

D0–DEVNETS DeviceNet Slave Module User Manual

Manual Number D0–DEVNETS–M

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Manual Revisions

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

Title: D0–DEVNETS DeviceNet Slave Module User Manual

Manual Number: D0–DEVNETS–M

Edition	Date	Description of Changes	
Original	11/01	Original issue	
Rev. A	11/02	Added DL06 references	

Added pages 2-10, 2-11, & 2-12 for I/O Configuration and I/O Count to explain configuration and setup.

Table of Contents

Chapter 1: Getting Started

Introduction The Purpose of this Manual Supplemental Manuals Who Should Read this Manual Technical Support Conventions Used Key Topics for Each Chapter	1–2 1–2 1–2 1–2 1–2 1–3
Introduction to DeviceNet DeviceNet Concepts The ODVA General Information about the D0–DEVNETS Specifications	1–4 1–4 1–4 1–5
Mini Glossary	1–5

Chapter 2: Installing the DeviceNet Slave Module

Installing the D0–DEVNETS Slave Module	2–2
Setting the DIP Switch (SW1)	2–2
Remove the Slot Cover	2–4
Insert the Module	2–5
Set the Node Address	2–6
Wiring the Adapter to a DeviceNet Network	2–6
Configure the Adapter	2–7
Configuring the DeviceNet Adapter	2–7
Status Indicators	2–8
D0–DEVNETS Parameter Setup	2–9
D0-DEVNETS Default Parameters	2–9
Software and Firmware Requirements	2–13
How to Update Your DirectSOFT32 Programming Software	2–13
How to Update Your DL05 Firmware	2–14
Changing the D0–DEVNETS Setup Parameters	2–12

Appendix A: Specifications

Appendix B:Tables

Data Input and Output Tables	B–2
Device Profile Tables	B–5

Appendix C: Image Table Mapping

Image Table Mapping	C–2
PLC Mode Image Table Mapping	C–8

Appendix D: Special Relays and DIP Switch Parameter Initializing

Network Status Speicial Relays	D–2
Initializing Parameter Values	D-2

Appendix E: D0–DEVNETS Think & Do/Entivity Setup

D0-DEVNETS Think & Do/Entivity Setup	E–2
T&D/Entivity setup for PC control	E–2
Setup Think & Do with DL05 on a network	E–4
T & D Studio setup	E–5

Appendix F: OIT with D0–DEVNETS

Using an OIT with D0–DEVNETS	F–2
T&D Studio	F–2

Appendix G: D0–DEVNETS and Allen–Bradley Set up

Setup D0–DEVNETS with Allen–Bradley RSNetWorxt	G–2
RSLinx	G–2
RSLogix	G–6
Configure D0–DEVNETS with RSNetWorx	G–8
Using the EDS file	G–8
Go on line	G–11
Set up I/O parameters	G–12
Map the nodes	G–15
Set Class Instance Attribute	G–18

Getting Started

In This Chapter. . . .

- Introduction
- Introduction to DeviceNet
- General Information About D0-DEVNETS

Introduction

The Purpose of this Manual

This manual describes the installation and operation of the D0–DEVNETS Slave Module (D0–DEVNETS).



Supplemental
ManualsThe following manuals are essential for the proper use of your DL05 DeviceNet
Slave Module.

• DL-05 Micro PLC User Manual part number **D0-USER-M**

This manual contains very important information, including a complete I/O Module Memory Map. The Memory Map is crucial in designing and implementing the I/O system.

- The PLC/PC software manual
- The DeviceNet software (if separate) manual
- The DeviceNet Scanner (or Master) manual
- **Who Should Read this Manual** If you have a working knowledge of the DeviceNet network, the DeviceNet software and PLC or PC which you are using, this manual will help you configure and install your D0–DEVNETS Slave Module.

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Conventions Used





The "light bulb" icon in the left-hand margin indicates a **tip** or **shortcut**.

The "note pad" icon in the left-hand margin indicates a **special note**.

The "exclamation mark" icon in the left-hand margin indicates a **warning** or **caution**. These are very important because the information may help you prevent serious personal injury or equipment damage.

Key Topics for Each Chapter

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

Introduction	1
In This Chapter — Overview — Creanization of Topics — Manual Convertions — System Hardware Requirements	

Introduction to DeviceNet

DeviceNet is a low-cost control bus used to connect field devices to PLCs and PCs. DeviceNet is designed to reduce the need for hard-wiring while providing device-level diagnostics. There are a host of manufacturers of DeviceNet products, offering an array of products including sensors, motor drives and starters, PLCs, pushbuttons, remote I/O systems, etc.

DeviceNet Concepts Here are some DeviceNet concepts you may find helpful.

- DeviceNet supports various communication structures including Peer to Peer, Multi-master and Master/Slave. *The D0–DEVNETS uses the predefined Master/Slave connection.*
- DeviceNet has two types of messaging: Explicit Messaging and I/O Messaging.
 - Explicit Messaging is low priority, not time-critical and usually for configuration/diagnostic purposes.
 - I/O Messaging is time-critical and high priority for I/O data transfer. I/O Messaging comes in four types:
 - Strobed
 - Polled (The D0–DEVNETS only supports Polled.)
 - Change of State (or COS)
 - Cyclic
- A single DeviceNet network is limited to 64 nodes. A node can be a single-bit device, such as a limit switch, or a remote I/O slave with several I/O modules, such as the D0–DEVNETS. The Master (Scanner) is usually assigned to node address 0, and many Slave devices have a factory default node address of 63.
- DeviceNet has the following data rates (with maximum bus lengths):
 - 125 kbps (bus length = 500m max.)
 - 250 kbps (bus length = 250m max.)
 - 500 kbps (bus length = 100m max.)
- The 24V DeviceNet power supply must be grounded at only one point. The V- terminal must be connected to Protective Earth Ground at the power supply only.

 The ODVA
 The DeviceNet standard is maintained by the ODVA (Open DeviceNet Vendor Association, Inc.). Contact the ODVA for detailed information about DeviceNet.

 Open DeviceNet Vendor Association, Inc.
 Open DeviceNet Vendor Association, Inc.

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General Information about the D0–DEVNETS

The D0-DEVNETS slave module offers the following features:

- The D0–DEVNETS installs into any of the DL05 PLC's option slot. The PLC must have firmware version 3.0 or higher installed.
- The D0–DEVNETS can be installed in any of the four option slots of the DL06 PLC. The PLC must have firmware version 1.0 or higher installed.
- Only one D0–DEVNETS can be installed in the DL06 PLC.
- The D0–DEVNETS is an interface for DeviceNet (slave mode only).
- The D0–DEVNETS collects and reports all discrete I/O data to a DeviceNet master as polled data.
- The D0–DEVNETS does not poll analog I/O data, the analog I/O is looked at in registers. Refer to the D0–DEVNETS–M pointer method setup for the analog module being used.
- The D0–DEVNETS can either be configured in the DL05/06 for slave I/O mode without the need for a ladder program or programmed with ladder control logic as part of a network.
- LEDs for the Module Status and Network Status.
- Node address switches are easily accessed.

Specifications Environmental specifications for the D0–DEVNETS are the same as for the DL05/06 PLCs. UL and CE approvals are pending. See Appendix A for detailed specifications.

Mini Glossary Below is a small glossary of terms used in this manual.

Scanner or Master	The DeviceNet Master of which the D0–DEVNETS is a slave. This can be either a PLC module or a card in your PC.	
Adapter or Slave	Short for the D0–DEVNETS Slave Module. The adapter is also referred to as a Network Interface Module elsewhere.	
Node Address or MAC ID	The unique device address on a DeviceNet network. There are a maximum of 64 total (0–63). Usually the scanner is node 0.	



Installing the DeviceNet Slave Module

In This Chapter....

- Installing the D0-DEVNETS Slave Module
- Configure the Adapter
- D0-DEVNETS Parameter Setup
- Software and Firmware Requirements
- Writing the D0-DEVNETS Setup

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.*



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.





