

Installing the DeviceNet Slave Module

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Installing the D0-DEVNETS Slave Module

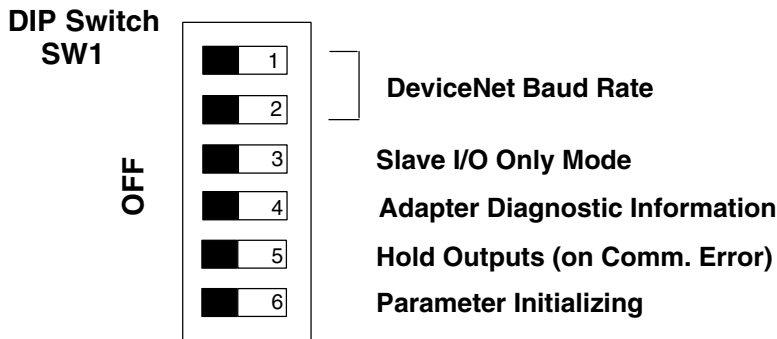
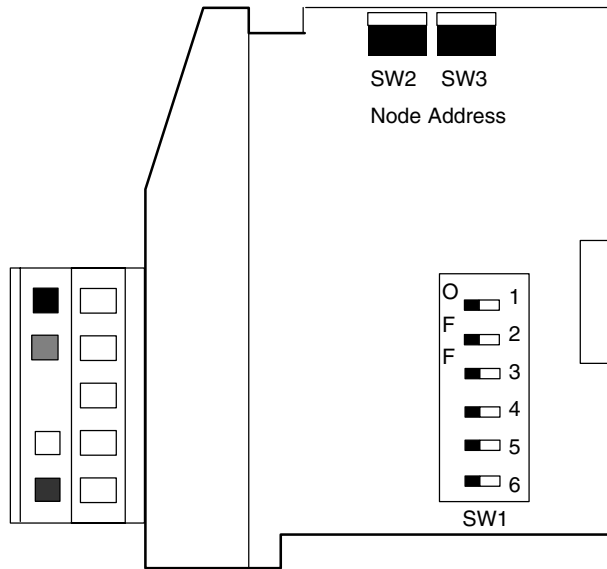
Setting the DIP Switch (SW1)



The DIP switch, SW1 must be set before installing the DeviceNet slave module in the DL05 option slot or in one of the DL06 option slots. The following diagram shows the location of the DIP switch.

Note: Be sure to look closely at the default settings below. If you are connecting to an existing DeviceNet network, you may need to change the DeviceNet Baud Rate on your D0-DEVNETS. *The factory default baud rate is 125kbps.*

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Set SW1-1 and SW1-2 for the DeviceNet baud rate.

DeviceNet Baud Rate		
Baud Rate	SW1-1	SW1-2
125 kbps	OFF	OFF
250 kbps	ON	OFF
500 kbps	OFF	ON
Reserved	ON	ON

Set the DL05/06 to Slave Mode.

When SW1-3 is ON, the DL05/DL06 can be placed in the RUN mode with the external RUN/TERM/STOP switch (with or without a program in it).

Slave I/O Only Mode	
Mode	SW1-3
Slave I/O only	ON
Normal	OFF

Eliminate adapter diagnostic information bits from I/O polling.

When SW1-4 is OFF D0-DEVNETS adds adapter information to the head of I/O polling.

Adapter diagnostic information	
Mode	SW1-4
Disable	ON
Enable	OFF



Note: Leaving position 4 OFF will add 2 bytes of inputs and 2 bytes of outputs for diagnostic information at the beginning of your I/O polling. Refer to the Adapter Input/Output Status Word tables on page C-8.

Position SW1-5 ON will hold the outputs on if there is a communication error.

Hold Outputs (on Comm. Error)	
Outputs	SW1-5
Turn Off	OFF
Hold	ON

Position SW1-6 ON will initialize the D0-DEVNETS system parameters.

Parameter Initializing		
Mode	SW1-6	Description
Initialize 1	ON	Default is set when power is ON *1
Initialize 2	OFF	

*1 Initialization parameter value changes with status of DIP switch positions 3 and 6. Refer to the Initialization Parameter Values table on page D-2.

