*Direct*SOFT

Quick Start

Manual Number QS-DSOFT-M

WARNING

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To minimize the risk of potential safety problems, you should follow all applicable local and national codes that regulate the installation and operation of your equipment. These codes vary from area to area and usually change with time. It is your responsibility to determine which codes should be followed, and to verify that the equipment, installation, and operation is in compliance with the latest revision of these codes.

At a minimum, you should follow all applicable sections of the National Fire Code, National Electrical Code, and the codes of the National Electrical Manufacturer's Association (NEMA). There may be local regulatory or government offices that can also help determine which codes and standards are necessary for safe installation and operation.

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Manual Revisions

If you contact us in reference to this manual, remember to include the revision number.

Title: ***Direct***SOFT Quick Start User Manual
Manual Number: QS-DSOFT-M

Issue	Date	Effective Pages	Description of Changes
Original	9/96	Cover/Copyright Contents Manual Revisions 1 — 57	Original Issue
2nd Edition	2/97	Contents Manual Revisions 1 — 56	Down size format
3rd Edition	6/98	Contents Manual Revisions 1 — 56	Add D3-350 Release 2.3 (3 diskettes)

Table of Contents

Introduction

The Purpose of this Supplementary Manual

With this short version manual, you can learn enough of the basics to get started without having to read the larger primary manual that covers all of the details of ***Direct***SOFT™. If you have received this with your ***Direct***SOFT™ demo disk, it will provide you with a sampling of how easy ***Direct***SOFT™ is to use. For those who have purchased the full version of ***Direct***SOFT™, exercise caution: **This is not intended to replace reading the Users Manual (DA-DSOFT-M). This is intended only as a supplement. This is only a quick start!**

Make Backup Copies of Your Diskettes

If you purchased the full ***Direct***SOFT™ package, you should have received in your software packet three 3.5" diskettes. **We strongly recommend that you make backup copies of these diskettes before you take a chance the original disks become accidentally overwritten or inoperative for some reason.** Read your computer documentation if you do not know how to make backup copies of diskettes.

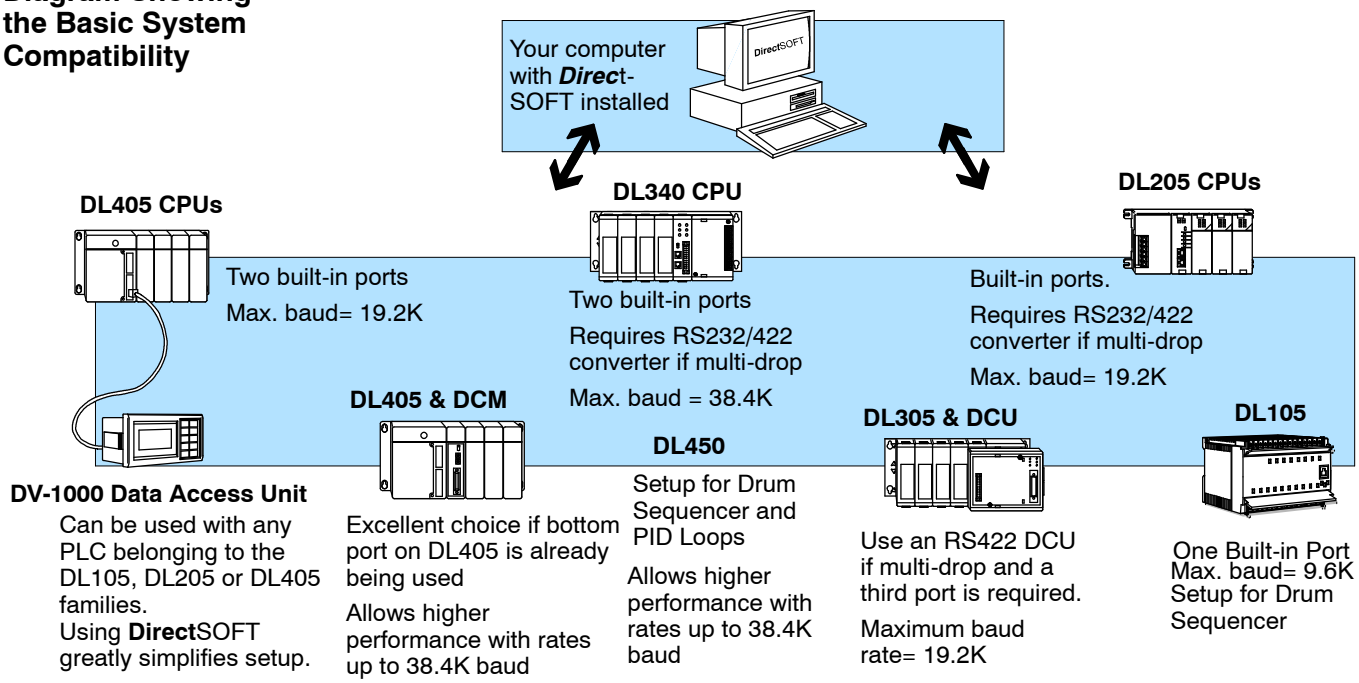
Who Can and Should Use *Direct*SOFT?

If you have a PLC belonging to the ***Direct***LOGIC™ CPU family, you can use ***Direct***SOFT™ to create your ladder logic programs. The four families of PLCs (DL105, DL205, DL305 and DL405) that currently exist under this description are shown below. We have included some other useful and related information. ***Direct***SOFT™ has added the following functionality;

- set up a DV1000 Data Access Unit
- tune PID loops for the D2-250, D3-350, and D4-450
- set up the parameters for Drum Sequencers in the DL105, D2-250, D3-350, and D4-450

DirectSOFT™ will also work with many ***Direct***LOGIC™ compatible products (not shown in the diagram). If you fall into this category, however, the chart on the next page shows you a complete list of which products work with the software.

Diagram Showing the Basic System Compatibility



PLC Compatibility

If you are using our *Direct*LOGIC™ products, then compatibility is not much of an issue. Make sure the package you choose supports the CPU you are using. Our software also supports many compatible products offered by previous vendors of the Koyo designed PLCs. If you are buying the software to program a compatible CPU, check the following table to make sure the CPU is supported.

Family	CPU	*Direct*-SOFT Programming PC-PGMSW
DL105	DL130 (requires Rel. 2.0 or later)	✓
DL205	D2-230	✓
	D2-240	✓
	D2-250	✓
DL305	D3-330*, D3-330P*	✓
	D3-340	✓
	D3-350	✓
DL405	D4-430	✓
	D4-440**	✓
	D4-450	✓

Family	CPU	*Direct*-SOFT Programming PC-PGMSW
GE® Series 1	IC609SJR-xxx	×
GE® Series 1	IC610CPU101	×
	IC610CPU104	×
	IC610CPU105*	✓
	IC610CPU106*	✓
TI305™ / SIMATIC® TI305™	315xx	×
	325-07*, PPX:325-07*	✓
	330-37*, PPX:330-37*	✓
	325S-07* (or 325 with Stage Kit)	✓
	330S-37*, PPX:330S-37*	✓
	335-37, PPX:335-37	✓
TI405™ / SIMATIC® TI405™	425-CPU, PPX:425-CPU **	✓
	N/A, PPX:430-CPU	✓
	435-CPU, PPX:435-CPU **	✓

✓ = Yes, it is available

× = No, it is not available

* Requires RS232 Data Communications Unit (D3-232-DCU).

**--also DC versions

System Requirements

Before you install the software, make sure your system is suitable to use with *Direct*SOFT. Your personal computer should meet (or exceed) the following:

- 486DX (or SX) CPU, 33Mhz clock speed
- Windows 3.1 or later, WIN 95, Windows NT 3.51 or later (no DOS, OS/2, MacIntosh, or UNIX versions.)
- 8MB RAM
- 10MB free hard disk space
- At least one unused serial port

NOTE on Laptops: *Direct*SOFT™ is perfectly suitable for use with laptop computers as long as they meet the requirements shown above. However, there can be a few problem areas. One inconvenient problem is when your laptop only has one COM port and does not have a built-in mouse. In this case, you will have to use the COM port for the PLC communications instead of the mouse connection.

TIP: Any size monitor will work, but larger monitorsenhance the display capabilities of *Direct*SOFT™. We also recommend a color monitor. *Direct*SOFT™ uses color for certain conditions, such as program editing, error conditions, etc. It will work with monochrome monitors, but the results are improved with color monitors.

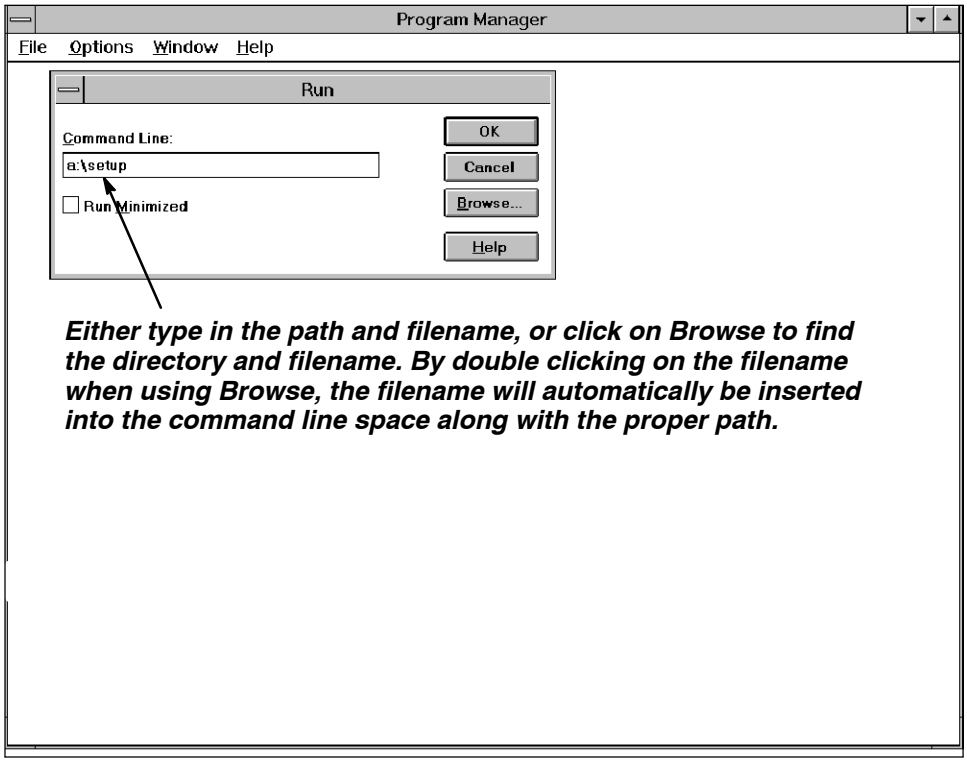
Five Steps to Installing the Software

Step1: Start Windows

If you have not done so, start Windows®. If you are a new user to Windows, consult your Windows documentation for details on setting up your computer system to run Windows effectively. Windows95® and WindowsNT® users can consult their computer manuals for the various options of startup.

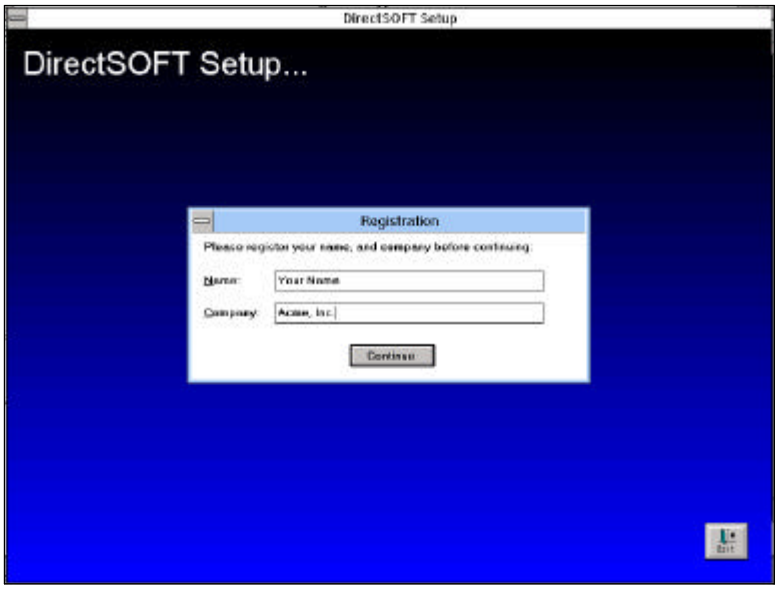
Step 2: Load the Setup Program from your Disks

Place your first diskette in either **Drive A** or **Drive B**. At the time we are creating this manual, we find that most customers are using a version of Windows that is 3.11 or lower. In such case, the screen shown below is typical of how things would look after you have clicked on **File** in the upper left hand corner of your opened Program Manager window, and after you have selected the item **Run** from the pull-down menu that appears. *Of course, for Windows95, you will have a different screen. Windows95 has its own Run dialog available when you click on its Start icon. If you have Windows95 and you don't know how to install a new program, you may have to refer to your Windows95 manual before proceeding further.*



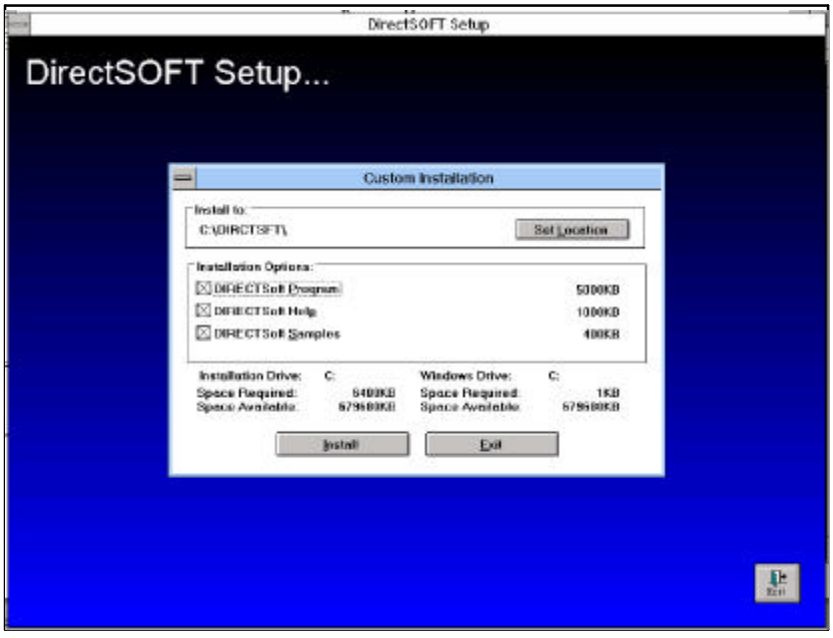
Step 3: Complete the Registration Information

The first dialog window of the setup program asks for your identification. Type in your name and the name of your company (if applicable). You cannot continue setup unless you at least place your name in the top box. Click on **Continue** when finished.



Step 4: Select the Installation Options

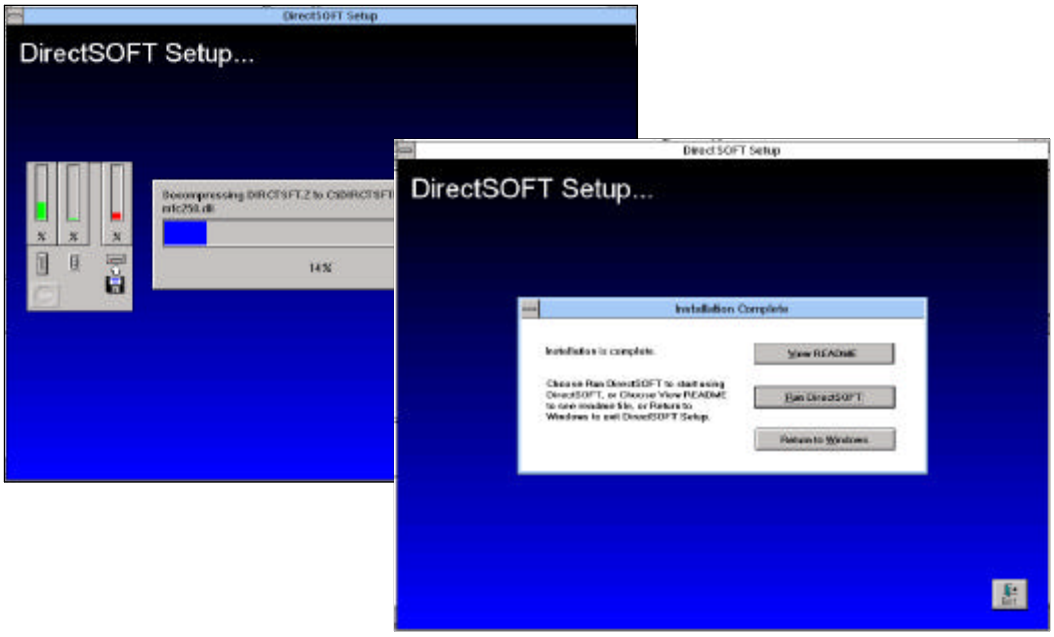
After confirming your entries, the next dialog window that appears gives you three options for Installation. Place Xs in all the boxes, but you can check only those options that you want. Unless you are running extremely low on hard disk space, we advise that you install all three options.



The Installation Process

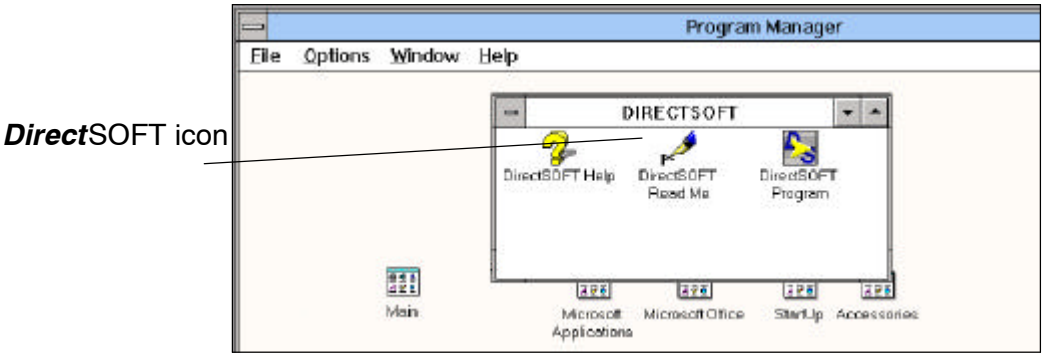
After clicking on **Install**, the actual installation process begins and you should see the screen shown below. The progress monitor is located on the left side of the screen and has three gauge indicators that show progress of the files being copied to the hard drive. You will be prompted as to when you should insert Disk 2and Disk 3. If for some reason you do not have enough disk space, a small Stop Sign icon will appear in the lower left hand corner of the progress monitor. If you don't have enough space, you will have to make space by getting rid of some files on your hard drive or installing a drive with greater memory capacity.

Upon a successful installation, you will be prompted with the choice of returning to Windows, entering ***Direct***SOFT, or viewing a README file. Choose **Return to Windows**.



Step 5: Return to the Windows Main Screen

In the illustration below, the Setup Program has already created a ***Direct***SOFT group for Windows 3.11 or lower. If you have Windows95, it will have added the group DIRECTSOFT to your programs directory in the start section. For Windows95 click **Start**/**Programs**/**DIRECTSOFT** and click on the ***Direct***SOFT icon. For Windows 3.11 or lower, open the ***Direct***SOFT group of the Program Manager and click on the ***Direct***SOFT icon.



DirectSOFT icon

Building an Example Program

What You Will Learn

The pages that follow will explain how to do the following:

- create a project
- use the tool palette to enter instructions and build a ladder program
- use “hot keys” to work faster
- enter nicknames and add comments
- setup an internal timer
- setup a self-resetting internal counter
- cut and paste rungs of logic
- save your program to disk
- communicate with your PLC
- load your program into PLC memory
- monitor your program with the Data View

NOTE: The following program is given only to illustrate how some of the key features of the software operate. This is not intended to teach you how to write ladder logic.

Example

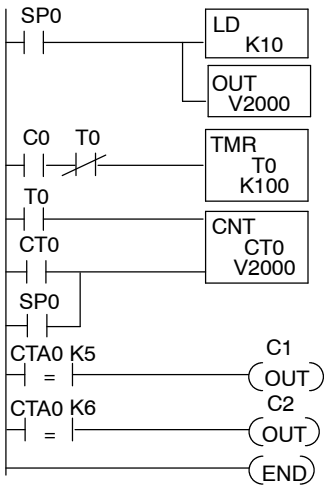
This example has four basic tasks:

1. Load a value into memory of your PLC that can be used as a preset for a timer.
2. Setup a self-resetting timer.
3. Use a counter to count the number of times the timer reaches the preset value and resets.
4. Use Comparative Boolean relays to turn ON an internal coil when the counter current value equals 5, and turn ON a second internal coil when the counter current value equals 6.

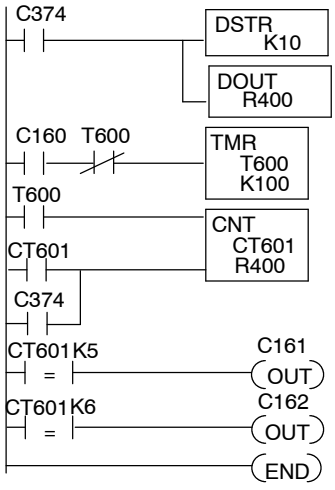
Ladder Logic Example

The ladder logic shown below is the same program for the DL105/DL205/DL405 and DL305 families. As you work through the ***Direct***SOFT screens to enter this program in the pages that follow, the DL105/DL205/DL405 will be shown. If you have a DL305 family PLC, substitute the proper elements and memory locations. For example instead of entering **SP0**, you would enter **C374**.

DL105, DL205 or DL405



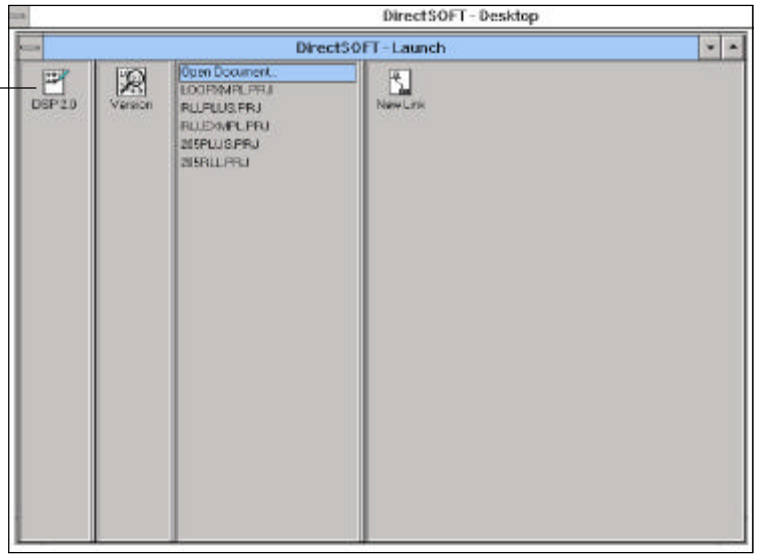
DL305



Step 1: Enter the Programming Mode

When you click on the ***Direct***SOFT icon from the ***Direct***SOFT Windows Group, a screen similar to the one shown below appears. You will notice a programming icon in the upper left-hand corner. Click on this icon to enter your new project.

Click here to start programming



Step 2: Start a New Project

You should now see the **New Project** window. You can name your project using any combination of 8 characters (no spaces). Use "**EXAMPLE1**" for this example. Move the selection bar to the **PLC Family** and **CPU Type**. For this example, use a PLC belonging to the DL105/DL205/DL405 families. Click on **OK** after you have made your Family and Type selections. If you have a DL305 type PLC, be sure and select it instead from the choices. Keep in mind the available mnemonics, processing rules and even the tool bar characteristics are tailored to the Family and Type selections that you make.

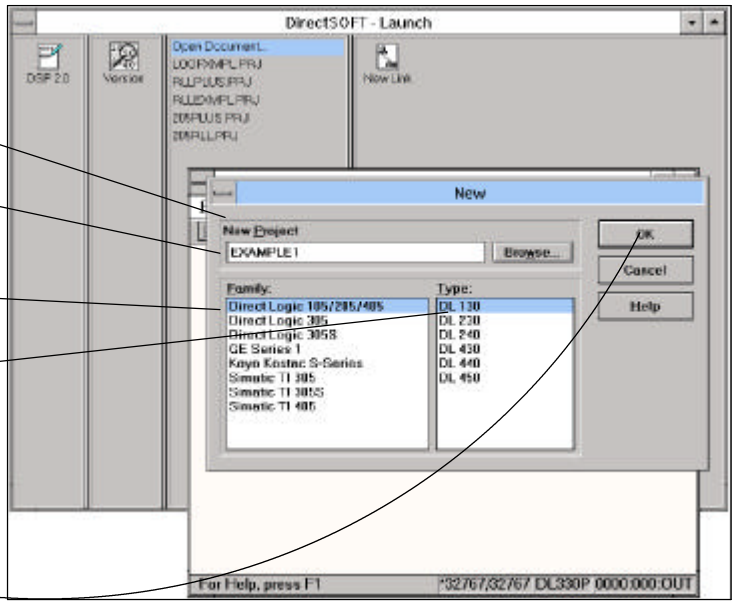
New Project Window

Type in a name for your project

Select the PLC Family..

Select the CPU Type..

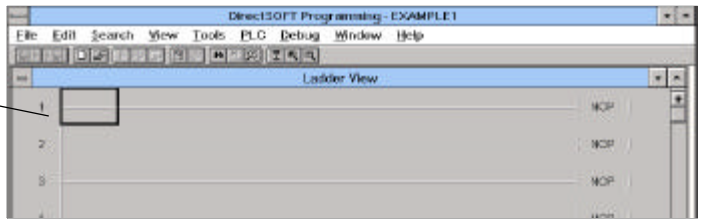
..then click on OK



After clicking **OK** to enter your project name, PLC family and CPU type, you will see the skeleton ladder logic template. You are in the **View Only Mode** at this point. In this mode, the cursor is always hollow and all you can do is browse.