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.



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)	(
$ \begin{array}{c} $	CAN* High (white) Shield (bare) CAN* Low (blue) V– (black)	

* Controller Area Network (CAN)

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).



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).

- 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.

- 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

2-8

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

STATUS MS NS

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
Г				V40400 - 40417 (X0-377)
				V40500 - 40517 (Y0-377)
				V40600 - 40637 (C0-377)
	V7610	Input starting address	V40400	V41000 - 41017 (S0-377)
				V41100 - 41107 (T0-377)
				V41140 - 41147 (CT0-377)
				V41200 - 41237 (SP0-377)
I/O Data Pointer	V7611	Input number of bytes	2 Bytes	0 - 8 Bytes
				V40400 - 40417 (X0-377)
	V7612 Output starting address		V40500	V40500 - 40517 (Y0-377)
		Output starting address		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
	V7614	Input starting V-memory location	V3000	V0 - 7777
Pointer setup	V7615	Input V-memory number of bytes	58 Bytes	0 - 128 Bytes
registers	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 their 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 *Direct*SOFT32 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 *Direct*SOFT32 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 *Direct*SOFT32 programming software, and click on PLC/Diagnostics/System Information. This will bring up the System Information screen.

躍 DirectSOFT Programming - F	IRST05	
<u>File Edit Search View T</u> ools	<u>PLC</u> <u>D</u> ebug <u>W</u> indow <u>H</u> elp	
	Disconnect Link Setup Offine Setup	OK Online Program
⊈ Output ■ Ladder Vie w	Memory Map PLC Modes Ctrl+Shift+R Configure [/0 Paşsword	
1 <u>×0</u>	Diagnostics ► Setup	System Information. Syntax Check VT
2 X1	Clear PLC Memory Copy config data from PLC to <u>D</u> isk Copy config data from Disk to <u>P</u> LC	Scan_ime
3		(END)
4		(NOP)
5		(NOP)
6		(NOP)
Displays PLC system information		00005/02048 05 0001:001:001 //



PLC <u>Iupe: 05</u> <u>CPU Version: V 3.11</u> Gate Array Ver: V 1.0 Mode: Run Hardware Switch: Terminal Memory Data Type: User Memory Type: F-ROM Memory Size: 4	Error Information Fatal Error: NONE Non-Fatal Error: NONE Warning: NONE <u>E</u> rrors:
--	---

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

How to UpdateIf your PLC requires ne
upgrade tool from our we
click on technical supportFirmwareclick on technical support

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 that 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 *Direct*SOFT32 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 *Direct*SOFT32 programming software. Once the following rung is editted, 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



Specifications

In This Appendix. . . . — Specifications

Specifications

General Specifications		
Ambient Operating Temperature	32°F to 131°F (0°C to 55°C)	
Storage Temperature	-4°F to 158°F (-20°C to 70°C)	
Ambient Humidity	5% to 95% non-condensing	
Atmosphere	No corrosive gases, max. environmental pollution = 2, UL840	
Vibration Resistance	MIL STD 810C, method 514.2	
Shock Resistance	MIL STD 810C, method 516.2	
Noise Immunity	NEMA ICS3–304 Impulse noise 1µs, 1000V FCC Class A RFI (144MHz, 430MHz, 10W, 10cm)	
Size	0.78" W x 3.02" H x 2.12" D	
Weight	1.75 oz. (50g)	

Communication Specification			
Protocol	DeviceNet Communication (Slave)		
Network address	0 to 63		
Data Packet	0 to 8 Bytes (Data beyond eight bytes are divided.)		
Baud Rate	125 kbps/250 kbps/500 kbps		
	DIP Switch Setting		
Maximum cable length	500m/125 kbps		
	250m/250 kbps		
	100m/500kbps		
Parameter storage	FLASH Memory		
Communication Status Indicator	MS: Module Status LED [Red/Green]		
	NS: Network Status LED [Red/Green]		
DeviceNet	11~25VDC		
Power Consumption	45mA Max.		

A-2

DeviceNet Communication Details			
Device Type		Generic	
Explicit Peer to Peer	r Message	No	
I/O Peer to Peer Me	ssage	No	
Configuration Consis	stency	No	
Fault Node Recover	у	No	
Communication Bau	d Rate	Yes	
125K, 250K, 500K			
Master/Scanner		No	
I/O Slave Message	Bit Strobe	No	
	Polling	Yes	
	Cyclic	No	
	Change of State (COS)	No	

A–3

DeviceNet Object			
Item	Instance	Class Number	
Identity Object	1	1h	
Message Router Object	1	2h	
DeviceNet Object	1	3h	
I/O Assembly Object	5	4h	
Connection Object	1	5h	

Device I/O Specification			
I/O LINK	Inputs: 64 Points		
	Outputs: 64 Points		
I/O LINK	X, Y, C, S, T, CT, SP (Read Only)		
Data Types Available			
Register LINK	128 Bytes Maximum: V0 – V7777		
Other PLC Communication from Master	Only PLC Mode Selection (Mode SW is in TERM only)		
Internal Power Consumption	45mA at 5VDC		

Tables

B

In This Appendix. . . . — DeviceNet Tables

Data Input and Output Tables

I/O Assembly Object is used for Data Transfer of the LINK register. I/O Assembly Object can access the data of the Input Point, Output Point, Input V–memory and Output V–memory. The I/O Assembly Object can also control the PLC Mode.

I/O Assembly CLASS = 4		
Data Type	Instance	Attri

Data Type	Instance	Attribute	Comment
Input Point	100	3	Read data from linking Input point.
Output Point	101	3	Write data to linking Output point.
Input Register	102	3	Read data from linking Input V-memory.
Output Register	103	3	Write data to linking Output V-memory.
PLC Mode	104	3	PLC Mode control (RUN/STOP)

Attribute Configure

The following tables describes each Link Register Attribute (Data Configure).

Input Point Attribute

Instance = 100 Attribute = 3

Name	Data		Address	Service	
	MSB		LSB		
Input Point	Input 07		Input 00	+00	Get
	Input 17		Input 10	+01	
	Input 27		Input 20	+02	
	Input 37		Input 30	+03	
	Input 47		Input 40	+04	
	Input 57		Input 50	+05	
	Input 67		Input 60	+06	
	Input 77		Input 70	+07	

One Input point is equal to one bit of the byte.

Eight bytes equals 64 Input points.

Output Point Attribute

Instance = 101 Attribute = 3

Name	Data		Address	Service	
	MSB		LSB	-	
Output Point	Output 07		Output 00	+00	Set
	Output 17		Output 10	+01	
	Output 27		Output 20	+02	
	Output 37		Output 30	+03	
	Output 47		Output 40	+04	
	Output 57		Output 50	+05	
	Output 67		Output 60	+06	
	Output 77		Output 70	+07	

One Output point is equal to one bit of the byte.

Eight bytes equals 64 Output points.

Input Register Attribute

Instance = 102 Attribute = 3

Name	Data	Address	Service
Input Register	Vn+00	+00	Get
	Vn+01	+02	
	Vn+02	+04	
	Vn+03	+06	
	Vn+04	+08	
	Vn+62	+124	
	Vn+63	+ 126	

The Data Register equals one Word (16 bits).

A maximum of 64 V–memory words can be accessed.

Output Register Attribute

Instance = 103 Attribute = 3

Name	Data	Address	Service
Output Register	Vn+00	+00	Set
	Vn+01	+02	
	Vn+02	+04	
	Vn+03	+06	
	Vn+04	+08	
	Vn+62	+124	
	Vn+63	+ 126	

The Data Register equals one Word (16 bits).

A maximum of 64 V-memory words can be accessed.

PLC Mode Control Attribute

Instance = 104 Attribute = 3

Name	Data	Address	Service
PLC Mode	01: RUN request	+00	Set
	02: STOP request		
	00: STOP		Get
	03: RUN		

The PLC Mode can be read and requested to be changed.