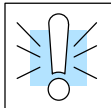
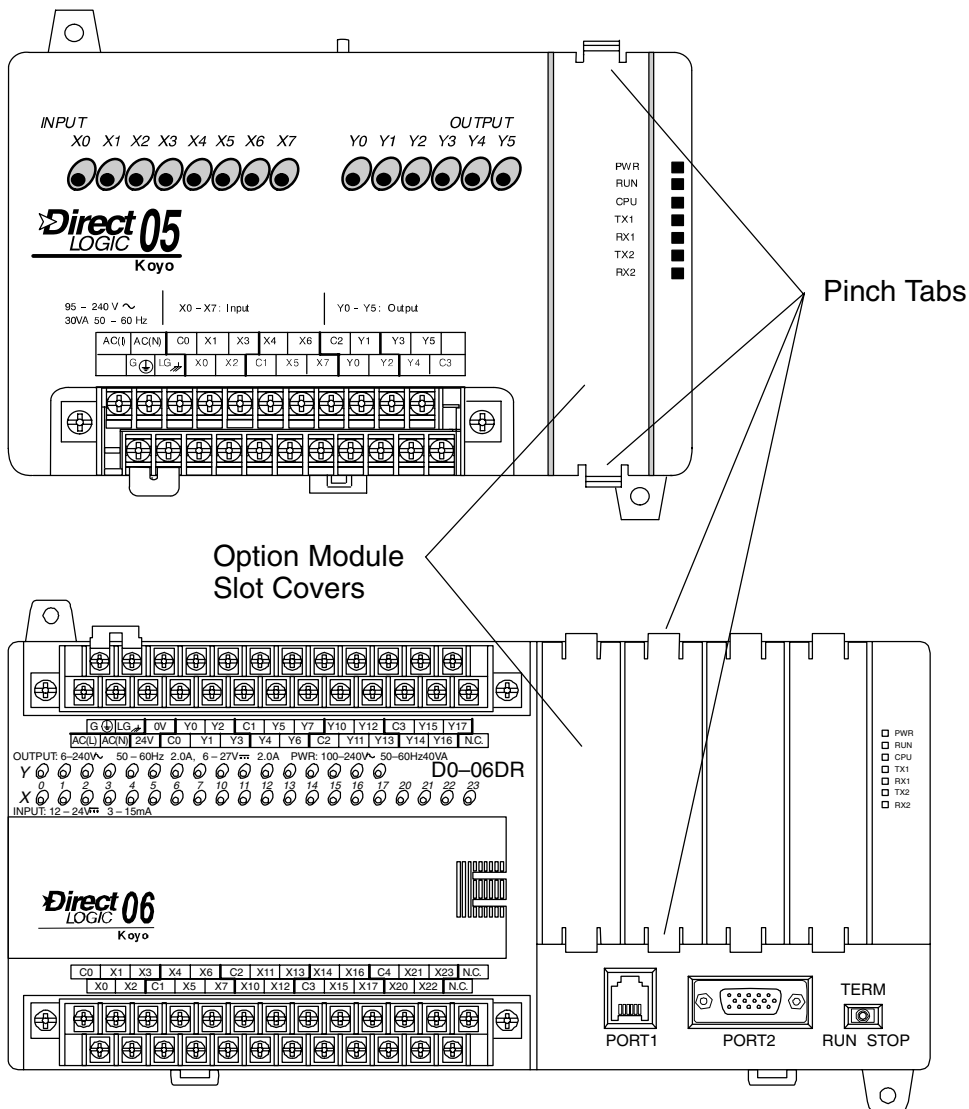


Note: All DIP switch positions shown are the factory default settings (all OFF).

Remove the Slot Cover

When the D0-DEVNETS module is ready to be installed the protective option slot cover must be removed. The protective cover is removed from the option card slot by squeezing the pinch tabs and lifting the cover off.