View Only Mode

(cursor is hollow)



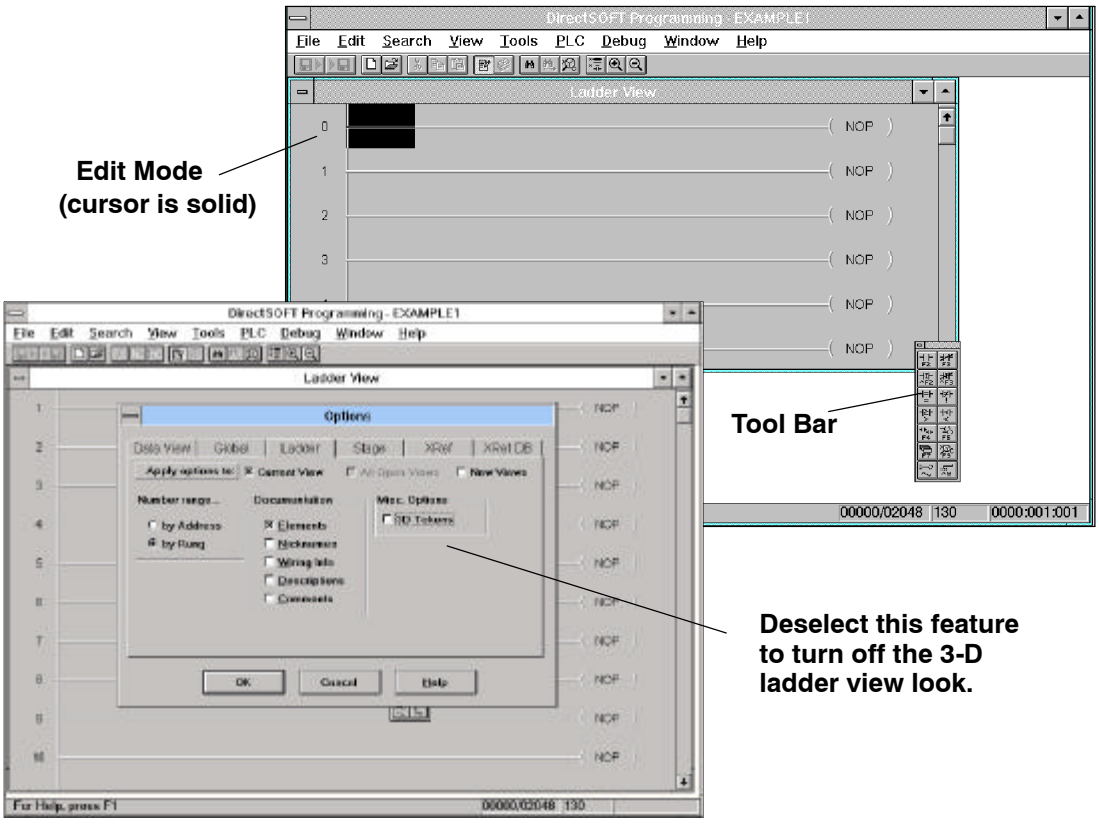
Step 3: Switch to the Edit Mode

You will want to use the **Edit Mode** for entering programs. This is accomplished by holding down the control key and simultaneously pressing the letter E key (**CTRL + E**). You could also click **Edit** on the top menu bar and then selected **Edit Mode**.

DirectSoft indicates the **Edit Mode** is active when the cursor becomes solid and a **Tool Palette** appears in the lower right portion of the screen.

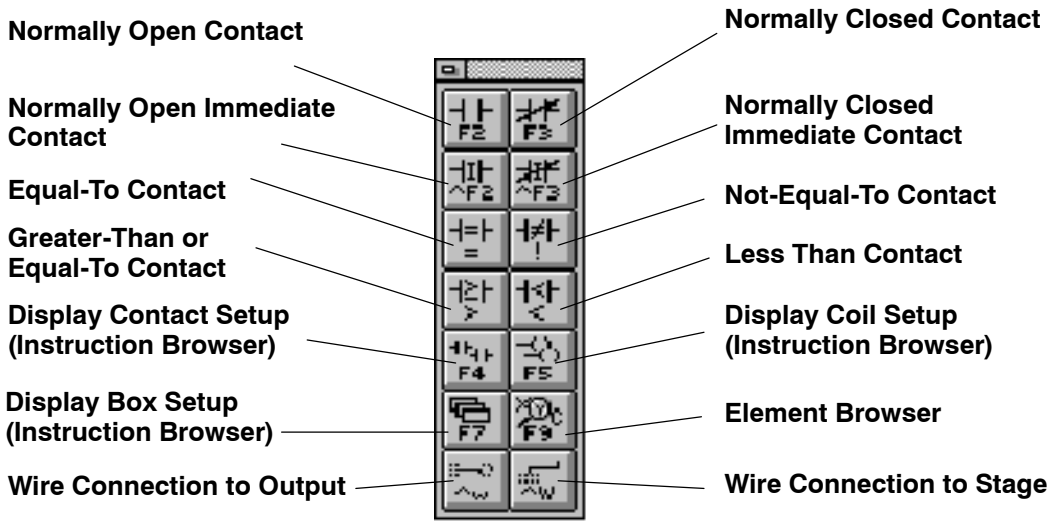
In order to facilitate clear printing reproduction in this manual, you will also at this time turn off the default 3-D Token for the ladder logic. You do this by clicking on **View** and then **Options**. This is followed by clicking on the box labeled **3-D Token**. This removes the **X** in the box. To exit and record your selections, click on **OK**.

Edit Mode (cursor is solid)



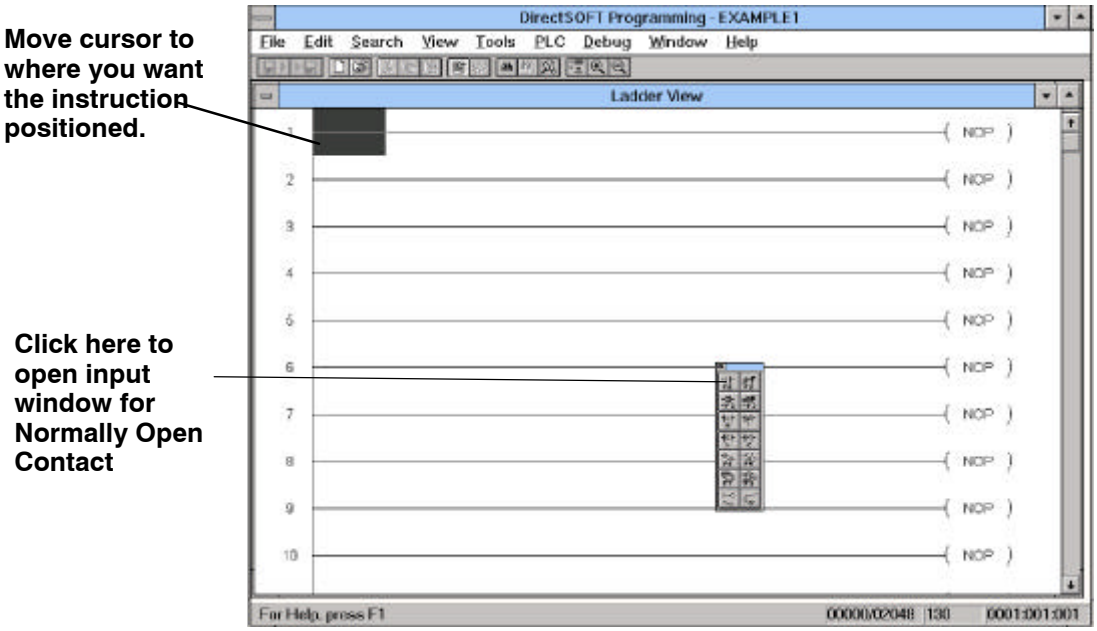
The Tool Palette

The **Tool Palette** can be very helpful, especially in the beginning while learning to program in ***Direct***SOFT. Later, you may prefer to use the faster **Hot Keys** instead of clicking on the tool buttons themselves. The Hot Keys are shown below each element symbol on the icon button. The expanded list is provided in the main ***Direct***SOFT User Manual. *The Tool Palette shown below may not be exactly like the one you have on your computer screen.* The tool palette shown depends on which CPU your PLC is using. In this example, you will be using only the elements common to all CPUs, therefore this will not be a problem.



Step 4: Using the Tool Palette to Enter the First Element

Use the **Tool Palette** to enter the first instruction of the program. First move the cursor to the desired location of the first element. A normally open contact needs to be placed in the selected position to load the preset on the first scan. To do this, click on the button that shows the normally open symbol. This will open a small input window for setting up the contact.

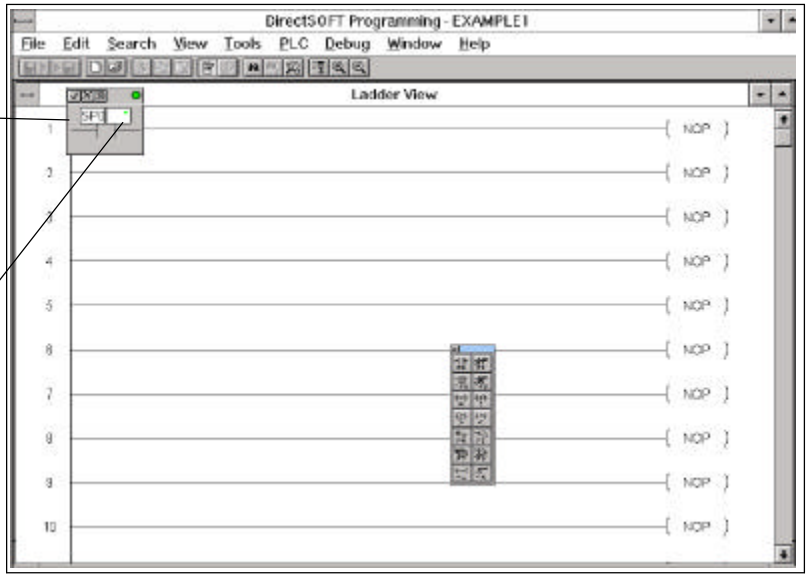


Step 5: Using the SP0 Relay in Our Program.

Use contact **SP0** as the first element to load a preset into the PLC memory. **SP0** is used because you only need this rung to execute once, i.e. the first scan. Notice the green/red indicator in the box. It will display the validation of each input. For example, if you typed the letter **O** instead of the digit **0**, the indicator would turn red and stay red until you correct your mistake.

Enter SP0 to have a contact that will close on the first scan only

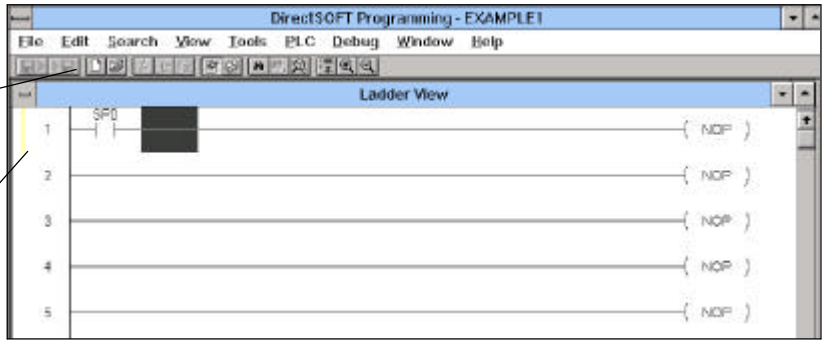
Notice the Error Indicator will glow green if you enter a valid contact



Click on the check mark (✓) in the upper part of the input box when you have finished typing in the element and have the green light. At that point, the instruction will be entered. Notice the yellow vertical bar that appears next to the rung. *Since this is not a color manual, you see a light gray vertical bar in the screen example shown below.* The yellow bar indicates you have entered an Instruction or instructions, but that you have not compiled the rung yet by selecting **Accept** from the **Edit** menu. Rungs that have already been accepted into compiled memory will have a green bar instead. Without being compiled, you will not see the icons for **Save to Disk** or **Save to PLC** enabled. This means in order to save your program anywhere you will have to **Accept** your editing first. For example, if you wanted to stop working with ***Direct***SOFT right now, you would first want to accept all the edited rungs so that you could save the revised program to disk.

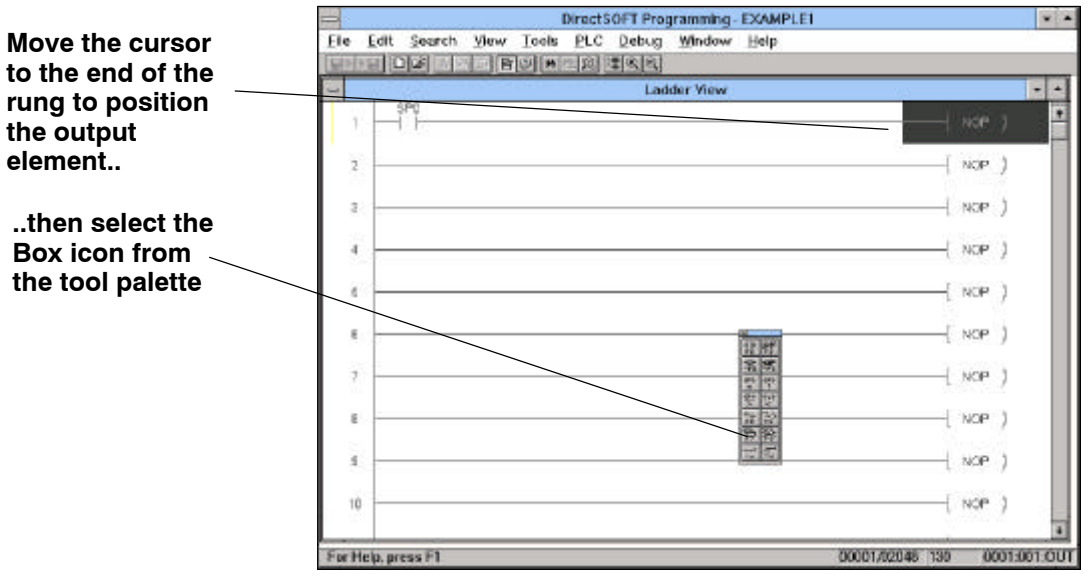
The Save to Disk icon is not available because you have not accepted your editing yet

Yellow color coded bar indicates the rung has not been accepted yet



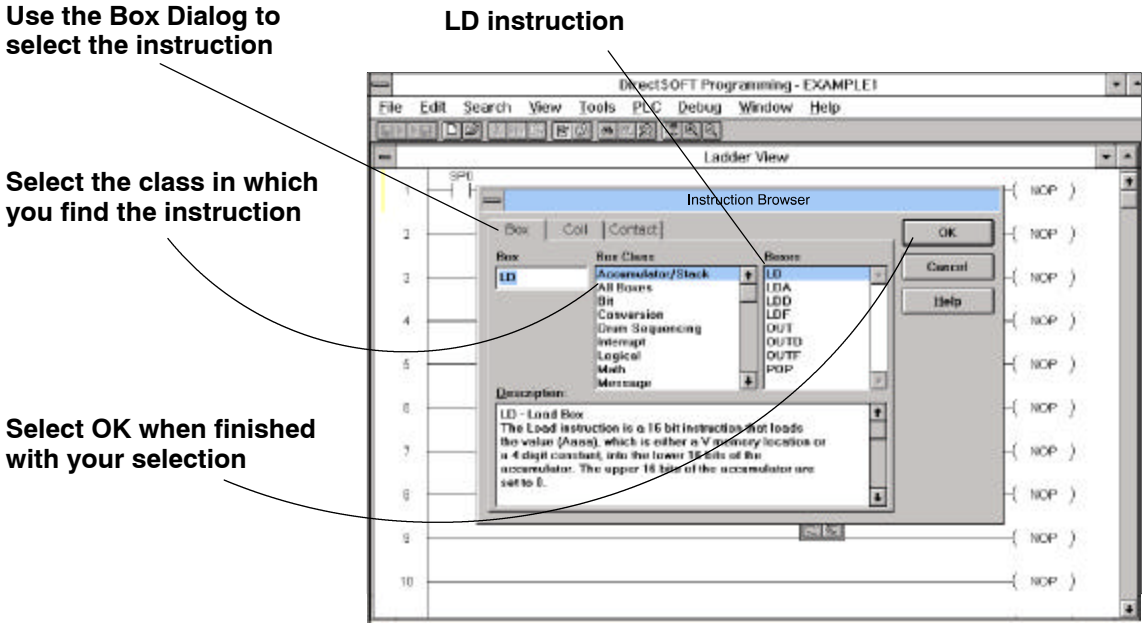
Step 6: Using the Box Browser

You are now ready for the output element on this rung. Move the cursor to the end of the rung to position where you want the element placed. Placing data in memory is a two step operation. First, load the data in the CPUs accumulator and then output it into memory. To accomplish this, *two output elements* will be placed on this rung. Start by entering the box instruction **Load Accumulator** that will load data into the accumulator. Once the cursor is positioned, click on the **Box** icon of the **Tool Palette**.



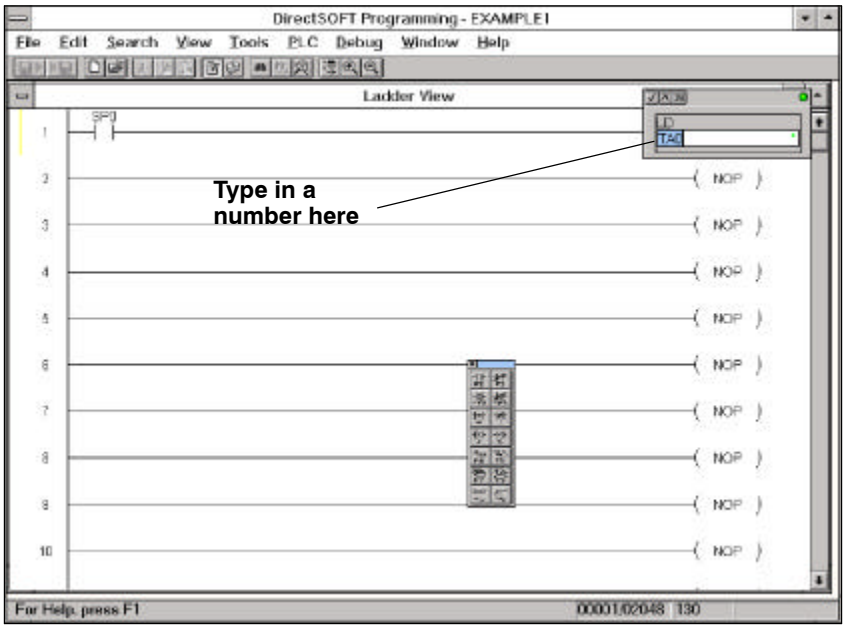
Step 7: Scrolling the Box Class Window

The box instruction to use for a DL105/DL205/DL405 is **LD**. This is found in the **Accumulator** class of the box instruction set shown in the **Box Setup** of the **Instruction Browser** that appears when you click on the **Display Box Setup** icon of the tool palette. With **Accumulator/Stack** and **LD** selected, click on **OK**.

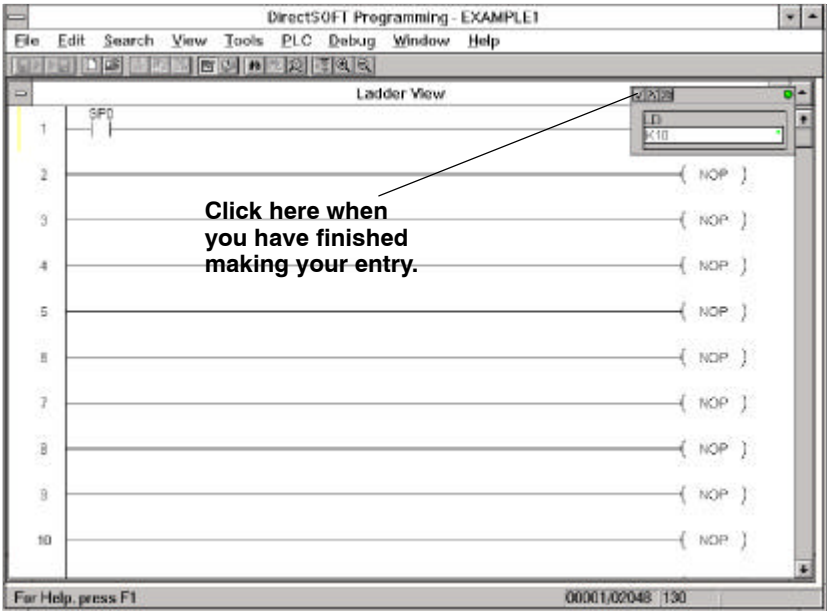


Step 8: Entering a Preset in the Accumulator

Now you see an input window that is very similar to the one used for entering the SP0 relay. It is waiting for you to type in the number to load in the Accumulator (recall from the program that you are using this first rung to enter the preset for the timer).



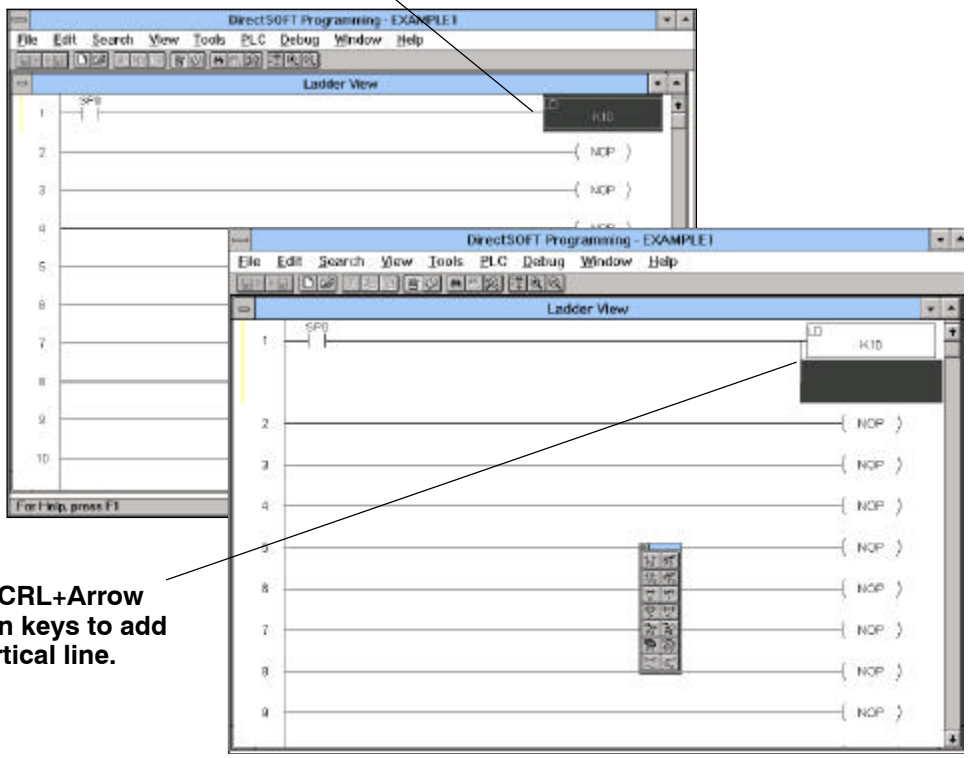
In this case use the number 10 as the preset. You will enter **K10** (where the **K** means **constant**). Again the green/red indicator inside the box will prompt you on whether or not you have made a valid entry. It glows green if it is correct. Click on (✓) when you have typed in **K10** and you "have the green light".



Step 9: Connecting Elements in Parallel

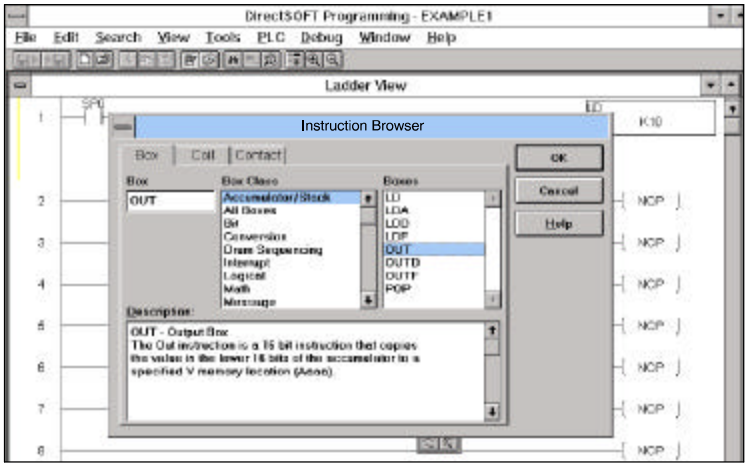
You are now ready to add a second box for this rung. It is going to be connected in parallel,therefore, you will need to add a vertical connecting line. With the highlight on the first box, hold down the control key and then press the down arrow (**CTRL + DOWN ARROW**). This draws the connecting line you need. You could have also performed the same thing from the upper menu bar by selecting: **Edit/Wire/Down.** However, the arrow keys are faster.

Make sure the cursor is on the top element before starting your vertical line.



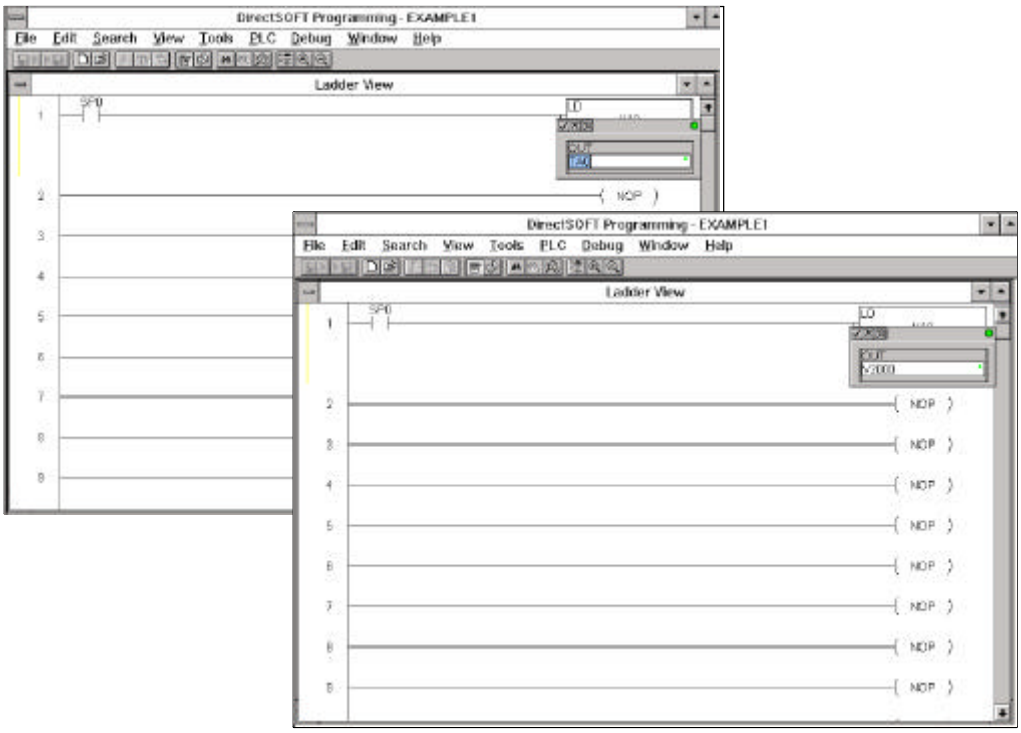
Step 10: Inserting an Output Box

With the cursor at the end of the line that you have created, select the Box icon from the tool palette again. This time, choose the **OUT** box from the **Box Tab** of the **Instruction Browser**. Select **OK** when you have highlighted the **OUT** function.

