DirectSOFT32

QuickStart Manual

QS–DSOFT32–M

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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–DSOFT32–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)
4th Edition	8/99	Contents Manual Revisions 1 — 56	Release 3.0, 32–bit application (CD)
5th Edition	8/02	Contents Manual Revisions 1 — 34	Release 4.0, 32–bit application (CD)

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Introduction

The Purpose of this Supplementary Manual

This Quick–start manual will show a person the basics of getting started using ***Direct***SOFT32 without referring to the ***Direct***SOFT32 Programming Software Users Manual. **This manual is not intended to replace reading the *Direct*SOFT32 Programming Software Users Manual. This manual is a supplement to those who may not be familiar with similar PLC programming software.**

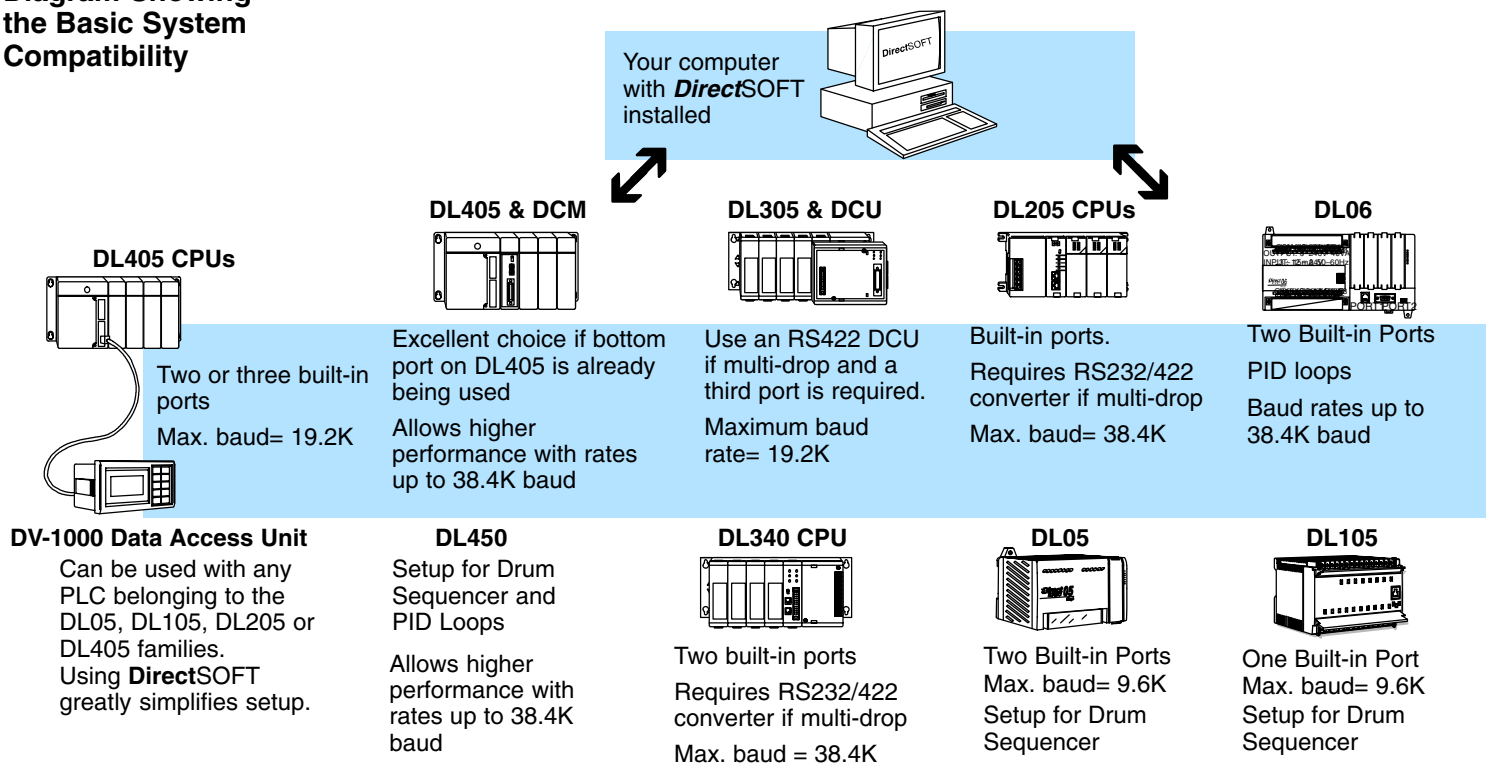
Who Can and Should Use *Direct*SOFT32?

If you have a PLC belonging to the ***Direct***LOGIC CPU family, you can use ***Direct***SOFT to create your ladder logic programs. The families of PLCs (DL05, DL06, DL105, DL205, DL305 and DL405) that currently exist under this description are shown below. The ***Direct***SOFT32 Programming Software Users Manual details all of the programming tools made available to the user. Besides being easy to use, ***Direct***SOFT32 version 4.0 includes the following features:

- set up a DV1000 Data Access Unit
- tune PID loops for the DL05, DL06, D2–250–1, D3–350, and D4–450
- set up the parameters for Drum Sequencers in the DL05, DL06, DL105, D2–250–1, 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

Family	CPU	*Direct*-SOFT Programming PC–PGMSW	*Direct*SOFT Programming Single Family	*Direct*-SOFT Site Licenses	*Direct*-SOFT OEM License	*Direct*-SOFT DSData Server
DL05	Requires Rel. 2.4a or later	✓	PC–PGM105 or PC–PGM–BRICK	✓		✓
DL06	Requires Rel. 4.0 or later	✓	PC–PGM–BRICK	✓		✓
DL105	F1–130** (requires Rel. 2.4a or later)	✓	PC–PGM105 or PC–PGM–BRICK	✓		✓
DL205	D2–230	✓	PC–PGM205	✓	PC–D2OEM	✓
	D2–240	✓	PC–PGM205	✓	PC–D2OEM	✓
	D2–250 (D2–250–1 requires Rel. 4.0 or later)	✓	PC–PGM205	✓	PC–D2OEM	✓
	D2–260 (requires Rel. 4.0 or later)	✓	PC–PGM205	✓	PC–D2OEM	✓
DL305	D3–330*, D3–330P*	✓	PC–PGM–305	✓	PC–D3OEM	✓
	D3–340	✓	PC–PGM–305	✓	PC–D3OEM	✓
	D3–350 (requires Rel.2.4a or later)	✓	PC–PGM–305	✓	PC–D3OEM	✓
DL405	D4–430	✓		✓	PC–D4OEM	✓
	D4–440**	✓		✓	PC–D4OEM	✓
	D4–450** (requires Rel 2.4a or later)	✓		✓	PC–D4OEM	✓
GE® Series 1	IC610CPU105*	✓		✓	PC–D3OEM	✓
	IC610CPU106*	✓		✓	PC–D3OEM	✓
TI305™ / SIMATIC® TI305™	325–07*, PPX:325–07*	✓		✓	PC–D3OEM	✓
	330–37*, PPX:330–37*	✓		✓	PC–D3OEM	✓
	325S–07* (or 325 with Stage Kit)	✓		✓	PC–D3OEM	✓
	330S–37*, PPX:330S–37*	✓		✓	PC–D3OEM	✓
	335–37, PPX:335–37	✓		✓	PC–D3OEM	✓
TI405™ / SIMATIC® TI405™	425–CPU, PPX:425–CPU **	✓		✓	PC–D4OEM	✓
	PPX:430–CPU	✓		✓	PC–D4OEM	✓
	435–CPU, PPX:435–CPU **	✓		✓	PC–D4OEM	✓

* — requires Data Communications Unit (D3–232–DCU) ** — also DC versions
NOTE: In general, the compatible products listed offer similar features and are even identical in some cases. However, ***Direct***SOFT32 has not been completely tested with the compatible products. There may be some aspects of system operation that may not be supported, or, that may not work the same as previous software packages.

Supported Devices One of the benefits with the ***Direct***LOGIC family is the wide variety of programming connections. For example, you can use ***Direct***SOFT32 to communicate directly with a PLC or you can use a communications device, such as, the DL405 Data Communications Module. Below is a list of supported devices:

Data Communication Devices:

- DL405 Data Communications Module (D4–DCM)
- DL405 Ethernet Communications Module (H4–ECOM)
- DL305 Data Communications Unit (D3–232–DCU, D3–422–DCU)
- DL205 Data Communications Module (D2–DCM)
- DL205 Ethernet Communications Module (D2–ECOM)

I/O Modules:

- DL405 Slice I/O Modules
- D2–RSSS (Slice protocol)
- T1K–RSSS (Slice protocol)

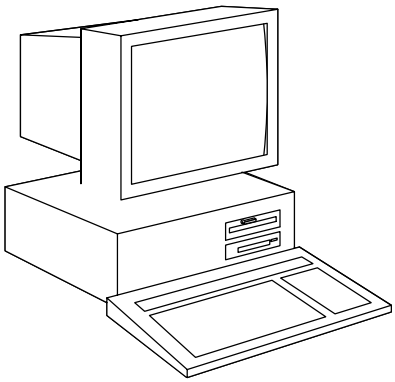
Preparing for Installation

Getting to Know Windows

DirectSOFT32 Programming Software runs under 32–bit Windows operating systems (98/NT/2000/XP). Please take a moment to study your PC's reference manual on the operation of Windows 98/NT/2000/XP.

Check Your PC Hardware Requirements

Please check the following requirements when choosing your PC configuration.



System Requirements

- Pentium/Celeron CPU, 333 MHx (or higher)
- Windows 98/2000/NT 4.0 or later, and all XP versions (No DOS, OS/2, Macintosh, Linux or Unix Versions, or 16 bit versions available)
- 32Mb free RAM
- 11Mb available hard drive disk space
- CD-ROM drive
- At least one unused serial communications port
- Color SVGA monitor

Tip on Monitors: Any size monitor will work, but larger monitors enhance the display capabilities of ***Direct***SOFT32**.**

Power Supply

We highly recommend that you use power surge protection for the computer running ***Direct***SOFT32. A quality surge protector will protect your computer from most surges and spikes however, an uninterruptible power supply (UPS) will provide the ultimate protection. A UPS provides complete isolation between the AC power source and the computer and has battery backup for blackout and brownout conditions.

DirectSOFT32 **package contents**

Now is the time to review the contents of your ***Direct***SOFT32 software package. You should have the following items:

- CD ROM
- Quick Start Manual
- Programming Manual
- License Agreement
- Registration Card

Installation of *Direct*SOFT32 Software

Step 1: Load the CD

Insert the ***Direct***SOFT32 CD into the CD drive.

Step 2: Review your options

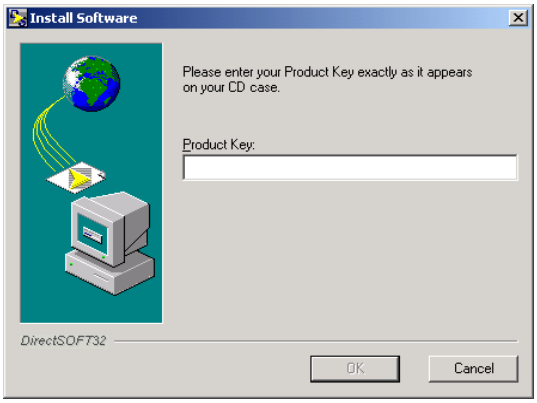
The CD will begin its auto-install feature. This CD also contains demo versions of other software products. You will see a screen that provides you with different options. You can browse the CD or install a program. When you are ready to install the program, click on that selection.

Step 3: Enter the Security Code

The product key code is located on a removable label attached to the outside of the ***Direct***SOFT32 box. Remove the label and place it on the CD jewel case or a safe place of your choosing. Enter the product key code in the window and click the **OK** button.

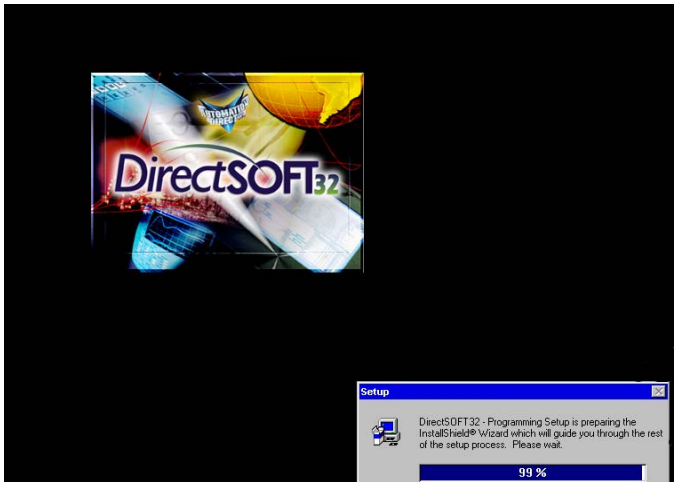
Note: The key code must be entered exactly as it appears (dashes, spaces, capital letters, etc).

