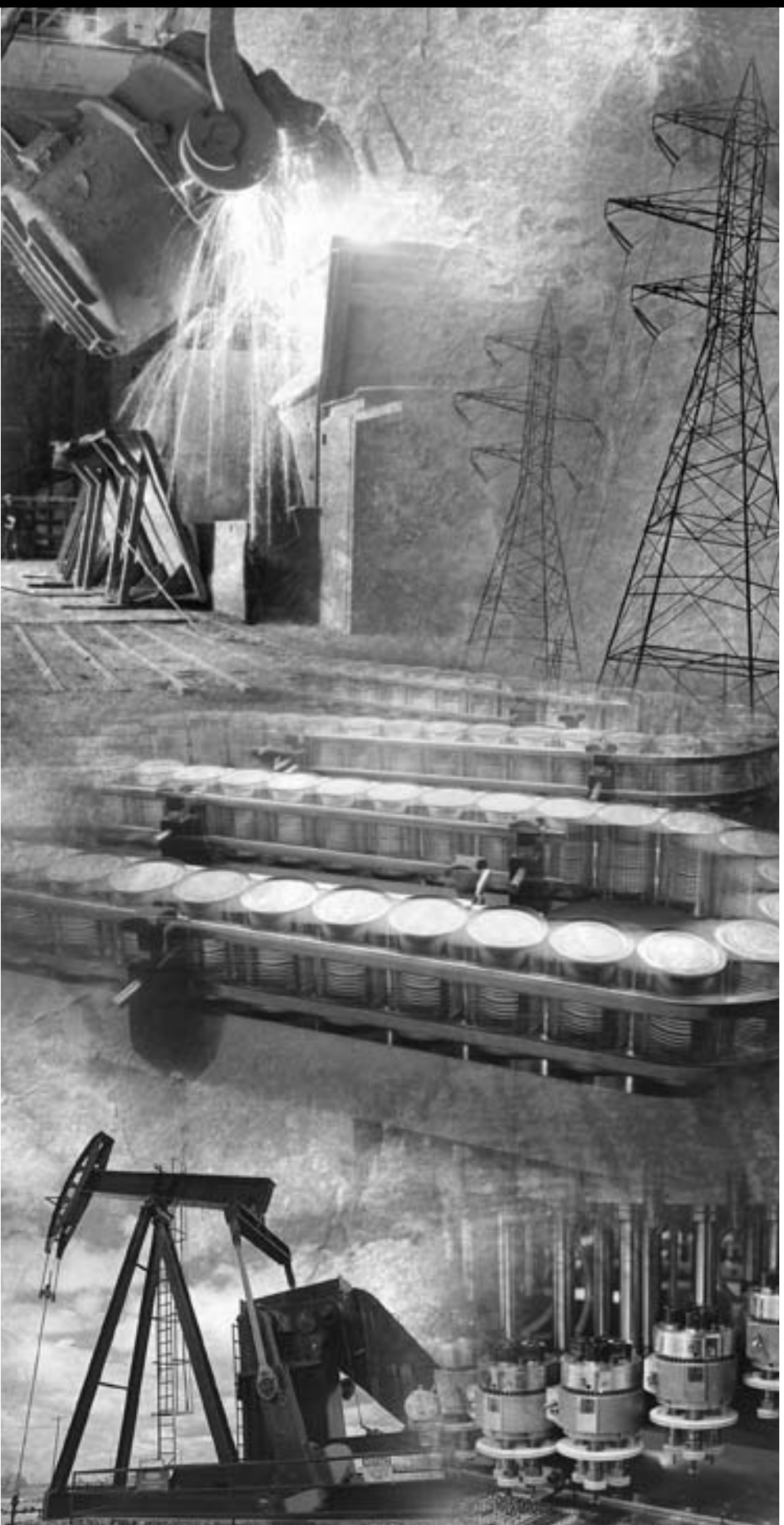


Allen-Bradley

DeviceNet To SCANport Communication Module with Digital Inputs

Catalog Number 2100-GK61
Firmware 2.xxx

User Manual

Rockwell Automation

Important User Information

Because of the variety of uses for the products described in this publication, those responsible for the application and use of this control equipment must satisfy themselves that all necessary steps have been taken to assure that each application and use meets all performance and safety requirements, including any applicable laws, regulations, codes, and standards.

The illustrations, charts, sample programs, and layout examples shown in this guide are intended solely for purposes of example. Since there are many variables and requirements associated with any particular installation, Rockwell Automation does not assume responsibility or liability (to include intellectual property liability) for actual use based upon the examples shown in this publication.

Rockwell Automation publication SGI-1.1, *Safety Guidelines for the Application, Installation, and Maintenance of Solid-State Control* (available from your local Rockwell Automation office), describes some important differences between solid-state equipment and electromechanical devices that should be taken into consideration when applying products such as those described in this publication.

Throughout this manual we use notes to make you aware of safety considerations:

ATTENTION: Identifies information about practices or circumstances that can lead to personal injury or death, property damage, or economic loss.

Attention statements help you to:

- Identify a hazard.
- Avoid the hazard.
- Recognize the consequences.

IMPORTANT: Identifies information that is critical for successful application and understanding of the product.

Using this Manual

Objectives

Read this preface to become familiar with the organization of the manual. In this preface, you will read about the following:

- Who should use this manual.
- An overview of the DeviceNet to SCANport Communication Module with Digital Inputs.
- The purpose of this manual.
- Terms and abbreviations.
- Conventions used in this manual.
- Rockwell Automation support.

Who Should Use this Manual?

Use this manual if you are responsible for installing, wiring, programming, or troubleshooting control systems that use the DeviceNet to SCANport Communication Module with Digital Inputs.

This manual is intended for qualified service personnel responsible for setting up and servicing the DeviceNet to SCANport Communication Module with Digital Inputs. You must have previous experience with and a basic understanding of electrical terminology, programming procedures, networking, required equipment and software, and safety precautions.

Purpose of this Manual

This manual is a learning and reference guide for the DeviceNet to SCANport Communication Module with Digital Inputs. It describes the procedures needed to install, configure, and troubleshoot the adapter.

Related Publications

Title	Publication Number
1771-SDN Scanner Configuration Manual	1771-6.5.118
DeviceNet Scanner Configuration Manual	1747-6.5.2
DeviceNet Cable System Planning and Installation Manual	DN-6.7.2

Safety Precautions

Please read the following safety precautions carefully.

ATTENTION: Only personnel familiar with SCANport products and associated machinery should plan or implement the installation, start-up, configuration, and subsequent maintenance of the DeviceNet to SCANport Communication Module with Digital Inputs. Failure to comply may result in personal injury and/or equipment damage.

Terms and Abbreviations

The following terms and abbreviations are specific to this product. For a complete listing of Allen-Bradley terminology, refer to the Allen-Bradley *Industrial Automation Glossary,* Publication AG-7.1.

Terms	Definition
DeviceNet	An open network that provides probabilistic I/O control through a managed bit-wise non-destructive multiplexing scheme.
SCANport	A standard peripheral communications interface for various Allen-Bradley drives and power products.
SCANport Peripheral	A device that provides an interface between SCANport and a network. It is often referred to as an adapter. For example, the DeviceNet to SCANport Communication Module with Digital Inputs is a SCANport peripheral.
SCANport Product	A device that uses the SCANport communications interface to communicate with one or more peripheral devices. For example, a motor drive such as a 1336 PLUS is a SCANport product.
Digital Input	ON-OFF input voltages of 230Vac, 115Vac, or 24Vdc.
RSNetWorx, RSLinx, RSLogix, RSLogix500	Rockwell Software products which provide communication to a wide range of applications. Refer to http://www.software.rockwell.com for more information.

Conventions Used in this Manual

The following conventions are used throughout this manual:

- Bulleted lists provide information, not procedural steps.
- Numbered lists provide sequential steps or hierarchical information.
- *Italic* type is used for chapter names and for parameter names.
- **Bold** type is used for names of menus, menu options, screens, and dialog boxes.

Important: This type of paragraph contains tips or notes that have been added to call attention to useful information.

Rockwell Automation Support

Rockwell Automation offers support services worldwide, with more than 75 sales/support offices, more than 500 authorized distributors, and more than 250 authorized systems integrators located throughout the United States alone. In addition, Rockwell Automation representatives are in every major country in the world.

Local Product Support

Contact your local Rockwell Automation representative for:

- Sales and order support.
- Product technical training.
- Warranty support.
- Support service agreements.

Technical Product Support

If you need to contact Rockwell Automation for technical assistance, please call your local Rockwell Automation representative.

Table of Contents

DeviceNet Objects

Overview

Chapter Objectives

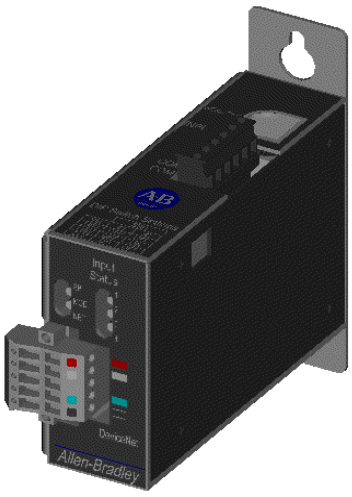
Chapter 1 provides an overview of your DeviceNet to SCANport Communication module with Digital Inputs. In this chapter, you will read about the following:

- Function of the 2100-GK61 module.
- Features of the 2100-GK61 module.
- SCANport products.
- Parts and hardware of the 2100-GK61 module.
- Steps for setting up the adapter.
- Required tools and equipment.

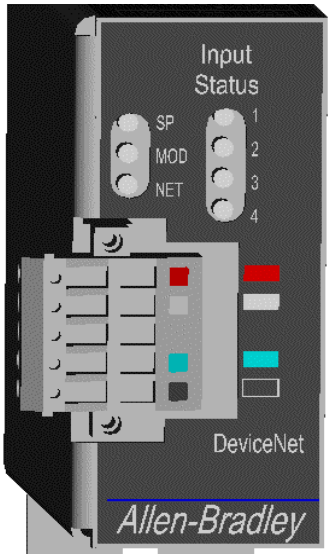
Overview of the Communication Adapter

Figure 1.1
2100-GK61 Module

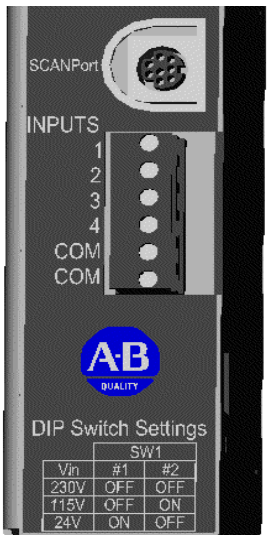
2100-GK61 Module



2100-GK61 Module - Front View



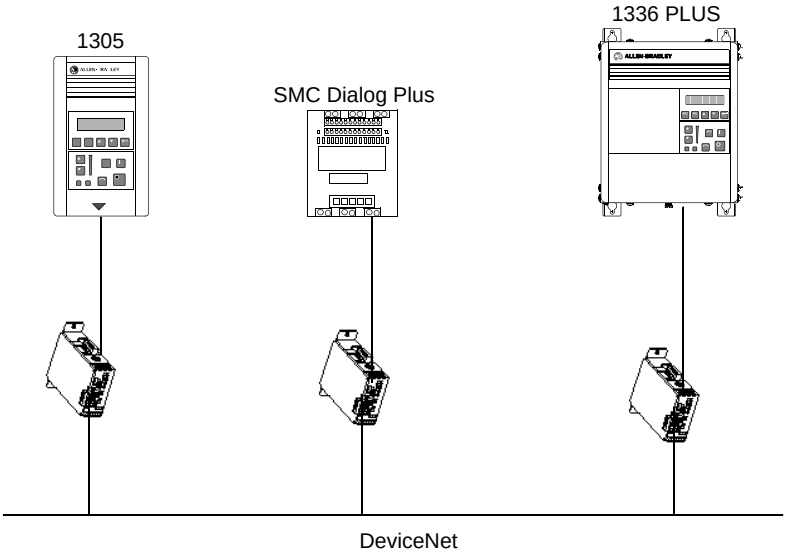
2100-GK61 Module - Top View



The 2100-GK61 module mounts on a panel and connects to the SCANport product via a SCANport cable. Digital inputs of 230Vac, 115Vac, or 24Vdc are connected to the adapter via discrete wires. The voltage level used for the digital inputs is set via a dip switch SW1.

The communications adapter provides an electronic communications interface between a DeviceNet network and any single SCANport product.

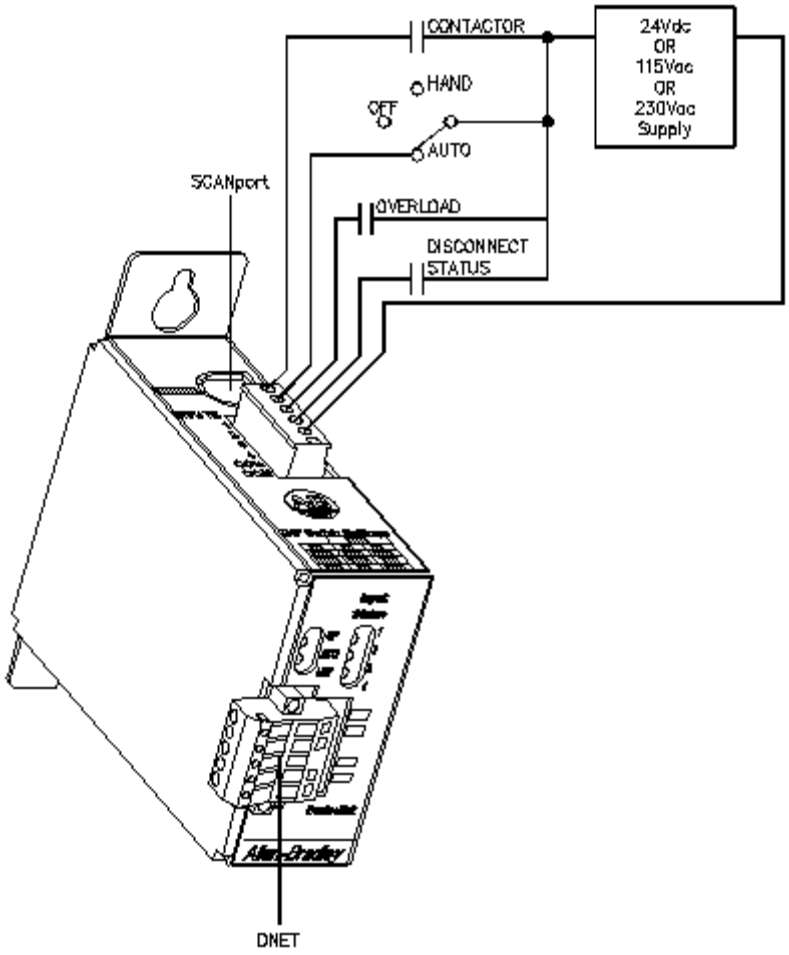
Figure 1.2
Example of 2100-GK61 Modules Connecting SCANport Products to DeviceNet



In Figure 1.2, a SCANport cable connects a 2100-GK61 module to a SCANport product through a port on the SCANport product. A DeviceNet cable connects the module to the DeviceNet network. The module then translates the DeviceNet messages into SCANport messages that can be understood by the connected product.

The adapter is also capable of connecting to four (4) common switch inputs. These inputs can monitor status of disconnect switches, starter and contactor auxiliary contact, relays, push buttons, or any ON-OFF device capable of switching 230Vac, 115Vac, or 24Vdc.

Figure 1.3
Example of 2100-GK61 Module Connecting Digital Inputs



In Figure 1.3, discrete wiring connects up to four (4) digital inputs to the 2100-GK61 module. A DeviceNet cable connects the module to the DeviceNet network and a SCANport cable connects a SCANport product to the module. The contact status is then translated into a DeviceNet message that can be used to control SCANport devices attached to the module or other devices on the DeviceNet network.

Features of the Communication Adapter

The DeviceNet network is an open, global industry-standard communication network designed to provide an interface through a single cable from a programmable controller directly to “smart” devices such as sensors, push buttons, motor starters, simple operator interfaces, and drives.

The 2100-GK61 module lets you connect your SCANport products to a DeviceNet network. This adapter features the following:

- Flash upgradeability allows for field updates in the event of changes to the adapter’s firmware.

- COS (Change of State) capability lets you customize this device's activity on the network by configuring the adapter to report only new data.
- Cyclic operation lets you customize the devices's activity on the network by configuring the adapter to report its data at specific intervals.
- Polled operation allows you to customize the device's activity on the network to respond only after the scanner sends control data.
- Peer I/O capabilities let the drive's I/O (logic command, reference, logic status, feedback and datalinks) be broadcast to or received from other drives connected via 1203-GU6, 1336-GM6 or 2100-GK61 adapters.
- Software configuration lets you configure the adapter using RSNetWorx for DeviceNet.
- Faulted Node Recovery lets you change an item, such as a node address of a device, even when it is faulted on the network.
- User-configurable fault response provides the ability to customize the adapter's actions to communication errors.
- A Module Status LED helps to diagnose network, module, and SCANport product health.
- Monitor and report status of four (4) individual digital inputs.

SCANport Products

Some SCANport products support one peripheral; others support up to six peripherals. The table below lists SCANport products, the number of peripherals each supports, the minimum and maximum I/O words, and the type of adapter that can be used.

Product	Number of Peripherals Supported	I/O Words		Adapter Use
		Minimum	Maximum	2100-GK61
1305 AC MICRO Drive	5	0	10	Yes
1336 IMPACT™ Drive	6①	0	10	Yes
1336 PLUS AC Drive	6①	0	10	Yes
1336 PLUS II Drive	6①	0	10	Yes
1336 FORCE™ Drive	6①	0	10	Yes
1394 AC Mult-Axis Motion Control System	5	0	10	Yes
SMC Dialog Plus	1	0	2	Yes
SMP-3 Smart Motor Protector	2	0	2	Yes
1397 Digital DC Drive	5	0	10	Yes
1557 Medium Voltage Drive	5	0	10	Yes

① Lower horsepower products may not support a sixth peripheral. Refer to your user manual to verify that your product supports a sixth peripheral.

Important: To connect multiple peripherals to a SCANport product, a port expander may be required. Refer to your product's documentation for more information.

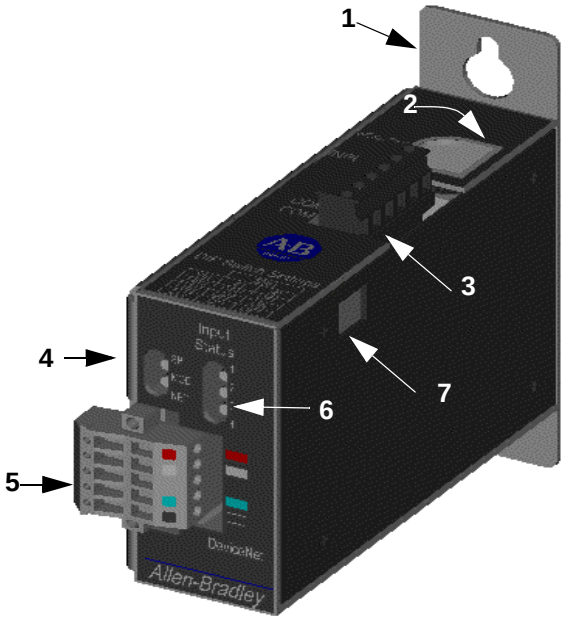
Important: If you intend to use datalinks to communicate with and control your SCANport product, verify that your SCANport product supports datalinks before enabling them in the adapter.

Hardware and Parts Description

2100-GK61 Module Hardware

Figure 1.4 illustrates and the following table lists the main parts of the 2100-GK61 DeviceNet to SCANport communication module with Digital Inputs:

Figure 1.4
Parts of the 2100-GK61 Module



Number	Part	Description
1	Panel mount	Attach module to sub-panel through mounting holes.
2	SCANport Connection	Provides a standard SCANport 8-pin circular mini-DIN connector for the SCANport cable.
3	Digital Input Connector	Allows connection of switched 230Vac, 115Vac, or 24Vdc inputs to module. The 6-pin plug-in connector (PIN 192 929) is supplied with the module.
4	Bi-Color LEDs	Indicate the status of the DeviceNet media channel, of the SCANport connection, and of the module. For more information, refer to Chapter 7, *Troubleshooting*.
5	DeviceNet Connection	Provides a 10-pin Phoenix connector to attach the module to the DeviceNet network. The 10-pin plug-in connector (PIN 94220605) is supplied with the module.
6	Input Status LEDs	Indicate the ON-OFF status of the digital inputs.
7	SW1	Set to match the digital input voltage applied of 230Vac, 115Vac, or 24Vdc.

Overview of Setting Up the Adapter

To set up the DeviceNet to SCANport Communication Module with Digital Inputs, you must perform the following tasks:

1. Install the module. Refer to Chapter 2, *Installation*.
2. Set the adapter's node address and configure the adapter's parameters. Refer to Chapter 3, *Configuring the DeviceNet to SCANport Communication Module with Digital Inputs*.
3. Configure a scanner (either PLC or SLC) to communicate with the Adapter. Refer to Chapter 4, *Configuring a Scanner to Communicate with the Adapter*.
4. If necessary, create a ladder logic program to control the SCANport product. Refer to Chapter 5, *Ladder Logic Programming—Including Reading Inputs*.

Required Tools and Equipment

To install and configure a 2100-GK61 module, you need the following:

- DeviceNet to SCANport Communication Module with Digital Inputs (2100-GK61).
- 10-pin plug-in DeviceNet connector (supplied with module).
- Appropriate cables for SCANport and DeviceNet connections. Refer to the Selecting Cables section in Chapter 2, *Installation*.
- 6-pin plug-in Input connector (supplied with module).
- #10 hardware for attaching module to a panel.
- A PC that is:
  - Running RSNetWorx.
  - Connected to and communicating with the DeviceNet network using a 1784-PCD card or a 1770-KFD adapter.
  - Running RS Linx.
  - Running RSLogix5 (if using PLC) or RSLogix500 (if using SLC).

Important: Refer to http://www.software.rockwell.com for more information on these software products.

Installation

Chapter Objectives

Chapter 2 provides the information that you need to install the 2100-GK61 module. In this chapter, you will read about the following:

- Required tools and equipment.
- Selecting cables.
- Installing the adapter.
- Removing the adapter.

Installing a 2100-GK61 Module

Follow these procedures to install a 2100-GK61 module.

Required Tools and Equipment

To install your 2100-GK61 module, you will need the following tools and equipment:

- DeviceNet to SCANport Communication Module with Digital Inputs(2100-GK61).
- A 6-pin and 10-pin plug-in connector (supplied with module).
- Screwdriver or nutdriver and mounting screws (#10).
- Appropriate cables for SCANport and DeviceNet connections. Refer to the “Selecting Cables” section below.

Selecting Cables

To connect the 2100-GK61 to the SCANport product and the DeviceNet network, you must select an appropriate DeviceNet cable and Allen-Bradley SCANport cable. Use the following information to select appropriate cables for each connection.

SCANport Cables

When selecting the SCANport cable to connect the 2100-GK61 module to the SCANport product, you need to:

- Use an Allen-Bradley SCANport cable. Refer to the table below.

Male to Male Connection		Male to Female Connection	
Length	**Catalog Number**	**Length**	**Catalog Number**
1/3 m	1202-C03	1/3 m	1202-H03
1 m	1202-C10	1 m	1202-H10
3 m	1202-C30	3 m	1202-H30
9 m	1202-C90	9 m	1202-H90

- Use less than 10 meters (33 feet) of cable between the SCANport product and adapter.
- Keep SCANport cables away from high power cables to guard against introducing noise into your system.

DeviceNet Cables

The 2100-GK61 module comes with a 10-pin (dual row 5-pin) connector. This connector is used to wire the module for both single drops, when only one side of each terminal is used, or to daisy chain devices together when both sides of the terminals are used. A drop line connects a node such as a 2100-GK61 module in the DeviceNet cable system to the DeviceNet trunk.

Before connecting modules to the network, you must determine if your network is within limits of the cable system. Class 1 cables are rated 600 volts, 8 amps. Class 2 cables are rated 300 volts, 4 amps. The cables in the chart below can be used for Trunk or Drop applications. When used for Trunk, length limits must be observed.

Cable Type	Part Number	Data Rates		
		125 Kbps	**250 Kbps**	**500 Kbps**
Class 1 Flat	1485C-P1-E75	420m (1378 ft.)	200m (656 ft.)	75m (246 ft.)
Class 2 Thick Round	1485C-P1-A50	500m (1640 ft.)	250m (820 ft.)	100m (328 ft.)
Class 2 Thin Round	1485C-P1-C50	100m (328 ft.)	100m (328 ft.)	100m (328 ft.)

Class 1 round drop cable is recommended for connections between devices and Class 1 Trunk. Maximum drop length is 6m (20 ft.) Cumulative Drop Budget is based on Data Rate.

125 Kbps	250 Kbps	500 Kbps
156m (512 ft.)	78m (256 ft.)	39m (128 ft.)

Class 1 Drop Cable is available in three spool sizes:

Cable Part Number	Spool Size
1485C-P1-B50	50m (164 ft.)
1485C-P1-B150	150m (492 ft.)
1485C-P1-B300	300m (984 ft.)

For more information on DeviceNet cables and cable systems, refer to the DeviceNet Cable System Planning and Installation Manual, Publication DN-6.7.2.

Input Wires

Choose a suitable wire to handle 230Vac, 115Vac, or 24Vdc voltage, depending on installation. The input connector is capable of installing 12-24AWG wire.

Installing the DeviceNet to SCANport Communication Module with Digital Inputs (2100-GK61)

The following instructions explain how to physically install your DeviceNet to SCANport Communication Module with Digital Inputs.

ATTENTION: Severe injury or death can result from electrical shock, burn, or unintended actuation of controlled equipment. Hazardous voltages may exist in the cabinet even with the circuit breaker in the off position. Recommended practice is to disconnect and lock out control equipment from power sources and discharge stored energy in capacitors, if present. If it is necessary to work in the vicinity of energized equipment, the safety related work practices of NFPA 70E, Electrical Safety Requirements for Employee Workplaces, must be followed.

ATTENTION: DO NOT work alone on energized equipment!

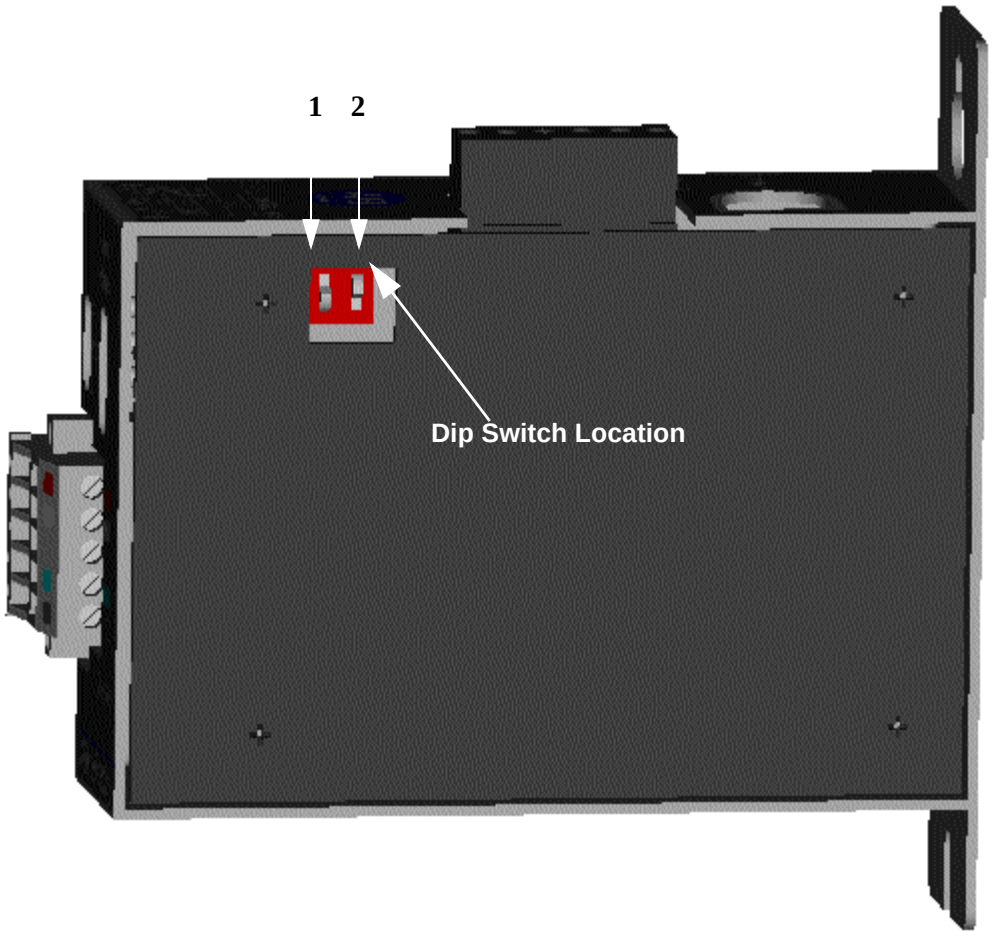
1. Before installing the module, set the Digital Input selection switch SW1 to the proper input voltage per the table below.

VIN	SW1	
	#1	#2
230Vac	OFF	OFF
115Vac	OFF	ON
24Vdc	ON	OFF

SW1 is accessed through the plastic cover on the 2100-GK61 module as show in Figure 2.1

ATTENTION: To guard against possible component damage, assure that Dip Switch SW1 is set for the correct input voltage used in the system before power is applied to the module.

Figure 2.1
Dip Switch Access - Side View of 2100-GK61 Module



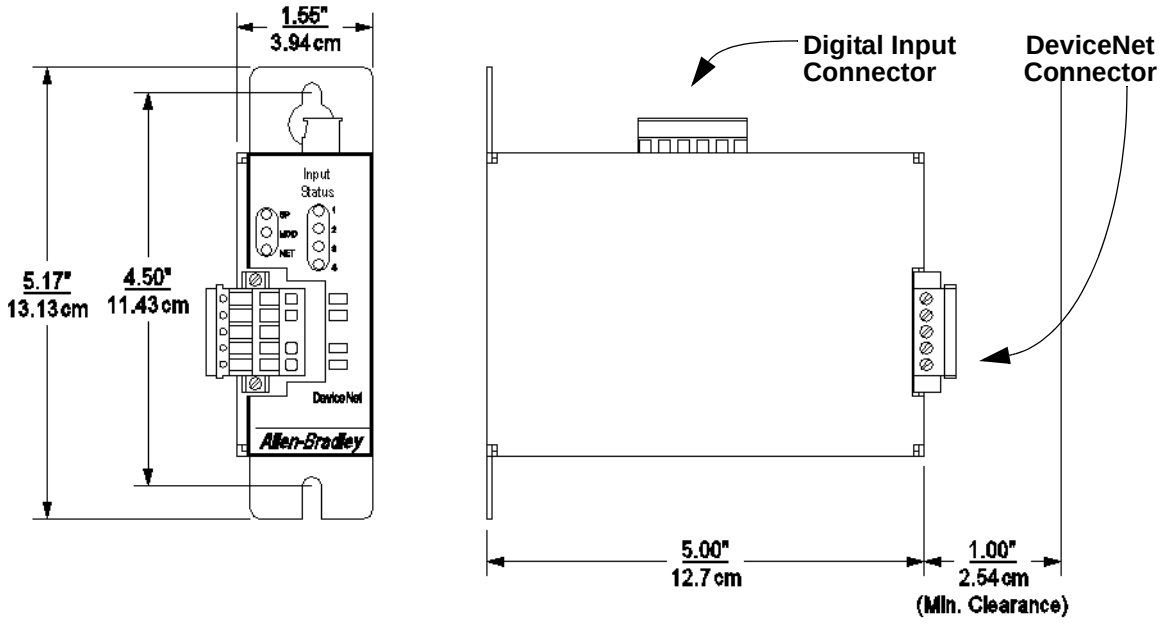
2. Determine a suitable mounting location within a desired location close to its interconnecting devices and /or components.

ATTENTION: The 2100-GK61 module is an open panel device and must be mounted inside a suitable enclosure.

When choosing a suitable mounting location, allow 1.0” (2.54cm) clearance from the front of the module to the door of the enclosure or other devices. This clearance is needed for DeviceNet wiring harness/bend radius.

Mount the module to the panel with #10 hardware as detailed in Figure 2.2.

Figure 2.2
Mounting Dimensions

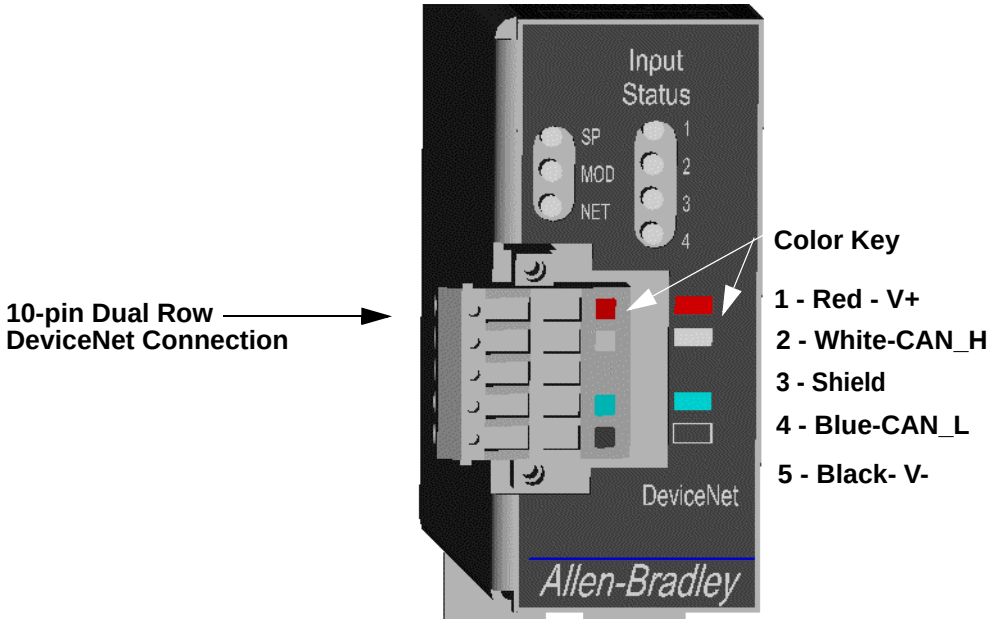


3. Remove power from the network.

4. Insert the DeviceNet cable wires into the 10-pin connector. Make sure you follow the color key next to the connector receptacle on the module.

ATTENTION: If you wire the 10-pin header after you've connected it to the module, static control precautions are required. Device malfunction may occur if you do not follow ESD control procedures. If you are not familiar with static control procedures, refer to Allen-Bradley Publication 8000-4.5.2, *Guarding Against Electrostatic Damage*, or other applicable ESD protection handbook.

Figure 2.3
DeviceNet Connections



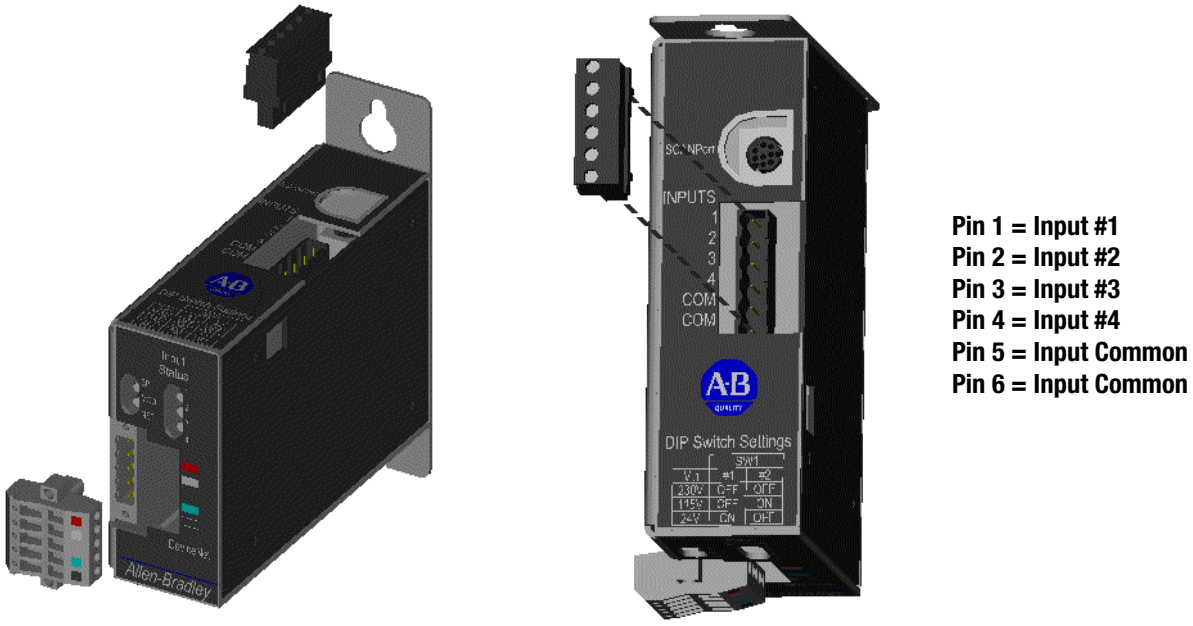
Front View of 2100-GK61 Module

5. Plug the connector into the module.

> ATTENTION: Danger of electrical shock exists if power is not disconnected to Digital Input Devices. Verify power is removed before proceeding.

6. Connect the Digital Inputs to the Digital Input six (6) pin connectors. Below is the connection pinout detail.

Figure 2.4
Digital Input Connections



Pin 1 = Input #1
Pin 2 = Input #2
Pin 3 = Input #3
Pin 4 = Input #4
Pin 5 = Input Common
Pin 6 = Input Common

7. Plug the Input connector into the module.

8. Connect the SCANport cable to the communications adapter and then to the SCANport product.

Figure 2.5
SCANport Connection

9. Reapply power to the DeviceNet network.

10. If necessary, apply power to the connected SCANport product and to the Digital Inputs.

Your 2100-GK61 module is now installed. The SCANport LED is green. The network and module LEDs are blinking green. If your module's LEDs are different, refer to Chapter 7, *Troubleshooting*, for more information.

You must now edit the adapter's node address, and you may want to edit some of its other parameters. Refer to Chapter 3 for more information.

Removing the DeviceNet to SCANport Communication Module with Digital Inputs (2100-GK61)

To remove the DeviceNet to SCANport Communication Module with Digital Inputs, you need to:

1. Disconnect Input Power from Digital Inputs.

ATTENTION: Electrical shock hazard exists if power is not disconnected to Digital Input Devices. Verify power is removed before proceeding.

2. Remove the SCANport cable from the SCANport product and then from the module.
3. Unplug the 10-pin DeviceNet connector from the module.
4. Unplug the 6-pin Digital Input connector from the module.
5. Remove the module from the panel.

Configuring the DeviceNet to SCANport Communication Module with Digital Inputs

Using RSNetWorx for DeviceNet

Chapter Objectives

Chapter 3 provides information that you need to configure the 2100-GK61 module over the DeviceNet network. In this chapter, you will read about the following:

- Factory-default settings for the module.
- RSNetWorx software.
- Equipment necessary to use RSNetWorx software.
- Editing the 2100-GK61 adapter's parameters using RSNetWorx software.

This section assumes you have experience using RSNetWorx software to configure a DeviceNet network.