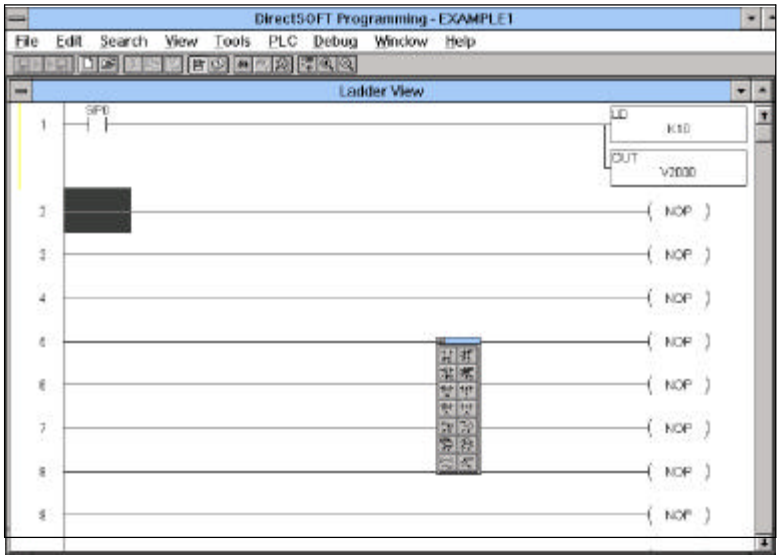


Step 11: Entering the Address to Hold the Preset

Now you need to enter the address into which you are outputting the accumulator data. Use **V2000** in this example (**V** means **"variable"** memory).

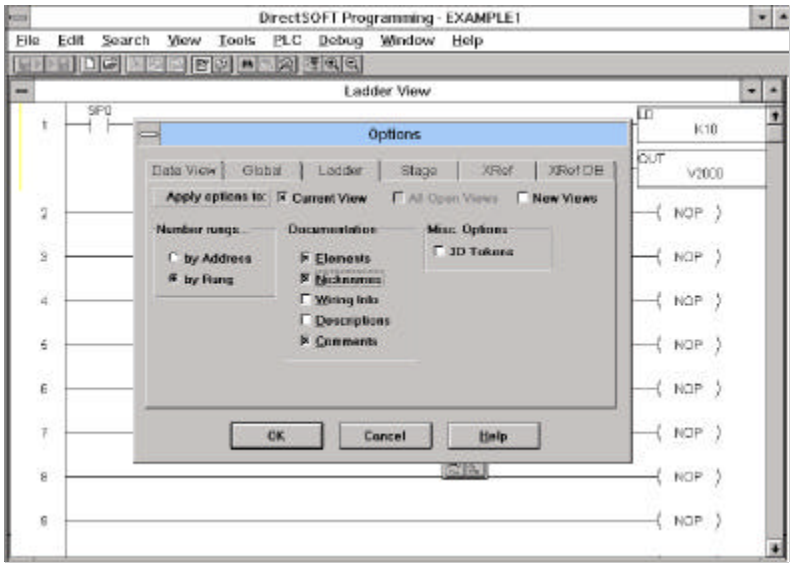


When you have entered the **V2000**, click on the check mark (✓). The new **OUT** function block should now be in place as shown below.



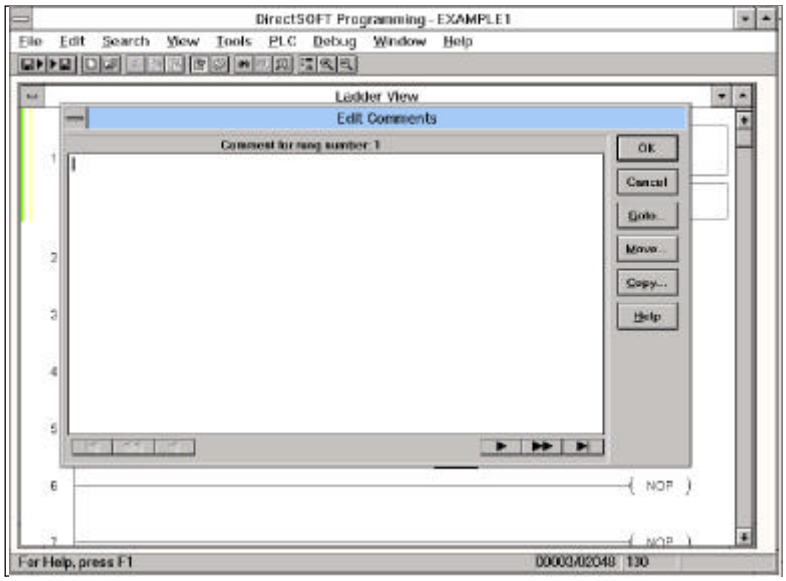
Step 12: Enabling the Documentation Options

You could stop with this particular rung at this point and go onto the next rung of our program. But in this example the idea is to make the program a little clearer to anyone who may look at it later. To accomplish this, you are now going to learn how to enter **comments** and **nicknames** for the program. Start by clicking on **View** from the menu bar at the top. Then select **Options**. An options menu appears (see below). Make sure nicknames and comments have been checked to ensure they will be displayed on the screen once entered. Select the boxes next to **Nicknames** and **Comments** to enable these options. Select **OK** when finished.

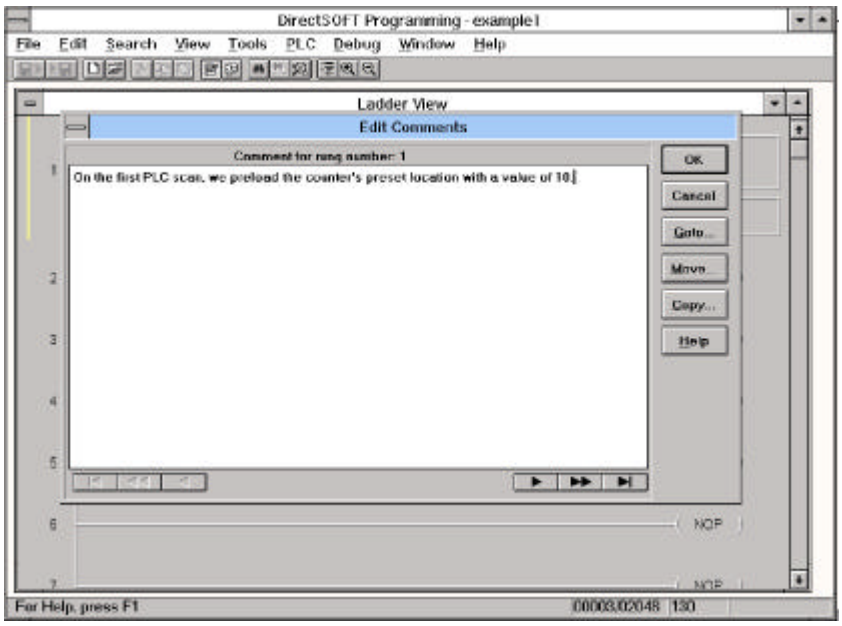


Step 13: Entering a Comment

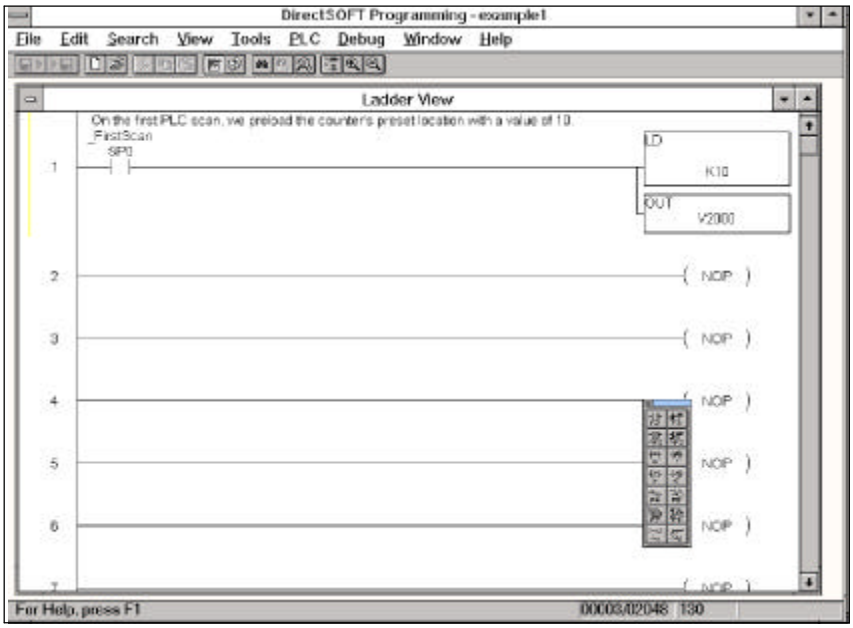
First insert a comment above the rung. To do this, you can pull down the menu from **Tools**, then select **Comment Editor** (Hotkey=**CTRL + K**). Either of these methods will display the **Edit Comments** dialog box shown below.



Now type in the comment you want and click on **OK**.

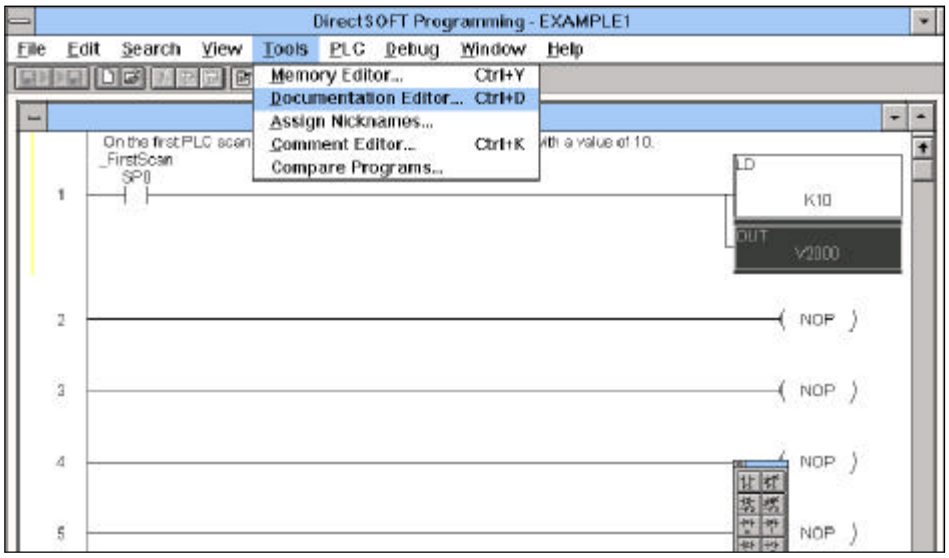


As a result, you end up with the comment shown above the rung like this:

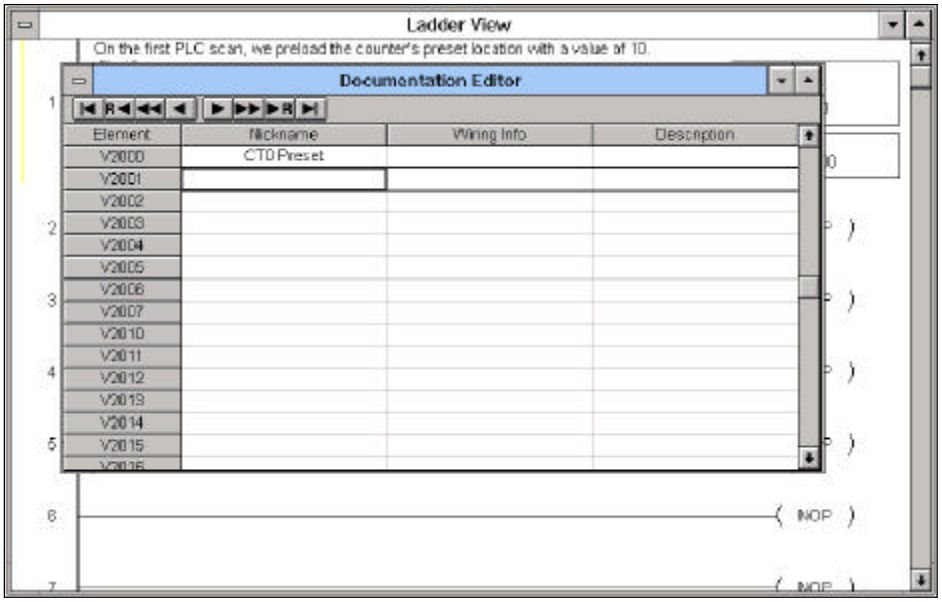


Step 14: Assigning a Nickname to the Preset Output

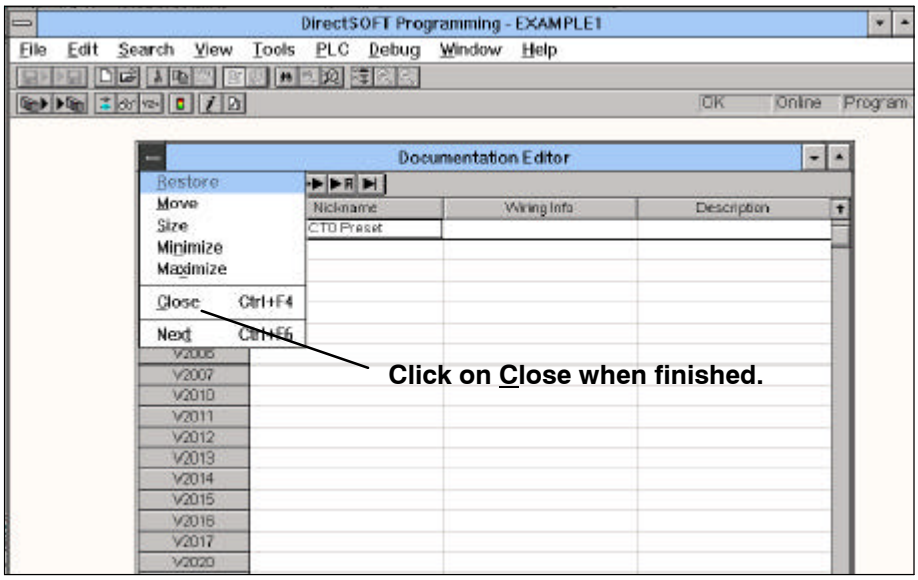
If you decide to assign a nickname to V2000, you will need to document that this address will hold the **preset** for the timeout counter **CT0** . Use a nickname that describes the function. Move the cursor to highlight the OUT box for the V2000. Select **Tools** from the upper menu bar. Next select the **Documentation Editor** or press **CTRL + D**.



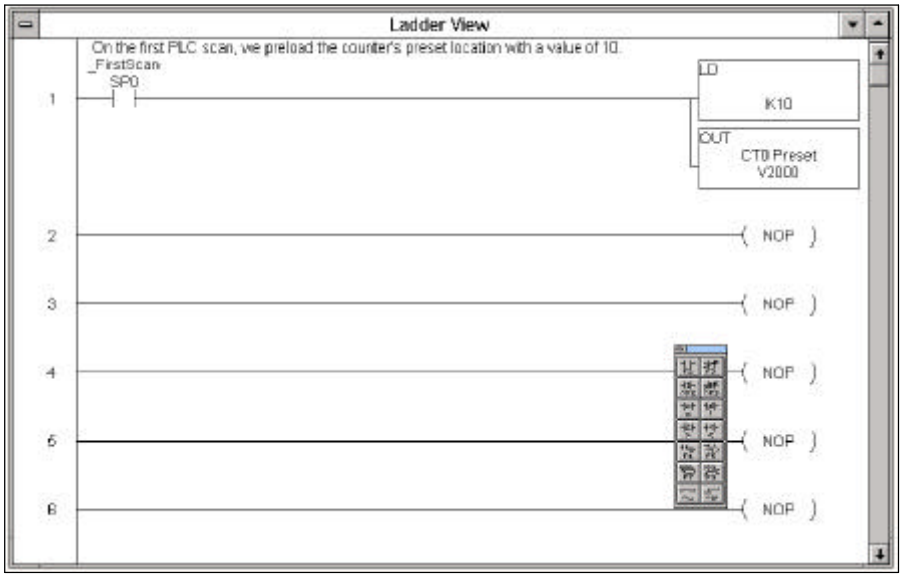
The dialog box shown below will appear. It will have **V2000** in the box labeled **Element**. Immediately to the right is the **Nickname** Box. Type in the nickname, in this case use the name **CT0 Preset**.



After typing in the nickname information, **Close** the **Documentation Editor** when you are finished.



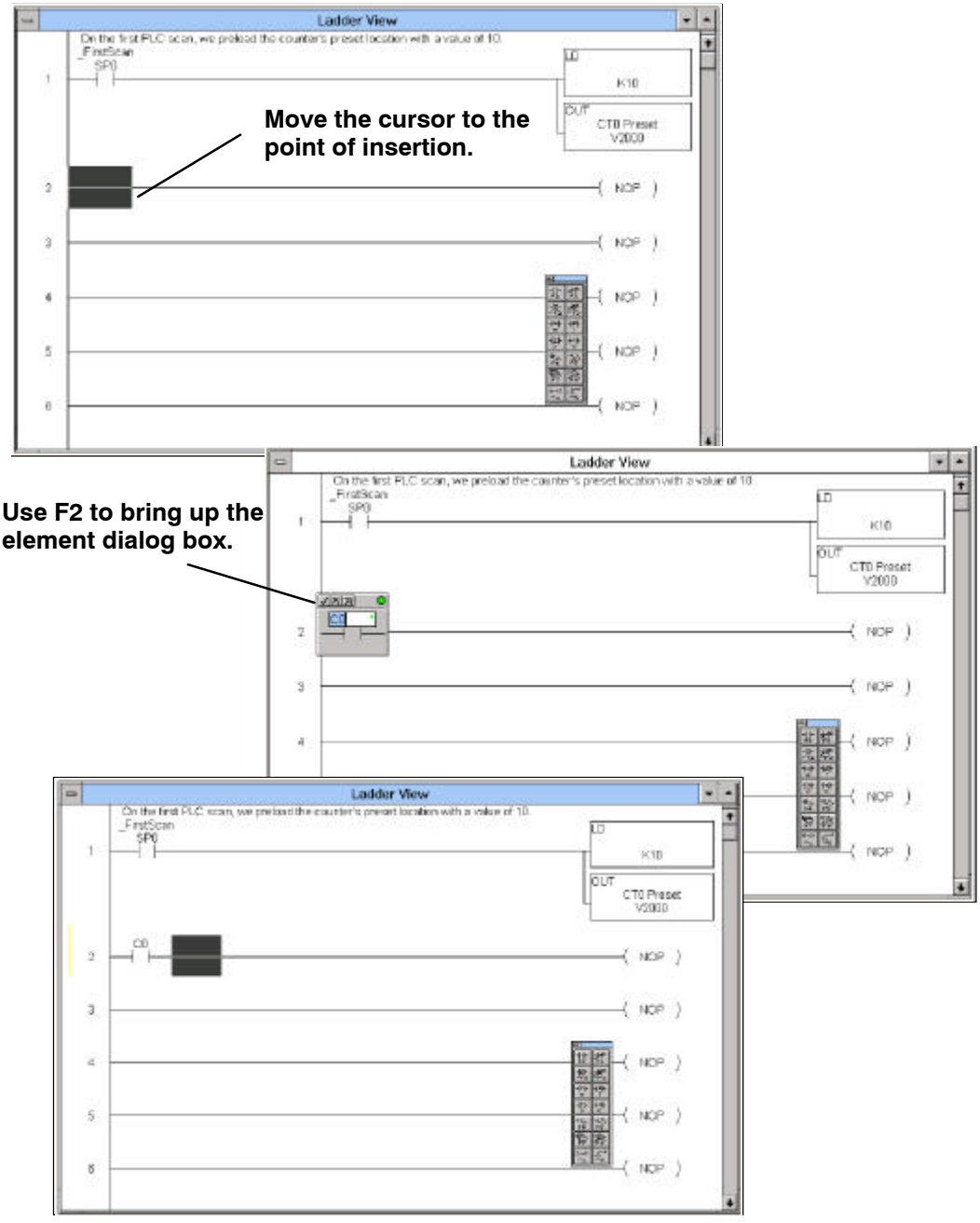
The nickname will appear inside the **OUT** box above **V2000**. You are now ready to create the second rung of ladder logic.



Step 15: Adding an Internal Relay to Start the Timer

In this next rung youwill start a timer, have it timeout at a certain preset value, and then reset itself. Choose to use **C0** as the **start relay**; and of course, **T0** is the timer "done" bit for the **TMR T0** timer.

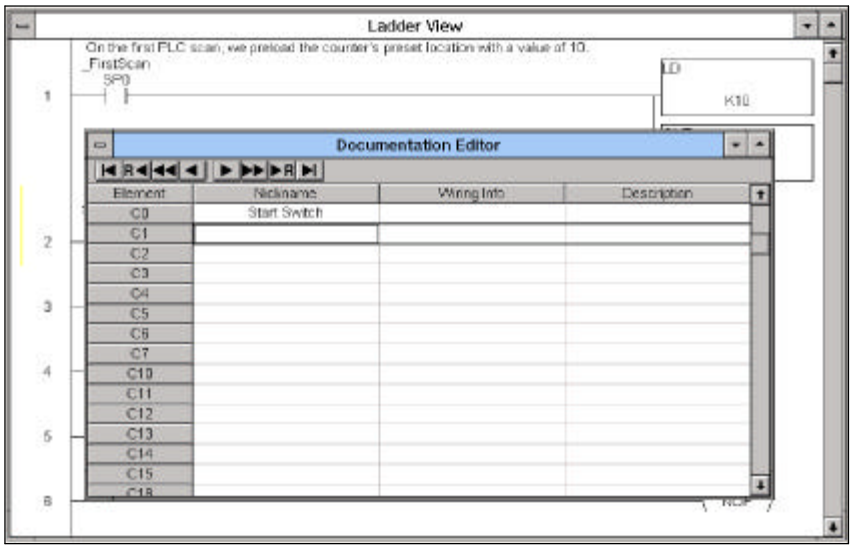
Insert the "start relay" **C0** first. Use a shortcut this time to create the normally open contact on the rung. You may recall on the first rung, the normally open contact icon was selected on the tool palette in order to create the contact. This time, move the cursor to the point where the contact is to be placed and press the **F2 key**. This opens the input box shown below and you can fill in the information as before. The shortcut keys are much faster than the icon selection method as you become more familiar with ***Direct***SOFT.



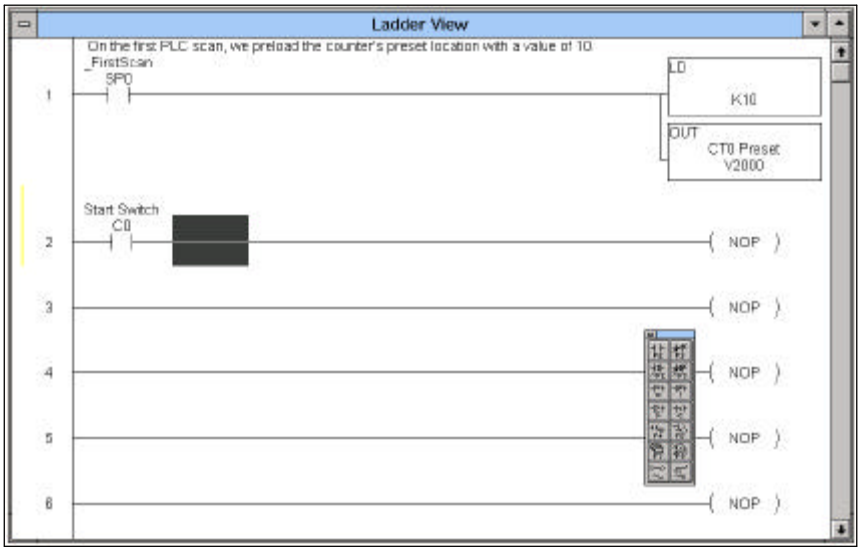
Step 16: Assigning a Nickname to the Start Contact

Next, document that **C0** is the "start switch". You could pull down the **Documentation Editor** from **Tools** on the horizontal menu bar to enter this information as a nickname. However, for learning purposes, use the hot key equivalent–**CTRL + D**. This will bring up the Documentation Editor without having to use the pull-down sub-menu of **Tools**.

If your cursor was on **C0** when you used the **CTRL + D** combination, the browser should have the **C0** in the **Element** column. Type **Start Switch** in the **Nickname** column.

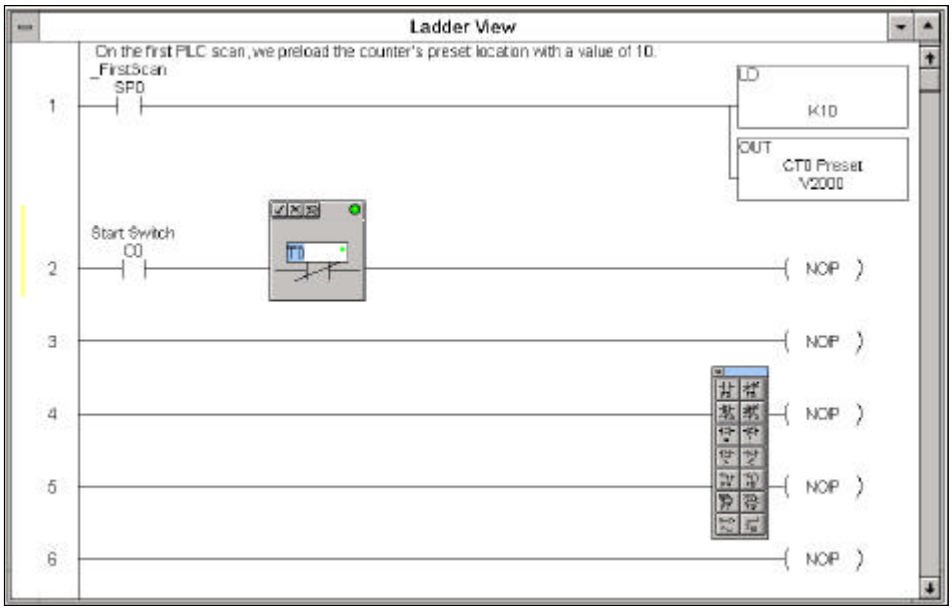


Close the **Documentation Editor**, returning to the rung. The nickname should be above the element **C0**.