If you have entered the number incorrectly, the **OK** button will not be accessible.



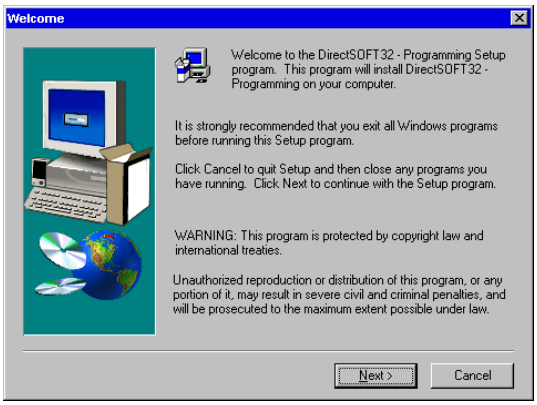
Step 4: Unpacking the software

The installation process begins by unpacking the information on the CD that corresponds to the security code entered. “Pop–up” windows will show you the status of the unpacking.



Step 5: End Other Windows Tasks

The installation issues a reminder to exit all other Windows applications. If you are unsure of the programs which might be running, press **Ctrl–Alt–Delete**, select the Task Manager and close the programs which are running. If everything is closed, click **Next** to continue.

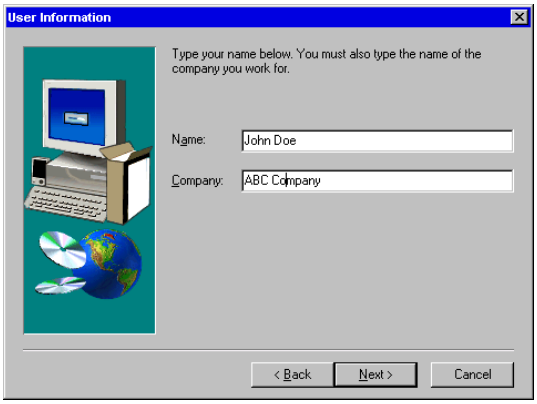


Step 6: *Direct*SOFT32 License Agreement

The next screen displays the software license agreement. If you agree to the terms and conditions, click **Yes** to continue.

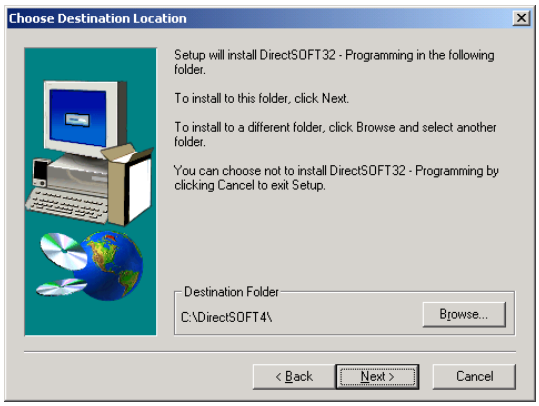
Step 7: Enter Your Name and Company

The next information required to enter is your name and the name of your company. This will register the software copy to you.



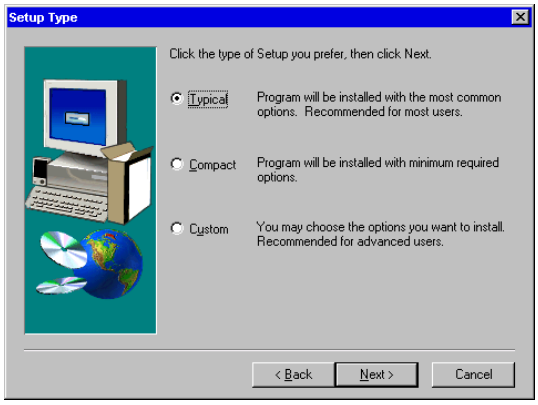
Step 8: Select Installation Directory

The program destination folder selection dialog lets you choose the folder where the ***Direct***SOFT32 files will be loaded.



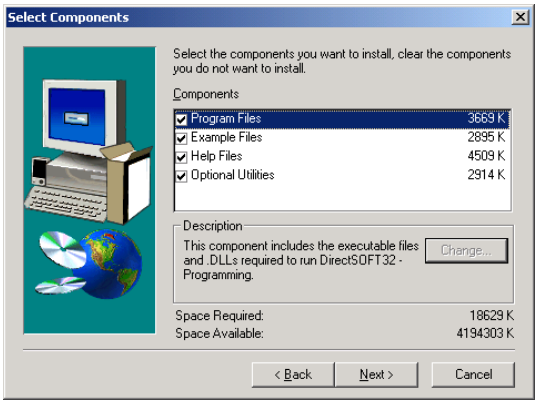
Step 9: Select Installation Type

Chose the type of installation to have performed. The **Typical** install loads everything ***Direct***SOFT32 has to offer (Program Files, Example Files, Help Files, Files). The **Custom** option lets you choose which features to install. The **Compact** option installs the Program Files only. Generally the choice will be **Typical** installation. Click on **Next** to begin the installation.



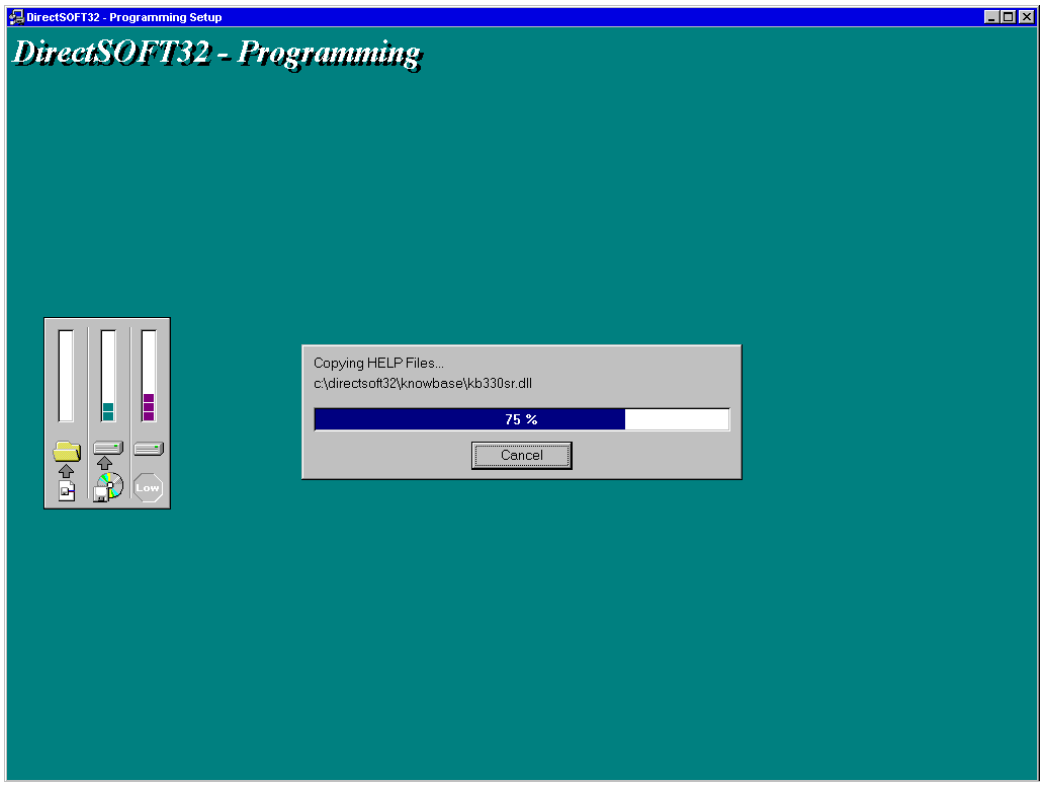
Step 10: Custom Installation

If **Custom** installation is your choice, you will be prompted to select the features to be installed.



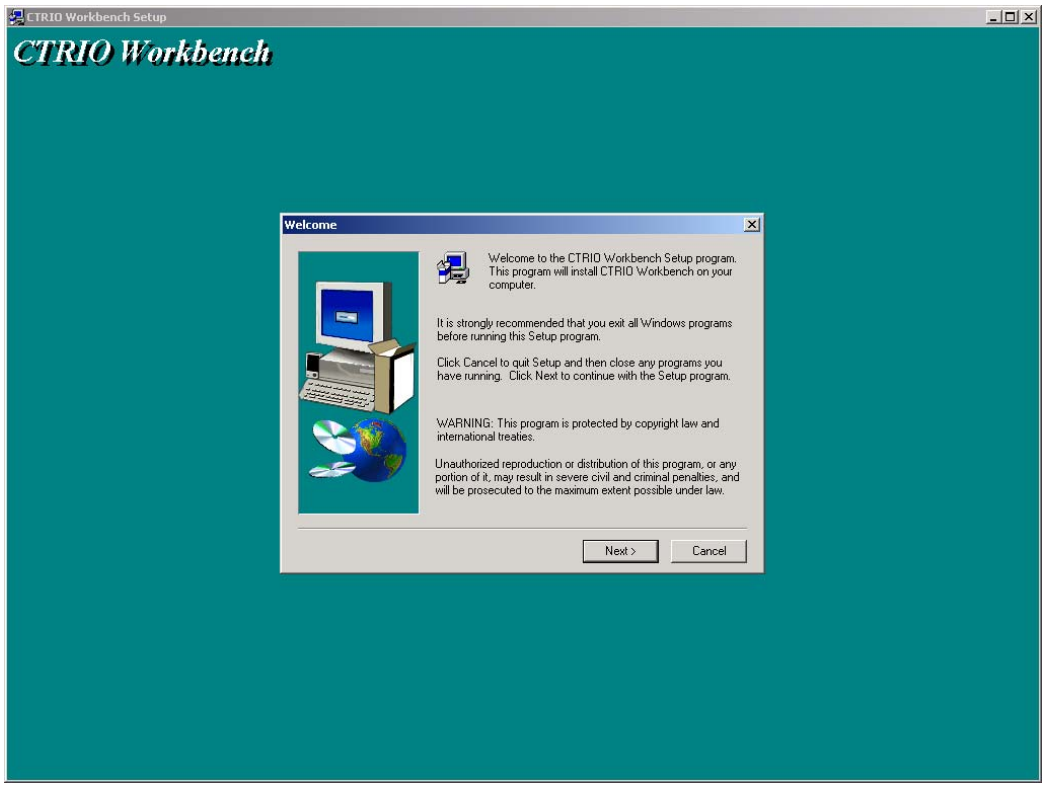
Step 11: Program Installation

Once the installation begins, the window below will appear to provide the status of the install.



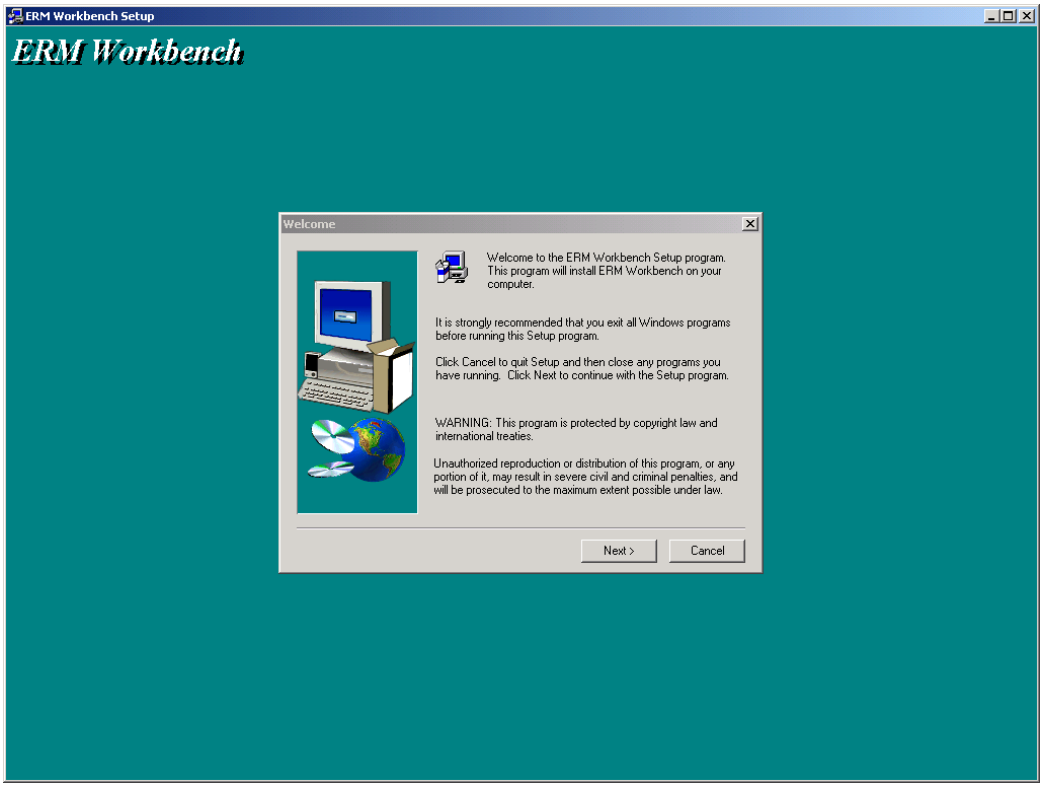
Step 12: CTRIO Workbench Installation

After the ***Direct***SOFT32 install status window reaches 100%, the screen will change to the CTRIO Workbench installation. The CTRIO Workbench is a utility used to setup the H2–CTRIO and H4–CTRIO modules. These are High–Speed Counter I/O modules offered as options for the DL205 and DL405 PLC families. This is an optional installation. If you do not want to install the CTRIO Workbench, simply click on **Cancel**. If you do chose to install it, click on **Next**. You will be asked the same questions which were asked for the ***Direct***SOFT32 installation.