Factory Default Settings for the 2100-GK61

The factory-default settings of the DeviceNet to SCANport Communication Module with Digital Inputs include the following:

- 16-bit Logic Command/Status enabled for polling.
- 16-bit Reference/Feedback enabled for polling.
- If the scanner is put into program mode or the network faults, the SCANport product will be faulted by the module. (Firmware must be version 2.080 or above. Earlier firmware versions are flash upgradeable. Consult the factory.)
- A node address of 63.
- DeviceNet autobaud detection enabled.

You should change the node address by editing the *DN Node Address* (2) parameter. Note: The number in ( ) following the parameter name corresponds to the parameter number as found in Appendix B, *DeviceNet to SCANport Communication Module with Digital Inputs Parameters*. You must change the autobaud detection if no other devices on your DeviceNet network have a fixed data rate by editing *DN Data Rate* (3) parameter in the module.

Important: Refer to Appendix B, *DeviceNet to SCANport Communication Module with Digital Inputs Parameters*, for information on changing the node address or data rate.

If you wish to change other functions (e.g., Fault Configurable inputs) or add more functions (e.g., datalinks), you must edit the adapter's parameters. To do so, refer to:

- Appendix B, *DeviceNet to SCANport Communication Module with Digital Inputs Parameters*, for detailed information about the adapter's parameters.
- Instructions in this chapter on using RSNetWorx for DeviceNet to edit parameters.

What is RSNetWorx for DeviceNet?

RSNetWorx for DeviceNet is a Windows application that lets you configure DeviceNet networks. Using a graphical representation of your network, you can configure network-wide parameters and the network-wide schedule.

After installing or mounting the adapter, you can use RSNetWorx for DeviceNet to configure or edit the adapter's parameters.

Required Equipment and Software

Before configuring or editing your adapter's parameters, your PC must be:

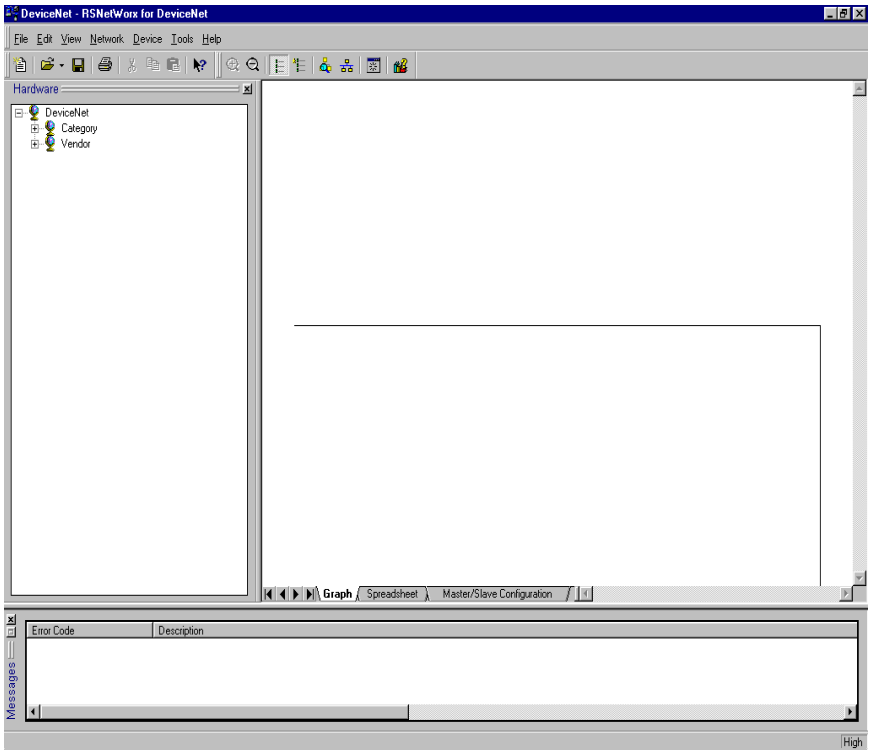
- Running RSNetWorx for DeviceNet. Refer to http://www.software.rockwell.com for more information on this product.
- Connected to and communicating with the DeviceNet network using a 1784-PCD card, a 1784-PCID card, a 1784-PCID5 card, or a 1770-KFD adapter running with RSLinx. Refer to http://www.software.rockwell.com for more information on the RSLinx product. Refer to http://www.ab.com/products.html for more information on "DeviceNet Network," under "Networks and Communication Products."

Using RSNetWorx to Edit Your Adapter's Parameters

The following instructions describe how to use RSNetWorx for DeviceNet in online mode to edit your adapter's parameters.

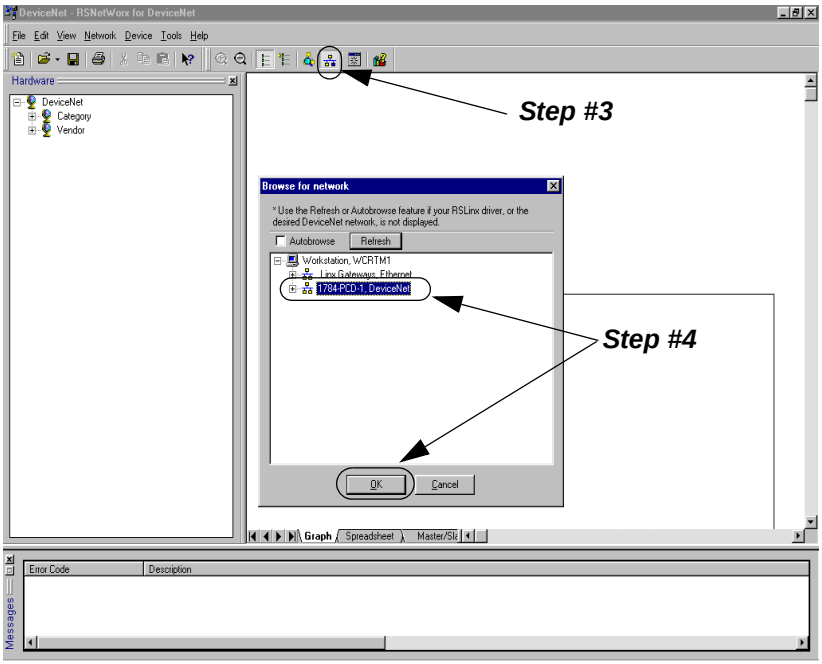
1. Use RSLinx to configure the DeviceNet drivers for your system using the **Configure Drivers** option in the **Communications** menu.
2. Start RSNetWorx for DeviceNet. The RSNetWorx for DeviceNet screen appears as seen in Figure 3.1.

Figure 3.1
RSNetWorx for DeviceNet Screen



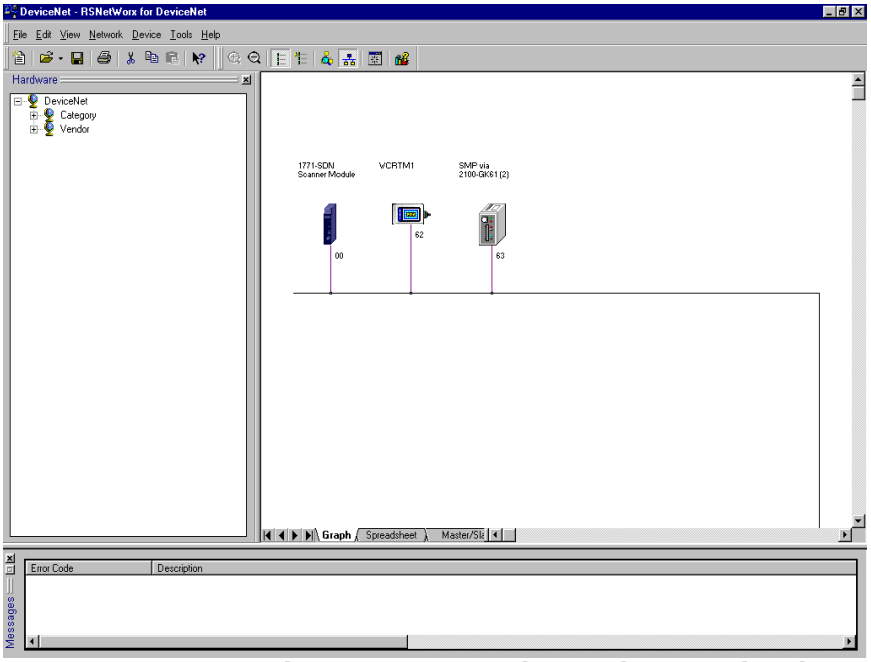
3. In the **Network** menu, select **Online,** or click on the **Online** icon as indicated in Figure 3.2.
4. The **Browse Network** screen appears asking to select which network you wish to go online with. Select the DeviceNet network desired and click on **OK**.

Figure 3.2
Online Screen



5. The network will be scanned and the screen will build the online configuration as shown in Figure 3.3.

Figure 3.3
RSNetWorx Graphical View



In Figure 3.3, Node 00 is scanner, Node 62 is the PC, and Node 63 is the module we are configuring.

Your module appears as Node 63 by default. If you have changed its node address parameter and reset the module, its new node address will appear on the screen.

Important: If the module does not appear:

- Verify there is an EDS file for the device. Refer to "Creating an EDS file for your SCANport Product" in Chapter 4, *Configuring a Scanner to Communicate with the Adapter*.
- Verify that the device has a unique node address. Check the network LED on the module. If it is red, it is not an unique address. You must configure the module in a point-to-point connection.

6. Double-click the icon for the 2100-GK61 module. (In our example, it is node 63 in Figure 3.3.)

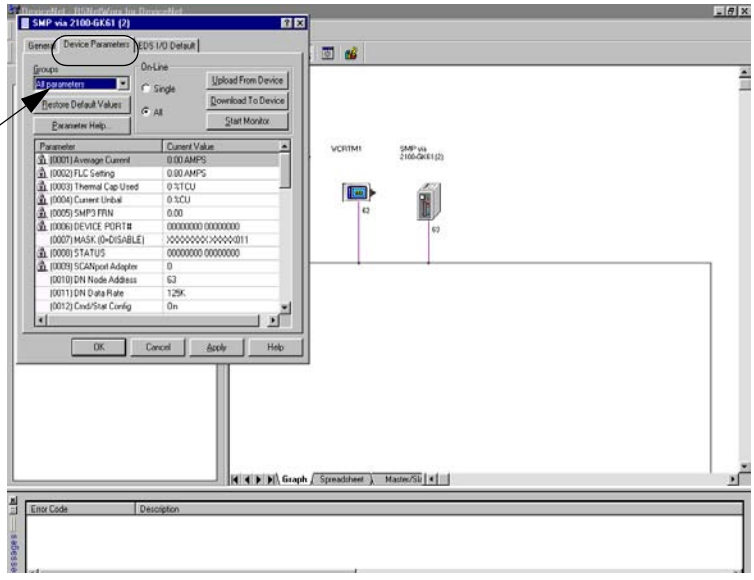
The DeviceNet Configuration screen appears for the selected device. The screen has three tabs to choose from: General, Device Parameters, and EDS I/O Default.

The **General** tab allows you to give the device a name and add a description for the device. These names and descriptions will be used to represent and describe the product throughout RSNetWorx for DeviceNet.

The **DeviceNet Parameters** and **EDS I/O Default** tabs allow you to see the parameters and configuration of the device selected.

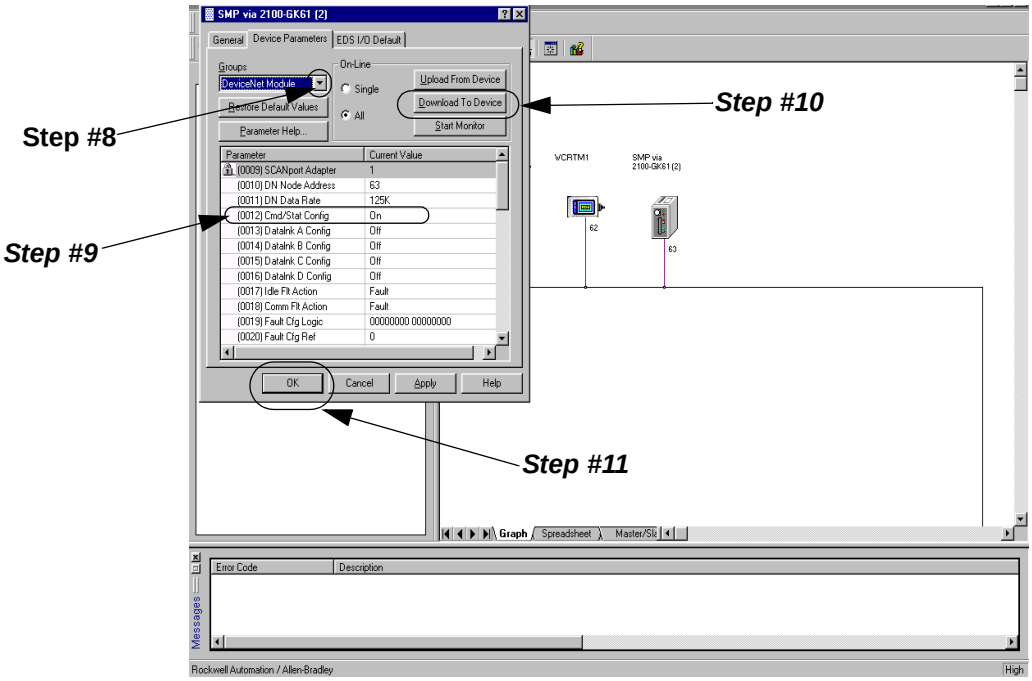
7. Click on the **Device Parameters** tab. A dialog box requesting to upload or download the device's parameters appears. Click on the **Upload** button to upload the parameters from the module. The screen listing all the device's parameters appears. In this example the 2100-GK61 is configured with an SMP3 device.

Figure 3.4
Device Parameters, all



8. Click on the Groups pull-down arrow and select DeviceNet Module. The display changes, listing only the parameters associated with the 2100-GK61.

Figure 3.5
Device Parameters, Module Only



9. Double click on the parameter(s) you wish to edit. Change the data to the desired value (refer to Appendix B for acceptable values for each parameter). A lock icon indicates that the parameter is read-only and cannot be changed.

10. Click on the Download to Device button to save the changes made to the module.

Important: It may be necessary to reset the adapter for the changes to take effect. Refer to Appendix B to see if the parameter you changed required the module to be reset in order to take effect.

11. Click on the OK button to return to the graph screen.

Configuring a Scanner to Communicate with the Adapter

Chapter Objectives

Chapter 4 provides instructions for configuring your scanner to communicate with the 2100-GK61 module. This allows the product connected to the adapter to be an active node on the DeviceNet network. In this chapter, you will read about the following:

- RSNetWorx for DeviceNet software.
- Equipment and software needed for the configuration.
- Configuring a PLC, SLC, or ControlLogix scanner to communicate with the adapter.

This chapter assumes you have experience using RSNetWorx for DeviceNet to configure a DeviceNet network.

What is RSNetWorx for DeviceNet?

RSNetWorx for DeviceNet is a Windows application that lets you configure DeviceNet networks. Using a graphical representation of your network, you can configure network-wide parameters and the network-wide schedule.

After installing and configuring the DeviceNet to SCANport Communication Module with Digital Inputs, you can use RSNetWorx for DeviceNet to configure the scanner to recognize and communicate with it.

For more information on RSNetWorx for DeviceNet, refer to the RSNetWorx for DeviceNet online help.

Required Equipment and Software

Before configuring the scanner, your PC must be:

- Running RSNetWorx for DeviceNet. Refer to http://www.software.rockwell.com for more information on this product.
- Connected to and communicating with the DeviceNet network using a 1784-PCD card, a 1784-PCID card, a 1784-PCID5 card, or a 1770-KFD adapter running with RSLinx. Refer to http://www.software.rockwell.com for more information on the RSLinx product. Refer to http://www.ab.com/products.html for more information on “DeviceNet Network” under “Networks and Communication Products.”

Getting Started

For the scanner on the DeviceNet network to transmit control I/O and/or messages to the adapter, you must first configure it to recognize and communicate with the adapter.

The following instructions describe how to use RSNetWorx for DeviceNet to configure a new DeviceNet network in online mode. The main steps in the configuration are:

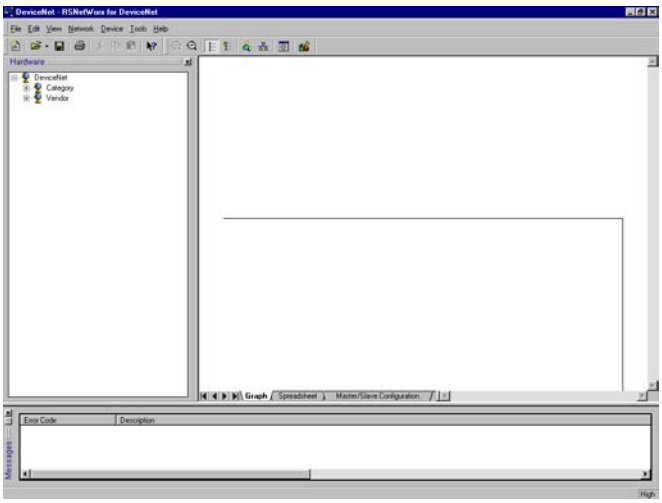
- Using online mode in RSNetWorx for DeviceNet.
- Downloading an EDS file for your SCANport product (if necessary).
- Configuring the PLC scanner or SLC scanner.

Using Online Mode in RSNetWorx for DeviceNet

Although you can configure the DeviceNet network offline, it is easier to configure the network online because you can see a graphical representation of your network in RSNetWorx for DeviceNet. The following directions explain how to use online mode.

1. Start **RSLinx** to configure the DeviceNet Drivers for your system, using the **Configure Drivers** option in the **Communications** menu.
2. Start RSNetWorx for DeviceNet. The RSNetWorx for DeviceNet screen appears.

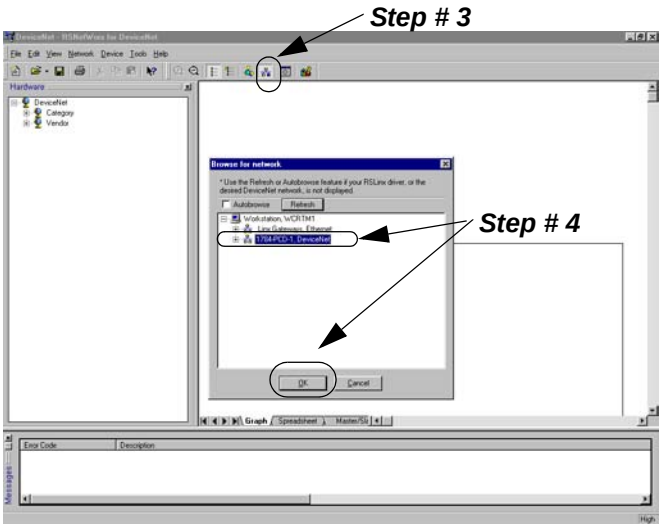
Figure 4.1
RSNetWorx for DeviceNet Screen



3. In the **Network** menu, select **Online**, or click on the **Online** icon as indicated in Figure 4.2.

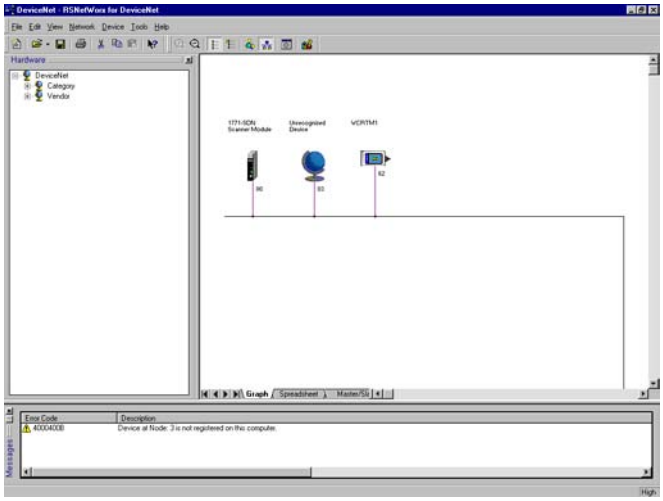
4. The **Browse Network** screen appears, requesting specification of which network you wish to go online with. Select the DeviceNet network desired and click on **OK**.

Figure 4.2
Online Screen



5. The network will be scanned and the screen will build the online configuration as shown in Figure 4.3.

Figure 4.3
Online Graphical View



Important: In our example, our module is Node 3. It has a Unrecognized Device icon, and the error code lists it as an unregistered device, so we will need to download an EDS file for it.

You are now in online mode. You must check to see if you need an EDS file for the device you are adding. Refer to the “Download an EDS file for Your SCANport product” selection in this chapter.

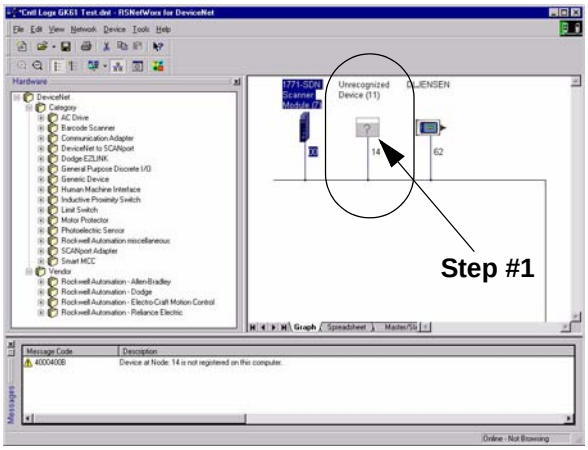
Downloading an EDS File for Your SCANport Product

Each DeviceNet product has a unique EDS file based on electrical ratings, I/O, and DeviceNet-to-SCANPort communication interface (if used). For IntelliCENTER software or RSNetWorx to function properly, a matching EDS file must be registered on the PC or laptop connected to DeviceNet network.

- An Electronic Data Sheet (EDS) is a simple file format that includes the device’s configurable parameters.
- There is a unique EDS file for each size of E3, each type of DSA, and every combination of GK61 and connected ScanPort Product (Drive, SMC, SMP-3).
- EDS files can be used by network tools (such as RSNetworx for DeviceNet) to read or set device parameters.
- Each vendor is required to supply the configuration information. The vendor must also supply an EDS file to successfully pass conformance testing.

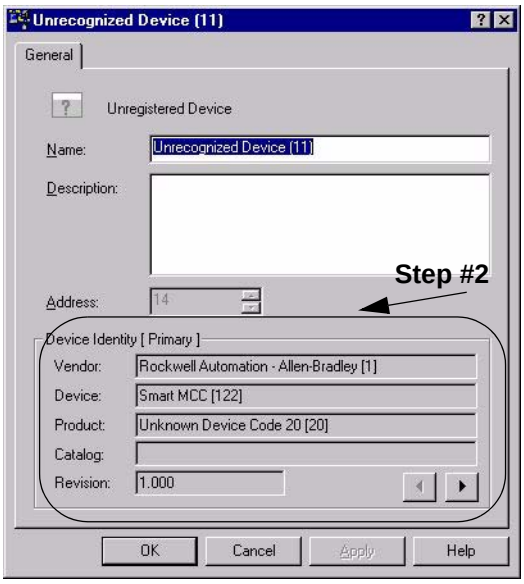
1. To get information about an unregistered Device in RSNetworx for DeviceNet, **double-click the icon**.

Figure 4.4
Unrecognized Device in RSNetWorx



2. An Unrecognized Device screen appears. The device identity can be obtained from this screen. Included in the example shown in Figure 4.4 are Vendor Code (1), Device Code (122), Product Code (20), and Major Revision Code (1).

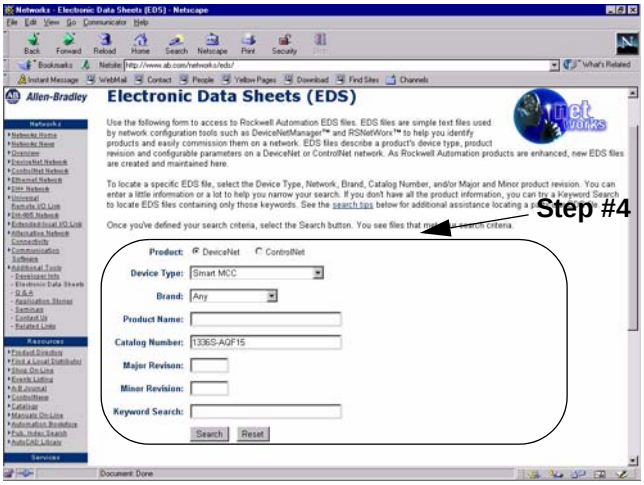
RSNetWorx Information Screen for Unrecognized Device



3. EDS files are available for download at the Allen-Bradley web site http://www.ab.com/networks/eds. There is a unique EDS (Electronic Data Sheet) file for each size of E3, each type of DSA, and every combination of 2100-GK61 and connected SCANPort Product (Drive, SMC, or SMP-3).

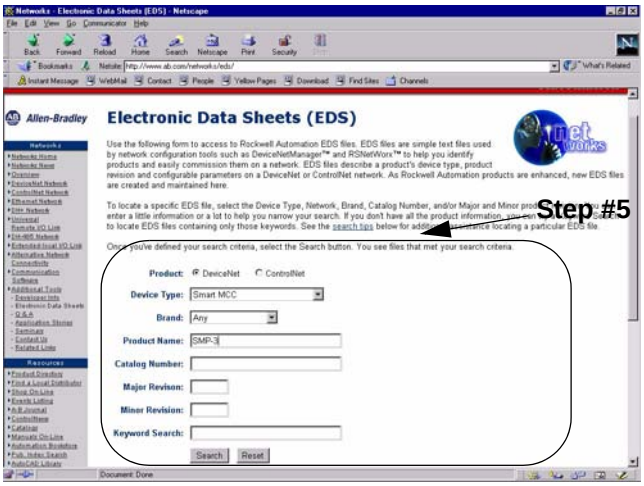
4. In the example below, a search is being performed for an EDS file for a 1336 drive with 2100-GK61. The procedure involves (1) selecting Smart MCC for the device type 2100-GK61, (2) entering at least a portion of the catalog numbers, and (3) clicking on **Search**.

Figure 4.5
EDS Search for 1336 Drive with 2100-GK61



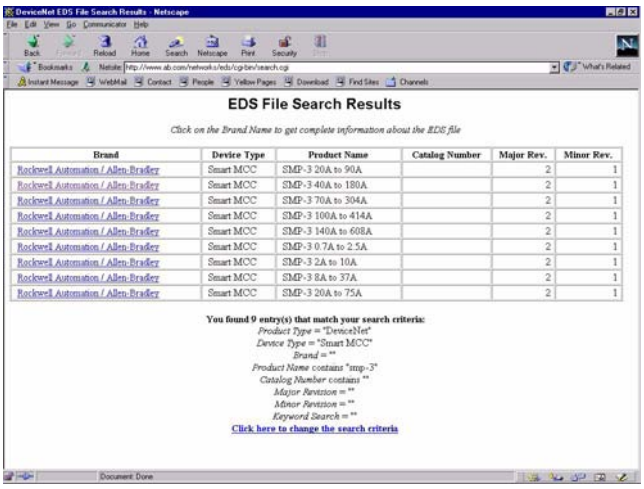
5. The next example displays an EDS search for an SMP-3 Solid-State Overload Relay with 2100-GK61. The procedure involves (1) selecting Smart MCC for the device type 2100-GK61, (2) entering SMP-3 for the product name, and (3) clicking on **Search**.

Figure 4.6
EDS Search for SMP-3 with 2100-GK61



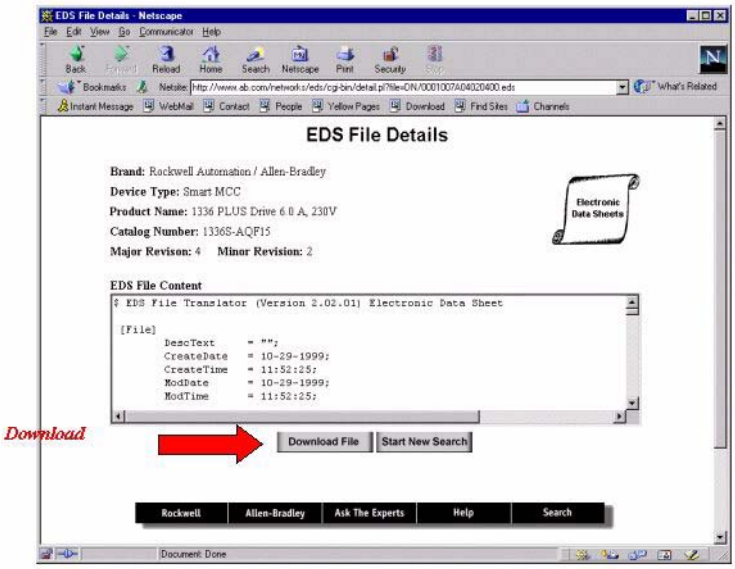
6. The search results display nine different EDS files available for a combination of an SMP-3 with a 2100-GK61. The correct one can be selected based on SMP-3 current range.

Figure 4.7
EDS Search Results for SMP-3 with 2100-GK61



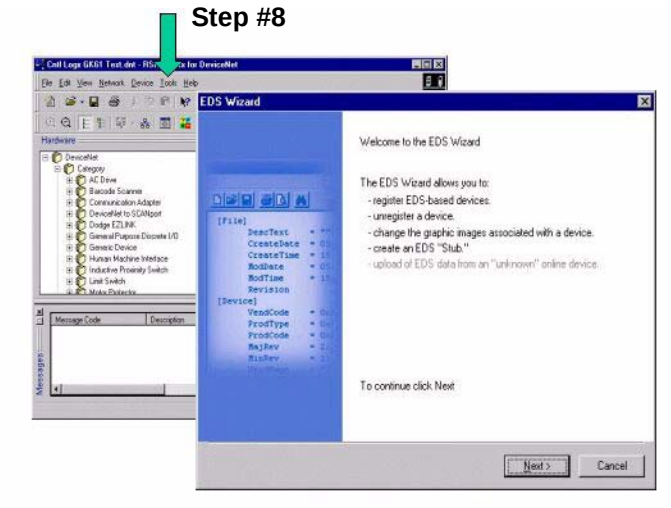
7. By clicking on **Rockwell Automation/Allen-Bradley** next to the chosen product description in Figure 4.8, an EDS File Details screen appears (Figure 4.9). The example for a “1336 Drive” provides file detail and a file download button. After clicking on the **Download File** button, download the EDS file to a temporary directory on your PC’s hard drive.

Figure 4.8
EDS File Details and Download Button



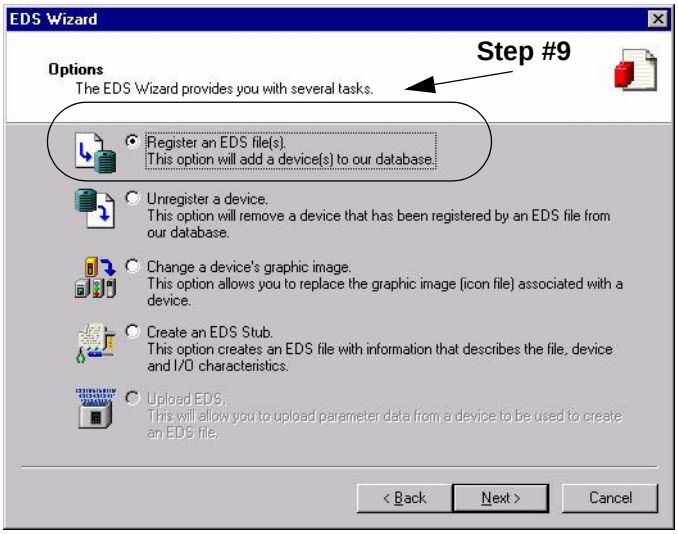
8. To register the EDS file, start EDS Wizard from the toolbar in RSNetWorx for DeviceNet.

Figure 4.9.
EDS Wizard in RSNetWorx for DeviceNet



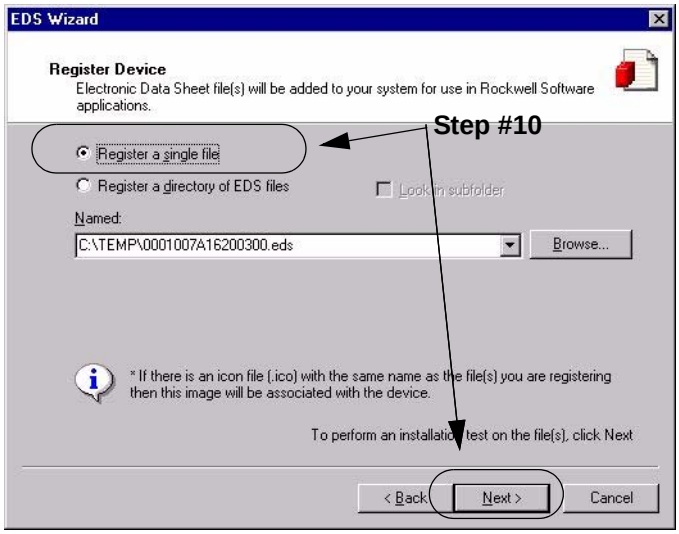
9. Select **Register an EDS file(s)**.

Figure 4.10
Registering an EDS File



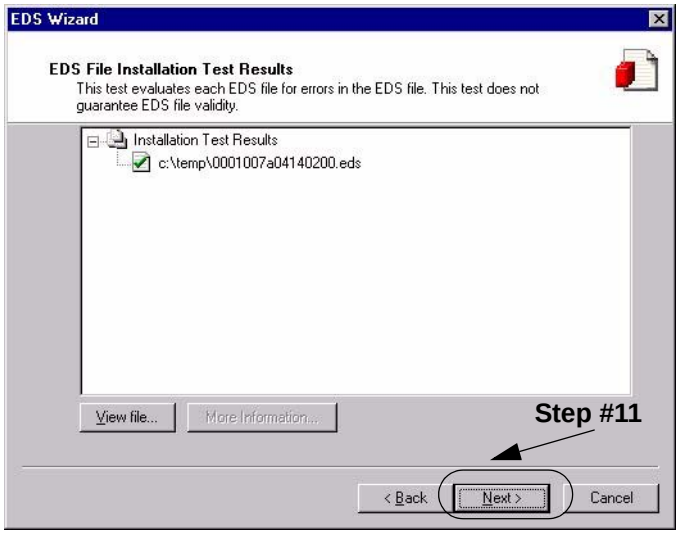
10. A single EDS file or a directory of EDS files may be registered as illustrated here. After selecting file or directory, click **Next** to continue.

Figure 4.11
Registering an EDS File



11. EDS files are evaluated for errors. Click **Next** to continue.

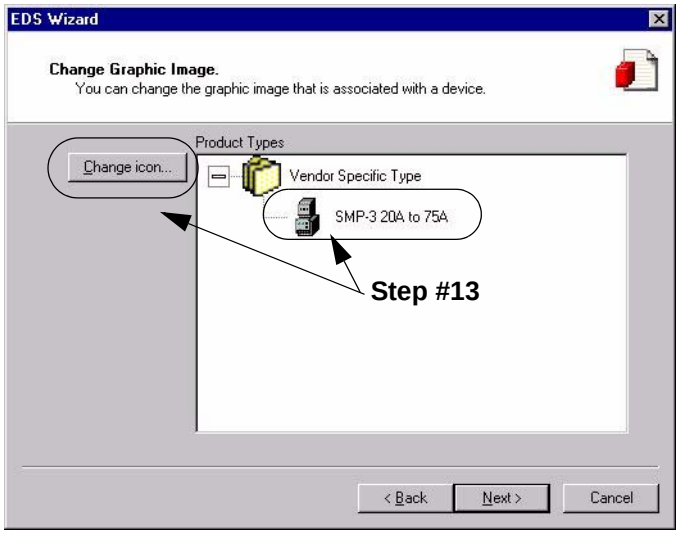
Figure 4.12
EDS File Validity Test



12. The Change Icon screen now appears. Here you will be able to select an icon that best represents the connected devices for the graph presentation of the network.

13. Select the device description you wish to change. In this example, we click on the test “SMP-3 via 2100-GK61.” Click the **Change icon** button.

Figure 4.13
Change Icon Screen



14. Pictures of various icons appear. Select the icon by clicking on the one which best represents your device.

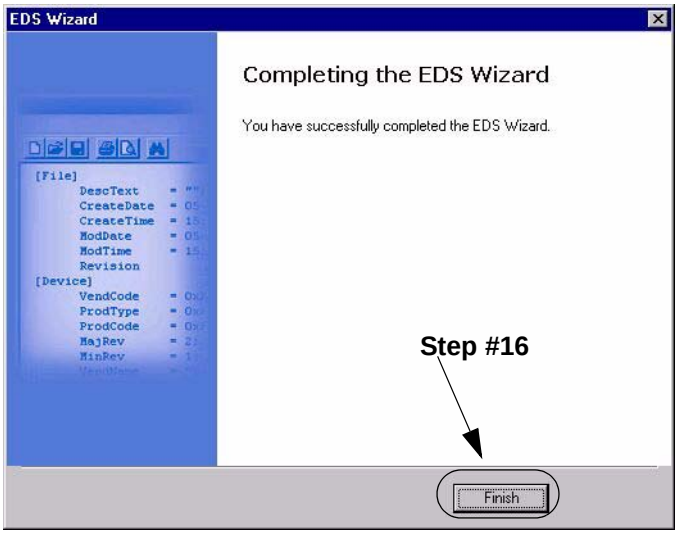
Figure 4.14
Icon Options

15. Click **Next** to complete EDS file registration.

Figure 4.15
Final Task Summary Screen

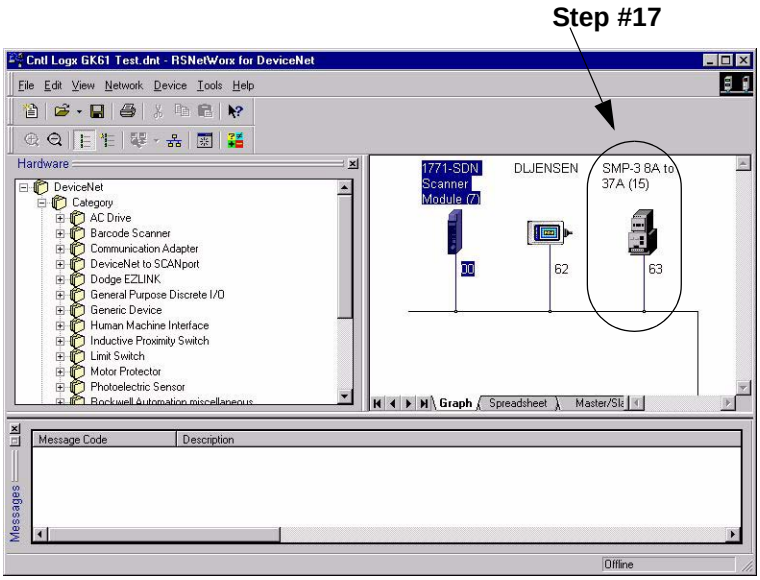
16. Click **Finish**.