Device Profile Tables

Identify Object (Class 1)

Instance 1 Attribute

Attribute	Item	Data type	Value	Service
1	Vendor ID	UINT	482	Get
2	Device Type	UINT	00	Get
3	Product Code	UINT	1500	Get
4	Major Revision	UINT	*	Get
	Minor Revision	UINT	*	
5	Status	WORD	*	
6	Serial Number	UDINT	****	Get
7	Product Name	SHORT-STRING	D0-DEVNETS	Get

Common Service

Service Code	Common Service
0E	Get_Attribute_Single
05	Reset

Device Net Object (Class 3)

Instance 1 Attribute

Attribute	Item	Item Data type Value		Service
1	MAC ID	UINT	0 - 63	Get
2	Baud Rate	UINT	0 – 2	Get
4	BusOff Counter	UDINT	*	Get
5	Allocation Choice	BYTE	*	Get
	Master MAC ID	USINT	*	

Common Service

Service Code	Common Service
0E	Get_Attribute_Single

Connection Object (Class 5)

Attribute	Item	Data type	Value	Service
1	State	UINT	*	Get
2	Instance Type	UINT	00	Get
3	TransportClass_trigger	BYTE	83h	Get
4	Produced_connection_id	UINT	*	Get
5	Consumed_connection_id	UINT	*	Get
6	Initial_comm_characteristics	BYTE	21h	Get
7	Produced_connection_size	UINT	*	Get
8	Consumed_connection_size	UINT	*	Get
9	Expected_packet_rate	UINT	2500	Get
12	Watchdog_timeout_action	USINT	01	Get
13	Produced_connection_path_length	UINT	00	Get
14	Produced_connection_path	USINT	String	Get
15	Consumed_connection_path_length	UINT	00	Get
16	Consumed_connection_path	USINT	String	Get

Slave Explicit Messaging Connection Object (Instance 1)

Poll Connection Object (Instance 2)

Attribute	Item	Data type	Value	Service
1	State	UINT	*	Get
2	Instance Type	UINT	01	Get
3	TransportClass_trigger	BYTE	82h	Get
4	Produced_connection_id	UINT	*	Get
5	Consumed_connection_id	UINT	*	Get
6	Initial_comm_characteristics	BYTE	01	Get
7	Produced_connection_size	UINT	*	Get/Set
8	Consumed_connection_size	UINT	*	Get/Set
9	Expected_packet_rate	UINT	00	Get/Set
12	Watchdog_timeout_action	USINT	00	Get/Set
13	Produced_connection_path_length	UINT	6	Get
14	Produced_connection_path	USINT	20h,04,24h,40h,64h,03	Get/Set
15	Consumed_connection_path_length	UINT	6	Get
16	Consumed_connection_path	USINT	20h,04,24h,42,65h,03	Get/Set

Common Service

Service Code	Common Service
10h	Set_Attribute_Single
0E	Get_Attribute_Single

I/O Assembly Object (Class 4)

Instance Attribute

Instance	Attribute	Data type	Description	Bytes	Service
				Maximum	
100	3	BIT	Input Data	8	Get
101	3	BIT	Output Data	8	Set
102	3	WORD	Input Register Data	128	Get
103	3	WORD	Output Register Data	128	Set
104	3	BYTE	PLC Mode	1	Get/Set

Common Service

Service Code	Common Service
10h	Set_Attribute_Single
0E	Get_Attribute_Single

Instance Attribute

Instance	Attribute	Bytes	Description	Data			Address	Service
		Maximum		MSB7		LSB0	-	
100	3	8	Input Data	07		00	+00	Get
				17		10	+01	
				:	:	:	:	
				67		60	+06	
				77		70	+07	
101	3	8	Output Data	07		00	+00	Set
				17		10	+01	
				:	:	:	:	
				67		60	+06	
				77		70	+07	
102	3	128	Input Register	Vn+00		+00	Get	
			Data		Vn+01		+02	
					:		:	
					Vn+62		+124	
					Vn+63		+126	
103	3	128	Output Register		Vn+00		+00	Set
			Data		Vn+01		+02	
					:			
					Vn+62		+124	
					Vn+63		+126	
104	3	1	PLC Mode	01:RUN Request			+00	Set
				02:STO	P Request			
				00:STO	Р			Get
				03:RUN				

The DeviceNet standard is maintained by the ODVA (Open DeviceNet Vendor Association, Inc.). Contact the ODVA for detailed information about DeviceNet. *Internet:* www.odva.org Email: odva@powerinternet.com
Image Table Mapping

In This Appendix. . . . — Image Table Mapping

Image Table Mapping

Read, Write and Status Byte References

D0-DEVNETS can access data bytes.

Discrete Input

Discrete Input Point (X,Y,C,S,T,CT,SP) Image Table Mapping



Dec. Bit	07	06	05	04	03	02	01	00	Size
Oct. Bit	07	06	05	04	03	02	01	00	
	X7	X6	X5	X4	X3	X2	X1	X0	Read Byte 1
	X17	X16	X15	X14	X13	X12	X11	X10	Read Byte 2
	X27	X26	X25	X24	X23	X22	X21	X20	Read Byte 3
	X37	X36	X35	X34	X33	X32	X31	X30	Read Byte 4
	X47	X46	X45	X44	X43	X42	X41	X40	Read Byte 5
	X57	X56	X55	X54	X53	X52	X51	X50	Read Byte 6
	X67	X66	X65	X64	X63	X62	X61	X60	Read Byte 7
	X77	X76	X75	X74	X73	X72	X71	X70	Read Byte 8
	Not Su	upporte	d						Write Byte 1

			Outputs							
		Y7	Y6	Y5	Y4	Y3	Y2	Y1	Y0	
I/O Image Output Size 1 to 8 bytes		Outputs								
	Y17	Y16	Y15	Y14	Y13	Y12	Y11	Y10		
						Out	puts			
			Y27	Y26	Y25	Y24	Y23	Y22	Y21	Y20
Output Size Write 1 to 8 bytes	Output Size		Outputs							
	1 to 9 bytes		Y37	Y36	Y35	Y34	Y33	Y32	Y31	Y30
	T to o bytes		Outputs							
			Y47	Y46	Y45	Y44	Y43	Y42	Y41	Y40
			Outputs							
			Y57	Y56	Y55	Y54	Y53	Y52	Y51	Y50
						Out	puts			
			Y67	Y66	Y65	Y64	Y63	Y62	Y61	Y60
						Out	puts			
			Y77	Y76	Y75	Y74	Y73	Y72	Y71	Y70

Discrete Output Point (X,Y,C,S,T,CT,SP) Image Table Mapping

Dec. Bit	07	06	05	04	03	02	01	00	Size
Oct. Bit	07	06	05	04	03	02	01	00	Size
		Read Byte 1							
	Y7	Y6	Y5	X4	Y3	Y2	Y1	Y0	Write Byte 1
	Y17	Y16	Y15	Y14	Y13	Y12	Y11	Y10	Write Byte 2
	Y27	Y26	Y25	Y24	Y23	Y22	Y21	Y20	Write Byte 3
	Y37	Y36	Y35	Y34	Y33	Y32	Y31	Y30	Write Byte 4
	Y47	Y46	Y45	Y44	Y43	Y42	Y41	Y40	Write Byte 5
	Y57	Y56	Y55	Y54	Y53	Y52	Y51	Y50	Write Byte 6
	Y67	Y66	Y65	Y64	Y63	Y62	Y61	Y60	Write Byte 7
	Y77	Y76	Y75	Y74	Y73	Y72	Y71	Y70	Write Byte 8