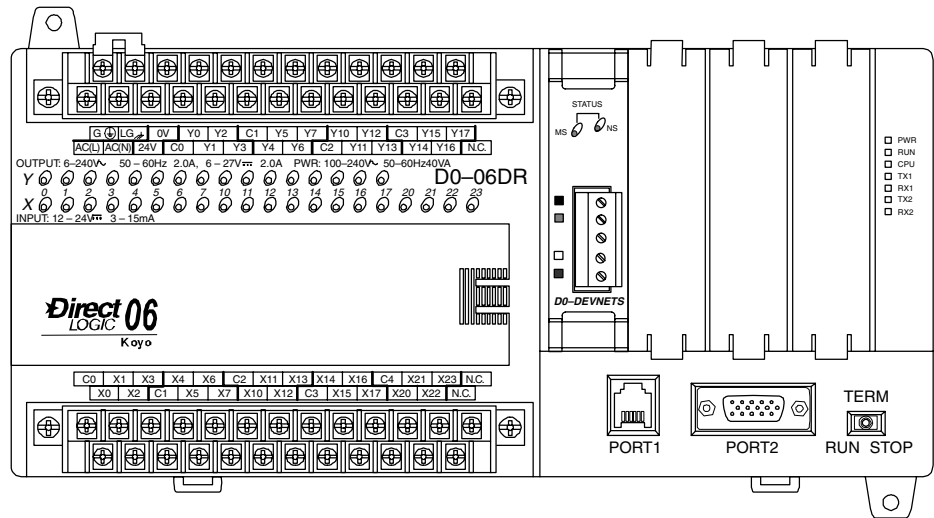
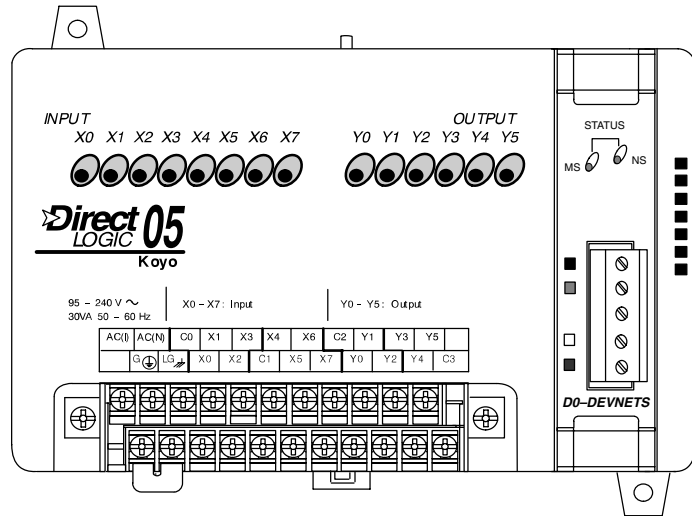
Installing the DeviceNet Slave Module



WARNING: Power to the PLC **must** be disconnected before inserting or removing the D0-DEVNETS slave module. Failure to disconnect power could result in serious damage to the module, the PLC or both.