Figure 4.16
EDS Installation Complete Screen



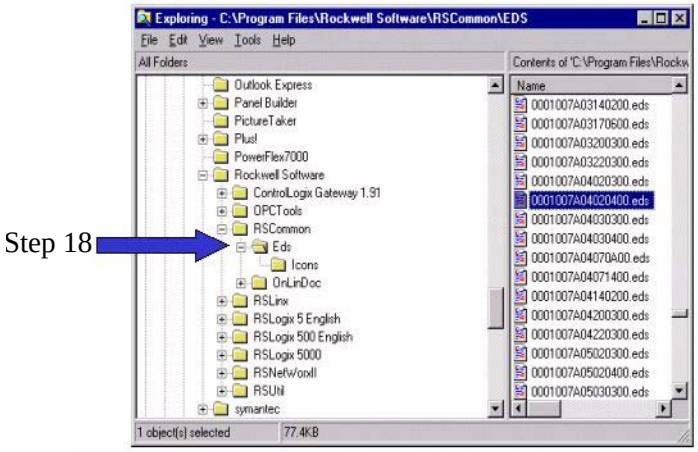
17. The program updates the EDS directory registry for the computer and redraws the graphical representation of the device with the new icon as shown.

Figure 4.17
Updated Online Screen



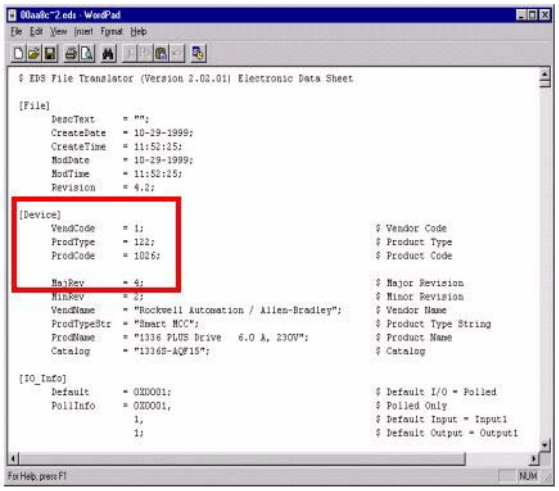
18. Registered EDS files are stored on a PC's hard drive under c:\Program Files\Rockwell Software\RS Common\Eds. A typical location is shown here.

Figure 4.18
PC Hard Drive Directory Example



Additional EDS detail can be viewed by opening the file with a text editor such as WordPad. EDS identifiers are in decimal within the body of the EDS document. RSNetWorx for DeviceNet also uses decimal IDs (1 122 1026 4). (Refer to the example in Figure 4.20.) The equivalent EDS file name is in hexadecimal (0001007A04020400.eds).

Figure 4.19
EDS File Detail



A scientific calculator, such as the one in Windows, can be used to convert decimal to hexadecimal and v.s. In the example, 122 is entered in the calculator with Dec button selected. When the Hex button is chosen, the display changes to 7A.

1 122 1026 4 ID code in decimal = 0001 007A 0402 0400 in hexadecimal.

Figure 4.20
Windows Scientific Calculator Used for Conversion

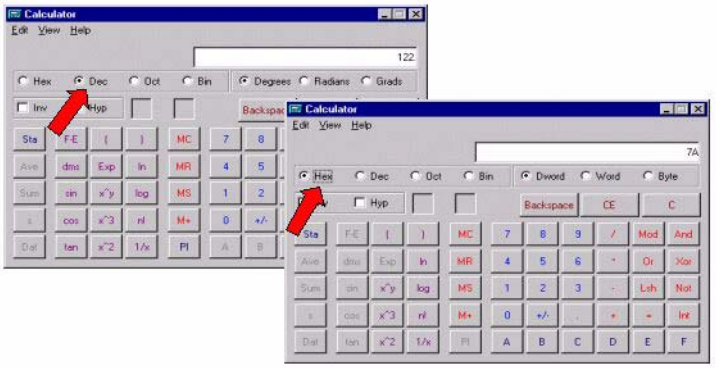
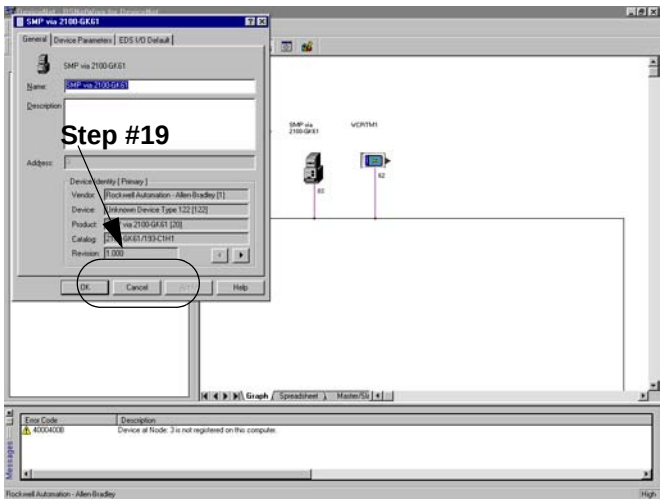


Figure 4.21
Device Configuration Screen



Important: This screen allows you to edit any of the parameters in the SMP or adapter itself. Refer to Chapter 3, *Configuring the DeviceNet to SCANport Communication Module with Digital Inputs*, for information on editing parameters.

19. Click on the Cancel button. The online screen appears.

Once all your devices have registered EDS files for RSNetWorx to

use, do one of the following.

Configuring a Scanner

To configure the scanner, you verify its properties, add devices on the network to its scan list, and determine how the scanner will communicate (e.g., polling) with each device. Follow these directions:

If Using:	Refer To:
PLC Scanner (1771-SDN)	Configuring a PLC Scanner (1771-SDN) to Communicate with the Adapter on page 4-15
SLC Scanner (1747-SDN)	Configuring an SLC Scanner (1747-SDN) to Communicate with the Adapter on page 4-23
ControlLogix Scanner (1756-DNB)	Configuring a ControlLogix Scanner (1756-DNB) to Communicate with the Adapter on page 4-30
RSNetworx for DeviceNet to edit parameters.	Chapter 3, *Configuring the DeviceNet to SCANport Communication Module with Digital Inputs*

Configuring a PLC Scanner (1771-SDN) to Communicate with the Adapter

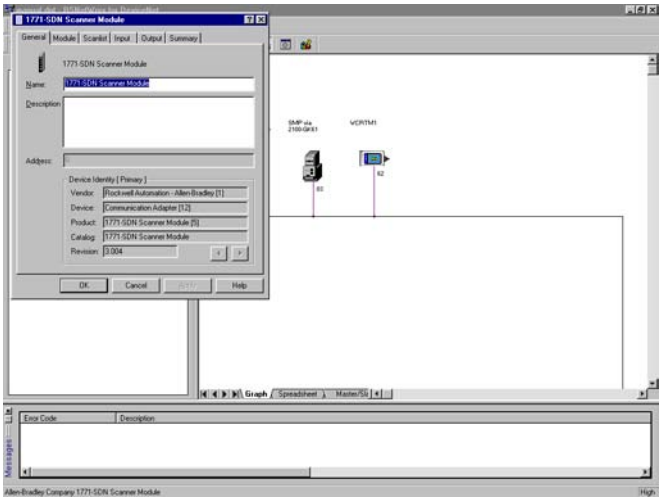
The following instructions describe how to configure a PLC scanner on a DeviceNet network.

For the PLC to recognize your device, you must do the following:

- Configure the PLC scanner.
- Map your adapter to the PLC scanner (1771-SDN).

1. In the **Online** screen, double-click on the scanner icon. The 1771-SDN Scanner Module properties and configuration screen appears.

Figure 4.22
1771-SDN Configuration Dialog Box

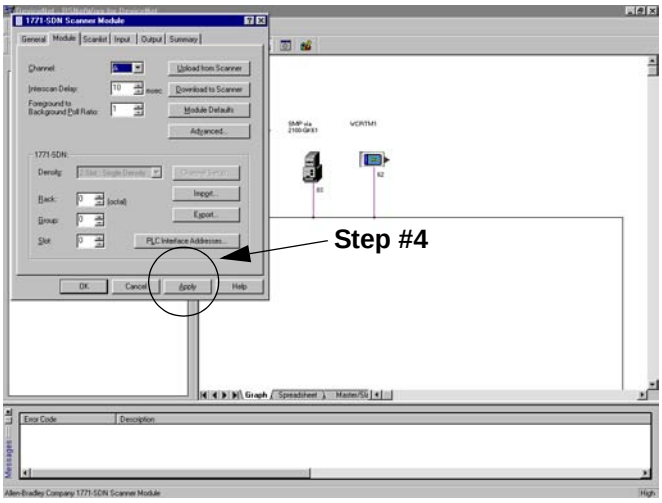


The dialog box contains 6 data tabs which are used to configure various portions of the scanner. The **General** tab allows the user to edit the name and descriptions of the scanner. The **Module** tab allows the user to configure the scanner setup properties. The **Scanlist** tab allows the user to choose which components the scanner will scan for data. The **Input** and **Output** tab is where the user sets up where the data from the scanned devices is kept to be used by the PLC processor. Finally, the **Summary** tab allows the user to view a concise summary of how the scanner has been configured.

2. On the **General** page, place the cursor in the name field and type the name you want to assign the scanner. If you want to add a description to the scanner, place the cursor in the description field and enter a description. Click on the **Apply** button to save the information.

3. Click on the **Module** tab. A dialog box will appear requesting to upload or download information from the scanner. Click on **Upload**. All the scanlist information currently stored in the scanner will be uploaded. Once the upload is complete, the **Module** screen will appear.

Figure 4.23
1771 SDN Module Screen

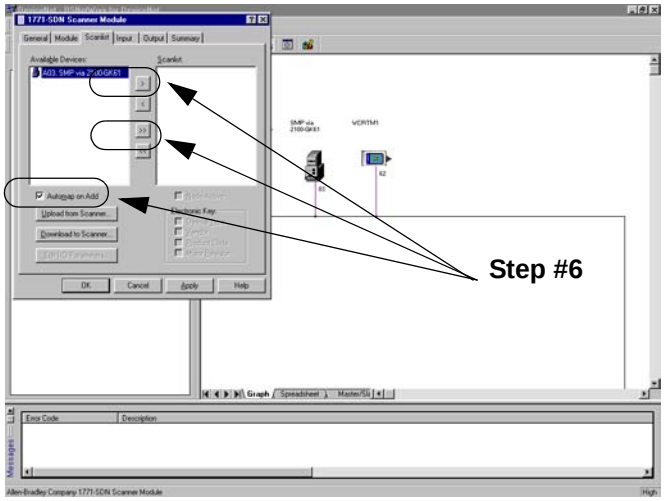


Verify the default values listed on this page. Edit them as necessary. Refer to RSNetworx for DeviceNet online help for more information.

4. Click **Apply** to save.

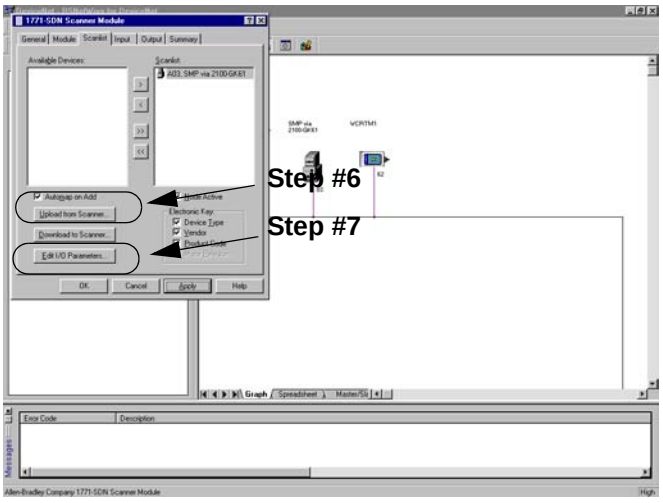
5. Click on the **Scanlist** tab so that the Scanlist page appears.

Figure 4.24
Scanlist Screen



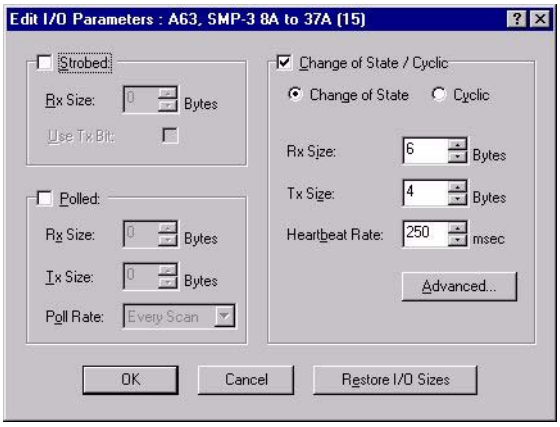
6. Select the available devices you wish to add to the scan list. Verify that the **Automap on Add** box is checked. This will map the devices into the scanner's memory automatically when added. Refer to the RSNetWorx for DeviceNet help menu for additional information on automapping. Once a device is selected, click on the **Add (>)** or **Add All (>>)** button.

Figure 4.25
Scanlist Configuration Screen



7. Modify each device's I/O parameters if needed. Select the device and click on the **Edit I/O Parameters** button. The I/O Parameters dialog screen appears.

Figure 4.26
I/O Configuration Edit Screen



8. Make the changes as necessary. You must configure your PLC based on how your adapter's parameters are configured and how you want your module to send and receive data from the network. Refer to the following table:

If Using:	Refer To:
Polled	Polled Allocation on page B-5.
COS (Change of State)	COS (Change of State) Allocation on page B-7.
Cyclic	Cyclic Allocation on page B-8.
Polled and COS	Polled and COS Allocation on page B-10.
Polled and Cyclic	Polled and Cyclic Allocation on page B-11.

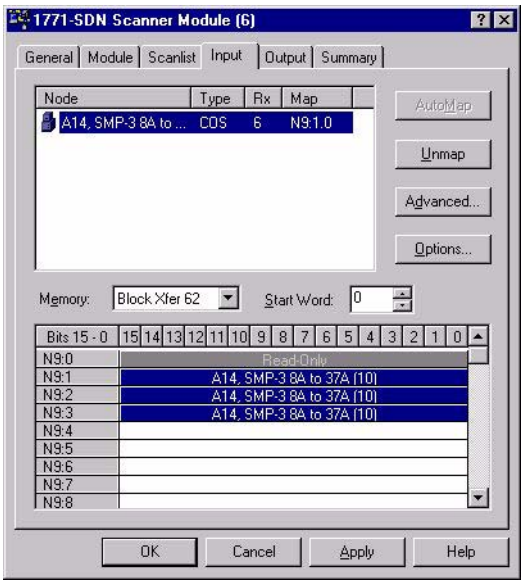
9. Click **OK** to return to the Scanlist screen.

10. Click on the **Apply** button. A dialog box appears asking if you wish to download the changes to the device. Click on **Yes**.

Important: If the processor is not in Program mode, a dialog box will appear stating which mode the processor is in. Clicking on the **OK** button returns the Scanlist screen **without** downloading any information to the processor. You must now place the processor in program mode and repeat the apply function.

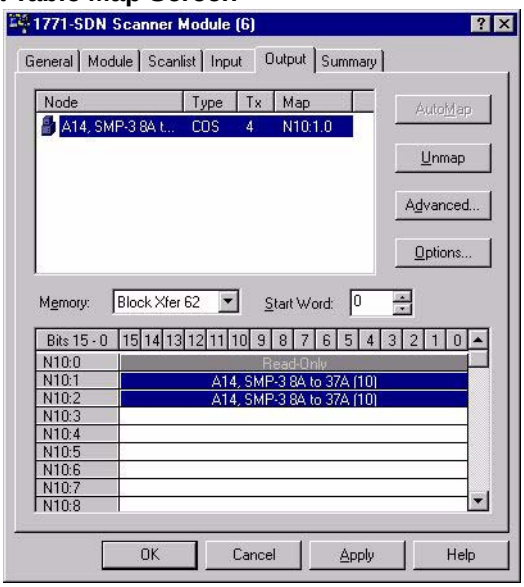
11. Click on the **Input** tab to view the input table map. From this screen you can customize the arrangement of the scanner's data table. Refer to the RSNetWorx online help for additional information.

Figure 4.27
Input Data Table Map Screen



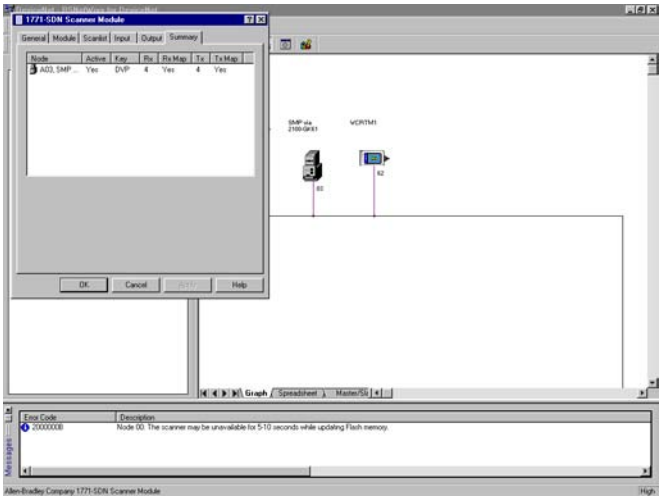
12. Click on the **Output** tab to view the output table map. From this screen you can customize the arrangement of the scanner's data table. Refer to the RSNetWorx online help for additional information.

Figure 4.28
Output Data Table Map Screen



13. Click on the **Summary** tab. This screen provides the user with a concise summary of how the scanner has been configured. Note: all of the information that appears on this page is read-only. If you want to change any of the parameters, you have to edit them on the appropriate property page.

Figure 4.29
Summary Screen



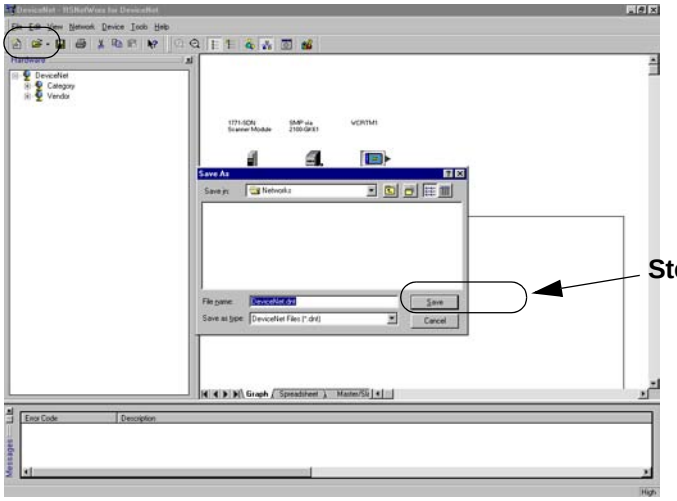
14. Click on the **OK** button. You are returned to the online screen.

15. To save the information just entered to your computer, select **Save As** under the **File** menu.

16. Select a path to store the information.

17. Enter a file name and click on **Save**.

Figure 4.30
"Save As" Dialog Screen



Your device is now configured on the DeviceNet network. The network LED on the module is solid green. If it is not, refer to Chapter 7, *Troubleshooting*, for more information.

Refer to Chapter 5, *Ladder Logic Programming—Including Reading Inputs*, for information on creating a PLC Ladder Logic Program.

Configuring an SLC Scanner (1747-SDN) to Communicate with the Adapter

The following instructions describe how to configure an SLC scanner on a DeviceNet network.

For the SLC to recognize your device, you must do the following:

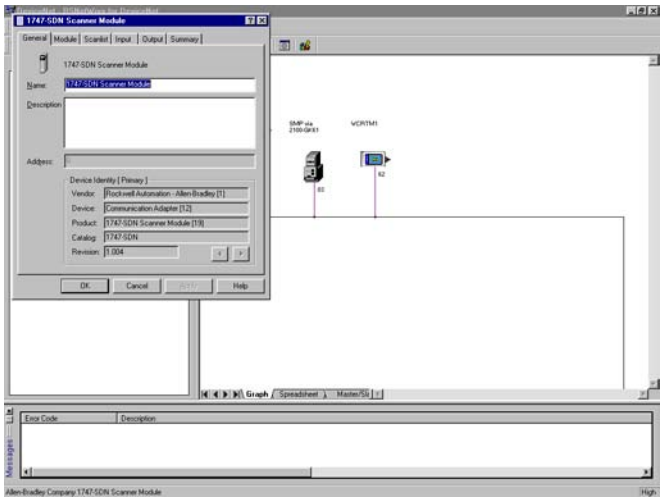
- Configure the SLC Scanner.
- Map your adapter to the SLC (1747-SDN).

Configuring an SLC Scanner

To configure the scanner, you verify its properties, add devices on the network to its scan list, and determine how the scanner will communicate (e.g., polling) with each device. Follow these directions:

1. In the **Online** screen, double-click on the scanner icon. The 1747-SDN Scanner Module properties and configuration screen appears.

Figure 4.31
1747-SDN Configuration Dialog Box



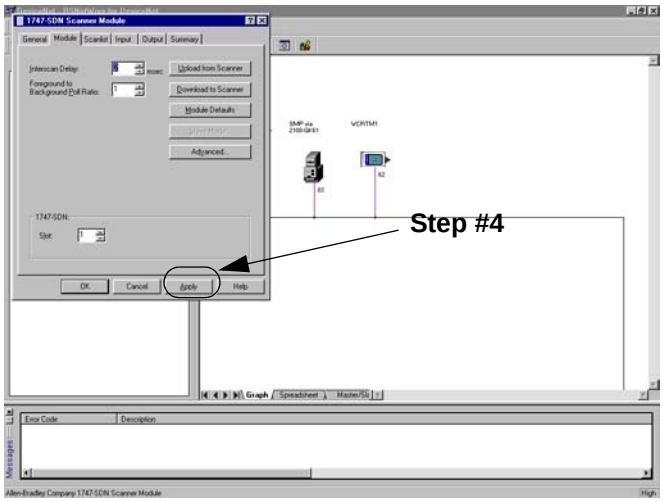
The dialog box contains six data tabs which are used to configure various portions of the scanner. The **General** tab allows the user to edit the name and descriptions of the scanner. The **Module** tab allows the user to configure the scanner setup properties. The **Scanlist** tab

allows the user to choose which components the scanner will scan for data. The **Input** and **Output** tabs are for setting up where the data from the scanned devices is kept for use by the SLC processor. Finally, the **Summary** tab allows the user to view a concise summary of how the scanner has been configured.

2. On the **General** page, place the cursor in the name field and type the name you want to assign the scanner. If you want to add a description to the scanner, place the cursor in the description field and enter a description. Click on the **Apply** button to save the information.

3. Click on the **Module** tab. A dialog box will appear requesting to upload or download information from the scanner. Click on **Upload.** The scanlist information currently stored in the scanner will be uploaded. Once the upload is complete, the **Module** screen will appear.

Figure 4.32
1747-SDN Module Configuration Screen

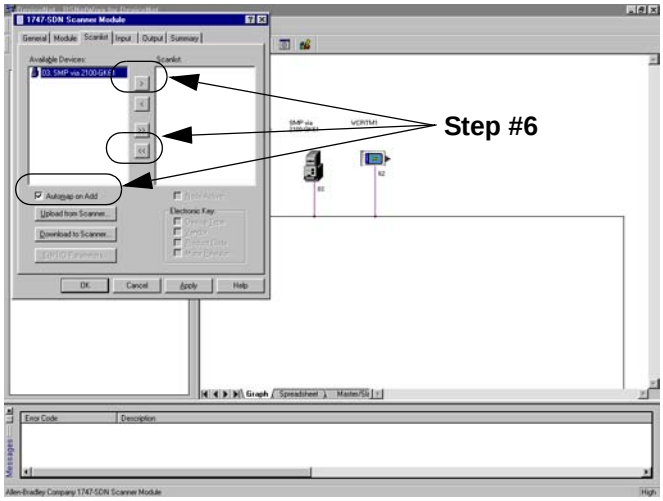


Verify the default values listed on this page. Edit them as necessary. Refer to RSNetWorx for DeviceNet online help for more information.

4. Click **Apply** to save.

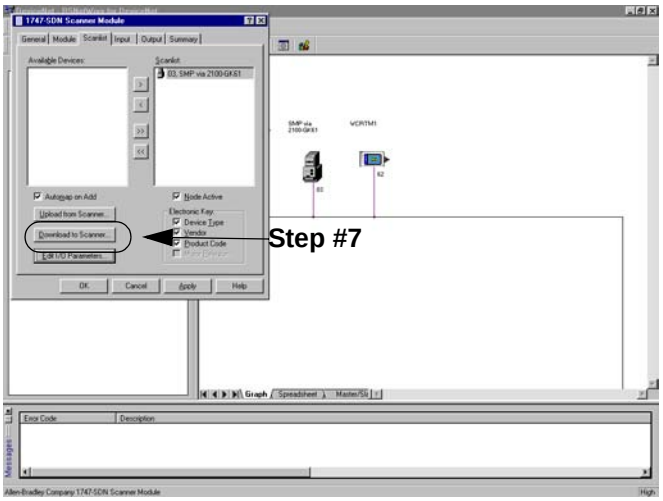
5. Click on the **Scanlist** tab so that the Scanlist page appears.

Figure 4.33
1747-SDN Scanlist Configuration Screen



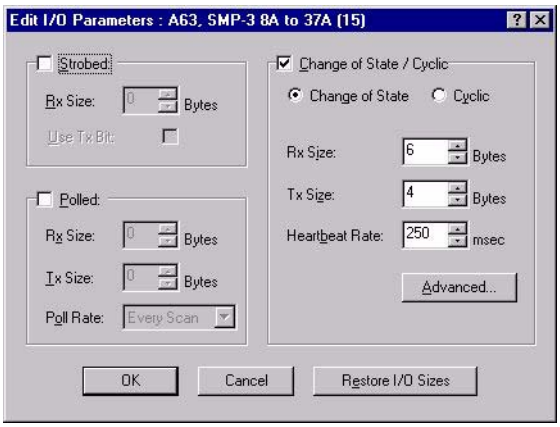
6. Select the available devices you wish to add to the Scanlist. Verify that the **Automap on Add** box is checked. This will map the devices into the scanner's memory automatically when added. Refer to the RSNetWorx for DeviceNet help menu for additional information on automapping. Once a device is selected, click on the **Add (>)** or **Add All (>>)** button.

Figure 4.34
Scanlist Configuration Screen



7. Modify each device's I/O parameters if needed. Select the device and click on the **Edit I/O Parameters** button. The I/O Parameters dialog screen appears.

Figure 4.35
I/O Configuration Edit Screen



8. Make the changes as necessary. You must configure your PLC based on how your adapter's parameters are configured and how you want your module to send and receive data from the network. Refer to the following table.

If Using:	Refer To:
Polled	Polled Allocation on page B-5.
COS (Change of State)	COS (Change of State) Allocation on page B-7.
Cyclic	Cyclic Allocation on page B-8.
Polled and COS	Polled and COS Allocation on page B-10.
Polled and Cyclic	Polled and Cyclic Allocation on page B-11.

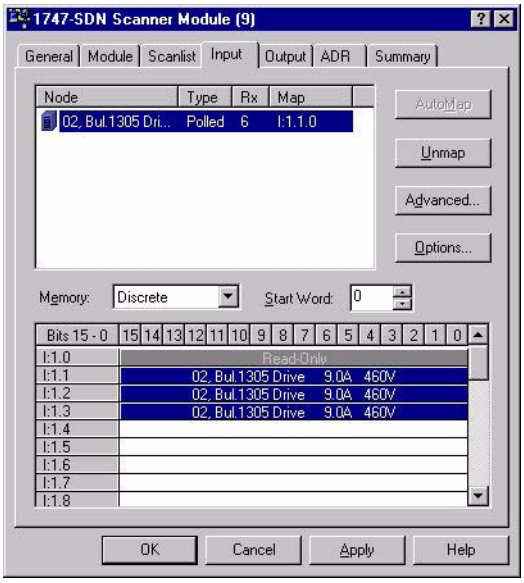
9. Click **OK** to return to the Scanlist screen.

10. Click on the **Apply** button. A dialog box appears asking if you wish to download the changes to the device. Click on **Yes**.

Important: If the processor is not in Program mode, a dialog box will appear stating which mode the processor is in. Clicking on the **OK** button returns you to the Scanlist screen **without** downloading any information to the processor. You must now place the process in program mode and repeat the apply function.

11. Click on the **Input** tab to view the input table map. From this screen you can customize the arrangement of the scanner's data table. Refer to the RSNetWorx online help for additional information.

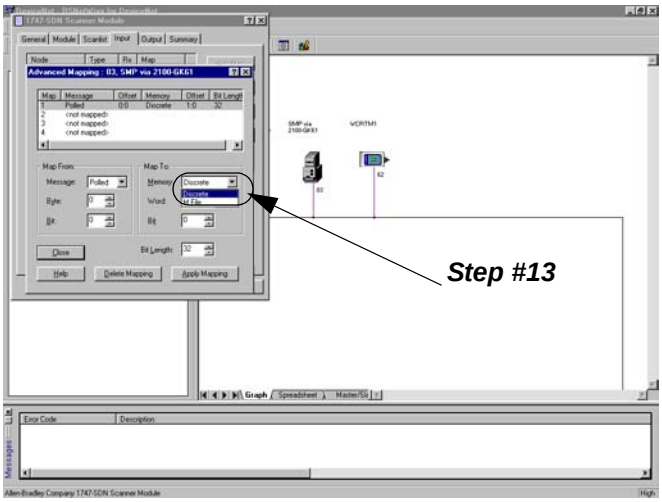
Figure 4.36
Input Data Table Mapping Screen



12. Clicking on the **Advanced** button moves to the advance memory mapping screen. From this screen you can specify where to map the data to.

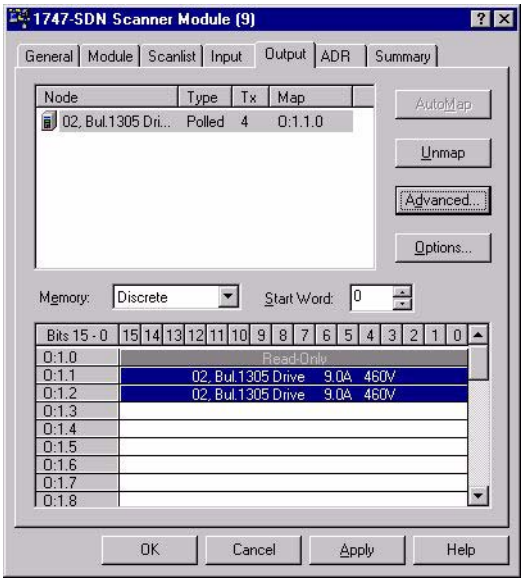
13. Selecting the **Memory Arrow** under the **Map To**: allows you to select Discrete or M File Memory. This example leaves the mapping in discrete memory.

Figure 4.37
Advanced Mapping Screen



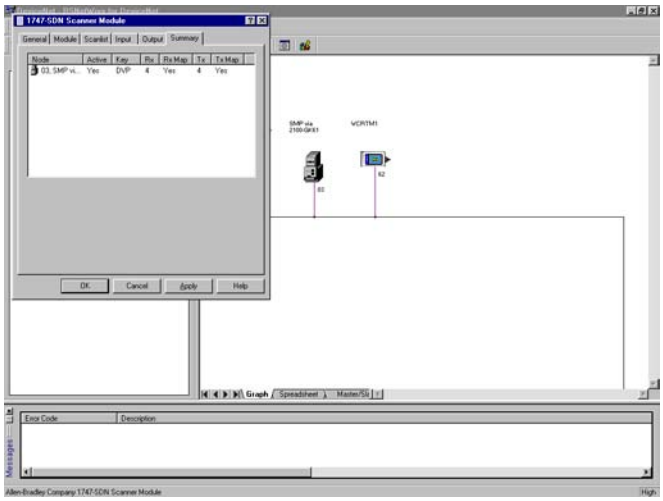
14. Click on the **Output** tab to view the output table map. From this screen you can customize the arrangement of the scanner's data table. Refer to the RSNetWorx online help for additional information.

Figure 4.38
Output Data Table Mapping Screen



15. Click on the **Summary** tab. This screen provides the user with a concise summary of how the scanner has been configured. Note: all of the information that appears on this page is read only. If you want to change any of the parameters, you have to edit them on the appropriate property page.

Figure 4.39
Summary Screen



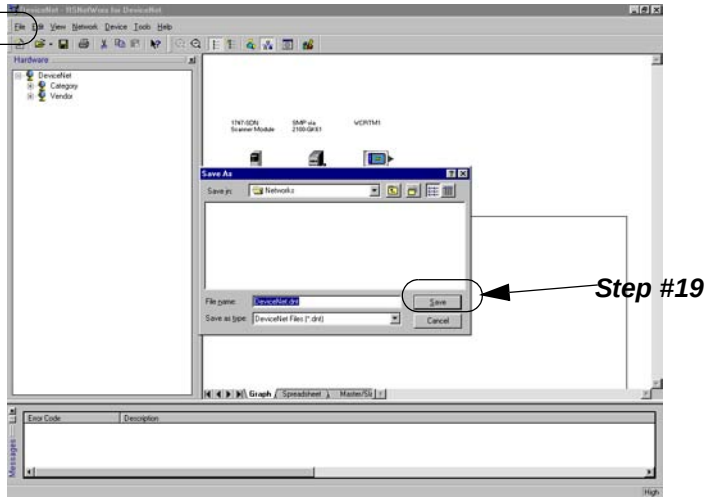
16. Click on the **OK** button. You are returned to the online screen.

17. To save the information just entered, select **Save As** under the **File** menu.

18. Select a path to store the information.

19. Enter a file name and click on **Save**.

Figure 4.40
"Save As" Dialog Screen



Your device is now configured on the DeviceNet network. The network LED on the module is solid green. If it is not, refer to Chapter 7, *Troubleshooting*, for more information.

Refer to Chapter 5, *Ladder Logic Programming—Including Reading Inputs*, for information on creating a Ladder Logic Program.

Configuring a ControlLogix Scanner (1756-DNB) to Communicate with the Adapter

The following instructions describe how to configure a ControlLogix scanner on a DeviceNet network.

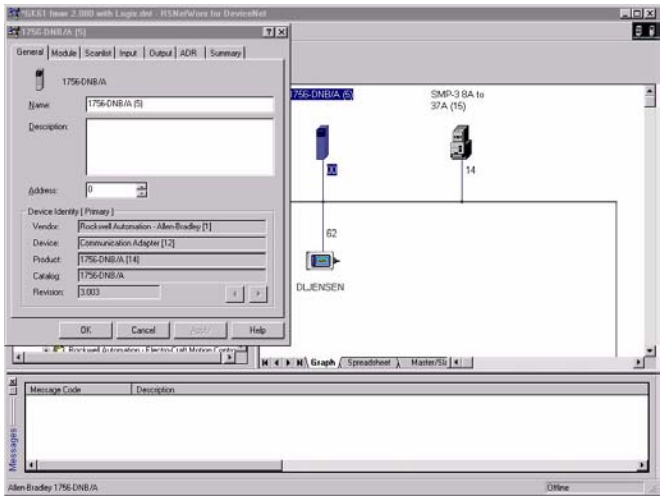
For the ControlLogix to recognize your device, you must do the following:

- Configure the ControlLogix scanner.
- Map your adapter to the ControlLogix scanner (1756-DBN).

To configure the scanner, you verify its properties, add devices on the network to its scan list, and determine how the scanner will communicate (e.g., polling) with each device. Follow these directions:

1. In the **Online** screen, double-click on the scanner icon. The 1756-DBN Scanner Module properties and configuration screen appears.

Figure 4.41
1756-DBN Configuration Dialog Box

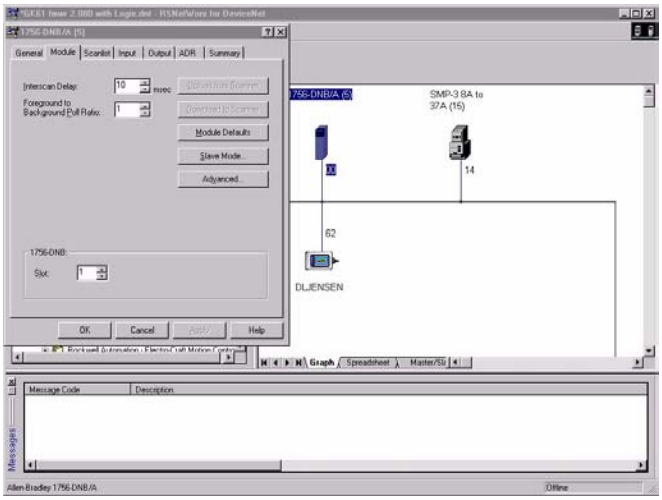


The dialog box contains six data tabs which are used to configure various portions of the scanner. The **General** tab allows the user to edit the name and descriptions of the scanner. The **Module** tab allows the user to configure the scanner setup properties. The **Scanlist** tab allows the user to choose which components the scanner will scan for data. The **Input** and **Output** tab is where the user sets up where the data from the scanned devices is kept for use by the PLC processor. Finally, the **Summary** tab allows the user to view a concise summary of how the scanner has been configured.

2. On the **General** page, place the cursor in the name field and type the name you want to assign the scanner. If you want to add a description to the scanner, place the cursor in the description field and enter a description. Click on the **Apply** button to save the information.

3. Click on the **Module** tab. A dialog box will appear requesting to upload or download information from the scanner. Click on **Upload**. All the scanlist information currently stored in the scanner will be uploaded. Once the upload is complete, the **Module** screen will appear.

Figure 4.42
1756-DBN Module Screen

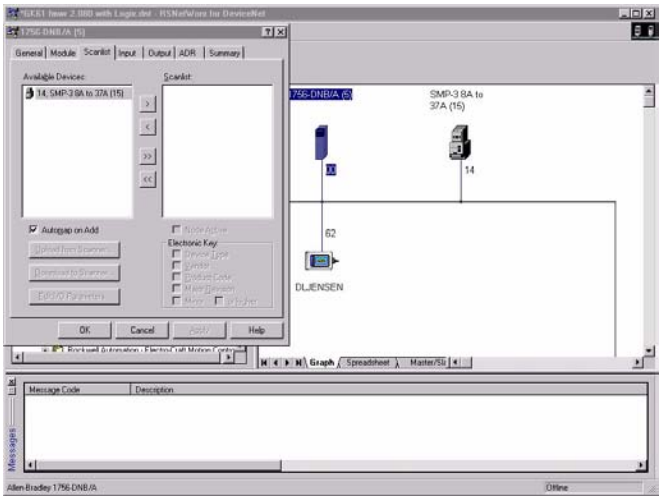


Verify the default values listed on this page. Edit them as necessary. Refer to RSNetworx for DeviceNet online help for more information.

4. Click **Apply** to save.

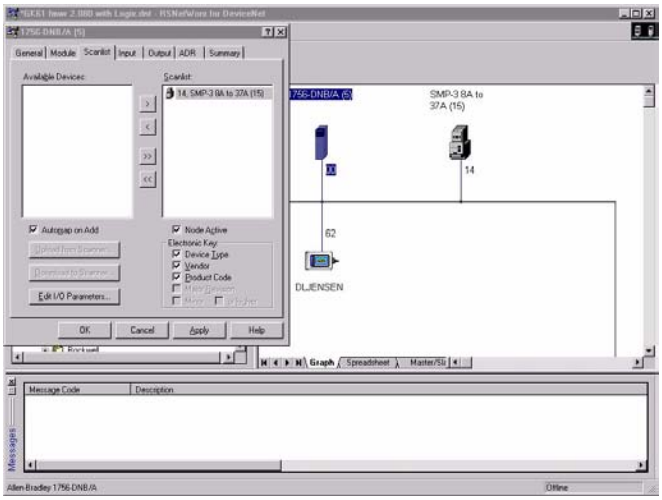
5. Click on the **Scanlist** tab so that the Scanlist page appears.

