components, resulting in interrupted operations.

When working on units located in a hazardous area (where explosive gases may be present), make sure the area is in a non-hazardous state before performing procedures. Performing these procedures in a hazardous area could result in personal injury or property damage.

Remote Automation Solutions delivers the DS800 runtime license on a standard ROC800 license key. To install a license key:

1. Remove power from the ROC800.
2. Remove the wire channel cover.
3. Unscrew the screws from the CPU faceplate.
4. Remove the CPU faceplate.
5. Place the license key in the appropriate terminal slot (P2 or P3) in the CPU.



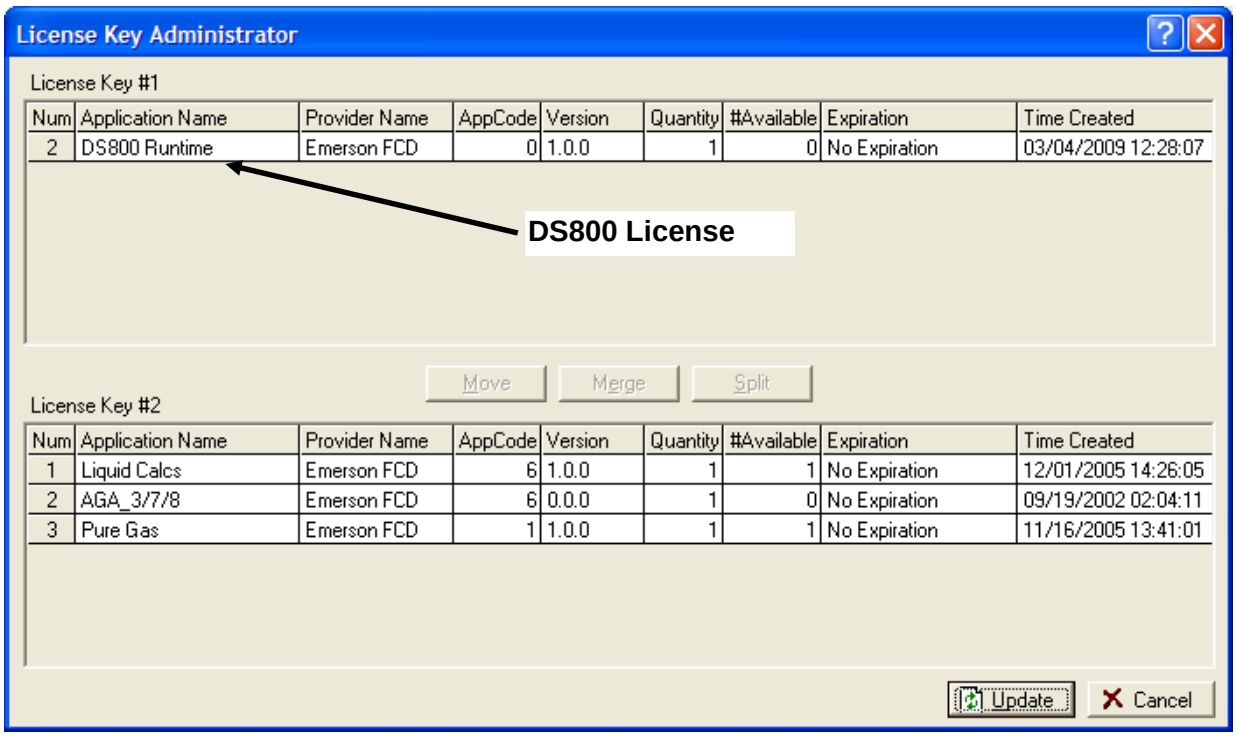
Note: If you are installing a **single** license key, place it in slot P2.

6. Press the license key into the terminal until it is firmly seated.
7. Replace the CPU faceplate.
8. Replace the screws on the CPU faceplate.
9. Replace the wire channel cover.
10. Restore power to the ROC80.

Note: The physical process of installing the license key also enables any licenses on that key.

11. Log onto ROCLINK 800.

12. Select **Utilities** > **License Key Administrator** on the ROCLINK 800 menu bar. The License Key Administrator screen displays.



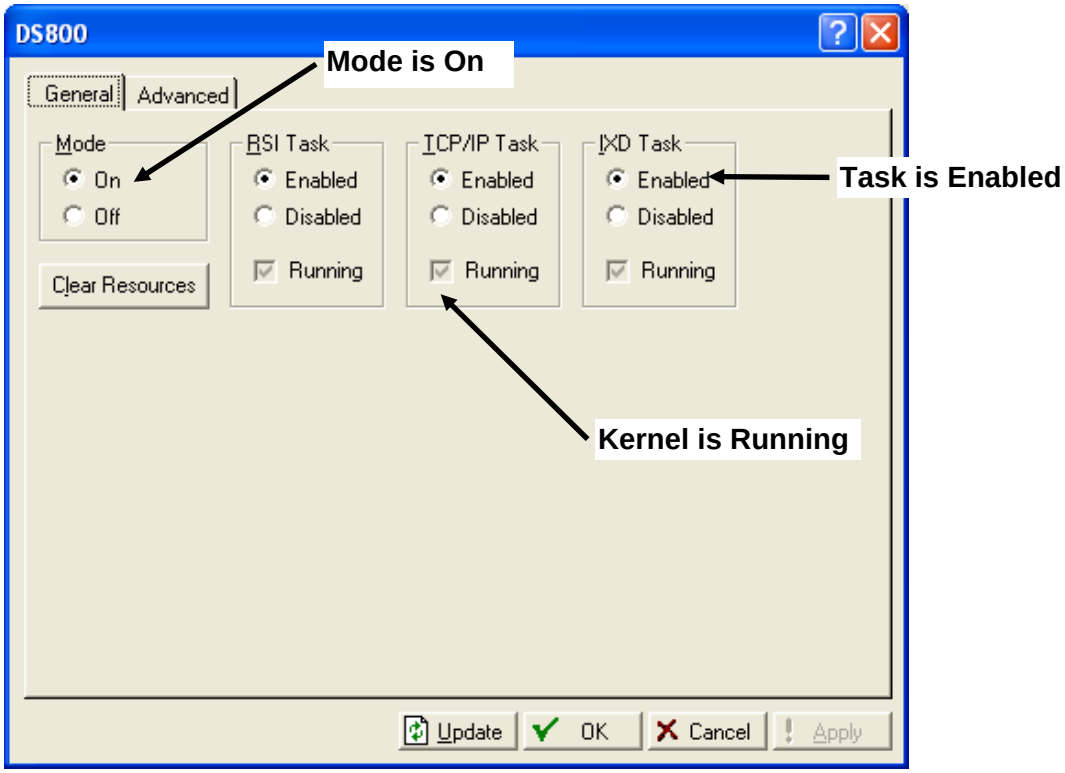
Note: The ROC800 displays the active DS800 Runtime license.

13. Click **Cancel** to close this screen but do not exit ROCLINK 800.
14. Proceed to *Verify the Operation of the DS800 Kernel*.

3. Verify the Operation of the DS800 Kernel

The DS800 kernel is the "engine" which runs inside the ROC800 and interprets and executes DS800 programs. Because the kernel is part of the ROC800-Series firmware, no software installation is necessary. To verify the operation of the kernel:

1. Click **Configure** > **Control** > **DS800** on the ROCLINK 800 menu bar. The DS800 dialog box displays, showing the General tab:



2. Verify that the Mode option is **On**. This enables the DS800 kernel.
3. Verify that the Running checkbox in each of the three task areas is checked. This confirms that the runtime kernel is executing.

> **Note**: Installing the license key should correctly set these fields. If the checkboxes are not selected, perform a warm start, and re-check the License Key Administrator to make sure the DS800 license is installed.

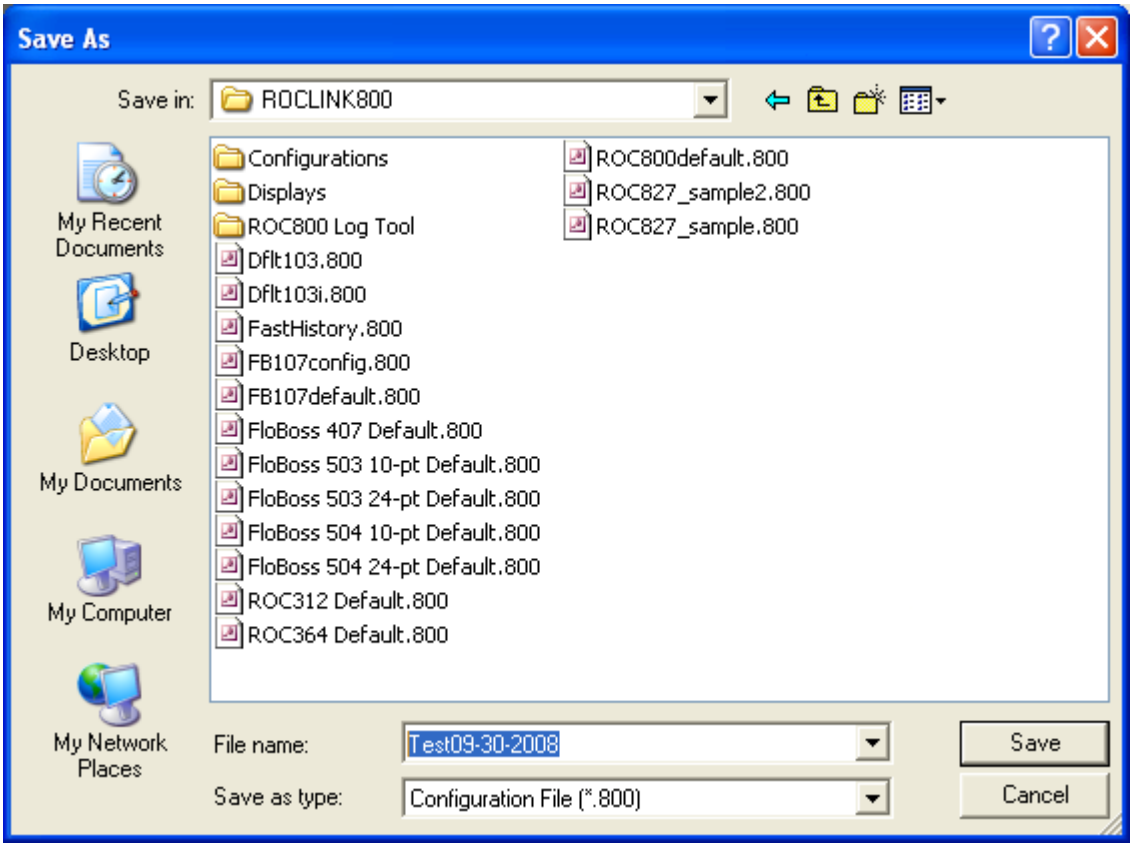
4. Click **OK**. Proceed to *Create Configuration File*.

4. Create Configuration File

Creating a configuration (.800) file preserves the I/O configuration you have defined on your ROC800. The DS800 Workbench software uses this configuration file (and its defined point types) to correctly map information you define in the Workbench back to your ROC800.

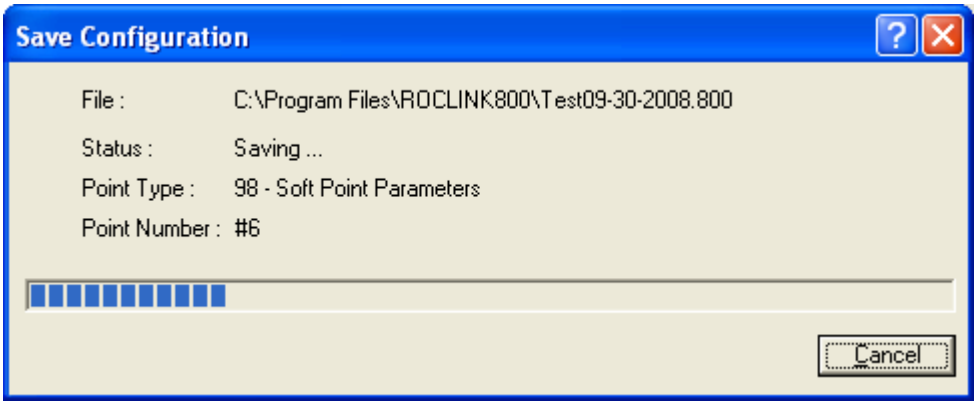
To create a configuration file:

1. Click **File** > **Save Configuration** on the ROCLINK 800 menu bar. A Save As dialog screen displays.

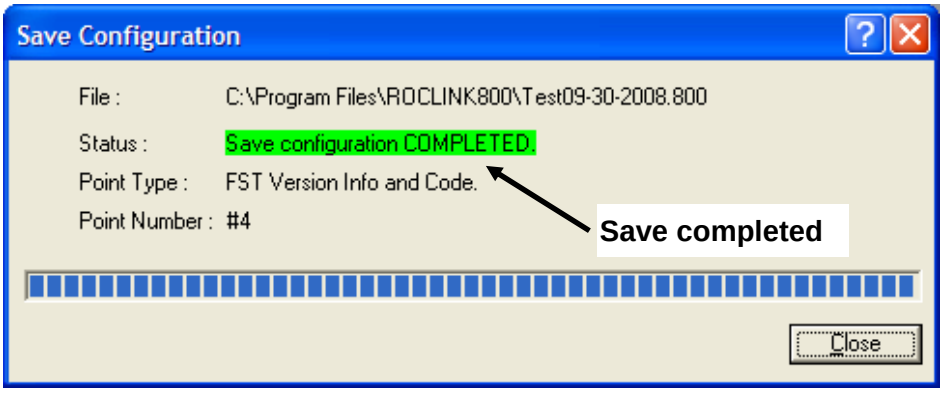


2. Complete the File name field with a meaningful file name (here, **Test09-30-2008**). Click **Save**. ROCLINK 800 displays a dialog box that shows the progress of the save.

Note: By default, ROCLINK 800 places all configuration files in the /ROCLINK800 folder on your PC.



A change in the Status message indicates when the process finishes.

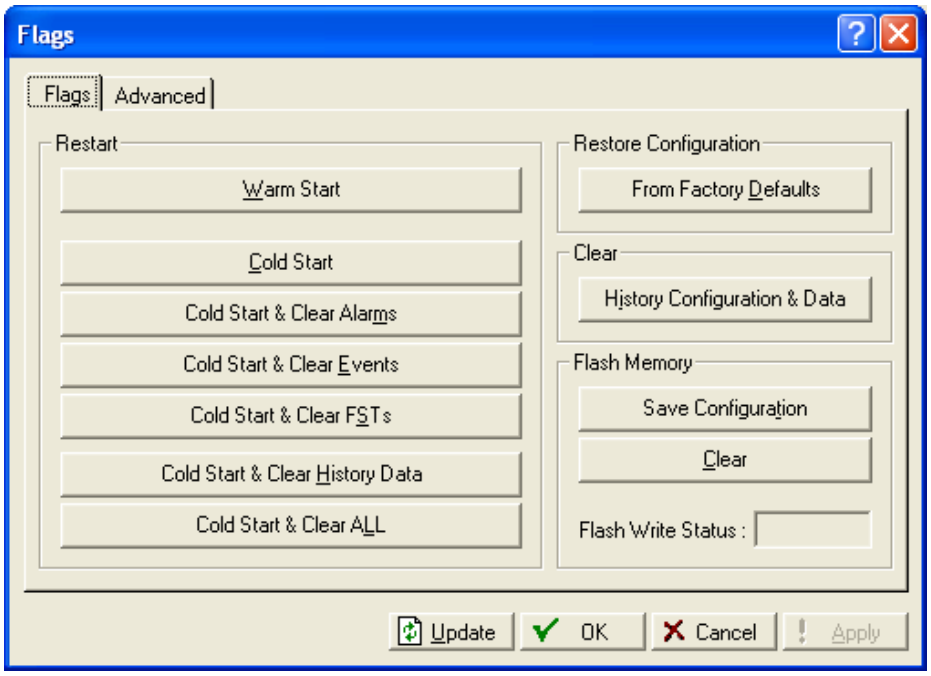


3. Click **Close** to complete the process. The Save Configuration dialog box closes and displays the ROC800 graphic. Proceed to *Save Flash Configuration.*

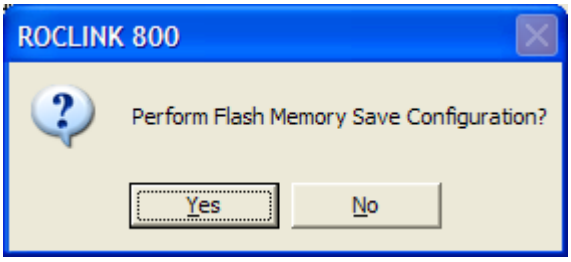
5. Save Flash Configuration

Saving the Flash configuration in your ROC800 is a precautionary step.

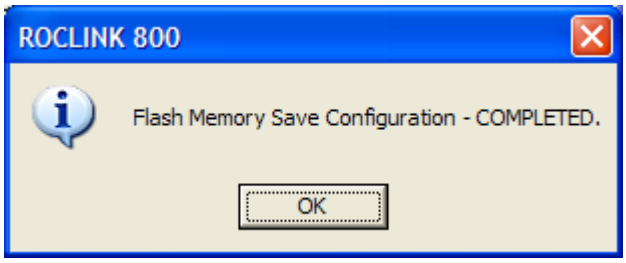
1. Select **ROC** > **Flags**. The Flags screen displays.



2. Click **Save Configuration** in the Flash Memory frame. ROCLINK 800 displays a confirmation dialog:



3. Click **Yes**. ROCLINK 800 saves the configuration and displays a dialog box when it finishes.



4. Click **OK** to close this dialog box. The Flags screen displays. Click **OK** to display the ROC800 graphic. Proceed to *Install the DS800 Workbench Software*.

6. Install the DS800 Workbench Software

The DS800 Workbench software provides the development environment you use to create DS800 "projects" (IEC 61131-3 compliant programs) which you consequently download to the ROC800.

Note: For more information on creating DS800 projects, refer either to *Create a Sample Workbench Program* in this document or to the *DS800 Development Suite Software User Manual* (Form A6126).

Remote Automation Solutions delivers the DS800 Workbench software on a CD-ROM. Your PC must have the following minimum requirements:

- Pentium-class processor (233 MHz or greater recommended).
- CD-ROM drive.
- Windows 2000 (Service Pack 2), XP.
- Ethernet (recommended) or serial port.
- Administrative privileges for the PC on which the software is to be installed.

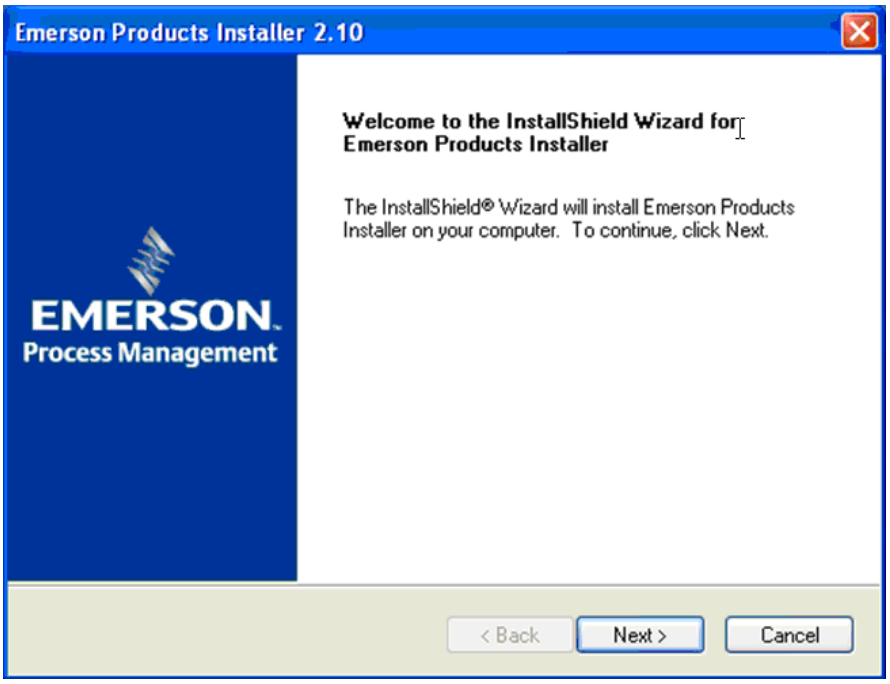
Caution **A Sentinel USB license key provides access to all the DS800 Workbench features. Do not insert the Sentinel USB license key in any USB port on your PC until directed to do so. Using the key before the Workbench is completely installed may cause unpredictable results.**

To install the software:

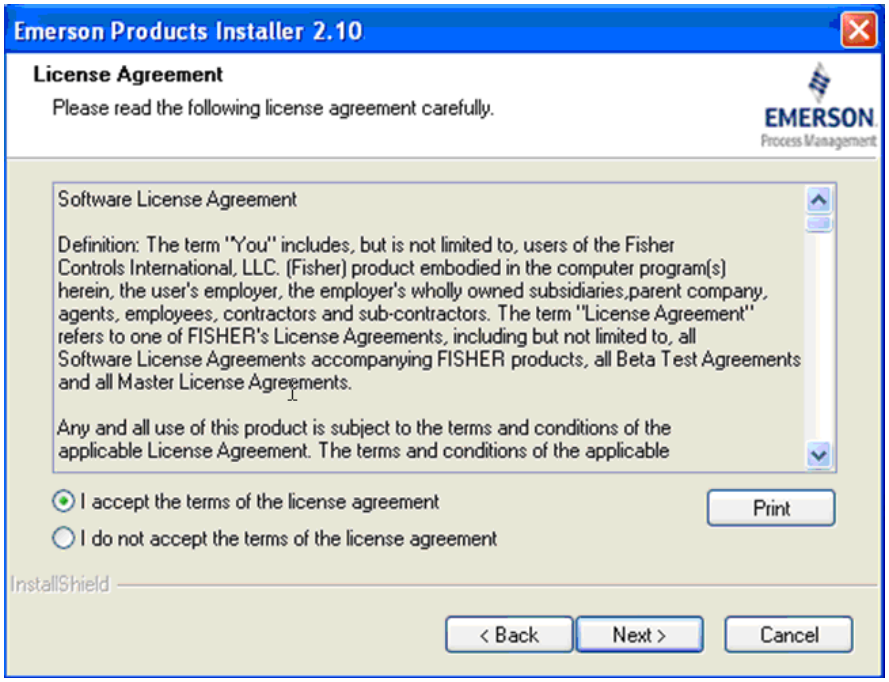
1. Place the CD-ROM into your PC's CD drive. The Product Installer wizard starts automatically.