Insert the Module

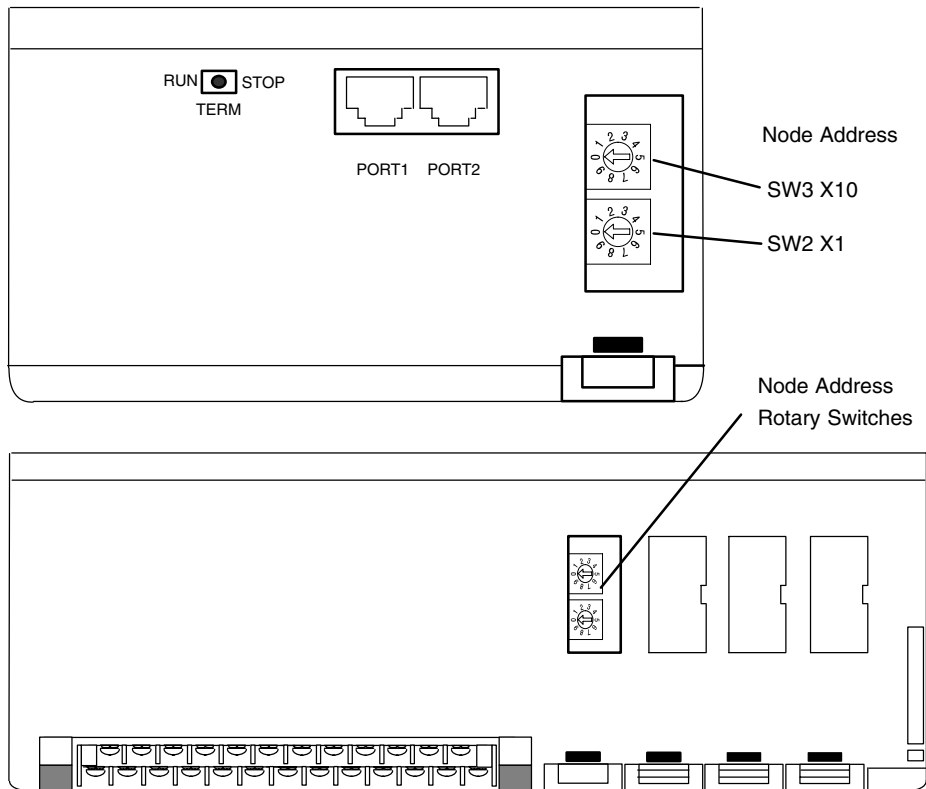
Insert the D0-DEVNETS slave module into the open card slot. Locate the module so the printed information is oriented in the same direction as the markings on the PLC. Be careful to align the female connector on the printed circuit board of the module with the male connector on the PLC mother board. Press the module into the slot until the front of the module is flush with the front of the PLC.



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Set the Node Address

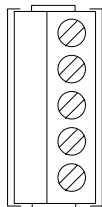
Once the D0-DEVNETS is installed in the option slot, set the Node Address. The Node Address rotary switches are accessed by removing the cover located to the right of Port1 and Port2 on the DL05.



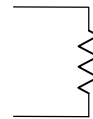
Remove the cover associated with the option slot where the D0-DEVNETS is installed in for the DL06 Once the access cover is removed, use a small, flat, screwdriver to set the Node Address to an *available* address (or MAC ID), from 0 – 63. Note that SW3 sets the tens and SW2 sets the units.

Wiring the Adapter to a DeviceNet Network

Connect the DeviceNet cable (Belden 3085A, YR-29832 or equivalent) to the removable connector as shown below. The wire colors are also labeled on the front of the adapter. Be sure to connect a terminating resistor (121 Ohm 1%, 1/4W). An external 11-25 VDC power supply is also required.



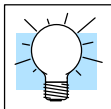
- V+ (red)
- CAN* High (white)
- Shield (bare)
- CAN* Low (blue)
- V- (black)



Connect a terminating resistor across the CAN High (white) and CAN Low (blue) screw terminals.

The terminating resistor is 121 Ohm 1%, 1/4 Watt. (2 resistors are included with each D0-DEVNETS).

* Controller Area Network (CAN)



Tip: Be sure that each end of the DeviceNet network 'trunk' has a proper terminating resistor connected as shown above.

Configure the Adapter

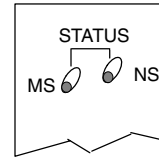
Configuring the DeviceNet Adapter

Use the software of your DeviceNet master to configure the controller for your network. *Refer to the software Help file and/or manual for help with configuration.* Follow these basic steps when configuring your D0-DEVNETS adapter.