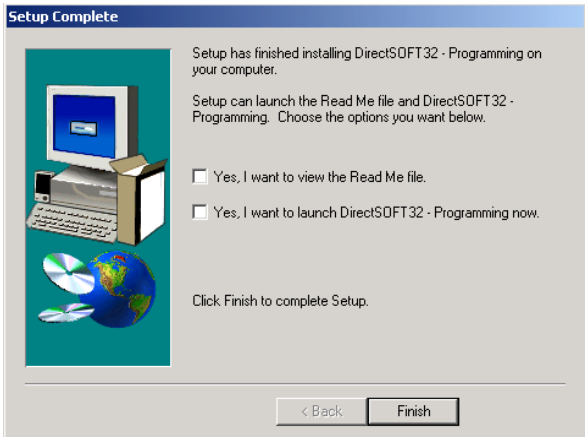
Step 13: ERM Workbench Installation

Once the CTRIO Workbench installation is either finished or cancelled, the following ERM Workbench installation screen will appear. The ERM Workbench is a utility used to setup the Ethernet Remote Master modules, H2–ERM and H4–ERM. These modules are used to slave I/O over a high–speed Ethernet link. This too is an install option. If you do not want to install the ERM Workbench, simply click on **Cancel**. If you do chose to install it, click on **Next**. You will be asked the same questions which were asked for the ***Direct***SOFT32 installation.



Step 14: Program Verification

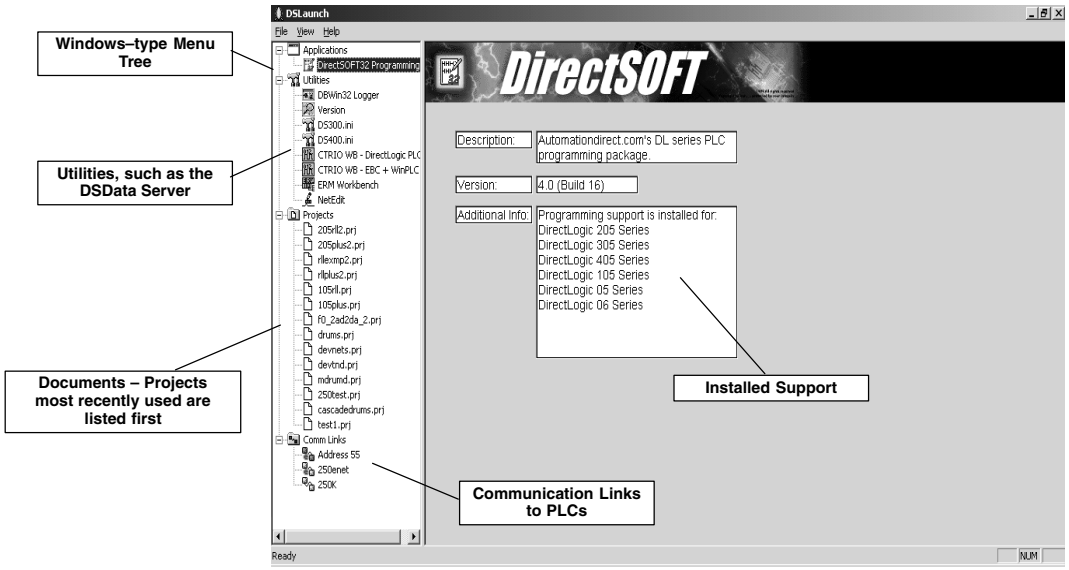
After all of the software has been successfully installed, the Setup Complete window will appear. You can either check the options offered and click **Finish** or just click on **Finish**. The ***Direct***SOFT32 software installation is now complete.



Getting Started

Before beginning to edit a program, you need to open ***Direct***SOFT32. Click on **Start** in the lower left–hand corner of the computer monitor. Now go to **Programs**, place the pointer on ***Direct***SOFT4 then click on **DSLaunch** (rocket) in the drop–down window. The following **DSLaunch** window will appear. From this window, additional utilities, such as, the DSData Server, CTRIO WB, etc., can all be launched from one central place. This same place is used to create and manage PLC programs and the communications between your personal compter and the PLC.

Notice the different areas which are pointed out in the Launch window.



- **Applications** — These are the applications currently installed in ***Direct***SOFT32. They are visible in the Menu Tree under the **Applications** folder/icon and are linked to applications that have been designed for launch from ***Direct***SOFT32. For example, to create a new program double-click the ***Direct*****SOFT32 Programming** name.
- **Utilities** — There are several utilities available under the **Utilities** folder/icon. Some of the utilities can be purchased from **AutomationDirect**, such as, DSData Server. Other utilities will come with ***Direct***SOFT32 Programming Software. These utilities are ERM Workbench, CTRIO Workbench and NetEdit.
- **Projects** — These are created in ***Direct***SOFT32. A project (also called a document) is the collective name for your program and all its documentation. When you create a new project, or work on an existing project, you will see it listed in the Menu Tree under the **Projects** folder/icon by name. Documents are listed in the "most recently used" order.
- **Comm Links** — The "links" are for communication links between your personal computer and one or more PLCs. The links are not only for the control programs. Instead they are communication links (i.e., the link between the computer and printer). Any application can use the link. When you create links, they will appear in the menu tree under the **Comm Links** folder/icon.

Begin Editing a Program

Once the ***Direct***SOFT32 Programming Software is installed in you computer, you will want to begin to use it. The following steps will show you the basic steps for editing with ***Direct***SOFT32. This will not be an attempt to teach you how to develop a control program, but it will give you the basics to get started using ***Direct***SOFT32 so that you can edit a program.

Step 1: Enter the Program Mode

To begin a new program (project) double–click on ***Direct***SOFT **Programming 4** located in the **Applications** folder of the menu tree.

Step 2: Start a New Project

You should now see the **New Project** window. You can name a project using any combination of 15 characters (including spaces). "**EXAMPLE1**" is the project name used for this example. Move the selection bar to the **PLC Family** and **CPU Type**. For this example, use a PLC belonging to the DL05/06/105/DL205/DL405 families. Click on **OK** after you have made your Family and Type selections. If you have a DL305 type PLC, be sure to select it 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.

Use this icon to start a new project and open up a fresh program window.

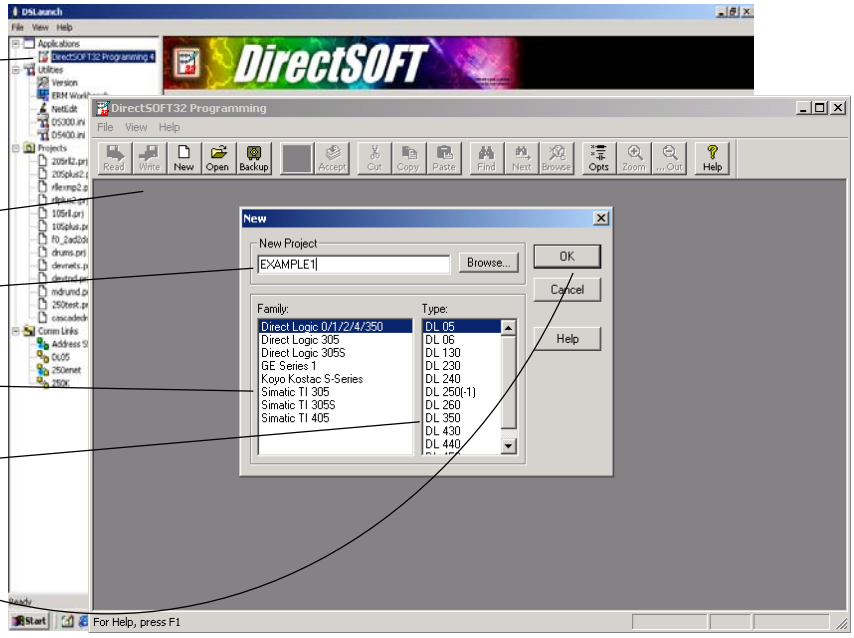
New Project Window

Type in a name for your project

Select the PLC Family..

Select the CPU Type..

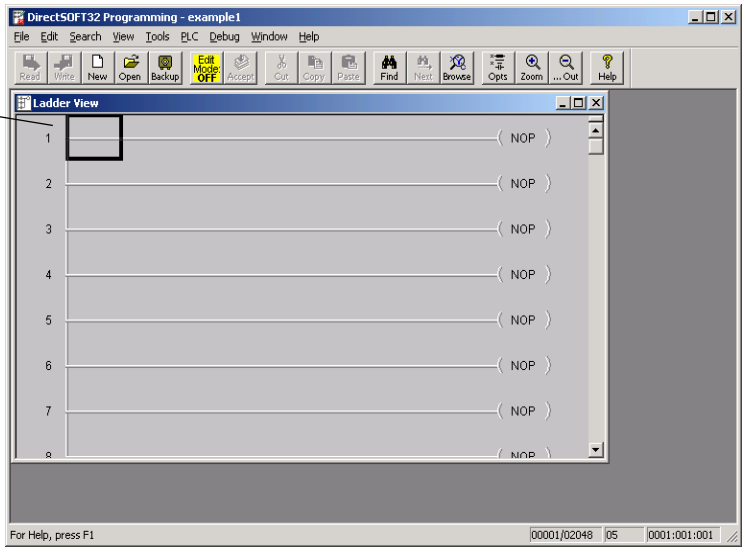
..then click on OK



After clicking **OK** to enter your project name, you will see ladder logic rungs ready to be edited. This is the **View Only Mode** at this point. In this mode, the cursor is always hollow and programming is not allowed. Viewing a project is all that is allowed.
If you are a "seasoned" programmer, you may not like the appearance of the display. This would be a good point to select the color options of your choice. Refer to the ***Direct***SOFT32 Programming Software User Manual, ***PC–DSOFT32–M***, chapter 4, to setup the appearance of the programming window.

View Only Mode

(cursor is hollow)



Step 3: Switch to the Edit Mode

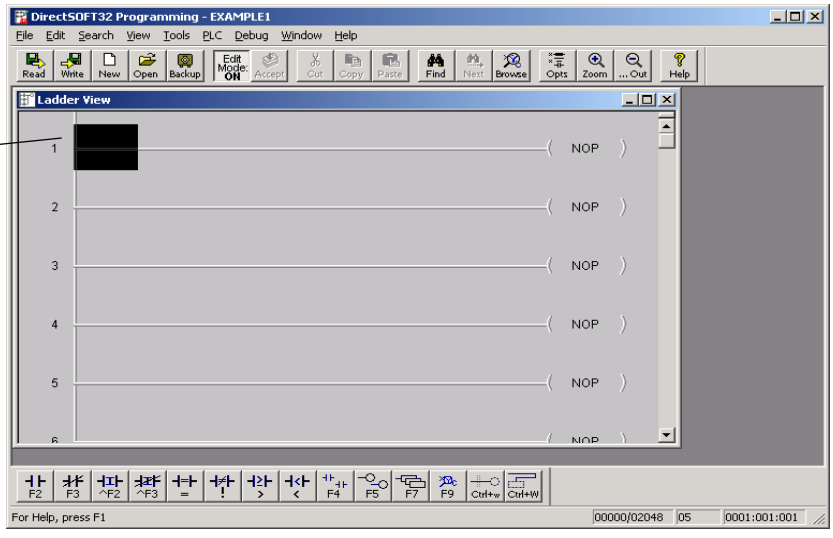
The **Edit Mode** is used to write the control program. You have the option of entering the Edit Mode in three different ways, the most common being to click on the **Edit Mode** button on the top tool bar. It will be yellow in color and indicate **OFF**. Another way to turn on the Edit Mode is to click on **Edit** at the top menu bar, then select **Edit Mode**. The last way to enter the Edit Mode is to hold down **Ctrl + E** (press the Control key and the E key simultaneously).