   Note: If you have Autorun enabled on your computer, the Product Installer wizard starts automatically. If you have **disabled** Autorun, use this procedure to start the wizard:

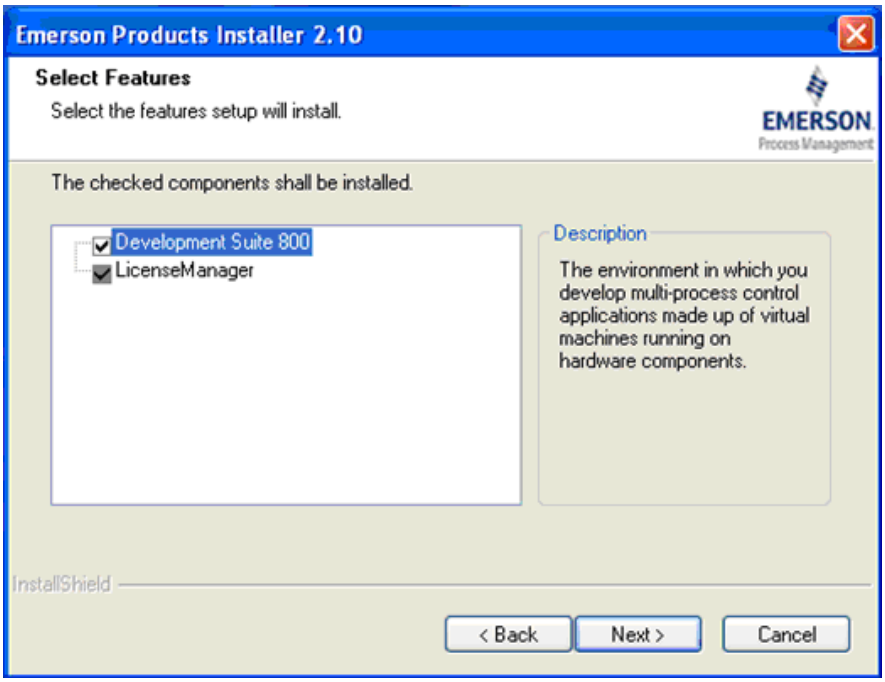
   a. Click **Start** > **Run**. The Run dialog box displays.
   b. Click **Browse**, navigate to the folder on the CD-ROM containing the Workbench software, and select the Setup.exe file in that folder. The Run dialog box displays.
   c. Click **OK**. The Product Installer wizard screen displays.



2. Click **Next**. A software license agreement displays.



3. Read the entire DS800 software license agreement. If you agree to the terms of the license, select **I accept the terms of the license agreement** and click **Next**. A Select Features screen displays.



4. Use this screen to select the two DS800 features you must install:

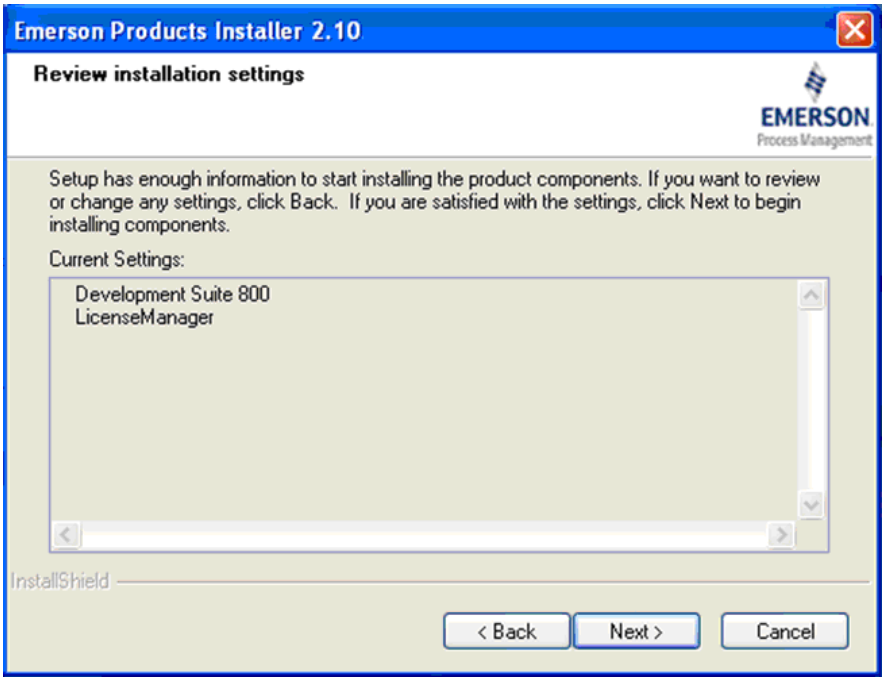
   - **Development Suite 800**
     Also known as the “Workbench,” this is the development

environment you use to create, view, and download custom control applications to the ROC800.

- **LicenseManager**
  Supports the USB Sentinel license key which is required to access all Workbench features. You also use this utility to transfer licenses and update existing license keys.

Note: The wizard selects these two features as defaults.

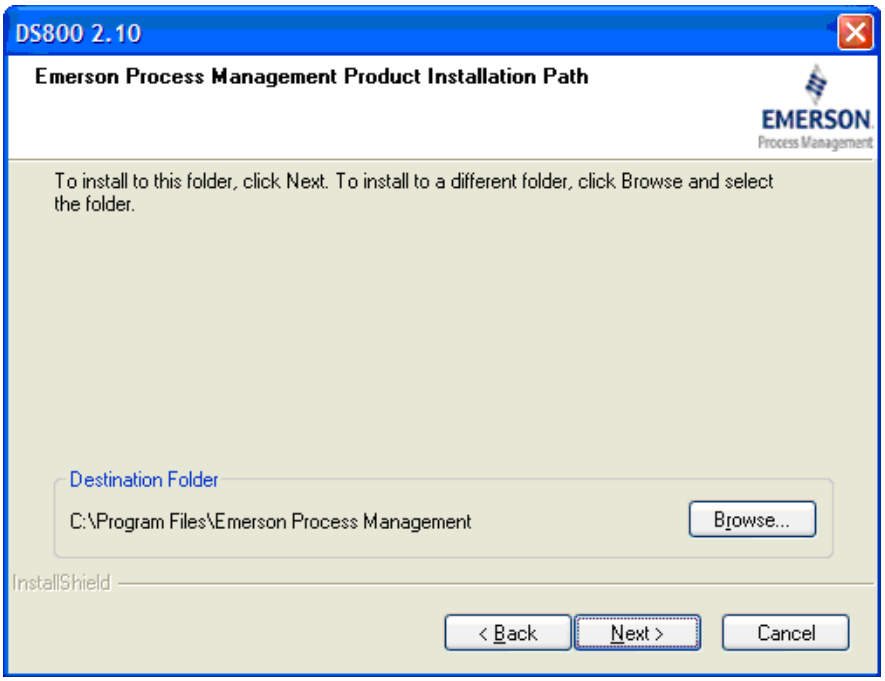
5. Click **Next**. A review screen displays.



6. Review the options you have selected for installation and click **Next**. The DS800 initial (or "splash") screen displays.

Note: Once you begin the DS800 installation process, you cannot stop it until it completes.

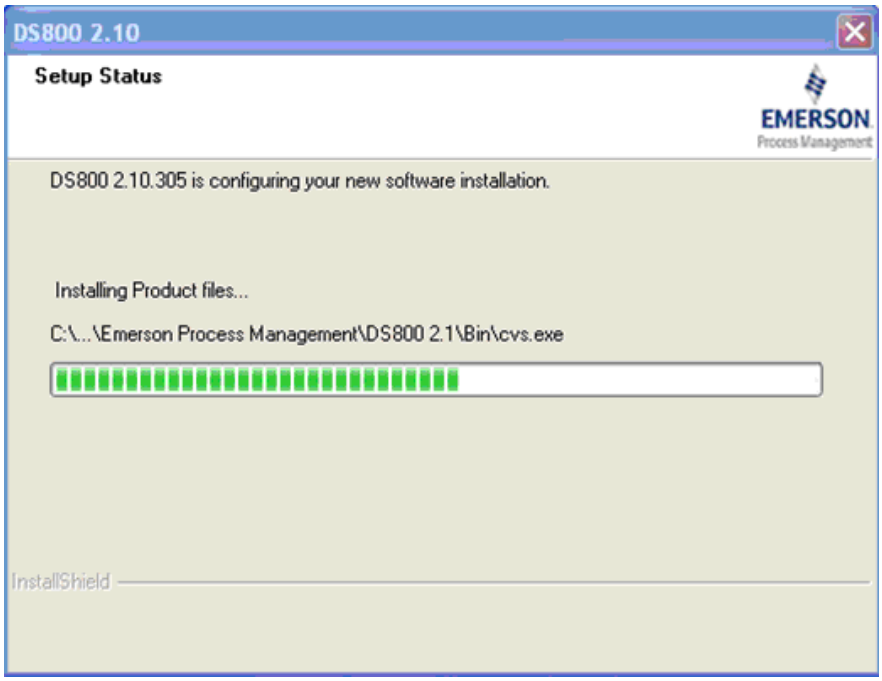
7. Click **Install**. The wizard prompts you to select the location for the installed software.



8. Click **Next** to accept the default location or click **Browse** to select another location.

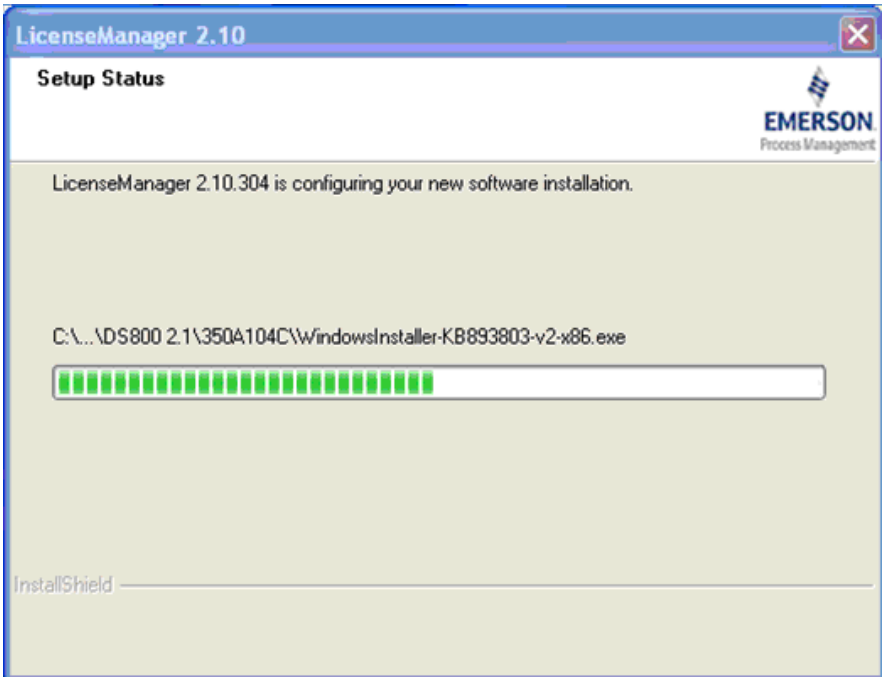
Note: If you have inserted the Sentinel USB license key in your computer, **remove it BEFORE you click Next**.

9. The wizard begins installing the first component (the DS800 Workbench).



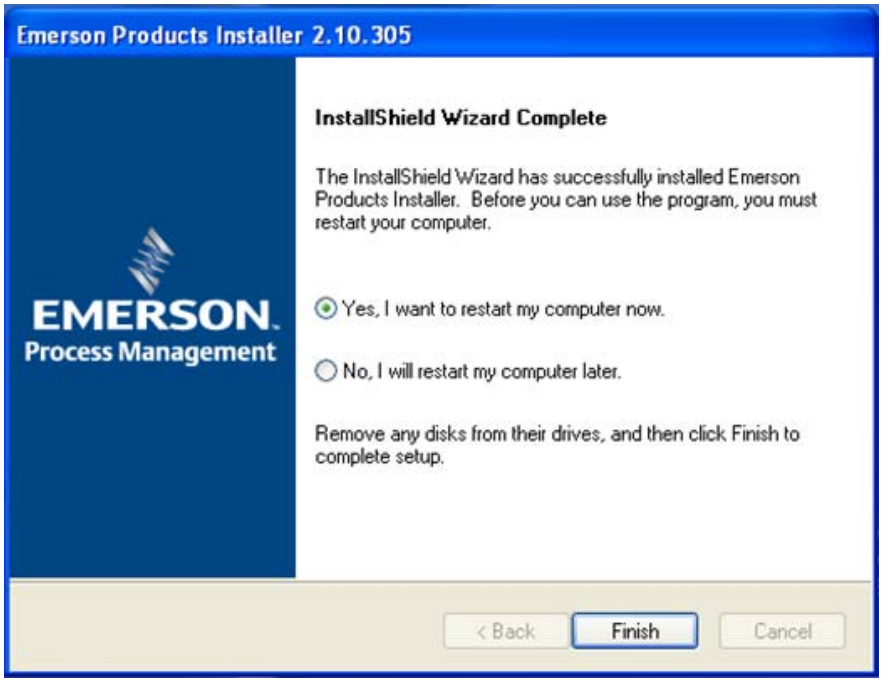
10. When the installation of the Workbench completes, the wizard prompts you to include an icon on your desktop.

11. Click either **Yes** or **No** to continue. The wizard begins installing the second component (the LicenseManager).



12. When the installation of the LicenseManager completes, the wizard prompts you to include an icon on your desktop.

13. Click either **Yes** or **No** to continue. The wizard prompts you to restart your computer.



Note: Until you restart your computer, **do not** start the DS800 application.

14. Proceed to *Verify the DS800 Workbench Installation.*

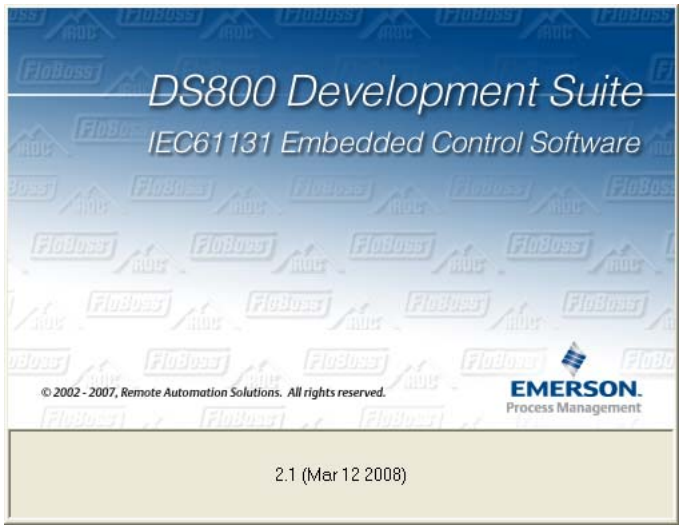
7. Verify the DS800 Workbench Installation

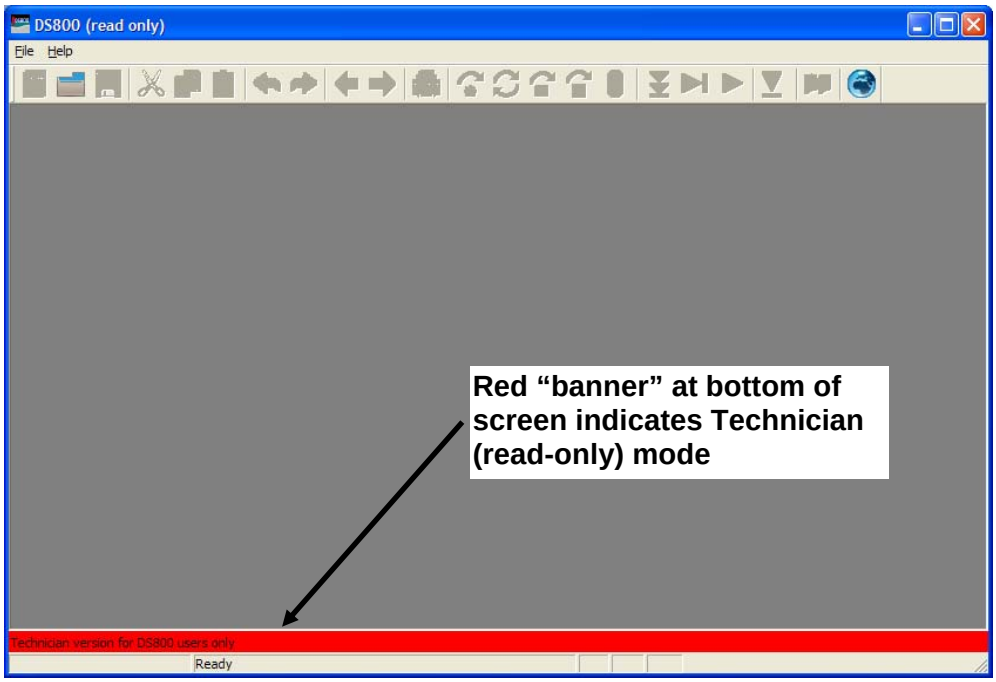
Remote Automation Solutions distributes the DS800 Workbench license on a Sentinel® USB key with a **blue** label:

Note: During this verification process, you are instructed to insert this Sentinel USB license key in your computer. **Do not** insert the Sentinel USB license key into a USB port on your computer **until** directed to do so.

To start Workbench:

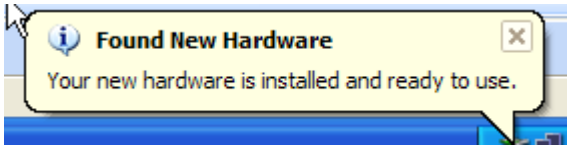
1. Click **Start** .> **Programs** > **Emerson Process Management** > **DS800 2.1 (**select the DS800 2.1 **application**, not the folder**)**. A splash screen (indicating the version number and build date for the software) displays briefly, and then closes to display the DS800 screen.





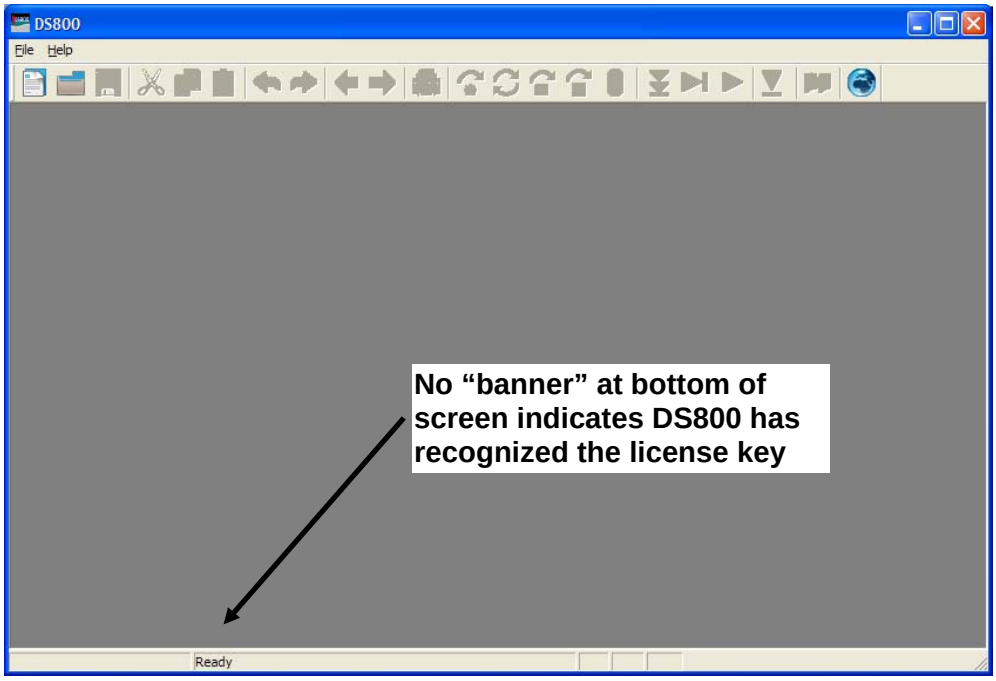
The red banner at the bottom of the DS800 screen indicates that the software successfully installed but was unable to find the license key.

2. Exit the application (select **File** > **Exit** on the DS800 menu bar).
3. Insert the Sentinel USB license key into a USB port on your computer. Windows automatically recognizes the USB device and displays a recognition message in the System Tray.



Note: If Windows **does not** automatically recognize the USB device, proceed to the *Troubleshooting* section of this document.

4. Click **Start** > **Programs** > **Emerson Process Management** > **DS800 2.1** (again, select the **application** and not the folder). The splash screen displays, followed by the DS800 screen.



Note: This version of the DS800 screen **does not** have a red banner across the bottom of the screen. This means that DS800 detected the license key and changed the Workbench functionality accordingly. If the DS800 **still** has a red banner, proceed to *Troubleshooting the Installation* in this document.

5. You can begin to develop DS800 projects. Refer to *Creating a Sample Workbench Project* in this guide.

Troubleshooting the Installation

The DS800 Development Suite software and the USB Sentinel license key use Sentinel Protection from SafeNet® Incorporated. Other software vendors today use the same technology, so if Windows does not recognize an attached USB license key, it’s possible that conflicting versions of the SafeNet Sentinel software are installed on your computer.