	• •	•	• /	U	•••	0
	I/O Image		Innuto	Data Via 100		Low Byte
			inputs	Dala VII+00		High Byte
			Innuto	Data Vin 101		Low Byte
			inputs			High Byte
			Inpute	Data Vn±02		Low Byte
			mputs			High Byte
		۸	Inpute	Data Vn 103		Low Byte
			inputs	Dala VII+03		High Byte
Input Size Read 2 to 128 bytes	Input Size		Inputo	Data Vin 104		Low Byte
			inputs	Dala VII+04		High Byte
			Innuts	Data Vn⊥61		Low Byte
			mputo			High Byte
			Innuts	Data Vn⊥62		Low Byte
			inputs			High Byte
			Inputs Data Vn+63			Low Byte
						High Byte

Register Input (V–memory) Image Table Mapping

Decimal Bit	07	06	05	04	03	02	01	00	Size	
Octal Bit	07	06	05	04	03	02	01	00	-	
	Vn + 00 V memory Low byte data									
	Vn + 00 V memory High byte data									
	Vn + 01 V memory Low byte data									
	Vn + 01 V		Read Byte 4							
	Vn + 02 V	' memory L	ow byte da	ta					Read Byte 5	
	Vn + 02 V	′ memory ⊦	ligh byte da	ata					Read Byte 6	
	Vn + 03 V		Read Byte 7							
	Vn + 03 V	′ memory ⊦	ligh byte da	ata					Read Byte 8	
	Vn + 04 V	' memory L	ow byte da	ta					Read Byte 9	
	Vn + 04 V	′ memory ⊦	ligh byte da	ata					Read Byte 10	
	Vn + 05 V	' memory L	ow byte da	ta					Read Byte 11	
	Vn + 05 V	′ memory ⊦	ligh byte da	ata					Read Byte 12	
	Vn + 06 V	' memory L	ow byte da	ta					Read Byte 13	
	Vn + 06 V		Read Byte 14							
	Vn + 07 V	' memory L	ow byte da	ta					Read Byte 15	
	Vn + 07 V	′ memory H	ligh byte da	ata					Read Byte 16	

C-4

Image	1
e Table	Appenc
Mapping	lix C

5

Vn + 08 V memory Low byte data	Read Byte 17
Vn + 08 V memory High byte data	Read Byte 18
Vn + 09 V memory Low byte data	Read Byte 19
Vn + 09 V memory High byte data	Read Byte 20
:	:
:	:
:	:
:	:
Vn + 30 V memory Low byte data	Read Byte 60
Vn + 30 V memory High byte data	Read Byte 61
Vn + 31 V memory Low byte data	Read Byte 62
Vn + 31 V memory High byte data	Read Byte 63
:	:
:	:
:	:
:	:
Vn + 60 V memory Low byte data	Read Byte 121
Vn + 60 V memory High byte data	Read Byte 122
Vn + 61 V memory Low byte data	Read Byte 123
Vn + 61 V memory High byte data	Read Byte 124
Vn + 62 V memory Low byte data	Read Byte 125
Vn + 62 V memory High byte data	Read Byte 126
Vn + 63 V memory Low byte data	Read Byte 127
Vn + 63 V memory High byte data	Read Byte 128
Not Supported	Write Byte 1

5 1 (,, 5				
I/O Image		Low Byte			
	Oulpuis Dala VII+00	High Byte			
	Outpute Data Va 01	Low Byte			
	Oulpuis Data VII+01	High Byte			
	Outputs Data Vin 02	Low Byte			
		High Byte			
	Outpute Data Via 02	Low Byte			
		High Byte			
Output Size	Outputs Data Vn±04	Low Byte			
- · · · · · · · · · · · · · · · · · · ·	Oulpuis Dala VII+04	High Byte			
		Low Byte			
	Outputs Data Vn+61	High Byte			
	Outpute Data Vin 62	Low Byte			
		High Byte			
	Outputs Data Vn+63	Low Byte			
		High Byte			

Register Output (V-memory) Image Table Mapping

Decimal Bit	07	06	05	04	03	02	01	00	Size	
Octal Bit	07	06	05	04	03	02	01	00		
	Not Supported									
	Vn + 00 V memory Low byte data									
	Vn + 00 V memory High byte data									
	Vn + 01 V	' memory L	ow byte da	ta					Write Byte 3	
	Vn + 01 V	′ memory ⊦	ligh byte da	ata					Write Byte 4	
	Vn + 02 V memory Low byte data									
	Vn + 02 V	′ memory ⊦	ligh byte da	ata					Write Byte 6	
	Vn + 03 V	' memory L	ow byte da	ta					Write Byte 7	
	Vn + 03 V	′ memory ⊦	ligh byte da	ata					Write Byte 8	
	Vn + 04 V	' memory L	ow byte da	ta					Write Byte 9	
	Vn + 04 V	′ memory ⊦	ligh byte da	ata					Write Byte 10	
	Vn + 05 V	' memory L	ow byte da	ta					Write Byte 11	
	Vn + 05 V memory High byte data									
	Vn + 06 V memory Low byte data									
	Vn + 06 V	' memory H	ligh byte da	ata					Write Byte 14	

C–6

Vn + 07 V memory Low byte data	Write Byte 15
Vn + 07 V memory High byte data	Write Byte 16
 Vn + 08 V memory Low byte data	Write Byte 17
Vn + 08 V memory High byte data	Write Byte 18
Vn + 09 V memory Low byte data	Write Byte 19
Vn + 09 V memory High byte data	Write Byte 20
:	:
:	:
:	:
:	:
Vn + 30 V memory Low byte data	Write Byte 61
Vn + 30 V memory High byte data	Write Byte 62
Vn + 31 V memory Low byte data	Write Byte 63
Vn + 31 V memory High byte data	Write Byte 64
:	:
:	:
:	:
:	:
Vn + 60 V memory Low byte data	Write Byte 121
Vn + 60 V memory High byte data	Write Byte 122
Vn + 61 V memory Low byte data	Write Byte 123
Vn + 61 V memory High byte data	Write Byte 124
Vn + 62 V memory Low byte data	Write Byte 125
Vn + 62 V memory High byte data	Write Byte 126
Vn + 63 V memory Low byte data	Write Byte 127
Vn + 63 V memory High byte data	Write Byte 128

PLC Mode Image Table Mapping

I/O Image



Dec. Bit	07	06	05	04	03	02	01	00	Size
Oct. Bit	07	06	05	04	03	02	01	00	
RUN	0	0	0	0	0	0	0	1	
Request									Read Byte 1
STOP	0	0	0	0	0	0	1	0	
Request									
STOP	0	0	0	0	0	0	0	0	
RUN									Write Byte 1

Adapter Input/Output Status Word

Polling format that the DO–DEVNETS (slave) transmits to a master.

Address	Bytes	Data	Comment
+ 0	1	I/O Status	Bit 0: Not used Bit 1: Not used Bit 2: Not used Bit 3: Node Error (Node number has changed) ON: Error/OFF: Normal Bit 4: IDLE (Output is IDLE) ON: Idle/OFF: Normal Bit 7: OUTPUT Status ON: Enable/OFF: Disable
+ 1	1	PLC Mode	00: Mode = STOP 03: Mode = RUN

Polling format that a master transmits to a DO-DEVNETS (slave).

Address	Bytes	Data	Comment
		No Code	No request
+ 0	1	C3h	Enable OUTPUT
		3Ch	Disable OUTPUT
+ 1	1	PLC Mode	01: RUN request 02: STOP request

Special Relays and DIP Switch Parameter Initializing

In This Appendix....

- Special Relays

— DIP Switch Parameter Initializing

Network Status Speicial Relays

The DL05 has special relays which allows the D0–DEVNETS to monitor the network status. These relays are SP120 and SP121.

SP	Condition	Details
0.0100	ON	Communicating
SP120	OFF	No communication
00104	ON	Communication error
SP121	OFF	Normal

Initializing Parameter Values

The values of the system parameter registers, V7610 - V7617, can be changed and initialized by the position of DIP switches SW1–3 and SW1–6.

Parameter values when the DL05/06 is powered up.