DirectSoft32 will indicate the Edit Mode to be active when the cursor box becomes solid and the **Edit Mode** button turns white and changes from **OFF** to **ON.** The **Tool Palette** will also appear on the bottom of the programming window.

Edit Mode

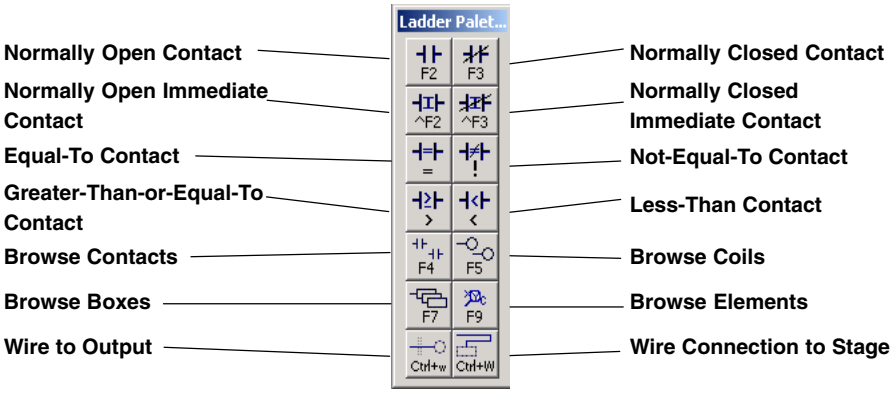
(cursor box is solid)

Tool Palette



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

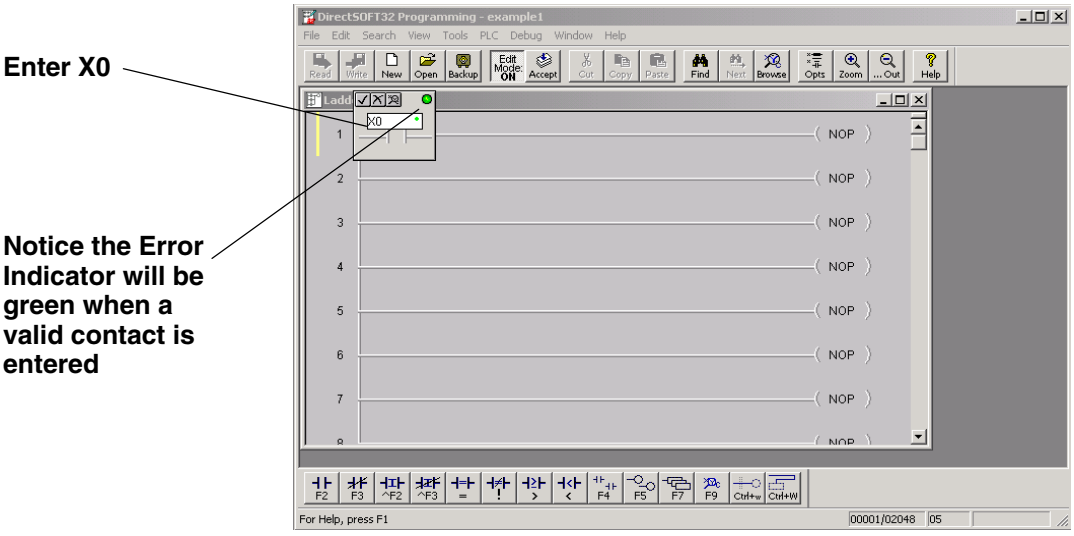
The **Ladder Palette** can be very helpful, especially in the beginning while learning to program with ***Direct***SOFT32. Later, you may prefer to use the faster **Hot Keys** instead of clicking on the tool buttons. The hot keys are shown on each tool button and appear whenever your cursor is on the tool button. Refer to the ***Direct***SOFT32 Programming Software User Manual for more details. *The Ladder Palette shown below may not be exactly like the one you have on your computer screen.* The tools used in the Ladder Palette will depend on which CPU your PLC is using. This example shows the elements common to all of the CPUs.



Use the **Ladder Pallete** to enter the first instruction of the program. First, move the cursor to the desired location for the first element. This is done with either the mouse or the up and down arrows on the keyboard. When using the mouse, simply position the mouse arrow to the point where you want the element to be placed and click the left mouse button. In this example, a normally open contact will be placed at the first position on Rung 1. Position the cursor at the beginning of the rung and click on the **Normally Open Contact** symbol on the Tool Pallete.

Step 5: Enter the Input Element

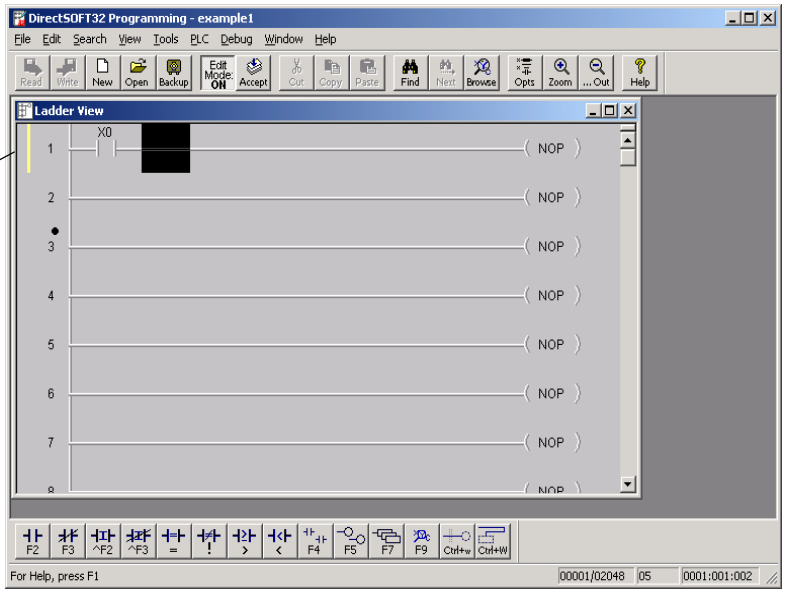
You will see the cursor change to a box with an open relay contact, a window with the text cursor blinking at the end of address **C0** (highlighted) and a green indicator. If the green dot changes to red, it means that the address is incorrect, not valid or a wrong character. For example, if you typed the letter **O** instead of the digit **0**, the indicator would turn red and stay red until you correct your mistake. Enter **X0** while **C0** is highlighted. After the address has been entered and the error indicator is green, either click on the check mark (✓) or press the **Enter** key.



The instruction has been entered and the cursor has moved to the next entry position. Notice the yellow vertical bar that appears next to the rung. *Since this is not a color manual, a light colored vertical bar is seen in the screen example.* The yellow bar indicates that an instruction or instructions have been entered, but that the program has not been accepted (compiled).

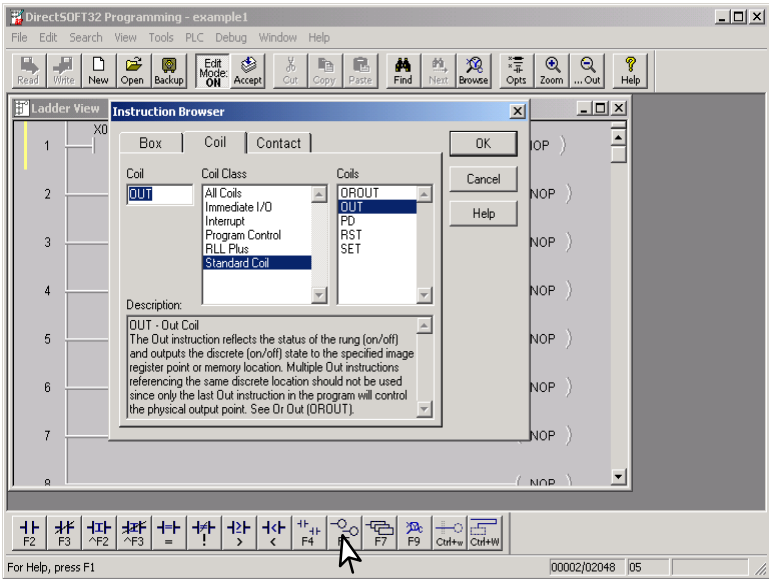
Rungs that have already been accepted into compiled memory will have a green bar instead. Without being compiled, you will not see the icons for **Save to Disk** or **Save to PLC** enabled. This means in order to save your program anywhere you will have to **Accept** your editing first. For example, 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.

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



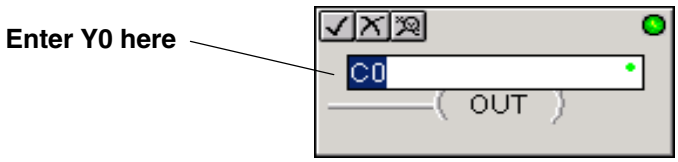
Step 6: Enter Ouput Elements

Next, move the cursor to the end of the rung, over the NOP. Click on the **Browse Coils** button on the tool palette. The **Instruction Browser** will appear with the **Standard Coil** selected as the default. Click **OK** to enter a standard coil.

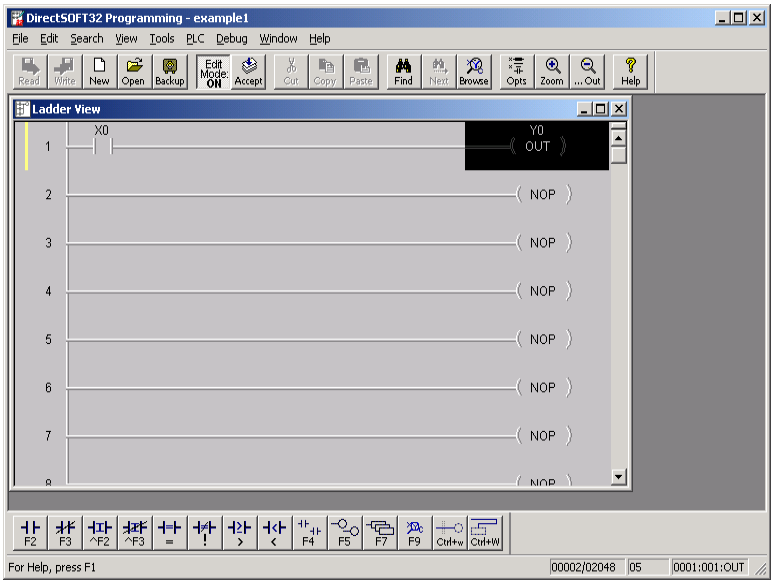


Step 7: Element Entry Window

The Instruction Browser will be replaced with the element entry box. The default address, C0, will be highlighted. Key in **Y0 > Enter**. When the address is entered correctly, the error indicator will be green.

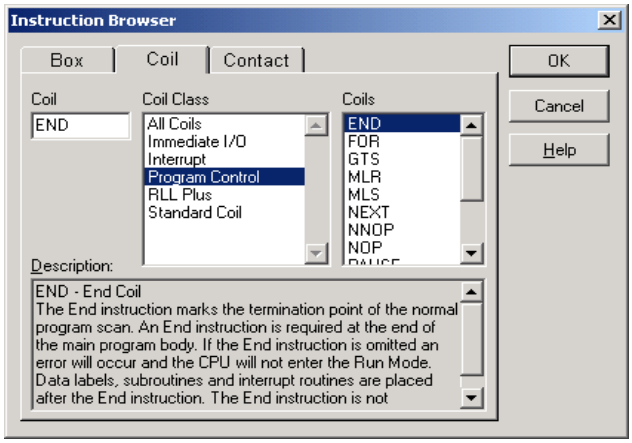


Rung 1 has just been programmed. This rung can be downloaded to the PLC element except for one missing element. The program must be terminated with an **END Coil** rung.



Step 8: Enter the END Coil

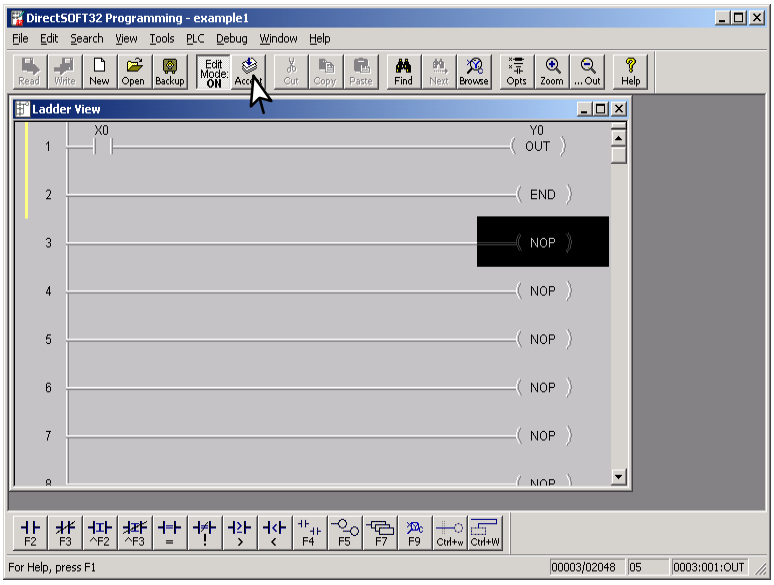
To program this rung, move the cursor so it is over the **NOP** in the next rung, and click on the Browse Coils button. The Instruction browser will appear. Either move the up/down arrows or use the mouse to select **Program Control** in the **Coil Class** section of the window. **END** will be at the top of the **Coils** list and it will be highlighted. Click on **OK** to enter the element.