- 1. Set the Adapter Node Address:**
In the DeviceNet master software, make sure the adapter node address is set to an available node number on the DeviceNet network (from 0 to 63).
- 2. Add the EDS file (if required by the software):**
In your DeviceNet software, add the D0-DEVNETS Electronic Data Sheet (EDS) file from the disk which came with this manual or from our web site www.automationdirect.com. Some software may not provide for the use of EDS files.
- 3. Commission the Node:**
Use the DeviceNet software to “Commission the Node” of the adapter. Again, some software may not require this.
- 4. Add the D0-DEVNETS to the Scan List:**
Add the D0-DEVNETS to the Scan List in your DeviceNet Master software.
- 5. Set the Input/Output Bytes:**
If required by your DeviceNet software, set the I/O Parameters to Tx = Output bytes and Rx = Input bytes, for Polled I/O. *Follow the steps in Appendix G to determine the actual number of Output and Input bytes your system has.*
- 6. Map the I/O to the Master:**
Map the D0-DEVNETS I/O to the Scanner using Auto Map, or map the I/O to another location if desired.
- 7. Scan:**
Go Online (or Scan) to verify the configuration and check for errors.
- 8. View Indicators on the adapter:**
Refer to the Status Indicators when connecting to the network.

Status Indicators

The adapter has two Status Indicators, one for **Module Status** and the other for **Network Status**.



MS (Module Status) Indicator	
Indication	Status
OFF	No power to module.
Solid Green	Power is ON, normal condition
Solid Red	Critical module Failure
NS (Network Status) Indicator	
Indication	Status
OFF	No power to module or no Network Access
Flashing Green	Online but not connected (no connection established)
Solid Green	Online, link okay and connected
Flashing Red	Recoverable fault
Solid Red	Critical module Failure (Duplicate ID or Bus off)

D0-DEVNETS Parameter Setup

D0-DEVNETS Default Parameters The DL05/06 PLCs reserve several V-memory locations for storing the DEVNETS parameters. These special registers store the I/O ranges. The parameters are stored in the DL05/06 systems FLASH memory, and are not lost when the PLC is powered off.

System V-memory	Description of Contents	Factory Default Value	Range
V7610	Input starting address	V40400	V40400 – 40417 (X0-377) V40500 – 40517 (Y0-377) V40600 – 40637 (C0-777) V41000 – 41017 (S0-377) V41100 – 41107 (T0-177) V41140 – 41147 (CT0-177) V41200 – 41237 (SP0-777)
V7611	Input number of bytes	2 Bytes	0 – 8 Bytes
V7612	Output starting address	V40500	V40400 – 40417 (X0-377) V40500 – 40517 (Y0-377) V40600 – 40637 (C0-777) V41000 – 41017 (S0-377) V41100 – 41107 (T0-177) V41140 – 41147 (CT0-177) V41200 – 41237 (SP0-777)
V7613	Output number of bytes	2 Bytes	0 – 8 Bytes
V7614	Input starting V-memory location	V3000	V0 – 7777
V7615	Input V-memory number of bytes	58 Bytes	0 – 128 Bytes
V7616	Output starting V-memory location	V3100	V0 – 7377
V7617	Output V-memory number of bytes	52 Bytes	0 – 128 Bytes

I/O Configuration

The consumed and produced I/O is user defined in the DL05/06 memory. The DeviceNET available memory in the PLC is basically divided into 2 sets of data pointers. The first set was intended to read and write discrete I/O memory (but other data ranges can be accessed) and is setup through V7610 – V7613. Since this data range was intended to contain discrete I/O, it is limited to 8 bytes of Input and 8 bytes of Output.

The other data set is configured through V7614 – V7617 and was intended to contain User V-memory locations. This data set has a much higher range of accessible values (128 bytes In and 128 bytes Out).

If the module to set to slave mode (dipswitch 3), it will be configured for 2 inputs/outputs in the I/O data pointers. If the PLC is not set to Slave mode, then these V-memory locations will need to be configured. The DL05/06 PLCs reserve several V-memory locations for storing the DEVNETS parameters. These special registers store the I/O ranges. The parameters are stored in the DL05/06 systems FLASH memory, and are not lost when the PLC is powered off.

Below is the V-Memory layout for the I/O configuration.

You can use both sets of data pointers, but if you have configured the I/O set of data pointers (V7610 – V7613), this is the only data available via Implicit messaging. If the I/O set of data pointers are used, then the V-memory set of data pointers (V7614- V7617) is only available via Explicit messaging.