SW–3	SW1–6	V7610	V7611	V7612	V7613	V7614	V7615	V7616	V7617
OFF	OFF	*1	*1	*1	*1	*1	*1	*1	*1
OFF	ON	O40400	2	O40500	2	O3000	128	O3100	128
ON	OFF	O40400	2	O40500	2	O3000	58	O3100	52
ON	ON	O40400	2	O40500	2	O3000	128	O3100	128

*The parameter value in the EEPROM is moved to a register.

D0–DEVNETS Think & Do/Entivity Setup

In This Appendix. . . . — D0-DEVNETS Think & Do/Entivity Setup

D0–DEVNETS Think & Do/Entivity Setup

For those who are using the D0–DEVNETS as slave I/O with Think & Do Studio PC based control, the following example shows how to setup Think & Do on your network.

T&D/Entivity setupUse the following procedure to setup the D0–DEVNETS adapter with Think & Dofor PC controlStudio.

- 1. Click on Add Driver and SST card is installed.
- 2. Set MAC ID to 62.
- 3. Set baud rate to either125k or 250k.
- 4. Set scanner interval to 0.
- 5. Set timeout shutdown to 5.
- 6. EDS not needed.

Think & Do Studio - ConnectivityCenter - un Configuration View Drivers Devices	titled.tio - [Configuration] Tools Window Help		_ 6 _ 6
6	16 🛛 🖬 🖬 🖬		
DeviceNet(SST) Board 1 Total Nodes=0			
	Refresh Grid		
Attributes	Value		A 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
Driver Name	DeviceNet(S-S Technologies)		
Board Number	1		
Board Configuration	Direct-Link Configuration		
Board Name	Driver250	X	
Board Family	5136-DN		
1/O Port Address	0x250		
Memory Address	0000bx0		
DeviceNet Configuration			
Mac ID	62	×	
Baud Rate	125Kb		
Scanner Interval(in msec)	0		
(imeout On Shutdown(in Sec)	5	research and a second	
nstall EDS File	Click Here		

7. Click on connection.	Think & Do/Entivi	ty will display D0–DEVNETS M	lacid #.
/	PIn and POut w i	Il display 32 points each.	
/		\wedge	
Think & Do Studio - ConnectivityCenter - until	iditio – [Configuration]		- 6 0
Configuration View Drivers Devices Io	olz Window Help		- 6 3
	Good Missing Node/Mod Extra Mode/Mod A Duplicate Node of	nle or Any Öther Error " r Module Mismatch	
DeviceNet(SST) Board 1 Total Nodes=1	DO-DEVNETS MacID-2	4 0 - R000001	Node2
	02	0 02 	•
	Befresh Grid		
Attributes	Value		
Driver Name	DeviceNet(S-S Technologies)		
Board Number	1		
Board Configuration	Click Here		
Board Name	Driver250		
Board Family	5135-DN		
1/0 Port Address	0x250		
Memory Address	0xd0000		
DeviceNet Continuation			
Mac ID	62		
Baud Bate	500Kb		
Seapper Intervallin mseel	9		
Timeout On Shutdownlin Sect			
Install EDS File	Click Here		
4			
Board Info Board Statuz Mapping Mo	dule Info / Module Statux Mapping / 1/0 Mapping /	, [A 82	<u>.</u>

8. Click on Scan and communication will begin.



Outputs Y0–Y15 (V40500) will display, and bits 0–15 of $\tt POut$ 02 can be forced ON/OFF.

For those who are using a DL05 with D0–DEVNETS as a PLC, for local I/O control, on a DeviceNet network with Think & Do Studio, the following example shows how to setup the DL05 and the adapter for use as a PLC on the network.

Setup Think & Do with DL05 on a network. The RLL program is edited using *Direct*SOFT32 programming software.

Set DIP switch, SW1, as follows:

1. SW1-1: OFF

SW1–2: ON (communications rate 500K or the baud rate of your choice) SW1–3: OFF SW1–4: OFF

SW1–4. OFF SW1–5: OFF

SW1-6: ON (initial value)

SW1–6 sets up the following system parameter defaults:

V7610 = O40400 / V7611 = 2 V7612 = O40500 / V7613 = 2 V7614 = O3000 / V7615 = 128 V7616 = O3100 / V7617 = 128

2. Set rotary switch, SW2 = 02, SW3 = 0.

3. Add the following RLL code to the DL05 program:



4. Return the DL05 to RUN mode.

- **T & D Studio setup** Use the following procedure to setup the D0–DEVNETS adapter with Think & Do Studio.
 - 1. Click on Add Driver and SST card is installed.
 - 2. Set MAC ID to 62.
 - 3. Set baud rate (500K in this example)
 - 4. Set scanner interval to 0.
 - 5. Set timeout shutdown to 5.
 - 6. EDS not needed.

	s Toos Window Hor	
DeviceNet(SST) Board 1 Total Nodes=0		
	Betresh Grid	
Attributes	Value	
Driver Name	DeviceNet(5-5 Technologies]	
Board Number		
Board Configuration	Direct-Link Configuration	
Board Name	Driver250	
Board Family	5136-DN	
1/0 Port Address	0x250	
Momore Address	Oxd0000	
Memory Address		
eviceNet Configuration		
Memory Address DeviceNet Configuration Mac ID	62 💌	
DeviceNet Configuration Mac ID Baud Rate	62 У 500КЬ У	
Mac ID Baud Rate Scanner Interval[in msec]	62 v 500Kb v 0	
Mac ID Baud Rate Scanner Interval(in msec) imeout On Shutdown(in Sec)	62 v 500Kb v 0 55	
Mac ID Baud Rate Scanner Interval[in msec] Timeout On Shutdown[in Sec]	62 × 500Kb × 0 -	
DeviceNet Configuration Mac ID Baud Rate Seconter Interval[in msec] Linecut On Shutdown[in Sec] Install EDS File	62 × 500Kb × 0 5 Click Here	
Periodization Mac ID Baud Rate Scanner Intervallin mxec] Timeout On Shutdown(in Sec) Install EDS File	62 v 500Kb v 0 5 Click Here	×

- 7. Click on connection.
- 8. Click on Scan and communication will be setup.



V40401 which shows the active inputs.

Using the DL05 PLC example will allow easy access to other bits in the PLC without using explicit messaging. Polling is often faster than explicit messaging.

The following example is a DL06 PLC with the following I/O modules installed:

Slot 1 = D0-16ND3 Slot 2 = F0-2AD2DA-2 Slot 3 = D0-10TD2 Slot 4 = D0-DEVNETS



PIn 01 shows the input diagnostic data (16 bits). PIn 02, linked to V40400, and the first four bits of PIn 03 are the DL06 integrated inputs (X0–X23 octal = 20 bits). The next four bits are not used. The last eight bits of PIn3 are the first eight inputs of the D0–16ND3 and PIn 04 are the last eight inputs of the D0–16ND3.

POut 01 are the diagnostic control bits for D0–DEVNETS. POut 02, linked to V40500, shows the 16 integrated outputs of the DL06 (Y0–Y17 octal), and POut 03 are the bits for the D0–10TD2 output points.

This is how the display appears after scanning begins. Notice the end points for the DL06 integrated I/O. Only the discrete I/O is polled. Analog I/O is setup in registers (See page 2-11).



Polled I/O

Byte				Address					
Pln 02	X7	X6	X5	X4	Х3	X2	X1	X0	V40400
PIn 02	X17	X16	X15	X14	X13	X12	X11	X10	V40400
Pln 03	NA	NA	NA	NA	X23	X22	X21	X20	V40401
PIn 03	X107	X106	X105	X104	X103	X102	X101	X100	V40401
PIn 04	X117	X116	X115	X114	X113	X112	X111	X110	V40402
POut 02	Y7	Y6	Y5	Y4	Y3	Y2	Y1	Y0	V40500
POut 02	Y17	Y16	Y15	Y14	Y13	Y12	Y11	Y10	V40500
POut 03	Y107	Y106	Y105	Y104	Y103	Y102	Y101	Y100	V40501

OIT with D0–DEVNETS



In This Appendix. . . . — OIT with D0-DEVNETS and Think & Do/Entivity

Using an OIT with D0–DEVNETS

An Operator Interface Terminal (OIT) can be used on your DeviceNet network. The example used here is for a D0–DEVNETS installed in a PLC on a DeviceNet network. The network is controlled by a PC, with an SST module installed and using Think & Do Studio. The OIT is an EZTouch unit connected to a DL05 PLC. The PLC does not have a RLL program in it.