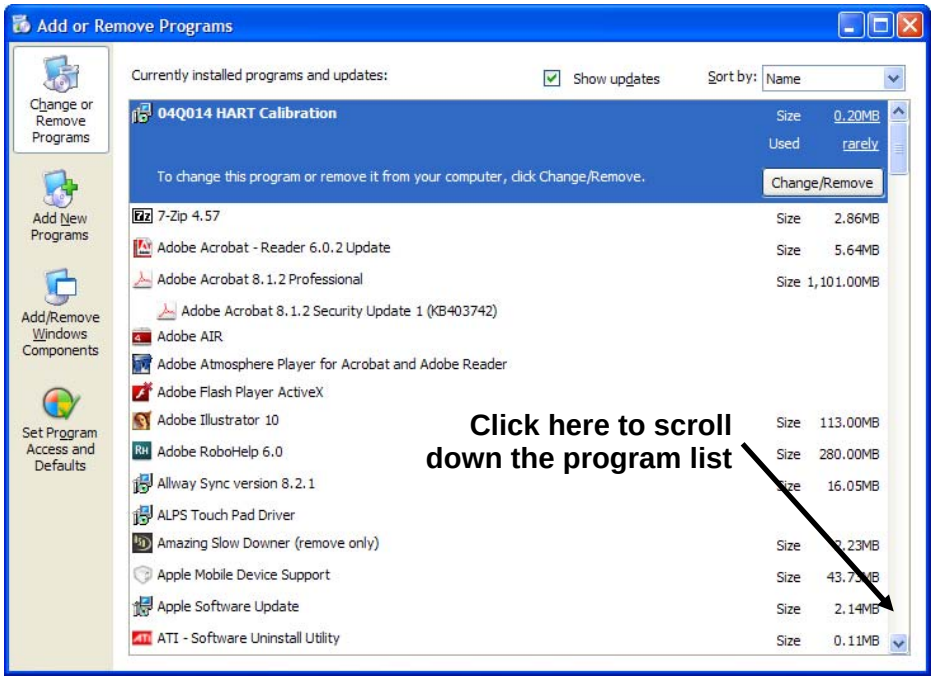
To resolve this conflict, you must uninstall all versions of the Sentinel driver from your computer and install the latest version. The updated

driver allows Windows to recognize the USB license key and does not adversely affect any other programs which use the SafeNet Sentinel driver.

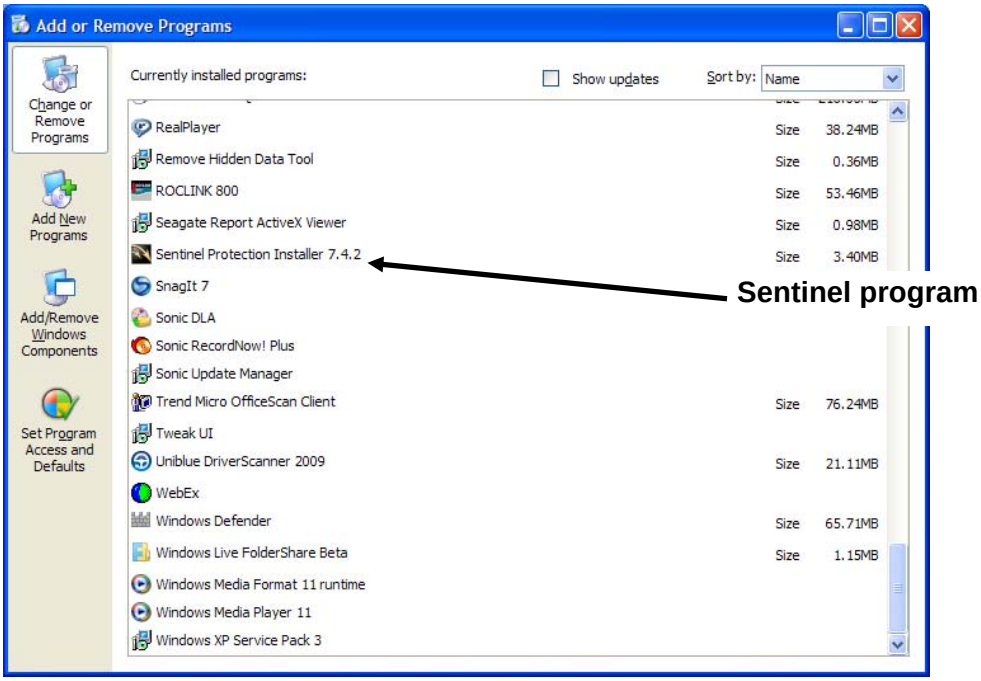
To uninstall prior versions of the Sentinel driver:

Note: **Before** you update any drivers, close all applications (such as DS800 Development Suite) which may require a USB license key.

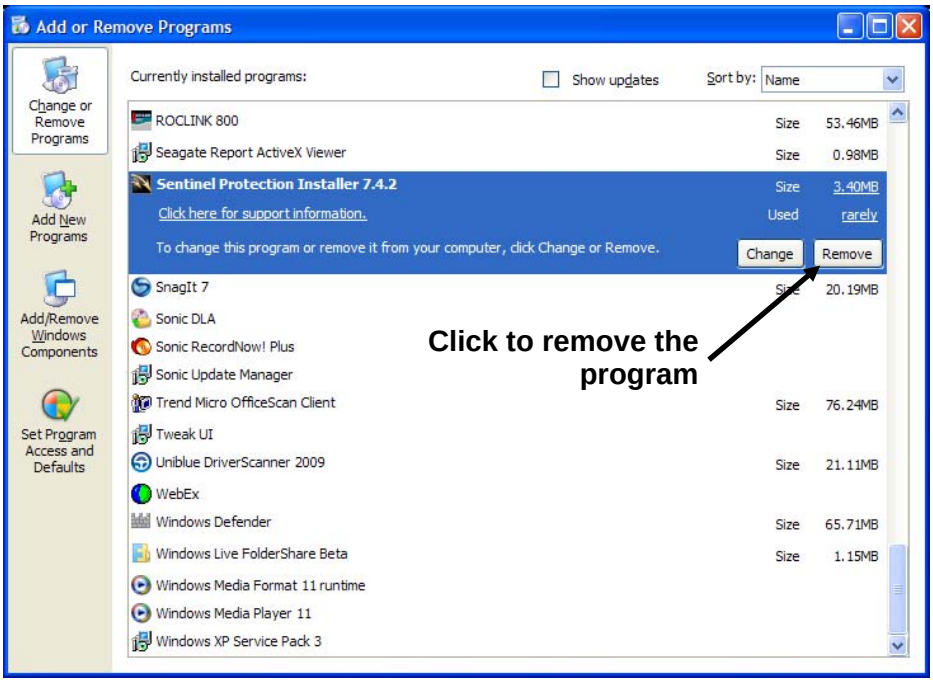
1. Open the Windows Control Panel (click **Start** > **Settings** > **Control Panel**).
2. Double-click **Add or Remove Programs**. Windows builds a list of all programs currently installed on your computer.



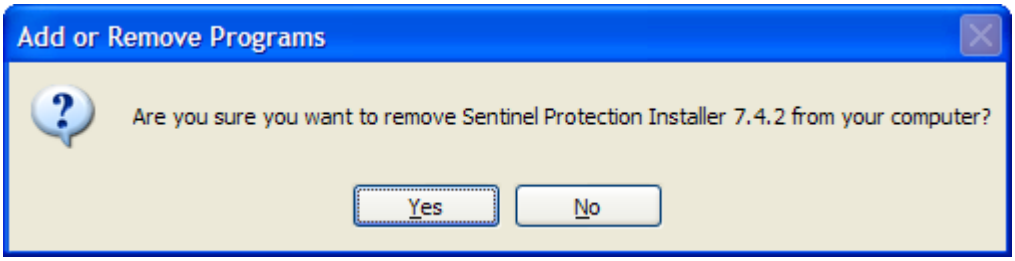
3. Scroll down the program list until you find software programs which begin with the word “Sentinel.”



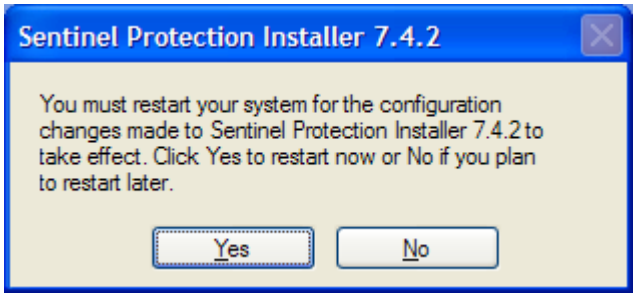
4. Click the program label. Windows opens a program-specific dialog box you use to change or remove this program.



5. Click **Remove**. Windows displays a verification dialog box asking you to verify the removal request.



6. Click **Yes** to continue. Windows displays a number of dialog boxes as it removes the program. If necessary, the last dialog box reminds you to restart your computer.

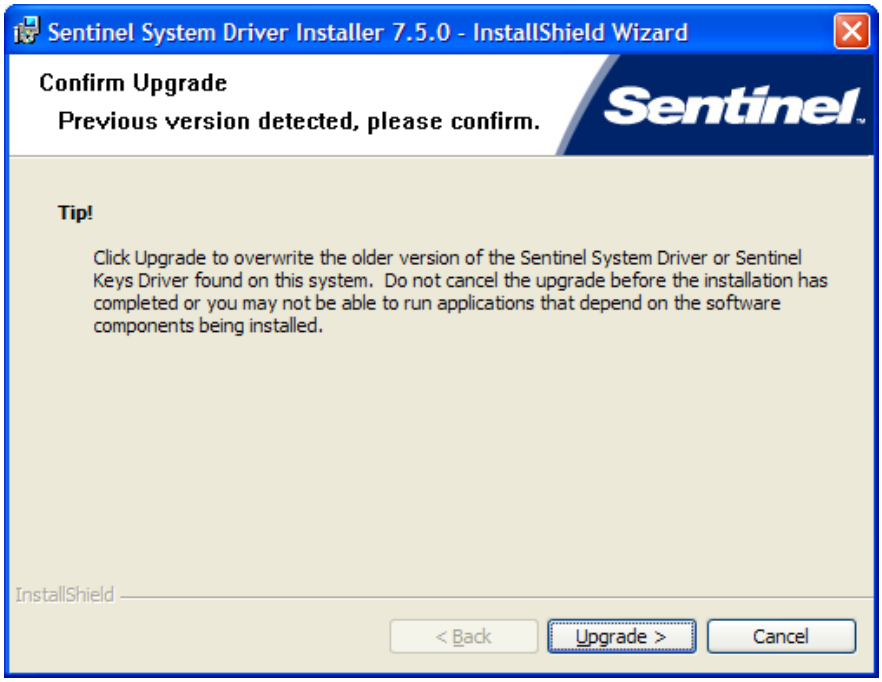


Note: If you have several programs to remove, remove all programs **before** you restart your computer.

7. Repeat steps 3-6 for any other Sentinel drivers. When you have uninstalled all previous versions of Sentinel drivers, you can install the most current Sentinel driver.

To install the most current version of the Sentinel driver:

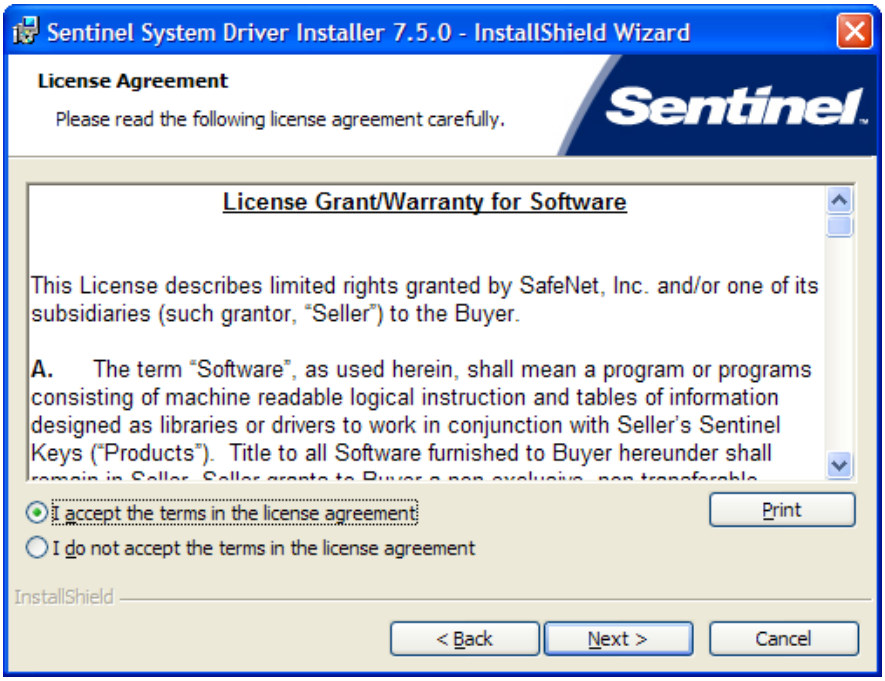
1. Place the CD-ROM you used to install the DS800 software in your computer's CD drive.
2. Click **Start** > **Run**. The Run dialog box displays.
3. Click **Browse**. Remote Automation Solutions placed the 7.5.0 Sentinel driver in the \Sentinel folder on the CD-ROM. Select the *Sentinel System Driver Installer 7.5.0.exe* file. The Run dialog box displays the selected file.
4. Click **OK**. The InstallShield wizard displays.



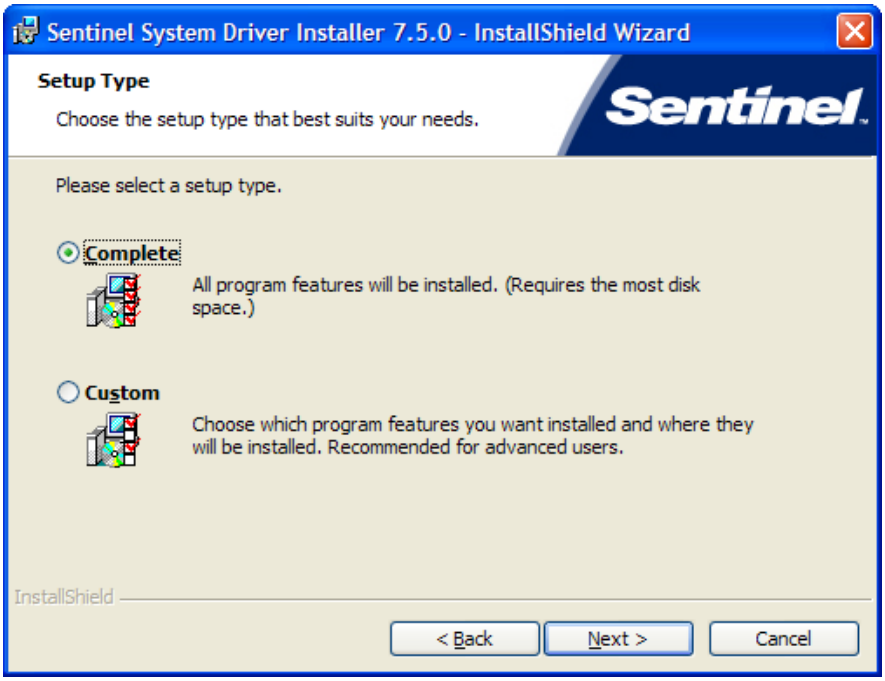
Note: If you have not removed all prior versions of the Sentinel Protection Installer, the wizard detects those versions and displays this screen to ensure the upgrade of all previous versions.

5. Click **Upgrade**. The wizard displays the installation splash screen.

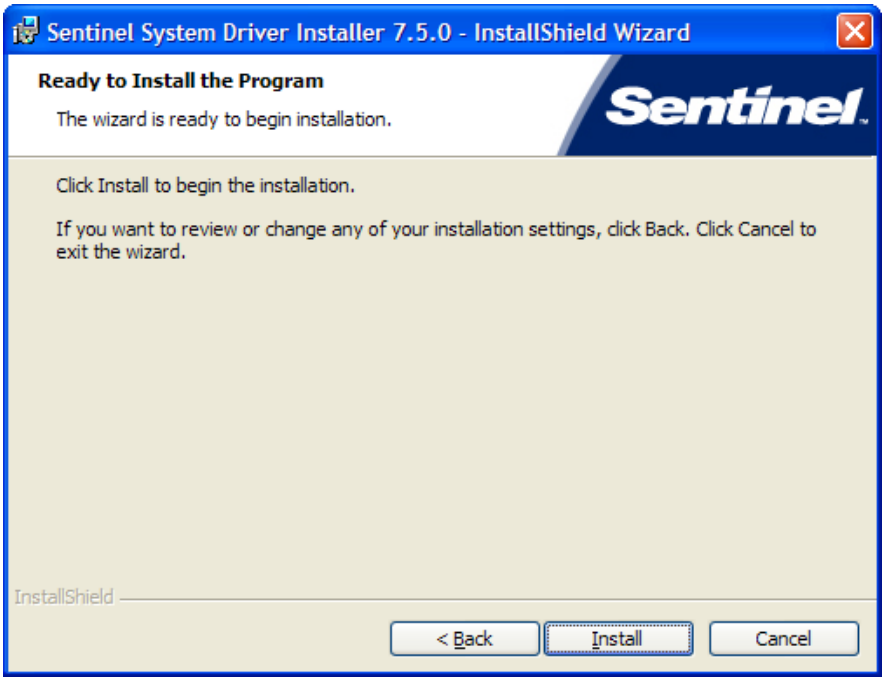
6. Click **Next**. A license agreement screen displays.



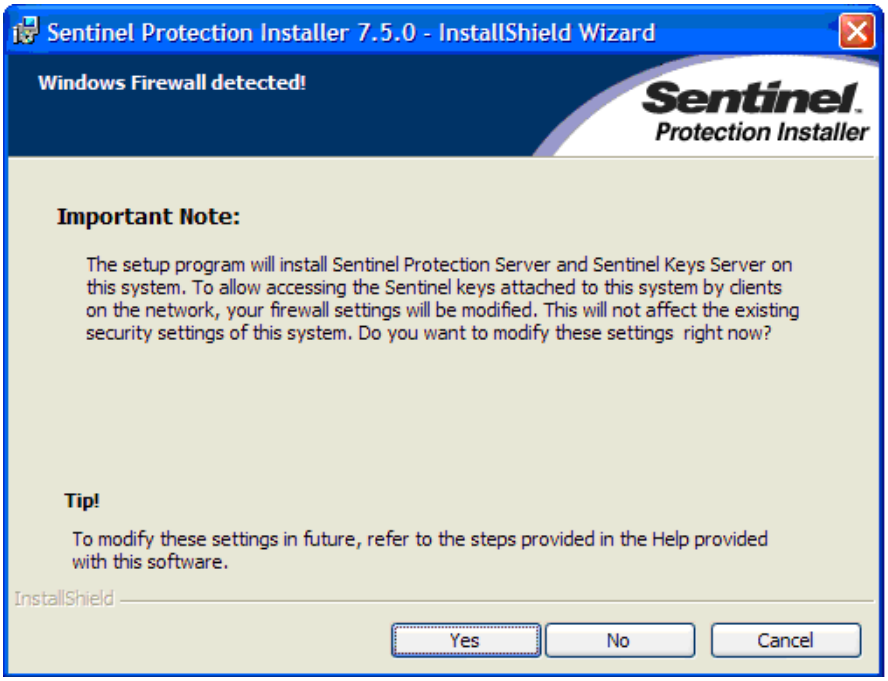
7. Select **I accept the terms in the license agreement** and click **Next**. The wizard displays a screen for the type of setup.



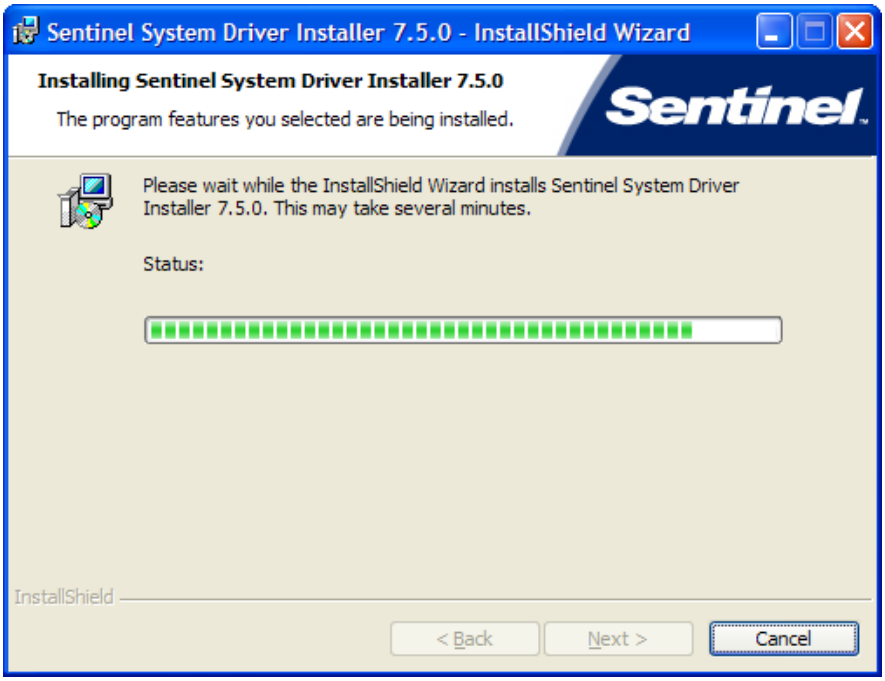
8. Select **Complete** and click **Next**. The wizard displays a screen used to start the actual installation.



9. Click **Install**. The wizard displays a security settings screen.



10. The DS800 does not include the ability to access Sentinel license keys from a remote machine. If you are aware of any installed software on your computer which requires this functionality, click **Yes**. Otherwise, click **No**. The wizard begins installing the software based on your selections.



11. As the installation proceeds, the wizard displays a progress indicator. When the installation finishes, the wizard displays a completion screen.

12. Click **Finish** to exit the installation wizard.

Creating a Sample Workbench Project

The DS800 Workbench software provides the development environment you use to create DS800 "projects" (IEC 61131-3 compliant programs) which you consequently download to the ROC800.

The functionality in the DS800 Workbench varies depending on the license key installed. With no license key installed, Workbench runs in Technician mode.

Technician mode can be considered "read-only" mode. You cannot create a new project or edit previously created projects. You can view existing projects and download them into the ROC800. When the software is running in Technician mode, a red banner appears across the bottom of the window reading "Technician version for DS800 users only."

Two license keys—PR2 and PRD—allow full use of Workbench.

The **PR2** license key enables you to use Workbench to create and edit an unlimited number of projects. However, PR2-created projects can only contain a single configuration (hardware unit), a single resource, and are limited to 128 points of I/O.

The **PRD** license key also enables you to use Workbench to create and edit an unlimited number of projects. However, PRD-created projects can contain an unlimited number of configurations (hardware units), define up to 4 resources per unit, and have an unlimited number of I/O points. You can distribute PRD-created projects across multiple devices.