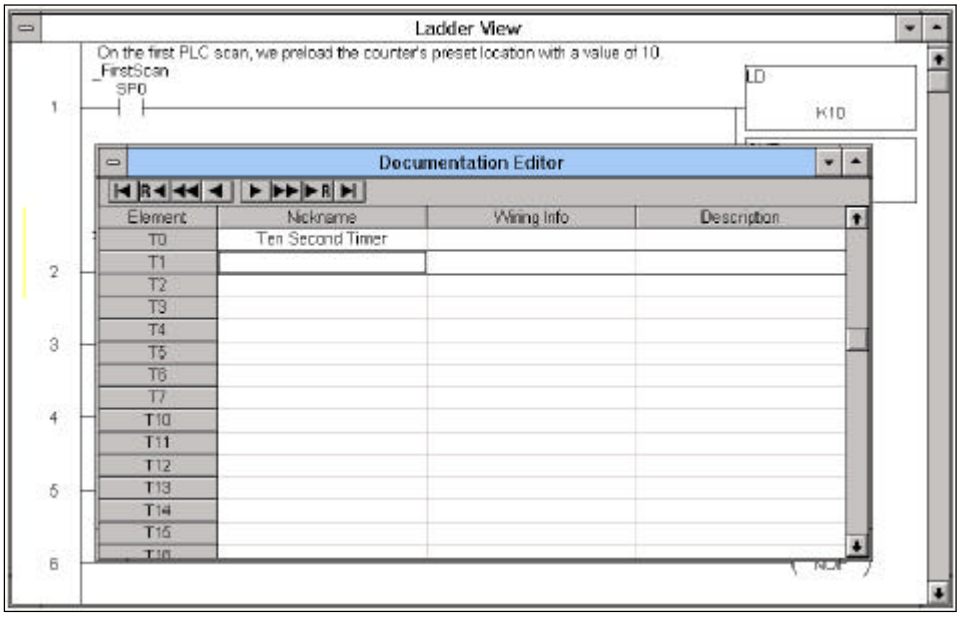
Step 17: Adding a Normally Closed Contact

Next, move the cursor further to the right on the rung to the point where you want to place the normally closed contact for the timer "done" bit (**T0**). Use shortcut key **F3** to bring up the dialog box for a normally closed contact. Type in **T0**. Finish by selecting the check mark.

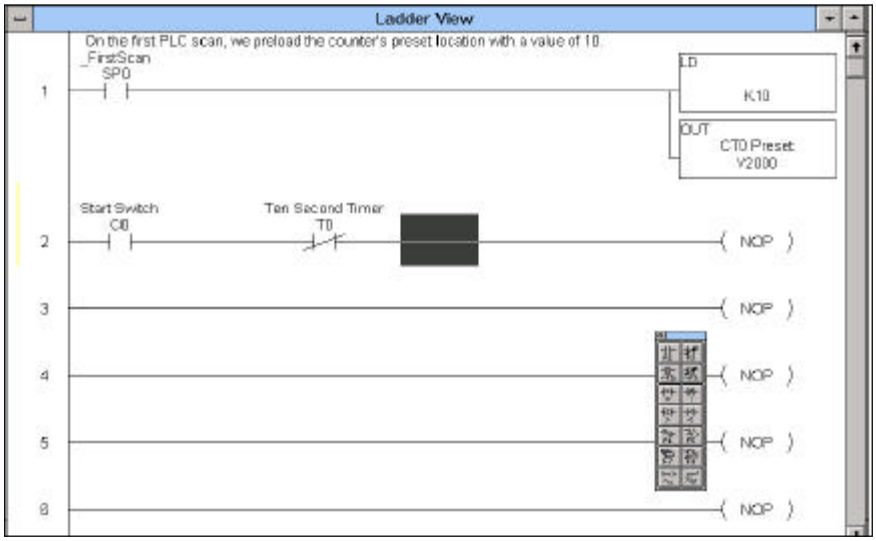


Bring up the **Documentation Editor** again by using the **CTRL + D** combination. Enter **Ten Second Timer** in the **Nickname** column. **Close** the Editor when finished.

Step 18: Adding a Nickname to the Normally Closed Contact

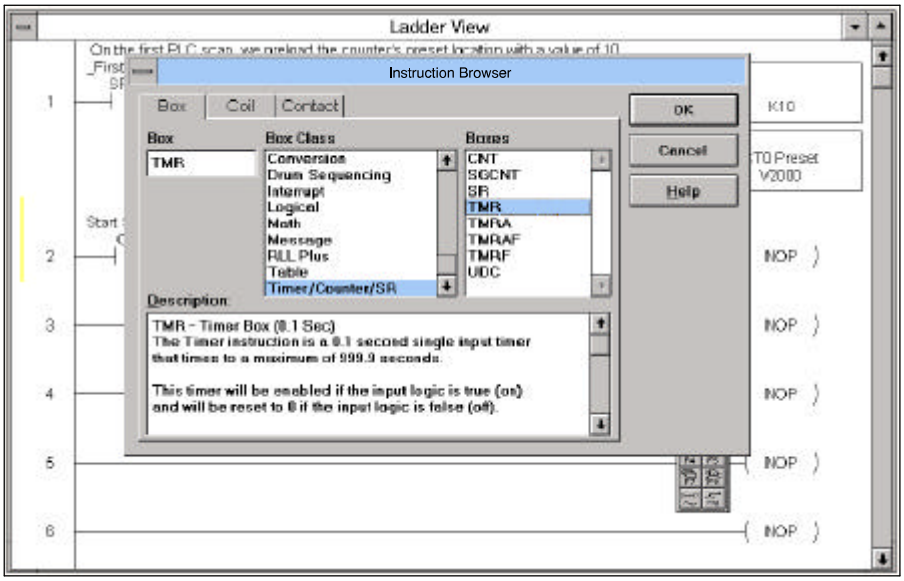


After the **Documentation Editor** closes, you will return to the rung where the words **Ten Second Timer** will be above the normally closed **T0** timeout relay.

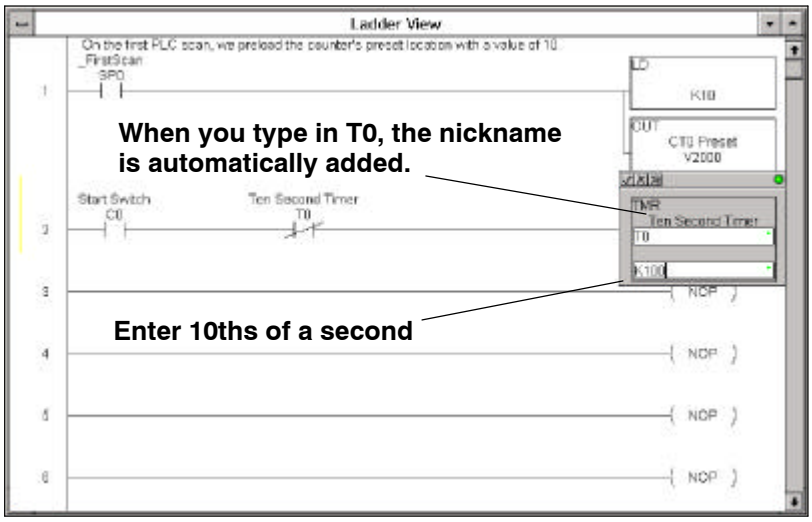


Step 19: Inserting the Timer Instruction

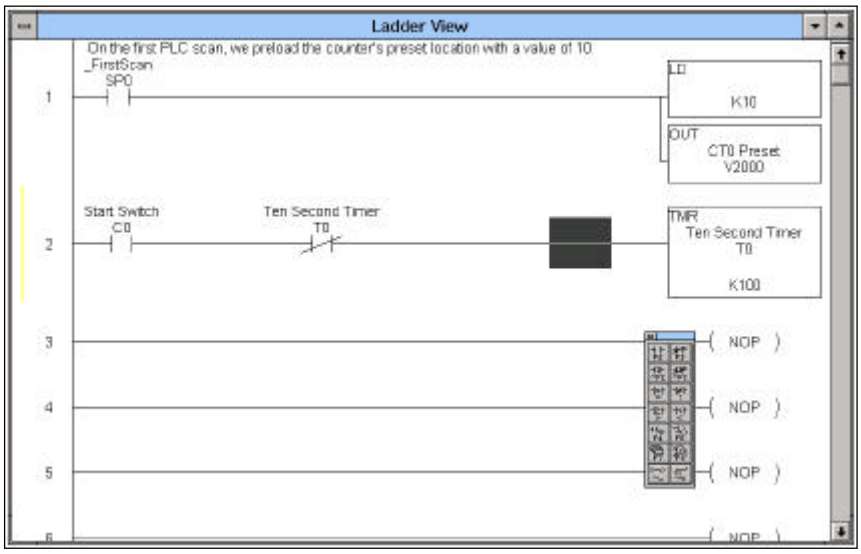
Move the cursor to the end of the rung to enter the timer **TMR T0**. Since a timer is a box command, you can use the shortcut key **F7** to bring up the box instruction dialog of the **Instruction Browser**. Once you have opened the dialog box shown below, move the cursor in the **Box Class** window to **Timer/Counter/SR** , move the cursor in the **Boxes** window to **TMR**, and click on **OK**.



The element box shown below will appear. This is the element input window for the timer. The first thing to do is allocate a particular timer. This example uses internal timer **TMR T0**, therefore type in **T0**. The indicator light of the box should turn green to tell you this is a valid entry. Notice also the nickname assigned earlier to the timeout relay **T0** appears above the first entry window. A second window also requires you fill in a preset value for the timer. Use the **Tab Key** or click with the mouse to move to the second field. The preset must be entered in tenths of a second. Therefore, **K100** would be one hundred tenths of a second (**100**/**10**), or **10 seconds**.

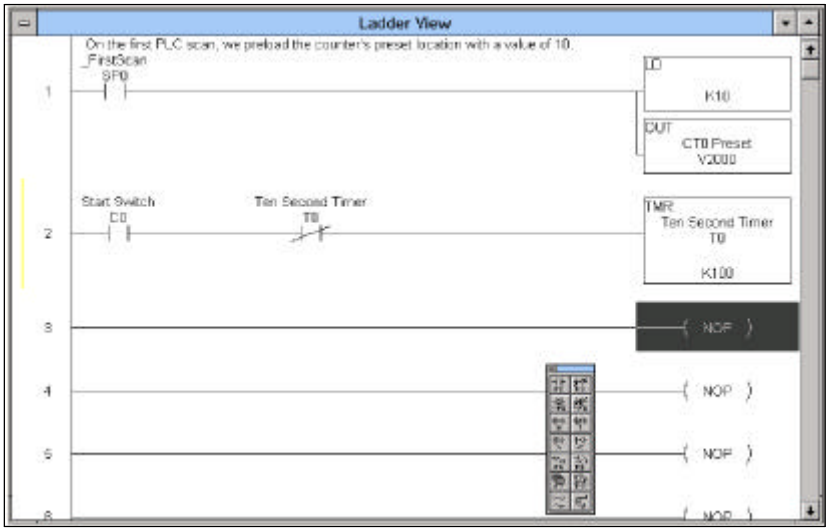


Click on the check mark to accept your entries. ***Direct***Soft returns you to the rung of ladder logic for further programming.

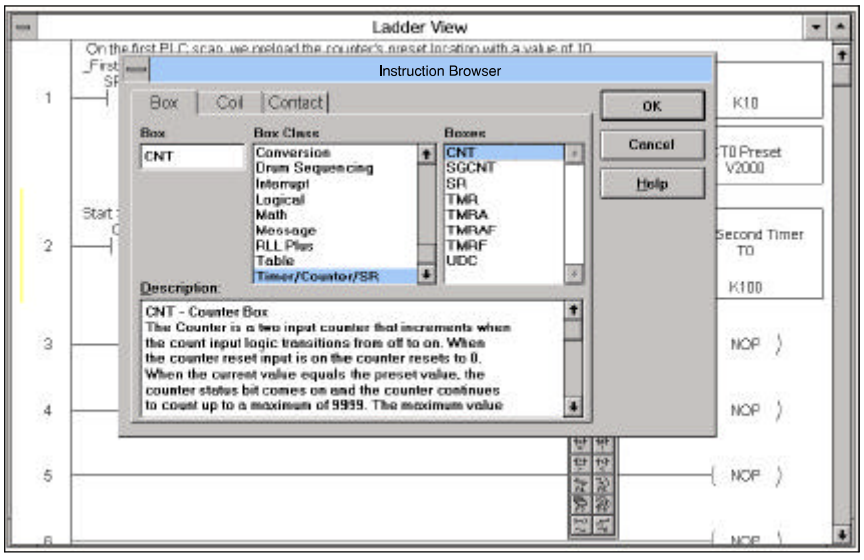


Step 20: Adding the Counter

You are now ready to start the third rung of the example program. You will be inserting the counter **CT0** (a preset was entered at V2000 with the first rung of logic). Move the cursor to the end of the third rung and press the **F7** key to open the **Box Tab** of the **Instruction Browser** again.

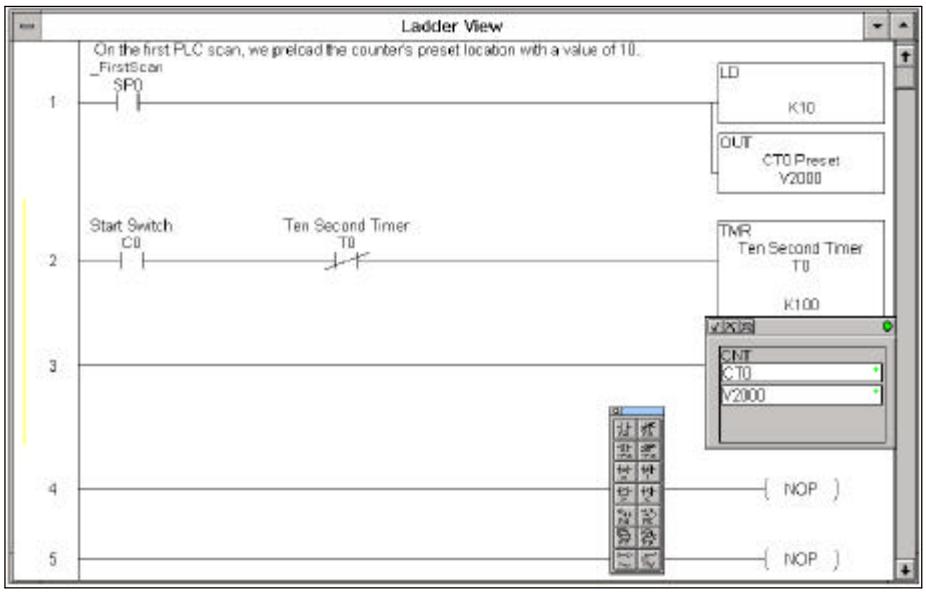


Select **Timer/Counter/SR** from the **Box Class**. Select **CNT** from the **Boxes** window and click **OK**.



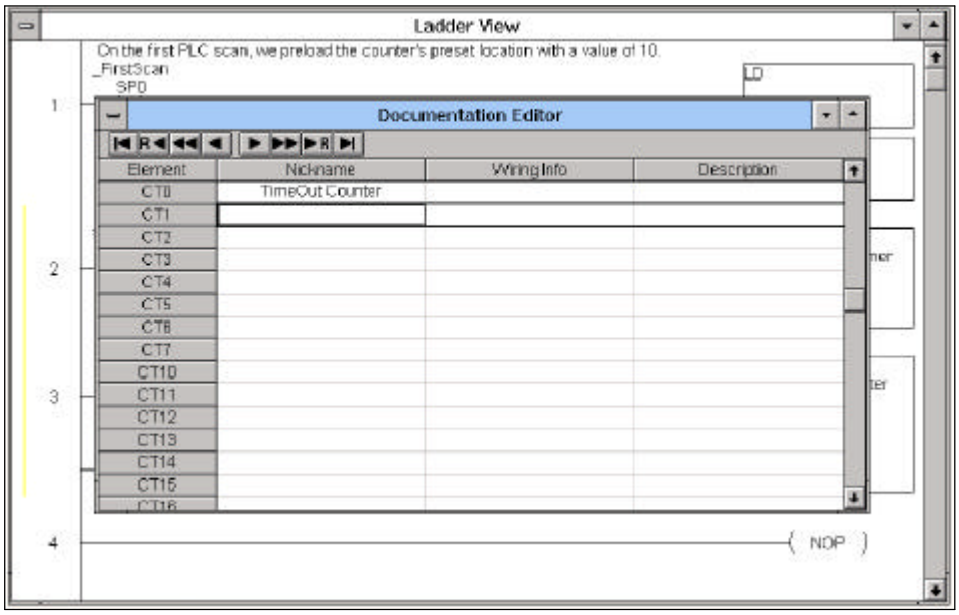
Step 21: Entering the Counter Data

An element window will appear. Enter **CT0** for the counter and **V2000** as the address holding the **preset** data for the counter. Select the check mark when you are finished making the entry.



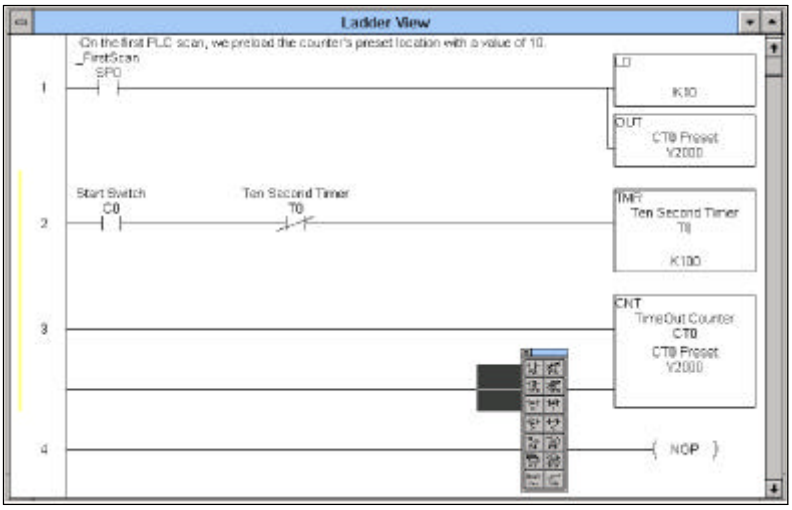
Step 22: Assigning a Nickname to the Counter

Enter the **Nickname** (TimeOut Counter), using the same procedure previously described. Use the key combination **CTRL + D** to bring up the browser.



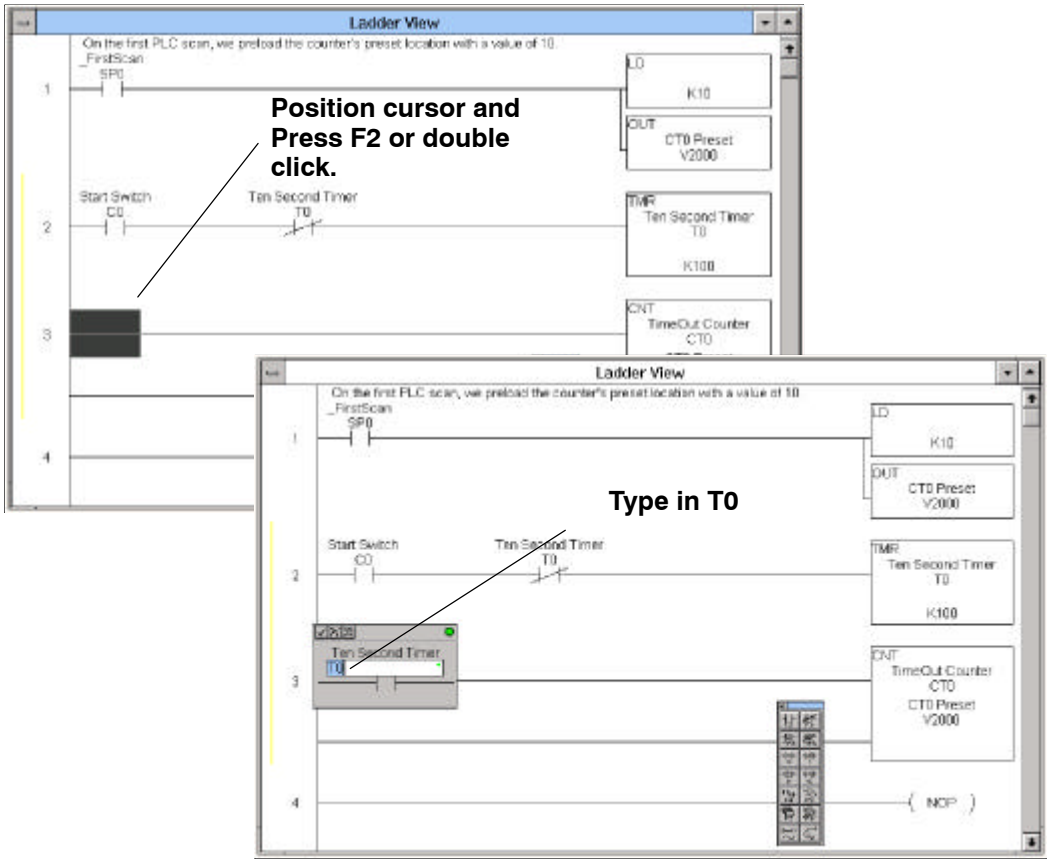
Step 23: Making the Counter Self-Resetting

Close the **Documentation Editor** and return to the rung. You will see the new Nickname, as well as the Nickname (**CT0 Preset**) you had given earlier to the preset memory location V2000.



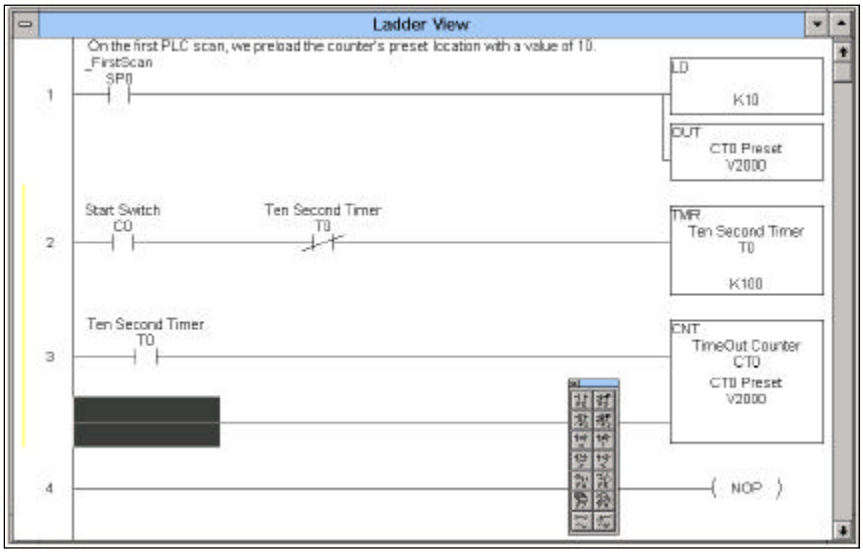
Notice the **CNT** box has two inputs--**count enable** and **reset**. To count the number of times the "done" bit turns ON, the contact for the timer "done" bit (**T0**) on the **count enable** rung needs to be inserted.

With the cursor in the position shown below, enter contact **T0**. Press **F2** to call up the contacts input window. Type in **T0**. Select the check mark when finished.

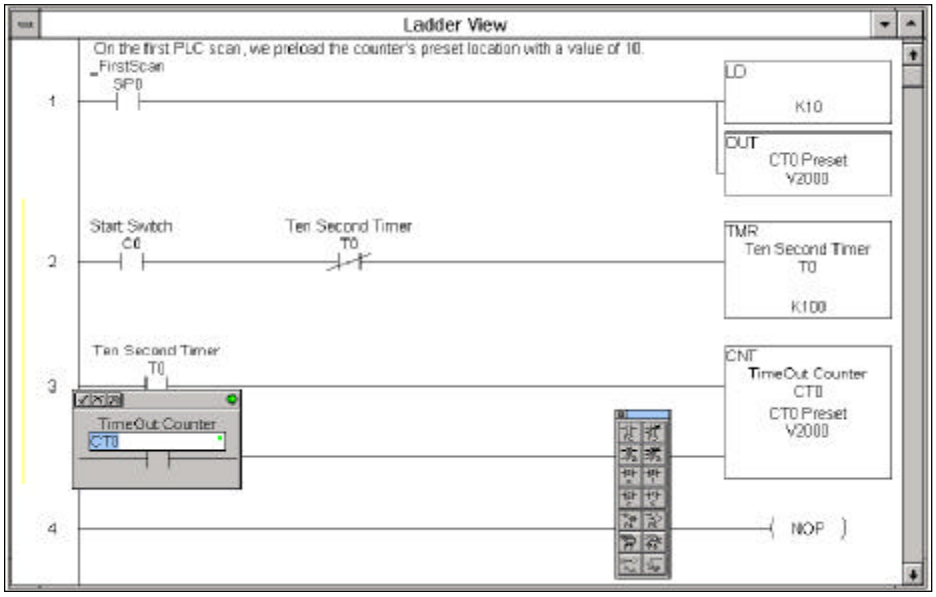


Notice the **Nickname** assigned previously for **T0 (Ten Second Timer)** automatically appears to the first rung of the counter.

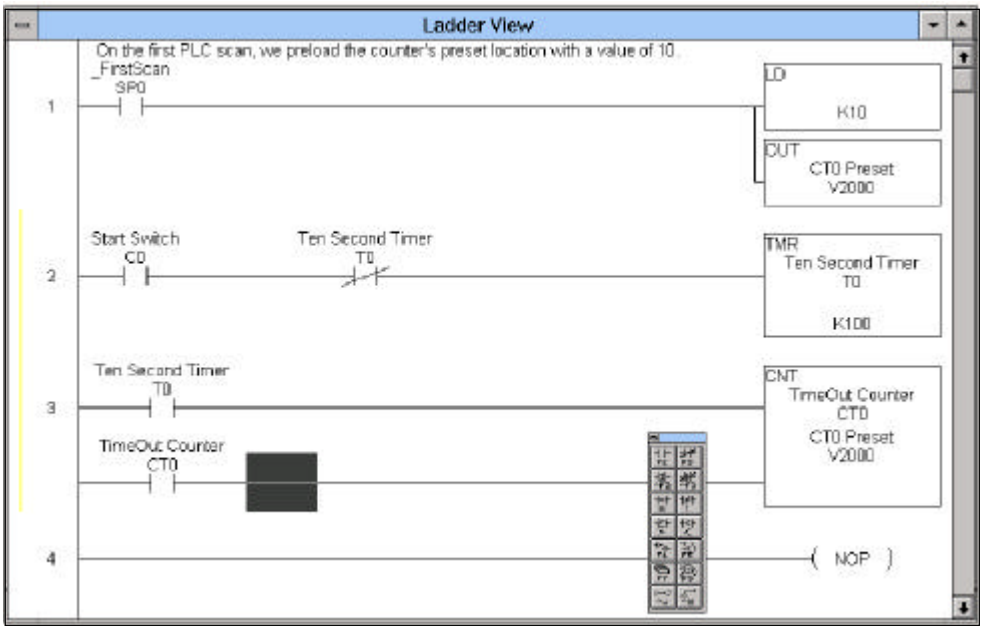
With the count enable rung of the counter completed, move the cursor down to the second rung of the counter to enter the reset logic.