Two rungs are now programmed for this example. This program can be downloaded to a PLC the way it is or , if desired, additional rungs can be added to the program . The END coil needs to be at the end of the program. Continue to practice what has been covered before continuing.

Step 9: Accepting and Saving the Program

We will continue with this example to keep things simple. The program needs to be accepted in order to be downloaded to the PLC. Click on the **Accept** button in the menu toolbar to compile the program. Notice that the two diskette buttons on the left of the menu toolbar are enabled to **Read from Disk** or to **Write to Disk**, they are not "grayed out". In this case, you will want to click on the Write button to save the program (it is not necessary to save the program in order to download the program to a PLC). It is a good practice to save your work as you edit a program. A mistake may be made at times and you may want to restore the program to the state that it was before the mistake was made. To do this, the Read button can be clicked on, and the previously saved program will refresh the screen and programming can continue.



Note: When the program is saved by clicking on the **Write to Disk** button, the ladder program is all that is saved. Once you have a larger program than what has been done here, you will want to save all that you have done. This is accomplished by selecting **File > Save Project to Disk**. You can also click on **Backup** to accomplish the same thing with the addition of a Backup file. For more detail about saving the project refer to the ***Direct***SOFT32 Programming User Manual, pages 3–6 and 6–25.

Establish the Communication Link

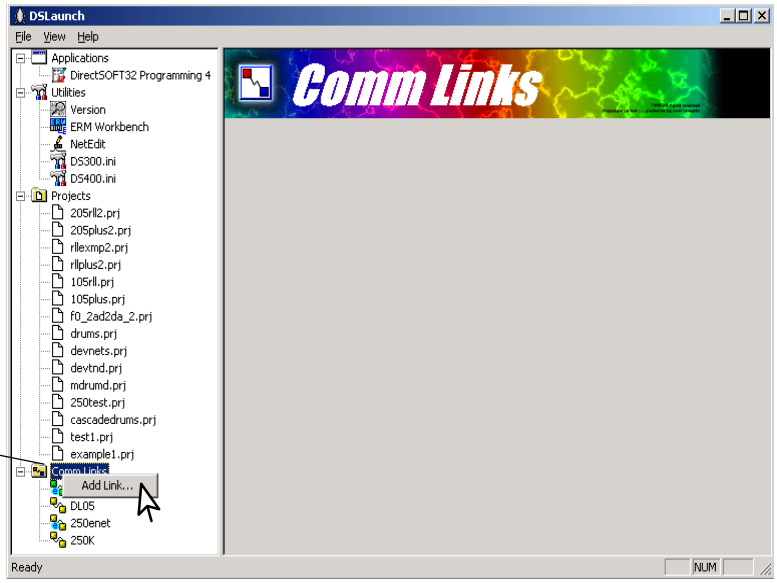
Setup the Communication Link

This section will discuss the configuration of a standard communication link which will use the serial port of your PC. If you are creating a serial Link that will connect through a modem, or an ethernet link, refer to the ***Direct***SOFT32 Programming Software Users Manual, Chapter 9. This example will step you through the setup using the **Link Wizard**.

Use the Link Wizard

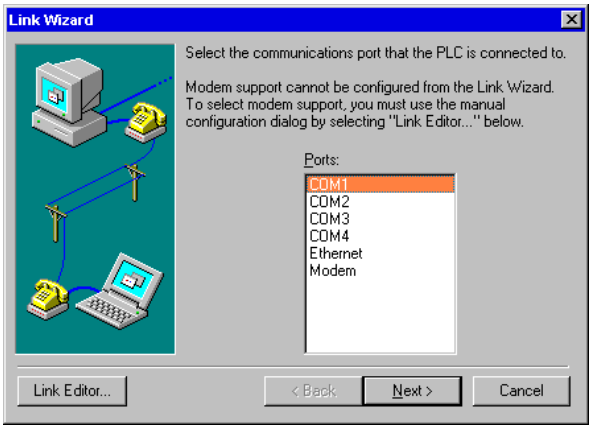
To use the **Link Wizard** connect the programming cable from the serial port of the PC to the serial port of the PLC. Also, be sure that the **RUN/TERM/STOP** switch on the PLC is in the **TERM** position. The Link Wizard can automatically determine the majority of communication settings for the PLCs. To establish a new link, activate the Link Wizard in the Launch Window by right–clicking on the **Comm Links** icon then click on **Add Link**.

Right–click Comm Links to add a new link



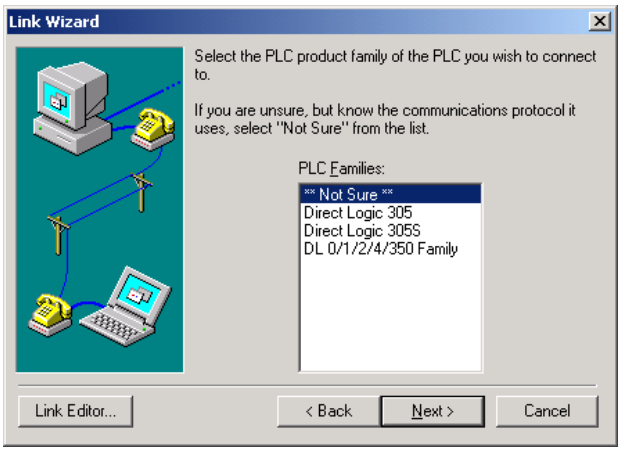
Step 1: Select the Port

The following window will appear showing a list of **Ports**. Select the port you will use and click **Next >**.



Step 2: Select the Port

The next window will show a list of **PLC Families**. Select the PLC family by clicking once with the mouse on the appropriate choice. If you are unsure of the PLC family but know which communications protocol to use, select the **"Not Sure"** choice. If you are using a ***Direct***Logic compatible PLC the Link Wizard will try and detect the PLC type automatically. Click on **Next** when you are finished.



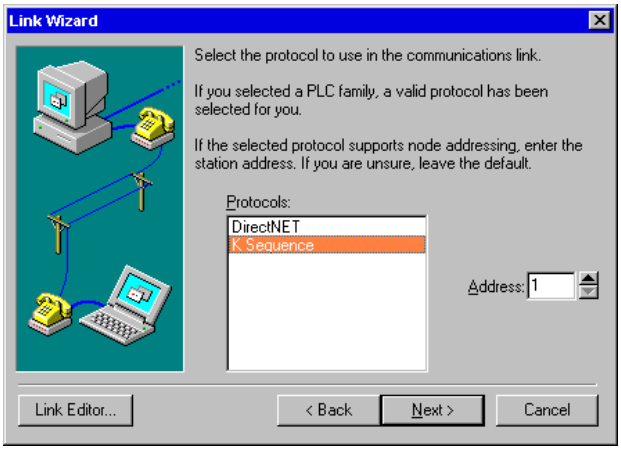
Step 3: Choose the Protocol and Node Address

Select either ***Direct***NET or **K-sequence** protocol. If during the previous step you selected one of the the families listed, the highlight bar will be on a valid protocol for that family. The choice of protocol to use will depend on two factors:

Whether or not the PLC supports the protocol on the port where you are connecting. See ***Direct***SOFT32 Programming Software Manual, Appendix A for a list of protocols available for ports on ***Direct***Logic and compatible CPUs.

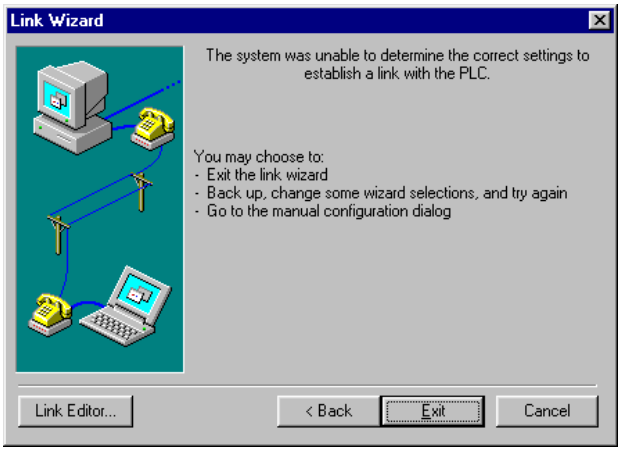
- If you need to perform write operations to individual Discrete I/O points or control relays. In this case you must select the K-sequence protocol. ***Direct***NET protocol cannot write to individual bit locations.

If the PLC has been configured with a node Address other than 1, enter that address now. Click **Next** when finished.



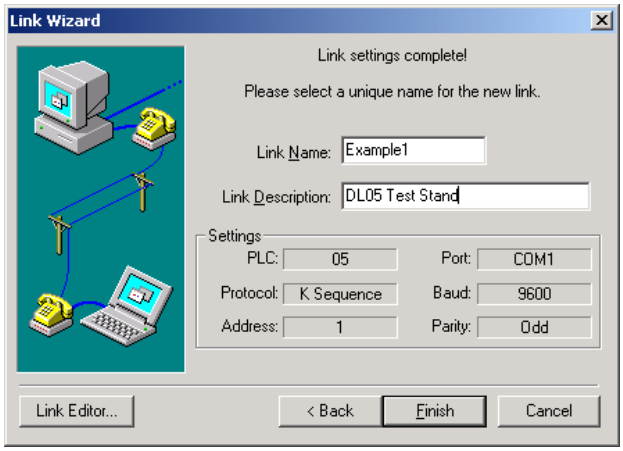
Step 4: Cannot Make a Link

The Link Wizard will attempt to establish a communication Link with the PLC using the node address and protocol you have selected. It will try the combination of 9600 Baud, and Odd Parity. If this combination is unsuccessful, an 'auto–baud' sequence will be used to try and determine the correct baud rate and parity combination. If these attempts are unsuccessful, the following dialog is displayed. You can click the **Link Editor** button, and manually attempt to adjust the port configuration, or you can consult the ***Direct***SOFT32 Programming Software Manual, Appendix B.



Step 5: Name the Link

If the Link Wizard is successful in communicating with the PLC, you will be prompted to enter a unique name and description for the Link. Each Link must have a unique name. The name can be up to 16 characters and can contain space characters. The description field allows 32 characters. Enter the name for the link and description then click **Finish** to return to the DSLaunch window.



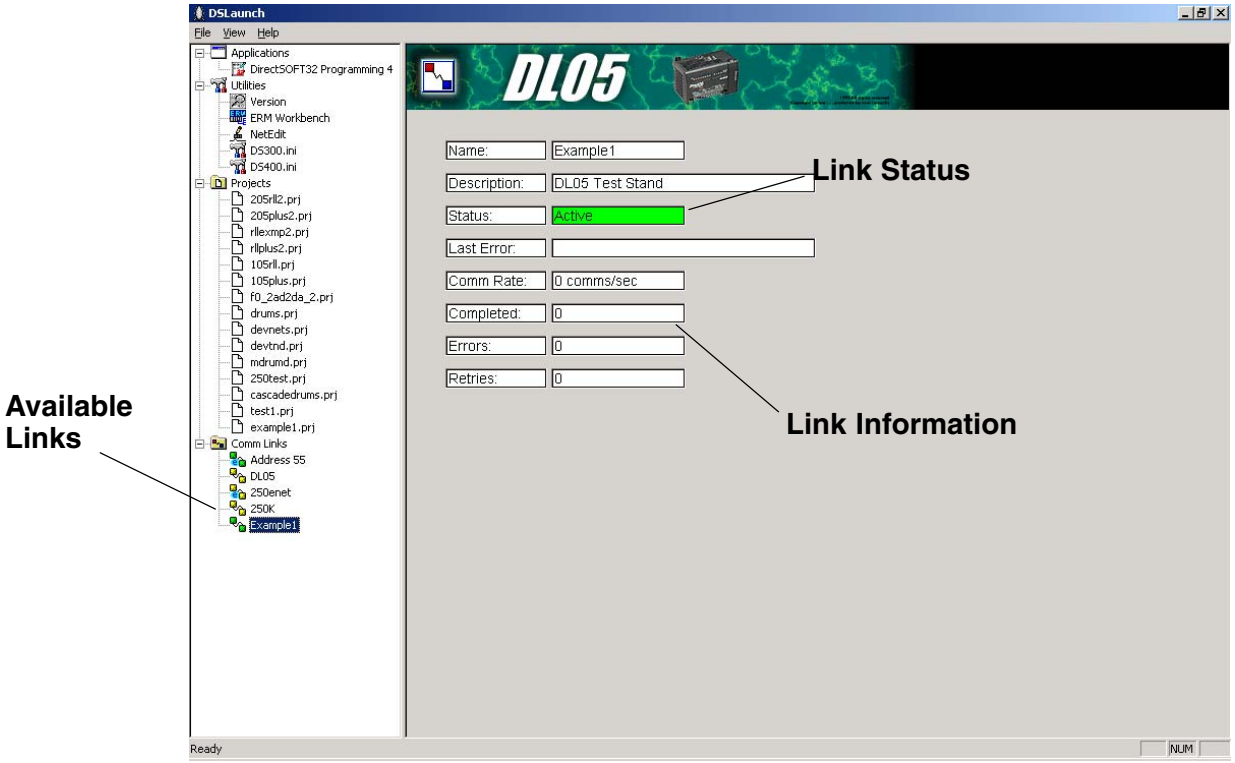
Link Status

After creating a link, the name of the link will be displayed in the menu tree under the **Comm Links** icon. When you click on the link all of the configuration information will be displayed on the DSLaunch window. The status field is color–coded to help easily identify the link status.

