

GETTING STARTED



CHAPTER 1

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Introduction

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Purpose of this Manual

Thank you for purchasing the AutomationDirect Productivity2000 Programmable Controller (CPU) family of products. This hardware user manual provides information that will help you install, set up, program, troubleshoot, and maintain your Productivity2000 CPU system. The manual includes information that is critical to the safety of the personnel who will install and use the controller and to the machinery, processes, and equipment controlled by the CPU.

The manual also includes important information about power and signal wiring, mounting of the CPU, and configuring the CPU system.

About Getting Started

If you are familiar with Programmable Controllers in general, then following the simple steps in this first chapter may be all you require to start being productive using a Productivity2000 CPU system. After you have completed the steps, your Productivity2000 controller will be running the ladder logic project that you programmed.

Online Help Files and Other Documentation

The Productivity2000 programming software, Productivity Suite, is available as a download from our website.

See <http://www.automationdirect.com/products/pseries.html>.

The Productivity Suite software includes searchable online help topics covering all aspects of the software, instruction set, module setup, and communications.

In addition, each base, power supply, CPU, and I/O module includes an installation insert.

Technical Support

We strive to make our manuals the best in the industry. We rely on your feedback to let us know if we are reaching our goal. If you cannot find the solution to your particular application, or if for any reason you need technical assistance, please call us at:

1-770-844-4200

Our technical support group will work with you to answer your questions. They are available Monday through Friday from 9:00 A.M. to 6:00 P.M. Eastern Time. We also encourage you to visit our web site where you can find information about our company and specific technical information about a wide array of our products.

<http://www.automationdirect.com>

Conventions Used



When you see the “note pad” icon in the left-hand margin, the paragraph to its immediate right will be a special note. Notes represent information that may make your work quicker or more efficient. The word **NOTE**: in boldface will mark the beginning of the text.



When you see the “exclamation point” icon in the left-hand margin, the paragraph to its immediate right will be a warning. This information could prevent injury, loss of property, or even death in extreme cases. Any warning in this manual should be regarded as critical information that should be read in its entirety. The word **WARNING** in boldface will mark the beginning of the text.

Key Topics for Each Chapter

The beginning of each chapter will list the key topics that can be found in that chapter.

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Before you begin...

It is recommended that the following items be available to make this short step-by-step introduction to the Productivity2000 System go smoothly.

Productivity2000 System Example



PC Running
Windows 7, 8, 8.1



Not available from
Automationdirect.com

Productivity Suite
Programming Software
PS-PGMSW



Download software from our website
at: www.automationdirect.com under
"Programmable Controllers".

USB-A to Micro USB-B
Programming Cable



Screwdriver
TW-SD-VSL-2



Wire Strippers
DN-WS



Hookup Wire



AC Power Cord



Not available from
Automationdirect.com.

Productivity Suite System Requirements

Productivity Suite Windows-based programming software (CD-ROM or web download) works with Windows® XP (Home or Professional), Vista (Home, Basic, Premium, 32 or 64-bit) or Windows 7, 8, 8.1, (Home, Professional, Ultimate, 32 or 64-bit). Please check the following requirements when choosing your PC configuration:

- Windows XP Personal Computer with a 333 MHz or higher processor (CPU) clock speed recommended; Intel Pentium/Celeron family or AMD K6/Athlon/Duron family, or compatible processor recommended.
- Vista or Windows 7 or Windows 8, 8.1, Personal Computer with a 800 MHz or higher processor (CPU) clock speed recommended; Intel Pentium/Celeron family or AMD K6/Athlon/Duron family, or compatible processor recommended.
- SVGA 1024x768 pixels resolution. (1280x1024 pixels resolution recommended).
- 300MB free hard-disk space.
- RAM: Windows XP 2.0.0.x or higher; 1GB memory (2GB recommended).
Windows XP 1.10 or lower; 128MB free RAM (512MB recommended).
Windows 7, 8, 8.1 or Vista;
Version 2.0.0.x or higher, 2GB memory (4GB recommended).
Version 1.10 or lower, 512MB (1GB recommended)
- CD-ROM or DVD drive for installing software from the CD.
- USB or Ethernet Port for project transfer to CPU.

NOTE: USB or Ethernet cable is also required for communications between PC and CPU.



Step 1: Install Programming Software

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1. Download the latest version of the Productivity Suite Programming Software from the Automationdirect website.

Or, if the Productivity Suite Programming Software CD is available, insert it into your PC CD drive. The splash screen should appear after a short time.

2. Click on the “Install” button at the splash screen and follow the dialog boxes.



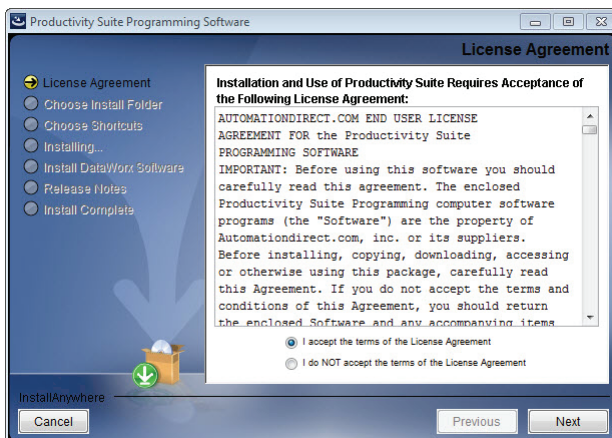
3. If the CD does not auto-run, click your PC Start menu (bottom left corner of screen), and select Run.

- In the Open: prompt text box, Type in “D: install.exe”, where “D:” is the drive letter of the CD drive being used, or browse to the location of the “install.exe” file that was downloaded and select that file.
- Select OK and follow the dialog boxes through the next pages.

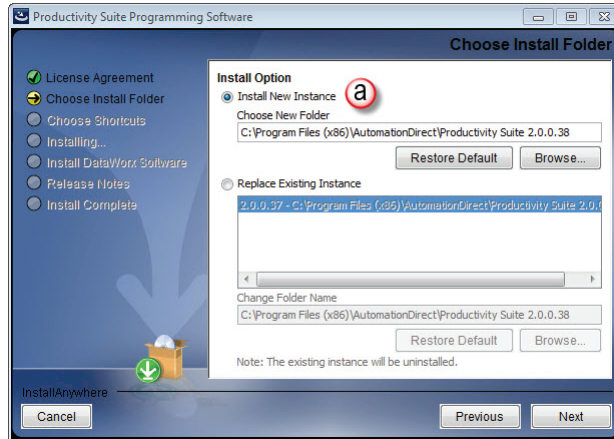


NOTE: See the *Productivity Suite Installation* and *Productivity Suite Startup* topics for additional details if needed.

4. Carefully read the software license agreement. If you agree to the terms and conditions of this agreement, select the “I accept the terms of the License Agreement” and then the “Next” button.