At this point, the reset contact using the counter "done" bit (**CT0**) will be entered so when the counter reaches its preset, it will automatically reset itself to zero. Again, press F2 to bring up the contacts input window. This time type in **CT0**.

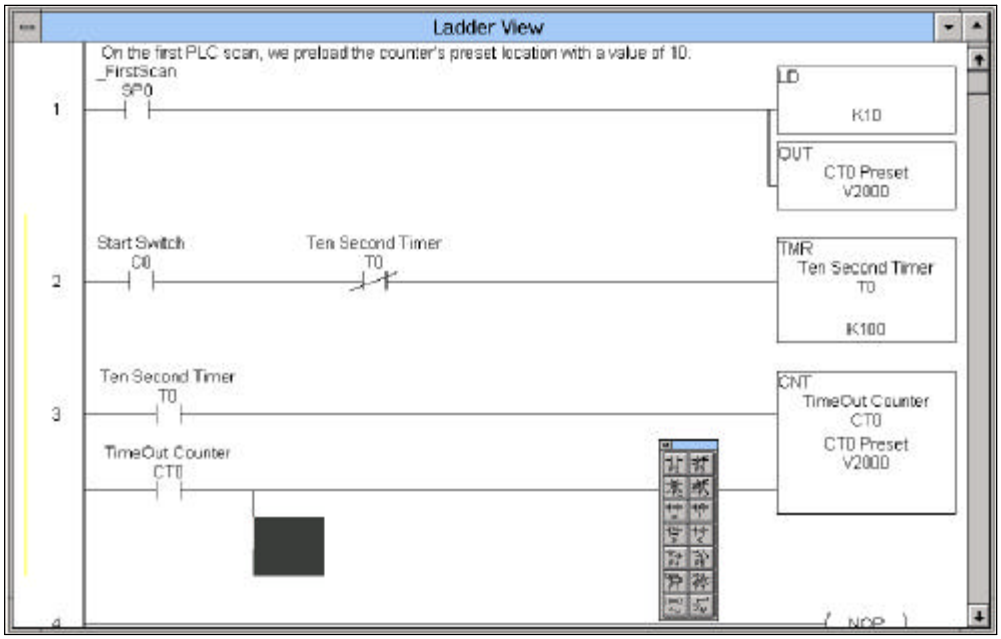


Click on the check mark in the dialog box to return to the rung. Notice the **Nickname** for **CT0 (TimeOut Counter)** is automatically placed above **CT0**.

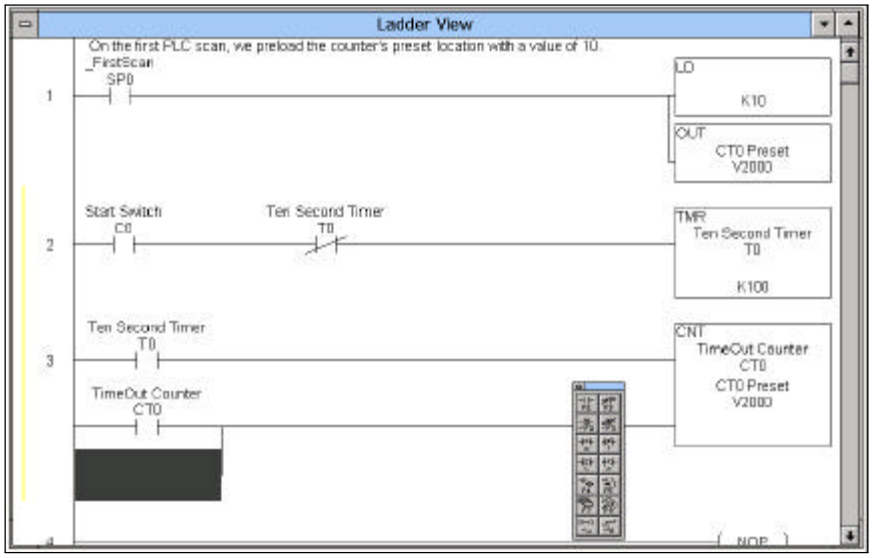


Step 24: Adding a Coil for Resetting on the First Scan

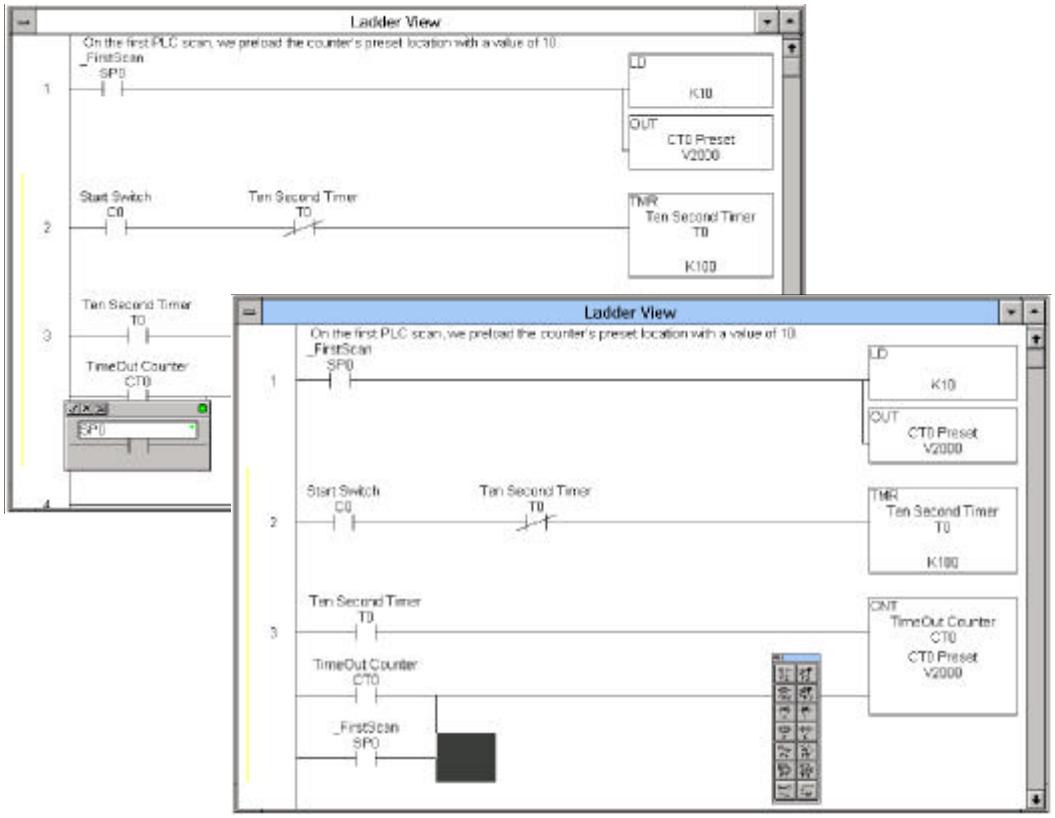
You will want to reset the counter during the first scan. The counter will reset on the first scan by placing special relay **SP0** in parallel with the reset contact **(CT0)**. To place an instruction in parallel with another, first position the cursor to the right of the first instruction and use **CTRL + DOWN ARROW** to place a vertical connecting segment extending downward.



Press the **F2** key to bring up the normally open contact input window.

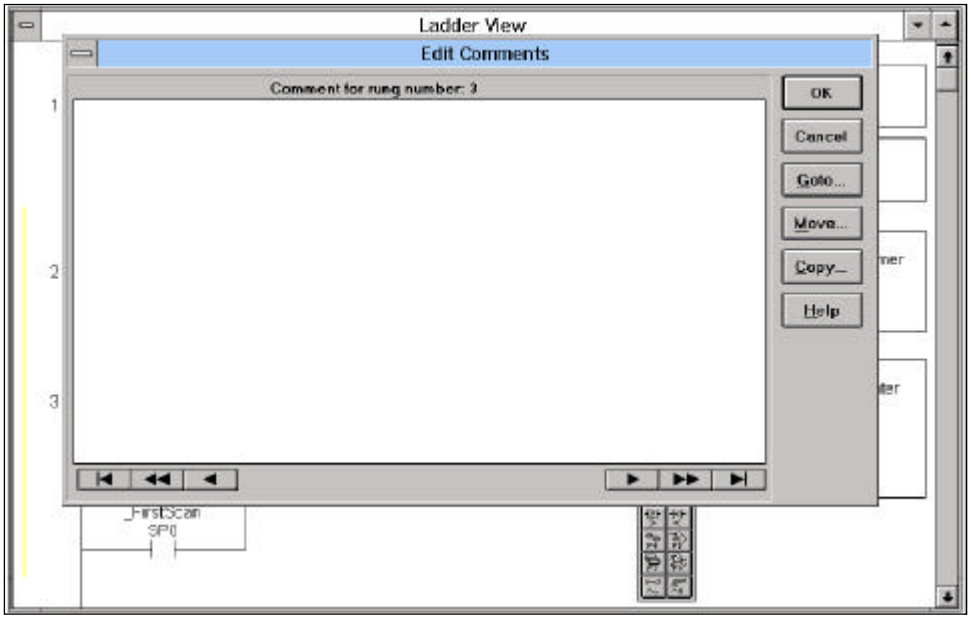


The special contact **SP0** turns **ON** for the first scan will be entered next. You do not have to place a nickname above SP0. The software automatically places **_FirstScan** above it. This is a “system-defined” nickname. You will find a list of special contacts and nicknames in an appendix near the end of your PLC user manual.

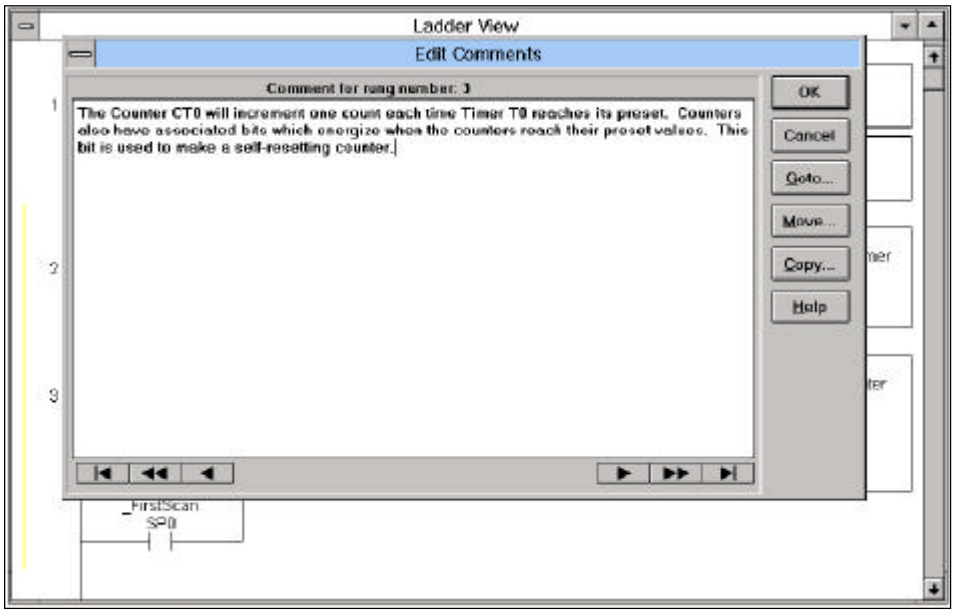


Step 25: Documenting the Function of the Counter

In this example, refer to the top rung of the counter and add a comment about the function of **CT0**. You will use the same **Edit Comments** dialog window as in the first rung. This is opened by pressing the shortcut key combination **CTRL + K** or by double clicking anywhere above the rung to which you are adding comments.



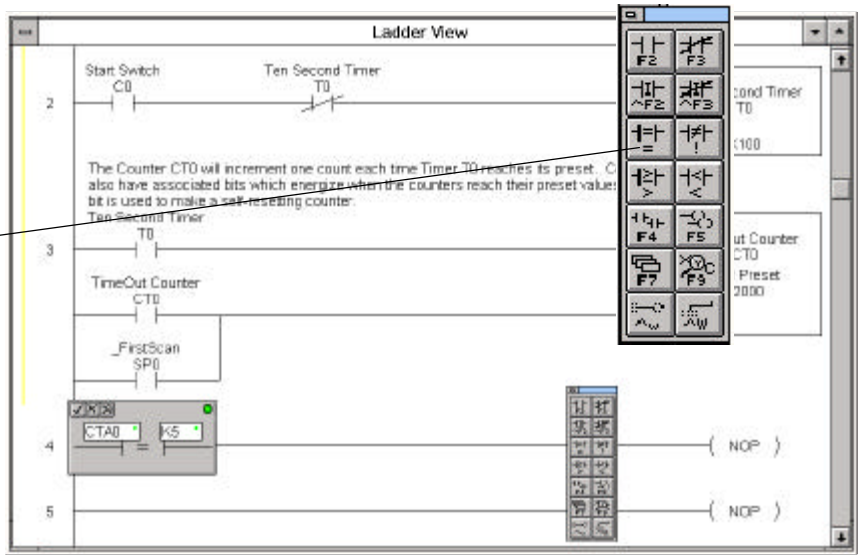
Now type in your comments for this part of the ladder logic. When finished, select **OK**.



Step 26: Adding a Comparative Boolean Instruction

You are now ready to start a new rung. The next rung of logic will turn ON an output when the counter reaches a count of 5. Use the Tool palette to open the **Equal To** (Comparative Boolean) dialog. Type in **CTA0**, which is the ***Direct***SOFT name for the accumulated value of counter **CT0**. Tab to the right side of the input window to enter **K5**. Select the check mark when you have entered the constant value, **K5**.

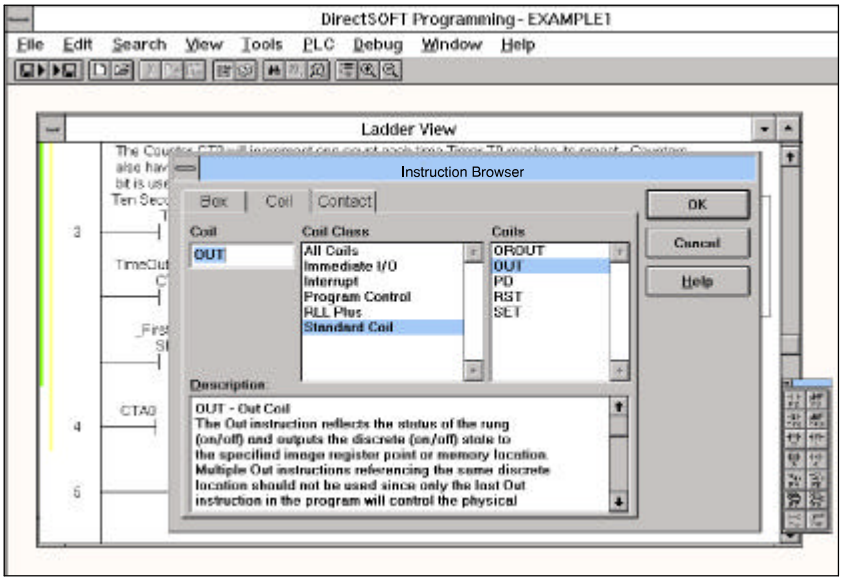
Click on this icon to open "equal to" dialog.



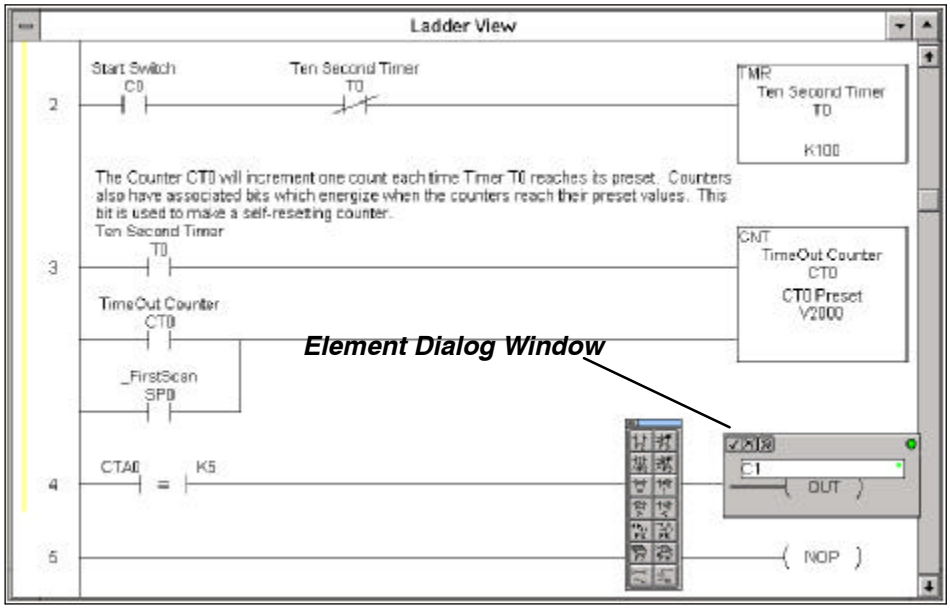
Step 27: Adding a Conditional Output

In this example, you will use **C1** as a test output coil. You will be able to see if C1 turns ON by viewing the screen during the running of this program. As an output turns from OFF to ON, there is a color change on the screen for that particular element.

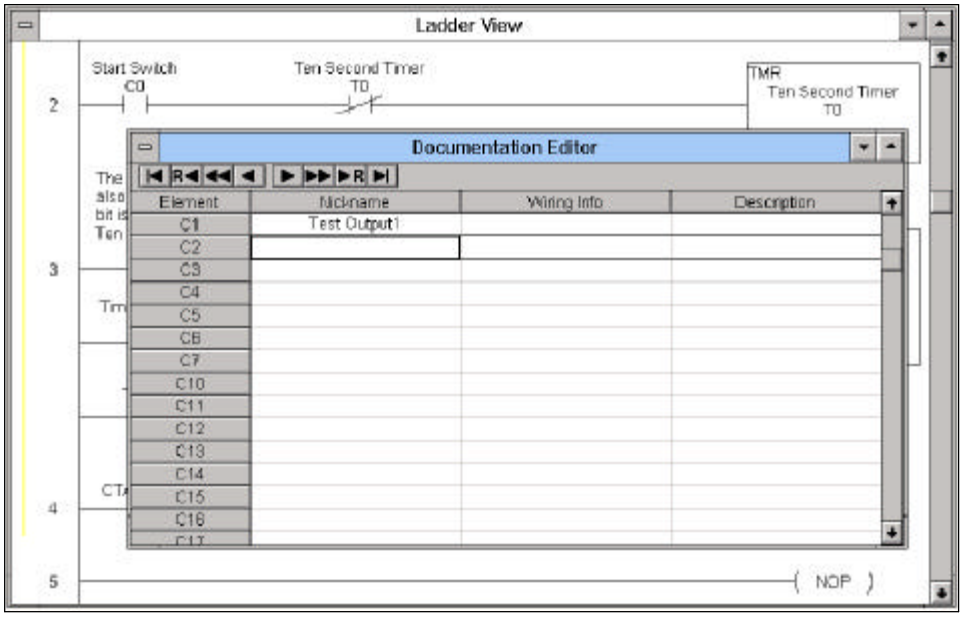
Add **C1** to the rung at this time by moving your cursor to the end of the rung and pressing **F5** to open the **Coil Tab of the Instruction Browser**. Select **Standard Coil** and **OUT** from the available choices. Select **OK** when finished.



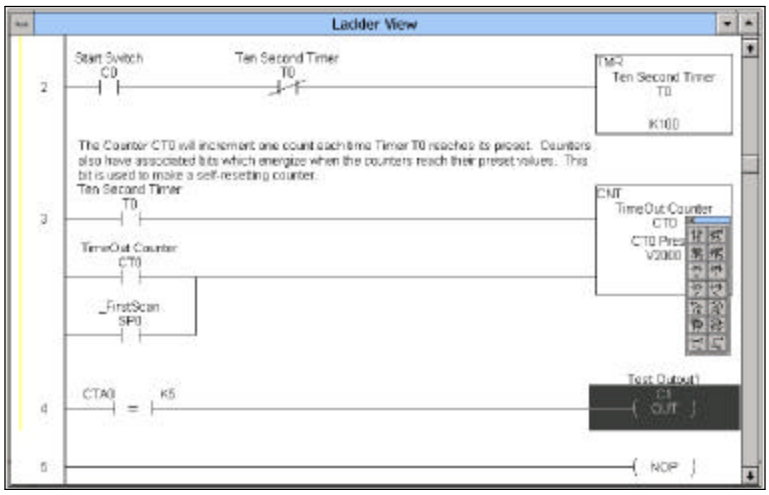
After selecting OK in the Instruction Browser, the Element Dialog box appears. You will be prompted for the output relay designation. In this case, type in **C1**.



You can now enter the nickname **"Test Output1"** for **C1**, using the same procedure used earlier. Press the key combination **CTRL + D** to bring up the **Documentation Editor** and enter"Test Output1" into the **Nickname** window.



Close the **Documentation Editor** and return to the rung. Notice the Nickname **Test Output1** is now above the element. You are now finished with these rungs. **Accept** them by using the hot key **F8** or by selecting **Edit**/**Accept** from the upper menu bar.

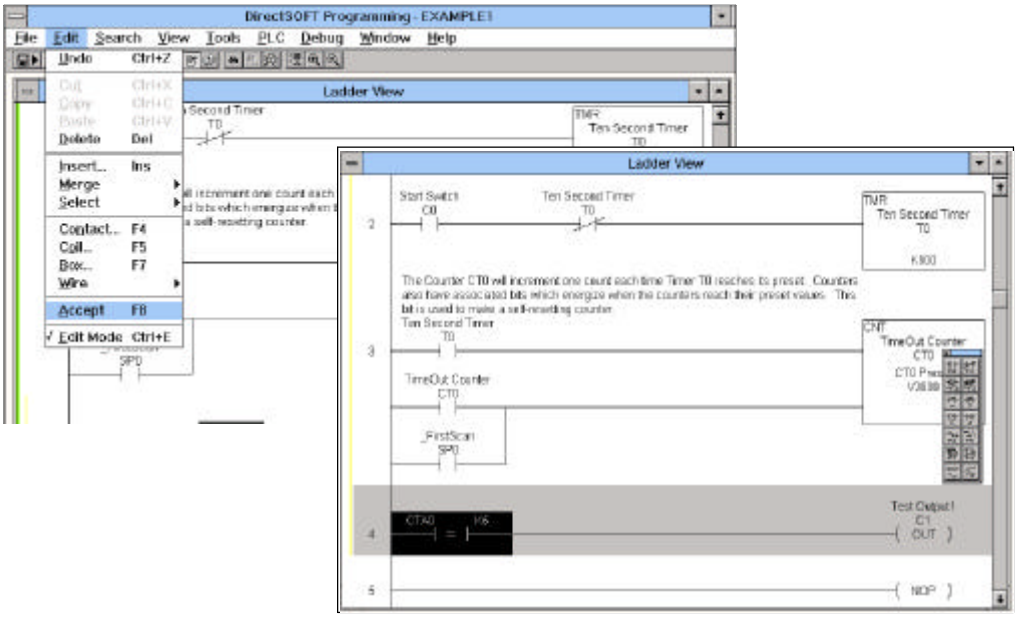


Step 28: Copying to the Clipboard

The following example illustrates the use of the **Copy and Paste** features of ***Direct***SOFT. You will copy a rung and paste it to the next. Then, change the count value to **K6** and use output relay **C2** to test it.

To copy a rung, first select the rung. **Rungs cannot be selected and copied unless you have accepted the rung.** Accept the rung by selecting **Edit** and **Accept**. You will see a green vertical bar by the rung when it is accepted.

Now you can select the rung for copying. This is accomplished by placing your cursor on the rung and using the **SHIFT + Arrow** key combination. With the rung selected, select **Edit** then select **Copy** to send a copy of the rung to the Windows clipboard.



Step 29: Pasting to your Program

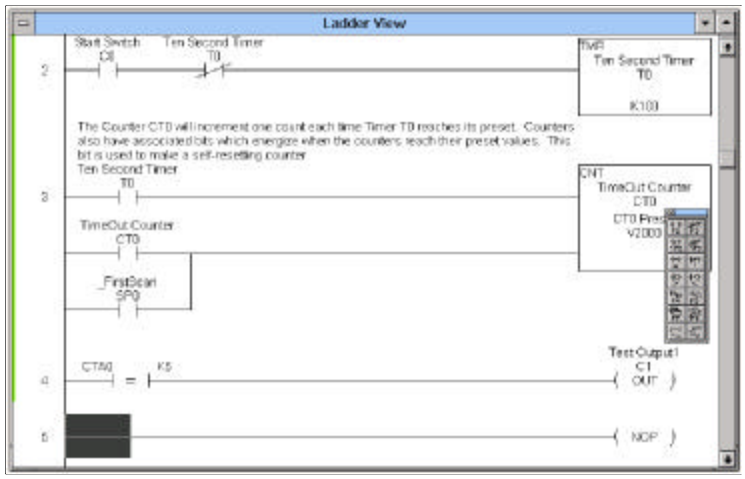
Once you have selected the rung and copied it to the clipboard,
① move the cursor down to the next rung in order to paste. The position of the paste will always be one rung above the current cursor position.

② To paste, select the **Clipboard Icon**, select **Paste** from the **Edit** menu, or use the key combination **CTRL + V**. Step 2 below shows the pasted rung in position.

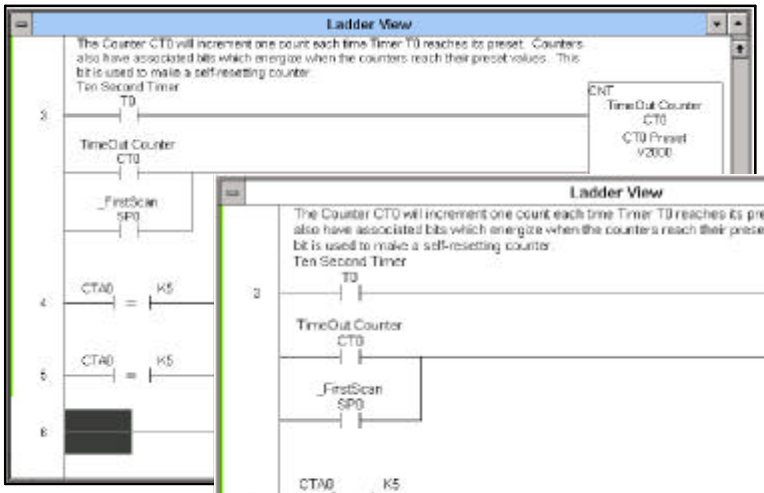
Move the cursor up to the pasted rung and start changing the elements. Start by editing the conditional contact so it shows **K6**.