A trial version of Workbench is also available. The trial version has the same features as a PRD license, but it operates for only 30 days. After 30 days the trial expires and you must uninstall the software. Any projects you may have created with the trial version require a copy of Workbench with a PR2 or PRD license key. Contact your local Remote Automation Solutions representative to receive a copy of the trial version of Workbench.

	Hardware Units Supported	Resources per Hardware	I/O Points	Notes
Technician	Unlimited	4	Unlimited	Cannot create or edit projects
PR2	1	1	128	
PRD	Unlimited	4	Unlimited	
Trial	Unlimited	4	Unlimited	Expires in 30 days

Technician mode is basically a "read-only" mode. You cannot create new projects or edit previously created projects, but you can view existing projects and download projects.

Getting Started with DS800

The DS800 workbench is designed to help you build process control applications. You can distribute these applications across several platforms or enable the applications to communicate with each other through networks. A DS800 project shows the distribution and links between each PLC loop, which the DS800 kernel (or "virtual machine") executes on each platform.

Using the function block diagram language, this section details the steps required to build a sample project (creating an incrementing counter in a soft point parameter) and familiarizes you with the views, buttons, and vocabulary of DS800.

The following steps are involved:

1. Creating a New Project
2. Importing a Device Configuration
3. Adding Variables to the Dictionary
4. Creating a Program to the Resource
5. Compiling the Program
6. Compiling the Project
7. Downloading the Project
8. Debugging the Project
9. Verifying the Program in ROCLINK 800

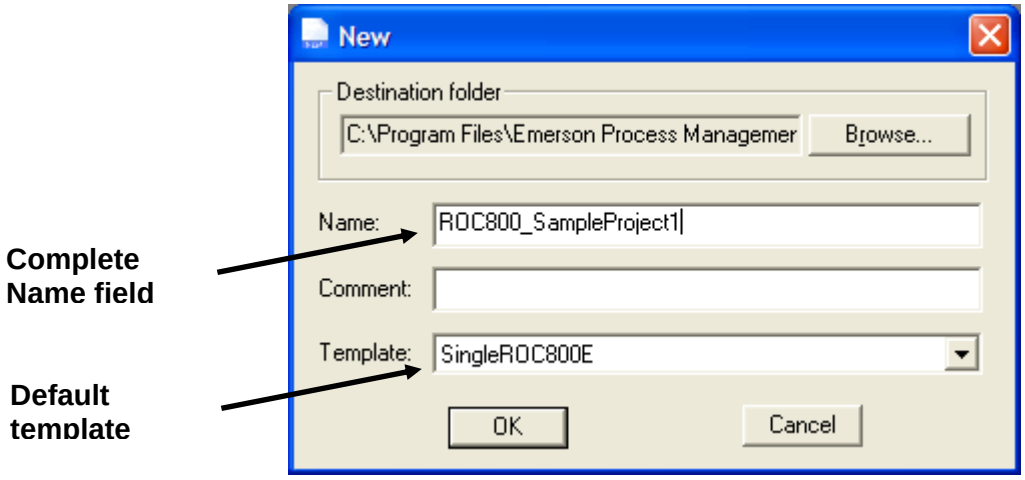
1. Creating a New Project

To create a new DS800 project:

1. Click the DS800 2.1 icon on your desktop. The DS800 workspace screen displays.

   Note: If you did not create a desktop icon for this application, you can also click **Start** > **Programs** > **Emerson Process Management** > **DS800 2.1**.

2. Click the New Project icon ( ) on the DS800 workspace toolbar. A New project dialog box displays.

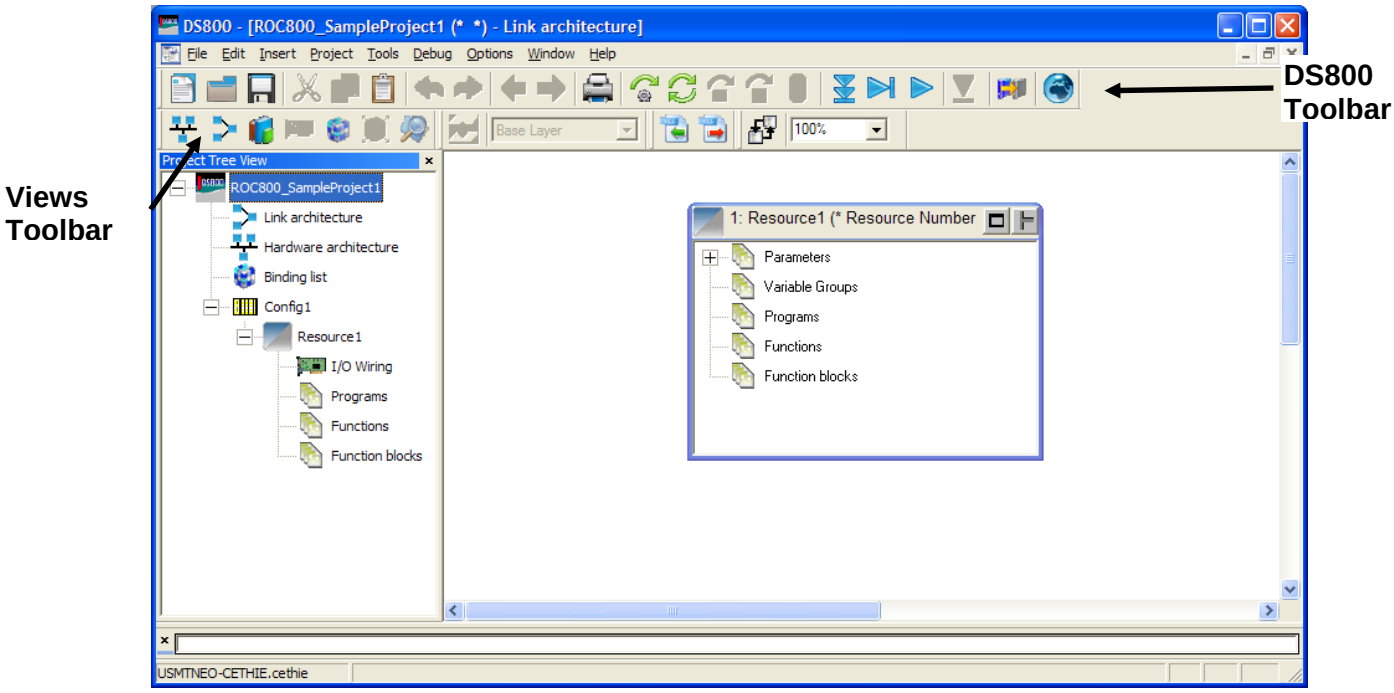


Note: By default, DS800 places project files in the folder C:\Program Files \ Emerson Process Management\ Projects\ DS800 2.1. If you want your project files in another location, click **Browse** to select that location.

3. Enter **ROC800_SampleProject1** in the Name field. DS800 completes the Template field with the default value **SingleROC800E** (a single ROC800 using Ethernet connections).

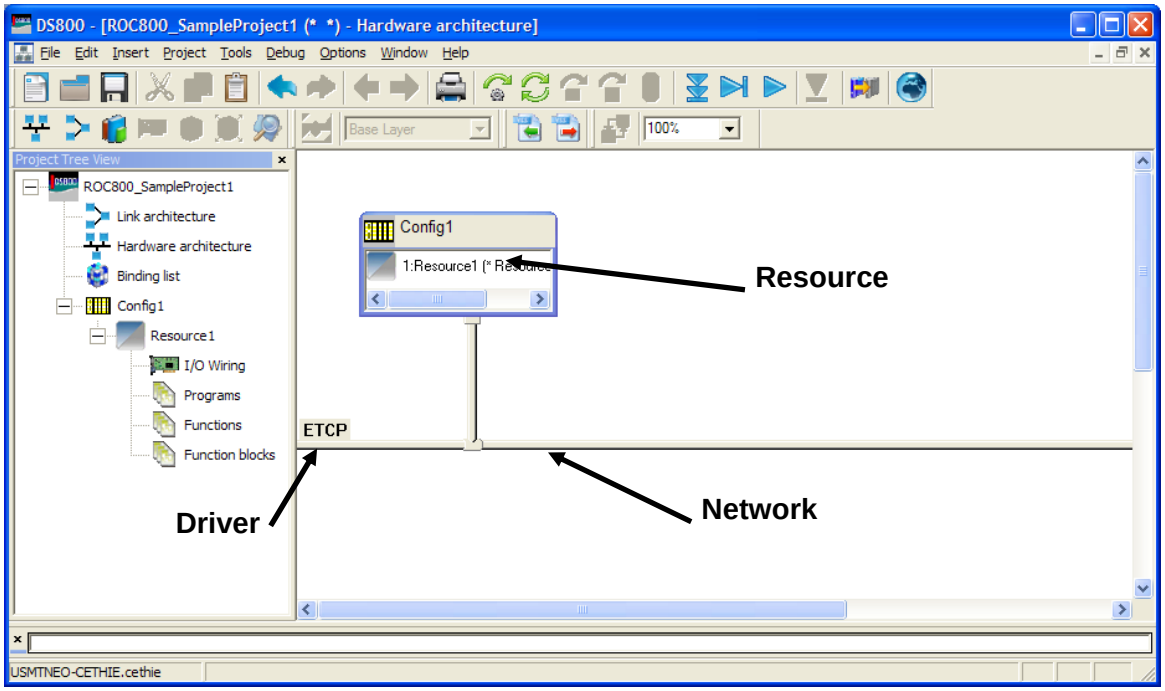
Note: You can click ▼ in the Template field to display other templates.

4. Click **OK**. The DS800 Resource view screen displays.



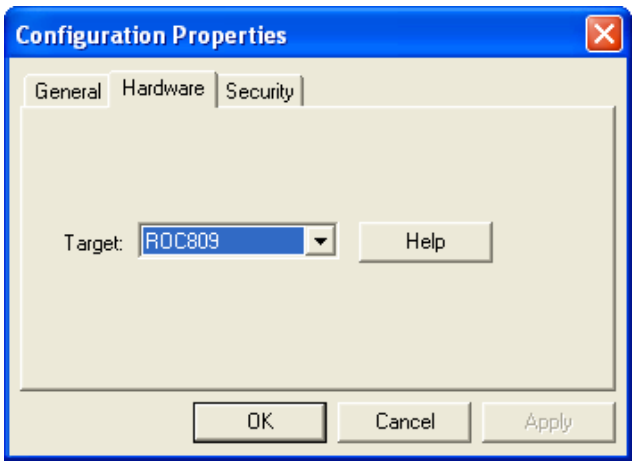
Use the icons on the DS800 toolbar and the Views toolbar to work with the project data. Small descriptive tags ("tool tips") appear as you move the cursor over each toolbar icon.

5. Double-click the hardware architecture icon ( ) on the Views toolbar to display the Hardware Architecture view.



This screen shows your project in relationship to existing hardware.

Resource	A resource is composed of programs and corresponds to a PLC loop. You compile a resource and then download its code to configuration, where the DS800 kernel ("virtual machine") executes it.
Configuration	A hardware platform, linked to other hardware platforms by a serial network. Use DS800's Hardware Architecture view to display configurations.
Target	You attach a configuration to a specific target. A target contains definitions about the hardware platform and the virtual machine running on it. Double-click the configuration's title bar to display a Configuration Properties screen, which has three tabs:

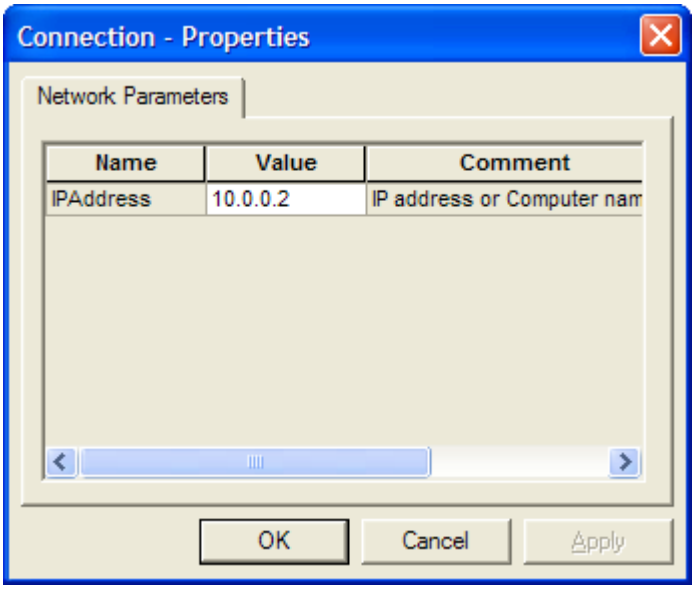


- **General**, which provides a title and any comments for the configuration.
- **Hardware**, which indicates the target device (such as the ROC809) for this configuration. This is the tab that displays when you open this screen.
- **Security**, which sets a password security to prevent unauthorized changes to the configuration's properties.

Specifying a target for a configuration affects the list of functions and function blocks that you can call in your programs, the list of I/O devices that you can use, and the networks that you can connect to your configuration.

Network	The ROC800 can communicate with the Workbench (the DS800 utility you use to create configurations) using either the **ISARSI** (serial) network driver or the **ETCP** (Ethernet) network driver. You select this through the template. The Hardware Architecture view provides a reminder of what network driver you are using. **ETCP** is the standard driver Remote Automation Solutions provides to communicate over an Ethernet network. The Workbench debugger also uses ETCP to communicate with the resources running on the configurations.

6. Double-click the vertical (connection) line to open the connection configuration. A Connection Properties screen displays.

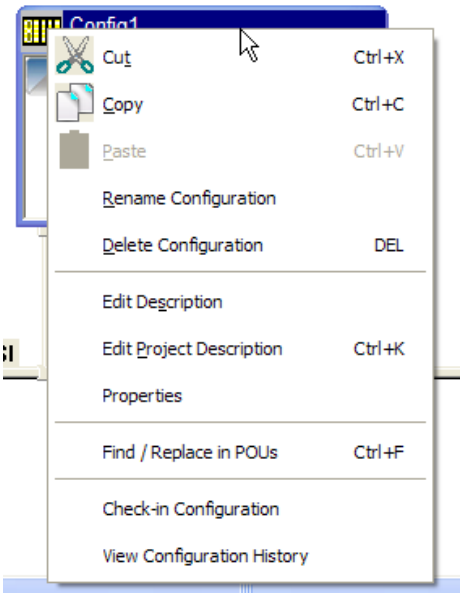


7. For an Ethernet connection, configuration is automatic. However, you can manually modify the value of the IP address on this screen according to the ROC800-series device you intend to connect to. Click **OK** to save the value.
8. Proceed to *Importing a Device Configuration*.

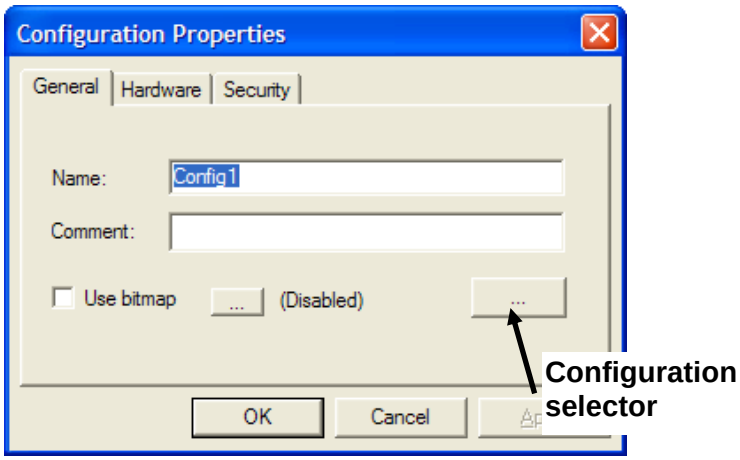
2. Importing a Device Configuration

The device configuration file contains device-specific information (such as number of points, number of meters, and TLPs) the DS800 application needs to appropriate place data. (You created a configuration file for the ROC800 in **Step 4** of the installation process.)

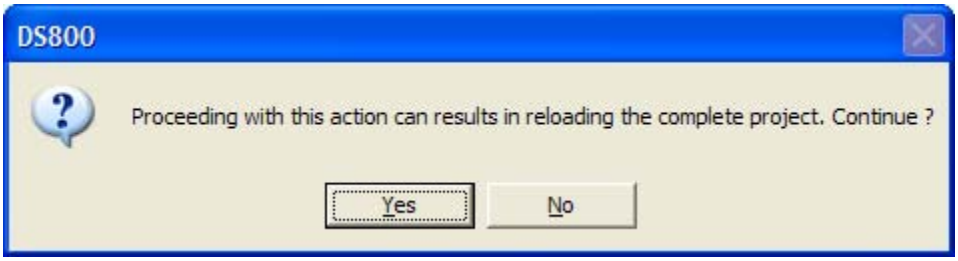
1. Right-click the configuration's title bar. A menu displays.



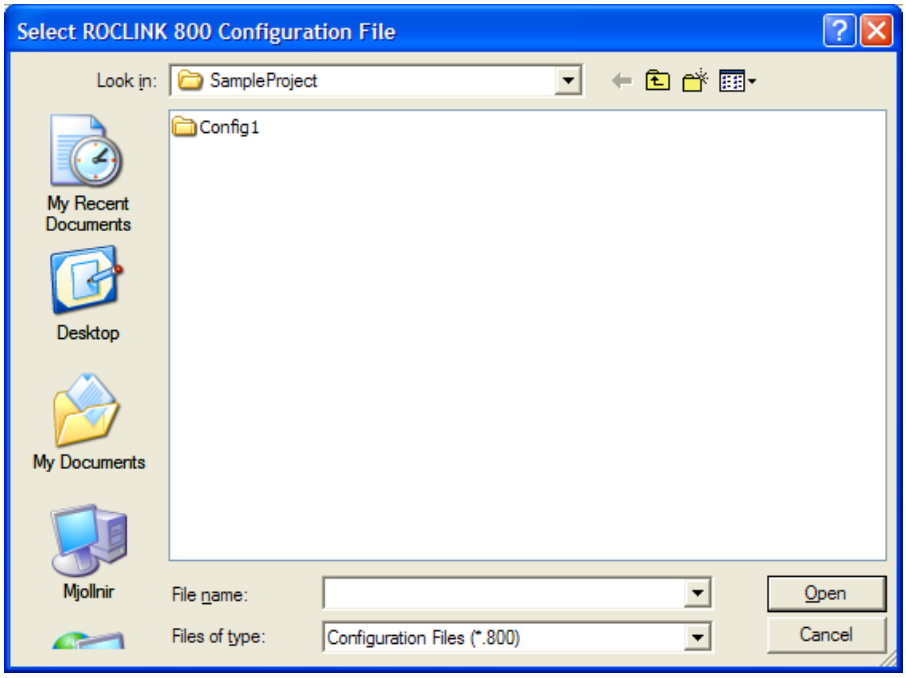
2. Select **Properties**. The Configuration Properties screen displays.



3. Click the right-most browse button. A message box cautions you that importing a configuration may reload the entire project.

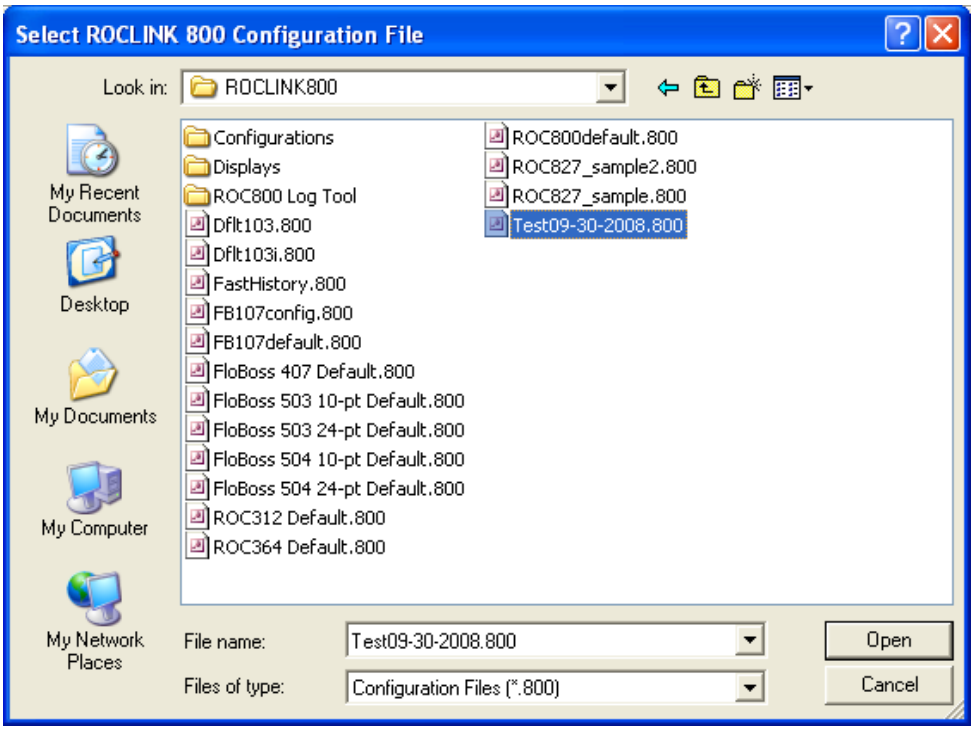


4. Click **Yes**. The Select ROCLINK 800 Configuration File screen displays.

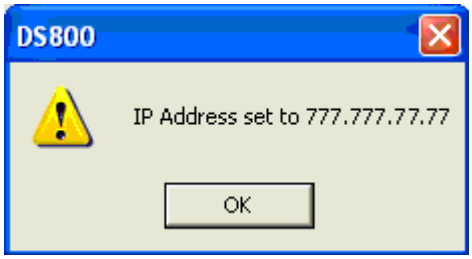


Note: As a default, ROCLINK 800 stores configuration files in the folder C:\Program Files\ROCLINK800. You may need to browse to this folder to locate the configuration file you want.