Green — link is already enabled (means it is active and you can use it).

Yellow — paused (you are currently changing the link parameters).

Red — link is disabled (inactive). This does not indicate a problem with the PLC, but that you cannot communicate until the link is active. If a link becomes disabled, ***Direct***SOFT32 will automatically attempt to enable the link when you double-click on the link project.

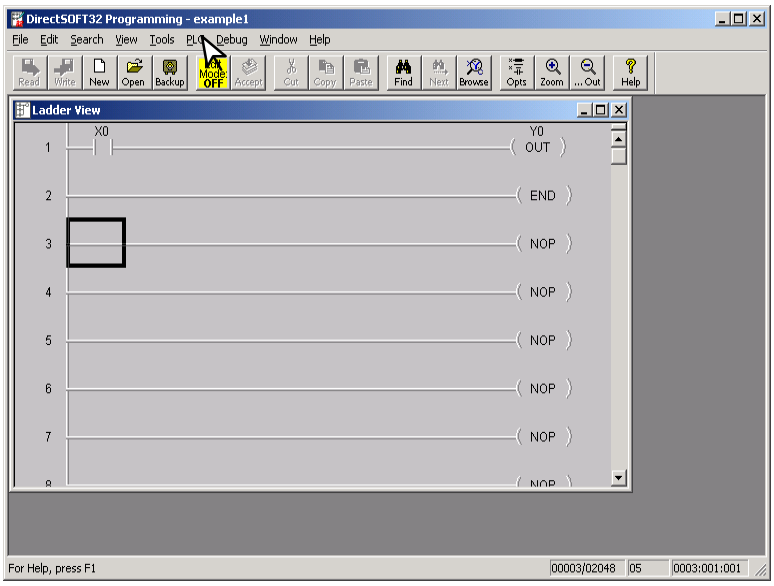


Download the Program

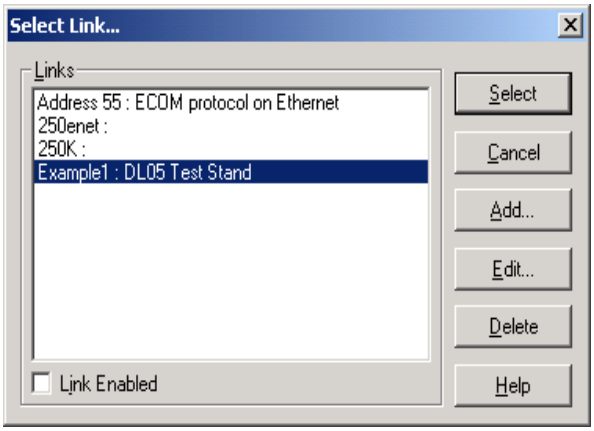
Download the Program to the PLC

Now that your PC and PLC are properly linked, the program can now be downloaded, or written, to the PLC. Return to the example program (Example1) which was previously edited. If the program is no longer open, displaying on your computer screen, it can be opened by pointing the mouse arrow to the name of the program, Example1, and double–clicking on it.

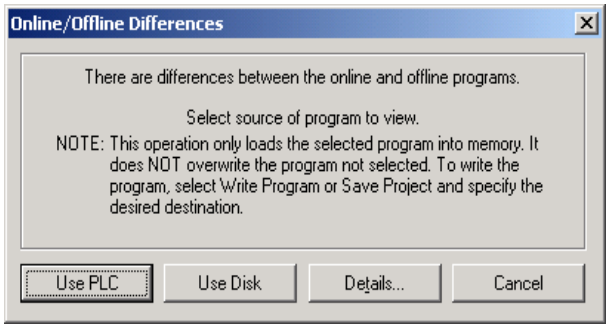
Now, refering to the example below, click on **PLC** on the menu toolbar. A drop down window will appear. Find and click on **Connect**.



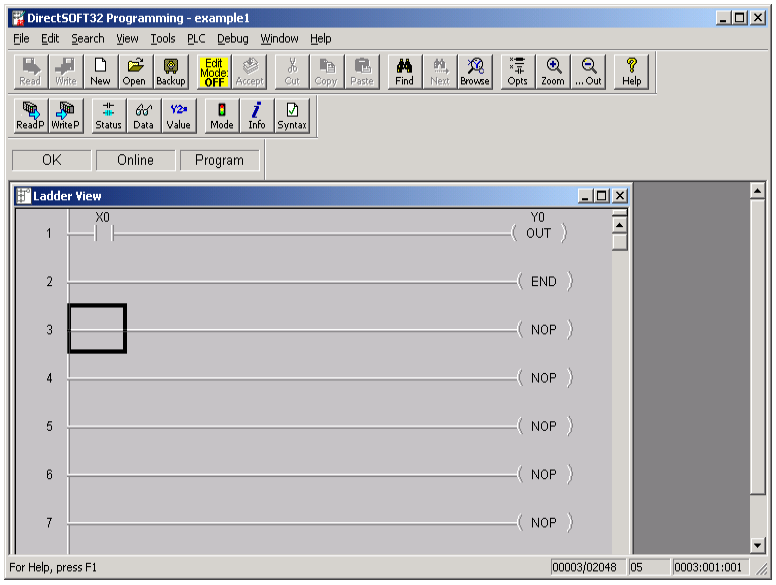
The **Select Link** window will appear, like the example below. Select the link which we made earlier, then click on **Select**.



DirectSOFT32 automatically compares the program stored on disk with the program stored in the PLC. The following dialog box will appear. There are four buttons on the bottom of the window. Since we are dealing with a new program, select the **Use Disk** button. The **Use PLC** button is used whenever you have edited a change to a program and you are going online to load the changed program. The other two buttons are self–explained.

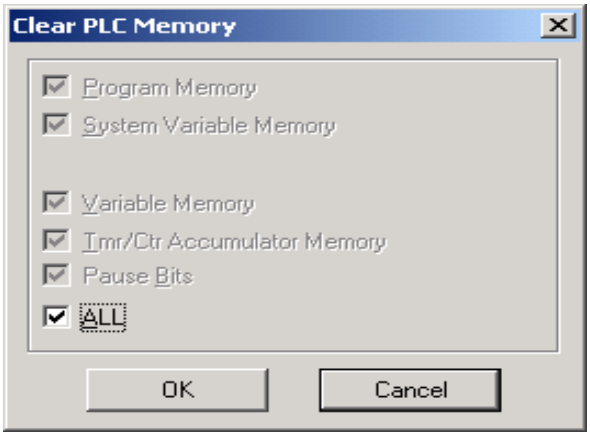


After clicking on the **Use Disk** button, the programming window will look a bit different, it has acquired another toolbar. This toolbar can be referred to as the online toolbar. Also, there are indicators under the online toolbar indicating that the PLC is okay, the PC is online with the PLC and the PC is in Program Mode. ***At this point the program has not been written to the PLC*** .



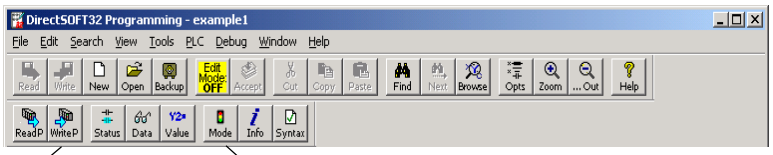
Whether you are writing to a new PLC or to a PLC that is being re–programmed, it is good practice to clear the PLC memory before writing the new program to it. To do this, click on **PLC** on the menu toolbar, then click on **Clear PLC Memory** in the drop–down menu.

The **Clear PLC Memory** dialog window will appear. There are several options listed in the window that will show unchecked boxes for each option. For our download example, click the **ALL** box to place a check (✓) in it. All of the options will "gray out" and the boxes will have check marks in them. Click **OK** to begin the clear memory process.



The following indicator will appear showing the beginning and end of the memory clearing process. When the window vanishes, the clear memory process will be complete. Notice that the program in the Ladder View is no longer there. Since your program is already saved to disk, you will need to read your program from disk to restore it to view. The program can now be written to the PLC.

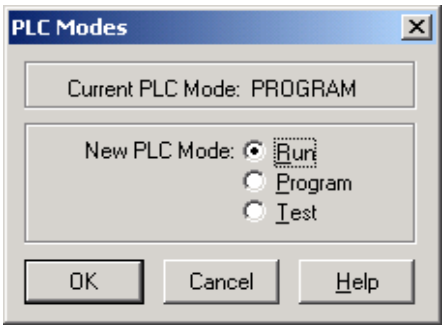
Notice the two left–most buttons on the online toolbar. These buttons are symbols of a PLC. They are highlighted to indicate that the PLC is ready to have a program written to it or to have a program read from it. We will write the program to the PLC. Click the mouse on the **WriteP** button. An indicator similar to the one above will appear. The red bar will flash to indicate the program is in the download process. It will be in view for the amount of time corresponding to the length of the program.



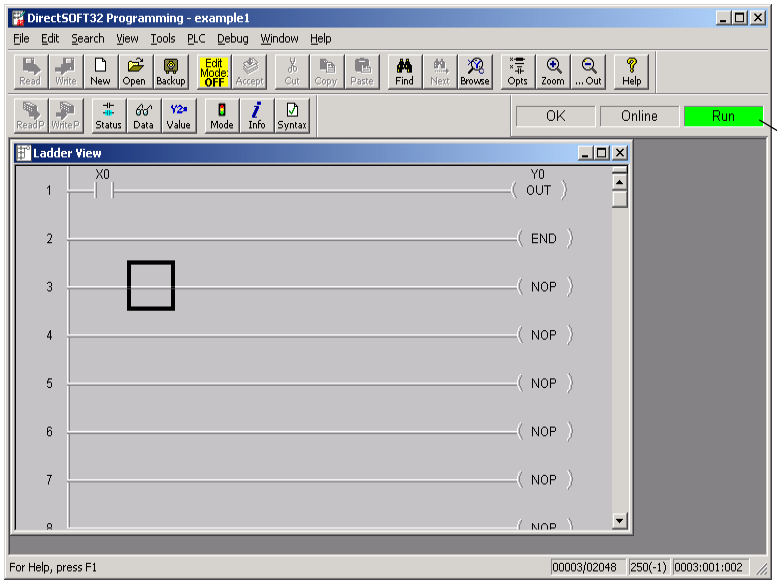
Click on this button to write the program to the PLC.

Click on this button to change the PLC Mode.

The program has now been written to the PLC. All that needs to be done now is to put the PLC in the RUN mode. Click on the **Mode** button on the online toolbar. This will bring the **PLC Modes** dialog window into view. Click on **Run** then **OK** and the PLC will be in the **RUN Mode**.



Now that the example program is in the **RUN Mode**, you will want to monitor the program online while the PLC is running.