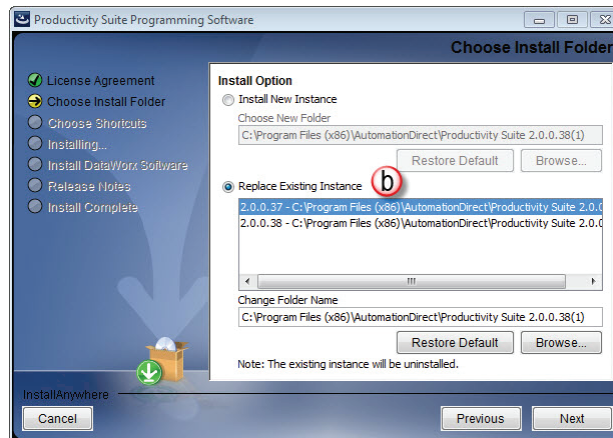


5. The “Choose Install Folder” window will open next. If this is the first installation of the Productivity Suite Software on your PC, choose
- (a) Install New Instance: This option will install a new instance of the Productivity Suite software in the default location, C:\Program Files\AutomationDirect\Productivity Suite

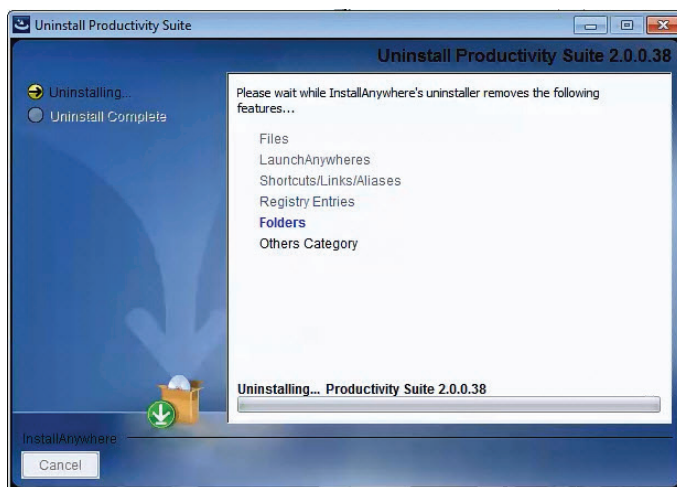
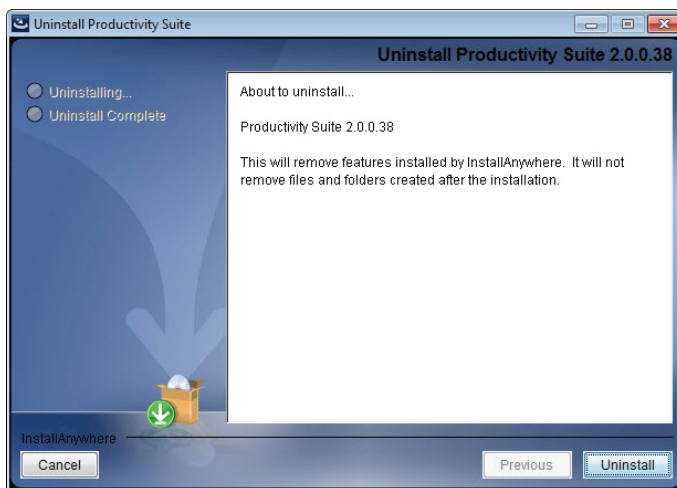


<Software Version>; or choose a different one using the Browse button.

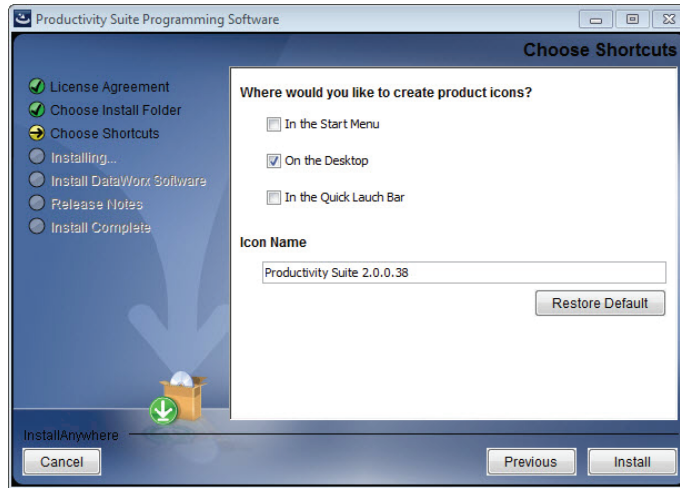
If the installer detects a previous version of Productivity Suite on your PC, there is another option available with this window:



- (b) Replace Existing Instance: This option allows you to uninstall the previous version of the software and install the new version in its place. If this option is chosen the following window appears. Click “Uninstall” to continue.

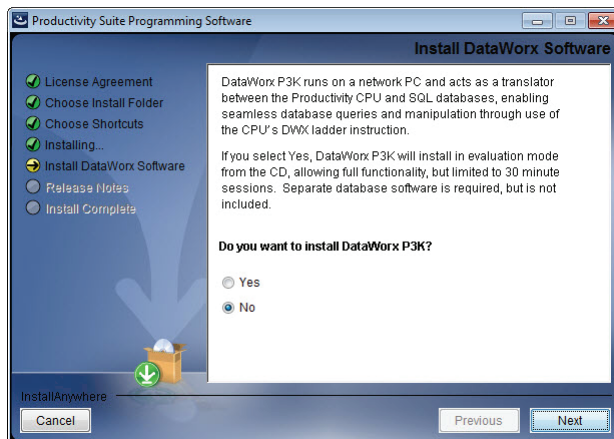


6. Once you have selected the install folder and whether or not to delete any previous instances, the “Choose Shortcuts” window will appear. If a Shortcut Icon is desired for the software select the location where the icon will be created. The default location is “On the Desktop”. Once all selections have been made, click “Install” to begin the installation. A status window will appear displaying the status of the installation.

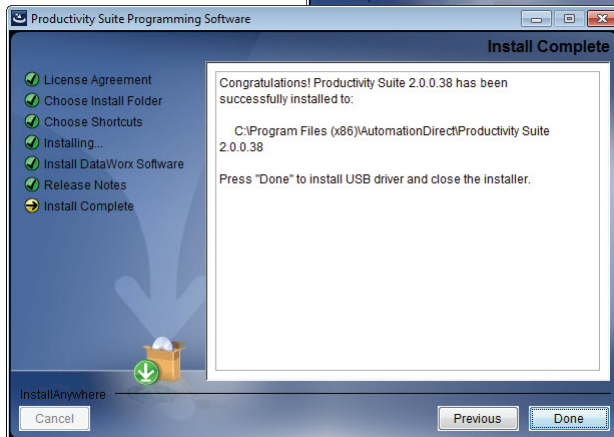
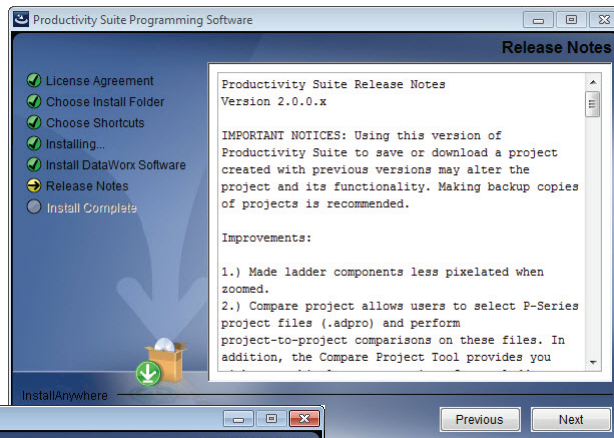


7. Do you want to install DataWorx P3K Software? (Following Dialog Box) DataWorx P3K runs on a network PC and acts as a translator between the Productivity2000 and SQL databases. If you select Yes, an evaluation version of DataWorx P3K will also install on your computer. The evaluation version allows full functionality, but is limited to 30 minute sessions. Separate database software is required, but is not included. See our website for more information on purchasing DataWorx P3K.

Choose Yes or No and select “Next”.