③ When the cursor is on the conditional contact, you can press the **Enter** key and the input window will be opened. Press the tab key to move the cursor to the right. Type in **K6** in place of **K5** and then select the check mark ✓.

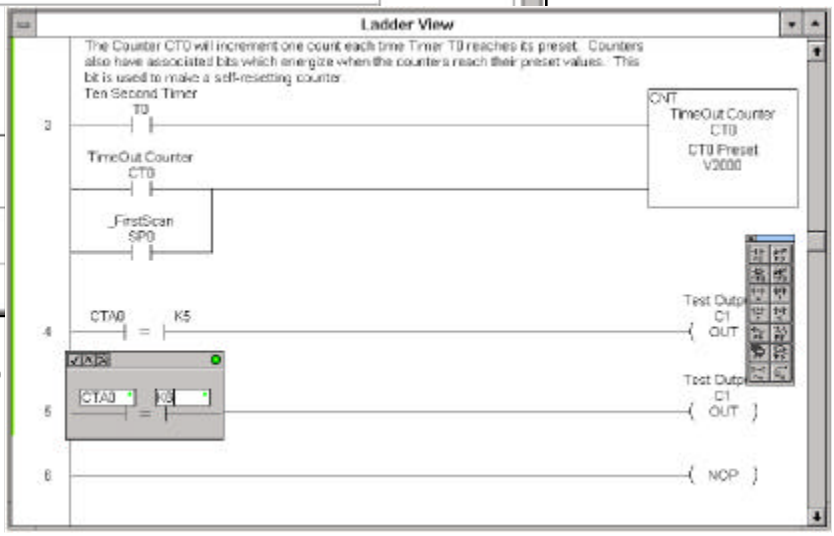
①



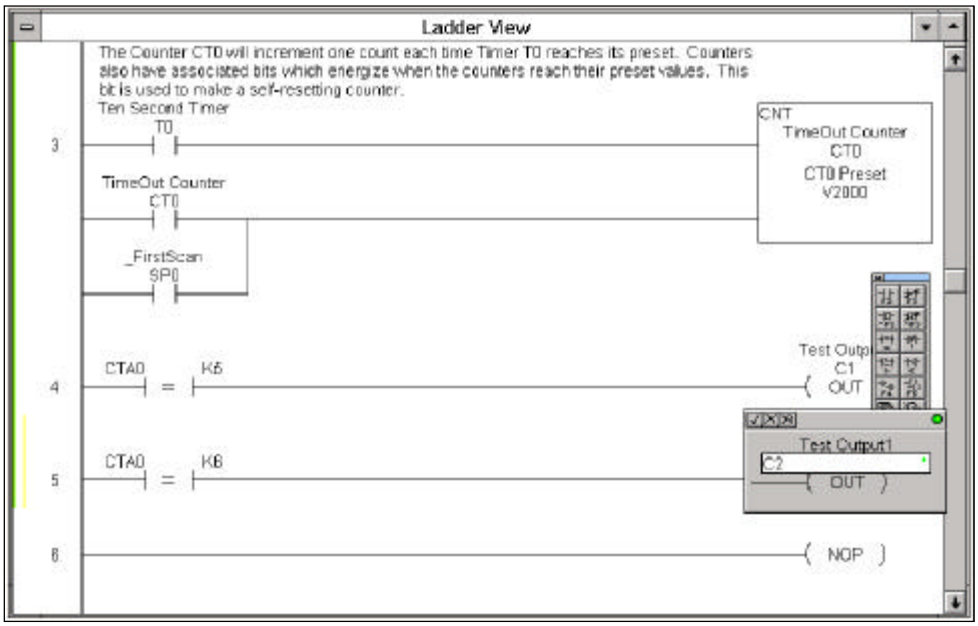
②



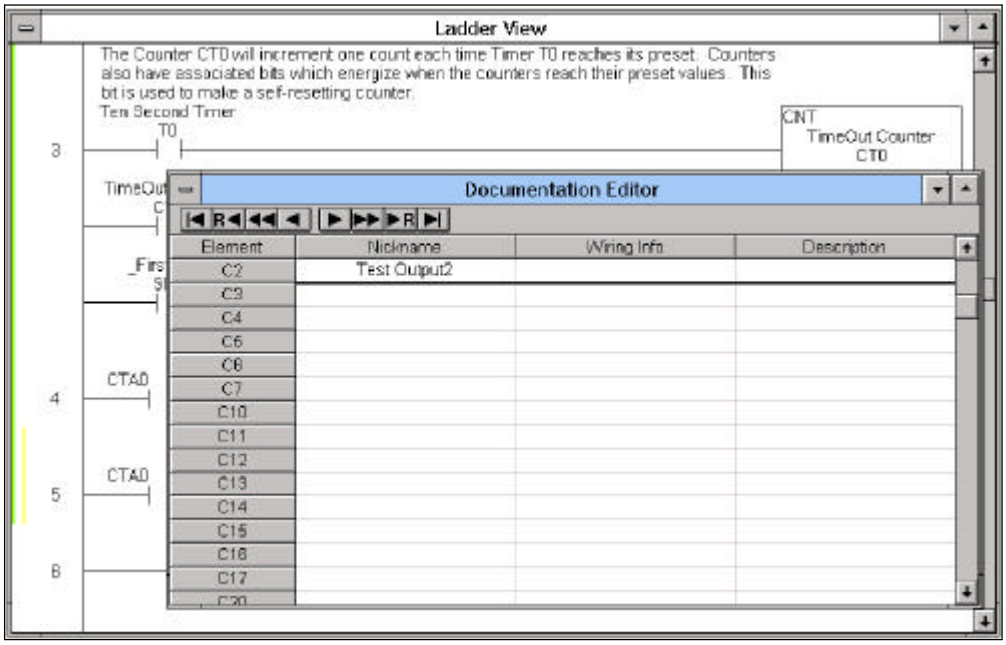
③



Next, move the cursor to the end of the pasted rung. With the cursor over the **C1** output element, double click with your mouse. This opens the window for editing the output coil. Change it to **C2**.

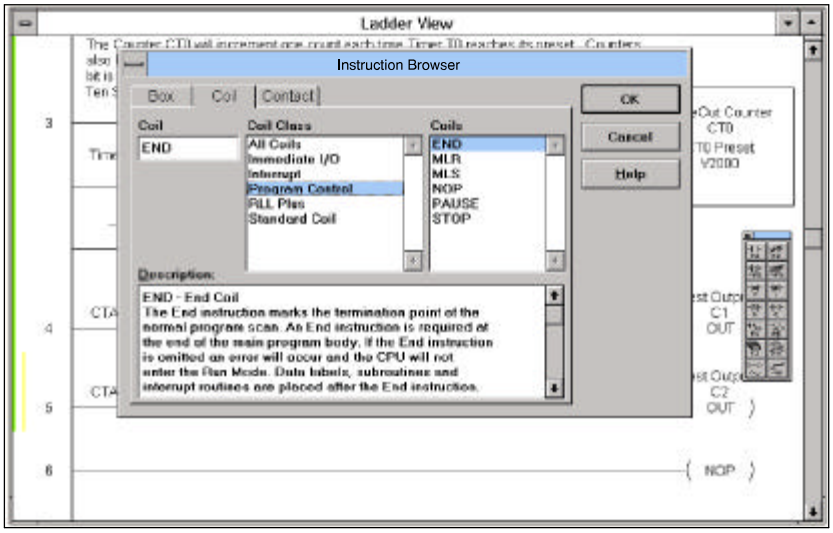


You will also want to assign the nickname C2 to **"Test Output2"**. Use the key combination **CTRL + D** to bring up the **Documentation Editor**. Follow the steps discussed previously for changing and entering the nickname. When your finished the dialog will show the information given below.

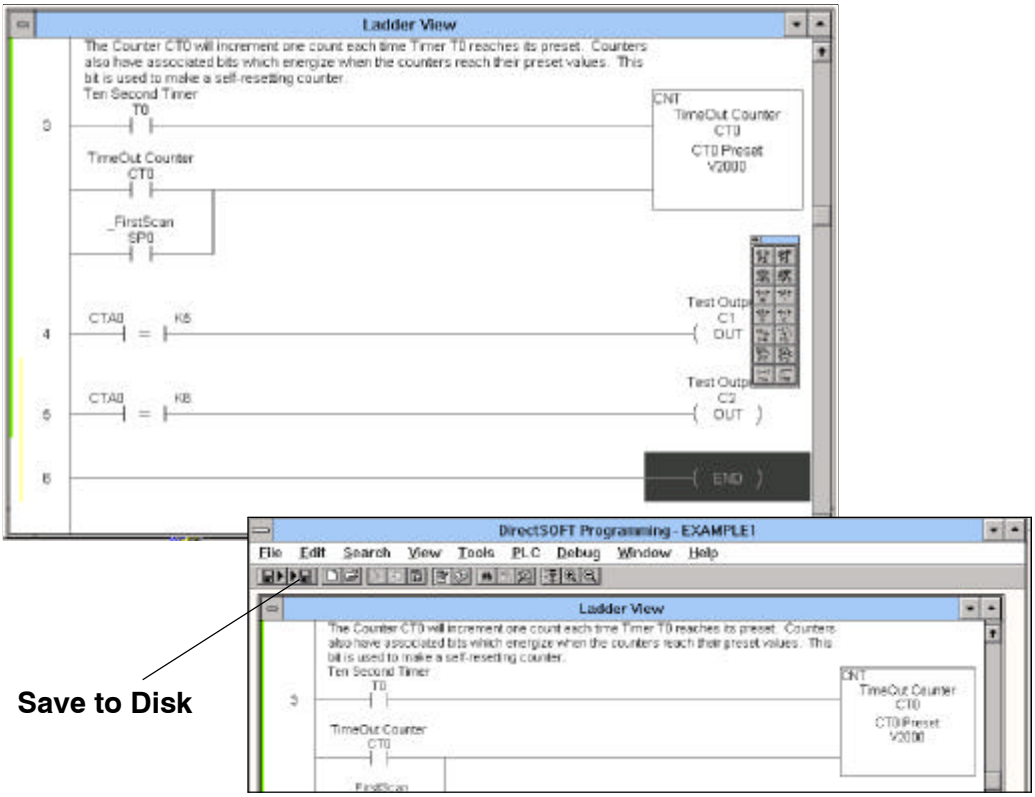


Step 30: Ending the Program

Every program must have a rung with the **END** command. Move your cursor to the far right of the next rung. Press the **F5** key to bring up the **Coil Tab of the Instruction Browser**. Select **Program Control** under **Coil Class** and **END** under **Coils**.



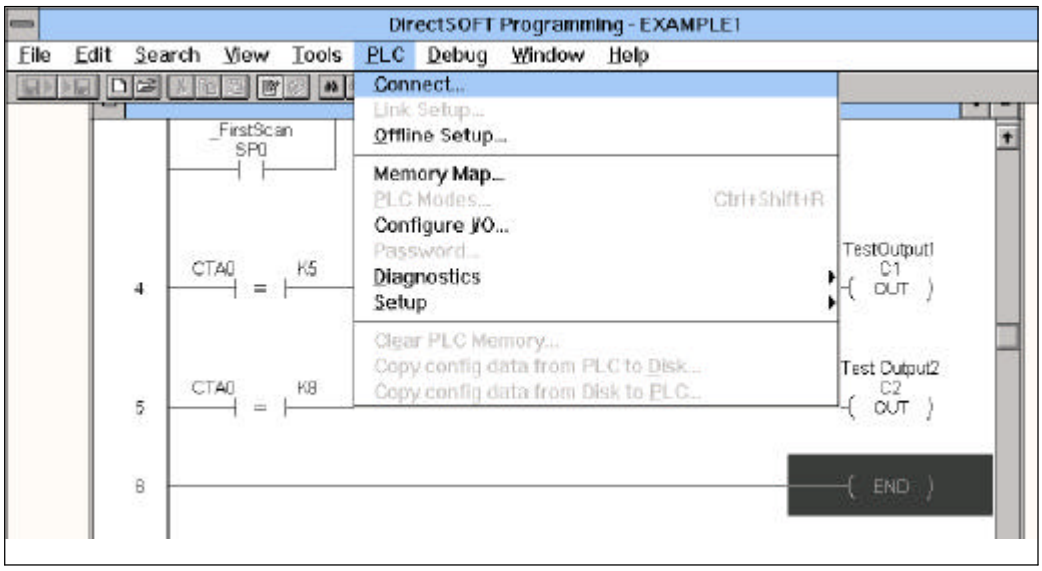
Click on **OK** when you are finished. With the final rung showing the **END** statement, you have now completed the program. Press **F8** to accept the rungs. Finally, click on the **Save to Disk** icon of the toolbar. You are now ready to connect and communicate with your PLC. Move to the next page and see how to download the program to the PLCs memory and test it.



Connecting Online to a PLC & Downloading the Program

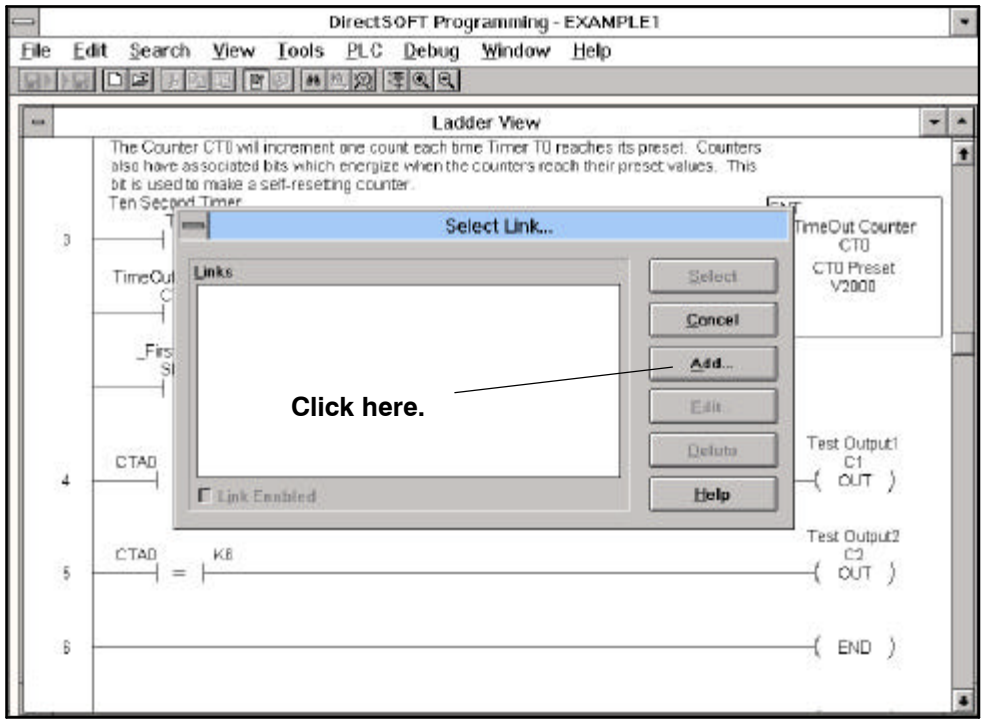
Starting the Linking Process

To connect with your PLC, select **PLC** from the menu bar, and move the cursor to **Connect**.



Adding a New Link

After completing the above actions, a window will appear asking to select a link. If you had already built a communications link, there would be links shown inside the window to select. Since this is presumably the first time you have worked with ***Direct***SOFT, the window is will be empty. Select the task button titled **Add t**o create a link.



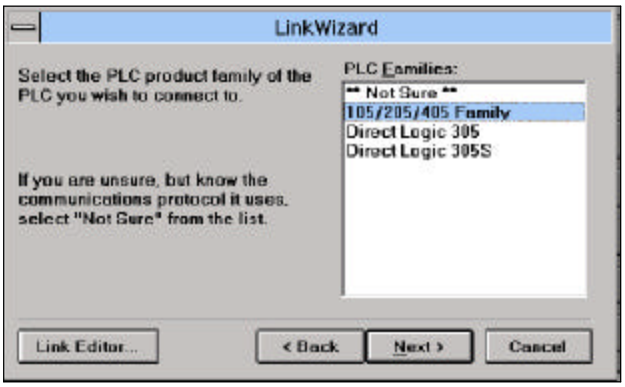
Selecting a COM port

The first step in adding the link is accomplished using the "Link Wizard". The window below shows the wizard. Move the cursor to the COM port to which you have connected your communications cable. If you have not connected a communications cable, do so at this time. Consult the chart on Page 56 to determine the CPU port and type of cable to be used.

Which serial port of the computer you connect to will depend on your computer configuration. In most cases, this will be COM1 or COM2. After you move the cursor to the correct COM port selection in the software window shown below, click on the button labeled **Next >**. In this Quick Start version, the situations where you are establishing a connection involving a modem are not discussed. A link for a modem configuration has to be performed manually (without using the Wizard) and is discussed in the main users manual.

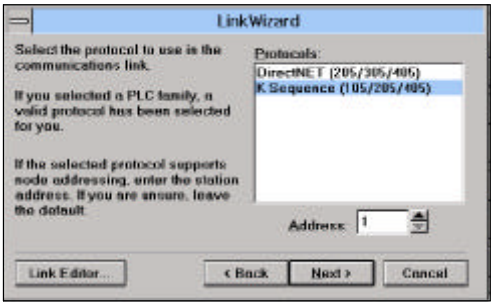
Selecting a PLC family

The LinkWizard will ask to select the PLC product family you are using. Move your cursor to the correct choice and click on the button labeled **Next >**. In this example, the connection is for a DL105, DL205 or DL405 PLC.



Selecting a Communications Protocol

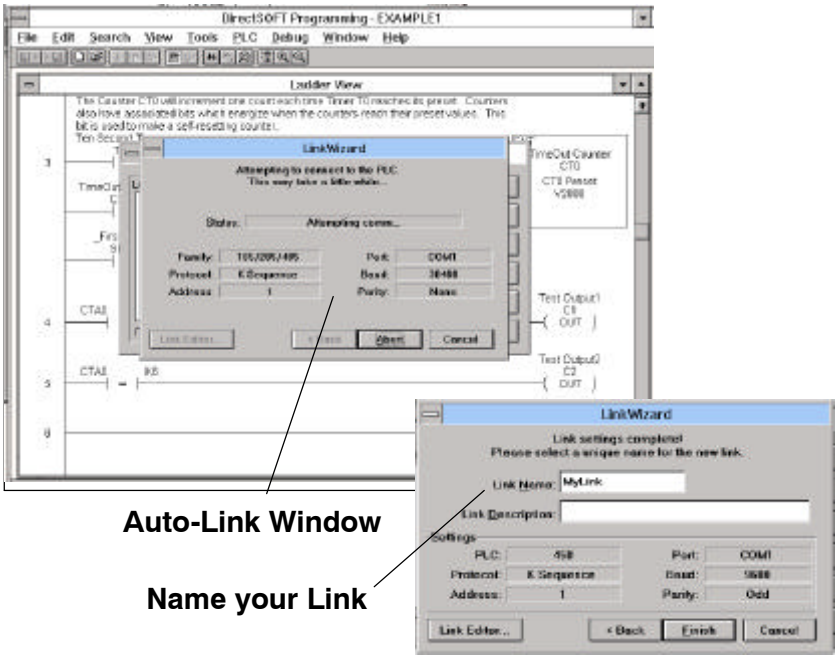
You now will select the protocol with the wizard. In this example, assume you have a DL450 CPU using K-sequence. (Consult your CPU operating manual for your PLC if you need more information about ***Direct***NET and K-sequence.) When the cursor is positioned on K-sequence, click on **Next >** again. Leave the PLC address number set to the default **1**.



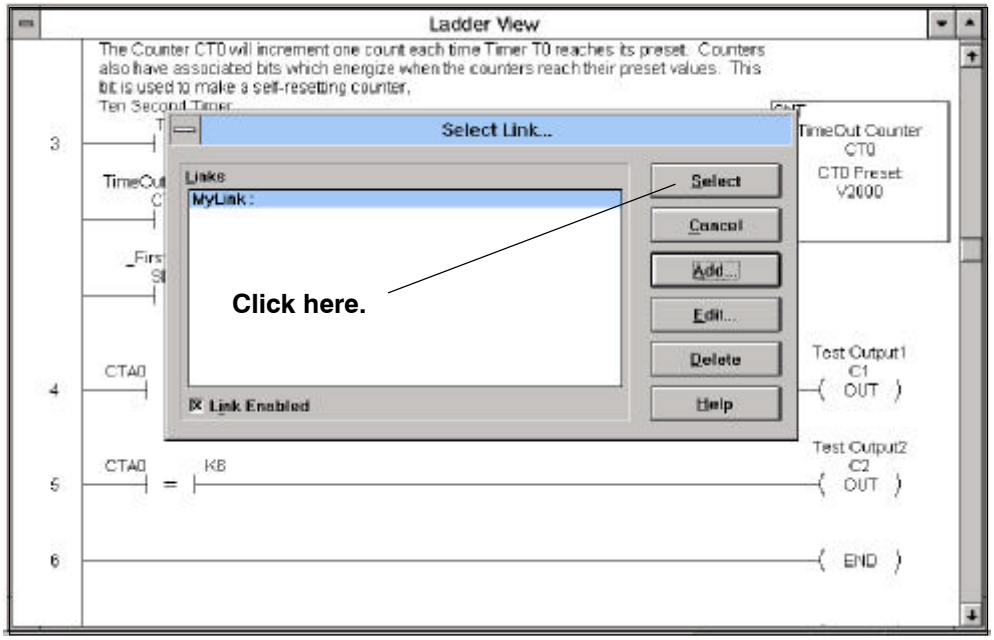
Enabling the Auto-Link Feature and Naming your Link

At this point, the wizard will automatically check-out your computer and CPU, determining the parity, number of stop bits and the correct baud rate for communication. ***If you have trouble establishing a communication link, see the Troubleshooting Guide starting on Page 52 of this manual.***

The next screen will allow you to enter a name and description for your link. The name is required, but the description is optional. In this example use the name **MyLink**. Click on **Finish**.



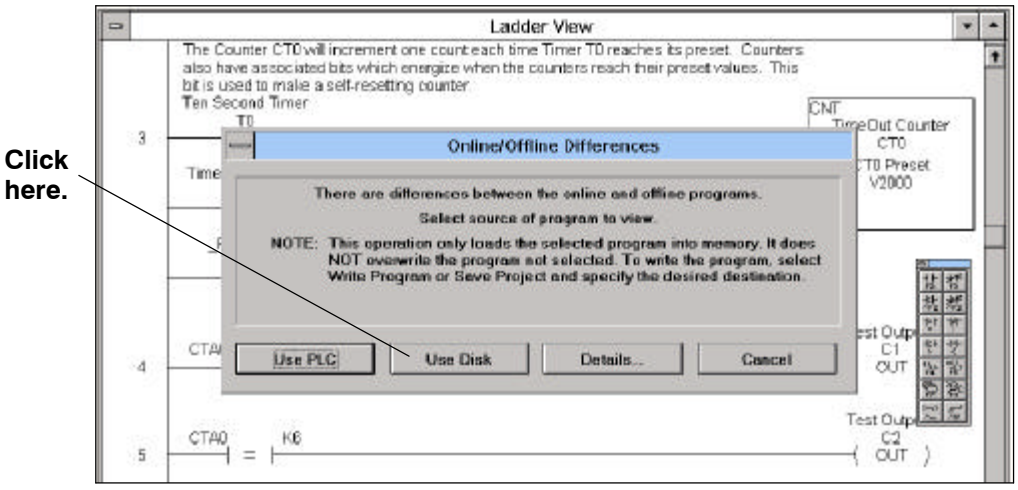
The software then returns to the original link window and shows the name of the new link. With the cursor on the link name created, select the button labeled **Select**.



Comparing Disk to PLC Memory

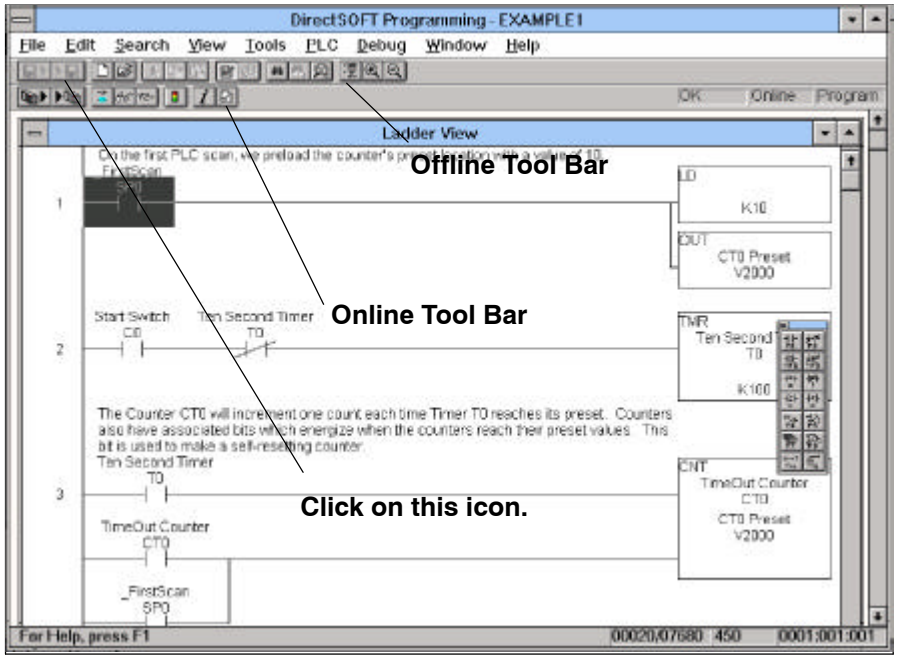
The above action will cause the software to compare the program stored in your PLCs memory to the one in the program editor. It will report back to you with the window shown below i*f it detects a difference between the two areas*. In this case, there is no program stored, therefore,it will state that what is stored in the PLC is different from what is stored in the programming memory. Select the button **Use Disk** to inform the software to use what is stored on your computer and not what is stored in your PLC memory.