Figure 4.43
Scanlist Screen



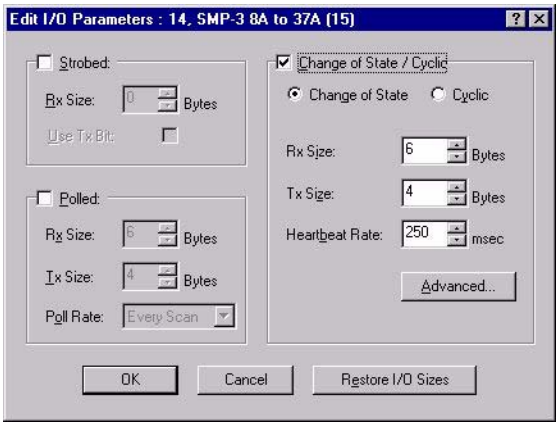
6. Select the available devices you wish to add to the scanlist. Verify that the **Automap on Add** box is checked. This will map the devices into the scanner's memory automatically when added. Refer to the RSNetWorx for DeviceNet help menu for additional information on automapping. Once a device is selected, click on the **Add (>)** or **Add All (>>)** button.

Figure 4.44
Scanlist Configuration Screen



7. Modify each device's I/O parameters if needed. Select the device and click on the **Edit I/O Parameters** button. The I/O Parameters dialog screen appears.

Figure 4.45
I/O Configuration Edit Screen



8. Make the changes as necessary. You must configure your PLC based on how your adapter's parameters are configured and how you want your module to send and receive data from the network. Refer to the following table:

If Using:	Refer To:
Polled	Polled Allocation on page B-5.
COS (Change of State)	COS (Change of State) Allocation on page B-7.
Cyclic	Cyclic Allocation on page B-8.
Polled and COS	Polled and COS Allocation on page B-10.
Polled and Cyclic	Polled and Cyclic Allocation on page B-11.

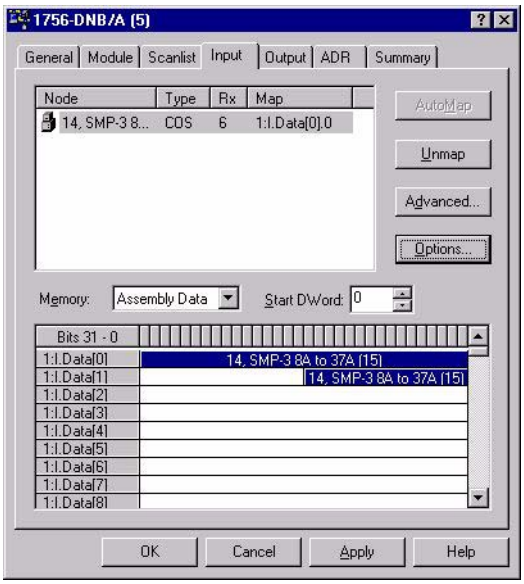
9. Click on **OK** to return to the Scanlist screen.

10. Click on the **Apply** button. A dialog box appears asking if you wish to download the changes to the device. Click on **Yes**.

Important: If the processor is not in Program mode, a dialog box will appear stating which mode the processor is in. Clicking on the **OK** button returns the Scanlist screen **without** downloading any information to the processor. You must now place the processor in program mode and repeat the apply function.

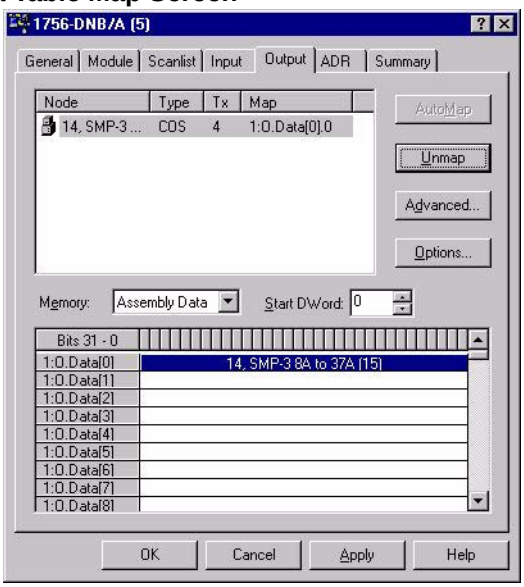
11. Click on the **Input** tab to view the input table map. From this screen you can customize the arrangement of the scanner's data table. Refer to the RSNetWorx online help for additional information.

Figure 4.46
Input Data Table Map Screen



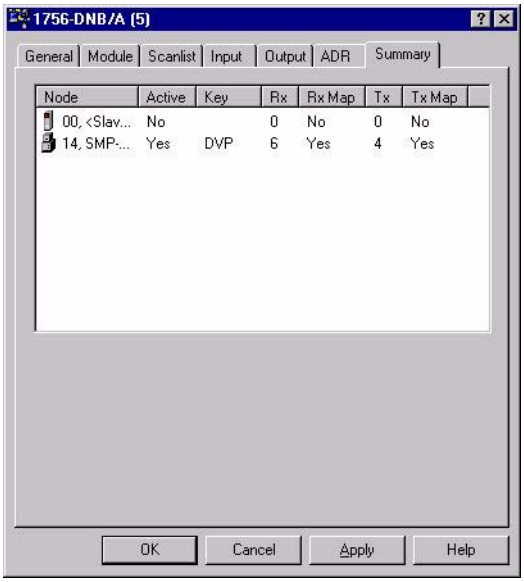
12. Click on the **Output** tab to view the output table map. From this screen you can customize the arrangement of the scanner's data table. Refer to the RSNetWorx online help for additional information.

Figure 4.47
Output Data Table Map Screen



13. Click on the **Summary** tab. This screen provides the user with a concise summary of how the scanner has been configured. Note: all of the information that appears on this page is read-only. If you want to change any of the parameters, you have to edit them on the appropriate property page.

Figure 4.48
Summary Screen



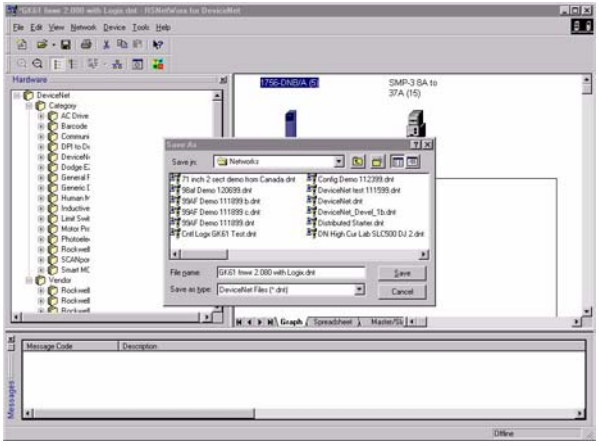
14. Click on the **OK** button. You are returned to the online screen.

15. To save the information just entered to your computer, select **Save As** under the **File** menu.

16. Select a path to store the information.

17. Enter a file name and click on **Save**.

Figure 4.49
"Save As" Dialog Screen



Ladder Logic Programming—Including Reading Inputs

Chapter Objectives

Chapter 5 provides information needed to create the PLC, SLC, or ControlLogix Ladder Logic program that the controller will use to transmit control I/O and messages to and from the SCANport product. In this chapter, you will read about the following:

- Equipment and software needed to create either a PLC or SLC ladder logic program.
- PLC, SLC, and ControlLogix ladder logic programs.
- Creating a PLC, SLC, or ControlLogix ladder logic program.

This chapter assumes you are familiar with the hardware components and programming procedures necessary to operate DeviceNet and SCANport devices, including the following:

- PLC-5, SLC-500, or ControlLogix.
- 1771-SDN, 1747-SDN, or 1756-DNB scanner.
- Ladder programming.
- RSLogix5 (for PLC-5), RSLogix500 (for SLC-5/02 through SLC 5/05), and RSLogix 5000 (for ControlLogix).

You may need to refer to the documentation associated with these products to create a ladder logic program.

Required Equipment

Before creating a ladder logic program for the PLC, SLC, or ControlLogix, your PC must be:

- Running RSLogix5 and RSLinx if using a PLC. Refer to http://www.software.rockwell.com for more information on these products.
- Running RSLogix500 and RSLinx if using an SLC. Refer to http://www.software.rockwell.com for more information on these products.
- Running RSLogix5000 and RSLinx if using a ControlLogix. Refer to http://www.software.rockwell.com for more information on these products.
- Connected to and communicating with the DeviceNet network using a 1784-PCD card, 1784-PCID card, 1784-PCID5 card, or a 1770-KFD adapter.

What is RSLogix?

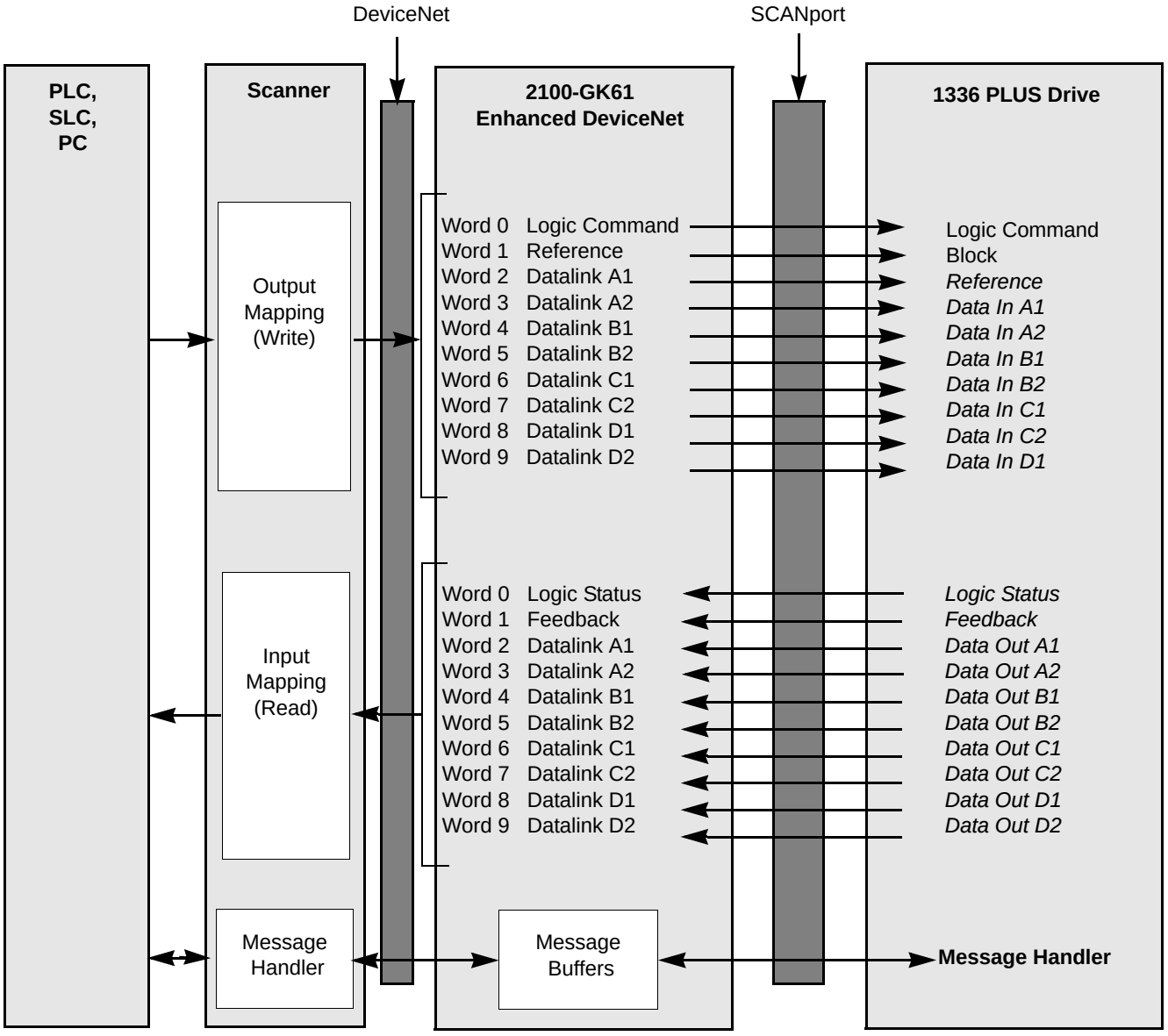
RSLogix5 (for the PLC-5), RSLogix500 (for the SLC-5/03), and RSLogix5000 (for ControlLogix) software let you create the ladder logic programs you need and download them to the processor. They also let you monitor the program as the processor is using it.

For more information on RSLogix5, RSLogix500, or RSLogix5000, consult the respective software's documentation.

What are Ladder Logic Programs?

A PLC, SLC, or ControlLogix ladder logic program lets you control the drive and the messaging from the processor to the drive. Figure 5.1 shows how the I/O image table for a DeviceNet scanner relates to the 1336 PLUS drive when a DeviceNet to SCANport Communication Module with Digital Inputs is used.

Figure 5.1
I/O Image Table



Important: Datalinks are optionally enabled in the adapter and configured in the product. Refer to Chapter 3, *Configuring the DeviceNet to SCANport Communication Module with Digital Inputs*, and your product's user manual for more information.

Example Ladder Logic Programs

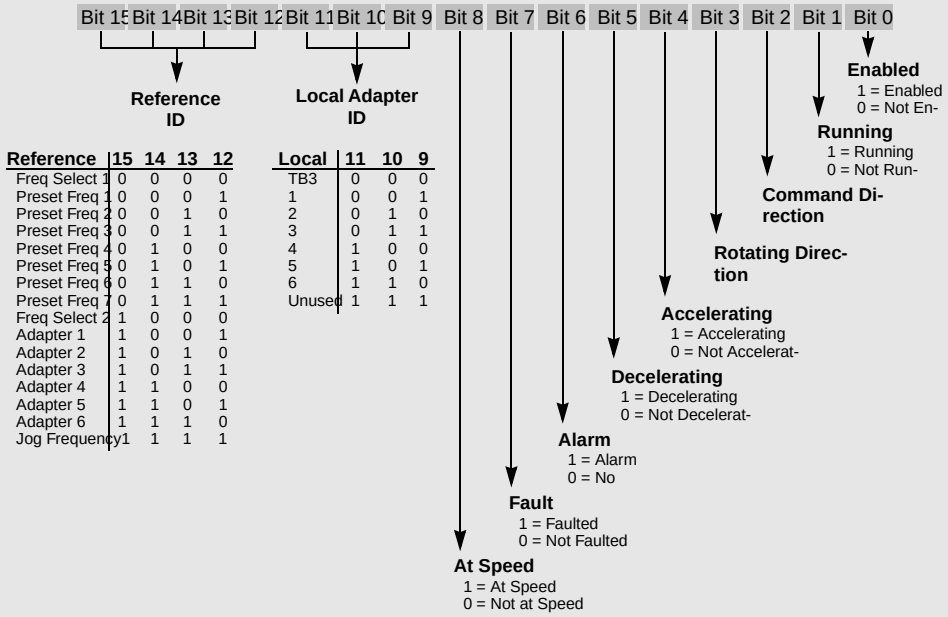
The following are example ladder logic programs for an SMP-3 solid-state overload relay.

ATTENTION: The example ladder logic program shown in this manual is intended solely for purpose of example. Because there are many variables and requirements associated with any particular installation, Rockwell Automation does not assume responsibility or liability (to include intellectual property liability) for actual use based upon the example shown in this publication.

Important: Refer to the user manual for your SCANport product for specific I/O definitions. Different SCANport products have different Logic Command, Logic Status, Reference, and Feedback I/O interpretations.

Drive Status Structure

This provides the drive status information that will be sent to the logic controller's input image table when the Communication Module is set to control the drive.

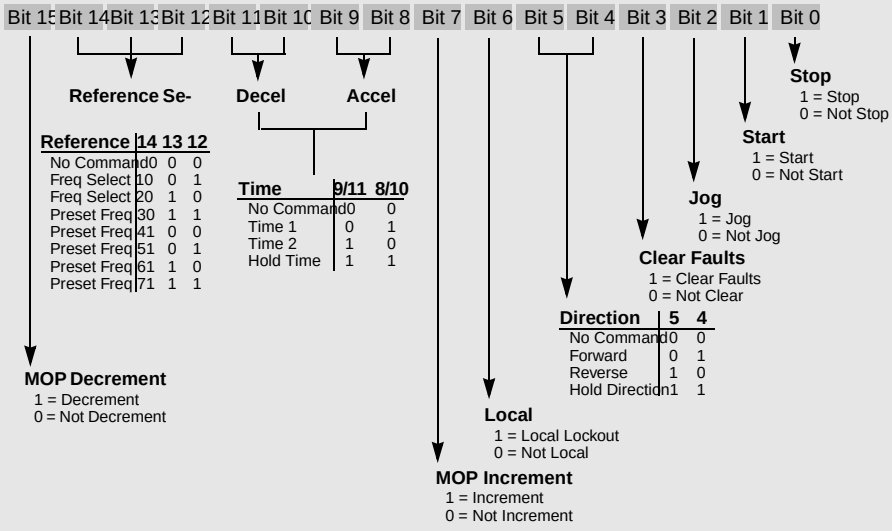


Reference	15	14	13	12
Freq Select 1	0	0	0	0
Preset Freq 1	0	0	0	1
Preset Freq 2	0	0	1	0
Preset Freq 3	0	0	1	1
Preset Freq 4	0	1	0	0
Preset Freq 5	0	1	0	1
Preset Freq 6	0	1	1	0
Preset Freq 7	0	1	1	1
Freq Select 2	1	0	0	0
Adapter 1	1	0	0	1
Adapter 2	1	0	1	0
Adapter 3	1	0	1	1
Adapter 4	1	1	0	0
Adapter 5	1	1	0	1
Adapter 6	1	1	1	0
Jog Frequency	1	1	1	1

Local	11	10	9
TB3	0	0	0
1	0	0	1
2	0	1	0
3	0	1	1
4	1	0	0
5	1	0	1
6	1	1	0
Unused	1	1	1

Logic Control Structure

This information provides the control logic information that is sent to the drive through the logic controller's output image table when the Communication Module is set to control the drive.

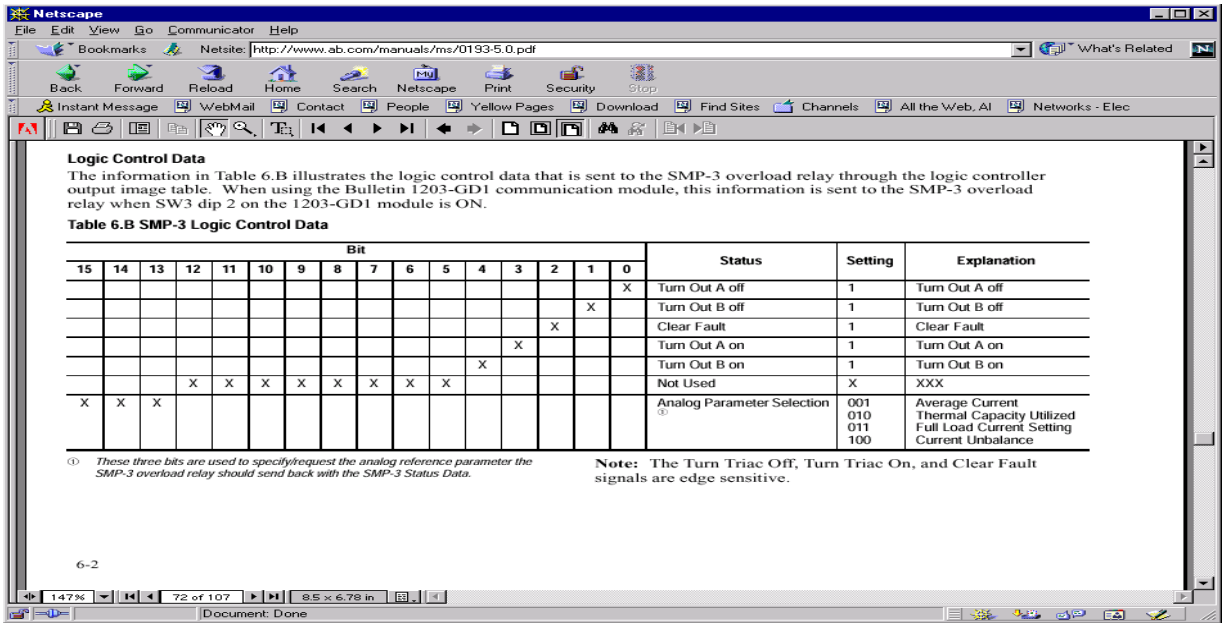


Reference	14	13	12
No Command	0	0	0
Freq Select 1	0	0	1
Freq Select 2	0	1	0
Preset Freq 3	0	1	1
Preset Freq 4	1	0	0
Preset Freq 5	1	0	1
Preset Freq 6	1	1	0
Preset Freq 7	1	1	1

Time	9/11	8/10
No Command	0	0
Time 1	0	1
Time 2	1	0
Hold Time	1	1

Direction	5	4
No Command	0	0
Forward	0	1
Reverse	1	0
Hold Direction	1	1

For reference, Logic Control Data and Status Data tables from the SMP-3 manual are included below.



Netscape

File Edit View Go Communicator Help

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Back Forward Reload Home Search Netscape Print Security Stop

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Logic Control Data

The information in Table 6.B illustrates the logic control data that is sent to the SMP-3 overload relay through the logic controller output image table. When using the Bulletin 1203-GD1 communication module, this information is sent to the SMP-3 overload relay when SW3 dip 2 on the 1203-GD1 module is ON.

Table 6.B SMP-3 Logic Control Data

Bit 15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Status	Setting	Explanation
															X	Turn Out A off	1	Turn Out A off
														X		Turn Out B off	1	Turn Out B off
													X			Clear Fault	1	Clear Fault
												X				Turn Out A on	1	Turn Out A on
											X					Turn Out B on	1	Turn Out B on
			X	X	X	X	X	X	X	X						Not Used	X	XXX
X	X	X														Analog Parameter Selection ①	001 010 011 100	Average Current Thermal Capacity Utilized Full Load Current Setting Current Unbalance

① *These three bits are used to specify/request the analog reference parameter the SMP-3 overload relay should send back with the SMP-3 Status Data.*

Note: The Turn Triac Off, Turn Triac On, and Clear Fault signals are edge sensitive.

6-2

147% 72 of 107 8.5 x 6.78 in

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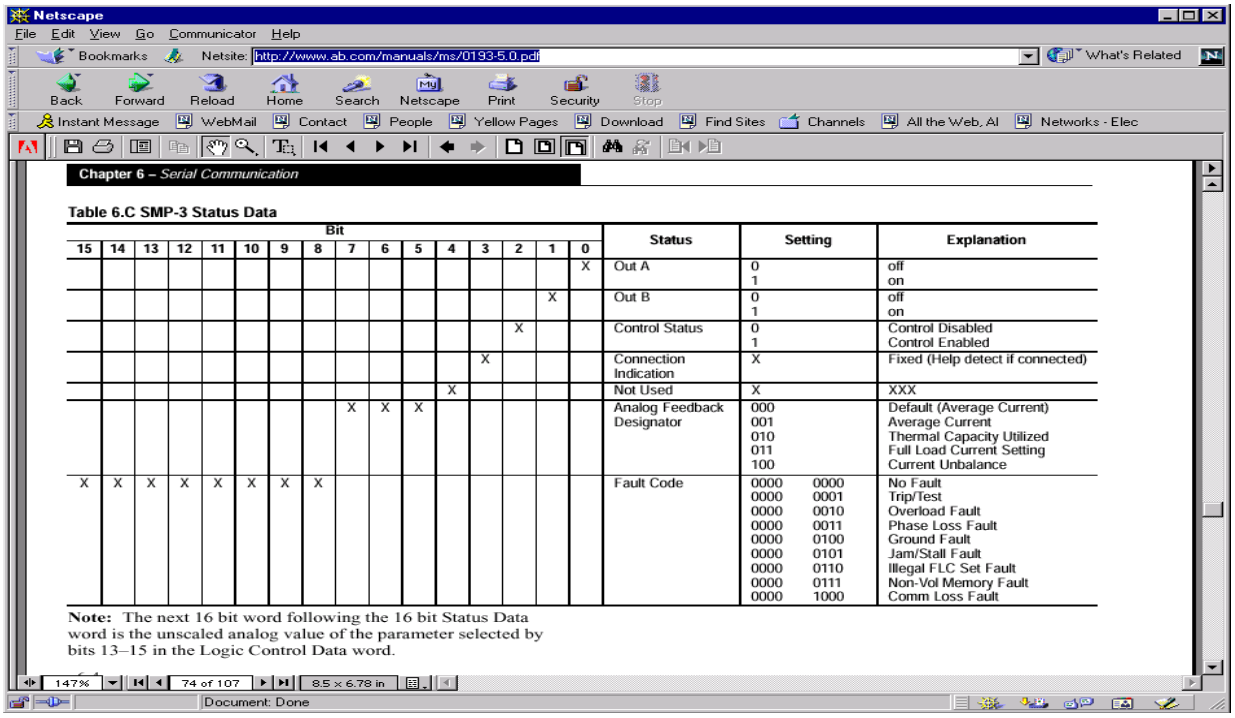

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Chapter 6 – *Serial Communication*

Table 6.C SMP-3 Status Data

Bit 15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Status	Setting	Explanation
															X	Out A	0 1	off on
														X		Out B	0 1	off on
													X			Control Status	0 1	Control Disabled Control Enabled
												X				Connection Indication	X	Fixed (Help detect if connected)
											X					Not Used	X	XXX
								X	X	X						Analog Feedback Designator	000 001 010 011 100	Default (Average Current) Average Current Thermal Capacity Utilized Full Load Current Setting Current Unbalance
X	X	X	X	X	X	X	X									Fault Code	0000 0000 0000 0001 0000 0010 0000 0011 0000 0100 0000 0101 0000 0110 0000 0111 0000 1000	No Fault Trip/Test Overload Fault Phase Loss Fault Ground Fault Jam/Stall Fault Illegal FLC Set Fault Non-Vol Memory Fault Comm Loss Fault

Note: The next 16 bit word following the 16 bit Status Data word is the unscaled analog value of the parameter selected by bits 13–15 in the Logic Control Data word.

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PLC Ladder Logic Example

The following example uses a PLC-5, a 1771-SDN DeviceNet scanner, and a 2100-GK61 to control a 1305, 1336 PLUS, or 1336 PLUS II drive.

The example program shows how to obtain status information from the drive and how to control it (e.g., starting the drive, stopping the drive, jogging the drive, sending reference, and clearing faults). When you understand this example, you should be able to customize the program to fit your application needs.

The example assumes that there is an operator's station wired to an I/O module in slot zero of module group zero of rack zero.

Important: You may want to verify a device has not failed using word 0 of block transfer 62 before sending control data. If a device has failed, use block transfer 52 to find out which device failed. Refer to the *1771-SDN DeviceNet Scanner Module Manual*, Publication 1771-5.14, for more information.

Figure 5.2
Example PLC Ladder Logic Program

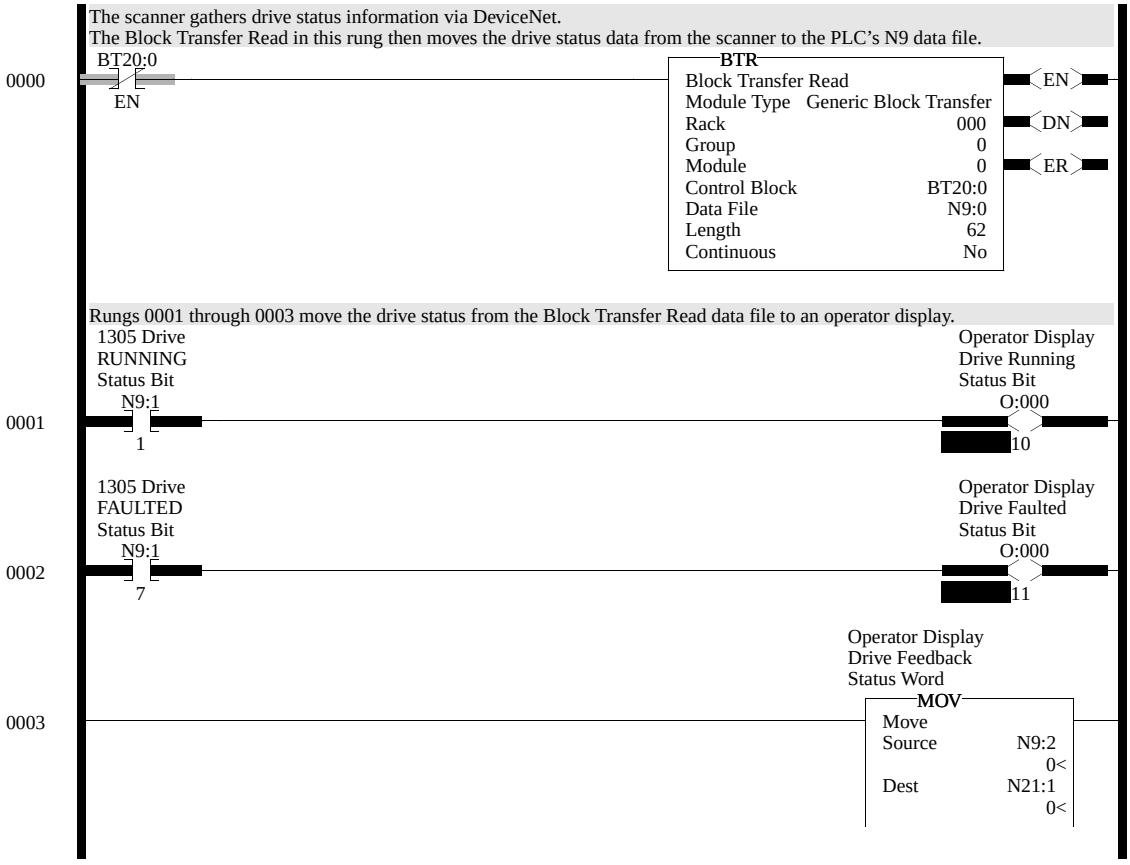
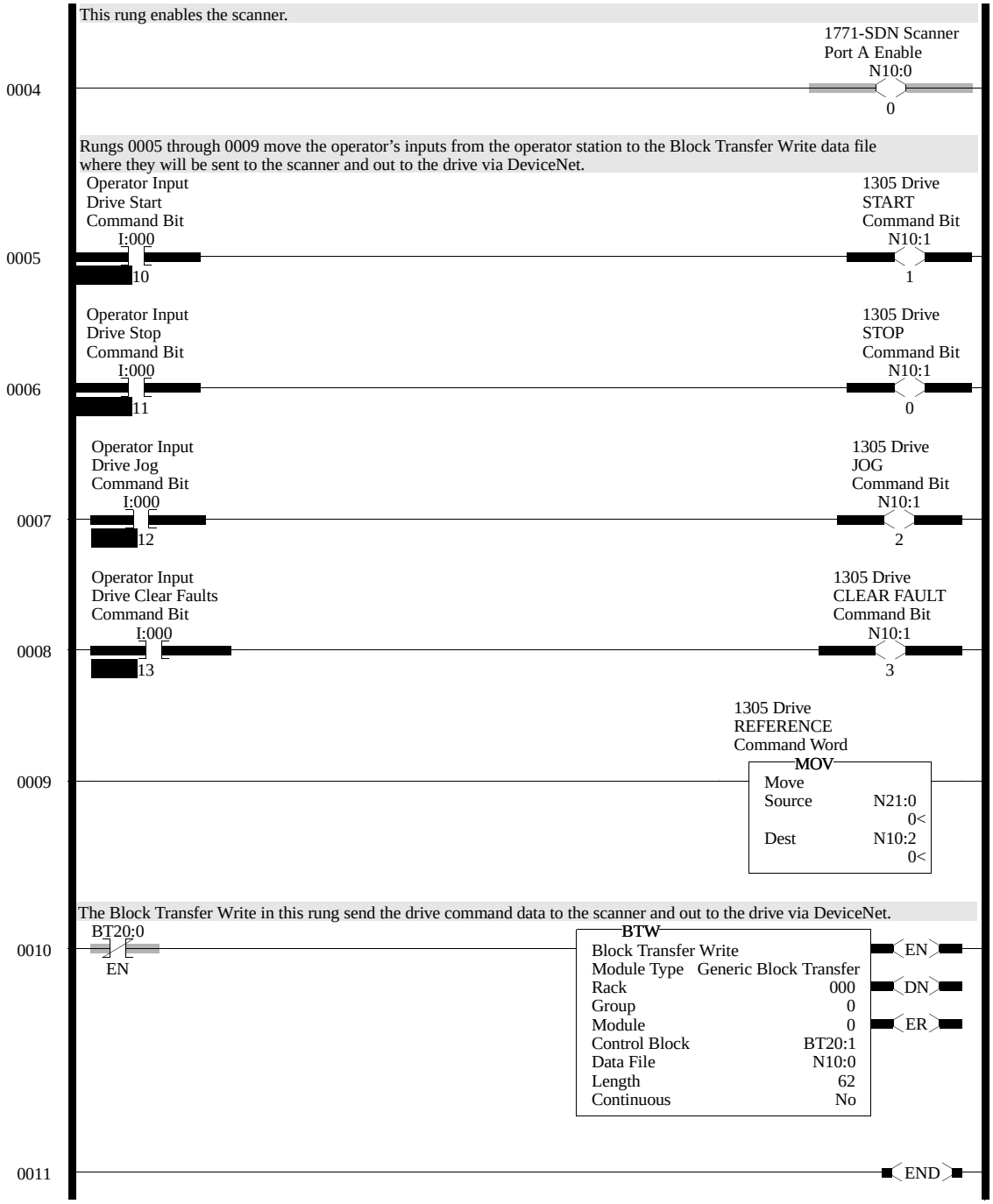


Figure 5.3
Example PLC Ladder Logic Program (continued)



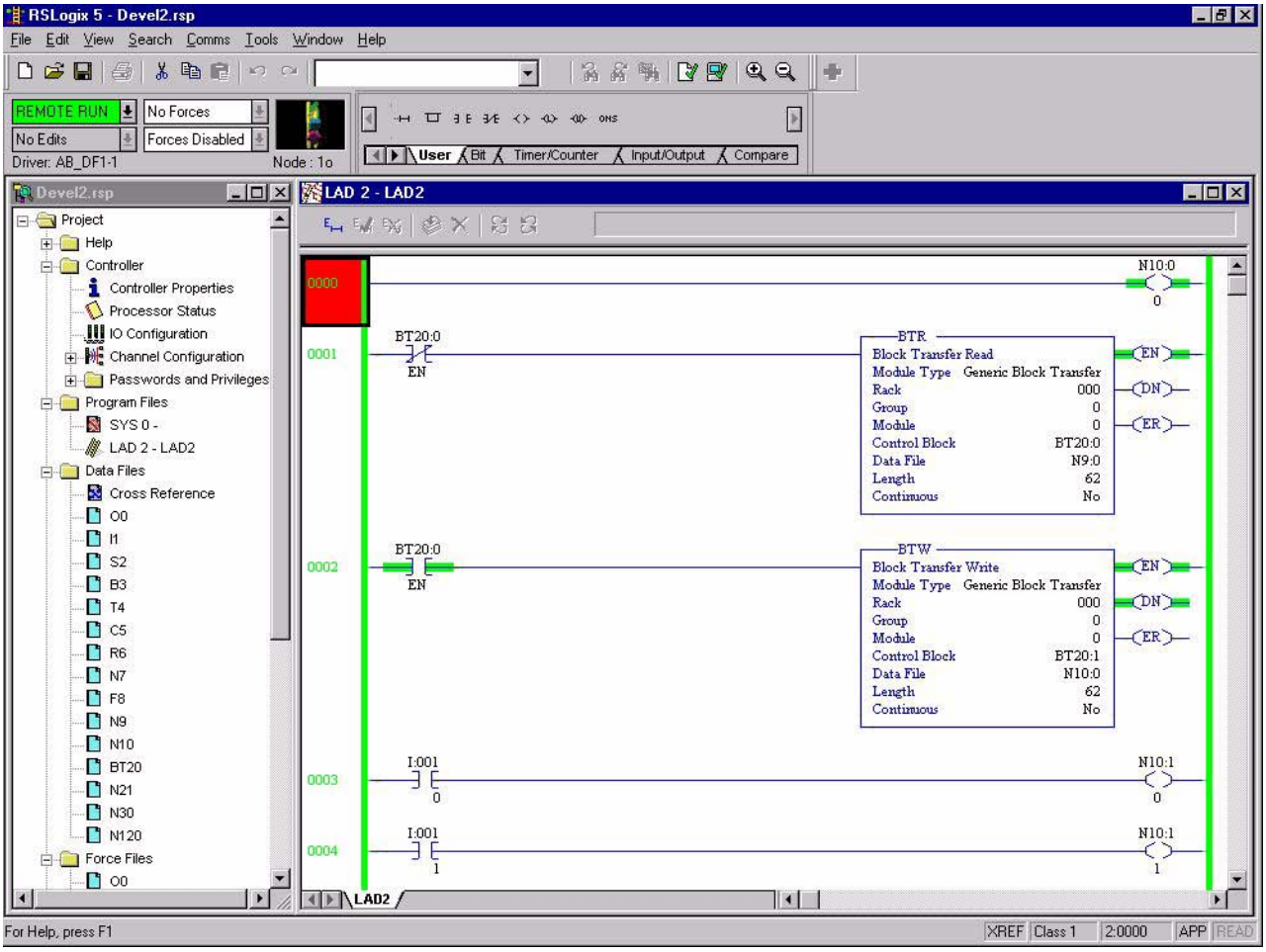
The following table represents the control file for the block transfers.

Offset	EN	ST	DN	ER	CO	EW	NR	TO	RW	RLEN	DLEN	FILE	ELEM	R	G	S
BT20:0	0	0	0	0	0	0	0	0	0	62	0	9	0	00	0	0
BT20:1	0	0	0	0	0	0	0	0	0	62	0	10	0	00	0	0

In the following programming example, a PLC is used to read the inputs of a 2100-GK61 and control the outputs of an SMP-3 electronic overload relay.