To make the V-memory set of data pointers available via Implicit messaging the I/O set of data pointers need to be zeroed out. Then 128 bytes of Input and 128 bytes of Output data can be accessed through Implicit messaging. If the actual discrete I/O data is needed, this can be mapped over to the V-memory Input and Output blocks using LD and OUT instructions. This can be an easier way to configure this module

System V-Memory	Description of Contents	Factory Default Value	Range
I/O Data Pointer setup registers	V7610	Input starting address	V40400 V40500 - 40517 (Y0-377) V40600 - 40637 (C0-377) V41000 - 41017 (S0-377) V41100 - 41107 (T0-377) V41140 - 41147 (CT0-377) V41200 - 41237 (SP0-377)
	V7611	Input number of bytes	2 Bytes 0 - 8 Bytes
	V7612	Output starting address	V40500 V40600 - 40637 (C0-377) V41000 - 41017 (S0-377) V41100 - 41107 (T0-377) V41140 - 41147 (CT0-377) V41200 - 41237 (SP0-377)
	V7613	Output number of bytes	2 Bytes 0 - 8 Bytes
V-memory Data Pointer setup registers	V7614	Input starting V-memory location	V3000 V0 - 7777
	V7615	Input V-memory number of bytes	58 Bytes 0 - 128 Bytes
	V7616	Output starting V-memory location	V3100
	V7617	Output V-memory number of bytes	52 Bytes 0 - 128 Bytes

I/O Count

As mentioned earlier the I/O count is set up in the PLC with ladder. To calculate the actual I/O count to assign in the master there are a few things to consider.

1. What is the position of SW1-4?
2. Are you using I/O data or V-memory Data?
3. Are there any I/O cards in the DL06 expansion slots?
4. What is configured in the PLC memory?

If you are using I/O data then the D0-DEVNETS will automatically add any digital I/O in the expansion slots to the I/O data configured in the PLC.

I/O Example:

V7611 = 6

V7613 = 6

Expansion Slot 1 = D0-16ND3 = 2 bytes

Expansion Slot 2 = D0-08ND3 = 1 bytes

SW1-4 = ON

The total I/O Count = 9 bytes input and 6 Output bytes.

When SW1-4 is off it adds 2 bytes to the total Input/Output count. In this example the D0-DEVNETS will error even if you entered these values correctly in the master because you are over the maximum Input/Output count for I/O data. The D0-DEVNETS NS LED will remain solid green for 10 sec and then flash red for 10 sec.

The solution to this problem is to use V-memory data in the PLC, disable the I/O data and map over the X input/Y output V-memory words to the DEVNETS V-memory data blocks.

The D0-Devnet will allow you to go over 8 bytes in V-memory data mode.

V-memory data setup Example:

V7610 –V7613 = 0

V7615 = 58

V7617 = 52

SW1-4 = off

The total I/O Count = 60 bytes input and 54 Output bytes.

In Slave Only Mode there are some nuances when using it with a DL06. The DL06 has 20 inputs so the default setting for Slave Only Mode is 2 input bytes which will only cover 16 of those inputs. If all 20 inputs are required, the PLC will need to be configured manually.

If the I/O Data pointer method is still desired, here are the byte counts for all cards.

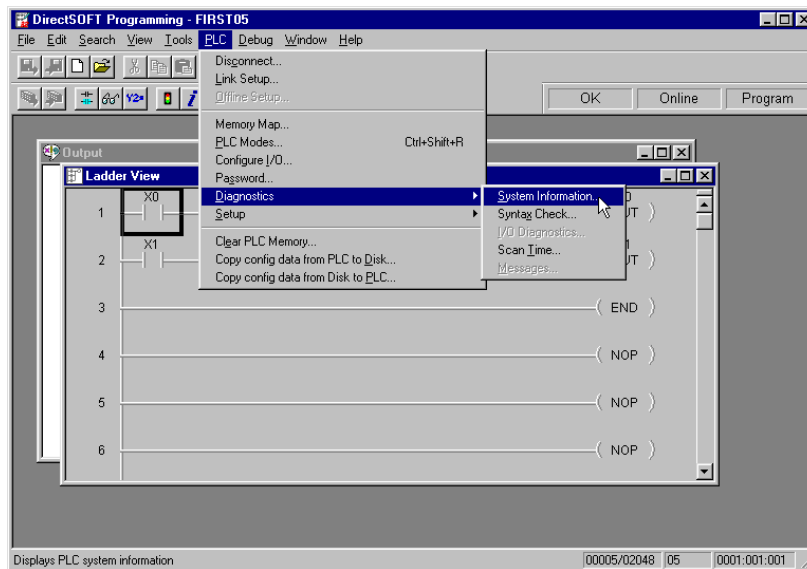
- Any 8 Point Input card = 1 Input byte
- Any 10 Point Input Card = 2 Input Bytes
- Any 16 Point Input Card = 2 Input Bytes
- Any 4 Point Output card = 1 Output byte
- Any 8 Point Output card = 1 Output byte
- Any 10 Point Output Card = 2 Output Bytes
- Any 16 Point Output Card = 2 Output Bytes
- Any Combo card will follow any combination of the above.