T&D Studio

You will first map the DeviceNet status.

Connect to the D0–DEVNETS on the DeviceNet network, select **Board Status Mapping** so the status items can be mapped. Map the data and provide a tag name for each item.

🔀 Think 🔀 Confi	& Do Studio iguration View	- ConnectivityCenter - explicit Drivers Devices Tools Wind	t05.tio - [Config dow Help	uration]					_ 8 ×
	88	NRI Han	<u>R</u>	à n 👘	12				
		/iceNet(SST) Board 1 tal Nodes=1	D0-D1 MacII FIn C	EVNETS D-1		Pou		Nod	e1
	Eill Down	<u>Clear Mapping</u> <u>B</u> efresh	Grid		-				
	St.	atus Item Description	Data Type	Logical ID	lagname	0	Value		-
9	SSIDn_BI	_BusUfr BusU(aming	Input			0			
10	CCTDp D1	Duswaining DoEuplicitMessaging	Output	0.0	doounlinit	0			
12	SSTDn B1		Number	N-5	servicecode	0			
12	SSTDn_B1	ExpMsg5ervicecode	Number	N-5	cmderrorcode	0			
14	SSTDn B1	ExpMsgCmd4dditionalError	Number	N-8	addtnlerror	0			
15	SSTDn B1	ExpMsqCmdErrorText	String	Str-1	cmderrortext				
16	SSTDn B1	NodeAddress	Number	N-7	nodeaddress	0			
17	SSTDn B1	ClassNumber	Number	N-0	class	0			
18	SSTDn B1	InstanceNumber	Number	N-1	instance	0			
19	SSTDn_B1	AtrributeNumber	Number	N-2	attribute	0			
20	SSTDn_B1	ExpMsgDataLen	Number	N-3	expmsglen	0			
21	SSTDn_B1	_ExpMsgBuf1	Number	N-4	buf1	0			
22	SSTDn_B1	ExpMsgBuf2	Number	N-9	buf2	0			
23	SSTDn_B1	ExpMsgBuf3	Number	N-10	buf3	0			
24	SSTDn_B1	_ExpMsgBuf4	Number	N-11	buf4	0			
25	SSTDn_B1	_ExpMsgBuf5	Number	N-12	buf5	0			
26	SSTDn_B1	ExpMsgBuf6	Number	N-13	buf6	0			
27	SSTDn_B1	_ExpMsgBuf7	Number			0			<u> </u>
•								•	
	II C Da		14 4 4 11	<u> </u>	(104 : (
Воа		no status mapping fodule		status Mapping	I/U Mapping				
For Help, p	press F1								NUM
Start	E 📝 🖉 🖞	🔁 🔛 Think & Do Studio - Proj	iec 🚺 Think &	Do Studio - Desi	a 🛛 🔀 Think & Do Studi	0 - [0		1	12:30 PM

Our example uses three flowcharts. Flowchart 1 Gets the data, flowchart 2, entitled Parsing, breaks down the data and flowchart 3 Sends the data. We will select **GetUpdateOn** first.

Think & Do Studio - ProjectCenter -	explicit05.pdb - [Flowcharts]	_ 8 ×
Eile Edit View Project Debug Too	ls <u>Wi</u> ndow <u>H</u> elp	_ & ×
□ + 🖨 🖶 🎒 🖇	H ◀ ▶ Ŋ 🖳 🖓 🔛 🖓 📗 🕹 🔛 🖉 📕 🕹 🚢 🌮 [Local	
Project Project Flowcharts Flowcharts Flowcharts Project Flowcharts Project	Flowchart Name: GetUpdateOn Prevent Dpen Flowchart Type: Standard Execution ofter: Description Modes Description Perview: Description Previous: Net	
Screens Data Items Data Logging Data Logging Data Logging Livel		
X Tool	Message	_
HMI screens Global Data		
HMI screens Global Function K HMI screens Building Global Fu	eys ents	
HMI screens Compiling Screen	- Screen1.	
HMI screens Screen compiled	successfully.	
Build XRef Output		
Ready		NUM
🏦 Start 🛛 🛃 🏀 🖏 🗍 🎆 Think &	Do Studio - Pr 💶 Think & Do Studio - Desig 🛛 💾 untitled - Paint	📢 🛃 🛞 🕥 🛛 12:32 PM

This flowchart shows how to set up explicit messaging to Get (receive) the data. Once the explicit messaging is done, it normally turns off, but in this example, the last block provides a 500 millisecond delay which allows the explicit messaging to turn on again.



Refer to the DeviceNet tables located in Appendix B when creating your flowcharts.

Since Think & Do Studio has 32 bit registers, the 32 bits must be broken down into two 16 bit registers in order to transmit (send) the correct data to the PLC. This flowchart, Parsing, shows how it is done.



This flowchart, **SendUpdateOn**, shows you how to put the data into a send (transmit) buffer. The data gets cleared out of the buffer whenever each explicit messaging is done, therefore, data needs to be loaded into the buffer before each explicit messaging is turned on. Notice that this flowchart uses a 500 millisecond wait block to allow the explicit messaging to turn on continuously.



After Think & Do has been setup, the EZTouch panel can be connected to the DL05/06 serial port. Match the communications settings in the EZTouch software to the settings for the DL05/06 serial port setup.

From the development screen, select **Setup** then **PLC...**.

Refer to the diagram below.



Appendix F OIT with TnD This is an example of a meter display and two numeric entry parts showing the use of the default V–memory input and output locations.



Finish the EZTouch display by completing the input and output information. Consult the EZTouch User Manual or the EZTouch help menu for more details.

Numeric Entry		×
General Scaling Protection	Visibility/Details	
Label Text Language 1 😳 Label Text V3000 Entry	Character Size 8x32	
Position EDIT TAG	G DETAILS	×
C Bottom	Enter TagDetails for the Tag	
	V3000	
Tag Name V3000	(PlcType: DirectLogic K-Sequence)	
Minimum	Address String	
Maximum 3276	Data Type SIGNED_INT_16	
Format Data Type Signed	No. of Chars	
Text	OK Cancel Help	
Background	I Blink Fractional Digits 0	
	OK Cancel H	elp

Meter		×
General Alarms Digital Di	splay Visibility/Details	
Label Text	Character Size 8x32 SPLAY	Style
Davilier	EDIT TAG DETAILS	
Fosition Top	Enter TagDetails for the Tag	
C Bottom	V3100	
	(PlcType: DirectLogic K-Sequence)	
Tag Name V3100	Address String	
Show Ticks	IO Type : R/W Data Type SIGNED_INT_16	
Number of Major Divisions	No. of Chars 🕕 🚊	
Number of Sub Divisions	OK Cancel Help	
Show Tick Numbers	Needle	
·	OK Cancel He	elp

D0–DEVNETS and Allen–Bradley Set up

In This Appendix....

— Setup D0-DEVNETS with Allen-Bradley RSNetworx™

Setup D0–DEVNETS with Allen–Bradley RSNetWorx[™]

For those who are using the D0–DEVNETS as a slave with an Allen–Bradley PLC, the examples on the following pages will step you through the process of setting up your Allen–Bradley DeviceNet network using RSNetWorx[™].

RSLinx

Begin by opening your RSLinx to configure the DeviceNet driver.

- 1. Click on Communications.
- 2. Click on **Configure Drivers**.



- 3. Click on the down arrowhead, ♥, and select a driver from the drop-down list.
- 4. Click Add New.