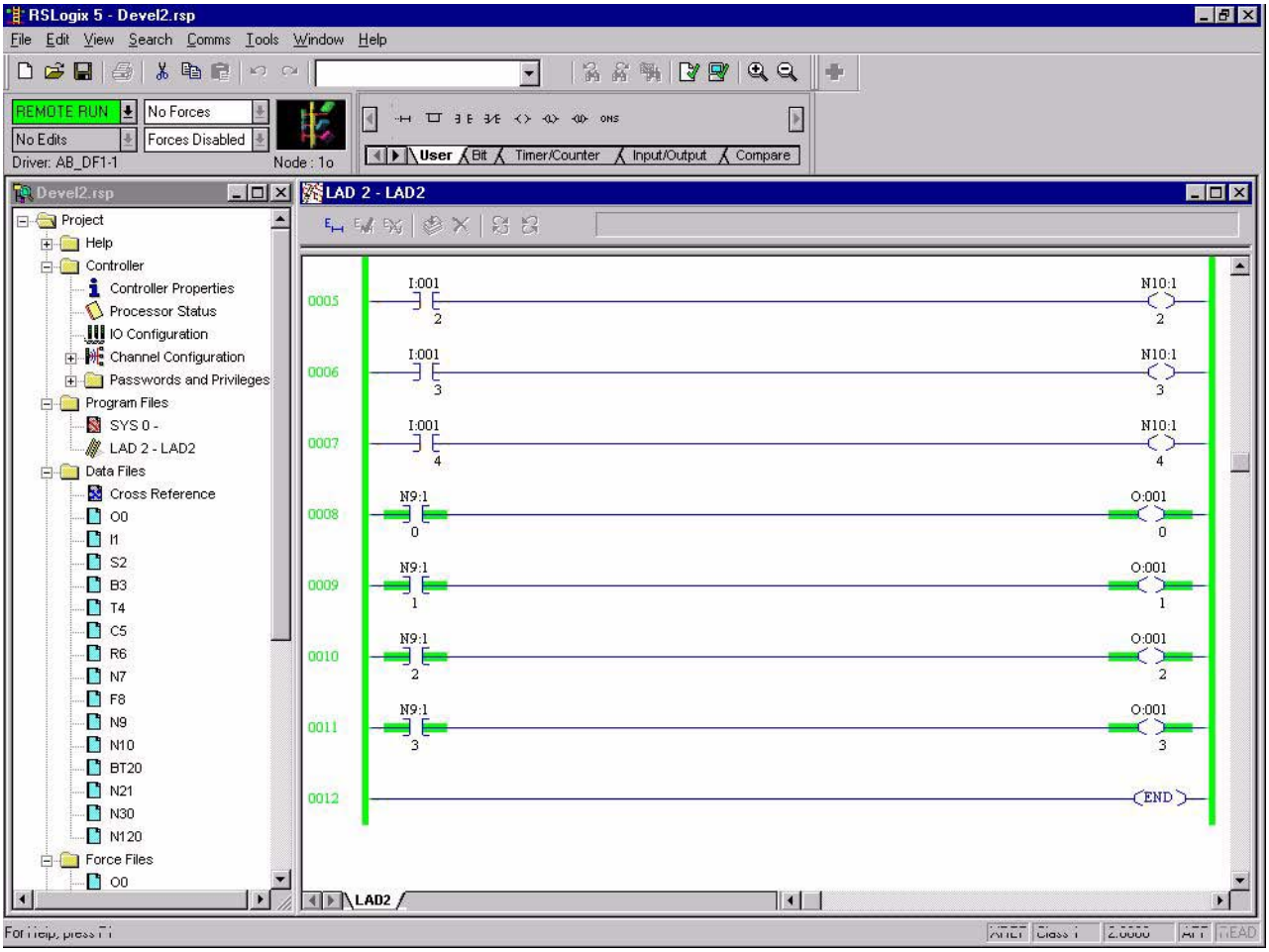
PLC Code: Rung 0 enables scanner; Rungs 1 and 2 are Block Transfer Read & Write. SMP-3 Output A is turned OFF when I:001/0 in Rung 3 is momentarily turned ON. SMP-3 output B is turned OFF when I:001/1 in Rung 4 is momentarily turned ON.

Figure 5.4



PLC Code: SMP-3 is RESET when I:001/4 in Rung 5 is turned ON. SMP-3 Output A is turned ON when I:001/3 in Rung 6 is momentarily turned ON. SMP-3 output B is turned ON when I:001/4 in Rung 7 is momentarily turned ON. Rungs 8-11 read GK61 inputs and turn on respective LED in SIM card located in PLC Chassis Slot 1.

Figure 5.5



SLC Ladder Logic Program Example

The following example uses an SLC-5/03, a 1747-SDN DeviceNet scanner, and a 2100-GK61 to control a 1336 PLUS, 1336 PLUS II or 1305 drive.

The example assumes that there is an operator's station wired to an I/O module in slot one of module group zero of rack zero.

Important: You may want to verify a device has not failed using word I:S.0. If a device has failed, read the appropriate M1 File to find out which device failed. Refer to the *1747-SDN DeviceNet Scanner Module Manual*, Publication 1747-5.8, for more information.

Figure 5.6
Example SLC Ladder Logic Program

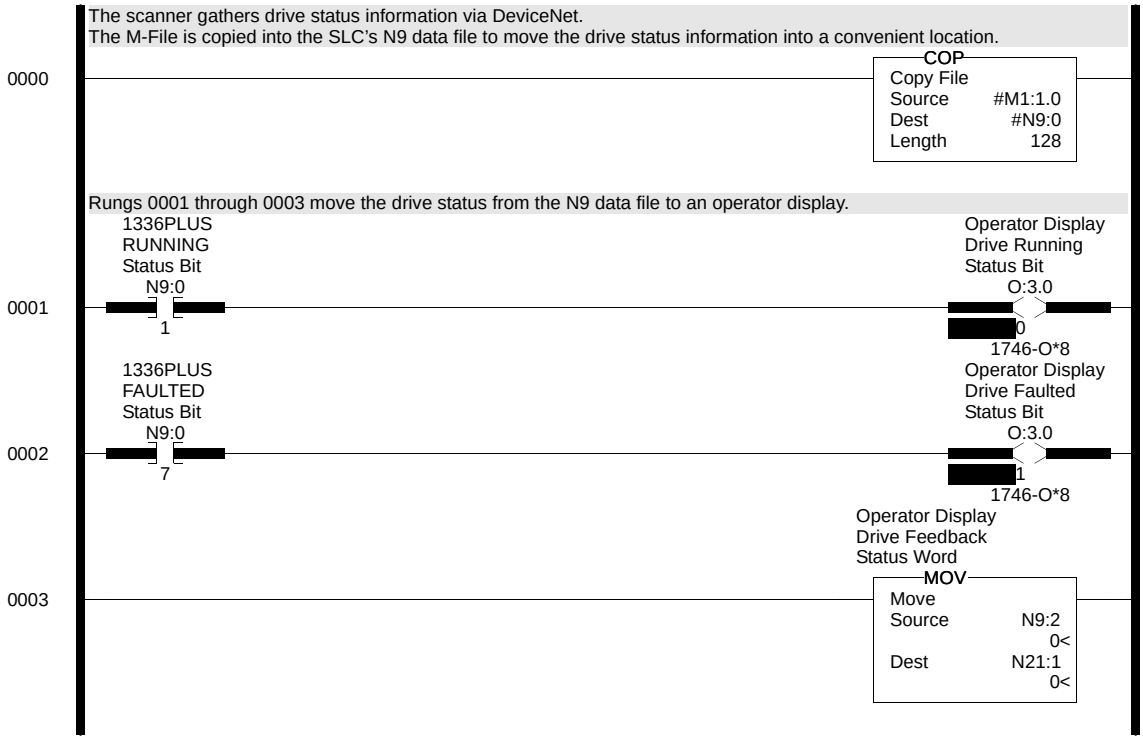
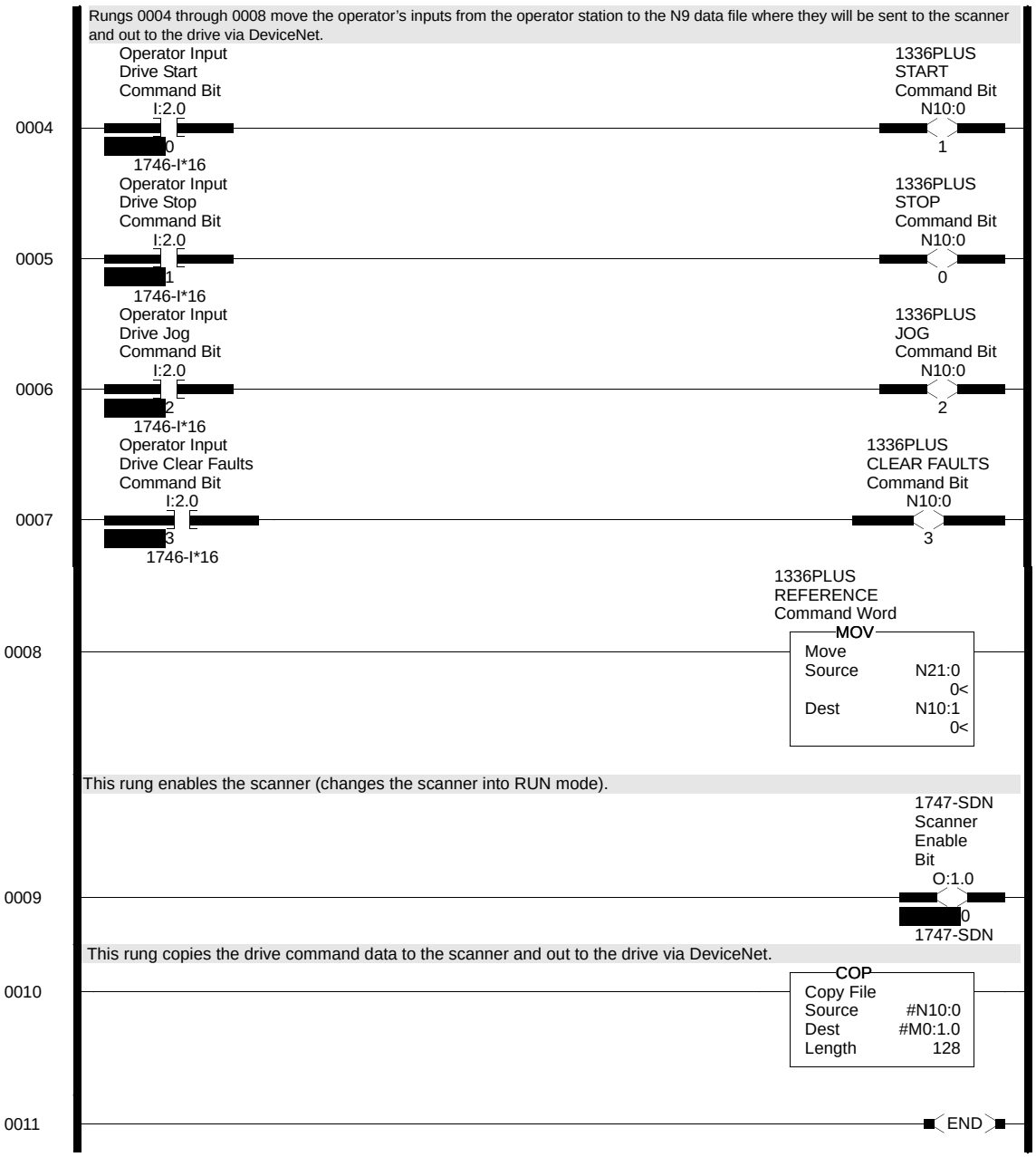


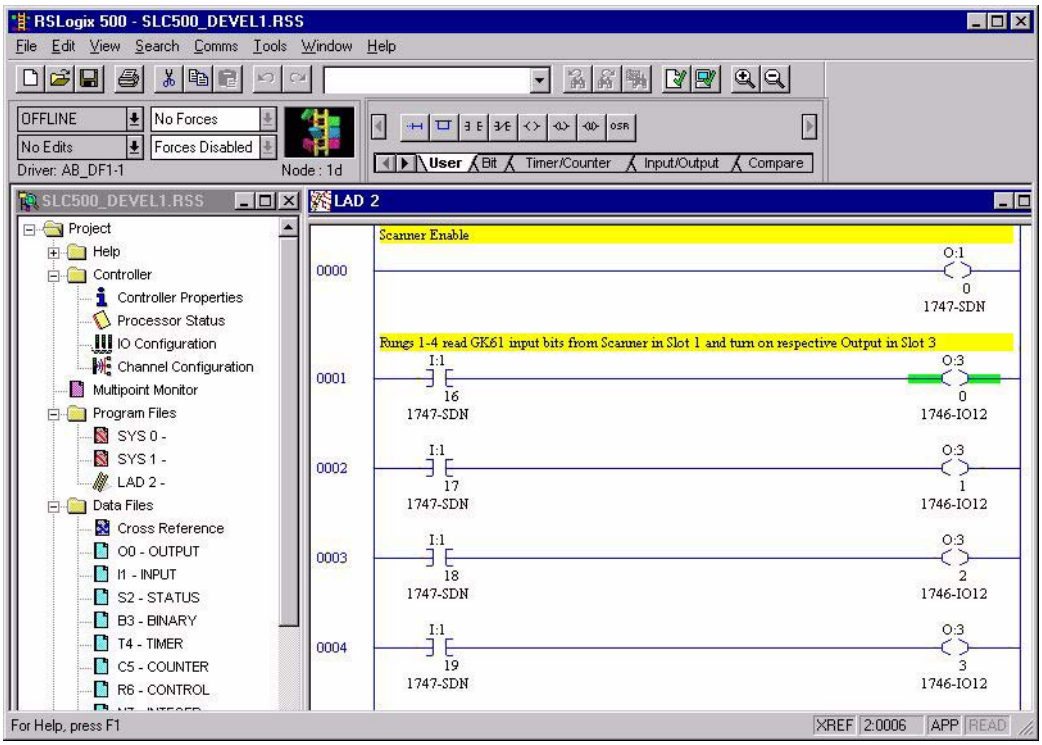
Figure 5.7
Example SLC Ladder Logic Program (continued)



The following programming example shows how to read 2100-GK61 inputs and control SMP-3 outputs with an SLC-500.

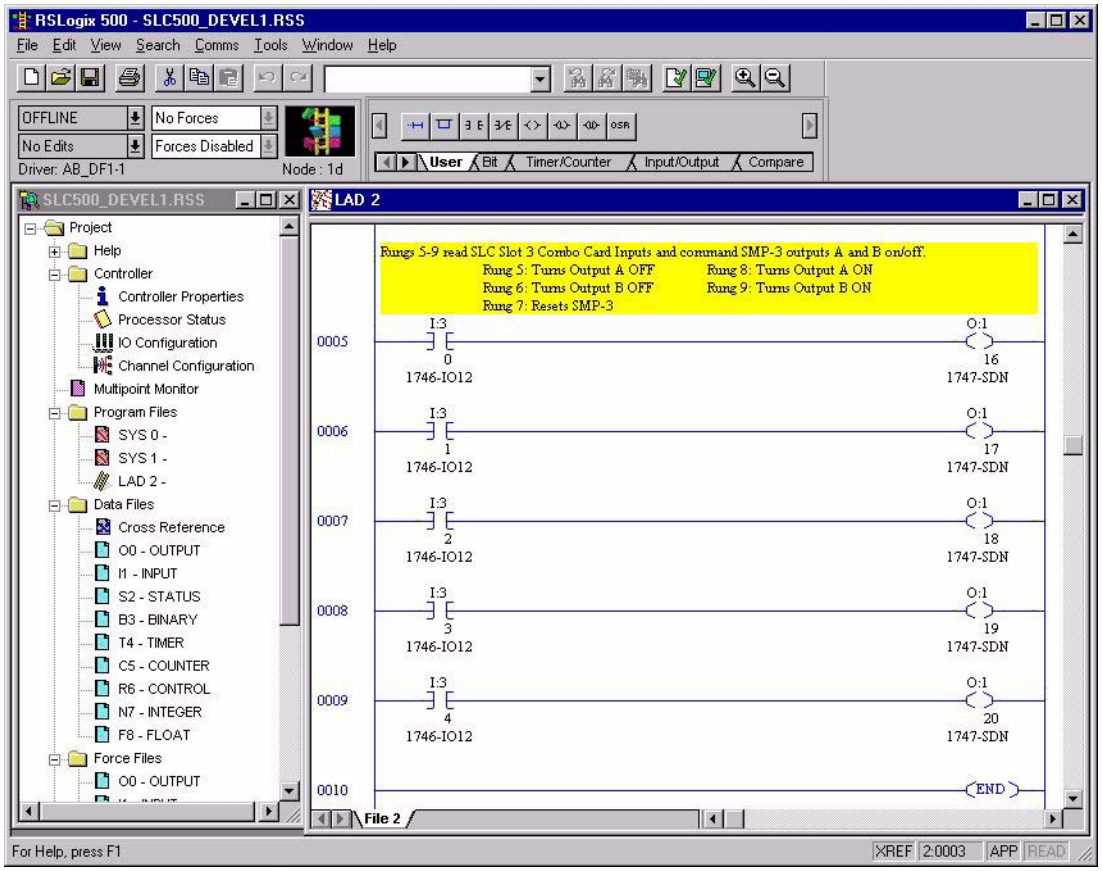
SLC Code: Rung 0 enables scanner; Rungs 1 through 4 read 2100-GK61 inputs and turn on respective output in Slot 3 I/O Card.

Figure 5.8



SLC Code: SMP-3 output A is turned OFF when Slot 3, Input 0 is true in Rung 5. SMP-3 output B is turned OFF when Slot 3, Input 1 is true in Rung 6. In Rung 7, SMP-3 is reset when input 2 of Slot 3 input card is true. Rungs 8 and 9 illustrate how SMP-3 outputs A and B are respectively turned ON when Inputs 3 and 4 of I/O card in slot 3 are true.

Figure 5.9



ControlLogix Programming Example

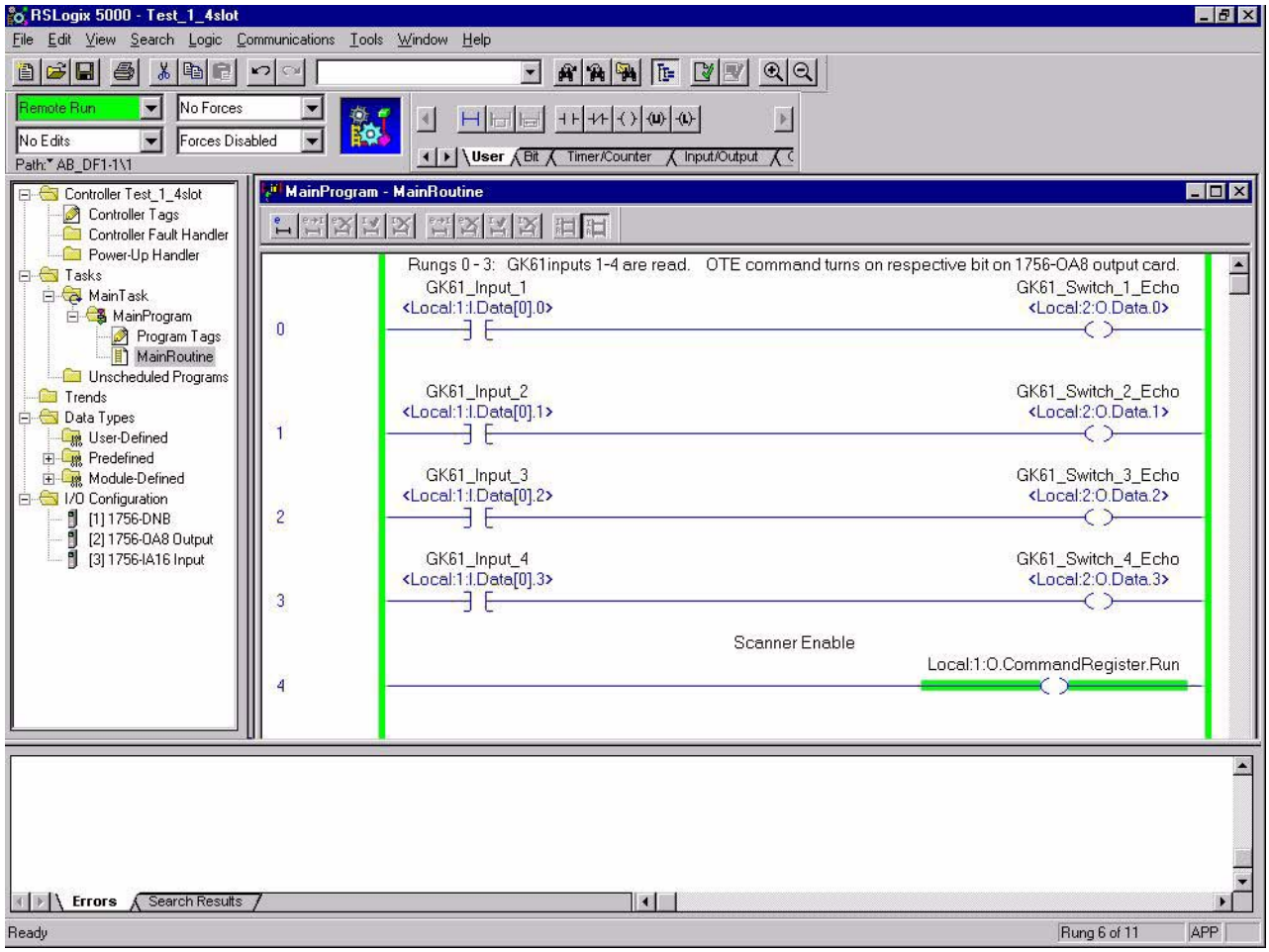
Unlike PLC and SLC programs, the ControlLogix utilizes a tag-based technique.

A ControlLogix is used to read 2100-GK61 inputs and control the outputs of an SMP-3 electronic overload relay.

Rungs 0 through 3 illustrate XIC (Examine if Closed) input instructions. Each 2100-GK61 input can be read by examining Scanner in slot 1. Therefore, the first input is Local:1:I.Data[0].0. The second input is located at Local:1:I.Data[0].1. In this example, status of each 2100-GK61 input is annunciated by the first four bits of the output card in slot 2. The first output is addressed as Local:2:O.Data.0.

Rung 4 enables the Scanner.

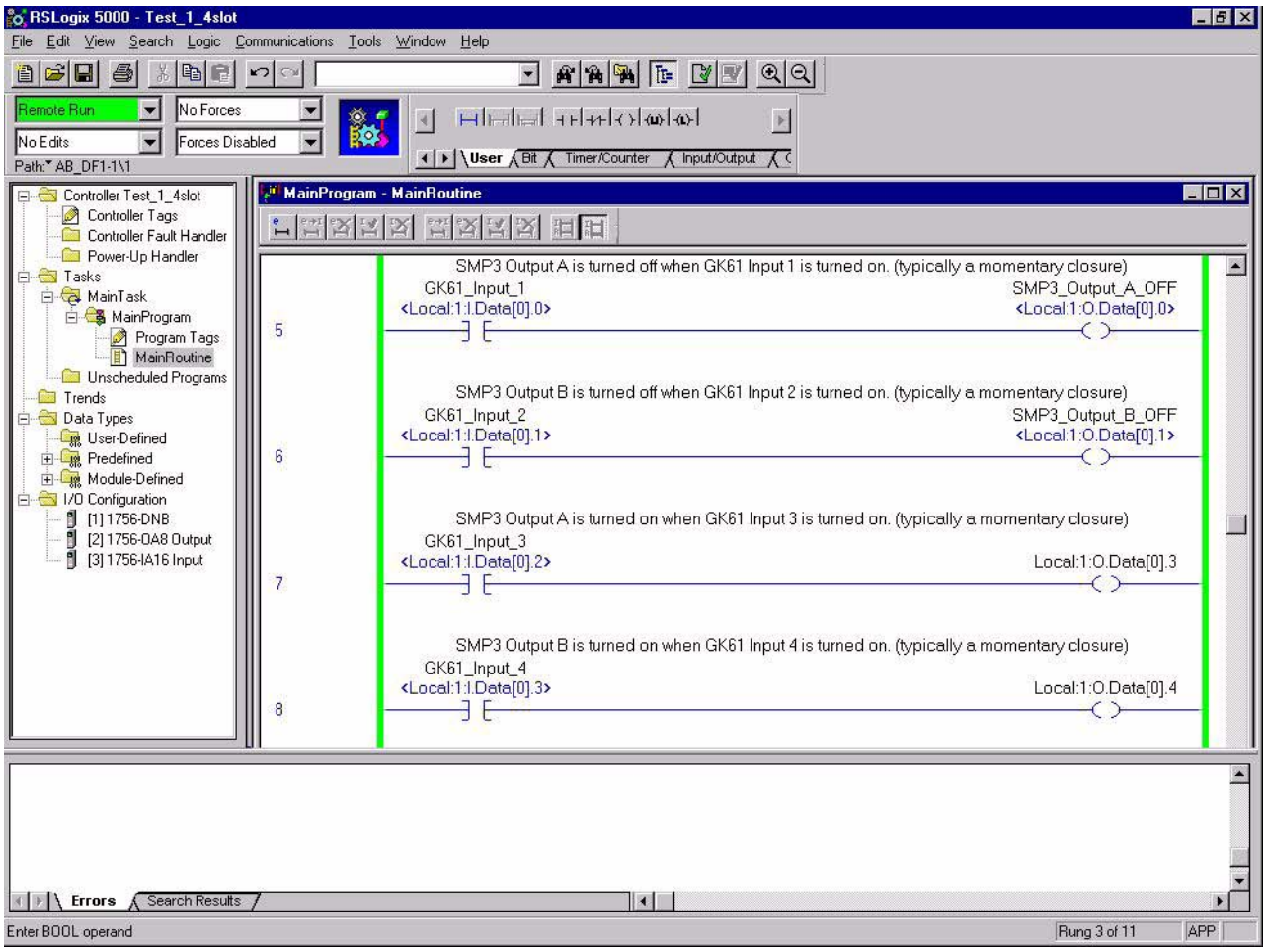
Figure 5.10



Rungs 5 through 8 also read 2100-GK61 inputs. In this case, however, control information is being sent to an area of the Scanner where SMP-3 Command Word is located. Commands pass through ScanPort to SMP-3, where Outputs A and B are turned on or off. For example, when 2100-GK61 input 3 is momentarily turned on in rung 7, SMP-3 Output A is energized via Local:1:0:Data[0].3.

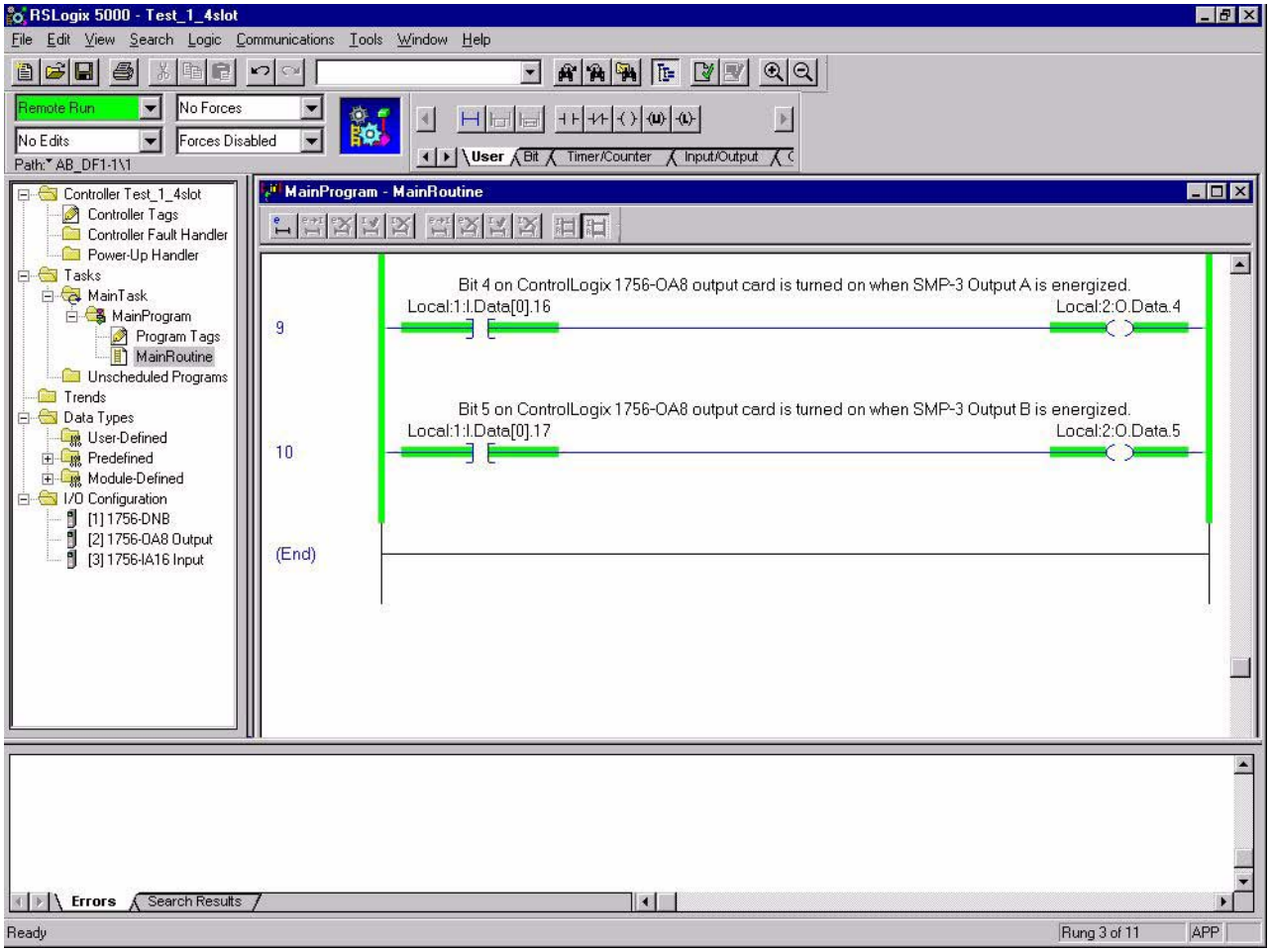
See Logic Control Data and Status Data tables from the SMP-3 manual on the last page of this Tech Note.

Figure 5.11



Rungs 9 and 10 show how SMP-3 Status Word information is read. The Output card in slot 2 shows status at bits 4 and 5.

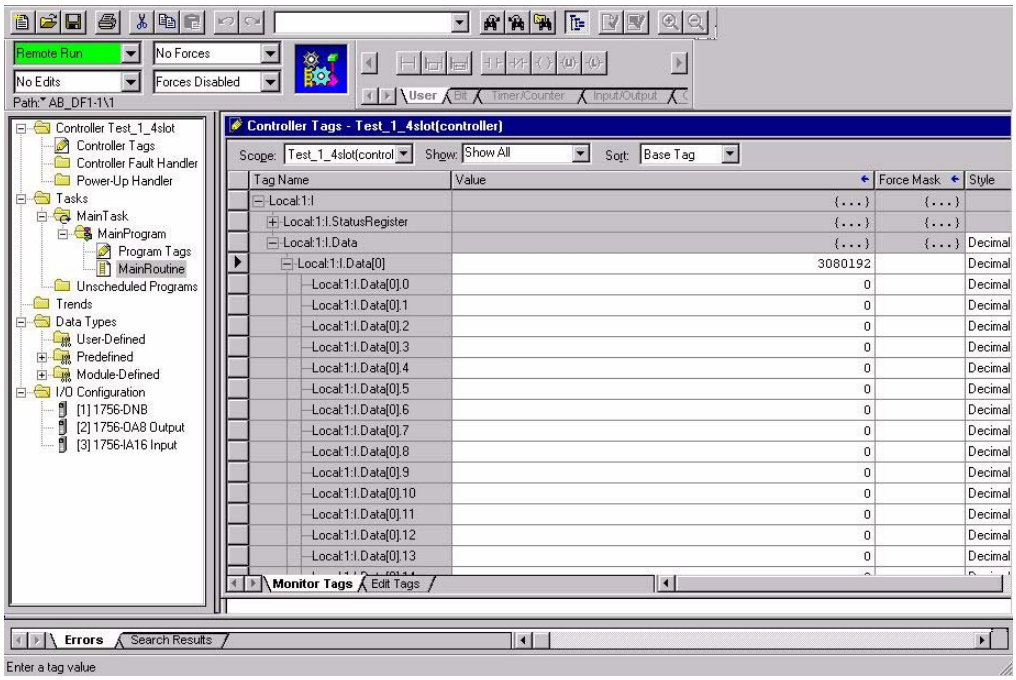
Figure 5.12



The next word after Status word is analog information from SMP-3. Average Current, Current Imbalance, Thermal Capacity Utilized, and Full Load Current Setting can be monitored. The parameter to be monitored is selected by logic state of bits 13-15 in the Logix Control Word.

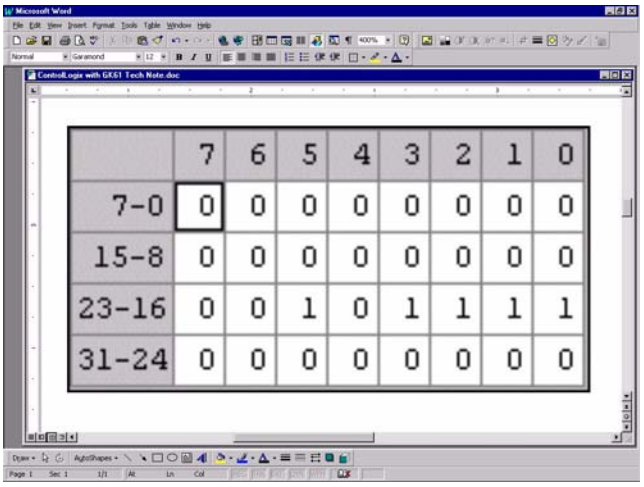
Input and Output states can be seen by selecting “Monitor Tag” Screen shown below.

Figure 5.13



Clicking on the appropriate tag can provide additional bit-level data.

Figure 5.14



	7	6	5	4	3	2	1	0
7-0	0	0	0	0	0	0	0	0
15-8	0	0	0	0	0	0	0	0
23-16	0	0	1	0	1	1	1	1
31-24	0	0	0	0	0	0	0	0

Using DeviceNet Explicit Messaging

Chapter Objectives

Chapter 6 provides information you need to monitor and configure the SCANport device using explicit messaging on DeviceNet. In this chapter, you will read about the following:

- Required equipment.
- Message translations.
- Messaging guidelines for the 1771-SDN scanner.
- Messaging guidelines for the 1747-SDN scanner.
- Example messages.
- Using messages to control SCANport products.
- Writing to register objects.

Refer to Appendix C, *DeviceNet Objects*, for information on object data support.

Required Equipment

Before using messaging, your PC must be:

- Running Logix5 and RSLinx if you are using a PLC. Refer to http://www.software.rockwell.com for more information on these products.
  -OR-
  Running RSLogix500 and RSLinx if you are using an SLC. Refer to http://www.software.rockwell.com for more information on these products.
- Connected to and communicating with the DeviceNet network using a 1784-PCD card, 1784-PCID, card or a 1770-KFIO adapter.

Explicit Message Program Control for PLC-5

Use the Explicit Message Program Control feature to configure device parameters on your DeviceNet network via the ladder logic program in the PLC-5 processor that is controlling these devices.

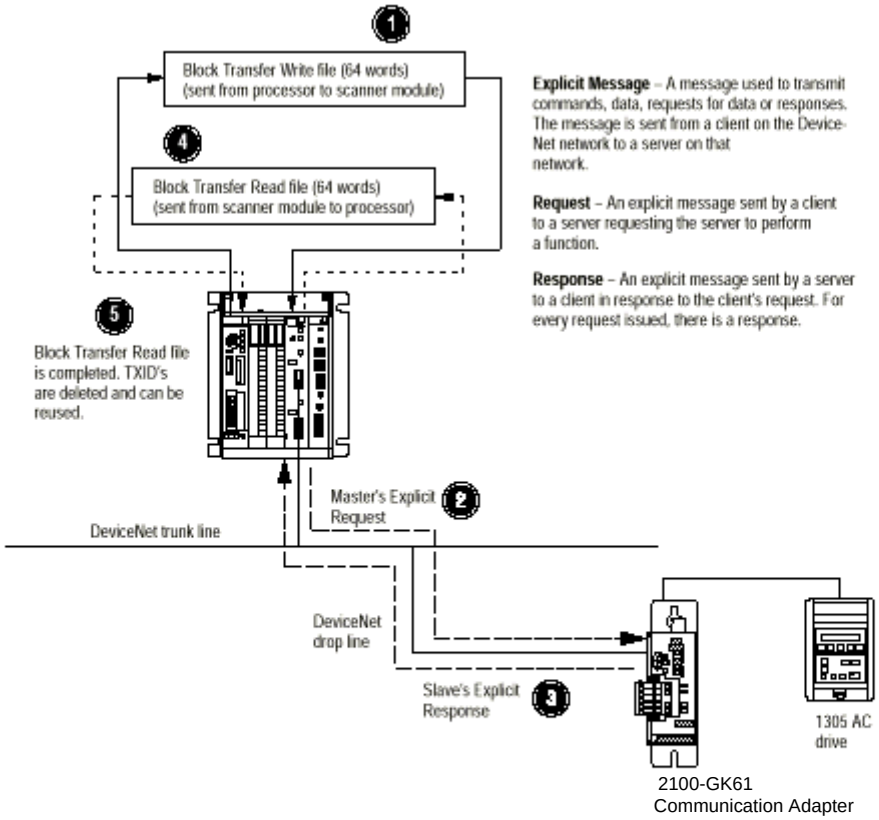
You can use Explicit Message Program Control only with devices that are slaves of your 1771-SDN Scanner Module. These slave devices must be mapped in the scanner module's scan list.

Use the Explicit Message Program Control feature to:

- Transmit configuration data from your scanner module to its slave devices on your DeviceNet network.

- Receive status and diagnostics from these devices on your DeviceNet network.
- Make runtime adjustments to device parameters according to changing conditions detected by your processor.

Figure 6.1
How the Explicit Message Program Control Feature Works



1. Format a Block Transfer Write file in the processor to send an Explicit Message Request to the scanner module **(download)**.
2. The scanner module transmits the Explicit Message Request to the slave device over the DeviceNet network.
3. The slave device transmits the Explicit Message Response back to the scanner and is queued into a block transfer buffer.
4. The processor uses a Block Transfer Read file to retrieve the explicit Message Response from the scanner's buffer (upload).
5. The Block Transfer Read file is completed. The transaction IDs are deleted and can be reused.

The scanner module requires a precisely-formatted block transfer read and write size of 64 words. The Explicit Message Control table in the scanner module is 64 words. The scanner module uses the block transfer size as an indicator that the content is a client/server request.

Message Translations

The communications adapter provides electronic translations of DeviceNet explicit messages into SCANport messages and back. The format of all DeviceNet explicit messages supported by the adapter is 8:16: within an explicit message, the class field is 8 bits long, and the instance field is 16 bits long.