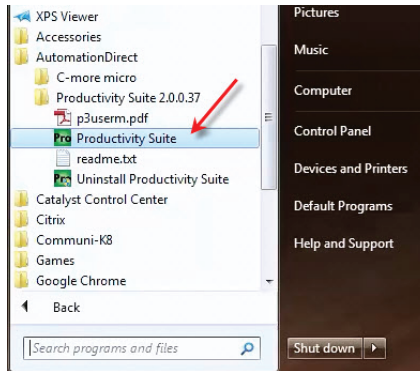
8. The next screen to appear contains the Release Notes for this version of the Productivity Suite software. This is an opportunity to review the software version release notes. You may read these before selecting the “Next” button.



9. The Installation is now complete. Select “Done”.

Step 2: Launch Programming Software

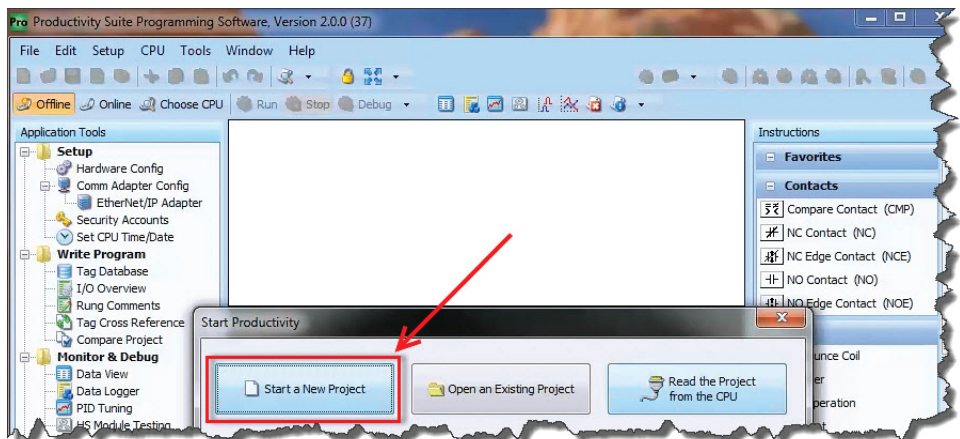
After installing the Productivity Suite Programming Software, PS-PGMSW, launch the software by double clicking the desktop Productivity Suite Icon. Or from the PC's 'Start' menu, slide the mouse pointer through the menus (start>All Programs>AutomationDirect>Productivity Suite x.x.x.x>Productivity Suite) to the Productivity Suite Programming Software selection, and use the left mouse button to click on it.



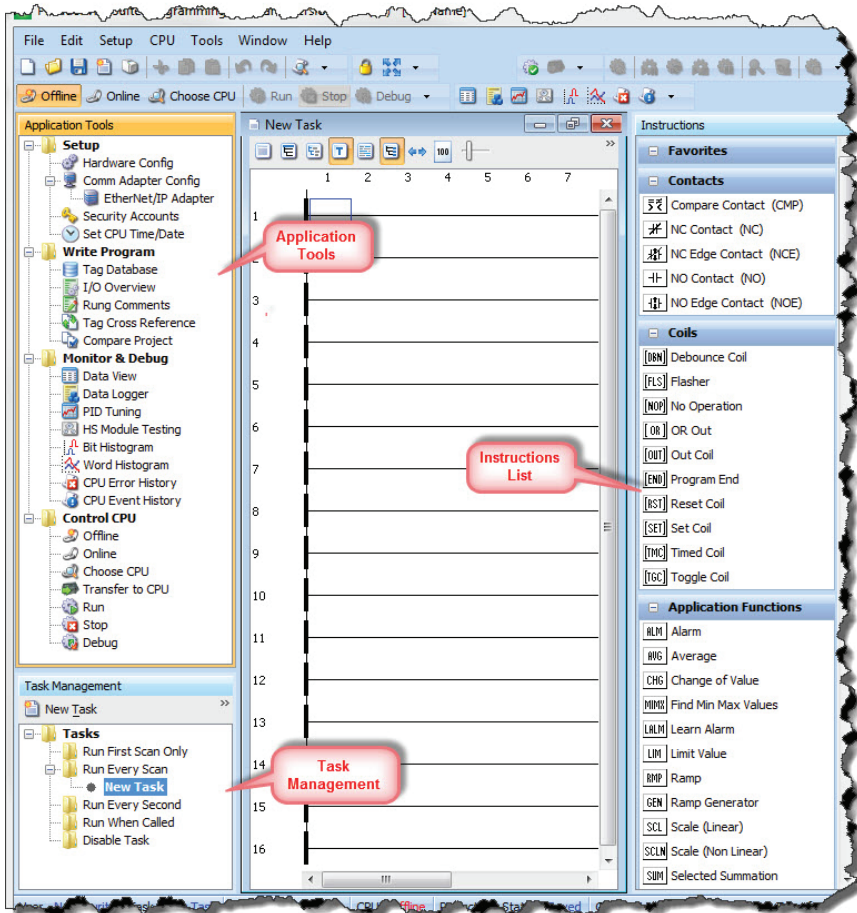
The Productivity Suite Programming Software will start up and display the Main Window as shown here.

NOTE: The recommended minimum screen size for the Productivity Suite Software is 1024 X 786 pixels.

Click on the 'Start a New Project' in the Start Productivity dialog box to open a programming window.



The Programming Window is divided into menus and toolbars that work together to make project development as simple as possible.



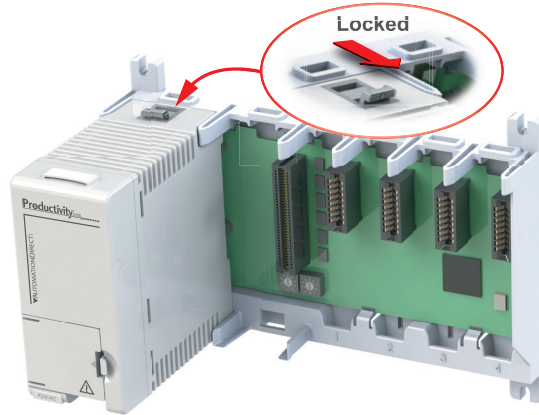
Online Help

It is essential that you use the Productivity Suite online Help to familiarize yourself with the software. Keep it open on your desktop and refer to it frequently as you build your system. Click on the toolbar Help button to open the Help file.

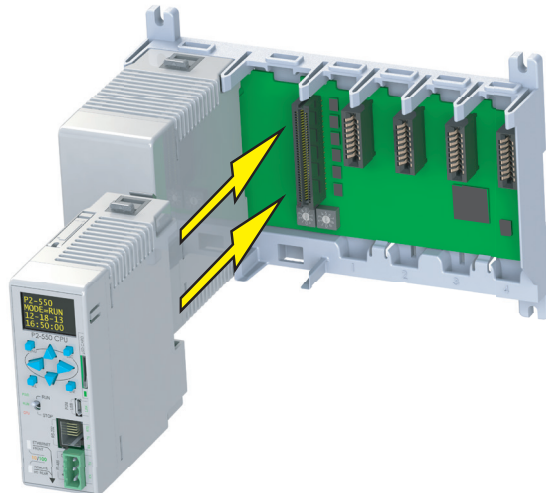
Step 3: Install Hardware

The Productivity2000 CPU system components snap together to form a configured CPU in minutes. See Chapter 5, Installation and Wiring, for more detailed hardware installation information. What follows are the basic steps:

1. Install power supply in the base and engage locking tab.

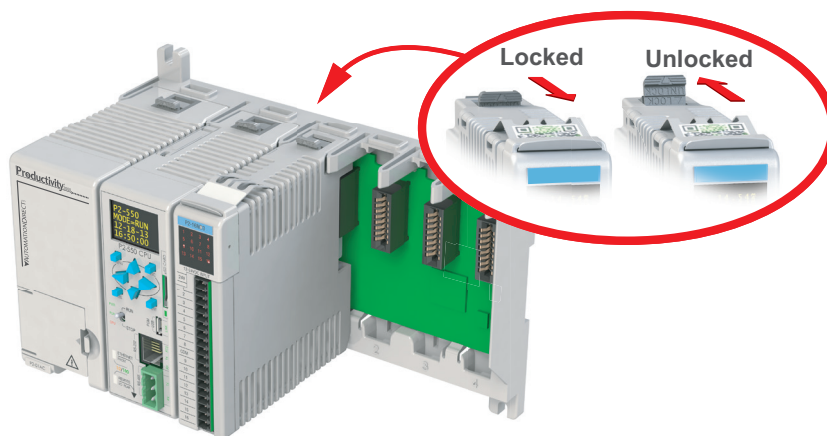


2. Install CPU in the base and engage locking tab.

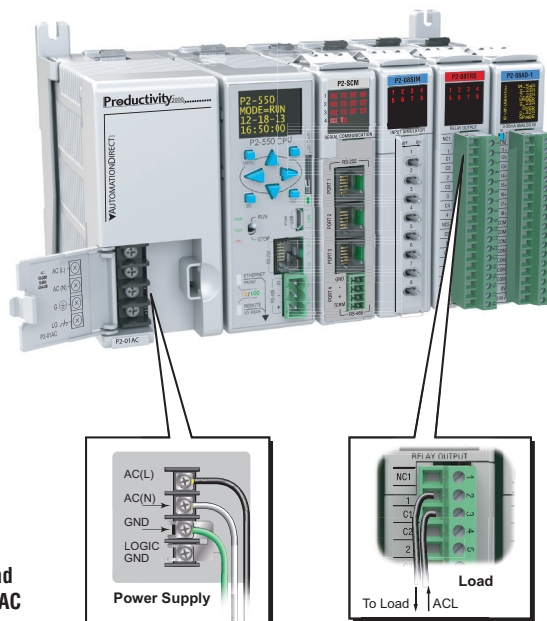


3. Install I/O Modules and engage locking tabs.

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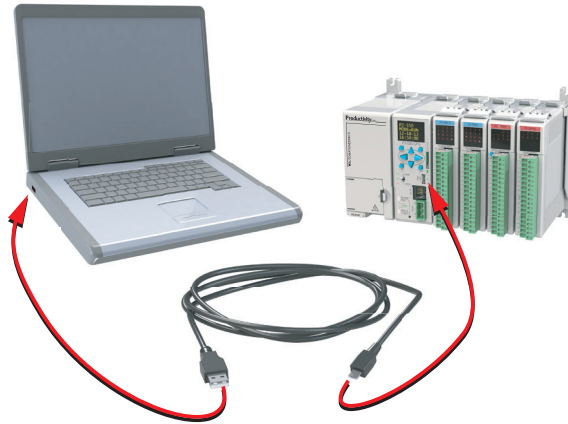


- 4..Connect appropriate wiring to the power supply (P2-01AC) and I/O (P2-08TRS module) in this example.



The power supply and load are connected through an AC current source.

5. Connect USB cable. Use a Micro USB cable with a Type A and Micro Type B connectors as shown below.

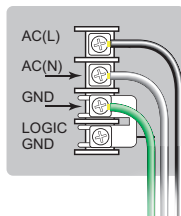


Step 4: Apply Power to CPU

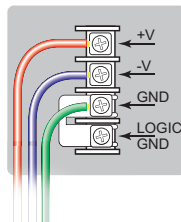
Ensure proper wiring and the correct voltage is available before connecting wiring to the power supply. Once this is verified, connect power to the power supply. Once power is applied, the CPU will perform a self evaluation and verification. See Chapters 2 and 5 of this manual for more power supply and input wiring information.



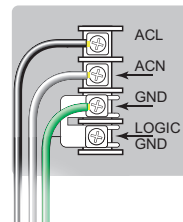
100-240 VAC



12-24 VDC

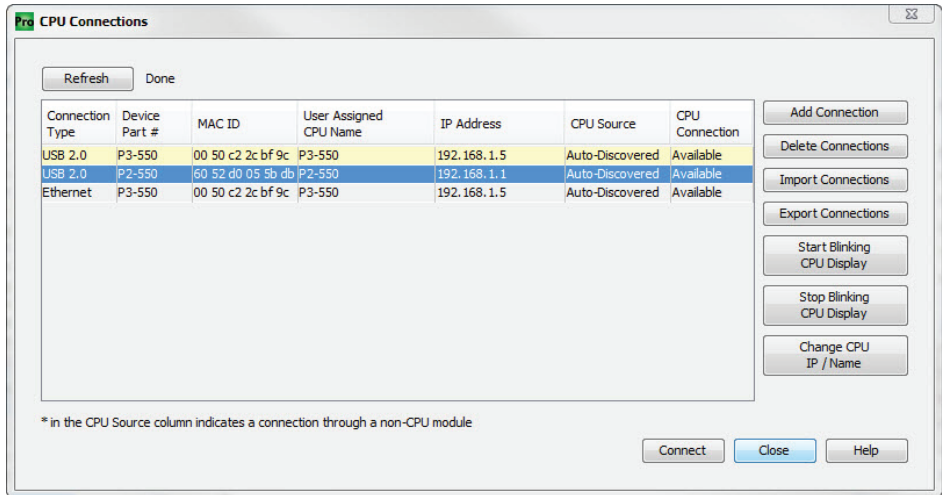


24VAC

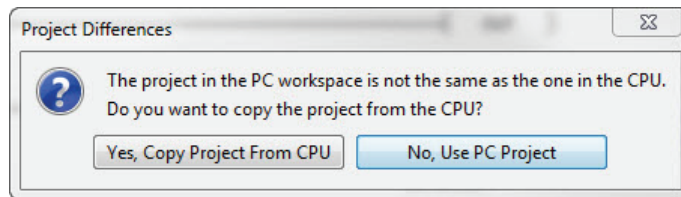


Step 5: Establish PC to CPU Communications

Select “Choose CPU” icon on the CPU Toolbar and the dialog box shown below will appear. Highlight the installed CPU listed in the dialog box and select “Connect”.