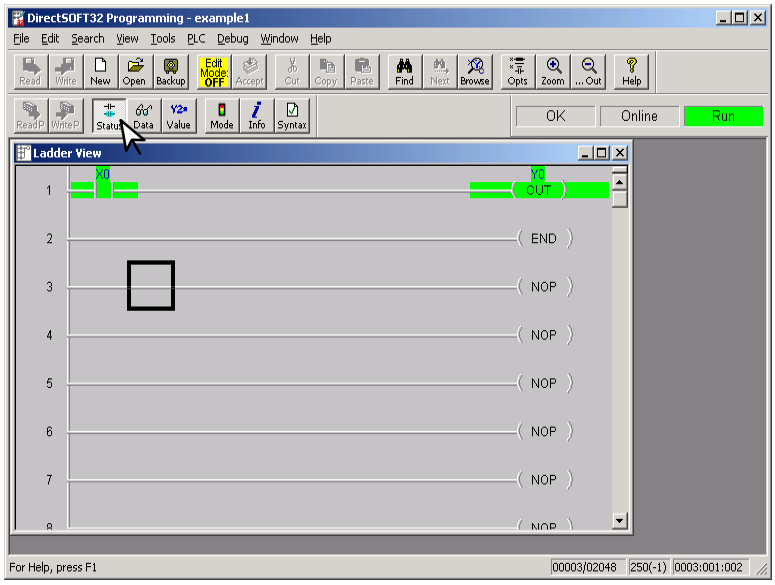


RUN Mode

Monitoring the Program

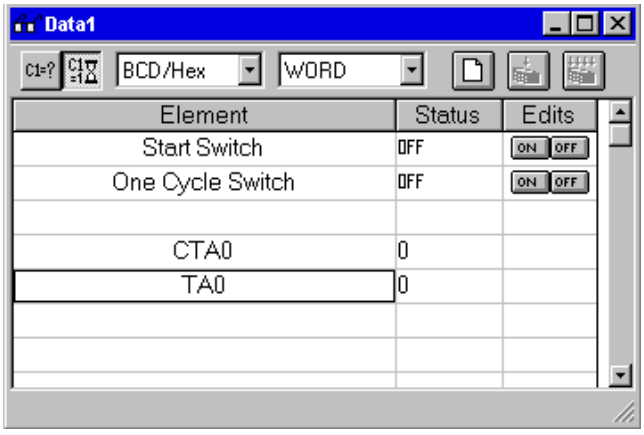
Monitor the Ladder View

There are many things that can be monitored in the relay ladder program by simply clicking the **Status** button on the online toolbar. Clicking on the Status button will either turn ON the monitor mode of the relay ladder view or turn it OFF. You can watch inputs and outputs turn ON/OFF, monitor counters and timers and the status of compare contacts. Notice that each element in the example below is backlit. The backlighted element means that the input or output is ON.



Monitor Using Data View

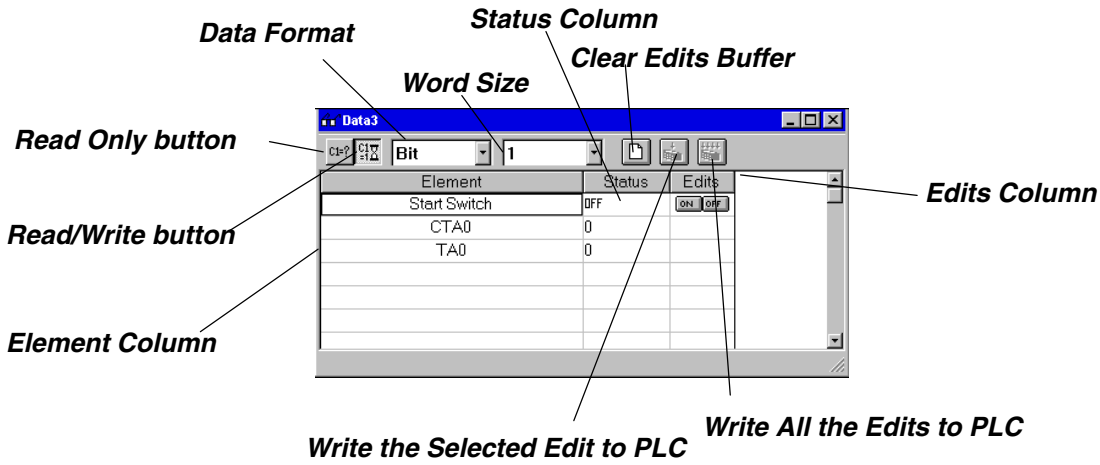
A good tool for monitoring the program is a **Data View** window. Data View will allow you to monitor and manipulate the status and data for the various elements and memory locations used in the program. If you have programmed in other languages before, you may know this type of window as a Watch Window. You can access this window by clicking on **Debug > Data View**, and **New**. The following is an example of a Data View window for a typical program.



When you open a new Data View, ***Direct***SOFT32 automatically provides a title for the window. These Data View windows are by default assigned the names **Data1**, **Data2**, etc. in order. You can change these names in the **Options** dialog of **View** from the main menu bar.

Details of the Data View Window

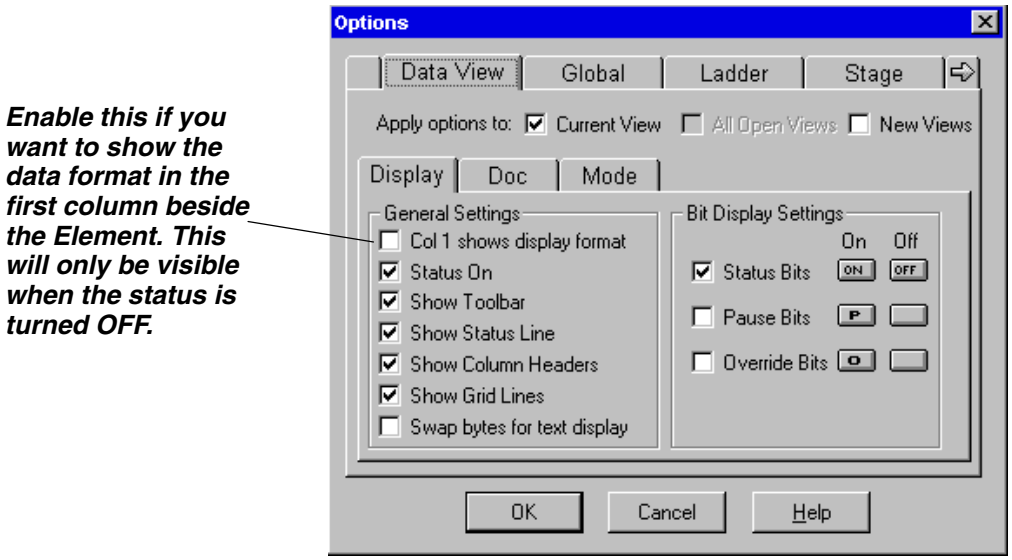
The example shown below illustrates the basic components of the Data View window.



To make the Data View window active, click on **Debug** on the main menu toolbar, then **All Status On**.

Data View Options Window

The Data View window can be tailored to your liking. Select **View** on the main menu toolbar, then **Options**. When the Options Dialog appears, click on the **Data View** tab to see the following view.



The default **General Settings** (left hand side of the window) are typically left as shown. Occasionally, you may want to enable the top setting, **Col 1 shows display format** (binary, hex/decimal, etc.). This feature will only show the display format in the first column when working offline or with the Status OFF. However, not all requirements are the same. You can experiment with these general settings to see which ones you need. More details of the Data View window can be found in chapter 10 of the ***Direct***SOFT32 Programming Software Users Manual.

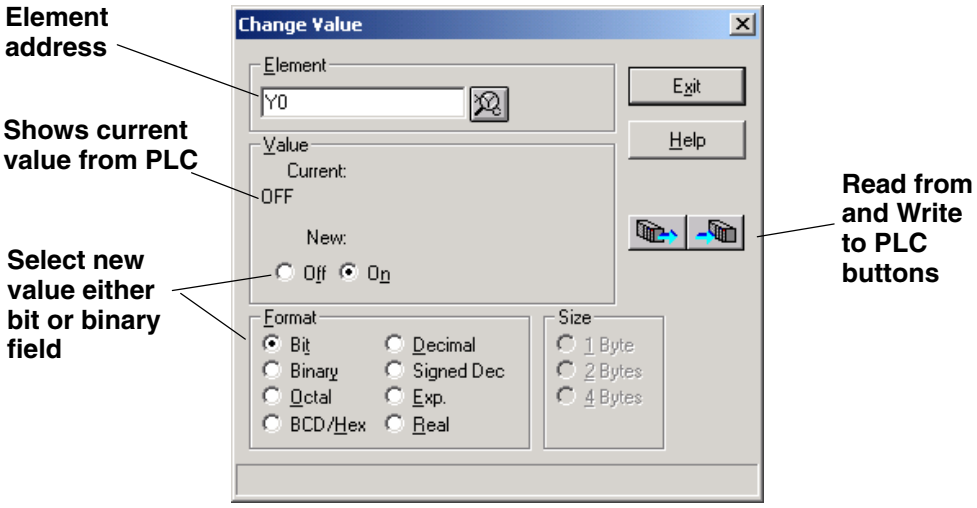
The Change Value Window

I/O points can be turned ON/OFF and data values can be written to memory locations by using the **Change Value** window. It is not necessary to enable Status to change a value, but it is highly recommended to see visible results.

There are several ways to access the Change Value window.

- Click on the element you want to change (in any window) and then use the **Debug > Change Value** menu option, or use the Hot Key **CTRL** + **SHIFT** + **F2**.
- Click on the element you want to change and then use the Change Value button.
- If status is on and you are not using the Edit Mode, double click on the element to display the Change Value window.

There are two command buttons located on the right side of the window, **Read from PLC** and **Write to PLC**. ***Direct***SOFT32 automatically reads the value from the PLC when the window appears. If you want to read the data again, click on the **Read from PLC** button. After you have entered a new value (OFF, ON, or data) click on the **Write to PLC** button to write the change to the PLC.



Enter the New Value

The **Change Value** window shows the current value stored in the PLC and allows the entry of a new value. There are several data formats, therefore the value which is entered depends on the format selected. For example, if viewing the I/O point as a bit, **On** or **Off** is selected. If the I/O point being viewed is binary, a binary bit pattern is entered. Enter a new, then click on the **Write to PLC** button to change in the PLC.

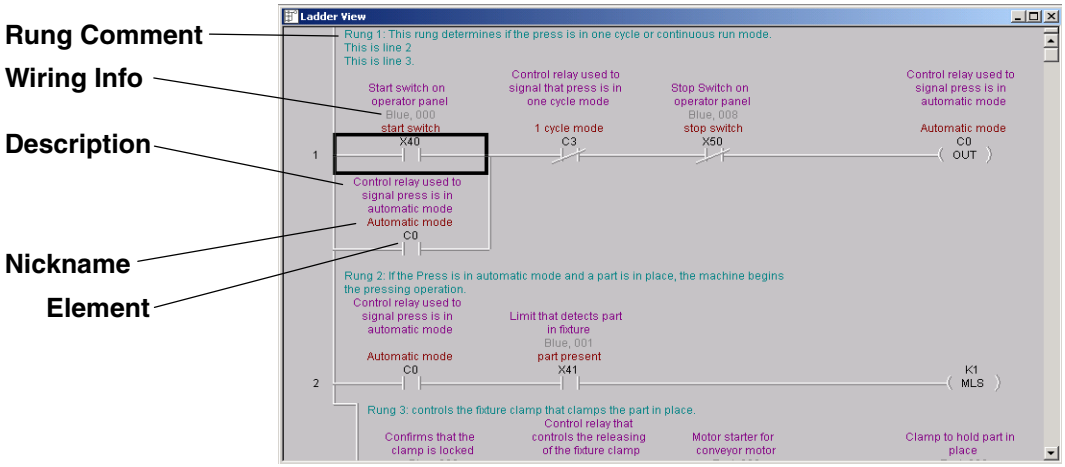
Documentation

Documentation Options

Documentation refers to rung comments, element nicknames, element descriptions, etc., which are intended to make the program a little clearer for anyone to read it. Documentation can be added to a program at any time, but it is good practice to include it as the program is being edited.

Most documentation refers to individual elements and is therefore specific in nature. Listed below are five types of documentation used in ***Direct***SOFT32.

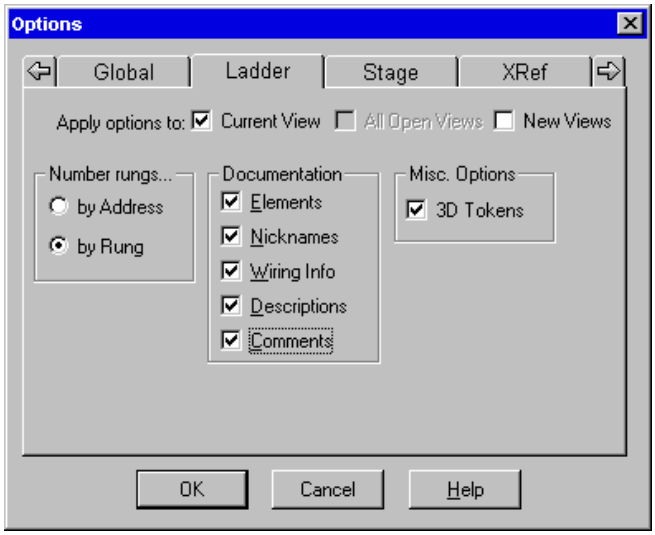
- **Elements** - the addresses for the single elements, i.e., X1, Y10, etc.
- **Nicknames** - alpha-numeric names can be used for the various types of program elements. It is usually easier to remember the name *Start Switch* than it is to remember that X1 is the input point for the switch.
- **Descriptions** - longer descriptions of the element. You can also use this area to include brief troubleshooting steps, etc.
- **Wiring Information** - the wiring information can help you quickly identify the panel wiring for a specific point. For example, you may know that X1 is the *Start Switch*, but you usually have to find another print to know which wire number to start tracing.
- **Rung Comments** - rung comments are assigned to an individual rung.