Messaging for the 1771-SDN Scanner

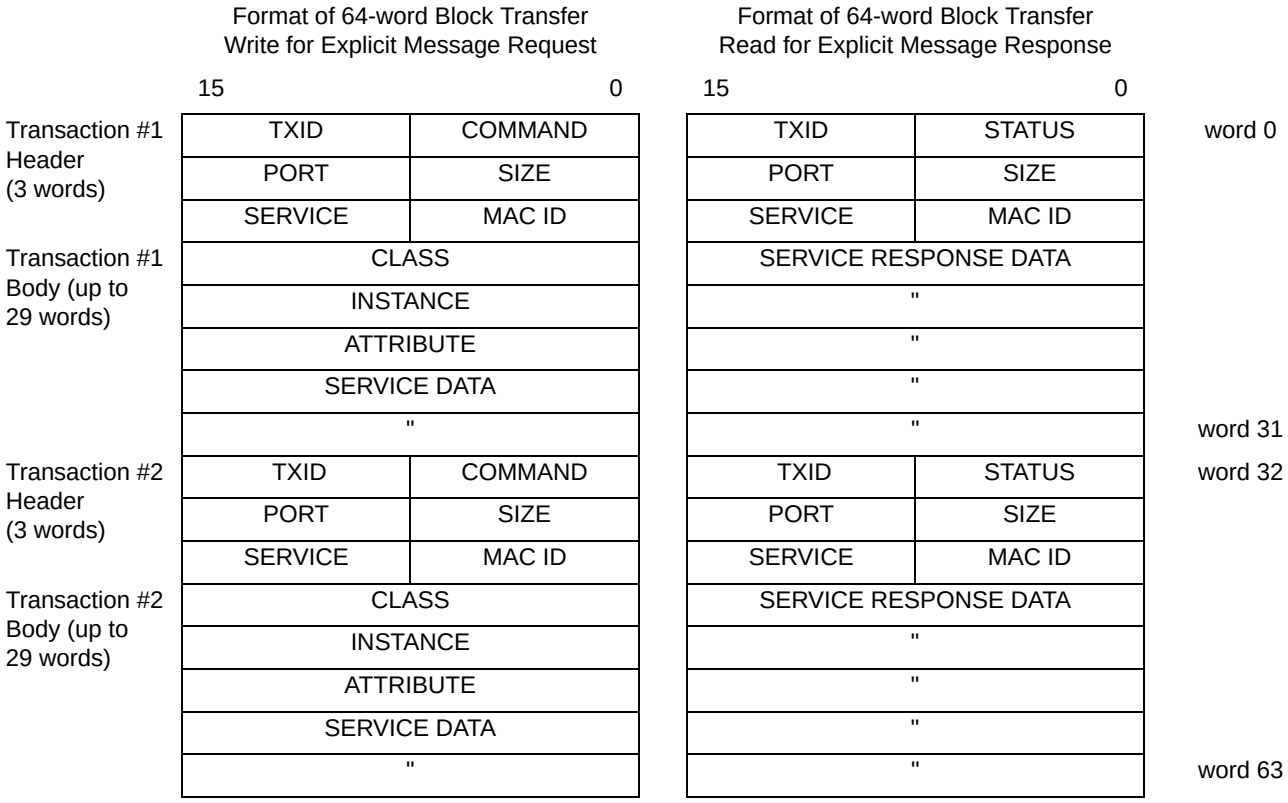
The PLC uses a 64-word Block Transfer Write (BTW) to copy an Explicit Message into the 1771-SDN scanner. Ten explicit message buffers are available within the 1771-SDN scanner. When the BTW completes, the scanner executes the message. The PLC must then poll the scanner by performing a 64-word Block Transfer Read (BTR) to complete the message. (Note: both the BTW and BTR commands are of module type “1771-SDN DeviceNet Scanner Module” and of length “64.” The PLC can transfer two Explicit Messages per BTW or BTR and the scanner can have up to ten Explicit Messages active at any time.)

When the BTR completes, the data received by the PLC will contain information about the status of the current Explicit Message being processed by the scanner. If an Explicit Message has completed, the STATUS code in the Explicit Message Response is set to 1 and the response message contains the data requested.

If the message status indicates that it is not completed, the BTR should be repeated until the message is complete.

The format of Request and Response Data File messages is in Figure 6.2.

Figure 6.2
Format of DeviceNet Messages



Transaction Blocks are divided into two parts:

- **Transaction header** — contains information that identifies the transaction to the scanner and processor.
- **Transaction body** — in a request, this contains the DeviceNet Class, Instance, Attribute, and Service Data portion of the transaction. See Appendix C. In a response, this contains the Service Data only.

Each of the data attributes in the transaction header is one byte in length. The table below details the information required:

Data Field	Description
TXID	Transaction ID — when the processor creates and downloads a request to the scanner, the processor's ladder logic program assigns a TXID to the transaction. This is a one-byte integer in word 31, with a range of 1 to 255. The scanner uses this value to track the transaction to completion, and returns the value with the response that matches the request downloaded by the processor.
COMMAND	In each message request, a command code instructs the scanner how to administer the request: 0 = Ignore transaction block (block empty) 1 = Execute this transaction block 2 = Get status of transaction TXID 3 = Reset all client/server transactions 4-255 = Reserved
STATUS	In each message response, the status code provides the processor with status on the device and its response: 0 = Ignore transaction block (block empty) 1 = Transaction completed successfully 2 = Transaction in progress (not ready) 3 = Error — slave not in scan list 4 = Error — slave off-line 5 = Error — DeviceNet port disabled or off-line 6 = Error — transaction TXID unknown 7 = Unused 8 = Error — Invalid command code 9 = Error — Scanner out of buffers 10 = Error — Other client/server transaction in progress 11 = Error — could not connect to slave device 12 = Error — response data too large for block 13 = Error — invalid port 14 = Error — invalid size specified 15 = Error — connection busy 16-255 = Reserved
Port	The DeviceNet port where the transaction is routed. The port can be zero (Channel A) or one (Channel B) on a 1771-SDN scanner.
Size	The size of the transaction body in bytes. The transaction body can be up to 29 words (58 bytes) in length. If the size exceeds 29 words, an error code will be returned.
SERVICE	The service attribute contains the DeviceNet service request and response codes that match the corresponding request for the TXID. Service codes vary for each DeviceNet object. Appendix C details available Service Codes referred to as "Common Services" for each object.
MAC ID	The DeviceNet network address of the slave device where the transaction is sent. This value can range from 0 to 63. The port and MAC ID attributes coupled together identify the target slave device. The slave device must be listed in the scanner module's scan list and be on-line for the Explicit Message transaction to be completed.

Examples

The following examples show messages used with the ladder logic programs begun in Chapter 5, *Ladder Logic Programming—Including Reading Inputs*.

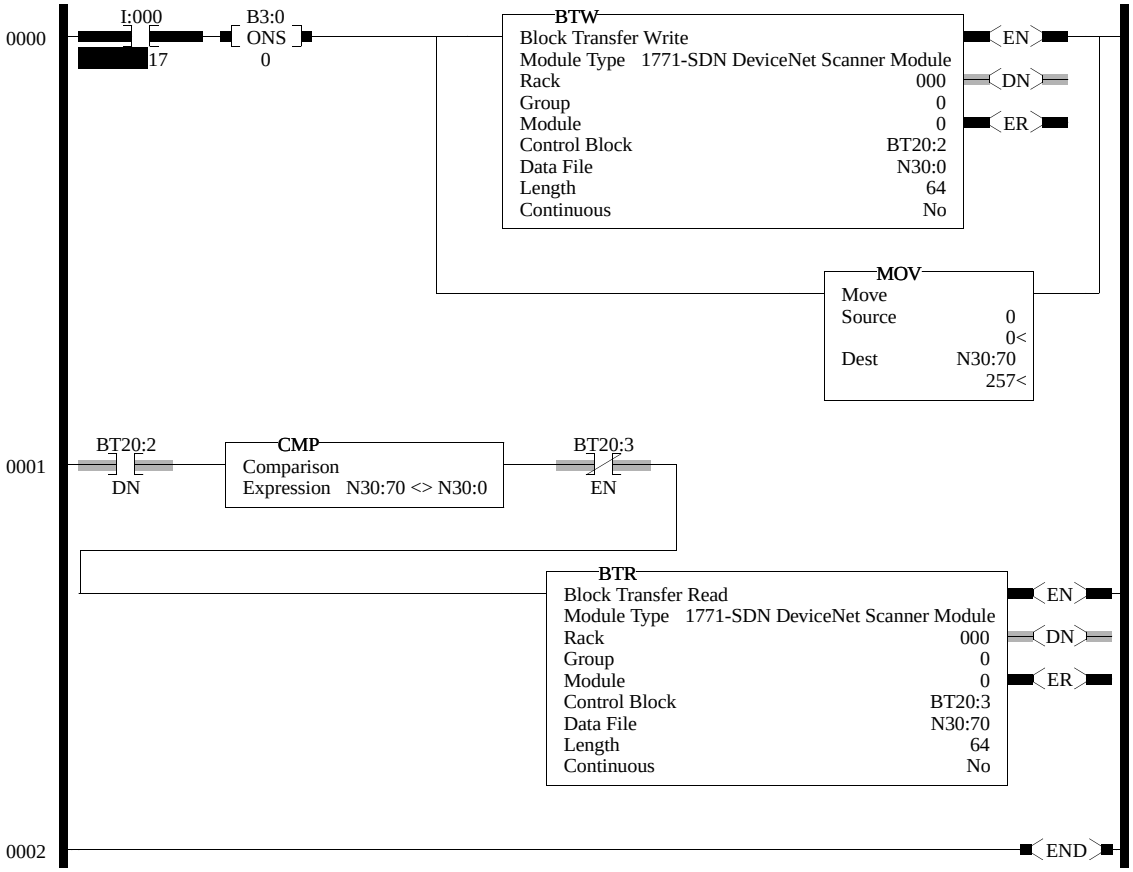
ATTENTION: The example ladder logic program shown in this manual is intended solely for purpose of example. Because there are many variables and requirements associated with any particular installation, Rockwell Automation does not assume responsibility or liability (to include intellectual property liability) for actual use based upon the example shown in this publication.

PLC-5 Ladder Example

PLC Messaging

Figure 6.3, started in Chapter 5, *Ladder Logic Programming—Including Reading Inputs*, shows an example PLC ladder logic program that sends an explicit message. The message sent is contained in N30, beginning at word 0. The response data will appear in N30, starting at word 70.

Figure 6.3
PLC Messaging Example



I:000/17: When you set this instruction to the true state, the next instruction, a one-shot block transfer write, sends data to the scanner. The Move instruction then initializes the first word of the data file that is used by the block transfer read instruction in the next rung.

Instruction BT20:2.DN: This instruction will be true when the block transfer write has completed. The compare instruction that follows compares the first word of data sent from the scanner to the first word of data you send to the scanner. When the messaging function has completed, these two words will be equal.

Instruction BT20:3.EN: Any time the block transfer read is not enabled, this instruction causes the block transfer read to be enabled if the two earlier conditions are true.

BTR: Reads 64 words of data from the scanner.

The following table displays data sent to and received from the scanner. Values are in hexadecimal.

Offset	0	1	2	3	4	5	6	7	8	9
N30:0	201	6	E03	97	0	1	0	0	0	0
N30:10	0	0	0	0	0	0	0	0	0	0
N30:20	0	0	0	0	0	0	0	0	0	0
N30:30	0	0	0	0	0	0	0	0	0	0
N30:40	0	0	0	0	0	0	0	0	0	0
N30:50	0	0	0	0	0	0	0	0	0	0
N30:60	0	0	0	0	0	0	0	0	0	0
N30:70	201	6	8E03	4	0	0	0	0	0	0
N30:80	0	0	0	0	0	0	0	0	0	0
N30:90	0	0	0	0	0	0	0	0	0	0
N30:100	0	0	0	0	0	0	0	0	0	0
N30:110	0	0	0	0	0	0	0	0	0	0
N30:120	0	0	0	0	0	0	0	0	0	0
N30:130	0	0	0	0						

Using the format of Figure 6.3, the above data would be defined as follows:

BTW Format

Location	Value	
N30:0	TXID	COMMAND
	02	01
N30:1	PORT	SIZE
	00	06
N30:2	SERVICE	MAC ID
	0E	03
N30:3	CLASS	
	0097	
N30:4	INSTANCE	
	0000	
N30:5	ATTRIBUTE	
	0001	

BTR Format

Location	Value	
N30:70	TXID	COMMAND
	02	01
N30:71	PORT	SIZE
	00	06
N30:72	SERVICE	MAC ID
	8E	03
N30:73	Data	
	0004	

Data in N30:0-5 is data associated with the BTW command. All of these values are entered into the data table. Data in N30:70-72 is data associated with the BTR command. All of these values are entered into the data table. Data at N30:73 is the data read from the DeviceNet Module as a result of the command's entered data.

In this example, there were four entries in the fault queue. Notice the following about the data:

Location	Value	Meaning
N30:0	0x0201	TXID of 2. Command 1 (Execute)
N30:1	0x0006	Port 0. Size = 6 bytes (N30:3 – 5)
N30:2	0x0E03	Service E (Get Attribute Single) Node 3
N30:3	0x0097	SCANport Pass-Through Fault Object
N30:4	0x0000	Instance 0 (Class Access)
N30:5	0x0001	Attribute 1 (Number of Fault Queues)
N30:70	0x0201	TXID of 2. Status 1 (Success)
N30:71	0x0006	Port 0. Size = 6 bytes (N30:3 – 5)
N30:72	0x8E03	Service 8E (Get Attribute Single Response)
N30:73	0x0004	4 fault queues

Refer to Appendix C, *DeviceNet Objects*, for more information on object descriptions.

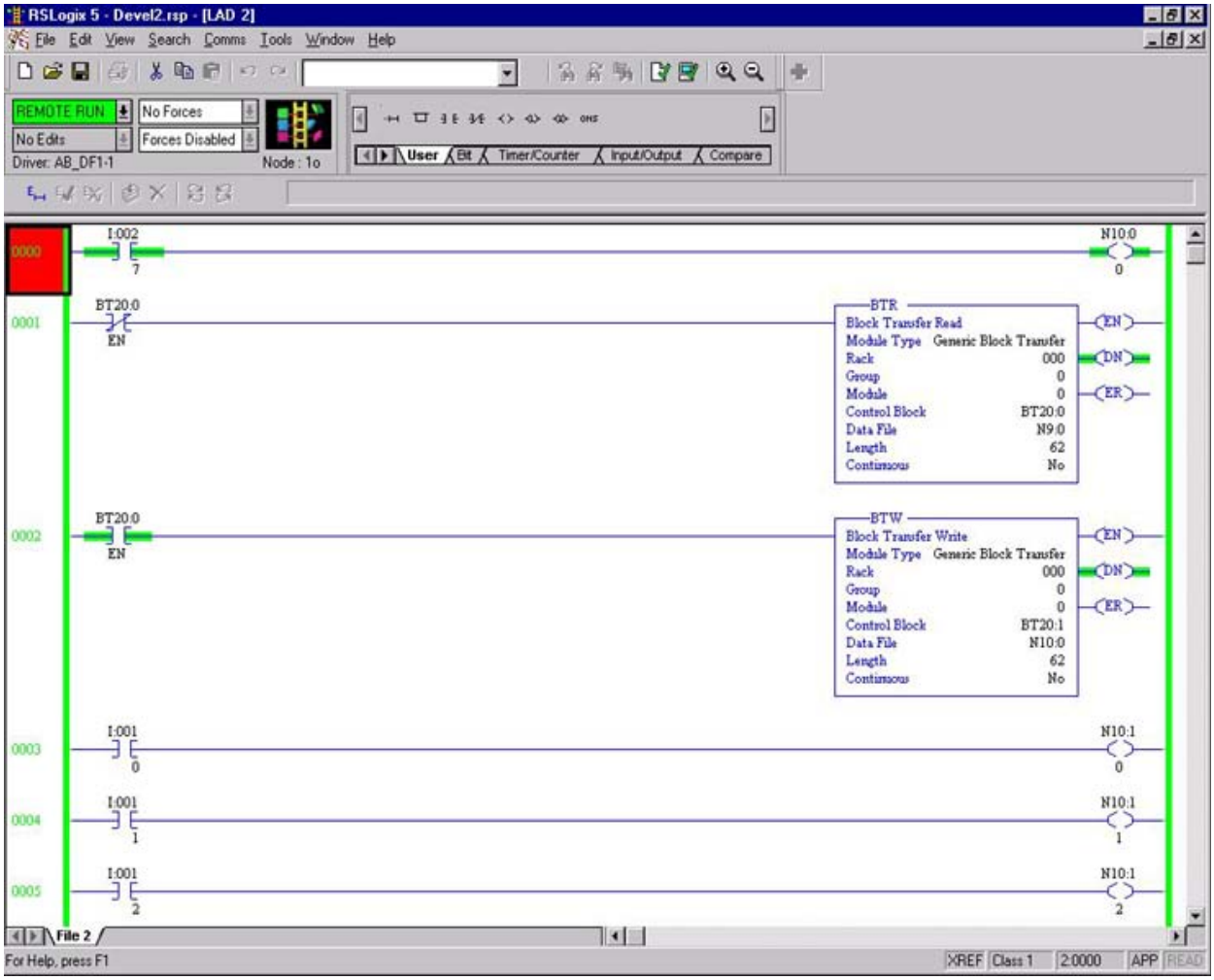
Explicit Messaging Programming Example

The example below illustrates how to read 2100-GK61 inputs and control the outputs of an SMP-3 electronic overload relay using explicit messaging.

Example Ladder Program Explanation

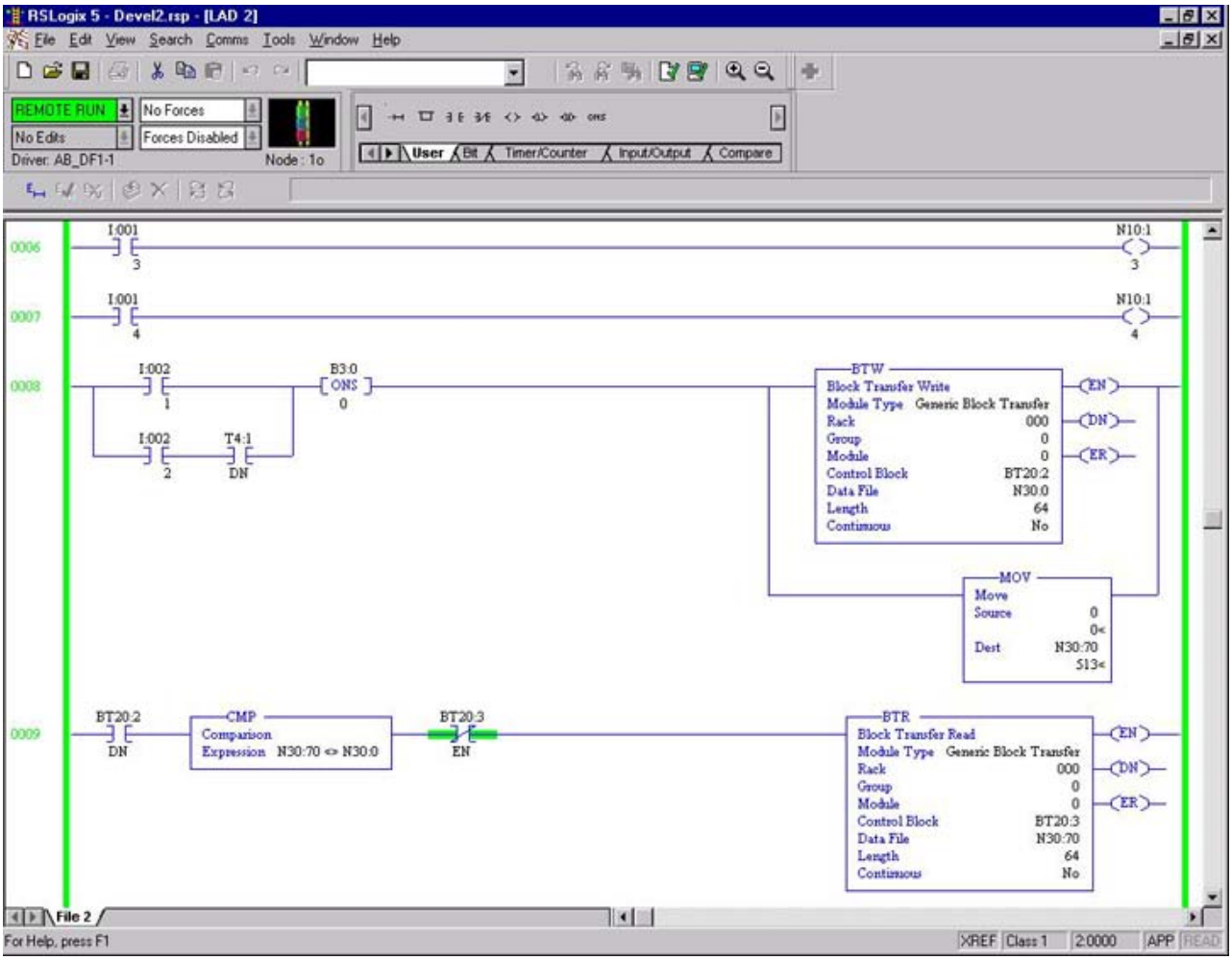
- Rung 0 – N10:0/0 enables 1771-SDN Scanner Port A.
- Rung 1 - BTR (Block Transfer Read) gathers SMP-3 Status Data via DeviceNet. The Block Transfer then moves the status data from the scanner to the PLC's N9 data file.
- Rung 2 – BTW (Block Transfer Write) sends SMP-3 command data to the scanner and out to the SMP-3 via DeviceNet.
- Rung 3 – Turns off SMP-3 Output A (by momentarily turning on I:001 / 0).
- Rung 4 – Turns off SMP-3 Output B (by momentarily turning on I:001 / 1).
- Rung 5 – Clears SMP-3 Fault (by momentarily turning on I:001 / 2).

Figure 6.4



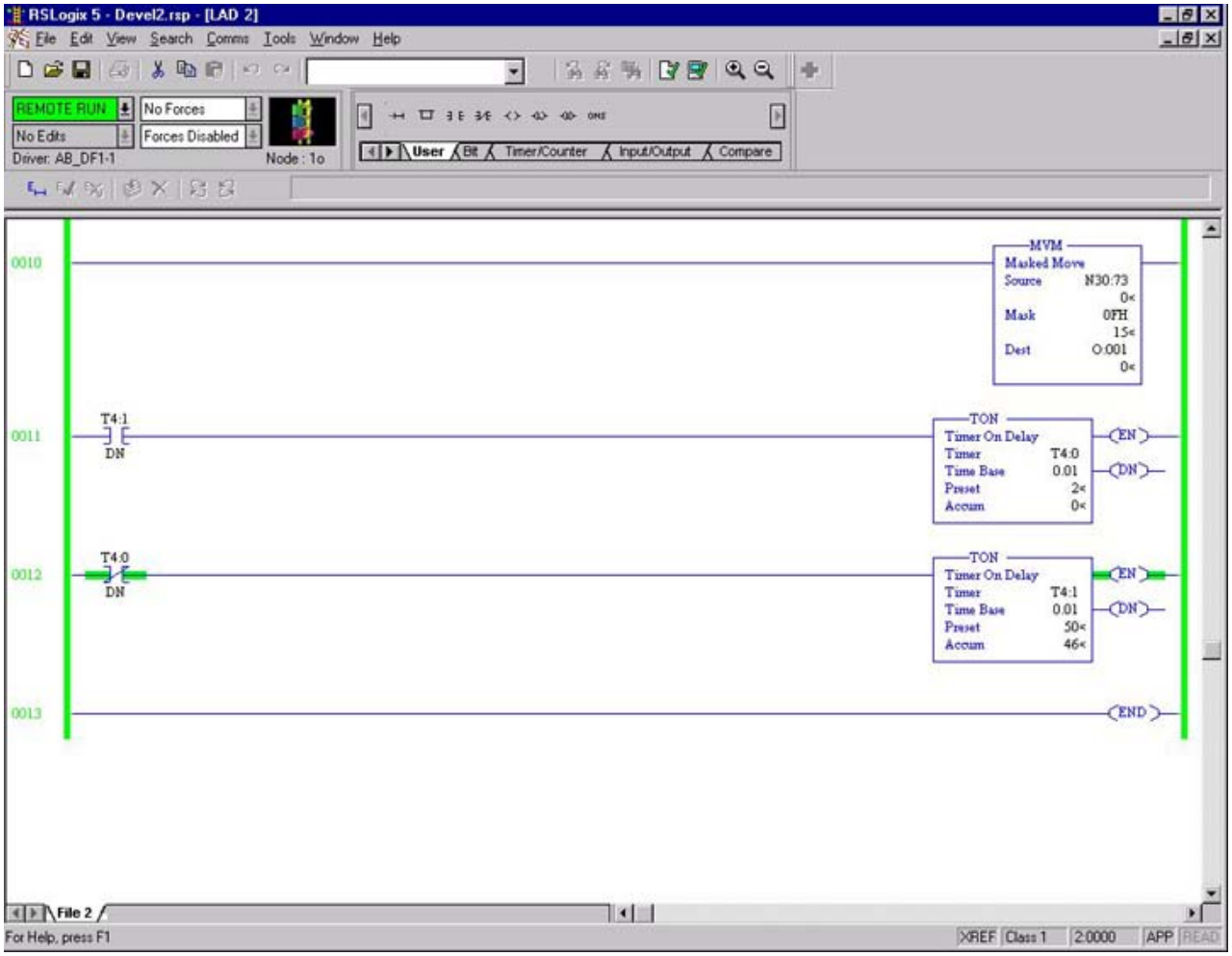
- Rung 6 – Turns on SMP-3 Output A (by momentarily turning on I:001 / 3).
- Rung 7 – Turns on SMP-3 Output B (by momentarily turning on I:001 / 4).
- Rung 8 – When I:002 / 1 is set to the true state, the next instruction, a one-shot Block Transfer Write, sends data to the scanner. The Move instruction then initializes the first word of the data file that is used by the Block Transfer Read instruction in the next rung. Alternatively, I:002 / 2 can be set true to enable a continuous read mode based on cycle rate of T4:1 / DN.
- Rung 9 – This instruction will be true when the Block Transfer Write has completed. The compare instruction that follows compares the first word of data sent from the scanner to the first word of data you send to the scanner. When the messaging function has completed, these two words will be equal.

Figure 6.5



- Rung 10 – GK61 input status is read at N30:73 and sent to Output 001, a 1771-SIM card in slot 1. The hexadecimal mask 0FH transfers only the four least significant bits.
- Rungs 11 and 12 – Generator provides a 20 ms read pulse every 500 ms. T4:1/DN must be enabled on Rung 8, as shown previously.

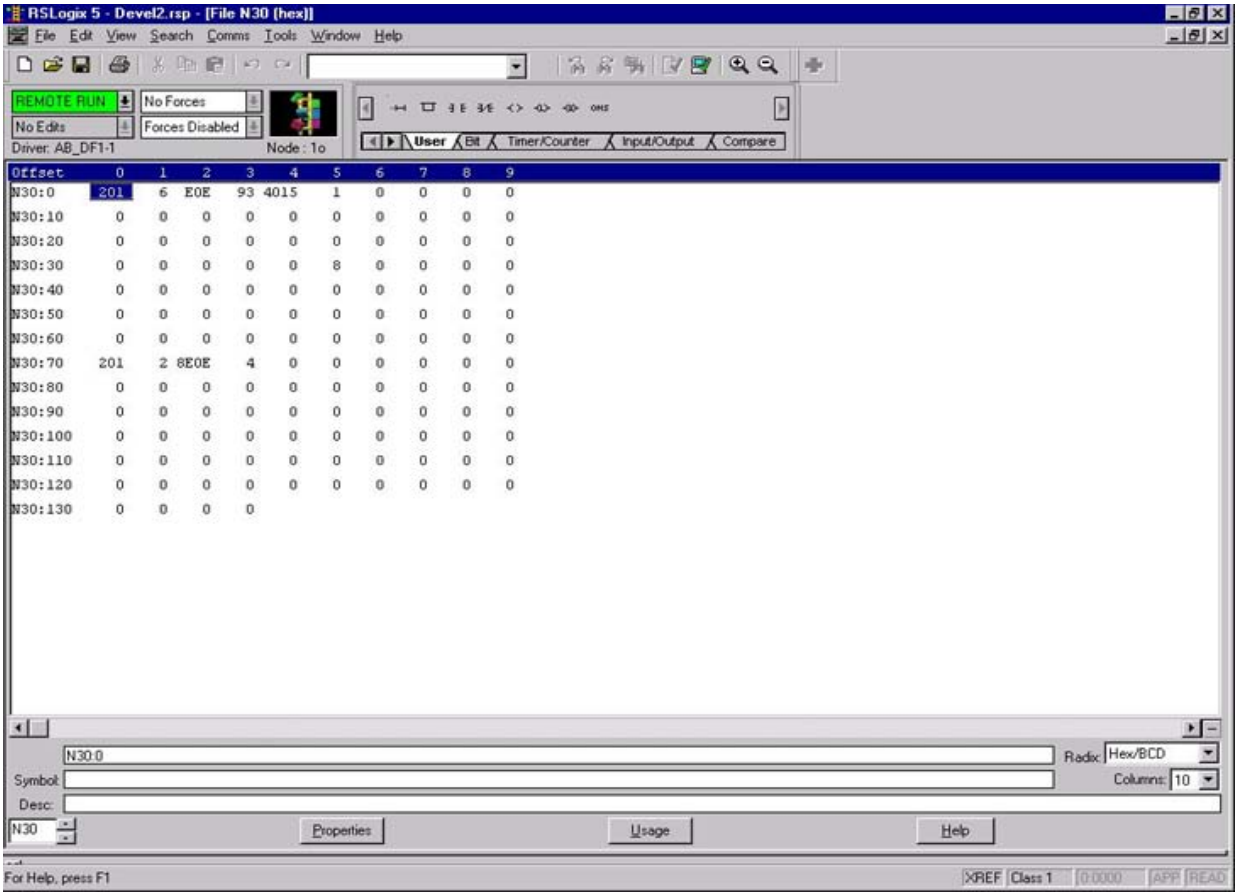
Figure 6.6



Data must be entered in N Register as shown below. Set Radix to Hex/BCD. A chart is provided on the next page to convert decimal node numbers to hexadecimal format.

- N30:0 = 0201 (02 = transaction ID; 01 = Execute command)
- N30:1 = 0006 (00 = Port 0; 06 = word size of 6 bytes)
- N30:2 = 0E**0E** (Service 0E = Get Attribute Single; 2nd **0E (bold)** is Node number.)
- N30:3 = 0093 (0093 = class code – SCANport Pass-Through Parameter Object)
- N30:4 = 4015 (4015 = parameter number for GK61 inputs)
- N30:5 = 0001 (Attribute = 1)
- N30:70 = 0201 (02 = transaction ID; Status 01 = Success)
- N30:71 = 0002 (00 = Port 0; 04 originally typed in – PLC changed value to 02)
- N30:72 = 8E**0E** (Service 8E = Get Attribute Singe; 2nd **0E (bold)** is Node number.)
- N30:73 = Results of GK61 input read. Data is in Hexadecimal format 0-F. 0 = 0000 (all bits off) F = 1111 (all bits off) F=1111 (all bits on).

Figure 6.7



DeviceNet Node addresses in Decimal, Hexadecimal, and Binary:

Decimal node number is in bold type. To the right of the decimal value is the equivalent hexadecimal value used in N register locations N30:2 and N30:72. (See previous page.)

Node (Dec)	Node (Hex)	Node (Bin)		Node (Dec)	Node (Hex)	Node (Bin)
0	00	0000 0000		**32**	20	0010 0000
1	01	0000 0001		**33**	21	0010 0001
2	02	0000 0010		**34**	22	0010 0010
3	03	0000 0011		**35**	23	0010 0011
4	04	0000 0100		**36**	24	0010 0100
5	05	0000 0101		**37**	25	0010 0101
6	06	0000 0110		**38**	26	0010 0110
7	07	0000 0111		**39**	27	0010 0111
8	08	0000 1000		**40**	28	0010 1000
9	09	0000 1001		**41**	29	0010 1001
10	0A	0000 1010		**42**	2A	0010 1010
11	0B	0000 1011		**43**	2B	0010 1011
12	0C	0000 1100		**44**	2C	0010 1100
13	0D	0000 1101		**45**	2D	0010 1101
14	0E	0000 1110		**46**	2E	0010 1110
15	0F	0000 1111		**47**	2F	0010 1111
16	10	0001 0000		**48**	30	0011 0000
17	11	0001 0001		**49**	31	0011 0001
18	12	0001 0010		**50**	32	0011 0010
19	13	0001 0011		**51**	33	0011 0011
20	14	0001 0100		**52**	34	0011 0100
21	15	0001 0101		**53**	35	0011 0101
22	16	0001 0110		**54**	36	0011 0110
23	17	0001 0111		**55**	37	0011 0111
24	18	0001 1000		**56**	38	0011 1000
25	19	0001 1001		**57**	39	0011 1001
26	1A	0001 1010		**58**	3A	0011 1010
27	1B	0001 1011		**59**	3B	0011 1011
28	1C	0001 1100		**60**	3C	0011 1100
29	1D	0001 1101		**61**	3D	0011 1101
30	1E	0001 1110		**62**	3E	0011 1110
31	1F	0001 1111		**63**	3F	0011 1111

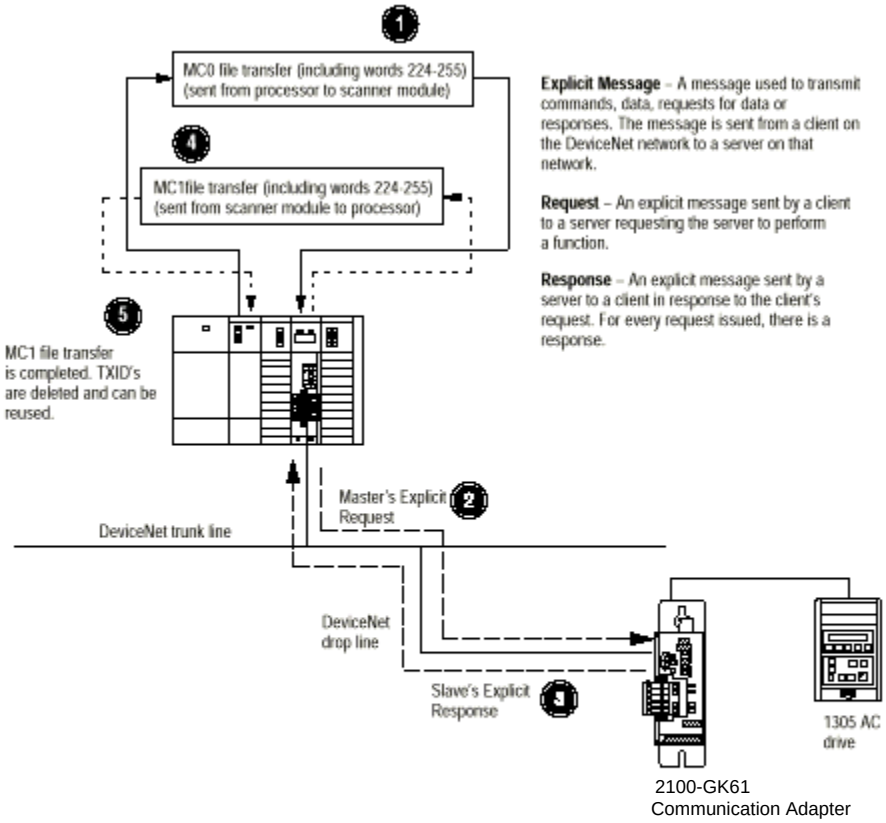
Explicit Message Program Control for SLC

Use the Explicit Message Program Control feature to configure device parameters on your DeviceNet network via the M0 and M1 files in the SLC processor that is controlling these devices.

You can use the Explicit Message Program Control feature to:

- Transmit configuration data from your scanner module to its slave devices on your DeviceNet network.
- Receive status and diagnostics from these devices on your DeviceNet network.
- Make runtime adjustments to device parameters according to changing conditions detected by your processor.

Figure 6.8
How the Explicit Message Program Control Feature Works



1. Format an MO file transfer in the processor to send an Explicit Message Request to the scanner module **(download)**.
2. The scanner module transmits the Explicit Message Request to the DeviceNet Network.

3. The slave device transmits the Explicit Message Response back to the scanner and is queued into a file transfer buffer.
4. The processor uses an M1 file transfer to retrieve the Explicit Message Response from the scanner's buffer **(upload)**.
5. Format an M0 file transfer with a Delete Response Command and the current transaction ID read in step 4. The transaction IDs are deleted and can be reused.

The scanner module requires a precisely-formatted M0 and M1 file transfer size of 32 words, including words 224-255. The scanner module uses the file memory content as client/server request.

Message Translations

The communications adapter provides electronic translations of DeviceNet explicit messages into SCANport messages and back. The format of all DeviceNet explicit messages supported by the adapter is 8:16: within an explicit message, the class field is 8 bits long, and the instance field is 16 bits long.

Examples

The following examples show messages used with the ladder logic programs begun in Chapter 5, *Ladder Logic Programming—Including Reading Inputs*.

ATTENTION: The example ladder logic program shown in this manual is intended solely for purpose of example. Because there are many variables and requirements associated with any particular installation, Rockwell Automation does not assume responsibility or liability (to include intellectual property liability) for actual use based upon the example shown in this publication.

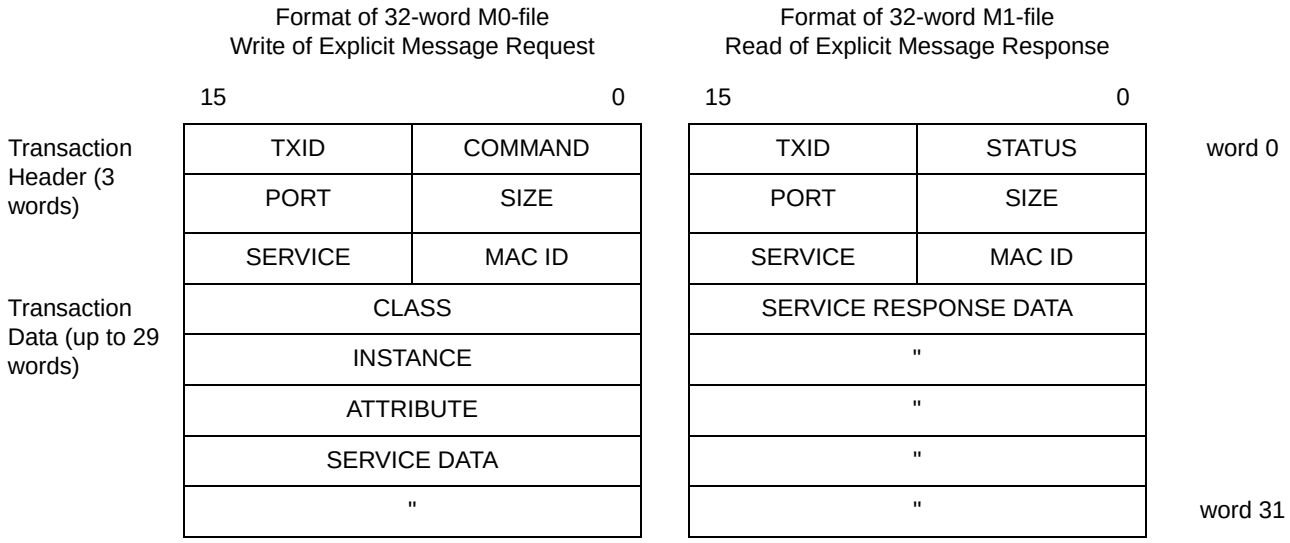
Messaging for the 1747-SDN Scanner

The SLC copies an Explicit Message into the scanner's M0-file. When the copy is completed, the scanner moves the message into a queue for processing. Up to ten Explicit Messages may be in this queue.

When the scanner receives a response message, it is placed into a queue. The first response in the queue is available from the M1-file. When the message delete command is copied into the scanner, the message is complete and the next available response will appear in the M1-file.

The format of Request and Response messages is in Figure 6.9.

Figure 6.9
Format of DeviceNet Messages



For information on M-File locations, refer to the *1747-SDN DeviceNet Scanner Module Manual*, Publication 1747-5.8.

The message buffer is composed of two sections:

- **Transaction header** — three words that contain information identifying the message transaction.
- **Transaction body** — in a request, this contains the DeviceNet Class, Instance, Attribute, and Service Data portions of the transaction. See Appendix C. In a response, this contains the Service Data only.