Note: If you were to click on **Use PLC**, it would display the empty information stored in your PLC memory and you would see nothing but empty rungs. **Make sure you click on "Use Disk".**

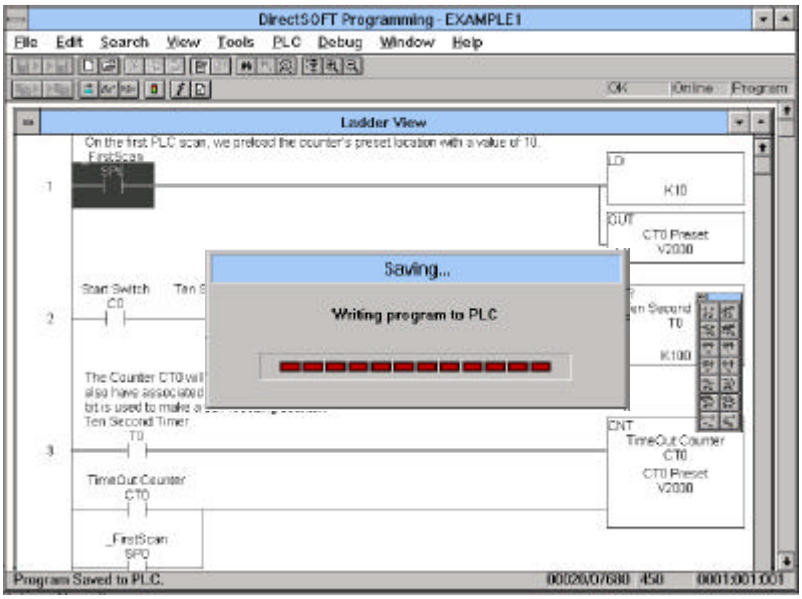


Writing your Program to the PLC

Now that your PC and PLC are properly linked, you can write the program to the PLC. You will note a second tool bar (online tool bar) has appeared below the offline toolbar. The second icon from the left is used to write your program from your hard drive to the PLC. Click on the icon now.



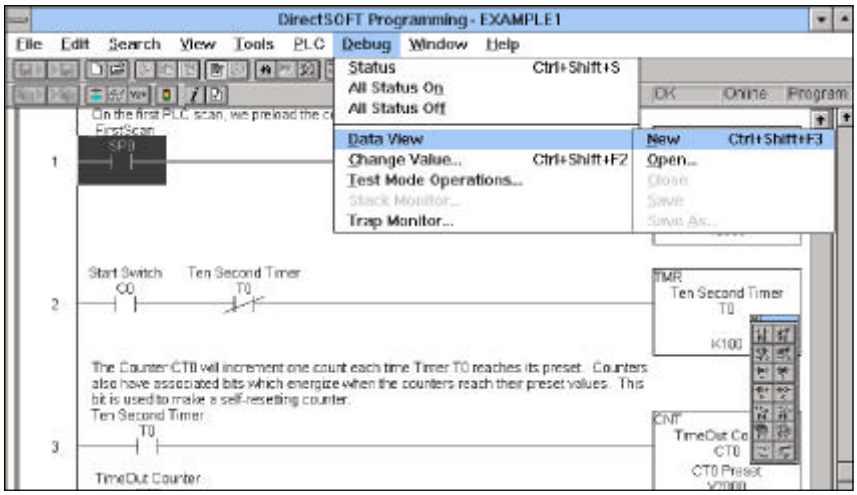
At this point, the program will be saved to your PLC. A window will be temporarily superimposed on your program area. A series of small red indicators will flash in succession to indicate the progress as ***Direct***Soft writes the program to the PLC.



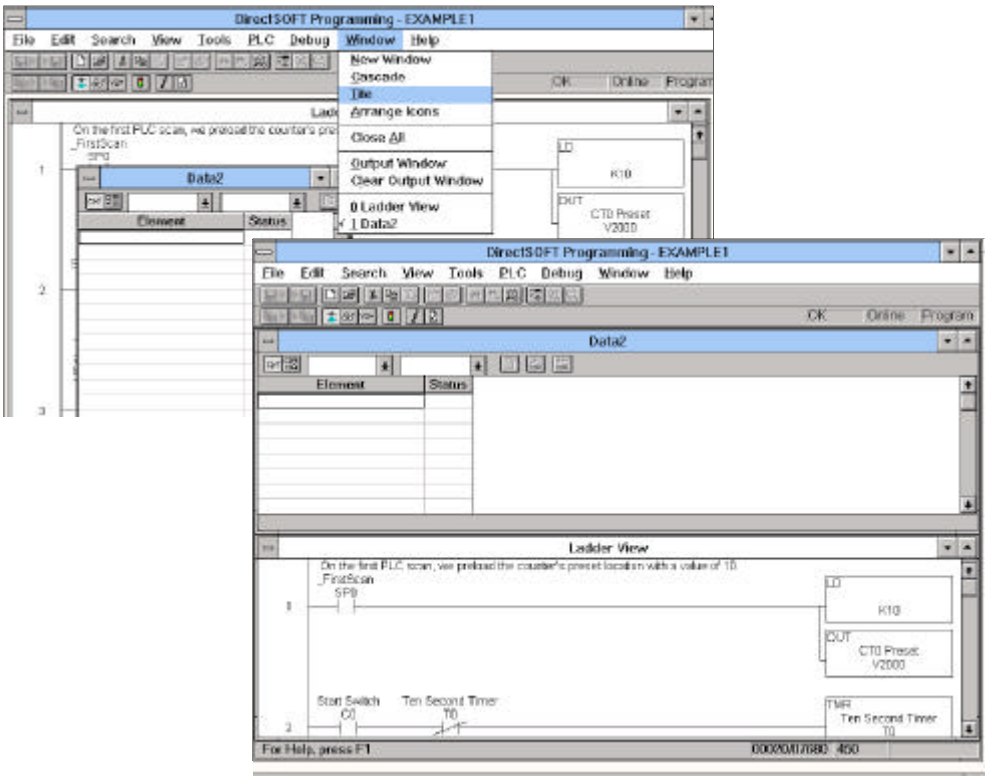
Monitoring the Program with a Data View

Creating a Data View

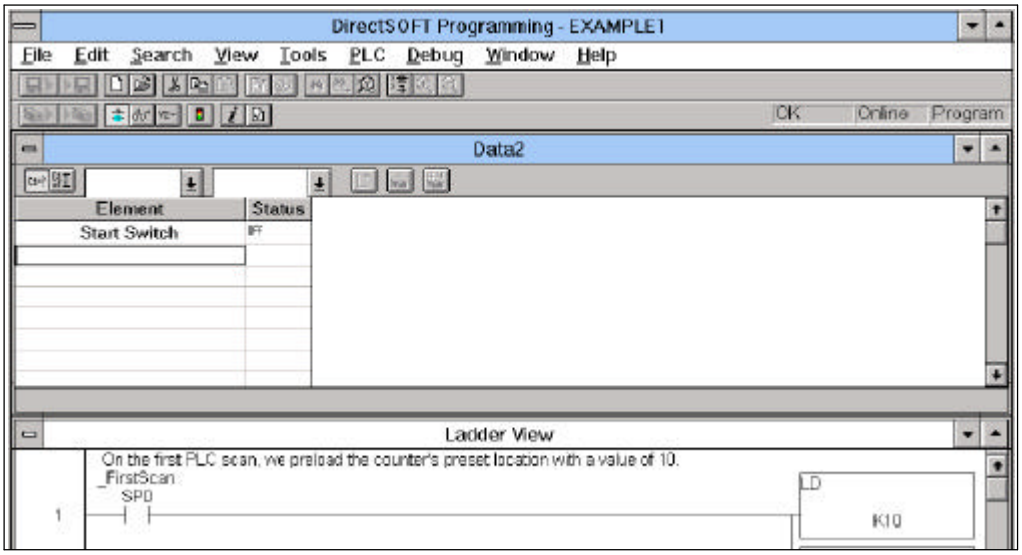
With the program loaded in the PLC, you can now open a **Data View** window to monitor and manipulate the status and data for the various elements of the program. If you have programmed in other languages before, you may know this type of window as a Watch Window. You can access this window by selecting **Debug**, then **Data View**, and **New**.



The Data View window is useful when observed with your ladder logic screen while in the Status ON Mode. To set this up, click on **Window**, then **Tile**. If you are using a DL305 PLC, turn to Page 47 after opening the Data View Window shown below. All other PLC users should continue to the next page.

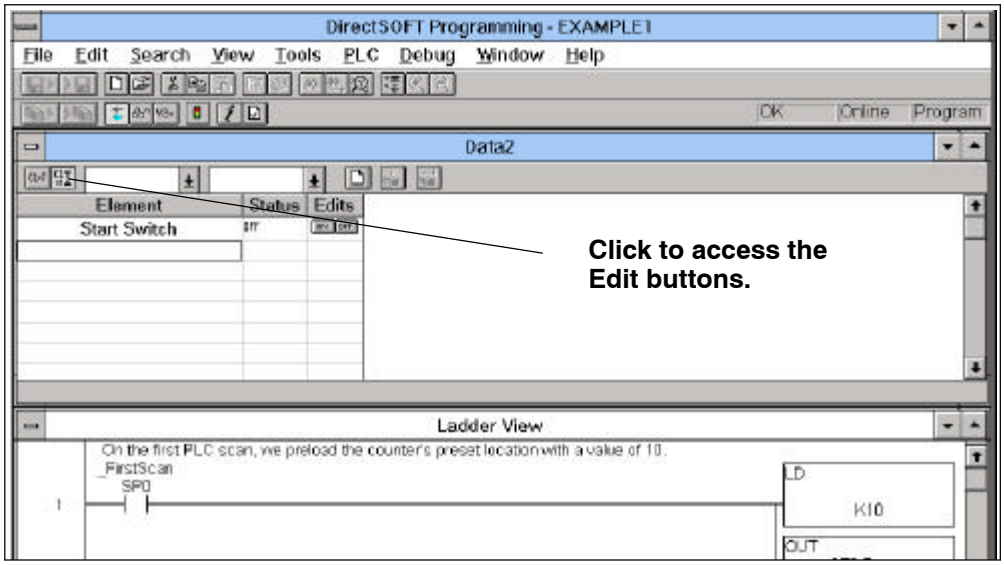


Below the column labeled **Element**, type in **C0** as the first element to be monitored. The software will substitute the assigned nickname, **Start Switch**.

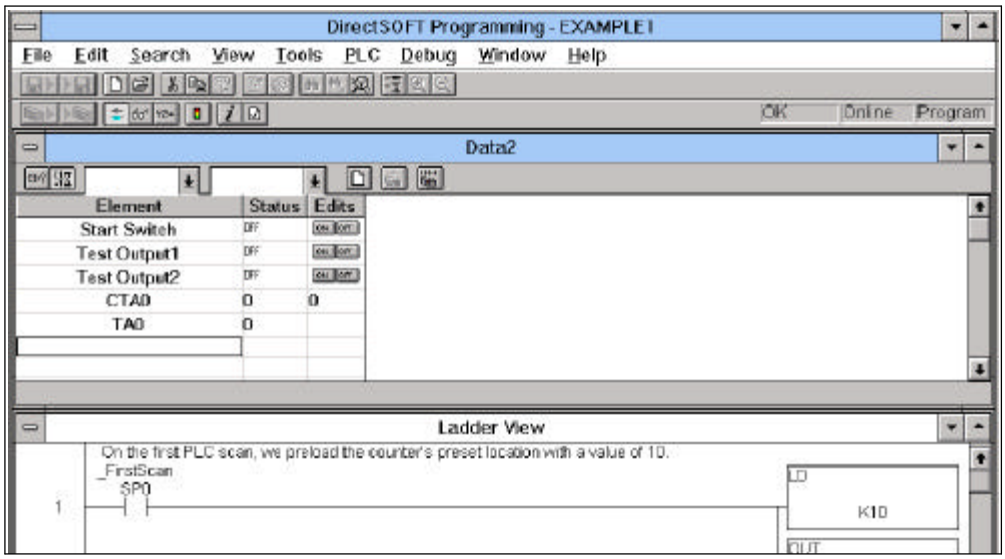


Adding Dynamic ON/OFF Edit Buttons

Now you can setup the Data View window to easily change the status of the observed elements. Notice in the tool bar at the top of the Data View window there is **C1?** and **C1=1 (with an hour glass)**. The C1? is active by default,however by selecting the other button ,C1=1, the ON/OFF **edit buttons** will appear beside the element.

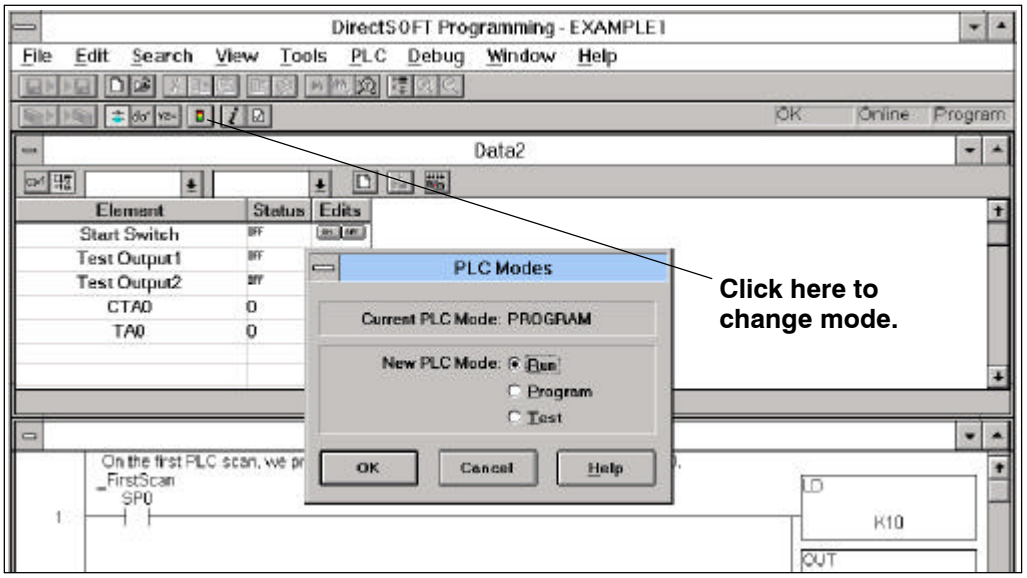


Now you can add the elements **C1 (Output1), C2 (Output2), CTA0 (the counter current value), and TA0 (the timer current value)** to the Data View window. Notice there are no ON/OFF edit buttons for the counter and timer values. This is because you are observing V-memory data for these elements as compared to observing an ON/OFF status.



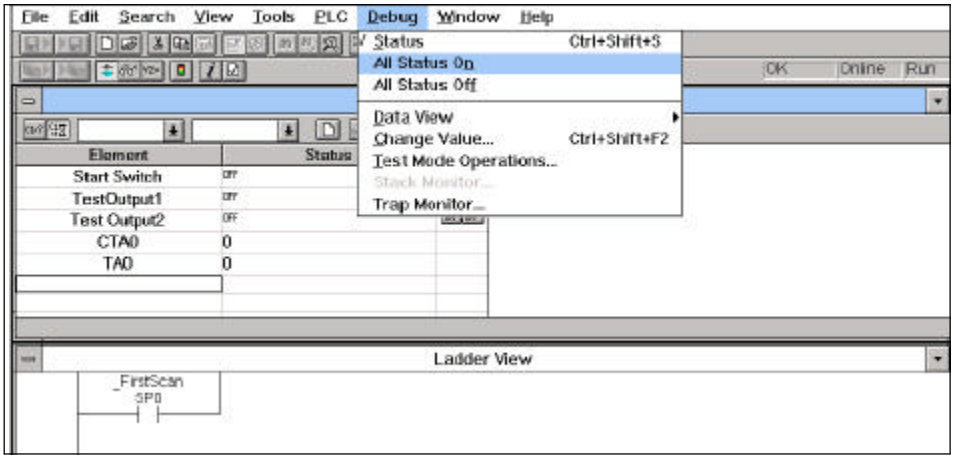
Entering the Run Mode

You are now ready to test the program. First, place the PLC in the **RUN** mode. Select the "traffic light icon" of the on-line tool bar. Then, click on the **Run** mode and **OK**. Alternately, you could have chosen **PLC Modes** from **PLC** of the main menu bar, and then selected **Run** mode from the pop-up dialog box.



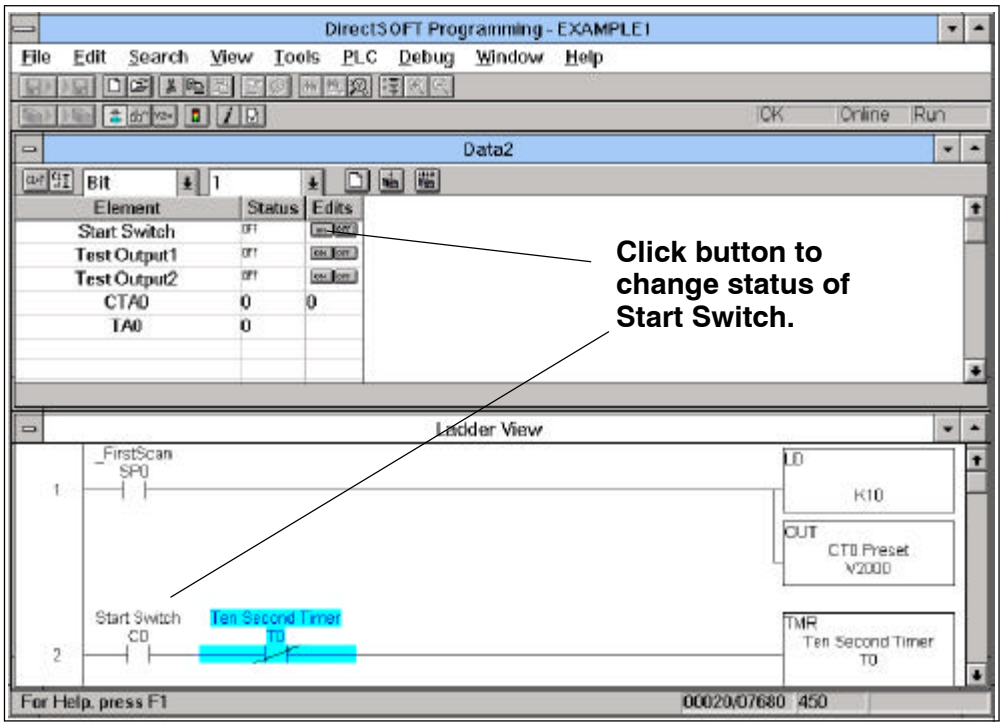
Observing the Status of Elements

To monitor the status of each element, you will need to place the software in the **All Status ON Mode**. Select **Debug**, then **All Status ON**.



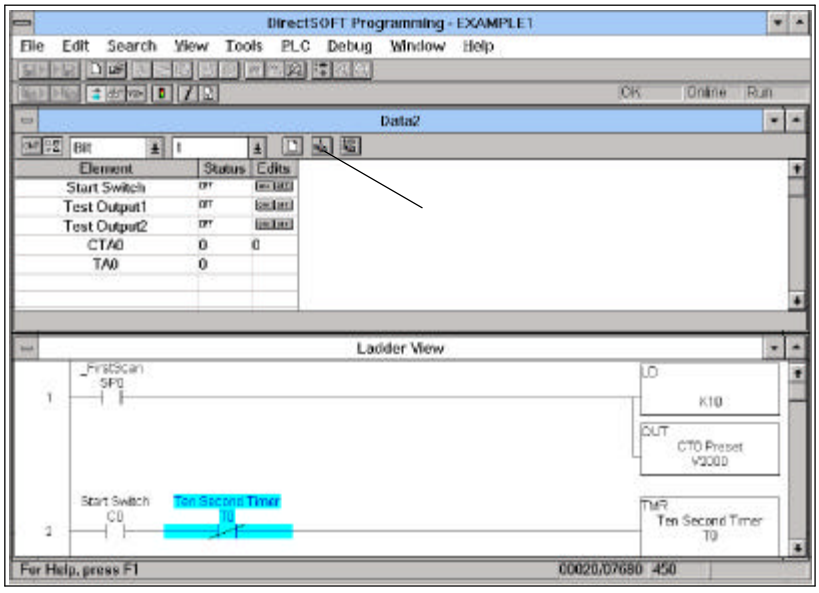
Using the Edit Buttons to Change Status

You can start the program by first clicking the edit button labeled **ON** for the **Start Switch (C0)**. This by itself does nothing. You will need to write a new status to the PLC. The next step shows you how this is accomplished.

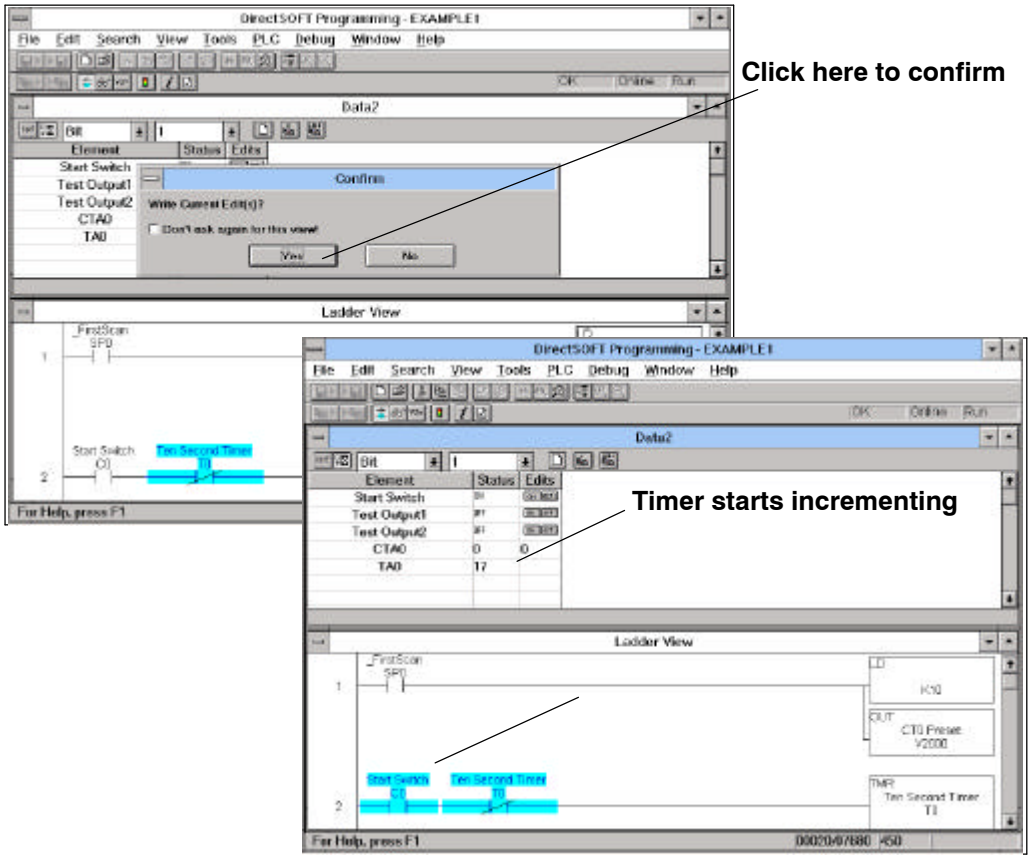


Writing Edits to the PLC

To write the new status to the PLC, select the icon of the Data View (one arrow pointing inward to the PLC).



A confirmation dialog will appear. It will ask if you want to write the edit (or edits) to the PLC. Answer **yes**. The active elements will change color when they are in the ON state. You will see the counter start. Now the program can be observed as it runs.



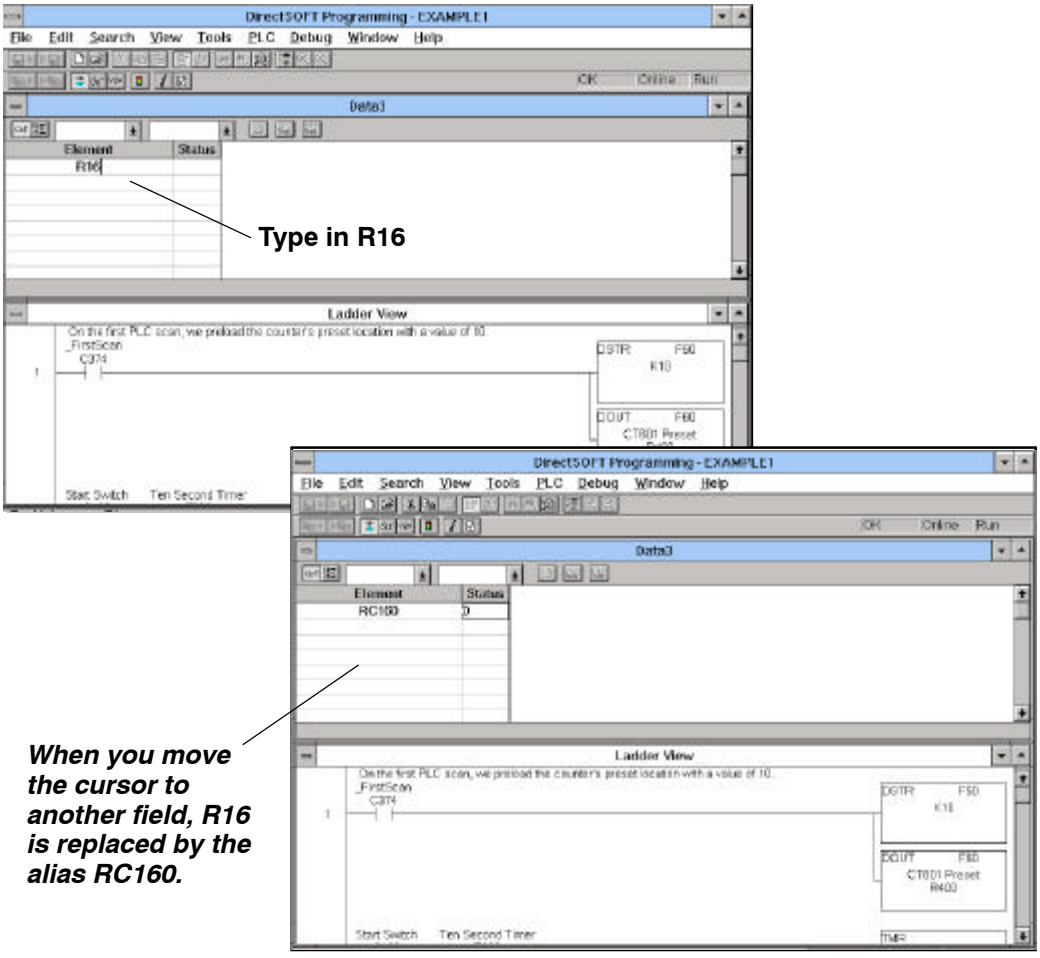
Special Data View Instructions for DL305 Family

_Direct_NET Restrictions

Unlike the DL105, DL205 and DL405 PLC families, the DL305 family can only use _Direct_NET protocol. This protocol allows you to READ the status of each internal relay directly, but it will not allow you to use the Data View window to change the status of an internal relay by WRITING to that bit individually. Instead you must do so indirectly by addressing the respective status register that includes the bit whose status you wish to change. Using the example introduced on Page 6 of this manual,C160 was designated as the Start Switch. If you refer to the memory map for the DL305, you would find that C160 is the first bit of status register R16. Consequently, in order to change the status of the Start Switch via the Data View window, you must write an 8-bit word to R16, making sure the first bit is flagged.

You can start by first entering the element **R16** in the Data View window. When moving the cursor to click another field, you will notice the alias **RC160** appears in place of R16. Do not confuse this alias with C160. The RC designation refers to the entire 8-bit register R16, but C160 refers only to the first bit.