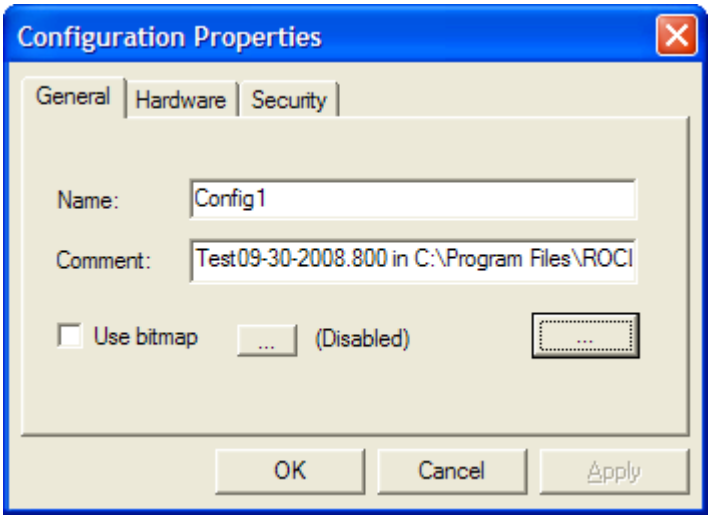
5. A dialog box displays that you use to select the configuration file to import.



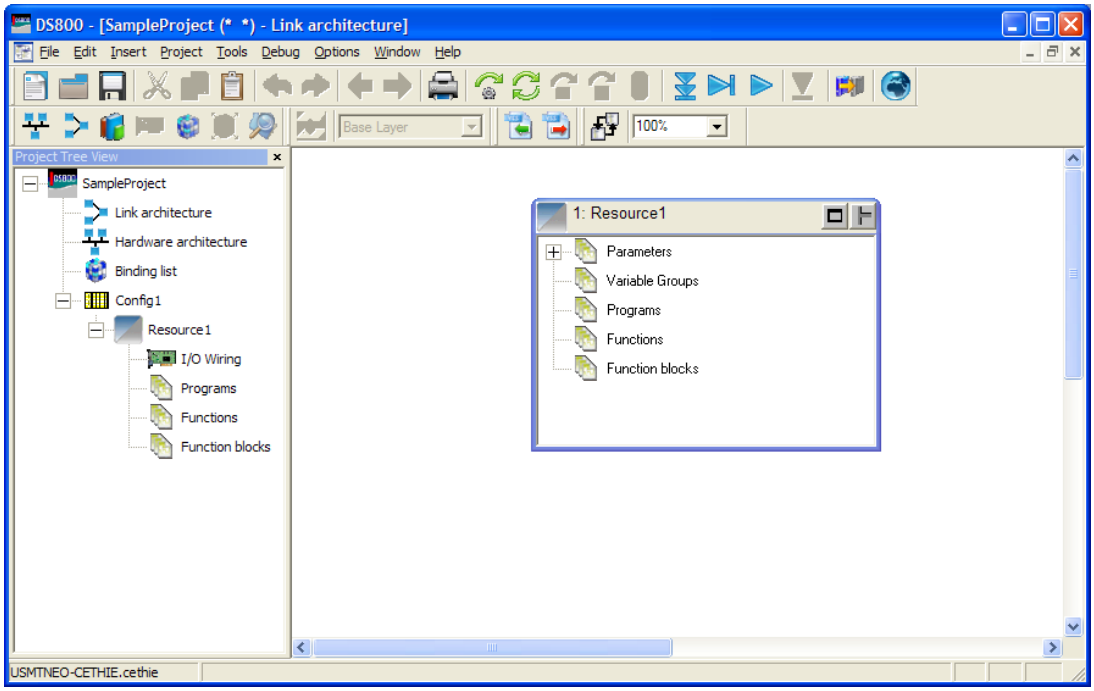
6. Select a file and click **Open**. A message box may display if the Workbench changes the IP address for the configuration to the value stored in the configuration file.



7. Click **OK**. The Configuration Properties screen displays with the configuration you have selected.



8. Click **OK** to apply the configuration file to the project. Once the file is loaded, DS800 displays the Resource view.

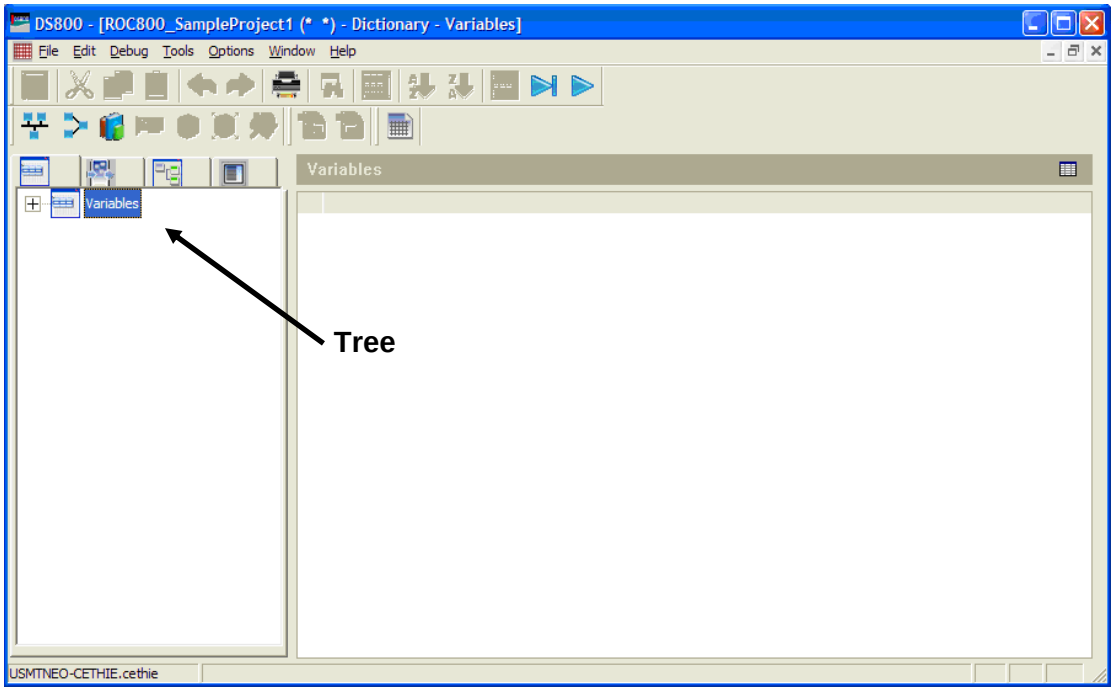


9. Proceed to *Adding Variables to the Dictionary*.

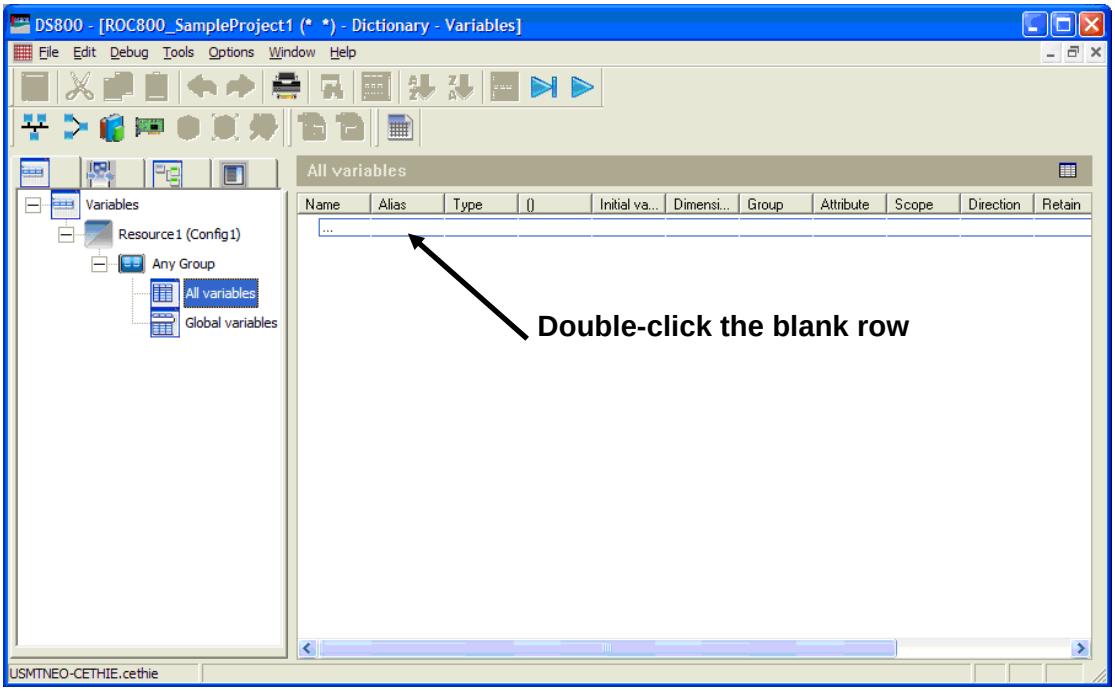
3. Adding Variables to the Dictionary

Once you have a configuration loaded, you can begin to define variables in the DS800 dictionary. Variables associate TLPs in the ROC800 with DS800 content. To add variables:

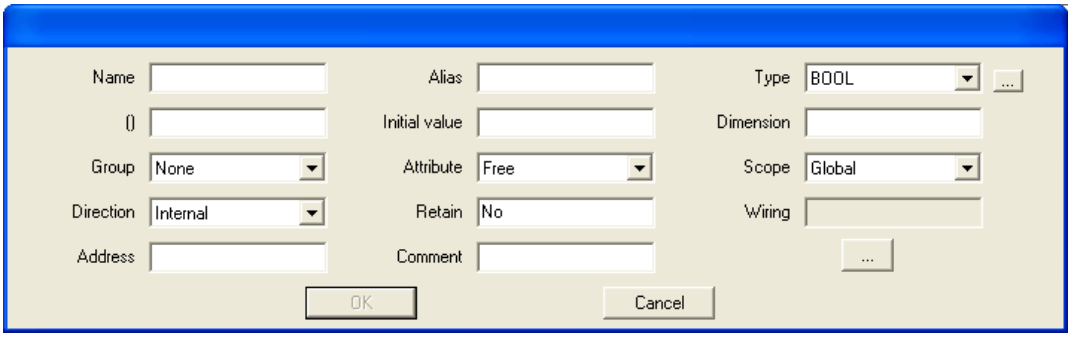
1. Click the Dictionary icon ( ) on the toolbar to open the Dictionary view.



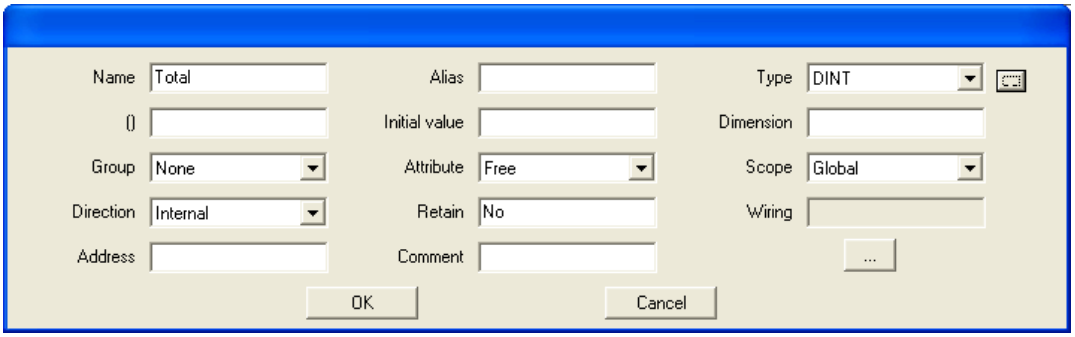
2. In the tree to the left of the screen, double-click **Variables** > **Resource1** > **Any Group** > **All variables**. The panel in the right portion of the screen changes to a grid format.



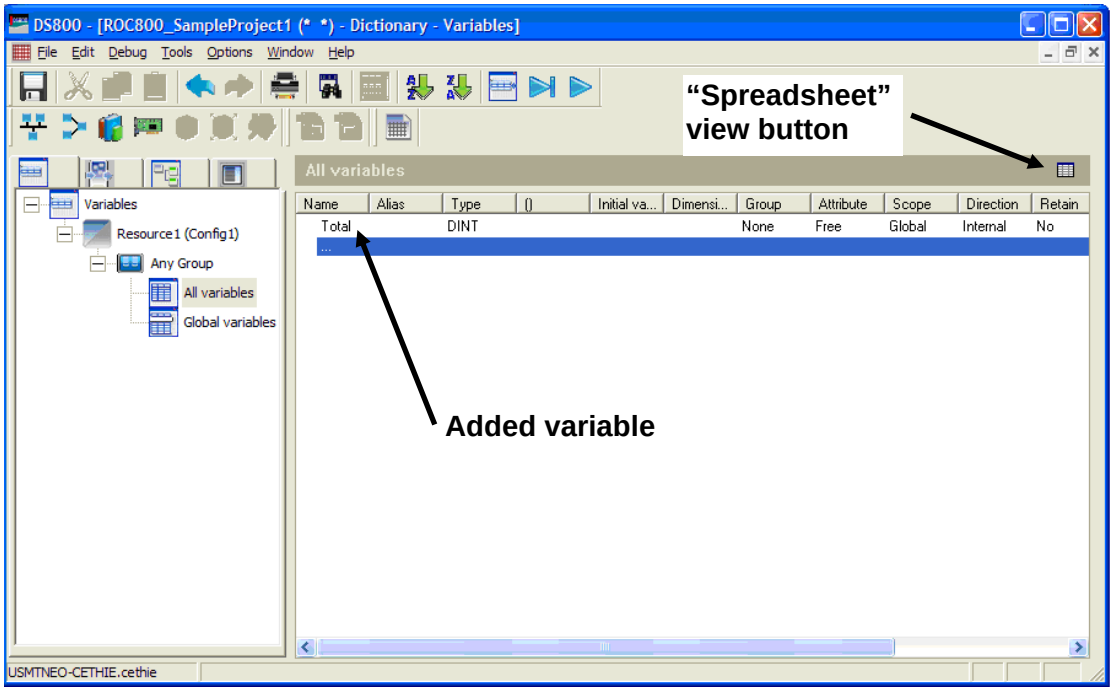
3. Double-click the blank row to open a dialog box that helps you to define the new variable.



4. Enter **Total** in the Name field, and select **DINT** (signed double integer) in the Type file.

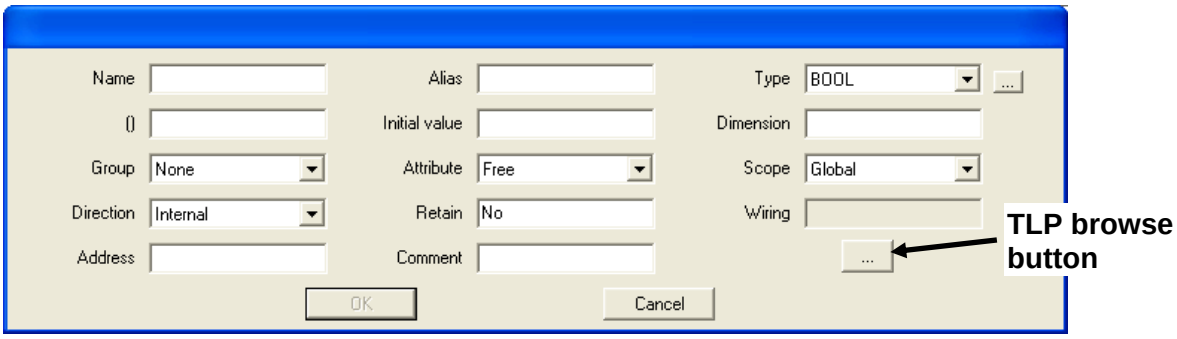


5. Click **OK** to add the variable. The Dictionary screen redisplays with the variable added.

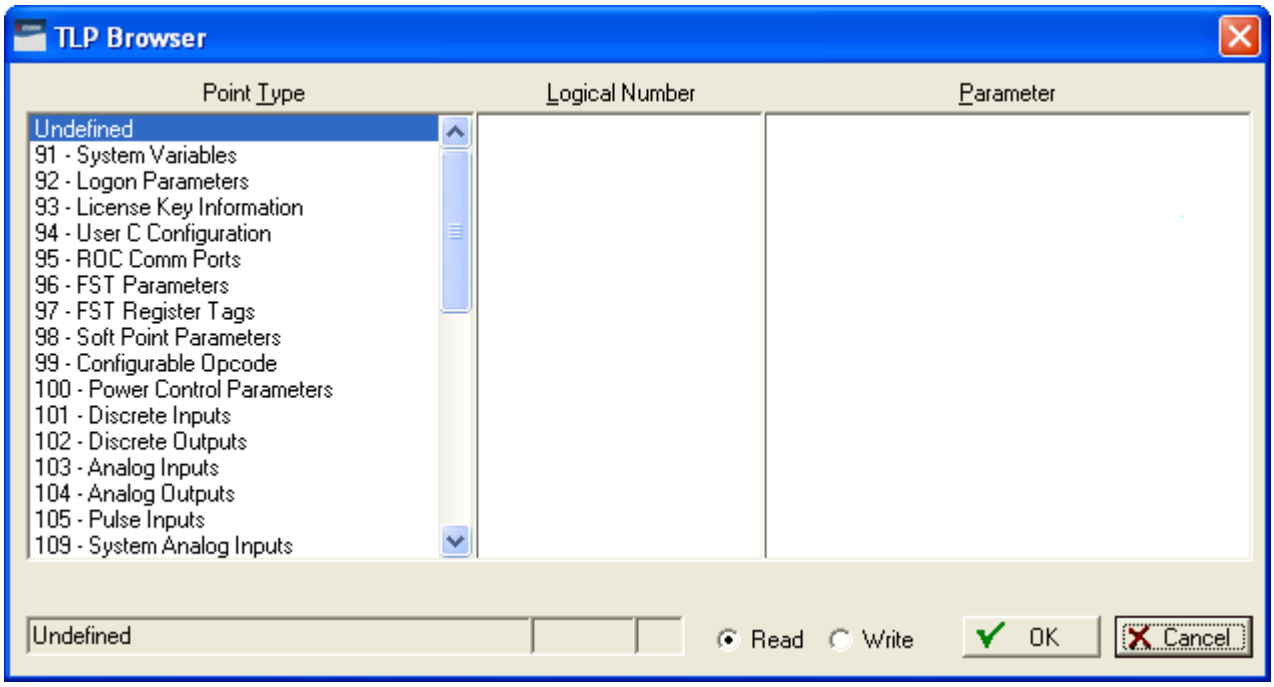


Note: Click the button in the upper right corner of the variable view to display the variable table in an editable spreadsheet format.

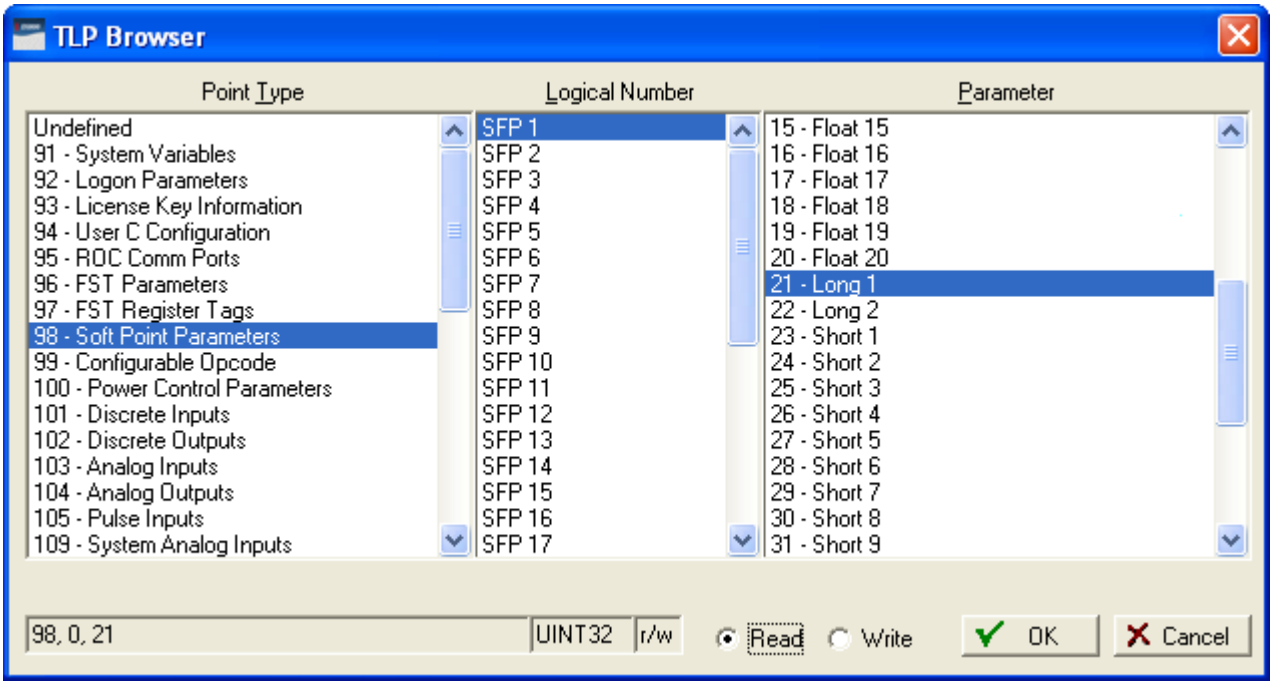
6. To define a second variable that is connected to a parameter in the ROC800, double-click the highlighted blank row to open the dialog box.
7. Click the TLP browse button on the dialog box.