Options Dialog Window

The documentation types can be selected for the Ladder view in the **Options** dialog window. There is a tab for each view, however, the Ladder View will be the only view explained here. The Options Dialog features are discussed in detail in the ***Direct***SOFT32 Programming Software Users Manual, Chapter 4. A quick way to open the **Options** dialog is to place the mouse cursor in the programming window of your Ladder View, and click the right mouse button. This opens a “pop–up” menu that, among several choices, allows you to select **Options** from the menu. This will bring up the **Options** dialog window. The **Options** dialog window can also be opened by clicking on **View** from the main menu toolbar, then click on **Options**.

Shown below is the Ladder view window. Check the boxes beside the types of documentation to be visible in the Ladder view. Detailed explanations of each type of documentation are on the adjacent page.

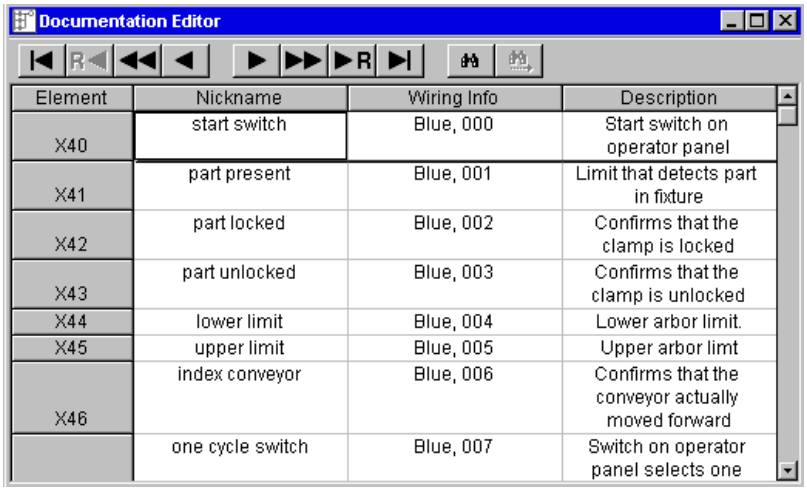


Click on the **OK** button, after making your choices.

NOTE: Once you click on OK for the settings of the **Options** dialog, ***Direct***SOFT32 saves the documentation settings for that view. If you click on the **New Views** box, the same settings will become the new defaults for the current project as well as any new projects opened thereafter. You can change the settings again at any time.

The Documentaion Editor

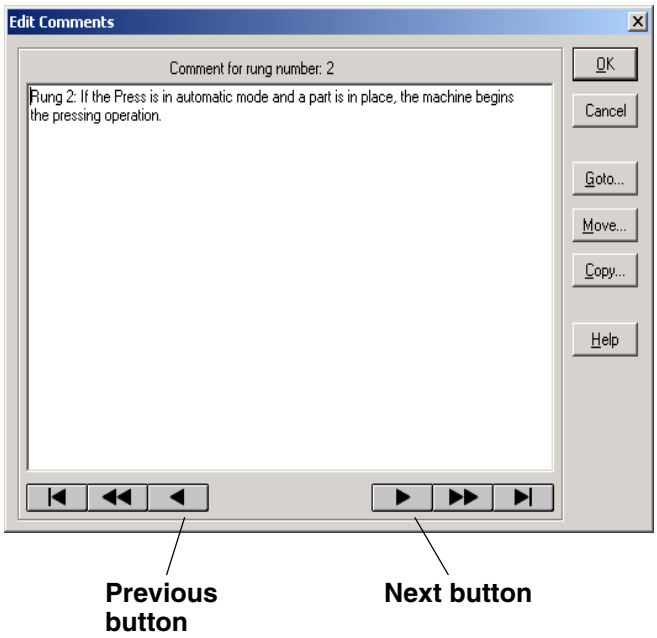
The Documentation Editor allows quick and easy entry of nicknames, wiring information and descriptions for program elements. The editor can be accessed by clicking on **Tools** on the main menu toolbar, then click on **Documentation Editor** from the drop–down menu, or use the Hot Key, **CTRL** + **D**. Practice using the documentation features in the program which was started earlier.



Element	Nickname	Wiring Info	Description
X40	start switch	Blue, 000	Start switch on operator panel
X41	part present	Blue, 001	Limit that detects part in fixture
X42	part locked	Blue, 002	Confirms that the clamp is locked
X43	part unlocked	Blue, 003	Confirms that the clamp is unlocked
X44	lower limit	Blue, 004	Lower arbor limit.
X45	upper limit	Blue, 005	Upper arbor limt
X46	index conveyor	Blue, 006	Confirms that the conveyor actually moved forward
	one cycle switch	Blue, 007	Switch on operator panel selects one

The Comment Editor

Each rung in a ***Direct***SOFT32 program may have associated comments. Unlike some programming packages from other vendors, the comments are not tied to the outputs and are not in sequential order. Instead, the comments in ***Direct***SOFT32 remain with the rung number, i.e., if you enter comments for Rung 2, they stay with Rung 2. To enter rung comments, open the **Comment Editor** by clicking on **Tools** from the main menu toolbar, then select **Comment Editor** from the drop–down menu, or use the Hot Key, **CTRL** + **K**. The Comment Editor can also be opened by double-clicking on the comment.



Comments are Free-Form

Start typing the comments as necessary. Since the ladder view is a full screen editor, you do not have to backspace an entire sentence to enter text or to fix a spelling error. Instead, position the cursor over the location you want to re–edit and click the left mouse button. Start entering the new text.

Selecting Rungs for Comments

You can use the **Previous** or **Next** command buttons to scroll through the rungs. You can also find a specific rung by using the **Goto** command button. ***Direct***SOFT32 will only let you enter comments for rungs that contain program elements. You cannot enter comments for rungs that do not contain instructions.

This manual only introduces a person to some of the documentation features available with ***Direct***SOFT32. The documentation features are discussed in detail in the ***Direct***SOFT32 Programming Software Users Manual, Chapter 6.

Troubleshooting Guide

It is useful to have an understanding of what ***Direct***SOFT32 does with the communication resources on your PC to be able to communicate with a PLC. The following information is provided to help resolve PC to PLC communication problems.

DS400.ini File

DirectSOFT32 can connect to the PLCs serially using a COM port, a modem or a USB–to–serial adapter. It can also connect via Ethernet using an ECOM module. You can control which communications resources on your PC you want to let ***Direct***SOFT32 use. This is done through entries in DS400.ini. This file will be in your ”Windows Folder”. By default, it will be in different places for different operating systems. For Windows 98/ME/XP, the file will be the ”C:\Windows” and for Windows 2000 / Windows NT, it will be the C:\WinNT” folder. The DS400.ini file can be opened by clicking on the DS400.ini icon ***Direct***SOFT32 launch window Utilities folder. You can edit this file with any text editor program such as Notepad. You must restart ***Direct***SOFT32 if any changes are made to the DS400.ini file.

The sections of the DS400.ini file we’re concerned with are [devasync.dll] and [devether.dll]. These groups are where you can enable and disable communication resources for ***Direct***SOFT32 to use. These settings do not affect other applications on your PC that use these resources; they only affect ***Direct***SOFT32. Here’s what these sections look like after a normal installation:

```
[devasync.dll]
COM1Enable=1
COM2Enable=1
COM3Enable=1
COM4Enable=1
ModemEnable=1
COM5Enable=0
COM6Enable=0
COM7Enable=0
COM8Enable=0

[devether.dll]
EthernetEnable=1
```

Setting a particular entry to a value of 0 excludes that resource from ***Direct***SOFT32’s use. A value of 1 enables it for ***Direct***SOFT32’s use. You should set the values for these entries so they match the resources that are physically present on the PC and are available for ***Direct***SOFT32 to use.

Example PC Configuration: Using an Ethernet card

Let's consider a common PC configuration with:

- one serial port (COM1)
- a built–in modem using COM2 that ***Direct***SOFT32 will not use
- an Ethernet card that ***Direct***SOFT32 will use to communicate via an ECOM module

Your DS400.ini can be configured to look like this:

```
[devasync.dll]
COM1Enable=1
COM2Enable=0
COM3Enable=0
COM4Enable=0
ModemEnable=0
COM5Enable=0
COM6Enable=0
COM7Enable=0
COM8Enable=0

[devether.dll]
EthernetEnable=1
```

Example PC Configuration: Using a Modem

Let's consider a laptop PC with:

- no serial ports
- USB–to–serial adapter configured as COM5 that ***Direct***SOFT32 will not use
- a built–in modem using COM2 that ***Direct***SOFT32 will use
- an Ethernet card that ***Direct***SOFT32 will not use

Your DS400.ini can be configured to look like this:

```
[devasync.dll]
COM1Enable=0
COM2Enable=0
COM3Enable=0
COM4Enable=0
ModemEnable=1
COM5Enable=0
COM6Enable=0
COM7Enable=0
COM8Enable=0

[devether.dll]
EthernetEnable=0
```

NOTE: If you make changes to DS400.ini, you must restart *Direct*SOFT32 to make the changes active.

Startup Issues

The first time ***Direct***SOFT32 starts up its communication server, it attempts to build links to PLCs that it can find based on the resources that are enabled by DS400.ini. The communications server will try fixed combinations of baud rate, parity and station number for both K–Sequence and ***Direct***NET protocols. If a PLC responds, a Link will be created.

It's this attempt to create a Link that can cause problems. Most of the time, if ***Direct***SOFT32 attempts to use a resource that physically isn't present on the PC nothing happens. But this action can have adverse effects on some PCs, especially in situations like leaving EthernetEnable=1 on PCs that don't have an Ethernet card installed and configured or if the IPX protocol is not installed.

If you make changes to DS400.ini, you must restart *Direct*SOFT32 to make the changes active.

USB–to–Serial Converters

The use of USB–to–Serial adapters has become an issue since more and more PC vendors remove serial ports from their PCs in favor of additional USB ports. In theory, there should be no problems with this as long as the USB–to–Serial drivers function like a standard PC serial port. We have made some changes to the communications server to better handle these adapters.

It is highly recommended to install the device drivers for the USB–to–Serial adapters before you physically attach the adapter to your PC. This is common practice for all USB devices and it does matter for some vendor's products.

Microsoft ActiveSync

ActiveSync is the software used to synchronize data between the PC and a PDA running Windows CE or Pocket PC. This software has a undesirable habit of attaching itself to the serial ports on the PC it's installed on so that it can auto–detect the presence of the PDAs.

The symptom of this problem you see in ***Direct***SOFT32 is the error dialog:
"Error connecting to PLC! "
"Error: cannot access comm port. The port may not be present or another app may be using it"

You can restrict the COM ports that ActiveSync has control of under it's File–>Connection Settings menu.

Adding AutoSense=0

Once you have created Link(s) to your PLCs, these links will be validated each time you start ***Direct***SOFT32. The communication server will use the Link's parity, baud rate, protocol and station number settings to see if the PLC is still available. This process can take quite a bit of time if you have several Links or if you have Links to PLC that are not hooked up because the attempts to communicate must time out. You can add an entry to the [comm server] group in DS400.ini that will keep ***Direct***SOFT32 from validating any links on startup.

Add Autosense=0 and restart ***Direct***SOFT32:

[Comm Server]
Autosense=0

Adding Dump=1

Add Dump=1 to the [devasync.dll] group in DS400.ini to enable some low level communications debugging for serial and modem connections. Use DBWin32, a debugging aid for Window NT/95, to view the debugging information. To start DBWin32, click on Start–>Programs–>***Direct***SOFT32–>***Direct***SOFT32 Program Tools–>DBWin32 Logger. The DBWin32 dialog window will be displayed. When you launch ***Direct***SOFT32, you will be asked if you want to enable the debugging mode. If you answer yes, the debugging output will be sent to the DBWin32 dialog window.

Add Dump=1 and restart ***Direct***SOFT32:

```
[devasync.dll]
COM1Enable=1
COM2Enable=0
COM3Enable=0
COM4Enable=0
ModemEnable=0
COM5Enable=0
COM6Enable=0
COM7Enable=0
COM8Enable=0
Dump=1
```