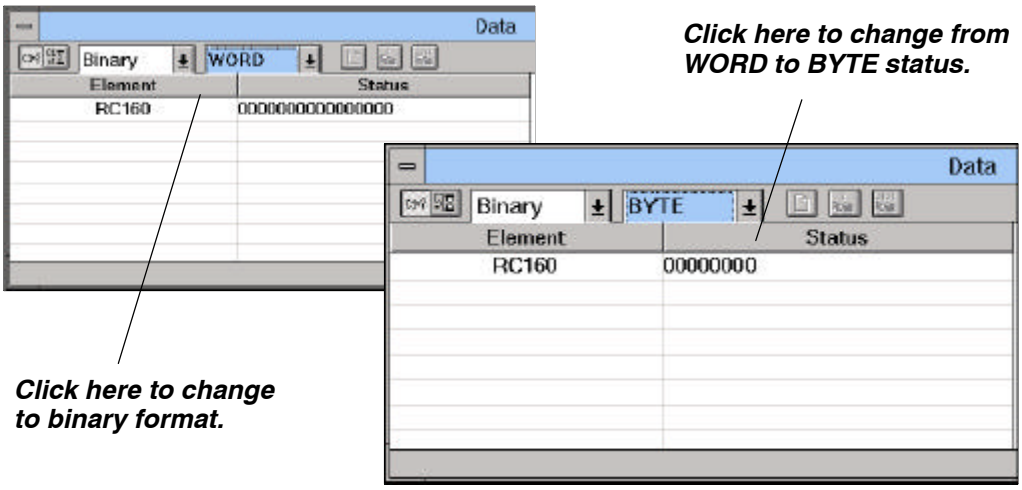
The number shown in the status column, by default, is in BCD/hex format.



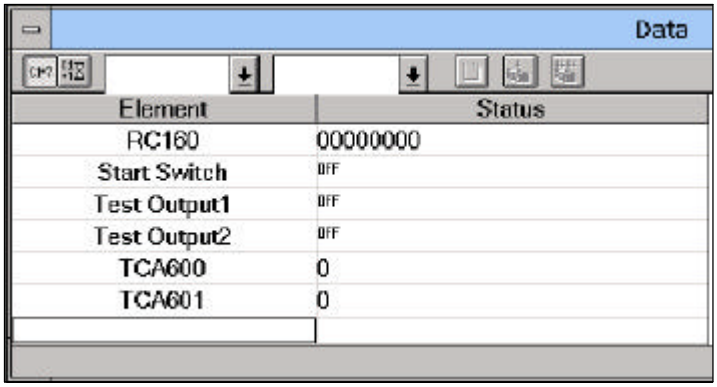
Changing the Value to Binary to Observe All 8 Bits.

The BCD/hex format does not allow to easily see the status for each of the 8 bits in R16 (RC160). Therefore you will need to change the format to binary.

The Data View window has a “drop down” button that can be used to select the binary format. This button is above the Element column. Select the button and you will see the several choices of formats available. Select **Binary** from the list. Notice now the value shown changes to **0000000000000000**, indicating a binary number format. However, it shows a default of 16 bits. Since the status registers are each 8 bits in size, click on the drop-down button above the Status column and change from **WORD** size to **BYTE** size data. This then displays only eight zeros: **00000000**.

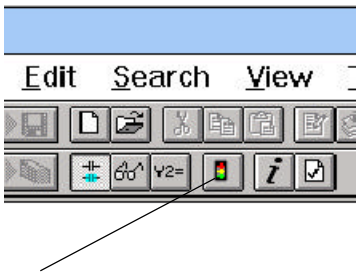


Although you could use R16 to view the status of C160 (Start Switch), C161 (Output1), and C162 (Output2), it is more convenient to view the internal relays directly for read-only purposes. Now you can type in the contacts by name (C160, C161, and C162). The software will substitute the nicknames for you. These use the bit format to show the contacts as being turned ON or OFF. If you see a **1**, the bit is **ON**. If you see a **0**, the bit is **OFF**. Include also **TCA600** (Timer/Counter 600 Current) and **TCA601** (Timer/Counter 601 Current) With the combination of the inclusive status register (R16) and the designated internal relays (C161, C162, and C163) in the Data View window, you can now write to any of these bits via the status register or read them directly by observing their respective bit values (0 or 1). Additionally you can watch TCA600 and TCA601 to see their respective values incrementing as the program runs.

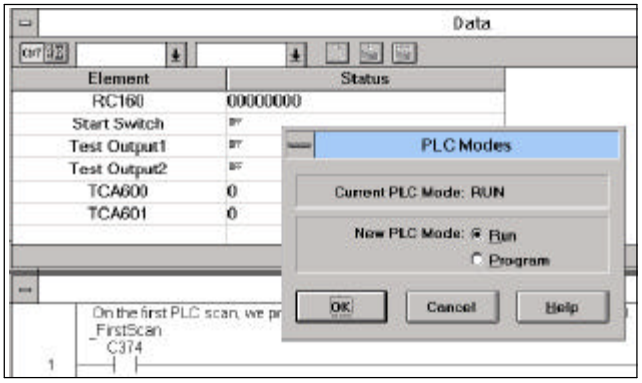


Changing to the Run Mode

You are now ready to test the program. First place the PLC in the **RUN** mode. Select the "traffic light icon" of the on-line tool bar. Then, click on the **Run** mode. You could also have chosen **PLC** from the main menu bar, selecting **PLC Modes** from the list of choices, and then selected **Run** mode from the pop-up dialog box.

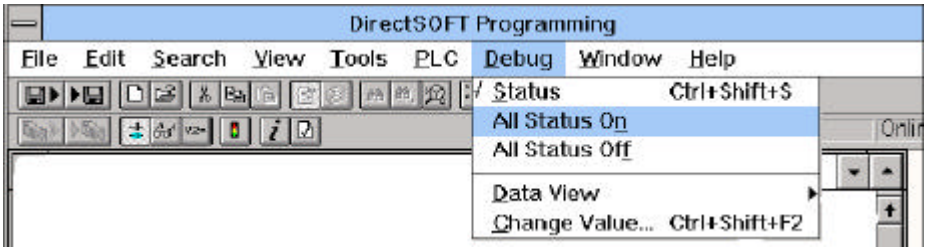


Click on the "traffic light" icon to enter Run mode



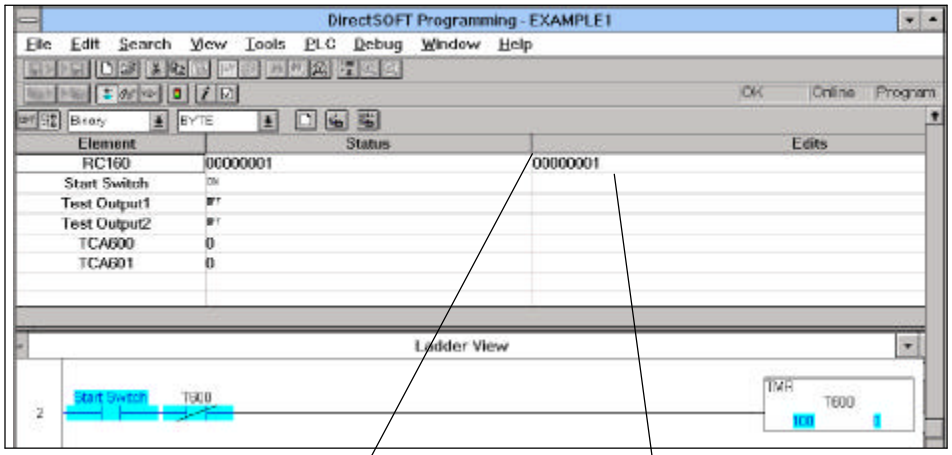
Enabling the All Status ON

To monitor the status of each element, you will need to place the software in the **All Status ON Mode**. Click on **Debug**, then **All Status ON**.



Entering Data for the Status Register

Start the program by writing a **1** to the status of the first bit in R16, which is actually C160. Do this in the **Edit** column of the Data View window. Sometimes the Data View window is not fully expanded. To make the Edit column visible, place your cursor on the vertical line that defines the right side of the status label. Hold down the mouse button and drag it to the right. Once the Edit column is visible, type in the 8 binary digits with the right-most digit (least significant digit) as a **1**. This is **00000001**.

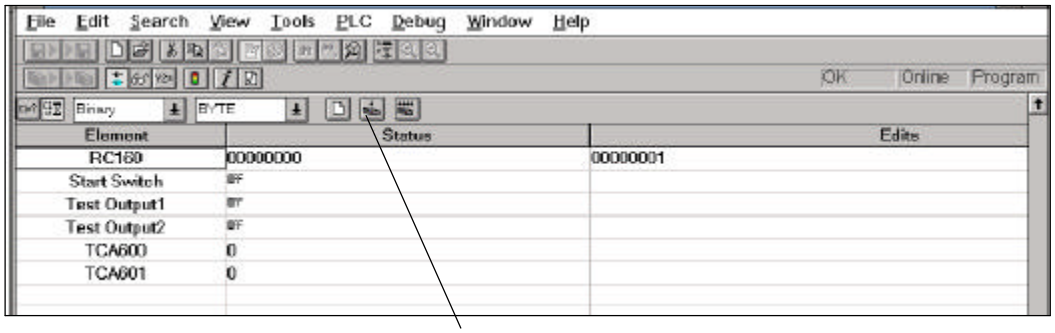


"Stretch" at this vertical line if the Edit column is not showing.

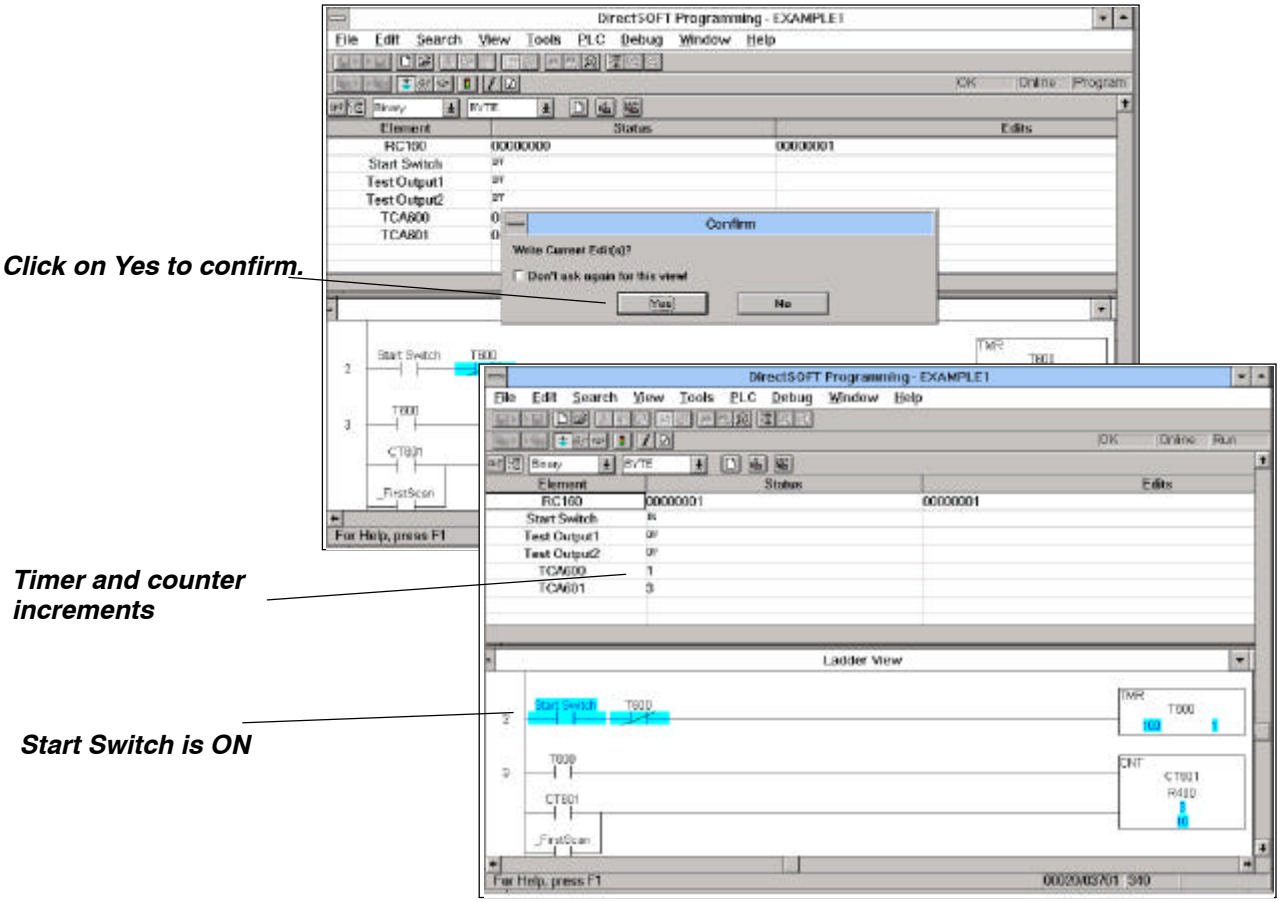
In the Edit column, enter the binary number that will set the first digit (representing the status of C160) to 1.

Writing the Edits to the PLC

To write the new status to the PLC, select the icon with the single arrow pointing down to the PLC from the on-line tool bar . The other icon showing several arrows is for writing multiple edits to the PLC.



After selecting the appropriate **Write Edit to PLC** icon, you will then see a confirmation dialog. It will ask if you want to write the edit (or edits) to the PLC. You answer **yes**. With the Start Switch (C160) now ON, you will see the active elements change color as the counter accumulates each tick of the timer and the Boolean conditions are met. Now you can observe how the program runs. Be sure to read the main user manual later.



Troubleshooting Guide

Software Installation Problems

There are currently two known problems when trying to install the software:

1. The first problem is only a Windows 3.1 or 3.11 problem, and it shows up when the software needs to prompt you to insert the second disk. What you see on the screen is a box stating the software has generated an Application Error. The file **LZWSERV** is usually mentioned. What has happened is that Windows is trying to get memory being used by an adapter such as a video card or network card in the high memory area of the computer. The remedy is to instruct Windows *not* to use this memory area. This is accomplished by adding the command line argument "/**D:X**" when you start Windows, where **X** means to exclude all of the high memory area:

   (example: **WIN /D:X**)

2. The second problem occurs *only* under Windows 95 and *only* if the installation diskettes are write-protected. The computer appears to lock up after the main installation screen appears. What is really happening is the message telling you the disk is write-protected is not being handled correctly and the dialog box that should prompt you to un-write-protect the disk and retry is not visible. The remedy is again very simple, un-write-protect the disk and retry the installation.

Communication Problems

The ***Direct***SOFT programming software requires no additional hardware except for what is already available on a normal computer- -an unused serial port. The key word in this phrase is *unused*. Before continuing, some background information on how personal computers work with multiple serial devices will be discussed. Serial ports are pathways in a computer directing information to and from the attached serial devices. Although a computer can have multiple applications using these serial ports, only one serial device at a time can use any given port.

The serial ports get access to the CPU through a mechanism called "interrupts". This is where the initial design of a computer has become a liability. Since there are four serial ports available in the BIOS, you would think there would be four interrupts separately assigned, but this is not true. COM1 and COM3 share interrupt #4 and COM2 and COM4 share interrupt #3. To make it more complicated, there can be different settings for DOS and for Windows. The software expects the 'default' settings for ports COM1 and COM2. There could be different interrupt values for COM3 and for COM4 if you have this additional hardware present in the computer. From within Windows, you can use **Control Panel** to make sure the ports are set with default values. Select **Control Panel**, double click **Ports**, double click the COM port you want, click on **Advanced** to see the data for that port. These are the default values for the serial ports:

COM Port	Base I/O Port Address	Interrupt Request Line
COM 1	03F8	4
COM 2	02F8	3
COM 3	03E8	4
COM 4	02E8	3

Comm Error Connecting to PLC

In a typical personal computer running under ***Direct***SOFT, there will be two serial devices active, the mouse with its device driver and the PLC with the ***Direct***SOFT driver. As long as the mouse is connected to COM1 or COM3 and ***DirectSOFT*** is connected to COM2 or COM4 you should be able to communicate freely. The problem occurs when you have a third or possibly fourth serial device, like an internal fax/modem giving you three devices and essentially two serial ports (because of the shared interrupts). The first indication of an interrupt conflict is in the Configure Link screen when trying to establish a link to the PLC. If you selected **Auto**, you probably saw the list of parity and baud rate combinations change so fast you could not read them, then the message "**Comm Error Connecting to PLC**" appeared. If this list of combinations changed about once per second, you most likely do not have an interrupt conflict. In this case, it is probably a device driver interfering with the communications. You now need to determine what is using these COM resources. Typically it is either the mouse or an internal modem.

Internal Modem Card Conflicts

If you have an **internal modem** and it can be set to use some other interrupt by jumpers or by software, the problem can be resolved. Be aware most modems cannot be set this way. The only other option is to let the modem and the mouse share an interrupt by setting the mouse to COM1 and the fax/modem to COM3, leaving ***Direct***SOFT on COM2. The disadvantage is the mouse may stop working when you dial the modem or the modem may not work because the mouse driver is already using the interrupt. Sometimes the only way to get the mouse and ***Direct***SOFT to both work is to remove the modem card from the computer.

Other alternatives are to remove the mouse and its driver by selecting the "**No Mouse or Other Pointing Device**" in the Windows setup utility, purchase a bus mouse with its interface card that allows you to select an unused interrupt, or purchase an additional serial interface card to get COM3 and/or COM4 with the ability to select different interrupts for these ports.

Mouse Driver Conflicts

Problems like **"my mouse quits working when I start Direct**SOFT**"** are probably caused by ***Direct***SOFT scanning the COM port where the mouse is connected when the communication server starts up. This problem usually occurs with older mouse drivers (like those shipped with the Windows software) that do not register themselves with Windows correctly. This registration error prevents ***Direct***SOFT from accurately detecting ports already in use. It can be corrected by instructing ***Direct***SOFT which ports it can access. The file **DIRCTSFT.INI** located in the WINDOWS directory contains a section that controls port access. This file can be edited with any text editor, such as Windows Notepad. Open the file and search for the section **[devasync.dll]** to see the following information.

```
[devasync.dll]
COM1Enable=1          COM3Enable=1
COM2Enable=1          COM4Enable=1
```

Set the port enable bits to match your machines configuration (1=enable, 0=disable) for the ports you do not want ***Direct***SOFT to use. It is good practice to disable all ports EXCEPT for the one used to connect to the PLC. For example, to disable COM1 (mouse), COM3 (not present) and COM4 (not present) set the port enable bits as follows:

```
[devasync.dll]
COM1Enable=0          COM3Enable=0
COM2Enable=1          COM4Enable=0
```

Now save the changes and restart ***Direct***SOFT.

Swapping Ports to Solve a Mouse Conflict

If you still cannot get a connection established to a PLC, the next logical step is to swap the mouse and ***Direct***SOFT ports to make sure both serial ports are working correctly inside Windows. Doing this can sometimes require the Windows installation diskettes to load the mouse driver for the other serial port. If you are using one of the mouse drivers supplied with Windows, first exit Windows, change to the WINDOWS directory, and run SETUP.EXE. Select the mouse option from the menu, choose a driver for the COM port you want to use, (if you were using COM1 pick a driver for COM2 and vice versa); then accept the changes. If SETUP needs drivers from the Windows diskettes, it will instruct which disk to use.

If you are not using a mouse driver supplied with Windows (for example a Logitech Mouse), refer to the mouse installation guide on what it takes to move the driver to the COM port you want. For a Logitech Mouse, specify what COM port you want as a command line parameter in **AUTOEXEC.BAT**, such as '**c:\lmouse\mouse 2**' to only use COM2. Once you do this, power down, swap the mouse and ***Direct***SOFT cables, power up and make sure the mouse is found on the COM port you specified, and make sure it works in Windows. If the mouse does not work, you may have found the source of the communication problem, a hardware problem of some kind with the COM port. If you are able to navigate around in Windows without the mouse, you should now be able to create a link to the PLC on the available COM port.

Other Driver Conflicts

If you still cannot get a connection established, try the following to see if there is some other DOS device driver causing the problem. You essentially need to reboot the system clean except for the one device driver needed for Windows. If you have DOS 6.00 or greater, there is a simple way to accomplish this. Reboot the computer, wait until you see the line "**Starting MS-DOS...**" appear on the monitor, then press the **F8** key. DOS will now prompt you to confirm each line in **CONFIG.SYS**. You should type "**N**" to every option except for the line that has something similar to "**DEVICE=C:\WINDOWS\HIMEM.SYS**". Once at the DOS prompt, change to the WINDOWS directory and start Windows as normal and retry the connection.

If you do not have **DOS 6.XX** or greater you should comment out each line of **CONFIG.SYS** (insert a **REM** at the beginning of the line) except for the line containing **HIMEM.SYS**, reboot and retry the connection.

Driver Conflicts with Laptop Computers

Laptop computers bring an entirely new set of problems because they are usually laden with device drivers for all of the options on the computer. The option that usually causes a problem is the **PCMCIA** driver set. You usually see the "**Comm Error Connecting To PLC**" message when trying to establish a link to the PLC. With a PCMCIA slot you usually get a new Windows serial device driver, possibly some other Windows drivers and a CONFIG.SYS full of "**device=**" commands. The Windows serial driver is found in the SYSTEM.INI file located in the WINDOWS directory. In the **[boot]** section at the top of the file, there is a line starting with "**comm.drv=**". ***Direct***SOFT expects the default driver therefore the line needs to read "**comm.drv=comm.drv**". If "**comm.drv=c:\pcmplus\pcmplus.drv**" or something similar appears, comment it out (insert a ';' as the first character on the line) and add the line comm.drv=comm.drv. While editing the file, continue to look through the file for other lines that have the same path information as the driver you commented out. If you find any, comment them out as well. If there are any, they will most likely be in the **[386Enh]** section. Most PCMCIA cards will work with the Windows version of the driver. You now need to do the same to the CONFIG.SYS file, commenting out lines (insert a **REM** at the beginning of each line) that have anything to do with the PCMCIA slot. Restart the computer and try again.

Power Management Conflicts

Another problem you may find on laptop computers is the **Power Management** software. This software monitors system activity and shuts down power to parts of the PC to conserve the batteries. Since the serial port is monitored, this driver can keep a connection to a PLC from working. This option is usually installed in the CONFIG.SYS file as a **"device=XXXXXX"** line. It is hard to be specific about the file name, but a few examples are BATTERY.PRO, POWER.EXE and PM.EXE. Comment out the drivers, reboot your computer and try the connection again.

Power Management could also be a BIOS setup option (check the CMOS setup). If it is, disable the option and retry the connection. Sometimes there is a driver used by Windows. It will usually show up in the WIN.INI file in the WINDOWS directory, usually on the line beginning with "**load=**" or "**run=**". If so comment them out, restart Windows and retry the connection.

Specialized Video Device Driver Problems

Toshiba laptops and any sold under different brand labels (with few exceptions) have a specialized video device driver that can adversely affect communications. They usually do not completely inhibit communications, but cause an excessive amount of data errors and retries. While in ***Direct***SOFT, with status enabled, you probably see the word "**Error**" in red on the On-line toolbar where the word "**On-line**" usually appears. You can eliminate this by using the VGA driver provided with Windows instead of the Toshiba driver. Select the Windows **Setup** (it is usually in the **Main** group), click **Options**, then select **Change System Settings**, click the down arrow on the **Display** option to see the list of available drivers. Scroll through the list looking for the VGA option. Select the option then select OK. Windows should now ask if you want to use the current VGA driver or install a new one, select **Current**. Windows will now have to restart to take effect. There should be no visible difference with the new driver, but hopefully the communications will improve.

Serial Device Driver Bug with Some Computers

The standard Windows serial device driver that came as part of Windows 3.1 and 3.11 has a known bug only when used on Pentium 60 and 66 Mhz machines and some 486 computers with PCI motherboards. It causes something like '**my machine locks up when DirectSOFT tries to bring up its launch window**'. There is an updated driver provided by Microsoft. Obtain the new serial driver '**SERIAL.386**' (dated 2-17-94 or later), place it in the WINDOWS\SYSTEM directory then restart Windows. This file is available in numerous places on the Internet (example **ftp://ftp.microsoft.com/Softlib/WG1001.EXE**). It is important to note the date because there is another version of this file dated November 1993 that does not provide this solution..

Conflicts with other PLC Vendor Software Drivers

Software for other PLC vendors sometimes have device drivers that replace the default drivers. One example is Allen-Bradley. Their KT card has drivers you may need to comment out. Their APS software, if setup to run from within Windows, will put "**device=**" statements in the SYSTEM.INI file that may need to be commented out (search for things like "**dh485.386**" in the **[386Enh]** section).

Non-Shunted Power Supplies

If you are trying to connect ***Direct***SOFT to a DL405 CPU being powered with 110VAC, you must install the shunt across the bottom two screws on the power supply connector (See the DL405 User Manual). Failure to connect the shunt when powering the CPU with 110VAC puts the CPU near brownout and prevents the COM ports from operating correctly.

Screen Saver Conflicts

There are some **screen savers** that can prevent ***Direct***SOFT from establishing a connection to a PLC because they also monitor the machine (serial ports) for activity. Disable the screen saver and retry the connection.

Printing Problems

There is only one problem currently with printing. If you have this problem it manifests itself by generating a **General Protection Fault** and dumping you out of the software any time any of the Print options are selected. This problem can be cured by deleting the global print settings file '**c:\dirctsft\program\bin\prntserv.rst**'. Exit Windows, delete the file, restart Windows and ***Direct***SOFT, and try the print again.

Another problem that sometimes happens is the documentation shows up on the screen and in **Print Preview** but does not show up on the printed page. It is usually a color related problem. Windows uses the video card in combination with the printer driver to generate the output for the printer. Since the printer is black and white and the display is in color, Windows has to make the translation from color to monochrome as part of what is sent to the printer. Bugs in printer drivers will sometimes cause Windows to guess wrong at the color translation and generate white text on a white background. The solution is to go to the View menu, select **Color Setup** and set the colors to **Black Text on White Background** and retry the print.

As a general rule, if the **ladder view looks correct in Print Preview but does not show up correctly on the printed page**, you should suspect the printer driver you are using. Upgrade your printer driver to the most current one available (check for updated drivers on the Internet. Most companies now have home pages with driver updates available). The drivers that come packaged with Windows can sometimes be several years old and do not support all of the new printers correctly. If your printer has the ability to emulate another printer, you can use the printer driver for the one being emulated. Make sure it still looks correct in **Print Preview** and retry the print.

Programming Cables

Since our CPUs provide so many different communication port possibilities, it is helpful to know exactly which communications cable is required. Use the table in Appendix A of the user manual to choose the proper cable for your particular application.