Each of the data fields in the transaction header is one byte in length. The table below details the information required:

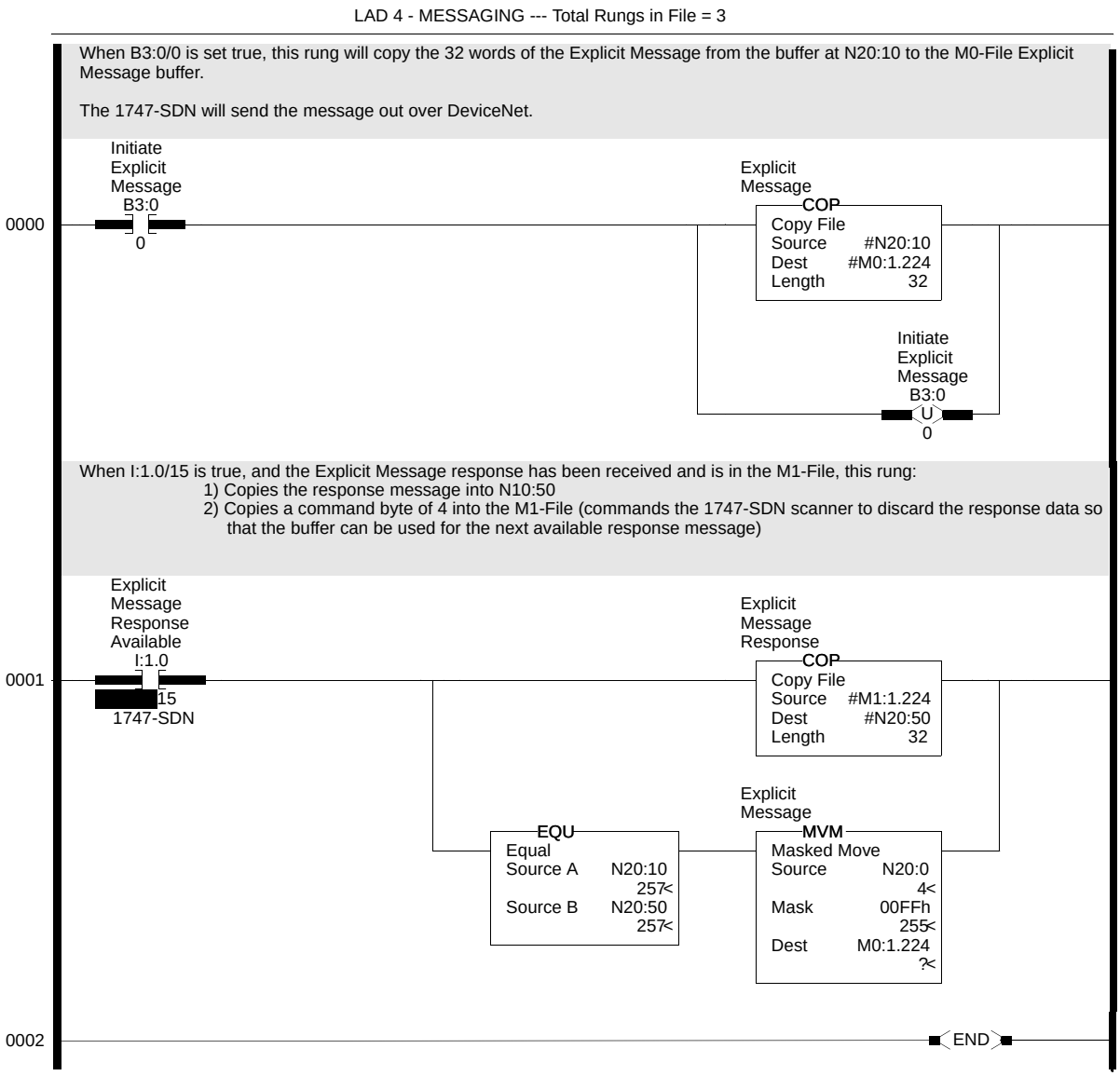
Data Field	Description
TXID	Transaction ID — when the processor creates and downloads a request to the scanner, the processor's ladder logic program assigns a TXID to the transaction. This is a one-byte integer in word 31, with a range of 1 to 255. The scanner uses this value to track the transaction to completion, and returns the value with the response that matches the request downloaded by the processor.
COMMAND	For each download, a command code instructs the scanner how to administer the request: 0 = Ignore transaction block (block empty) 1 = Execute this transaction block 2 = Get status of transaction TXID 3 = Reset all client/server transactions 4 = Delete this transaction block 5-255 = Reserved
STATUS	For each upload, the status code provides the processor with status on the device and its response: 0 = Ignore transaction block (block empty) 1 = Transaction completed successfully 2 = Transaction in progress (not ready) 3 = Error — Slave not in scan list 4 = Error — Slave off-line 5 = Error — DeviceNet port disabled or off-line 6 = Error — Transaction TXID unknown 7 = Unused 8 = Error — Invalid command code 9 = Error — Scanner out of buffers 10 = Error — Other client/server transaction in progress 11 = Error — Could not connect to slave device 12 = Error — Response data too large for block 13 = Error — Invalid port 14 = Error — Invalid size specified 15 = Error — Connection busy 16-255 = Reserved
PORT	The DeviceNet port used by this message. The port must be zero (Channel A) on a 1747-SDN scanner.
SIZE	The size of the transaction body in bytes. The transaction body can be up to 29 words (58 bytes) in length. If the size exceeds 29 words, an error code will be returned.
SERVICE	The service attribute contains the DeviceNet service request and response codes that match the corresponding request for the TXID. Service Codes vary for each DeviceNet object. Appendix C details available service codes referred to as "Common Services" for each object.
MAC ID	The DeviceNet network address of the slave device where the transaction is sent. This value can range from 0 to 63. The port and MAC ID uniquely identify the target slave device. The slave device must be listed in the scanner module's scan list and be on-line for the Explicit Message transaction to be completed.

SLC Ladder Example

SLC Messaging

Figure 6.10 shows an example message in the SLC ladder logic program started in Chapter 5, *Ladder Logic Programming—Including Reading Inputs*.

Figure 6.10
SLC Messaging Example



Important: To originate a scanner transaction, you must use a copy operation to M0:[slot number]:224. Then, use a copy operation to read M1:1.224 for the results. If you have more than one message enabled, you will have to use the TXID to determine which message you are reading.

The following table displays data sent to and received from the scanner. Values are in hexadecimal.

Offset	0	1	2	3	4	5	6	7	8	9
N20:0	4	0	0	0	0	0	0	0	0	0
N20:10	201	6	E02	97	0	1	0	0	0	0
N20:20	0	0	0	0	0	0	0	0	0	0
N20:30	0	0	0	0	0	0	0	0	0	0
N20:40	0	0	0	0	0	0	0	0	0	0
N20:50	201	6	8E02	4	0	0	0	0	0	0
N20:60	0	0	0	0	0	0	0	0	0	0
N20:70	0	0	0	0	0	0	0	0	0	0
N20:80	0	0								

Using the format of Figure 6.4, the above data would be defined as follows:

BTW Format

Location	Value	
N20:10	TXID	COMMAND
	02	01
N20:11	PORT	SIZE
	00	06
N20:12	SERVICE	MAC ID
	OE	03
N20:13	CLASS	
	0097	
N20:14	INSTANCE	
	0000	
N20:15	ATTRIBUTE	
	0001	

BTR Format

Location	Value	
N20:50	TXID	COMMAND
	02	01
N20:51	PORT	SIZE
	00	06
N20:52	SERVICE	MAC ID
	8E	03
N20:53	DATA	
	0004	

Data in N20:10 - 15 is data associated with the BTW command. All of these values are entered into the data table. Data in N20:50-52 is data associated with the BTR command. All of these values are entered into the data table. Data at N20:53 is the data read from the DeviceNet Module as a result of the commands entered in the table.

In this example, there were four entries in the fault queue. Notice the following about the data:

Location	Value	Meaning
N20:10	0x0201	TXID of 2. Command 1 (Execute)
N20:11	0x0006	Port 0. Size = 6 bytes (N30:3 – 5)
N20:12	0x0E03	Service E (Get Attribute Single) Node 3
N20:13	0x0097	SCANport Pass-Through Fault Object
N20:14	0x0000	Instance 0 (Class Access)
N20:15	0x0001	Attribute 1 (Number of Fault Queues)
N20:50	0x0201	TXID of 2. Status 1 (Success)
N20:51	0x0006	Port 0. Size = 6 bytes (N30:3 – 5)
N20:52	0x8E03	Service 8E (Get Attribute Single Response)
N20:53	0x0004	4 fault queues

Refer to Appendix C, *DeviceNet Objects*, for more information on object descriptions.

Using Messages to Control SCANport Products

Explicit messages provide multi-purpose, point-to-point communication paths between two devices. It is possible to control SCANport devices through explicit messaging on DeviceNet by following particular guidelines and by writing to various register objects that are buffering the I/O data. The guidelines are as follows:

- The adapter cannot be allocated by a master/scanner in order to allow explicit writes to the register object.
- Write access to any register object within the adapter will not be allowed if the message is passed through a connection whose expected packet rate (EPR) is zero.
- The adapter is required to mark any explicit connection after allowing a write to a register object through it.
- If a marked explicit connection times out based on the EPR, then the I/O fault action will be that configured for Communication Loss over the I/O connection.
- If a marked explicit connection is deleted, then the I/O fault action will be that configured for Idle over the I/O connection.
- Multiple explicit connections can write/overwrite the control I/O if they meet the guidelines specified. Each connection will need to be marked individually within the adapter.
- If the adapter gets allocated/re-allocated by a controller such that valid I/O data is being sent to the adapter, or if an Idle condition from the allocating controller is transitioned back to valid data, then all marked explicit connections will be reset to unmarked

and future writes blocked.

- If a marked connection has its EPR value reset to zero (0) after being marked, then the connection will become unmarked.

Writing to Register Objects

Within the DeviceNet to SCANport Communication Module with Digital Inputs, various register objects buffer I/O in the following fashion (RO=Read Only, R/PW=Read/Write Protected):

Instance	Access	Size	Function
1	RO	See M-S Output	Poll Response I/O data to controller
2	R/PW	See M-S Output	Buffered Poll I/O data from controller
3	RO	32 bits	Logic Status & Feedback
4	R/PW	32 bits	Datalink A from SCANport Device (if enabled)
5	RO	32 bits	Datalink A to SCANport Device (if enabled)
6	R/PW	32 bits	Datalink A from SCANport Device (if enabled)
7	RO	32 bits	Datalink B to SCANport Device (if enabled)
8	R/PW	32 bits	Datalink B from SCANport Device (if enabled)
9	RO	32 bits	Datalink C to SCANport Device (if enabled)
10	R/PW	32 bits	Datalink C from SCANport Device (if enabled)
11	RO	32 bits	Datalink D to SCANport Device (if enabled)
12	R/PW	32 bits	Datalink D from SCANport Device (if enabled)
13	RO	32 bits	Logic Status and Feedback
14	R/PW	32 bits	Logic Command (Last Logic Command is ANDed with the first word in this command and ORed with the second word in the command. The reference is not modified. This command allows bit changes to the logic command without affecting the speed reference or other control bits.)

Refer to the “Class Code 0x07 — Register Object” section in Appendix C, *DeviceNet Objects*, for more information on the Register Object.

Reading Values from DeviceNet Using Explicit Messaging and ControlLogix

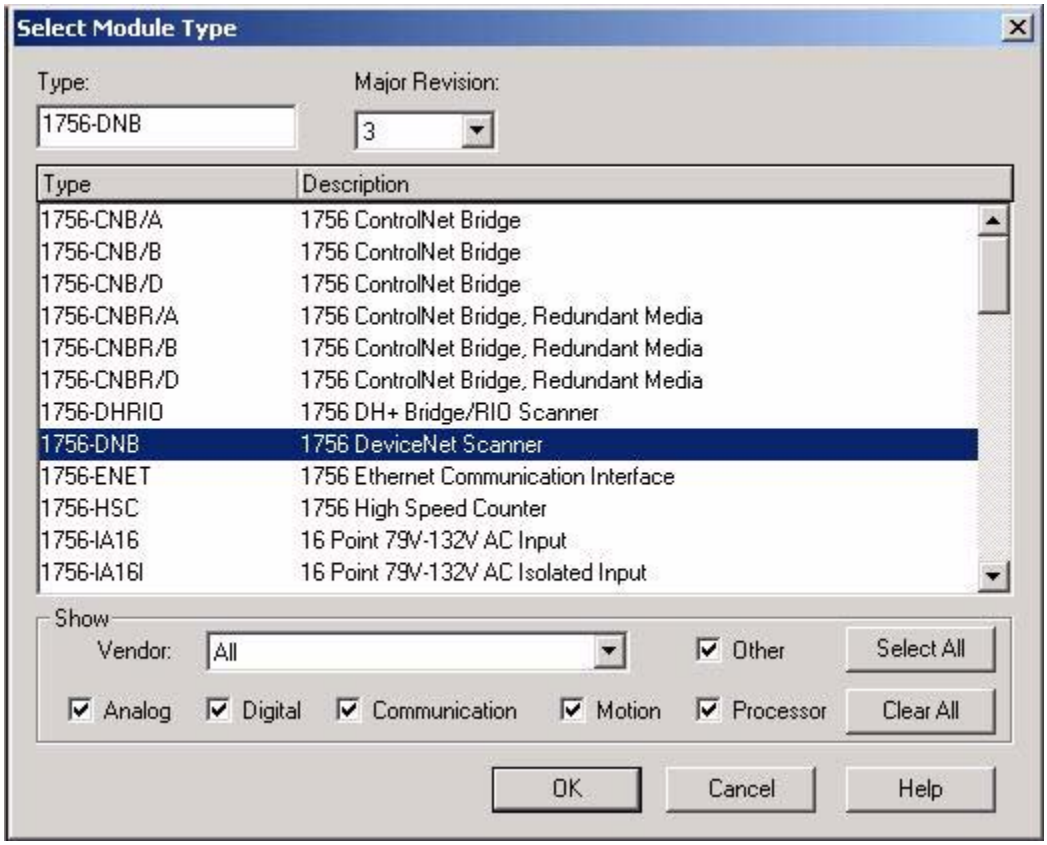
Explicit messaging can be used to read any value from any device on a DeviceNet network. An example program and explanation are used to illustrate the technique using ControlLogix.

Configure the I/0

The DeviceNet communications card must be configured before programming any ladder logic. I/O Configuration must be done offline in RSLogix 5000.

1. Insert a 1756-DNB into the I/O Configuration by selecting **I/O Configuration**, right clicking, and selecting **New Module**.

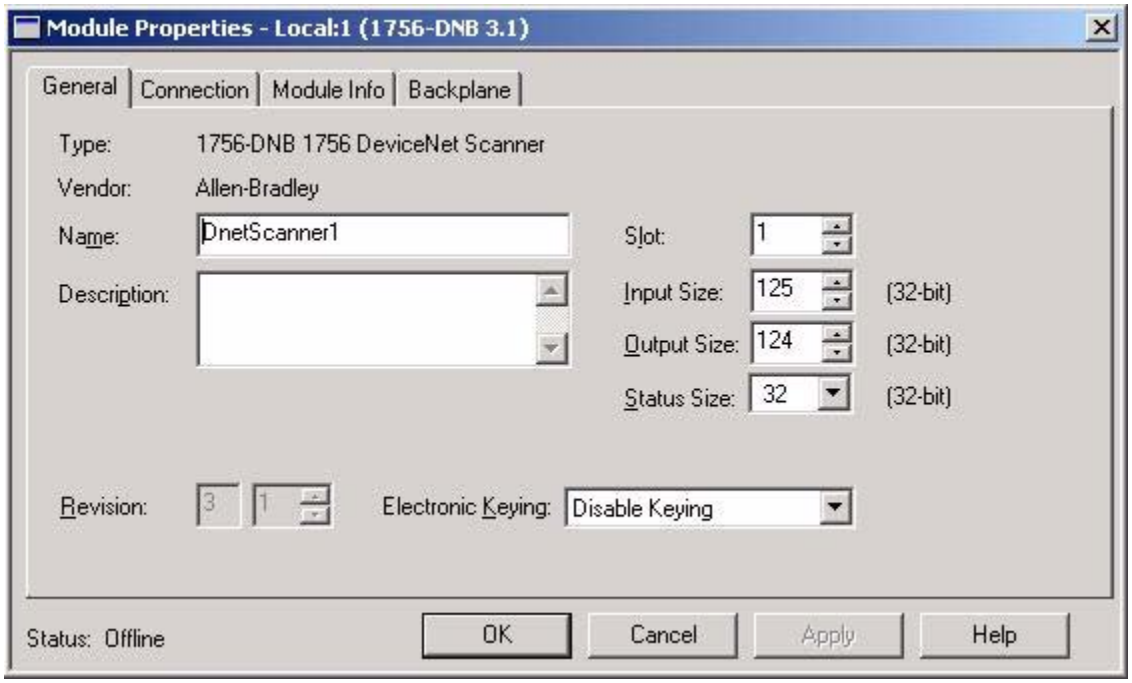
Figure 6.11
List of Devices



2. Scroll through the module options and select the 1756-DNB Module. Click on the **OK** button to select the module and open the configuration screen.

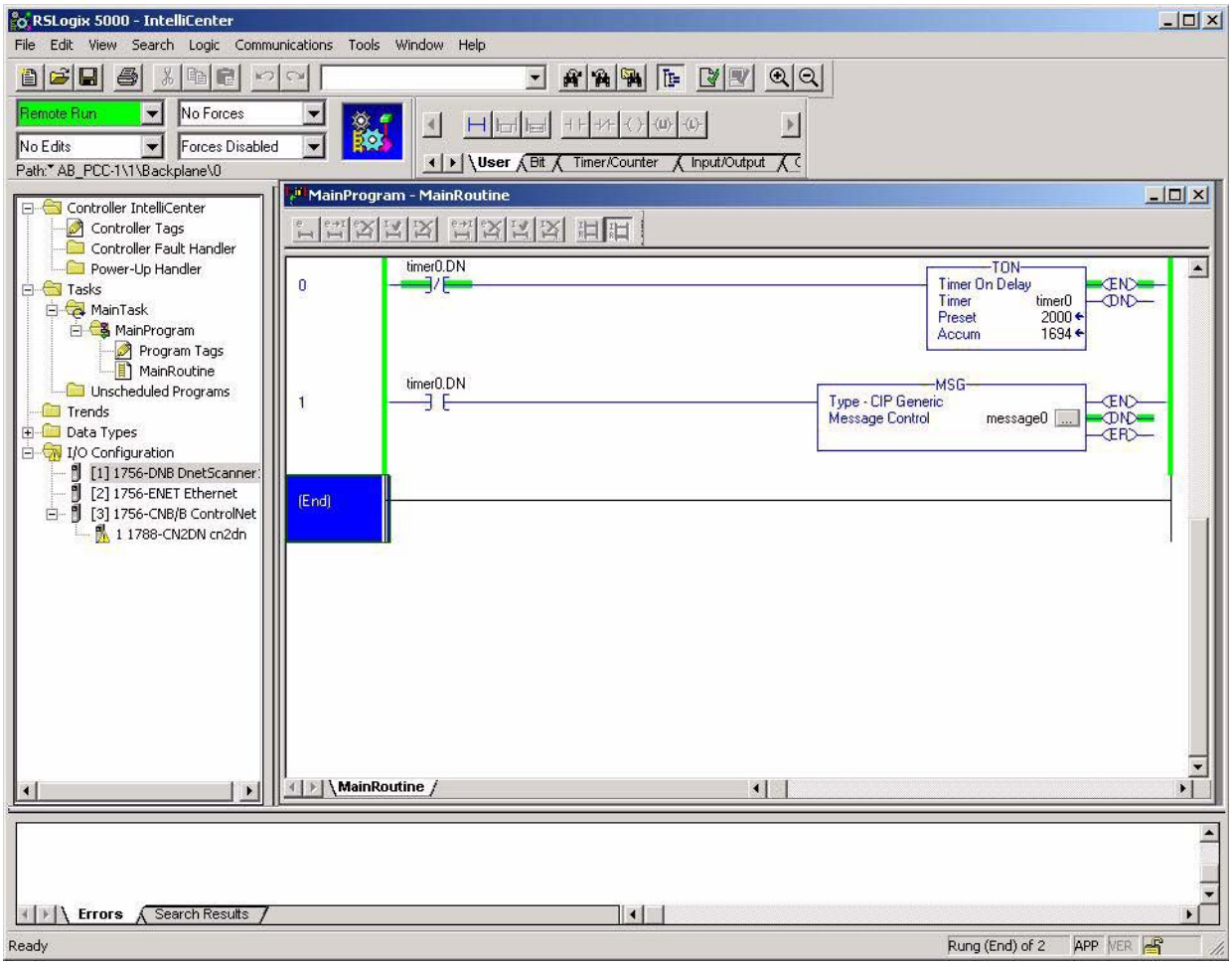
3. Type in a unique name, a Slot for the DNB module, and the revision of the DNB module. By selecting Disable Keying, upgrading the revision of the DNB will not cause a major error to the logix processor. Select **Finish** to create an I/O module for the DNB.

Figure 6.12
Configuration Screen



- Rung 0 – Create a free running timer that will set the interval of executing the message instruction. In this case, there is a two second timer.
- Rung 1 – Each time the timer is done (XIC of timer0.dn), the message (MSG) instruction will be executed.

Figure 6.13
Example Ladder Program Explanation



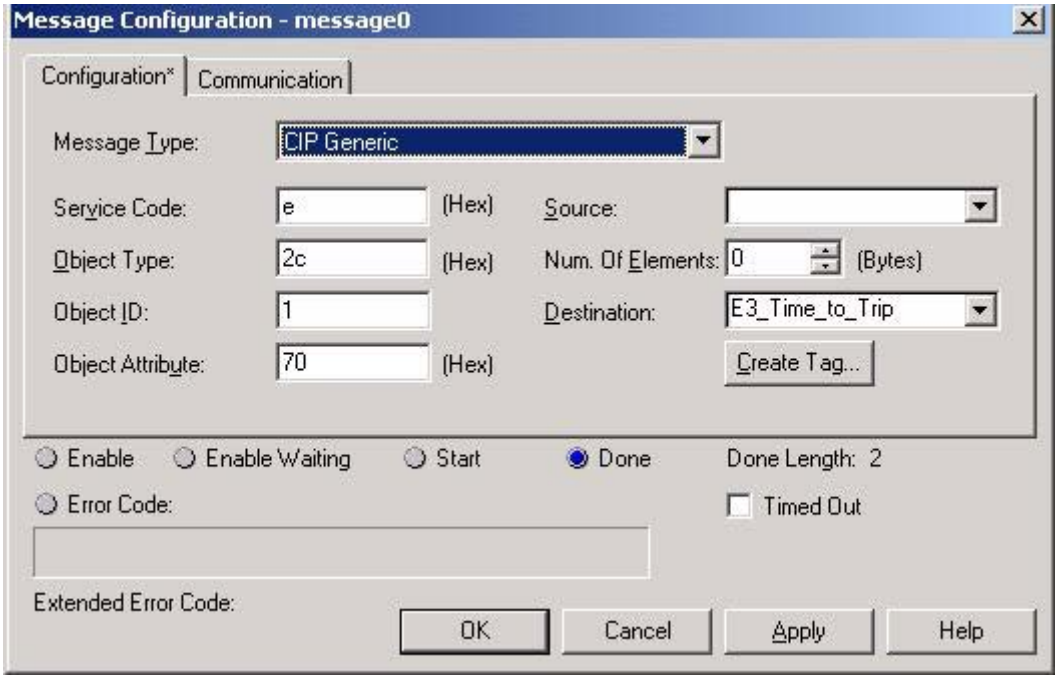
4. Select a message type of CIP Generic. The next information (Object Type, Object ID, and Object Attribute) corresponds to DeviceNet Class, Instance, and Attribute. Service code is the same service code used in DeviceNet.

Note: Class, instance, and attribute information can be found in Appendix B of the *E3 Overload Relay User Manual*. For example:

- Overload Object - Class Code 0x2C
- Instances Supported – 1
- Attribute 112 (0x70) – Time to trip
- Service Code Supported – 0x0E (Message type – Get_Attribute_Single)

Note: Numbers that start as 0x are hexadecimal numbers. All other numbers are decimal.

Figure 6.14

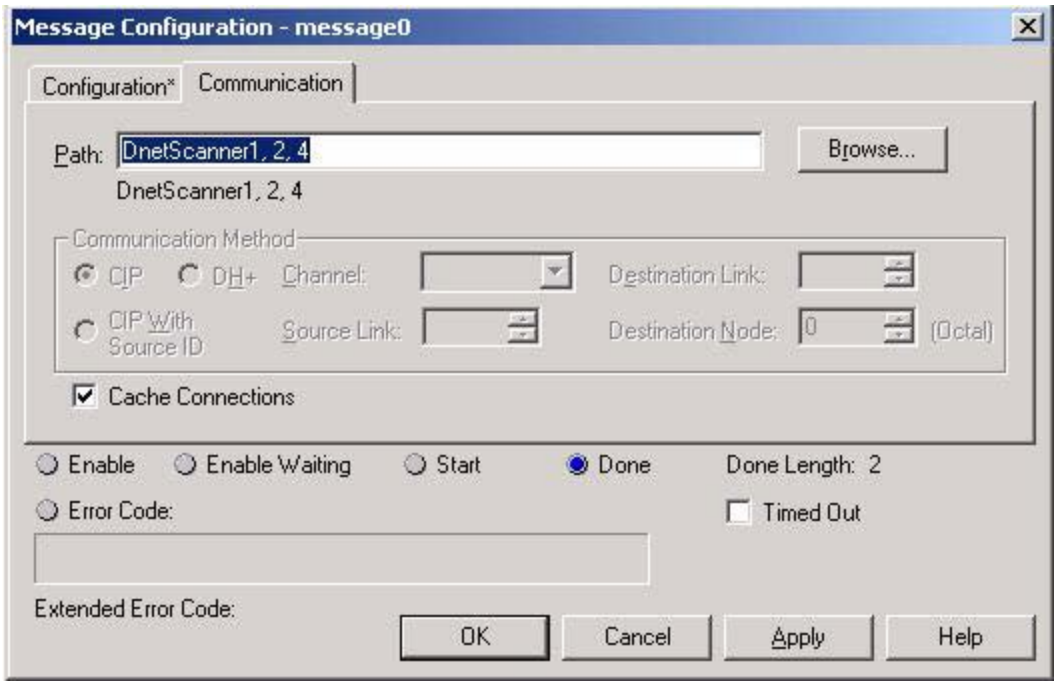


5. The Source field can be left blank as long as the number of Elements is 0.

6. Create a destination for the proper data type being read. In this example, Time to Trip is an integer value.

7. Next click the Communication tab on the Message Configuration Dialog.

Figure 6.15
Message Communication

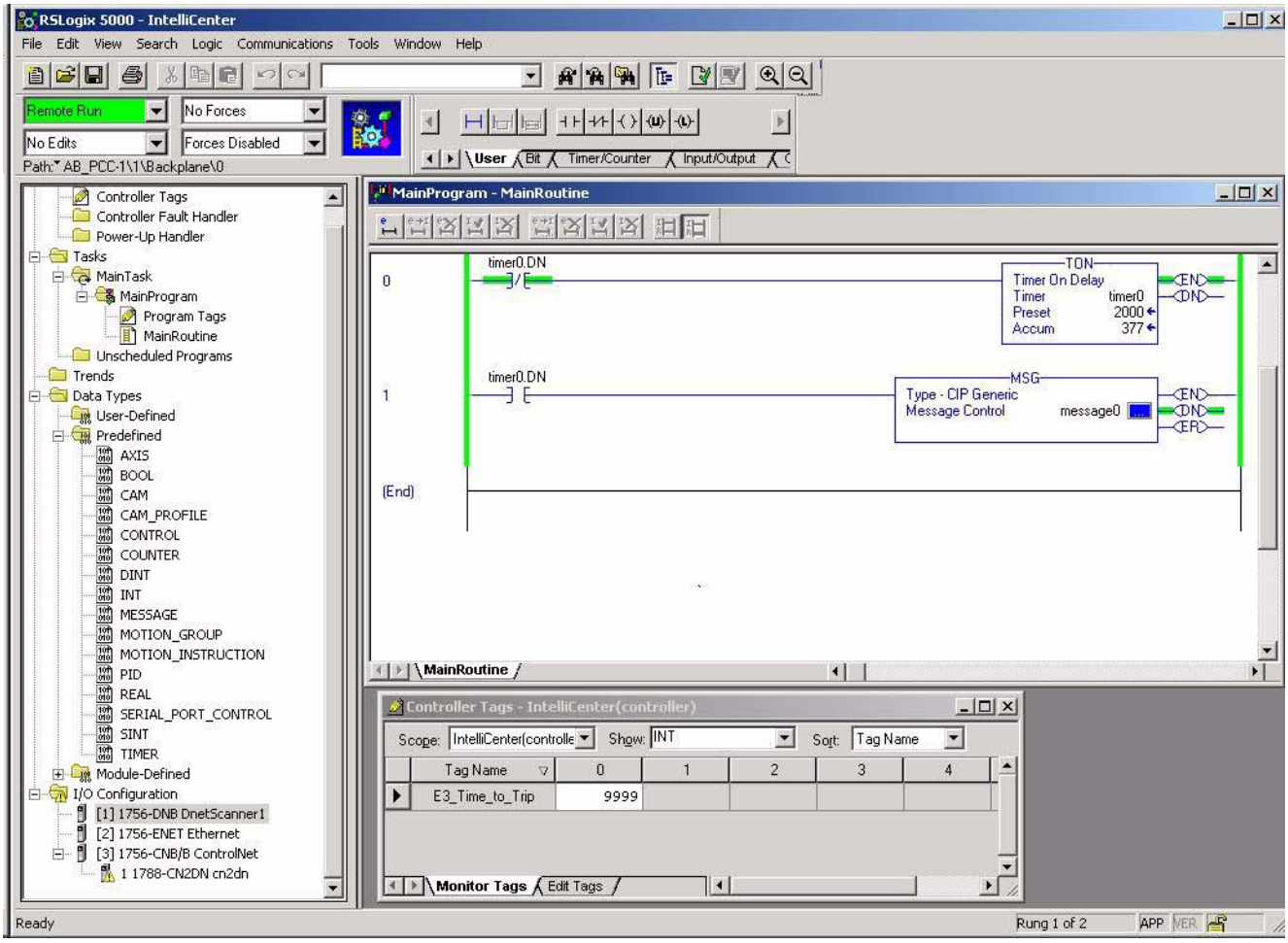


8. The communication path must be entered here. In this example, we enter **DnetScanner1, 2, 4**. DnetScanner1 is the name given to the 1756-DNB module, 2 is the DeviceNet Port on that module, and 4 is the node of the E3 we want to read from. Please adjust your entries to properly match your hardware configuration.

9. Select **OK** to finish MSG configuration.

10. Accept and assemble the rungs of logic just entered, and then look at the destination tag for the value being read.

Figure 6.16
RSLogix 5000 Complete



Troubleshooting

Chapter Objectives

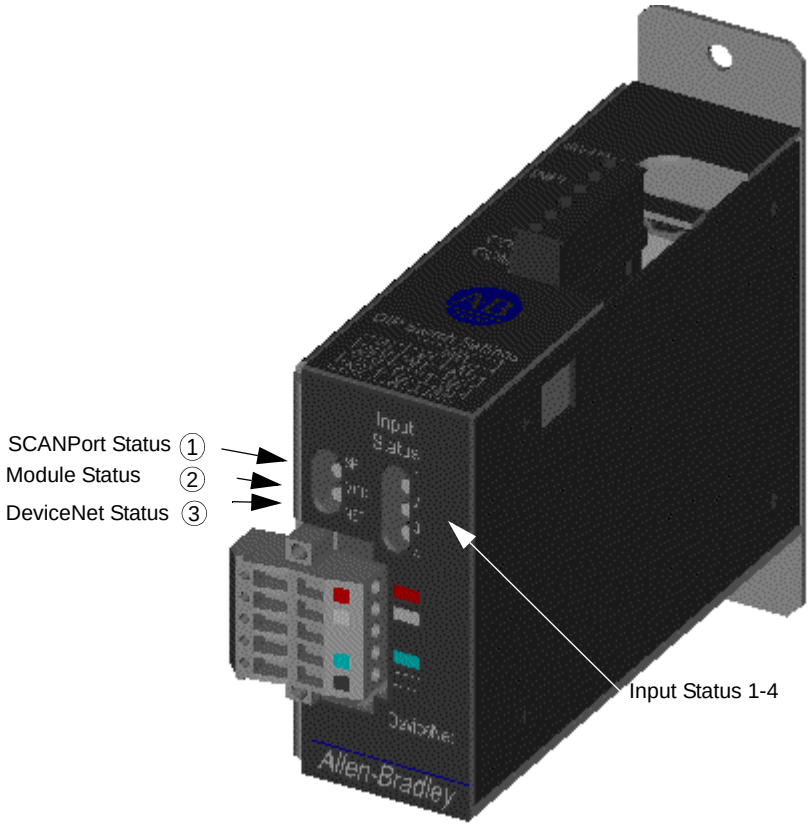
Chapter 7 provides information about the adapter's LEDs and basic troubleshooting procedures. In this chapter, you will read about the following:

- Locating the LEDs.
- Using the LEDs to troubleshoot the adapter.

LEDs on the 2100-GK61 Module

Your communications adapter has three LED status indicators. The LEDs provide status information about the DeviceNet network, SCANport connection, and the adapter itself. Refer to Figure 7.1.

Figure 7.1
LED Status Indicators



DeviceNet Network Status LED States

The LED closest to the DeviceNet connector is the DeviceNet Status LED, labeled “NET.” It functions as follows:

LED Viewed:	If:	State:	Indicates	Action:
Network Status LED	LED is off	Not powered/Not online	No power/Duplicate ID not completed	1. Verify that the network supply is connected and that power is reaching the adapter through the connector. 2. Make sure one or more nodes are communicating on the network. 3. Make sure at least one other node on the network is operational at the same time and data rate as the adapter.
	LED is flashing green	Online/Not connected	Passed duplicate ID/No connection established	No action needed. The LED is flashing to signify that there are no open communication connections between the adapter and any other device. Any connection (I/O or explicit message) made to the adapter over DeviceNet will cause the LED to stop flashing and remain steady on for the duration of any open connection.
	LED is steady green	Online/Connected	One or more connections established	No action needed.
	LED is flashing red	Online/Time-out	I/O connection timed out	1. Bring controller back onto the network. 2. Reduce traffic or errors on the network so that messages can get through within the necessary time frame.
	LED is steady red	Network failure	Failed Duplicate ID or Bus-off	1. Ensure that all nodes have unique addresses. 2. If all node addresses are unique, examine network for correct media installation.

Module Status LED States

The middle LED, labeled “MOD,” is the Module Status LED. It indicates the operation of the DeviceNet to SCANport Communication Module with Digital Inputs and functions as follows:

LED Viewed:	If:	State:	Indicates:	Action:
Module Status LED	LED is off	Not powered	No power	Ensure that the connected SCANport product is powered and connected to the adapter.
	LED is flashing green	Waiting for I/O data	Normal operation — No I/O, or PLC in program	No action needed. Adapter has passed all operational tests and is waiting to pass I/O data between the DeviceNet and SCANport interfaces.
	LED is solid green	Operational	Normal operation — I/O operational	No action needed.
	LED is flashing red	Configuration problem	Bad CRC of Adapter parameters or flash program	1. Power cycle the adapter to reset it. 2. Enable an adapter reset via the adapter’s configuration parameter. 3. Re-flash the adapter.
	LED is steady red	Hardware failure	Failed internal or external RAM test	Replace unit.

SCANport Status LED States

The LED furthest from the DeviceNet connector is the SCANport Status LED, and is labeled “SP.” It indicates the status of the SCANport connection, and functions as follows:

LED Viewed:	If:	State:	Indicates	Action:
SCANport Status LED	LED is off	Not powered	No power	Ensure that the connected SCANport device is powered and that the product is connected to the adapter.
	LED is flashing green	Online/ I/O connecting	Requesting I/O connections or no I/O is selected	No action needed. Adapter is establishing one or more of the I/O connections with the SCANport device.
	LED is steady green	I/O operational	One or more connections established	No action needed.
	LED is flashing red	Configuration fault	SCANport problem: No communications seen from the SCANport device to request connections	1. Reseat cable properly. 2. Replace cable. 3. Data links improperly configured reset adapter to factory default.
	LED is steady red	Link failure	SCANport failure: Poor cable connection does not allow proper port identification or the SCANport device isn’t allowing the configured I/O connections.	1. Check all SCANport cables and connections to the SCANport device. 2. Ensure datalinks are not enabled on a product that doesn’t support datalinks. Or, ensure that a particular datalink is not already being used by another adapter on the same SCANport device. In either case, the adapter must be properly configured and power cycled after the problem is fixed.
	LED is steady orange	Failed SCANport compatibility test		Call Rockwell Automation support.

Input Status LED States

The row of LED's furthest right on the front of the module are the Input Status LED's and function as follows:

LED Viewed:	If:	State:	Indicates	Action:
1	LED is Red	Input Off	No power to input	1. Input is off. No action is required. 2. Power is missing from Input 1, verify external wiring to module. 3. Verify DIp Switch setting matches Input voltage.
	LED is Green	Input On	Input has power applied	1. Input is on. No action is required. 2. Voltage is applied to Input, verify external wiring to module.
2	LED is Red	Input Off	No power to input	1. Input is off. No action is required. 2. Power is missing from Input 2, verify external wiring to module. 3. Verify DIp Switch setting matches Input voltage.
	LED is Green	Input On	Input has power applied	1. Input is on. No action is required. 2. Voltage is applied to Input, verify external wiring to module.
3	LED is Red	Input Off	No power to input	1. Input is off. No action is required. 2. Power is missing from Input 3, verify external wiring to module. 3. Verify DIp Switch setting matches Input voltage.
	LED is Green	Input On	Input has power applied	1. Input is on. No action is required. 2. Voltage is applied to Input, verify external wiring to module.
4	LED is Red	Input Off	No power to input	1. Input is off. No action is required. 2. Power is missing from Input 4, verify external wiring to module. 3. Verify DIp Switch setting matches Input voltage.
	LED is Green	Input On	Input has power applied	1. Input is on. No action is required. 2. Voltage is applied to Input, verify external wiring to module.

Product Specifications

Appendix Objectives

Appendix A provides the specifications that you may need to install or use the 2100-GK61 module. These adapters are non-repairable units. If they are broken, you must replace them.

2100-GK61 Specifications

The following table gives the specifications for the 2100-GK61 DeviceNet to SCANport Communication Module with Digital Inputs.

Category	Specifications
Dimensions	Mounting: 1.55”W X 5.17”H X 5.00”D (Mounting: 3.94cm X 13.13cm X 12.70cm) Module: 1.55”W X 3.48”H X 5.00”D (Module: 3.94cm X 8.84cm X 12.70cm)
Weight	17 oz (482g)
Operating Temperature	0 to +55° C (32 to 131° F)
Storage Temperature	–40 to +85° C (–40 to 185° F)
Relative Humidity (Operating)	5 to 95% non-condensing
Relative Humidity (Non-Operating)	5 to 95% non-condensing
Shock (Operating)	30g peak acceleration, 11(+/-1)ms pulse width
Shock (Non-Operating)	50g peak acceleration, 11(+/-1)ms pulse width
Vibration (Operating)	2.5g at 5Hz - 2KHz
Vibration (Non-Operating)	5g at 5Hz - 2KHz
Power Consumption	Supplied through DeviceNet 24Vdc, 120mA Supplied through SCANPort 12Vdc, 50mA
Digital Inputs	At 24V, 10mA each Input At 115V, 10mA each Input At 230V, 10mA each Input
Regulatory Agencies	UL 508 and CUL

DeviceNet to SCANport Communication Module with Digital Inputs Parameters

Appendix Objectives

Appendix B provides information on the DeviceNet to SCANport Communication Module with Digital Inputs parameters and how to configure them. In this appendix, you will read about the following:

- Setting the node address.
- Setting the data rate.
- Using datalinks and command I/O.
- Using Master-Slave communications.
- Using Peer-to-Peer communications.
- Using Fault Configurable inputs.
- Parameters in the DeviceNet to SCANport Communication Module with Digital Inputs.