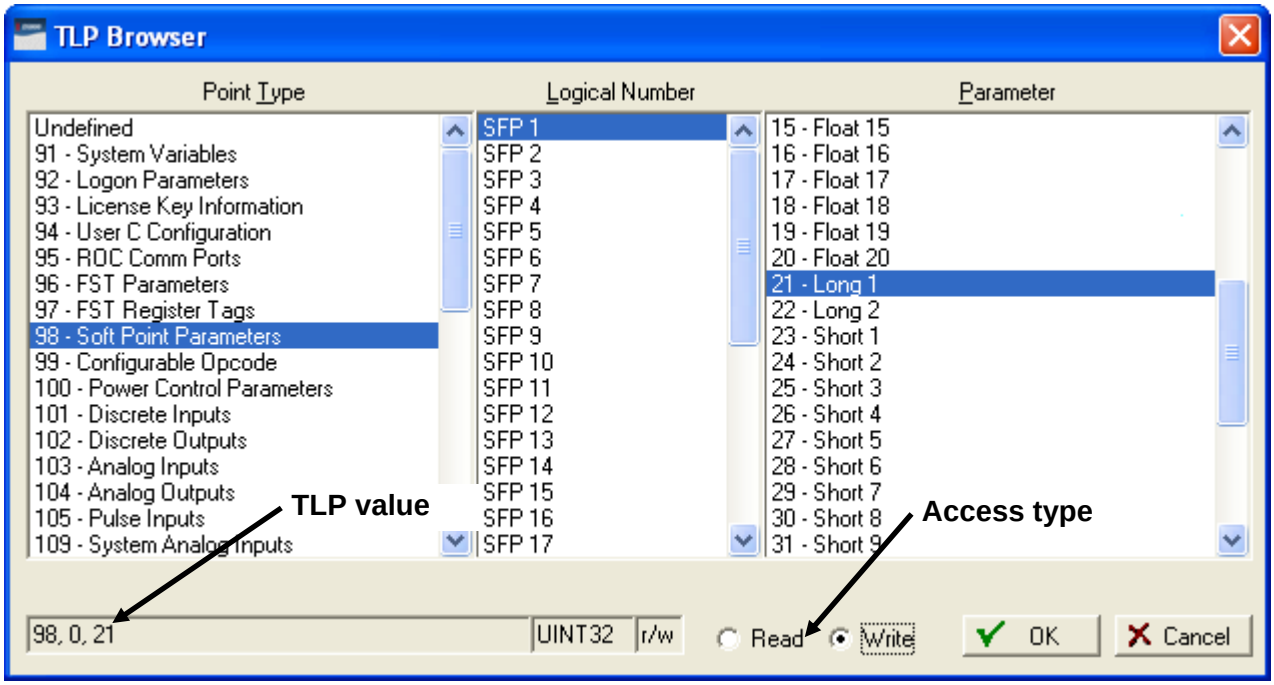
A TLP Browser screen displays.



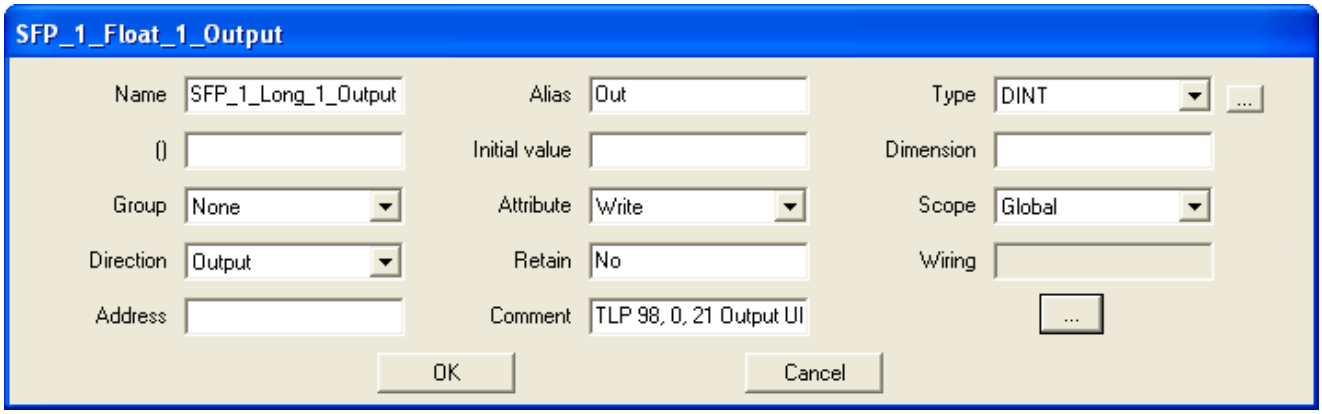
8. Select **98 – Soft Point Parameters** in the Point Type column. The program completes the Logical Number and Parameter columns.



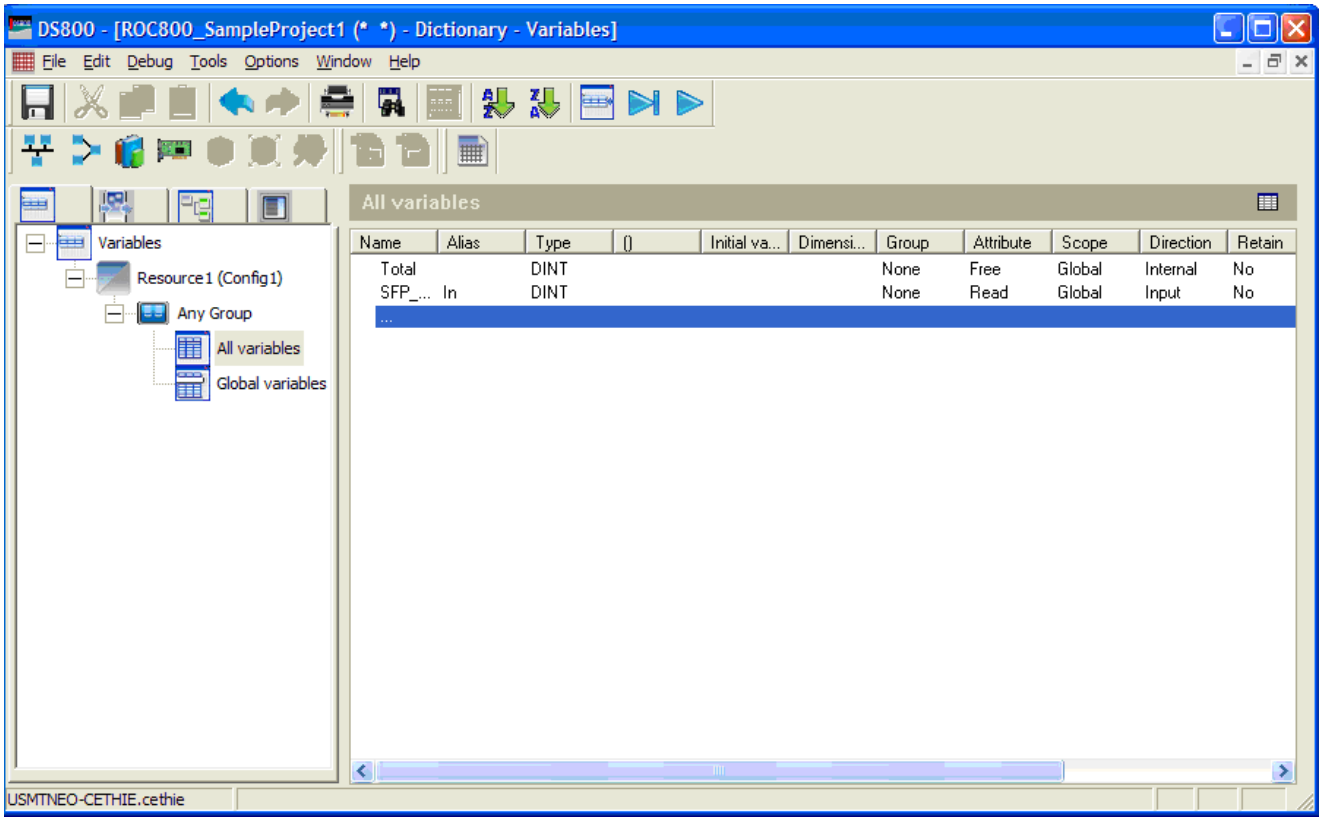
9. Leave **SFP 1** as the value in the Logical Number column and select **21 – Long 1** in the Parameter column.



10. Finally, select **Write** as the access type. Click **OK**. The variable dialog box displays. Note that the values in several fields have changed to correspond to your defined variable.



11. Click **OK** to add the variable to the dictionary.



12. Click the Save icon ( ) to save your changes to the dictionary.

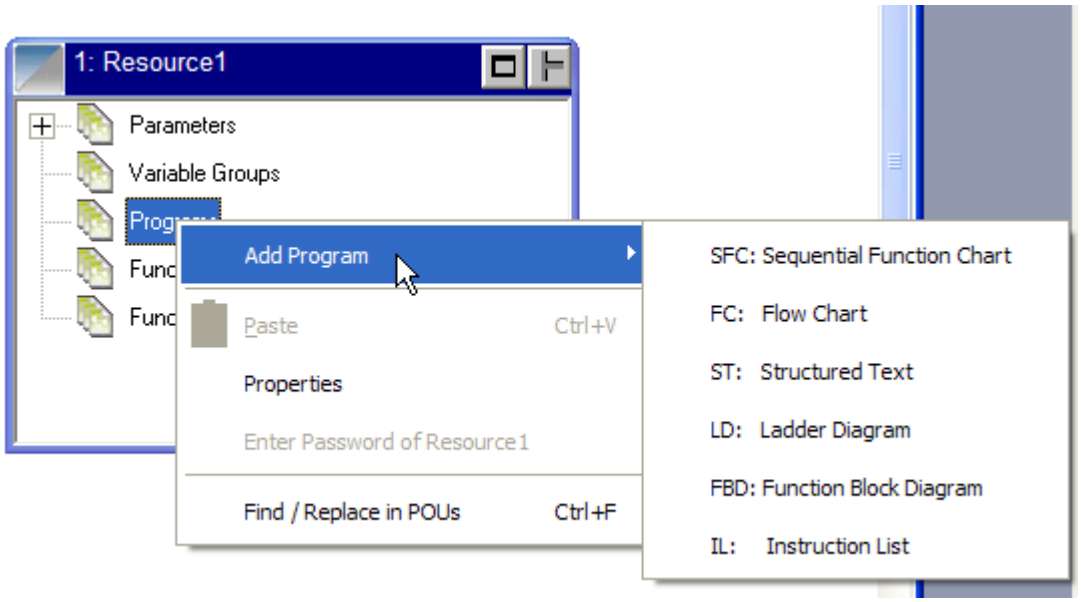
13. Click the Link Architecture view icon ( ) to display the project's link architecture.

14. Proceed to *Adding a Program to the Resource*.

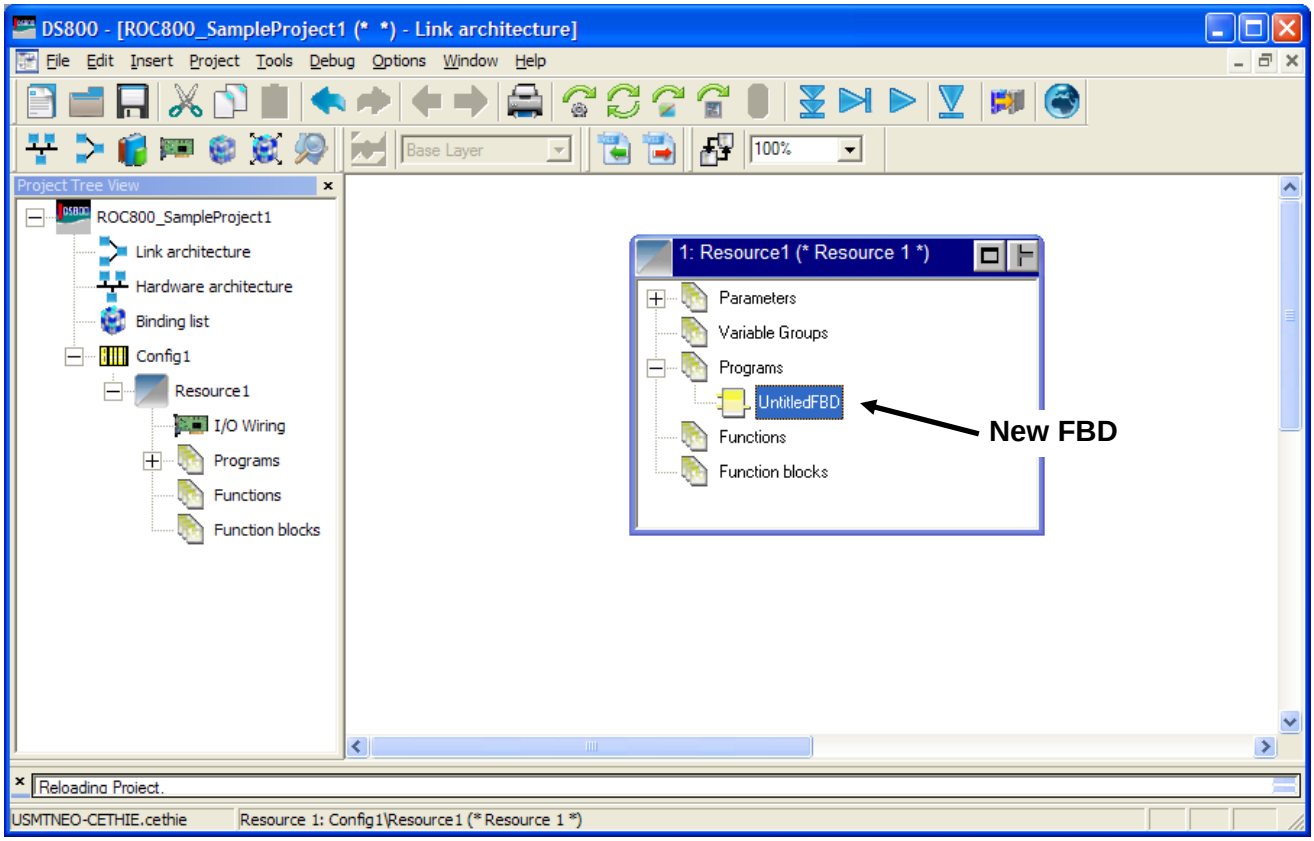
4. Adding a Program to the Resource

Using the Link Architecture view, you can see how the components of your DS800 project fit together. The next step is to give the ROC800 resource functionality by adding a program:

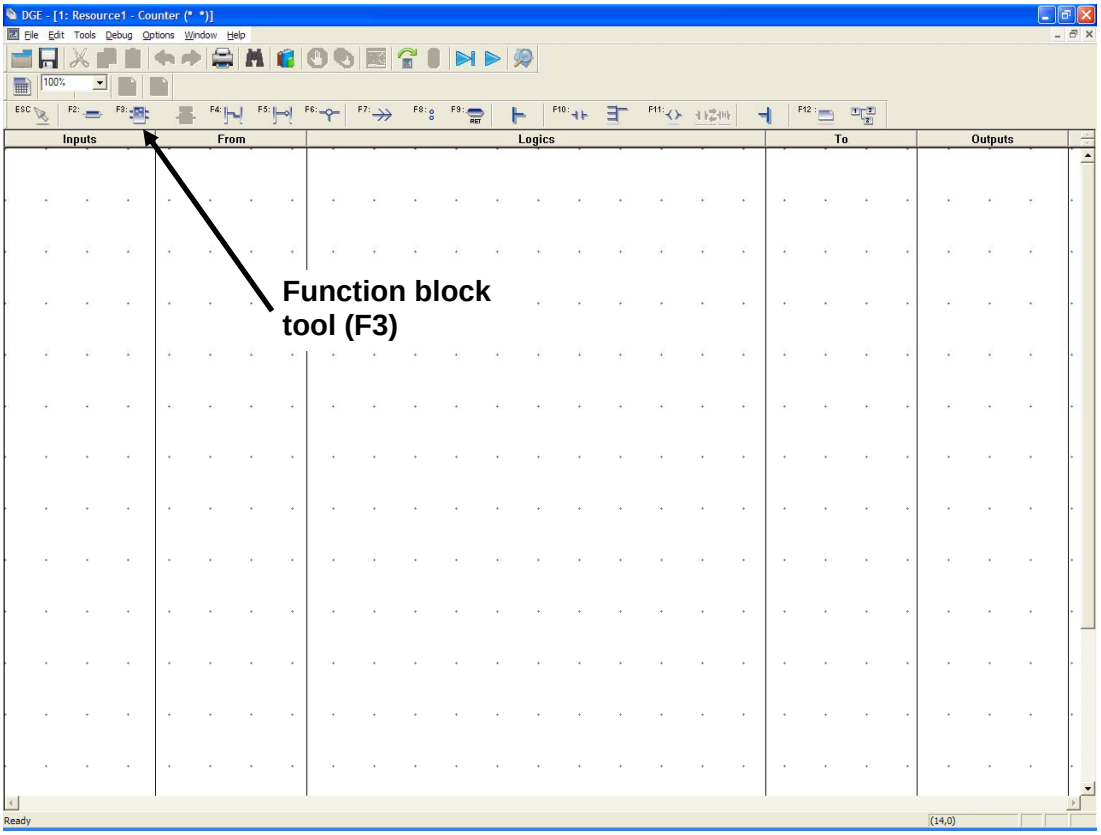
1. Right-click **Programs** in the Resource1 box. A menu displays.
2. Move the cursor over the **Add Program** option to display a menu of programming languages.



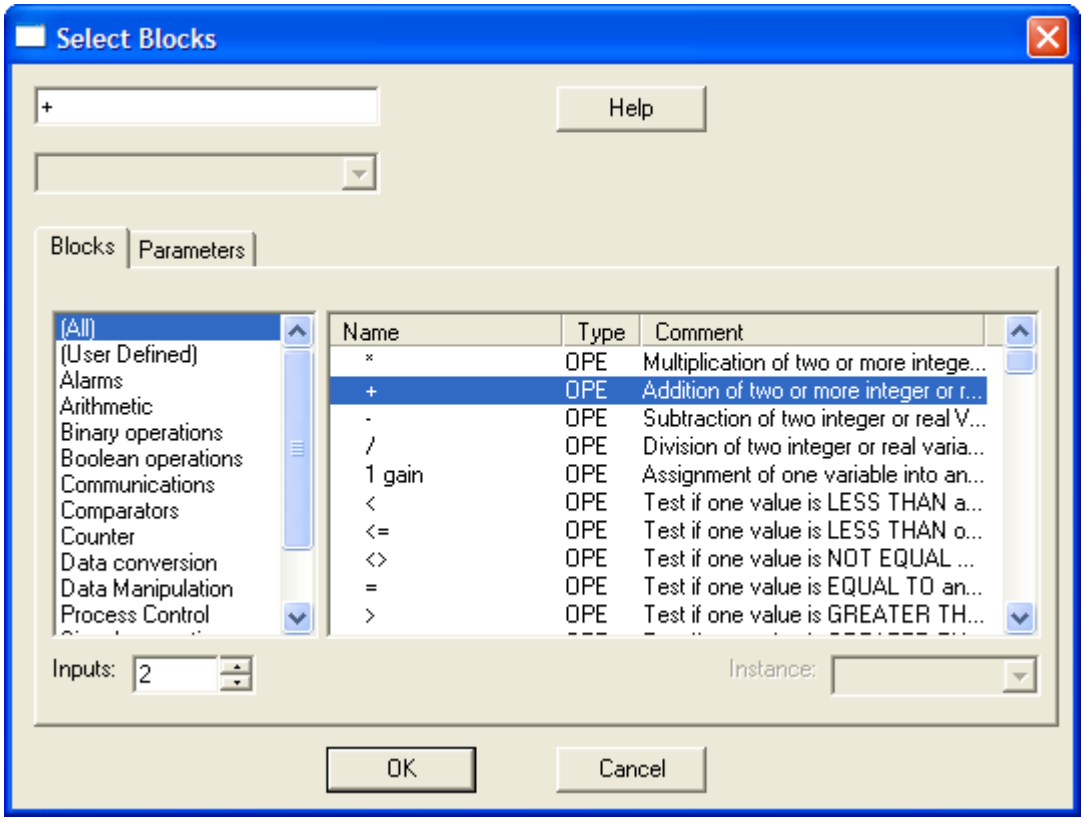
3. Select **FBD: Function Block Diagram**. The Link Architecture view displays, showing an unnamed FBD.



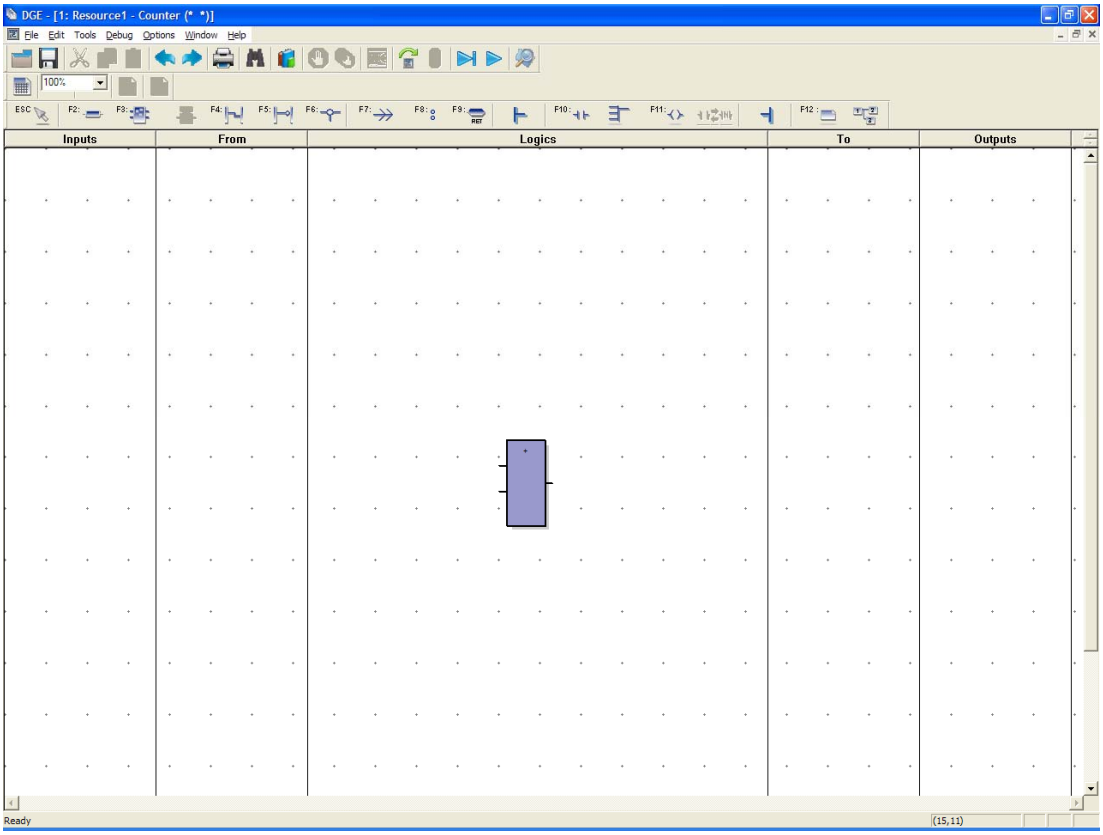
4. Rename the UntitledFBD program as **Counter**.
5. Double-click the Counter program to open the DS800 Editor program.