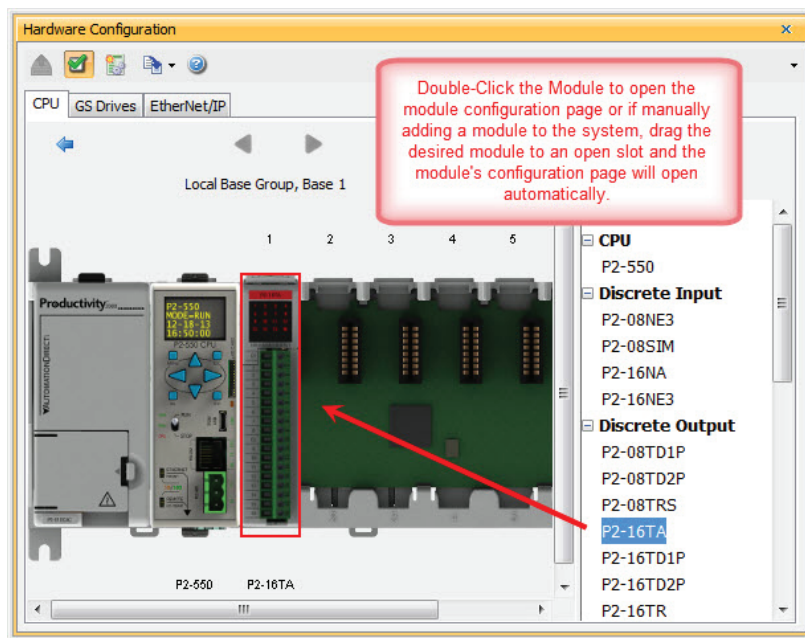
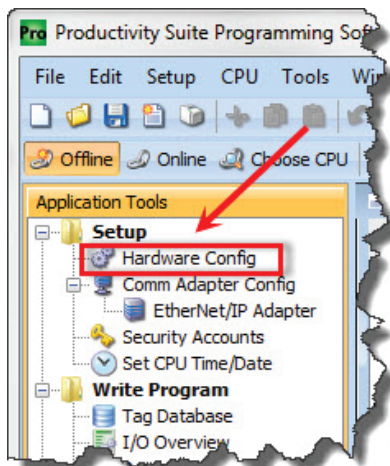
When initially going Online with the CPU, a popup window will notify you of a project difference between the CPU and the PC. Select “No, Use PC Project” command button.



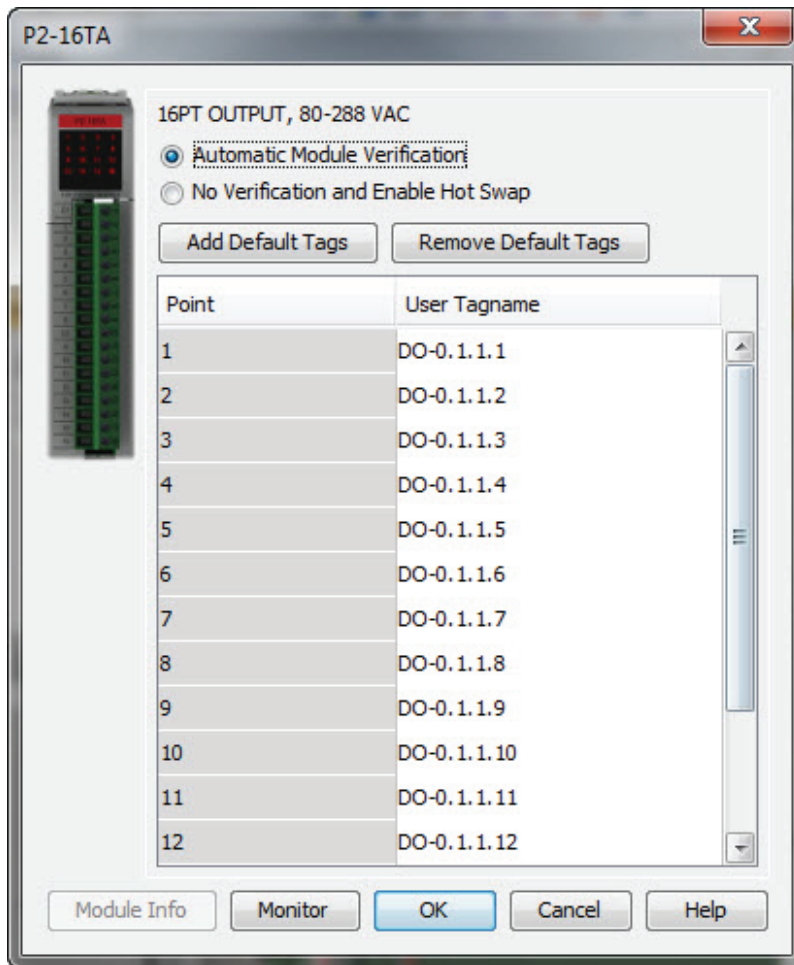
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Step 6: Open/Read Hardware Configuration

Before we create a project we must configure the hardware so we'll have default input and output tags for use in our project. With the CPU in "STOP" Mode, select Hardware Configuration under Application Tools and the following screen opens.



This screen shows the user tag names for all sixteen I/O points. Select “OK”.



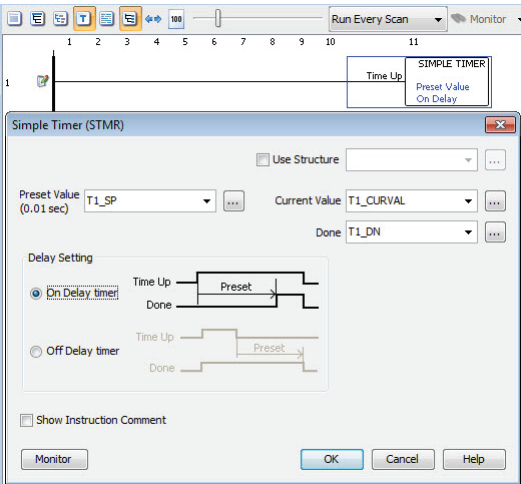
1 Step 7: Create a Project

We’re going to start by entering a simple ladder logic program in the order that follows.

Rung #1

Select the “END” position on Rung #1 with your cursor. From the Instruction List on the right, scroll down to Counters/Timers section and double click on the Simple Timer (STMR) instruction. The “Simple Timer” instruction automatically is placed on the selected rung and the Simple Timer (STMR) dialog box pops up.

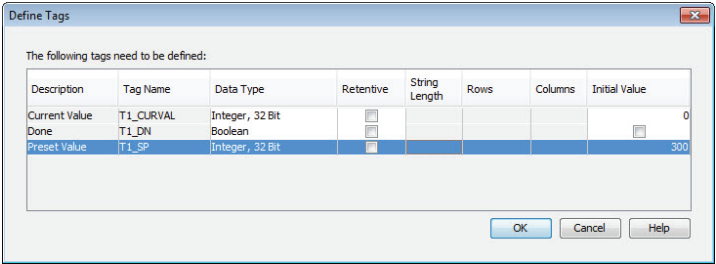
- 1. Enter ‘T1_SP’ into the Preset Value field.
- 2. Enter ‘T1_CURVAL’ into the Current Value field.
- 3. Enter ‘T1_DN’ into the Done field.



- 4. Select “OK”.

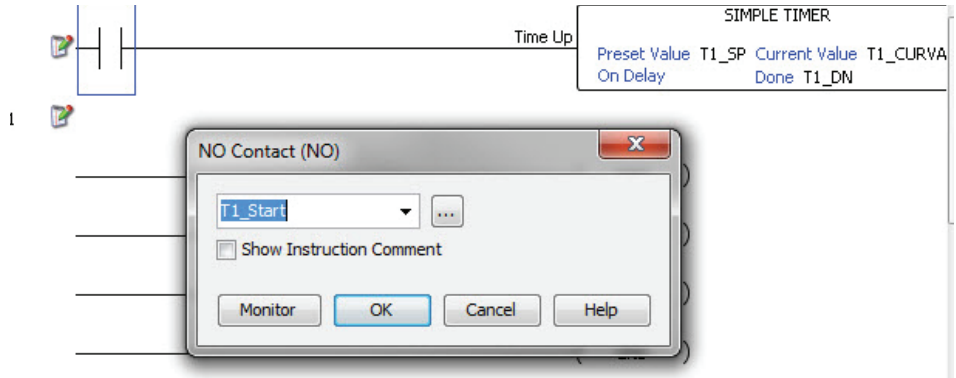
The Define Tags dialog box opens. Select OK.