A DF1 driver is selected in this example.







Note: Selecting a new driver may prompt you to reboot or to restart your computer.

5. Click **OK** in the pop–up window.



This window will appear.

6. Click on **Auto–Configure** to setup the communication parameters.

configure Alterroraties DET Communications Device
Device Name: AB_DF1-1
Comm Port: COM1 Device: PLC-CH0
Baud Rate: 19200 Station Number: 0 (Octal)
Parity: None Error Checking: BCC
Stop Bits: 1 Protocol: Full Duplex 💌
Auto-Configure
Use Modem Dialer Configure Dialer
Ok Cancel <u>D</u> elete <u>H</u> elp

Auto Configuration Successfull will appear.

7. Click OK.

Configure Allen-Bradley DF1 Communications Device			
Device Name: AB_DF1-1			
Comm Port: COM1 Device: SLC-CH0/Micro/PanelView			
Baud Rate: 19200 Station Number: 00 (Decimal)			
Parity: Even Error Checking: BCC			
Stop Bits: 1 Protocol: Full Duplex 💌			
Auto Configuration Successful!			
Use Modem Dialer Configure Dialer			
Ok Cancel <u>D</u> elete <u>H</u> elp			

The Configure Drivers window will now appear showing the **Status** as Running.

Configure Drivers		
Available Driver Types: RS-232 DF1 Devices	Add New	Close
Configured Drivers:		
Name and Description	Status	1
AB_DF1-1 DH485 Sta: 0 COM1: RUNNING	Running	Configure
		Startjup
		<u>S</u> tart
		Stop
		Delete
1 1		

The next step is to add a DeviceNet driver.

- 8. Click on the down arrowhead, ▼, and select your choice of drivers from the drop–down list.
- 9. Click on Add New.

Configure Drivers	
Available Driver Types:	Close
DeviceNet Drivers Add New R5:232 DF1 Devices Ethernet to PLC-5/SLC-5/5820-E1 CAlen-Bradley 1784-KTC(X) devices 1784-KTC(X) for ControlNet devices 1784-KTC(X) for ControlNet devices 1784-KTC(X) for ControlNet Driver 1784-PCIC ControlNet Driver Running 1784-PCIC ControlNet Driver Running 1784-PCIC ControlNet Driver PCI-5 (DH-1) Envices 1784-PCIC ALC Driver PCI-5 (DH-1) Envices 1784-PCIC ControlNet Driver PCI-5 (DH-1) Envices	Qooe Help Configure Statup Statu
SoftLogical Remote Devices via Linx or 1756-ENET Gateway	Delete

This window will appear.

10. Select the proper driver, then click **Select**.

Configure Drivers	
Available Driver Types:	lose
Di DeviceNet Driver Selection - RSLinx DeviceNet-2	×
Con Available DeviceNet Drivers: Allen-Bradley 1770-KFD Allen-Bradley 1771-SDNPT Allen-Bradley 1747-SDNPT Allen-Bradley 1747-SDNPT	e) e

G–4



Appendix G Allen–Bradley Setup

D0–DEVNETS DeviceNet Slave Module User Manual, Rev A

RSLogix

You are ready to connect to the PLC using your RSLogix software.

1. Click on **Communications** and select <u>Who Active Go</u> **Online.**



- 2. When this window appears, select the PLC to connect to.
- 3. Click OK.



This window will appear with the relay ladder program. You now want to configure the I/O. This must be done **OFFLINE** in order to change the configuration.

4. Select I/O Configuration.

TOLOGIE DOD - 11. LAWEE HACK		
Ele Edit View Search Commo Lools Windo	* Help	
🗋 😅 🖬 🐼 🕉 🖄 🐻 🗠 м 🕅	9.* 💿 입 옷 뜻 말 못 먹 윽 드 🗖	•
Former Development		
Driver 48 DF1-1 Node: 10	H Buser ABt & Timer/Counter & Input/Output & Compare	
	40.2	
	40 2	
	83/1	020
Controller		
Controller Properties		1746-OW8
Second Se		
CIII IO Configuration 000	· · · · · · · · · · · · · · · · · · ·	(END)
- Re Change Comparison		
Multipoint Monitor		
B- C Program Files		
-SYS 0 -		
N 5151.		
Colo 2 .		
Cross Baferarce		
- 00 - OUTPUT		
H - NPUT		
S2 - STATUS		
- DNARY		
T4 - TMER		
CS - COUNTER		
R6 - CONTROL		
- N7 - INTEGER		
Pre-PLOAT		
D N11		
Figure Fles		
- O co-output		
	File 2	2
For Help, remov F1		TOOD ODOD LARR IREAD



G-

Configure D0–DEVNETS with RSNetWorx You are now ready to configure the D0–DEVNETS installed in your DL05. First, open RSNetWorx. Look for Koyo Electronics in the hardware tree listed under **Vendor**. Click on the + to show the devices for Koyo. The following example shows two devices, D0–DEVNETS and T1K–DEVNETS.

orx for D

RSNetWorx opened.



C

Hardware	× ×	and the second	and the second second second
DeviceNet DeviceNet		{\Graph / Speachines } Majate/38 €	
Message Code Description			

Using the EDS file If you do not see your device listed, it will need to be added from the EDS file (refer to page 2–7). The following example will guide you through the procedure of installing the device from the EDS file.

Click <u>Tools</u> and select <u>EDS</u> Wizard....



G–9

Appendix G Allen-Bradley Setup

The EDS Wizard will open. EDS Wizard Simply follow the instructions Welcome to the EDS Wizard to register the device. The EDS Wizard allows you to: register EDS-based devices.
 unregister a device. [File] DescText CreateDate CreateTime NodTime Revision change the graphic images associated with a device.
 create an EDS "Stub."
 upload of EDS data from an "unknown" online device. ----ProdType To continue click Next Next > Cancel EDS Wizard X Register the EDS file. • Options The EDS Wizard provides you with several tasks. Register an EDS file(s). This option will add a device(s) to our database. C Unregister a device. This option will remove a device that has been registered by an EDS file from our database. ۳ĵ Change a device's graphic image. This option allows you to replace the graphic image (icon file) associated with a device. Create an EDS Stub. This option creates an EDS file with information that describes the file, device and I/O characteristics. C C <<u>B</u>ack <u>N</u>ext > Cancel

Enter the path for the EDS file.


EDS file installation results.



Change the icon image for your device, if you desire to.

EDS Wizard	×
Change Graphic Image. You can change the graphic image that is associated with a device.	
Change icon Change icon Generic Device D0-DEVNETS	
< <u>B</u> ack <u>N</u> ext >	Cancel

Review what you have done.

EDS Wizard		×
Final Tas This is	sk Summary s a review of the task you want to complete.	
	You would like to register the following device. D0-DEVNETS	
	To complete the above task, click Next	L
	< <u>B</u> ack <u>N</u> ext > Cance	əl

EDS Wizard complete.

EDS Wizard	×
	Completing the EDS Wizard You have successfully completed the EDS Wizard.
[File] DesoText = "" CreateFlace = 05 HodDate = 05 Revision [Device] VendCode = 00 ProdType = 00 ProdType = 00 ProdType = 00 HajRev = 21 HinRev = 11	
	Frish

E 12 🕸 🚓 🔟 👪

Q

Go on line

You will want to go on line with the network now.

In the main RSNetworx window,

1. Click on <u>Network</u> to select_ <u>Online</u>.

*k to select_

- 2. Select your network from the pop–up window.
- 3. Click **OK**.



G-11



Set up I/O parameters

Now you can set up the I/O parameters for the devices. The scanner needs to be configured first. This is done by accessing the scanner properties.

1. Select the scanner module.

This can be done in two different ways.