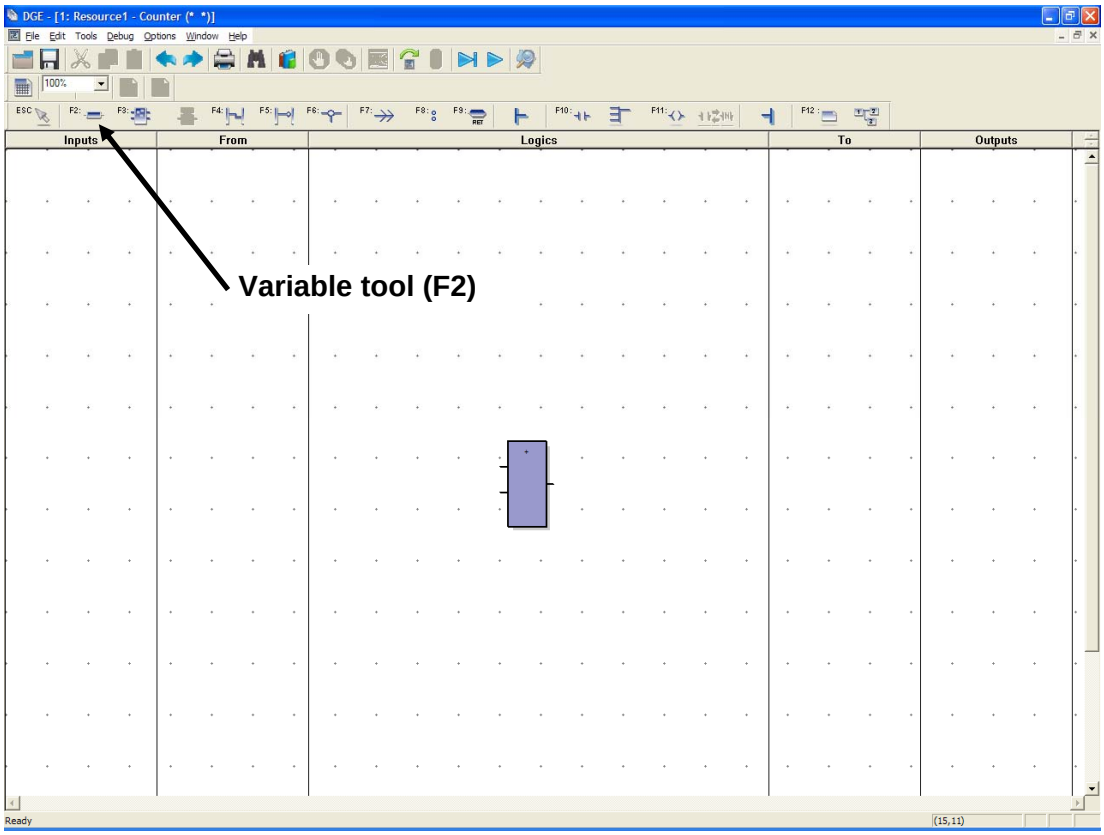
6. Click the function block tool on the language toolbar (or press **F3**). The cursor becomes a function block tool once you move it into the editor grid.
7. Move the cursor in the middle of the editor screen and click. A Select Blocks screen displays.



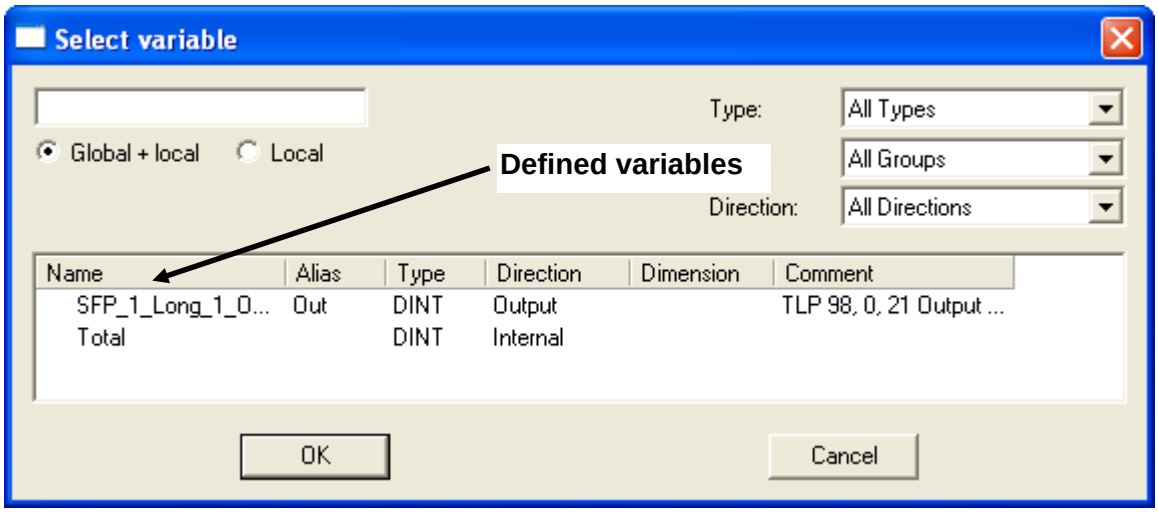
8. In the right-hand panel, select the second block option (**Addition of two or more integer or…**) and click **OK**. The editor changes the shape of the generic function block to an addition function block. Note the two inputs on the left side of the block and one output (which provides the sum) on the right side of the block.



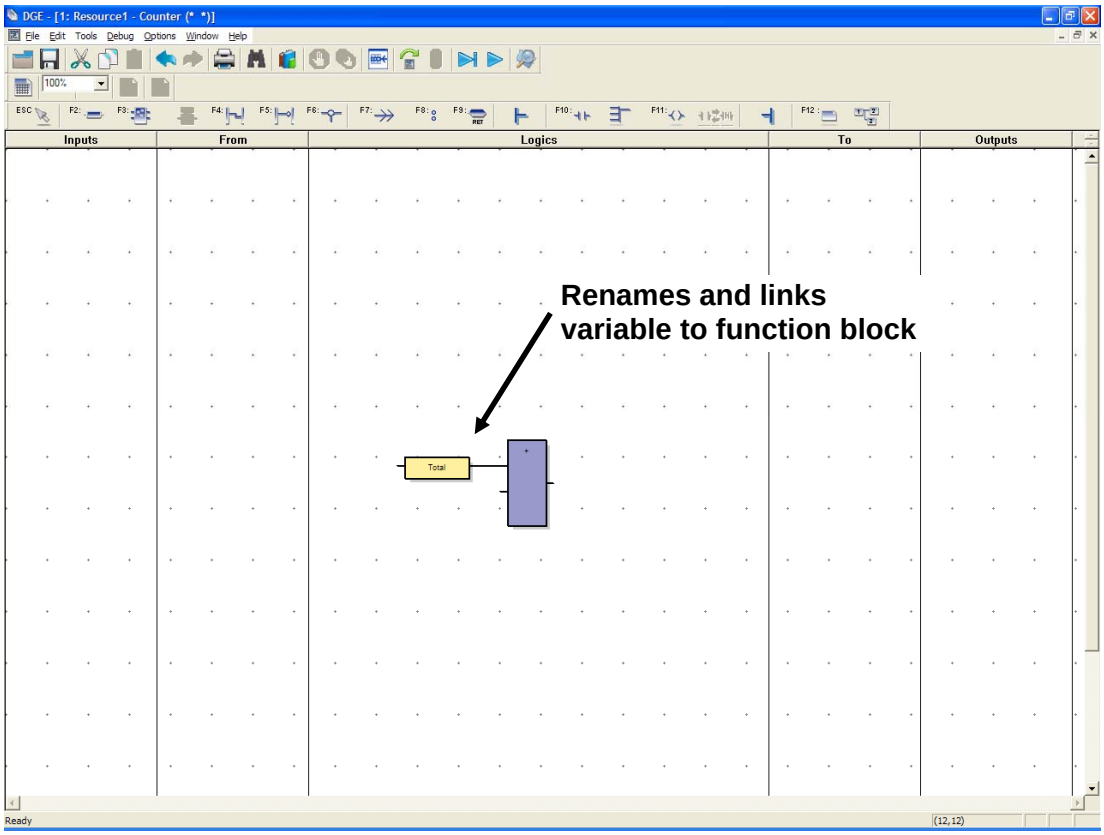
9. Click the variable tool on the language toolbar (or press **F2**). The cursor becomes a variable tool once you move it into the editor grid.



10. Move the variable tool close to one of the inputs on the left side of the function block and click. The Select Variable dialog box displays, which shows the variables currently defined for this project.



11. Select the Total variable and click **OK**. The editor renames the variable and, if the variable is close to the function block, automatically links the variable and function block.

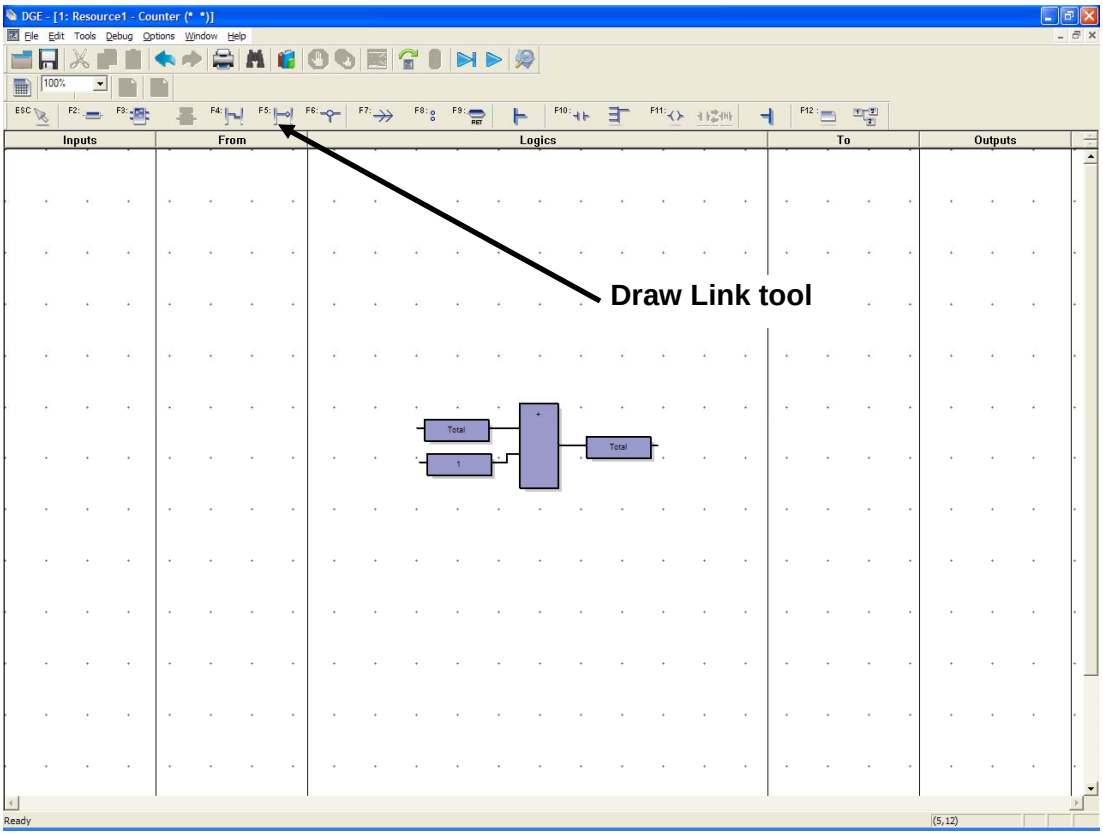


12. Select the variable tool again and click near the second input on the function block to display the Select variable dialog box.

13. Enter **1** in the upper left-most field in the Select variable dialog box and click **OK.**

Note: This value is not a variable, but is a constant value.

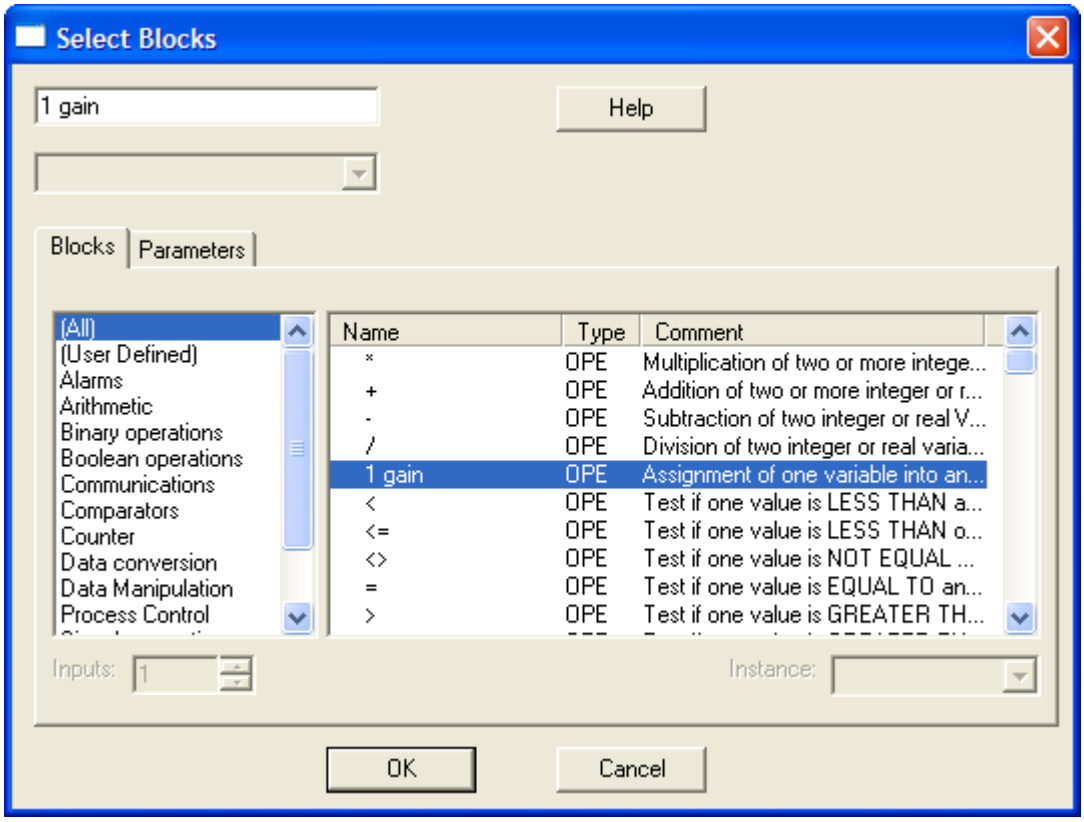
14. Select the variable tool a third time, but click near the **output** on the function block. When the Select variable dialog box displays, select the Total variable and click **OK**. At this point, the program should look like this:



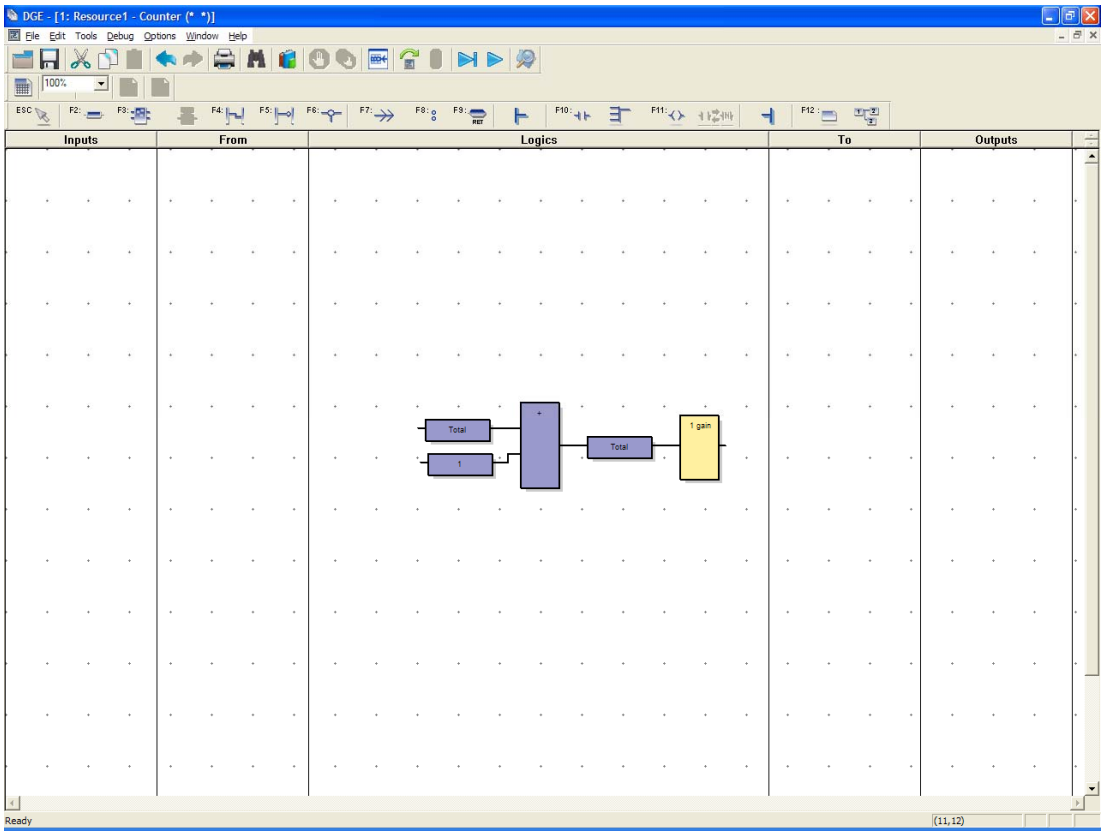
Note: If the editor has not automatically connected the variables to the function block, select the Draw Link tool (F4) to connect the variables. Alternately, you can move the variables closer to the function block.

A text-based equivalent for this program would be **Total = Total + 1.** Once you have defined the program, you need to write the output to a parameter in the ROC800.

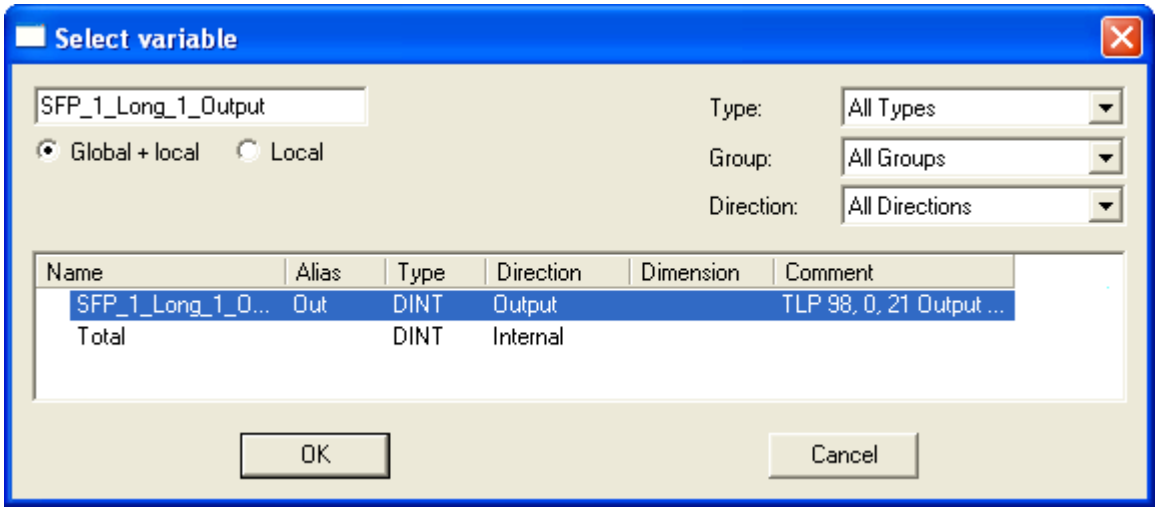
15. Select the function block tool (or click **F3**) and click at the extreme right-hand end of the current block structure. The Select Blocks dialog box displays.



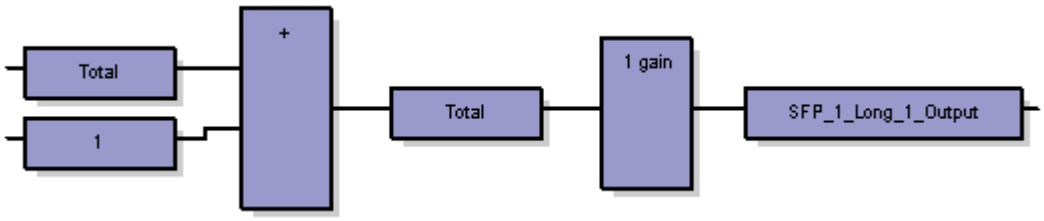
16. Select the **1 gain** function block (as shown above) and click **OK**. The editor renames the function block.



17. Select the variable tool (F2) and move the cursor to the right of the 1 gain function block. The Select variable dialog box displays.