- 5. Enter preset time value of 300ms into “Intial Value” field for Tag T1_SP.

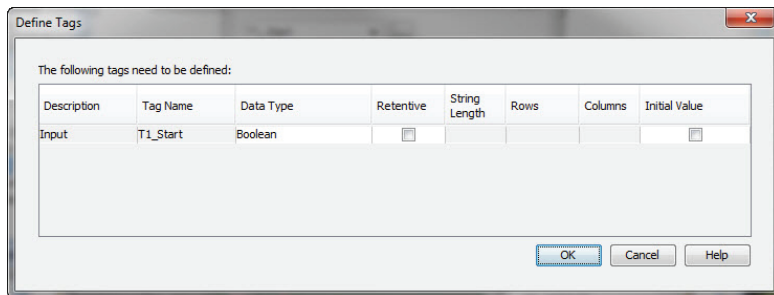


Place the cursor on the first position on Rung #1 as shown below. In the Instruction List on the right, scroll up to Contacts section and double click on “NO Contact (NO)”. A NO Contact (NO) is placed at this rung position and a dialog box pops up.

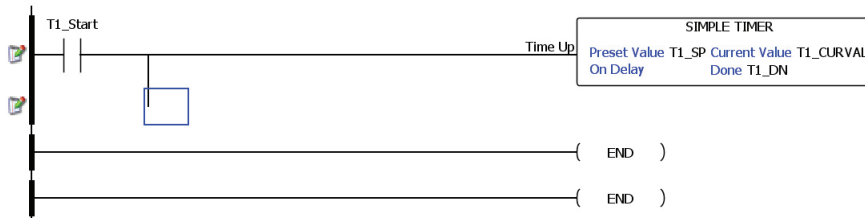
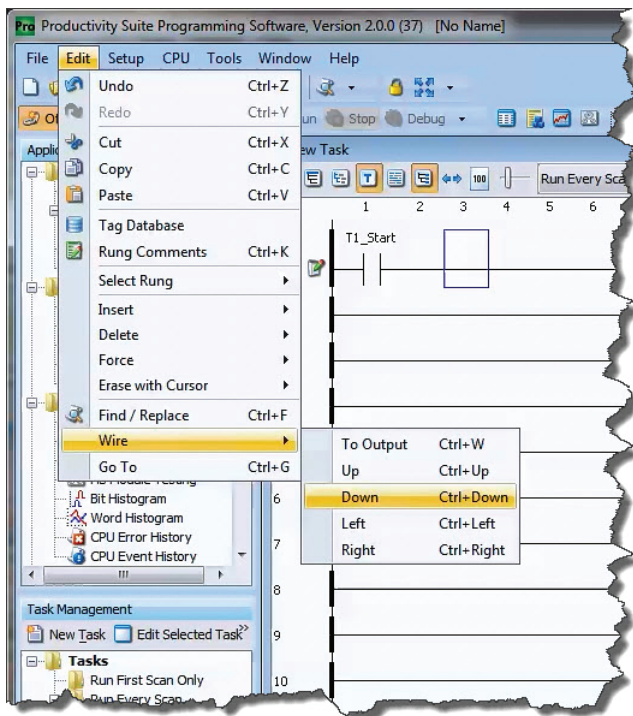
1. Enter ‘T1_Start’ into the text box.
2. Select OK.



The Define Tags dialog box opens. Select “OK”.

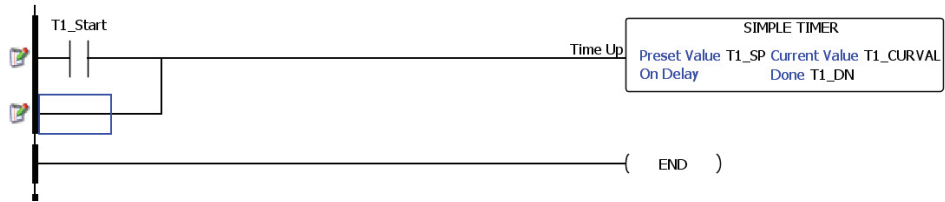


With the cursor on Rung #1, to the right of contact 'T1_Start', we are going to begin drawing a branch circuit. Under the Edit drop down menu, select "Wire", then select "Down". Notice that a wire has been added.



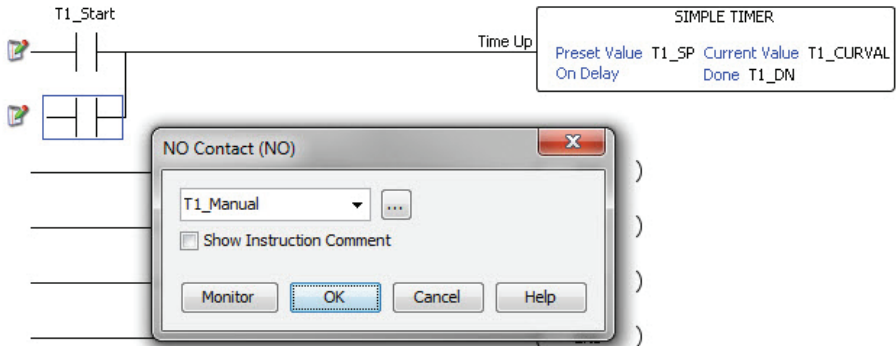
NOTE: There is also a wire Erase With Cursor tool in the Edit drop down menu that is used to erase any lines that were created using the Wire tools.

Next we'll draw a wire to the left. Under the Edit drop down menu, select "Wire", then select "Left".

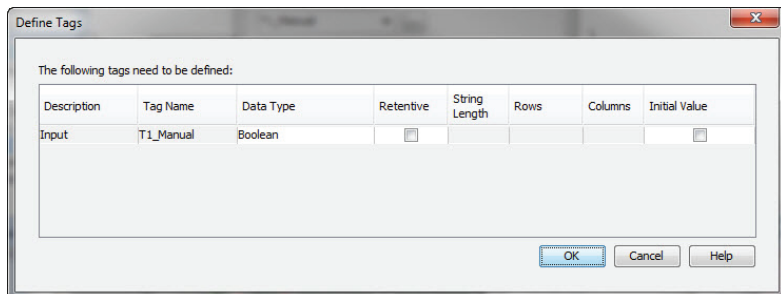


Next we'll add another normally-open contact. Place the box cursor on the first position on the newly created SubRung #1. From the Instruction List click & drag a Contact (NO) into this box. A NO Contact (NO) dialog box pops up.

1. Enter 'T1_Manual' into the field.
2. Select "OK".



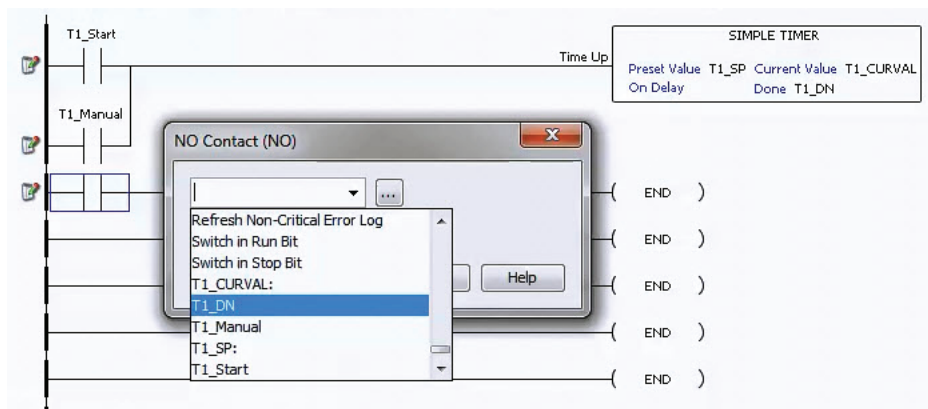
The Define Tags dialog box opens. Select "OK".