2. Click on the scanner name, then right click the mouse,

or

3. Click on **Device**, then click on properties in the pop–up window.

lardware zi	T1K-DEVNETS (6)	DO-DEVNETS	747-SDN icanner Actule (3)	
A Chine A Chine A Chine A Chine A Chine Communication Address Communication Communicatinatination Communicatination Commu		02	X Cd Ra Coy Rit Date Uplat	Cash Cath Di Ca Stor
	N 4 > N Graph (Spr	sadsheet) Master/3	ak 1	×

The properties window will appear. 4. Click Module .	General Module Scanlist Input Dutput ADR Summary 1747-SDN Scanner Module 1747-SDN Scanner Module 1747-SDN Scanner Module
	Name: Interference Description: Interference
	Address:
5. Click Upload .	Scanner Configuration Applet Image: Configuration Applet Op you want to upload the configuration from the device, updating the software's configuration to the device, updating the device? For more information, press F1 Upload Download
Uploading network information.	Uploading from Scanner



Note: Do not cancel. The entire network data must be allowed to upload.

The data appears.

- 6. Select the correct slot number which the DeviceNet scanner module is residing.
- 7. Click Scanlist.



G-13

If the node that you want is not	1747-SDN Scanner Module (3)
in the <u>S</u> canlist, it needs to be	General Module Scanlist Input Output ADR Summary
moved to the list.	Available Devices: Scanlist:
8. Highlight D0–DEVNETS	102, D0-DEVNETS
9. Click the right arrow.	
	Image: Automap on Add Image: Automap on Add Upload from Scanner Electronic Key: Download to Scanner Devroe Type Upload to Scanner Product Code Edit I//0 Paremeters. Minor OK Cancel Apply OK Cancel Apply
Now that D0–DEVNETS is in the list, be sure that it is	General Module Scanlist Input Dutput ADR Summary
selected.	Available Devices: Scanlist:
10. Click <u>E</u> dit I/O Parameters.	Image: state of the state o
	✓ Automap on Add ✓ Node Agtive Upload from Scanner Electronic Key: Download to Scanner ✓ Vendor Ørduct Code Major Bevision Edit I/O Parameters ✓ Major Contexplayer
	OK Cancel Apply Help
11. Set the R <u>x</u> Size and the T <u>x</u> Size to match the polled	Edit I/O Parameters : 02, D0-DEVNETS ? ×
of I/O bytes (refer to tables in Appendix C).	Bx Size: Bytes C Cyclic
12. Click OK .	Rx Size: Bytes Image: Bolled: Image: Bytes
Refer to page G–18 (Set Class Instance Attribute) if the total number of Rx and Tx bytes are not known.	Rx Size: 4 Bytes Heartbeat Rate: 250 msec Ix Size: 9 Bytes Advanced. Poll Rate: Every Scan
	OK Canad Batter UD City

Allen-Bradley Setup

This window will appear. 13. Click <u>Y</u>es.



Map the nodes

Map each node.

1. Click the **Input** tab in the properties window.

Be sure that D0–DEVNETS is selected.

- 2. Select **Discrete** for **Memory**, and **0** for **Start Word**.
- 3. Click AutoMap.

NOTE: M file is used with explicit messaging.

1747-SDN Scanner Module (3) ? × General Module Scanlist Input Output ADR Summary Node Type Rx Map Auto<u>M</u>ap 1. T1K-DEVNE... Polled 3 1:9.1.0 202, DO-DEVNETS Polled 4 No Advanced... Options. Memory: Discrete Start Word: 0 Bits 15 · 0 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0 -1:9.0 1:9.1 01, T1K-DEVNETS (6) 1:9.2 01, T1K-DEVNETS (6) 1:9.3 1:9.4 1:9.5 1:9.6 1:9.7 1:9.8 OK Cancel Apply Help

At the completion of the input AutoMapping, the window will look like this example. The D0–DEVNETS node is now shown.

NOUE		Туре	Bx	Мар		AutoMag
🗐 01, T1K	DEVNE	Polled	3	1:9.1.0		
202, DO-0	DEVNETS	Polled	4	1:9.2.8		Unmap
						Advanced
						Options
Memory:	Discrete	<u></u>	J	Start Word:	0	
Memory: Bits 15 - 0	Discrete	₹ 3 12 11] 10 9	<u>S</u> tart Word:	0 5 4	3210-
Memory: Bits 15 - 0 1:9.0	Discrete	31211	10 9	Start Word:	0	3210-
Memory: Bits 15 - 0 1:9.0 1:9.1 1:9.2	Discrete	3 12 11 0 00-DEVN	10 9 1, T1 ETS	Start Word: 8 7 6 K-DEVNET 01.	0 5 4 <u>5 (6)</u> T1K-DE	3210-
Memory: Bits 15 - 0 1:9.0 1:9.1 1:9.2 1:9.3	Discrete 15 14 1: 02,	3 12 11 0 00-DEVN	10 9 1, T1 IETS 02, I	Start Word: 8 7 6 K-DEVNET 01, 00-DEVNE	0 5 4 5 (6) T1K-DE	3 2 1 0 • VNETS (6)
Memory: Bits 15 - 0 I:9.0 I:9.1 I:9.2 I:9.3 I:9.4	Discrete 15 14 13	3 12 11 0 00-DEVN	10 9 1, T1 IETS 02, I	Start Word: 8 7 6 K-DEVNET 01, 00-DEVNE	0 5 4 5 (6) T1K-DE S 2, D0-D	3210 VNETS (6) EVNETS
Memory: Bits 15 - 0 1:9.0 1:9.1 1:9.2 1:9.3 1:9.4 1:9.5	Discrete 15 14 11	3 3 12 11 0 0 0 0 0 0 0 0 0 0 0 0 0 0	10 9 1, <u>11</u> 1, <u>11</u> 1, <u>11</u> 1, <u>11</u> 1, <u>11</u> 1, <u>11</u> 1, <u>11</u>	Start Word: 8 7 6 K-DEVNET 01, D0-DEVNE 0	0 5 4 5 (6) T1K-DE S 2, D0-D	3 2 1 0 •
Memory: Bits 15 - 0 1:9.0 1:9.1 1:9.2 1:9.3 1:9.4 1:9.5 1:9.6	Discrete 15141: 02,1	31211 00-DEVN] 10 9 1, T1 IETS 02, I	Start Word:	0 5 4 5 (6) T1K-DE [S 2, D0-D	3210

Now, map the outputs just the way you mapped the inputs. This time:

1. Click the **Output** tab in the properties window.

Be sure that D0–DEVNETS is selected.

- 2. Select **Discrete** for **Memory**, and **0** for **Start Word**.
- 3. Click AutoMap.

At the completion of the output AutoMapping, the window will appear like this example. The D0–DEVNETS node is now shown.

Node		Туре Тх	Мар	Auto	Man
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Download the scanlist to the scanner.

- 1. Select the **Scanlist** tab in the properties window.
- 2. Select <u>D</u>ownload to Scanner.

In the pop-up window:

- 3. Check All Records, then
- 4. Click **Download**.

DeviceNet - BSNetWork for DeviceNet	7 X	
General Module Scanlist Input Output ADR	Summary	
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Message Code Description		
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G-1



Note: Verify that the processor is in program mode before downloading the scanlist.

This is an error message that may appear.

Scanner Configuration Applet	×
The processor is in Run Mode!	
OK I	

When the download indication ends, download is complete.

ownlo	ading to Scanner	×
	Downloading Scanlist Node 2	
	Cancel	

Set Class Instance Use the Service Class Instance Attribute Editor to set the I/O to read and write to the Attribute DL05/06.

- 1. Select the D0-DEVNETS node.
- 2. Select Device

or.

- 3. Right click on the node symbol in the RSNetWorx window.
- 4. Select Class Instance Editor in the pop-up window.



? ×

5. Setup input attributes in this window.

Object Address must be set to: Class = 5, Instance = 2, Attribute = 7 Size = Word (2 bytes).

6. Click Execute

Read the data here.⁻



DO-DEVNETS

Service Class Instance Attribute Editor - [Node 2]