18. Select the **SPF_1_Long_1_Output** variable (as shown above) and click **OK**. The finished block structure should look like this:



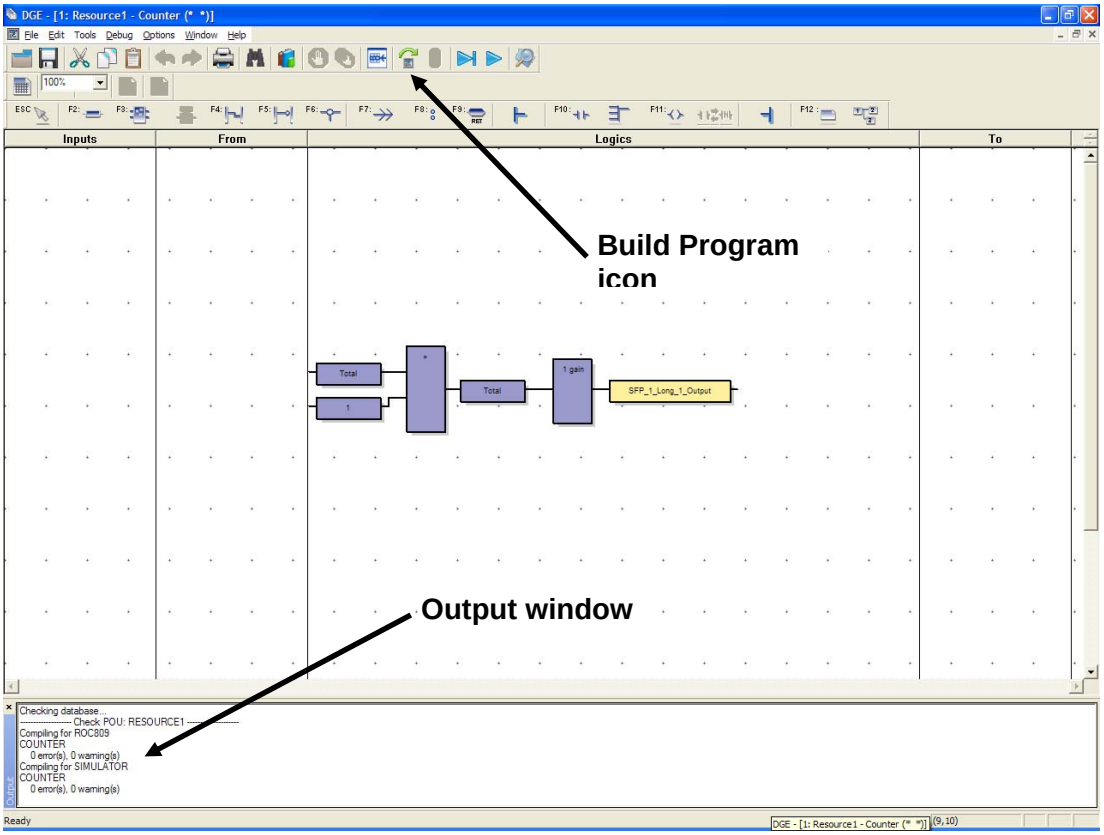
19. Click the Save icon ( ) on the toolbar to save the program.

20. Proceed to *Building the Program*.

5. Building the Program

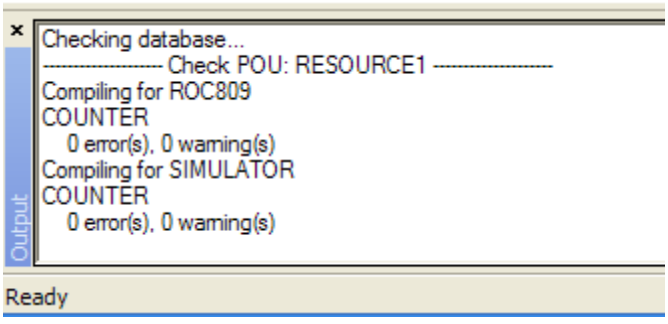
Once you complete and save your program, you must build (or compile) it.

1. Click the Build Program icon ( ) on the editor toolbar. As the program builds, the Output window at the bottom of the screen notes any errors or warnings.

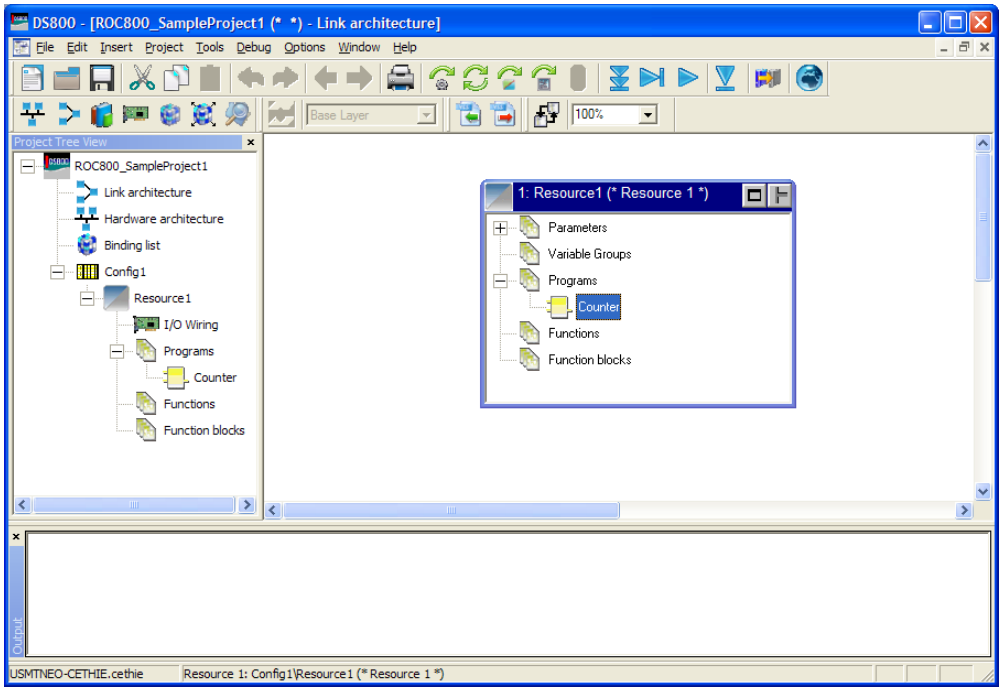


Note: The Output window shows the result of the code generation. During testing, it can also show any execution messages. You can change the height of the window to display more or fewer lines.

2. When the build completes, the message in the Output window should resemble the following:



3. Close the editor window. The main workbench window displays.

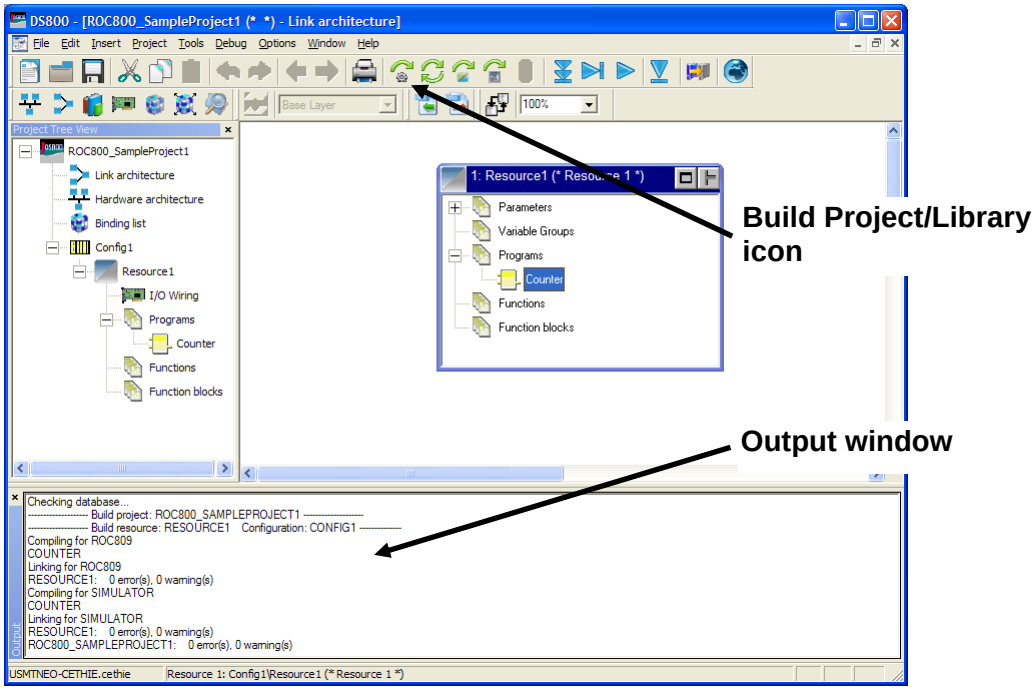


4. Proceed to *Compiling the Project*.

6. Compiling the Project

As noted before, a project may have one or more programs. Our simple project has only one program, but if your project has multiple programs, you need to successful compile—or "build"—each program (when the Output window displays *0 error(s), 0 warning(s)*). Only then should you attempt to compile the project. To compile the project:

1. Click the Build Project/Library icon ( ) on the DS800 toolbar. The Output window indicates whether any errors or warnings occurred:

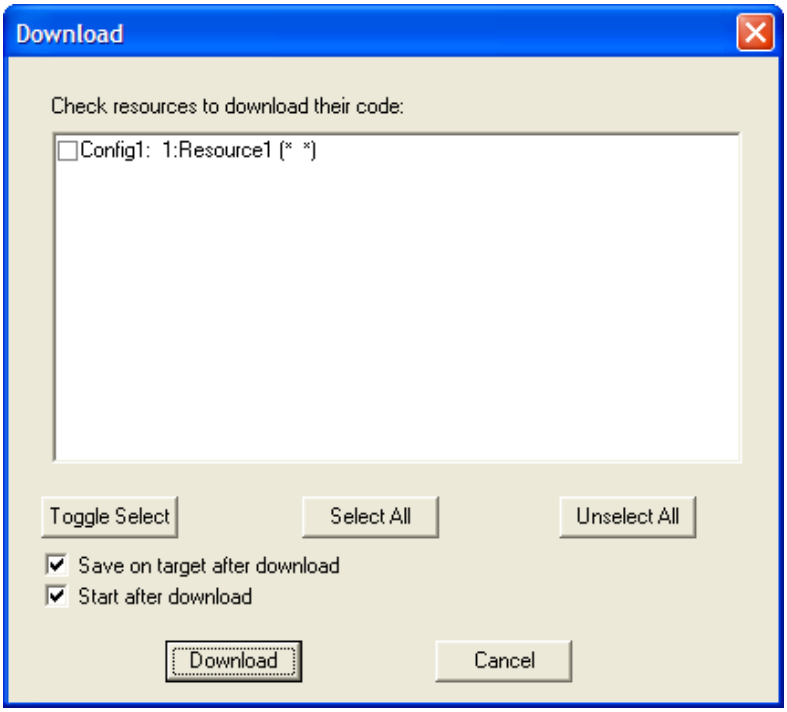


2. For a successful compile, the Output window should display *0 error(s), 0 warning(s)*.
3. Proceed to *Downloading the Project*.

7. Downloading the Project

Once you have successfully compiled the project, you can download it to the ROC800 for execution there. Ensure that your PC is connected via an Ethernet connection to the target ROC800 (the same ROC800 from which you imported your configuration file).

1. Click the download icon ( ) on the toolbar. The Download dialog box displays.



2. Click **Select All** to choose the resource you want to download. (For this sample project, we defined only one resource.) You can de-select any resources you want to omit them from this download.
3. Click **Download** to start the download process. When the download completes, DS800 displays the following message in the Output portion of the Workbench screen.

   ```
   Checking database...
   03-November-08 14:11 Download completed successfully
   ```

   Note: If the message *Error occurred during downloading to configuration! Connection to the Configuration Manager failed* displays, refer to *Troubleshooting Connections* at the end of this manual.

4. Proceed to *Debugging the Project*.

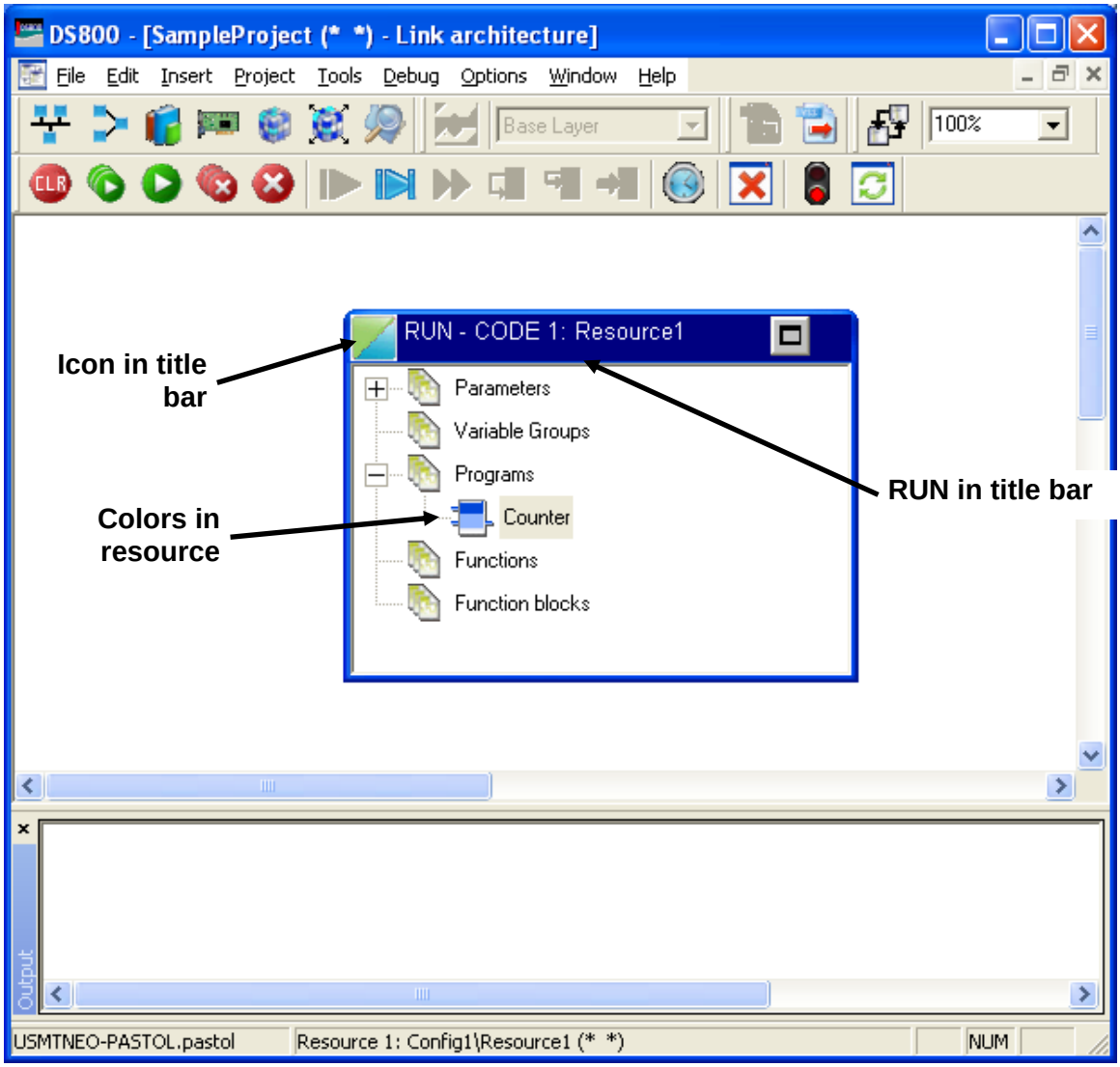
8. Debugging the Project

Debug mode enables you test resources while you are online. The debug routine establishes a connection with the hardware and displays the current value of variables while the code executes. This “live view” helps you to detect and remove errors.

Note: You must have successfully downloaded a project to use debug mode.

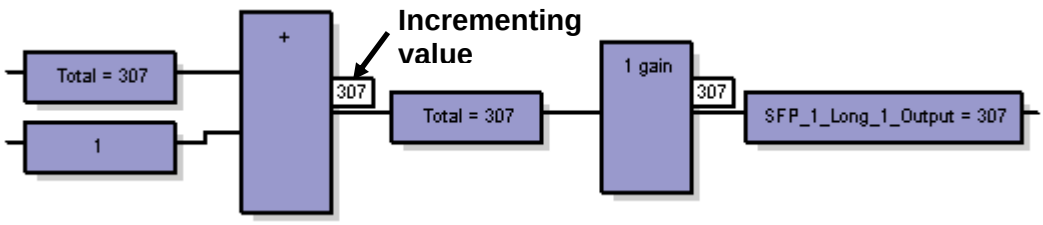
To start a debugging session:

1. Click the Debug Target icon ( ) on the toolbar. The Workbench software connects to the ROC800 and includes the word **RUN** in the title of the Resource 1 dialog box.



The green and blue icon in the upper left corner of the screen ( ) indicates that no errors are present.

2. Double-click the Counter program to open the editor.
3. Review the real-time results of the program. The editor displays the block diagram showing the current value of the variables and the output of the function blocks. The value increases at a rate of 10 times per second, which is how frequently the code executes by default.

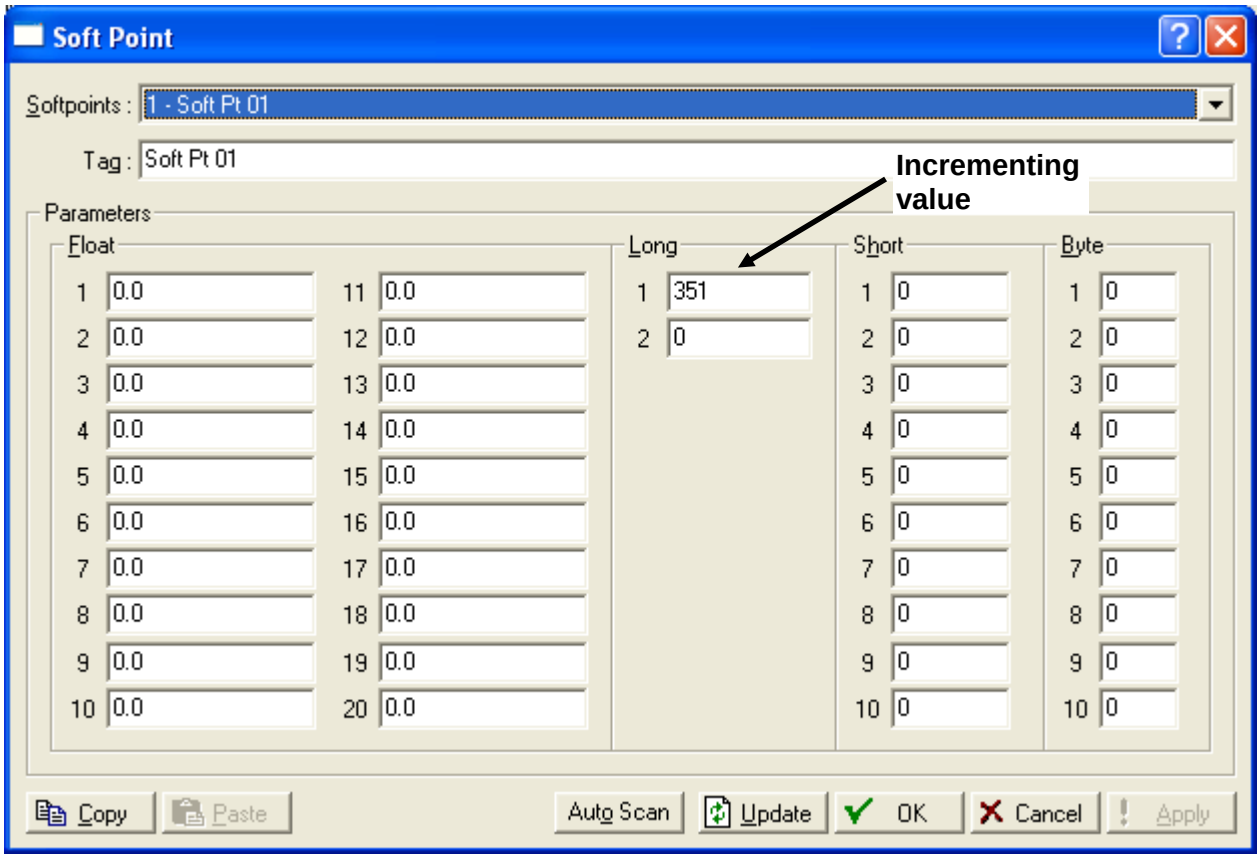


4. Click the Stop Debug Target icon ( ) on the toolbar to stop the real-time display and exit Debug mode. Close the editor. The DS800 screen displays.
5. Proceed to *Verifying the Program in ROCLINK 800*.

9. Verifying the Program in ROCLINK 800

The final step in the process of developing a program is to access ROCLINK 800 software and verify that the program is correctly incrementing the soft points you have targeted.

1. Disconnect from DS800.
2. Connect to the ROC800 using ROCLINK 800.
3. Select **Configure** > **I/O** > **Soft Points** from the ROCLINK 800 menu bar. The Soft Point screen displays.



4. Note the value in the Integer field. Click **Update** several times over 5-10 seconds, and watch the value increase. This indicates that the DS800 program is incrementing that value 10 times per second, as you intended.

Summary

To meet the needs of your organization, the DS800 programs you develop will—of course—be more complex than this simple example. But the processes you use to develop those programs are the same. If you need further information on the DS800 software, refer to the *DS800 Development Suite Software User Manual* (Form A6126).

Troubleshooting Connections

While attempting to download a DS800 project to the ROC800, you may see the message *Error occurred during downloading to configuration! Connection to the Configuration Manager failed*. This means that the Workbench cannot communicate with the DS800 kernel inside the ROC800. Following are some tips to help you diagnose and resolve this problem.

Note: These solutions assume you have an Ethernet connection between the ROC800 and the PC on which the DS800 software is installed.

- **Can you ping the ROC800?**

  Open up a command window (**Start** > **Run** > **cmd.exe**) and enter the command ***ping nnn.nnn.nnn.nnn*** (where **nnn.nnn.nnn.nnn** represents the IP address of your ROC800). If you get no response, then there is a network connection problem.

- **Does the ROC have a DS800 Runtime License?**

  Using ROCLINK 800, check if the ROC800 in question has a DS800 Runtime License. (**Utilities** > **License Key Administrator**). If the license is not present, then DS800 projects cannot download.

- **Is the configuration connected?**

  Check, using the Hardware Architecture view of the Workbench, that the Configuration box representing the ROC is connected via a vertical line to the ETCP network.

- **Does the configuration in the project have the right IP address?**

  Check that the IP address in the DS800 Hardware Architecture view, connection properties, is the same IP address you see in ROCLINK 800 (**ROC** > **Information** > **Internet**).

- **Are you connecting to the correct device?**

  Unplug the Ethernet cable from the ROC800 and try to ping the ROC. If you still get a response, then you do not have the correct IP address.

- **Is the DS800 kernel inside the ROC running?**

  Go into the ROCLINK 800 DS800 configuration (**Configure** > **Control** > **DS800**) and ensure that the DS800 "switch" is turned on. Press **Update** several times to make sure. Are the three associated tasks "Running"? (See *3. Verify Operation of the DS800 Kernel*.)

- **Have you accidentally created a Library Project?**

  Does a CD and Book icon display in the lower right corner of the Resource view of the Workbench? If so, you've accidentally created a library, which is not downloadable to a ROC800. You'll need to create a new project with the template **SingleROC800E**.