Rung #2

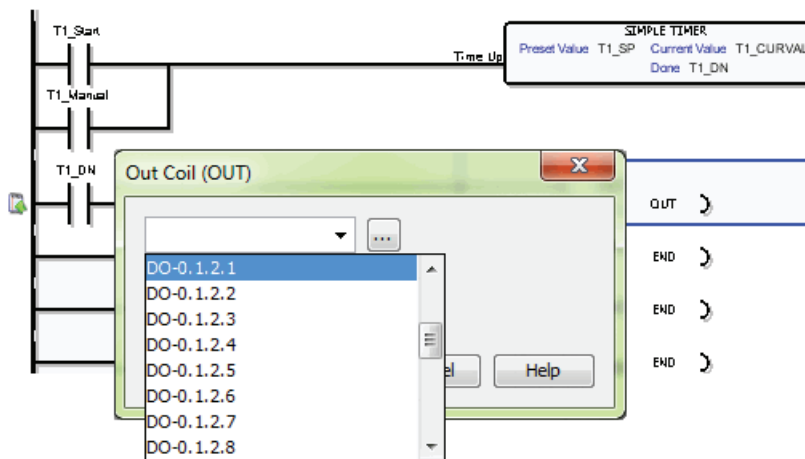
Next we'll add another normally-open contact at the start of Rung #2. Click & drag a "NO Contact (NO)" into this box. A NO Contact (NO) dialog box pops up.

1. In the empty tag field press the down arrow on the right to open a drop-down list; scroll down and select 'T1_DN'.
2. Select "OK".

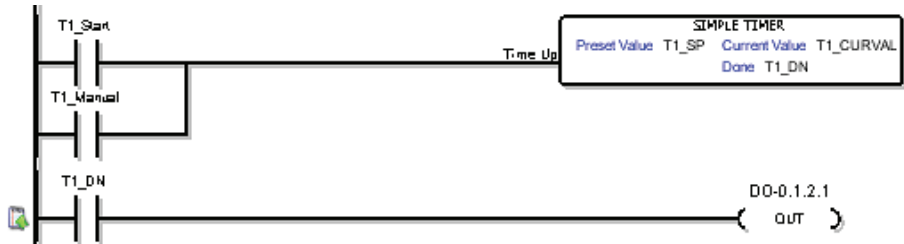


Next we'll add an Out coil at the end of the rung. Place the cursor at the end of the rung. From the Instructions list Coil section, double click on an "Out Coil (OUT)". An Out Coil (OUT) is placed on the rung and a dialog box pops up.

1. In the tag field press the down arrow on the right to open a drop-down list; scroll down and select 'DO-0.1.2.1'.
2. Select OK.

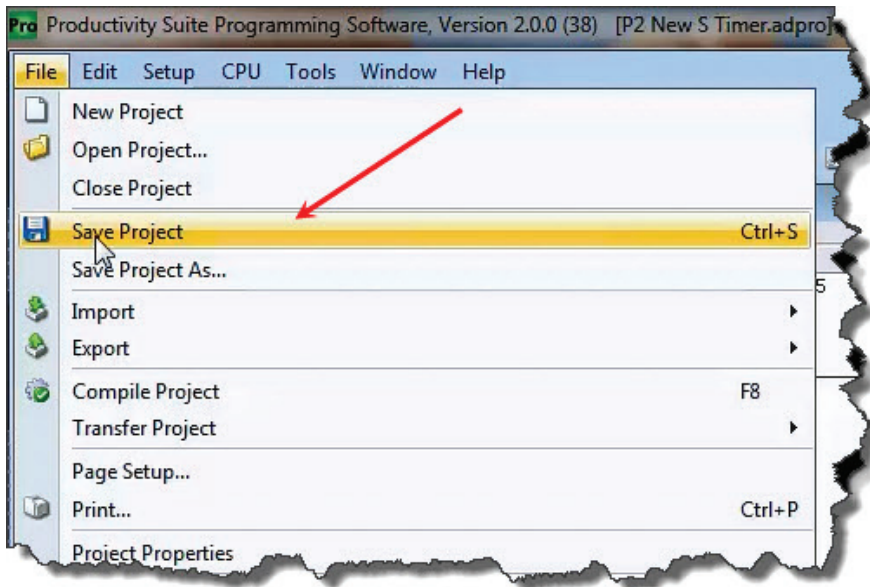


The ladder program now looks like this. When either of the T1 contacts are energized, the timer starts. When it times out, contact T1_DN energizes and turns on the rung 2 output.



1 Step 8: Save Project

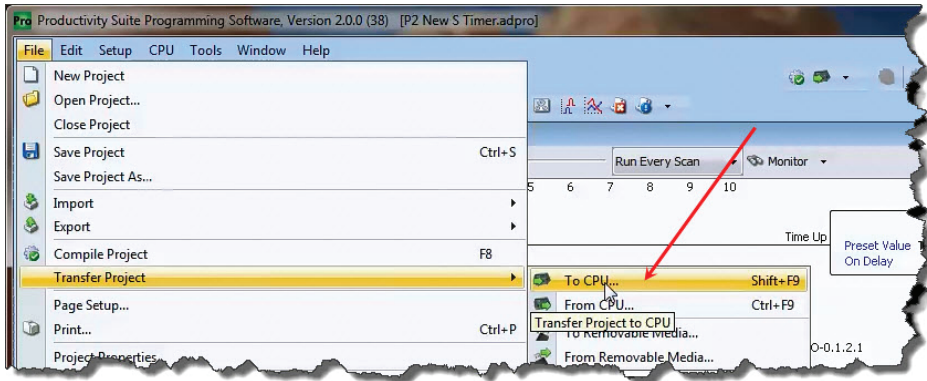
Save the project by opening the File drop-down menu and selecting Save Project.



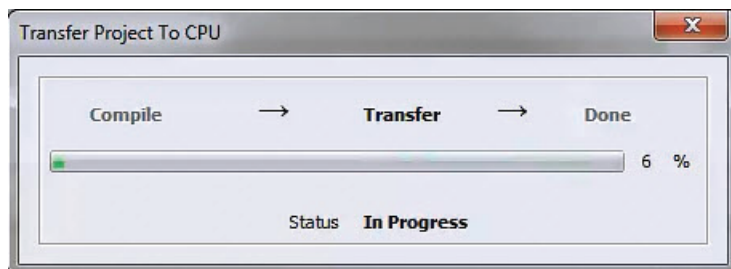
Step 9: Write Project to CPU

Next we will transfer the project to the CPU. Transfer Project is accessed by selecting Transfer Project from the File Menu.

Select “To CPU” from the Transfer Project menu.

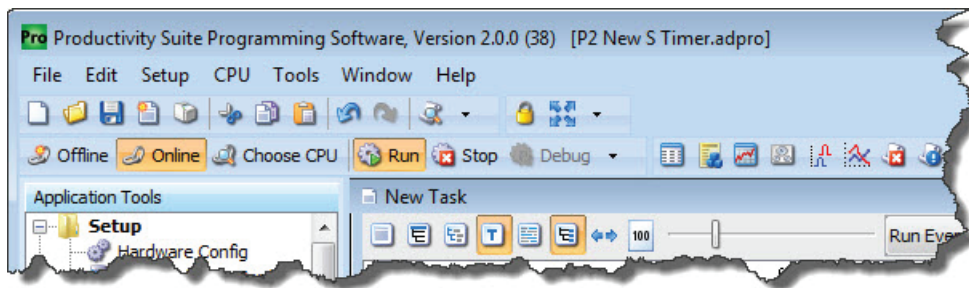


The project will then be Transferred to the CPU from the PC. During the transfer a status window will open displaying the process.