Software and Firmware Requirements

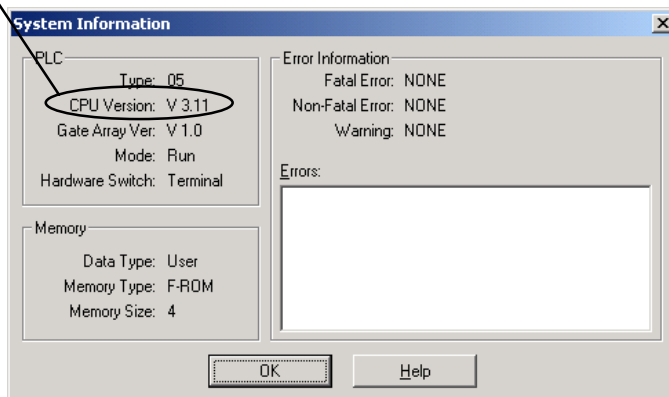
How to Update Your *DirectSOFT32* Programming Software

When a D0-DEVNETS module is installed, the DL05/06 PLCs do not need to have a relay ladder logic (RLL) program in them to operate as slave I/O. However, if you are using the D0-DEVNETS in either a DL05 or a DL06 for local control on a network, they must have a RLL control program in them. You will need *DirectSOFT32* Version 3.0b (or later) for the DL05 and/or Version 4.0 for DL06 in order to use all features of the D0-DEVNETS. If you have a licensed copy of Version 3.0 or 3.0a, the Version 3.0b Maintenance Release (or a later maintenance release) is available for free on our website at www.automationdirect.com.

The DL05 must have Version 3.0 (or later) firmware and the DL06 must have Version 1.0 (or later) firmware to operate correctly with all features of the D0-DEVNETS. If your DL05/06 was received with your D0-DEVNETS, the correct firmware is already installed in the PLC. If you already have a DL05 and need to determine what firmware version is installed in the PLC, connect to the DL05 with *DirectSOFT32* programming software, and click on PLC/Diagnostics/System Information. This will bring up the System Information screen.



The “CPU Version:” will tell you what firmware version is installed in your PLC.



How to Update Your DL05 Firmware

If your PLC requires new firmware, you may download the latest firmware and upgrade tool from our website. Point your browser to www.automationdirect.com, click on technical support, then select Firmware Upgrades. There, you will find the latest firmware for your CPU, which you can download at no charge.

Follow the upgrade instructions contained in the downloaded files. Cycle power after upgrading the firmware in your PLC, and **DirectSOFT32** will recognize the new features available for the PLC.

Changing the D0-DEVNETS Setup Parameters

There may be a time when the initial setup parameters will need to be changed. The following example shows how to edit a DL05/06 PLC program to make the parameter changes using *DirectSOFT32* programming software. Once the following rung is edited, be sure to either power cycle the PLC or put the PLC into Program mode, then to Run mode. This will insure that the settings will become effective.

Parameter Example

Function	Register Number	Data Size
Input Point	V40400	2 Bytes
Output Point	V40500	2 Bytes
Input Register	V3000	128 Bytes
Output Register	V3100	128 Bytes

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