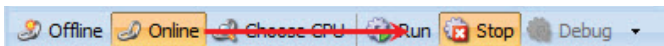


Step 10: Place CPU in RUN Mode

Next, verify the Run/Stop switch on the CPU faceplate is placed in the Run position and then place the CPU in RUN mode on the Productivity Software Toolbar so the ladder logic program executes.

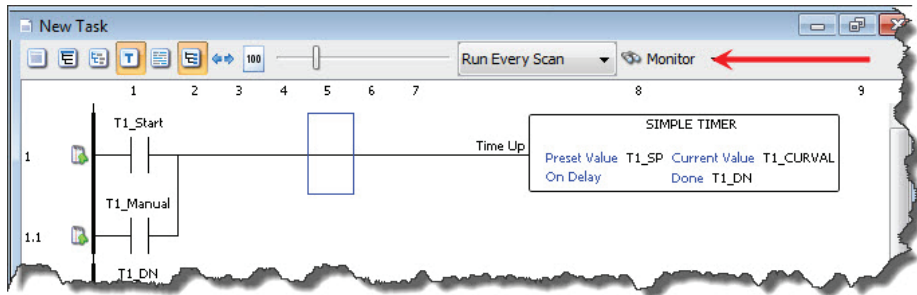


NOTE: If the Run/Stop switch on the CPU is in the Stop position, the Run button on the Programming Software Toolbar will be disabled.



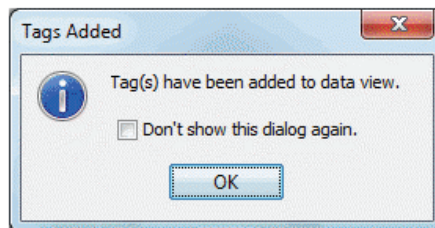
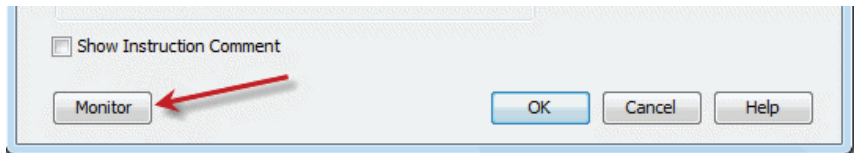
Step 11: Test the Project Using Monitor Mode

In this next step, use the Monitor Mode and Data View to test the ladder logic program. Select Monitor Mode from the top of the Ladder Logic screen to display the status of Boolean and Integer Tags.

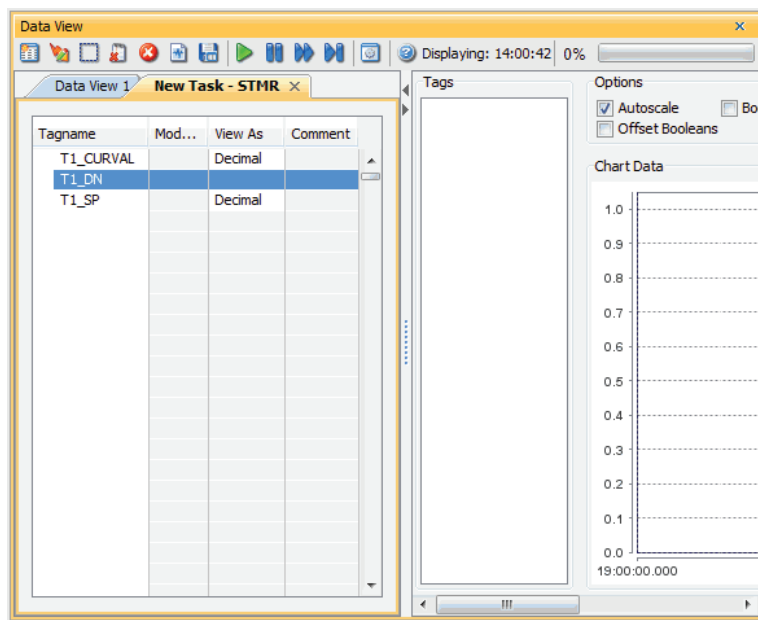


Using Data View, the Tag values can be viewed or manipulated for testing the project. The Data View window can be accessed by selecting Data View from the Tools Menu of the Main Menu.

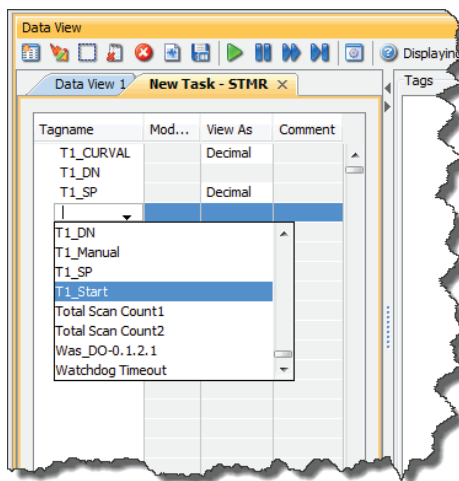
For the Simple Timer Instruction, a Monitor button is provided that, when selected, will load the tags associated with the instruction into Data View.



The tags will be placed in a separate Tab titled New Task - STMR as seen below.



The remaining tagnames in the Ladder Logic can be added to the Data View window by clicking on a blank area in the Tagname column. This will display a drop down menu where the tags can be selected. Scroll down the list and select the tags to be added.



Once all of the tagnames have been added, they can now be monitored and manipulated. See the Data View help file topic for additional details if needed.



NOTE: Force must be enabled for a Tag in the Tag Database before Force can be used in Data View.

Tag Database

Tags to show in the Editor

Show All ☒ Discrete Inputs ☐ Analog Inputs ☒ Integers ☒ System Data ☒ Booleans ☒ <enter text>

Invert ☒ Discrete Outputs ☐ Analog Outputs ☒ Floats ☒ Strings ☒ Unused I/O ☒ <enter text>

☐ Module Status ☐ Structures ☒ Search Tag Names

Editor

Name	Type	Forceable	Init Forced	Init Force Value
DO-0.1.2.13	Discrete Output	<input type="checkbox"/>	<input type="checkbox"/>	
DO-0.1.2.14	Discrete Output	<input type="checkbox"/>	<input type="checkbox"/>	
DO-0.1.2.15	Discrete Output	<input type="checkbox"/>	<input type="checkbox"/>	
DO-0.1.2.16	Discrete Output	<input type="checkbox"/>	<input type="checkbox"/>	
T1_CURVAL	Integer, 32 Bit	<input type="checkbox"/>	<input type="checkbox"/>	
T1_DN	Boolean	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
T1_SP	Integer, 32 Bit	<input type="checkbox"/>	<input type="checkbox"/>	
T1_Start	Boolean	<input type="checkbox"/>	<input type="checkbox"/>	
T1_Manual	Boolean	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
DO-0.1.2.1	Discrete Output	<input type="checkbox"/>	<input type="checkbox"/>	

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Data View

Forceable Tags Data View 1 New Task-STMR

Tagname	Modbus Address	View As	Comment
T1_DN			
T1_Manual			

Notes

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