Important: The number for parameters appears in parentheses after the name. This is the number in the adapter. If you are using RSNetWorx for DeviceNet, the number for each adapter parameter varies depending on the type of drive you are using.

Setting the Node Address

The DeviceNet to SCANport Communication Module with Digital Inputs has a default node address of 63. This address should be changed to a unique address (between 0 and 62) on your DeviceNet network.

Important: If you are installing multiple DeviceNet to SCANport Communication Modules with Digital Inputs on the network at the same time or there is already a node 63 on the network, you need to do one of the following:

- Power up only one adapter at a time on the network and give each a unique node address.
- If using software that supports the Fault Node Recovery feature of DeviceNet, power up all the adapters at the same time and give each a unique node address.

To set the node address, you need to:

1. Access the adapter's parameters over the DeviceNet network (refer to Chapter 3, *Configuring the DeviceNet to SCANport Communication Module with Digital Inputs*).

2. Set the *DN Node Address* (2) parameter to the desired address.
3. Reset the adapter by setting the *Reset Adapter* (22) parameter to **Enable**.

Setting the Data Rate

The DeviceNet to SCANport Communication Module with Digital Inputs supports the following data rates:

- 125 Kbps
- 250 Kbps
- 500 Kbps
- Autobaud

The adapter defaults to using autobaud data rate detection.

Important: At least one continually transmitting device on the network (usually the scanner) must be set to a fixed data rate (not autobaud). This device sets the data rate for the network that the other nodes using autobaud detect.

If you want to change your adapter's data rate, you need to:

1. Access the adapter's parameters using the DeviceNet network (refer to Chapter 3, *Configuring the DeviceNet to SCANport Communication Module with Digital Inputs*).
2. Set the *DN Data Rate* (3) parameter to the desired value. Refer to the following table for information on acceptable values.

Before connecting modules to the network, you must determine if your network is within the limits of the cable system. Class 1 cables are rated 600 volts, 8 amps. Class 2 cables are rated 300 volts, 4 amps. The cables in the chart below can be used for Trunk or Drop applications. When used for Trunk, length limits must be observed.

Cable Type	Part Number	Data Rates		
		125 Kbps	250 Kbps	500 Kbps
Class 1 Flat	1485C-P1-E75	420m (1378 ft.)	200m (656 ft.)	75m (246 ft.)
Class 2 Thick Round	1485C-P1-A50	500m (1640 ft.)	250m (820 ft.)	100m (328 ft.)
Class 2 Thin Round	1485C-P1-C50	100m (328 ft.)	100m (328 ft.)	100m (328 ft.)

Class 1 round drop cable is recommended for connections between devices and Class 1 Trunk. Maximum drop length is 6m (20 ft.). Cumulative Drop Budget is based on Data Rate.

125 Kbps	250 Kbps	500 Kbps
156m (512 ft.)	78m (256 ft.)	39m (128 ft.)

Class 1 Drop Cable is available in three spool sizes:

Cable Part Number	Spool Size
1485C-P1-B50	50m (164 ft.)
1485C-P1-B150	150m (492 ft.)
1485C-P1-B300	300m (984 ft.)

3. Reset the adapter by setting the *Reset Adapter* (22) parameter to **Enable**.

Using Datalinks and Command I/O

Command I/O provides two 16-bit words of input and two 16-bit words of output when enabled. Datalinks let you increase the size of I/O to and from a SCANport device (provided the SCANport device supports datalinks). By enabling datalinks, you can continuously change or monitor the value of a parameter without using the DeviceNet to SCANport messaging function.

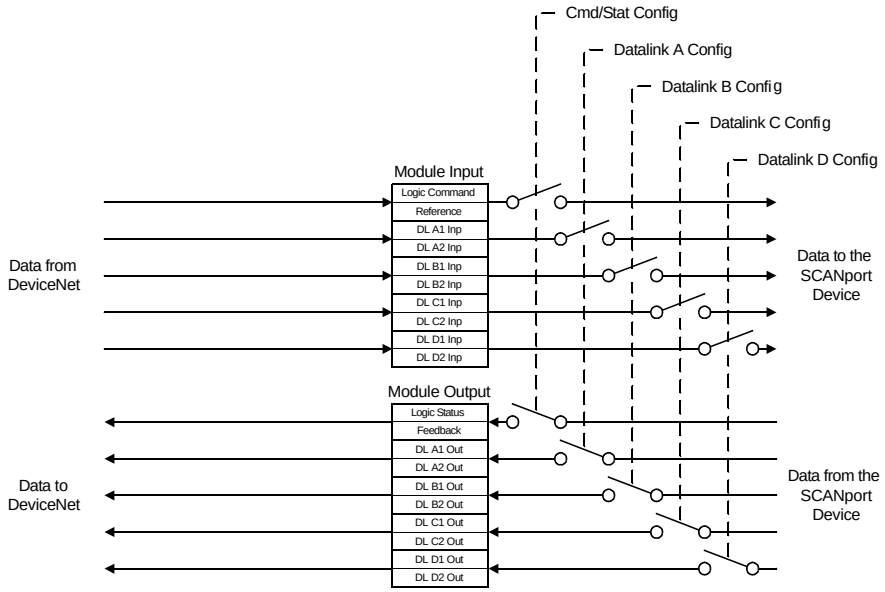
Datalinks consist of two 16-bit words of input and two 16-bit words of output when enabled. They provide up to eight words (in and out) of data if they are supported in the connected SCANport product.

SCANport devices that support this function have a group of parameters for datalink configuration. These parameters are *Data In A1 – D2* and *Data Out A1 – D2*.

If you intend to use command I/O and/or datalinks, you must do the following:

1. Access the adapter's parameters using DeviceNet network (refer to Chapter 3, *Configuring the DeviceNet to SCANport Communication Module with Digital Inputs*).
2. Enable the *Cmd/Stat Config* (4) parameter and/or desired *DataLink* (5 – 8) parameters within the DeviceNet to SCANport Communication Module with Digital Inputs.

Figure B.1
Module I/O Configuration

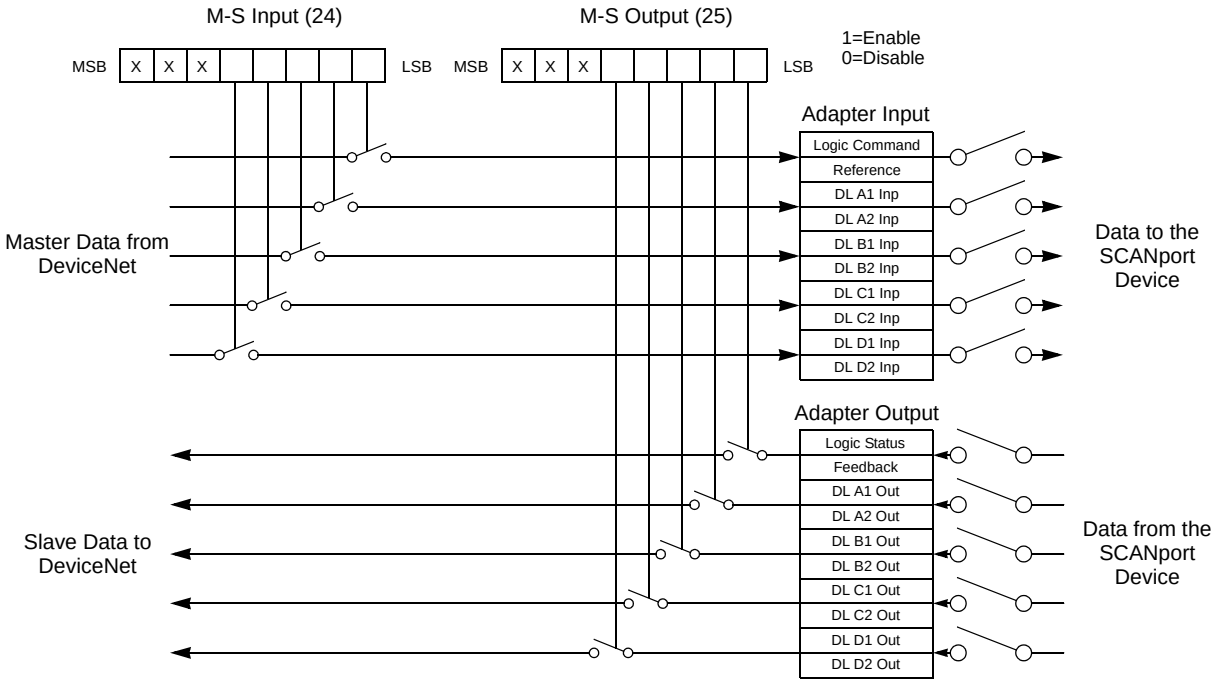


3. Configure or link the *Data In A1– D2* and *Data Out A1 – D2* parameters in the SCANport product. Refer to the documentation for your SCANport product.
4. Configure the *M-S Input* parameter and *M-S Output* parameter as desired. Refer to the "M-S Input Parameter Configurations" section or the "M-S Output Parameter Configurations" section in this chapter.
5. Reset the adapter by setting the *Reset Adapter* (22) parameter to **Enable**.

Using Master-Slave Communications

To have your DeviceNet to SCANport Communication Module with Digital Inputs receive its I/O from a scanner (PLC or SLC) on the DeviceNet network, you must configure it for Master-Slave communications.

Figure B.2
Master-Slave Communications



Master-Slave communications let you transmit 2 – 10 words of I/O data between the adapter and the scanner.

How you configure your adapter and scanner depends on the type of allocation you are using. The adapter supports the following:

- Polled.
- COS (Change of State).
- Cyclic.
- Polled and COS.
- Polled and Cyclic.

Polled Allocation

In polling, the scanner sends control data to the adapter, and then the adapter responds with its status data. To use polling, you must enable polling in the adapter and in the scanner.

Enabling Polling in the Adapter

The following must be configured in the adapter:

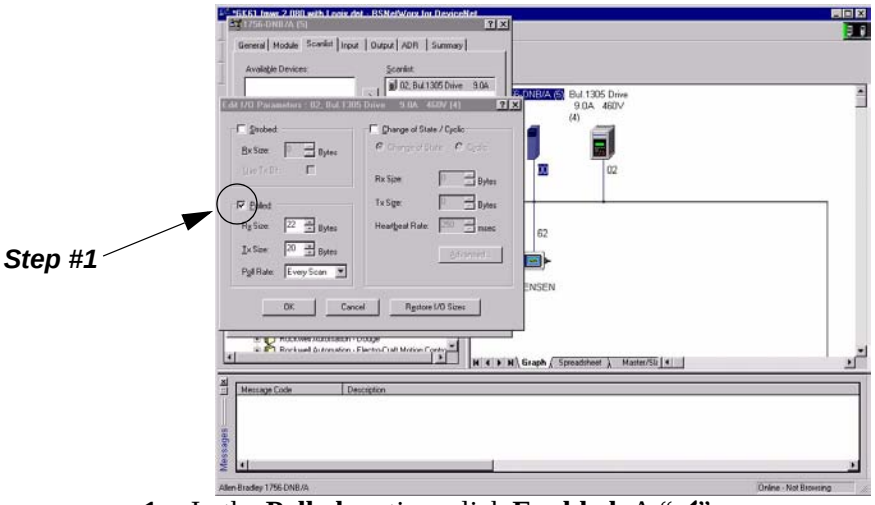
1. Enable the desired I/O and datalinks (parameters 4 – 8).
2. Set the *M-S Input* (24) parameter. Refer to the "M-S Input Parameter Configurations" section in this chapter.
3. Set the *M-S Output* (25) parameter. Refer to the "M-S Output Parameter Configurations" section in this chapter.
4. Reset the adapter by setting the *Reset Adapter* (22) parameter to **Enable**.

Enabling Polling in the Scanner

Use RSNetWorx to enable polling in the scanner. Refer to Chapter 4, *Configuring a Scanner to Communicate with the Adapter*, for more information on configuring the scanner.

Polling must be enabled in the **Edit Device I/O Parameters** dialog box.

Figure B.3
Edit Device I/O Parameters Dialog Box for Polling



1. In the **Polled** section, click **Enabled**. A "✔" appears.
2. In the **Rx** field, enter the size for the I/O input. Enter 4 for each datalink enabled and 6 if Com/Ref is enabled. For example, if Cmd/Ref and all 4 datalinks are enabled, you would enter 22.
3. In the **Tx** field, enter the size of the I/O output. Enter 4 for each datalink enabled and 4 if Com/Ref is enabled. For example, if Cmd/Ref and all 4 datalinks are enabled, you would enter 20.
4. In the **Poll Rate** field, select the desired rate.
5. Click **OK**.

COS (Change of State) Allocation

When you set up COS allocation, the scanner sends data to the adapter at a constant rate (called a heartbeat). If data in the adapter changes between messages from the scanner, your adapter sends its new status to the scanner. To use COS, you must enable COS in the adapter and in the scanner.

Enabling COS in the Adapter

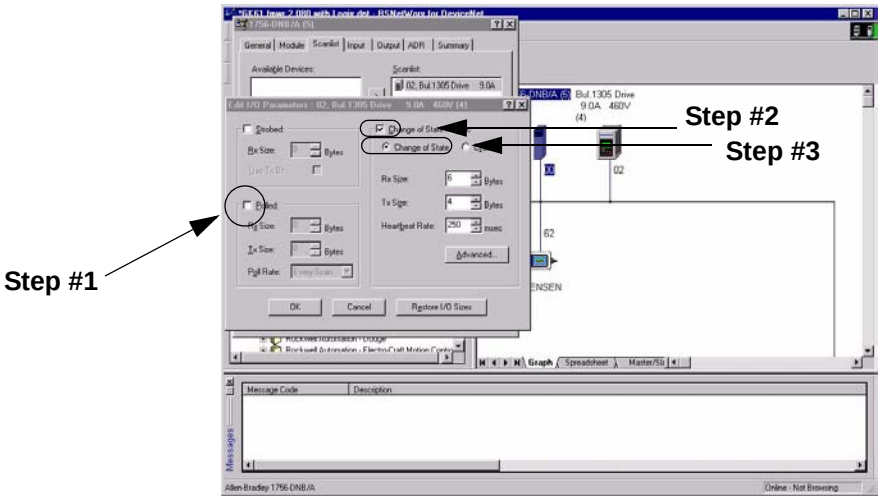
1. Enable the desired I/O and datalinks (parameters 4 – 8).
2. Set the *M-S Input* (24) parameter. Refer to the "M-S Input Parameter Configurations" section in this chapter.
3. Set the *M-S Output* (25) parameter. Refer to the "M-S Output Parameter Configurations" section in this chapter.
4. Ensure the *Cmd/Stat Config* (4) parameter is **On**.
5. Ensure the lowest bit in the *M-S Output* (25) parameter is set to **1**. For example, xxx0, 0001. This enables status/feedback to be sent over the slave connection.
6. Set the *COS Status Mask* (26) parameter to specify which bits in the logic status word will trigger a message to the scanner when changed. (0 = do not check the corresponding bit.)
7. Set the *COS Fdbk Change* (27) parameter to specify the amount of change required in the reference word needed to trigger a message to the scanner. (0 = do not check the corresponding bit.)
8. Reset the adapter by setting the *Reset Adapter* (22) parameter to **Enable**.

Enabling COS in the Scanner

Use RSNetWorx to enable COS in the scanner. Refer to Chapter 4, *Configuring a Scanner to Communicate with the Adapter*, for more information on configuring the scanner.

COS must be enabled in the **Edit Device I/O Parameters** dialog box.

Figure B.4
Edit Device I/O Parameters Dialog Box for COS



1. If necessary, deselect the **Polled** section.
2. In the **Change of State/Cyclic** section, click on the box next to Change of State/Cyclic. A "✔" appears.
3. Click **Change of State**.
4. In the **Rx** field, enter **6** for the size for the I/O input.
5. In the **Tx** field, enter **4** for the size of the I/O output.
6. In the **Heartbeat Rate** field, enter the desired time for the maximum interval between messages.
7. Click **OK**.

Important: After you have configured the scanner and adapter for COS, you can verify the desired heartbeat rate is used by viewing the *COS/CYC Interval* (28) parameter in the adapter.

Cyclic Allocation

When you set up cyclic allocation, your adapter sends or receives data based on a periodic time interval. To use Cyclic, you must enable Cyclic in the adapter and in the scanner.

Enabling Cyclic in the Adapter

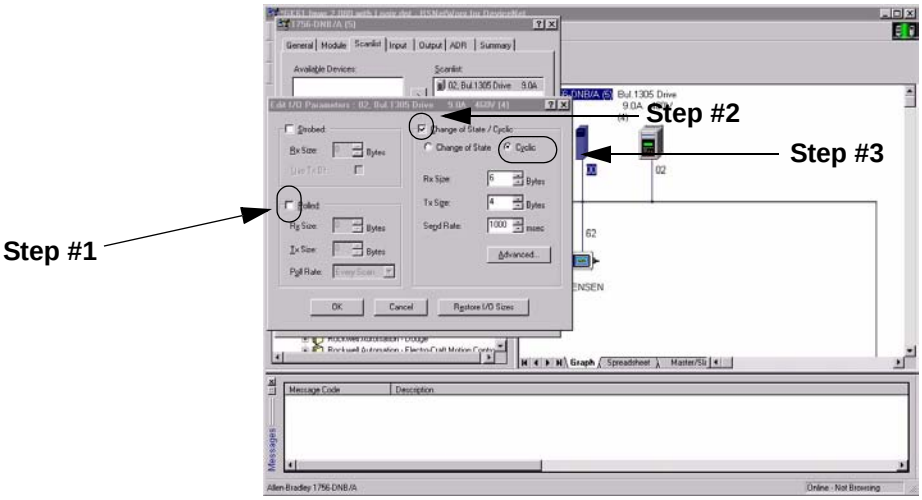
1. Enable the desired command I/O and datalinks. Refer to the "Using Datalinks and Command I/O" section in this chapter.
2. Set the *M-S Input* (24) parameter. Refer to the "M-S Input Parameter Configurations" section in this chapter.
3. Set the *M-S Output* (25) parameter. Refer to the "M-S Output Parameter Configurations" section in this chapter.
4. Ensure the *Cmd/Stat Config* (4) parameter is set to **On**.
5. Ensure the lowest bit in *M-S Output* (25) parameter is set to **1**.
6. Reset the adapter by setting the *Reset Adapter* (22) parameter to **Enable**.

Enabling Cyclic in the Scanner

Use RSNetWorx to enable Cyclic in the scanner. Consult Chapter 4, *Configuring a Scanner to Communicate with the Adapter*, for more information on configuring the scanner.

Cyclic must be enabled in the **Edit Device I/O Parameters** dialog box.

Figure B.5
Edit Device I/O Parameters Dialog Box for Cyclic



1. If necessary, deselect the **Polled** section.
2. In the **Change of State/Cyclic** section, click on the box next to Change of State/Cyclic. A "✔" appears.
3. Click **Cyclic**.
4. In the **Rx** field, enter **6** for the size of the I/O input.

5. In the **Tx** field, enter **4** for the size of the I/O output.
6. In the **Send Rate field**, enter the desired time for the interval between messages.
7. Click **OK**.

Important: After you have configured the scanner and adapter for Cyclic, you can verify the desired send rate is used by viewing the **COS/CYC Interval** (28) parameter in the adapter.

Polled and COS Allocation

You can enable both polling and COS allocations. This lets the scanner poll the adapter at a fixed interval and the adapter report its status changes to the scanner after they occur.

Enabling Polling and COS in the Adapter

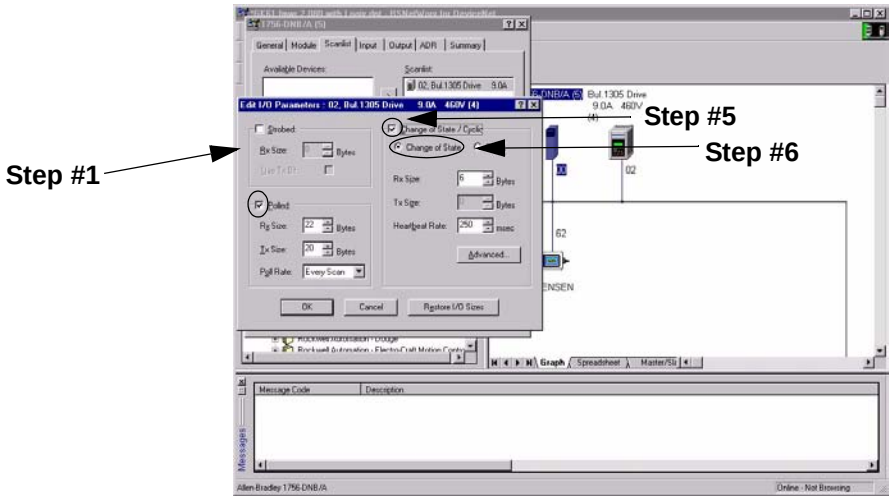
Refer to both the "Polled Allocation" and the "COS (Change of State) Allocation" sections in this chapter for information.

Enabling Polling and COS in the Scanner

Use RSNetWorx to enable polling in the scanner. Refer to Chapter 4, *Configuring a Scanner to Communicate with the Adapter*, for more information on configuring the scanner.

Polling and COS must be enabled in the **Edit Device I/O Parameters** dialog box.

Figure B.6
Edit Device I/O Parameters Dialog Box for Polling and COS



1. In the **Polled** section, click on the box next to **Polled**. A "✔" appears.
2. In the **Rx** field, enter the size for the I/O input. Enter 4 for each datalink enabled and 6 if Com/Ref is enabled. For example, if Cmd/Ref and all 4 datalinks are enabled, you would enter 22.

3. In the **Tx** field, enter the size of the I/O output. Enter 4 for each datalink enabled and 4 if Com/Ref is enabled. For example, if Cmd/Ref and all 4 datalinks are enabled, you would enter 20.
4. In the **Poll Rate** field, select the appropriate rate.
5. In the **Change of State/Cyclic** section, click the box next to **Change of State/Cyclic**. A "✔" appears.
6. Click **Change of State**.
7. In the **Rx** field, enter **6** for the size of the I/O input.
8. In the **Heartbeat Rate** field, enter the desired time for the maximum interval between messages.
9. Click **OK**.

Polled and Cyclic Allocation

You can enable both polling and cyclic allocations. This allows the scanner to poll the adapter at fixed intervals and the adapter to send its status to the scanner at fixed intervals.

Enabling Polling and Cyclic in the Adapter

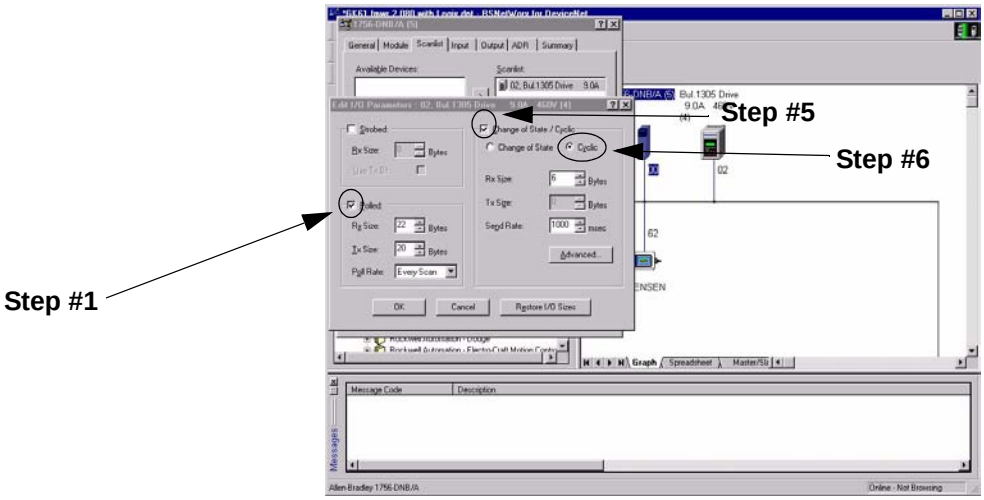
Refer to both the "Polled Allocation" section and the "Cyclic Allocation" section in this chapter for information.

Enabling Polling in the Scanner

Use RSNetWorx to enable polling in the scanner. Refer to Chapter 4, *Configuring a Scanner to Communicate with the Adapter*, for more information on configuring the scanner.

Polling and Cyclic must be enabled in the **Edit Device I/O Parameters** dialog box.

Figure B.7
Edit Device I/O Parameters Dialog Box for Polling and Cyclic



1. In the **Polled** section, click on the box next to Polled. A "✔" appears.
2. In the **Rx** field, enter the size for the I/O input. Enter 4 for each datalink enabled and 6 if Com/Ref is enabled. For example, if Cmd/Ref and all 4 datalinks are enabled, you would enter 22.
3. In the **Tx** field, enter the size of the I/O output. Enter 4 for each datalink enabled and 4 if Com/Ref is enabled. For example, if Cmd/Ref and all 4 datalinks are enabled, you would enter 20.
4. In the **Poll Rate** field, select the appropriate rate.
5. In the **Change of State/Cyclic** section, click the box next to **Change of State/Cyclic**. A "✔" appears.
6. Click **Cyclic**.
7. In the **Rx** field, enter **6** for the size of the I/O input.
8. In the **Send Rate field**, enter the time for the message interval.
9. Click **OK**.

Using Peer-to-Peer Communications

To have your adapter receive data from or transmit data to another 2100-GK61, 1203-GU6, or 1336-GM6 on the DeviceNet network, you must configure it for peer-to-peer communications. Peer-to-peer communications are best used in the following instances:

- A PLC sends data to a drive. That drive re-transmits the data to other drives on the network.
- A drive is configured on a network. It sends data to other drives on the network.

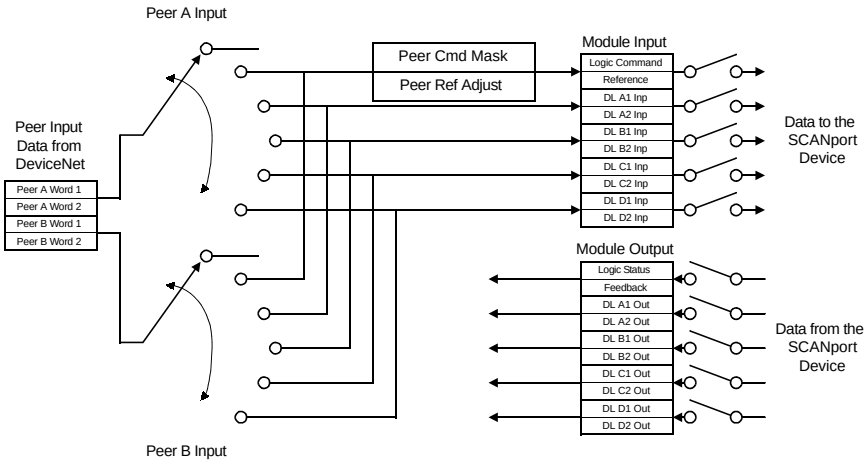
Important: After setting up peer-to-peer communications, you must make sure the configuration that you set up works as you intend it to work.

To enable peer-to-peer communications, you must enable one adapter to transmit peer I/O and one or more adapters to receive peer I/O.

Enabling the Adapter to Receive Peer I/O

To have your DeviceNet to SCANport Communication Module with Digital Inputs receive input data from another DeviceNet to SCANport Communication Module with Digital Inputs on the network, you must configure it for peer-to-peer communications.

Figure B.7
Receiving I/O from a Peer Device



In Peer-to-Peer communications, you can receive two or four I/O words from another adapter. Follow these directions:

1. Enable the desired I/O and datalinks within the adapter and SCANport product. Refer to the “Using Datalinks and Command I/O” section in this chapter.
2. Ensure the *Peer Inp Enable* (36) parameter is **Off**.
3. Set the *Peer Node to Inp* (34) parameter to the number of the node from which you want to receive data.

4. Set the *Peer A Input* (29) parameter to a destination for the first two words of data.

5. If using four words of input, set the *Peer B Input* (30) parameter to a destination for the second two words of data.

6. If receiving Cmd/Ref input data, set the bits in the *Peer Cmd Mask* (31) parameter according to the following table.

Important: If both Master-Slave data and Peer data are being used to control the adapter, make sure you know which one is transmitting which control bits. The adapter will receive each control bit from only one source. This includes the stop bit.

If receiving I/O from:	Then set bit to:
Master device (PLC or SLC)	0
Peer device (another DeviceNet to SCANport Communication Module with Digital Inputs)	1

7. If sending Cmd/Ref I/O data, set the percentage in the *Peer Ref Adjust* (23) parameter. The adapter multiplies this value with the speed reference value to determine the drive's speed.

8. Set the *Peer Inp Timeout* (35) parameter to the maximum amount of time the adapter will wait for a message before timing out.

Important: This value must be greater than the product of *Peer Out Time* (41) parameter multiplied by the *Peer Out Skip* (42) parameter in the adapter from which you are receiving I/O.

9. Set the *Peer Flt Action* (33) parameter to determine what the adapter should do if it times out.

10. Set the *Peer Inp Enable* (36) parameter to **On**.

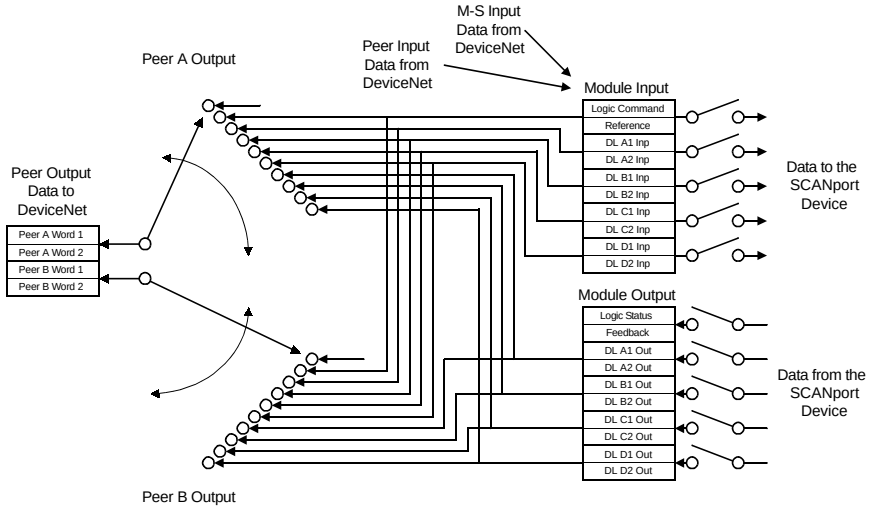
11. Check the *Peer Inp Status* (37) parameter to verify operation. It should either be **Waiting** (meaning it is waiting for the first Tx) or **Running** (meaning it is receiving input data).

Your adapter is now configured to accept I/O data from another DeviceNet to SCANport Communication Module with Digital Inputs. Make sure another DeviceNet to SCANport Communication Module with Digital Inputs on the DeviceNet network is configured to transmit peer data. Refer to the "Enabling the Adapter to Transmit Peer I/O" section in this chapter.

Enabling the Adapter to Transmit Peer I/O

You can have your DeviceNet to SCANport Communication Module with Digital Inputs send I/O data to another DeviceNet to SCANport Communication Module with Digital Inputs on the network.

Figure B.8
Transmitting I/O to Another Adapter



To have your adapter send output data to another adapter, you need to:

1. Ensure the *Peer Output Enable* (40) parameter is **Off**.
2. Set the *Peer A Output* (38) parameter to the source of the output data.
3. If transmitting four words, set the *Peer B Output* (39) parameter to a different source of output data.
4. Set the *Peer Output Time* (41) parameter to the minimum time interval between peer messages.
5. Set the *Peer Output Skip* (42) parameter to a value between 1 and 16. The product of this value and the value of the *Peer Output Time* (41) parameter determine the maximum time interval between peer messages if there is not a change in status.
6. Set the *Peer Output Enable* (40) parameter to **On**.

Your adapter is now configured to transmit I/O data to another DeviceNet to SCANport Communication Module with Digital Inputs. Make sure another DeviceNet to SCANport Communication Module with Digital Inputs on the DeviceNet network is configured to receive peer data. Refer to the “Enabling the Adapter to Receive Peer I/O” section in this chapter.

Using Fault Configurable Inputs

You can select constant values that your adapter will maintain in the event of a controller mode change or error. These constant values are referred to as Fault Configurable inputs. When the controller is placed in program mode or a DeviceNet network fault occurs, the control outputs from the adapter to the SCANport product can be set to automatically switch to the constant values set in the *Fault Cfg In* parameters. This lets you define a safe operating state for controlled devices that depend on pre-programmed output from the adapter.

ATTENTION: Risk of severe bodily injury or equipment damage exists. The *Idle Flt Action* (9) and *Comm Flt Action* (10) parameters allow the user to change the default configuration that would allow the module and associated drive to continue to operate if communication is lost. Precautions should be taken to assure that your settings for these parameters and your application do not create a hazard of bodily injury or equipment damage.

If you intend to use Fault Configurable inputs, you must do the following:

1. Set desired values for the *Fault Cfg Logic* (11), *Fault Cfg Ref* (12), and *Fault Cft In* (13 – 20) parameters.
2. Set the *Idle Fault Config* (9) parameter and/or the *Comm Flt Action* (10) parameter to **Fault Cfg**.

Refer to Chapter 3, *Configuring the DeviceNet to SCANport Communication Module with Digital Inputs*, for instructions on editing parameters.

DeviceNet to SCANport Communication Module with Digital Inputs Parameters

The following table provides information on the DeviceNet to SCANport Communication Module with Digital Inputs parameter set.

Important: When accessing this parameter set through the DeviceNet Parameter Class, add the adapter's parameter number to the number of the last parameter of the SCANport device. When accessing this parameter set through the vendor-specific SCANport Variables-Linear Class, add the adapter's parameter number to 4000H.

#	Name	Valid Values/ Settings	Default	Writable	Reset or Power Cycle	Description
1	*SCANport Adapter*	0-7	NA	No	No	Identifies the port number to which the adapter is connected on the SCANport product.
2	*DN Node Address*	0-63	63	Yes	Yes	Identifies the DeviceNet Node Address for the adapter.
3	*DN Data Rate*	125K 250K 500K Auto	Auto	Yes	Yes	Identifies the data rate used on the DeviceNet network. **Important:** At least one node on your DeviceNet network must be configured to a data rate (125, 250, or 500 K), not autobaud.
4	*Cmd/Stat Config*	Off, On	On	Yes	Yes	Determines whether to pass logic command and analog reference control data from a DeviceNet connection to a SCANport product.
5	*Datalink A Cfg*	Off, On	Off	Yes	Yes	Determines whether to pass control data contained in datalink A from a DeviceNet connection to the SCANport product.
6	*Datalink B Cfg*	Off, On	Off	Yes	Yes	Determines whether to pass control data contained in datalink B from a DeviceNet connection to the SCANport product.
7	*Datalink C Cfg*	Off, On	Off	Yes	Yes	Determines whether to pass control data contained in datalink C from a DeviceNet connection to the SCANport product.
8	*Datalink D Cfg*	Off, On	Off	Yes	Yes	Determines whether to pass control data contained in datalink D from a DeviceNet connection to the SCANport product.

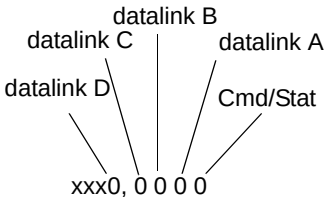
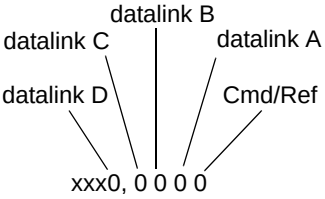
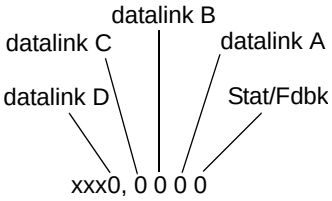
Important: For information on accessing and editing parameters, refer to Chapter 3, *Configuring the DeviceNet to SCANport Communication Module with Digital Inputs.*

#	Name	Valid Values/ Settings	Default	Writable	Reset or Power Cycle	Description
9	*Idle Flt Action*	Fault Zero Data Hold Last Fault Cfg	Fault	Yes	No	Determines the action the adapter should instruct the SCANport product to take if the adapter detects that the PLC is set to program mode. **Important:** If you change this parameter's value, the user application may not be able to control the product after a fault.  **ATTENTION:**Risk of severe bodily injury or equipment damage exists. The *Idle Flt Action* (9) and *Comm Flt Action* (10) parameters allow the user to change the default configuration that would allow the module and associated drive to continue to operate if communication is lost. Precautions should be taken to assure that your settings for these parameters and your application do not create a hazard of bodily injury or equipment damage.
10	*Comm Flt Action*	Fault Zero Data Hold Last Fault Cfg	Fault	Yes	No	Determines the action the adapter should instruct the SCANport product to take if the adapter detects a network failure. **Important:** If you change this parameter's value, the user application may not be able to control the product after a fault.  **ATTENTION:**Risk of severe bodily injury or equipment damage exists. The *Comm Flt Action* (10) parameter allows the user to change the default configuration that would allow the module and associated drive to continue to operate if communication is lost. Precautions should be taken to assure that your settings for these parameters and your application do not create a hazard of bodily injury or equipment damage.

Important: For information on accessing and editing parameters, refer to Chapter 3, *Configuring the DeviceNet to SCANport Communication Module with Digital Inputs.*

#	Name	Valid Values/ Settings	Default	Writable	Reset or Power Cycle	Description
11	*Fault Cfg Logic*	0 – 65535	0	Yes	No	Provides the logic command data to the SCANport product when the adapter is instructed to use the values for the *Fault Cfg* parameters.
12	*Fault Cfg Ref*	0 – 65535	0	Yes	No	Provides the analog reference data to the SCANport product when the adapter is instructed to use the values for the *Fault Cfg* parameters.
13	*Fault Cfg A1 In*	0 – 65535	0	Yes	No	Provides the first word of datalink A data to the SCANport product when the adapter is instructed to use the values for the *Fault Cfg* parameters.
14	*Fault Cfg A2 In*	0 – 65535	0	Yes	No	Provides the second word of datalink A data to the SCANport product when the adapter is instructed to use the values for the *Fault Cfg* parameters.
15	*Fault Cfg B1 In*	0 – 65535	0	Yes	No	Provides the first word of datalink B data to the SCANport product when the adapter is instructed to use the values for the *Fault Cfg* parameters.
16	*Fault Cfg B2 In*	0 – 65535	0	Yes	No	Provides the second word of datalink B data to the SCANport product when the adapter is instructed to use the values for the *Fault Cfg* parameters.
17	*Fault Cfg C1 In*	0 – 65535	0	Yes	No	Provides the first word of datalink C data to the SCANport product when the adapter is instructed to use the values for the *Fault Cfg* parameters.
18	*Fault Cfg C2 In*	0 – 65535	0	No	No	Provides the second word of datalink C data to the SCANport product when the adapter is instructed to use the values for the *Fault Cfg* parameters.
19	*Fault Cfg D1 In*	0 – 65535	0	Yes	No	Provides the first word of datalink D data to the SCANport product when the adapter is instructed to use the values for the *Fault Cfg* parameters.
20	*Fault Cfg D2 In*	0 – 65535	0	Yes	No	Provides the second word of datalink D data to the SCANport product when the adapter is instructed to use the values for the *Fault Cfg* parameters.
21	*Digital Input*	xxxx 0000 - xxxx 1111	NA	No	No	Digital Input Status. 1 = power applied to Input 0 = no power at Input

Important: For information on accessing and editing parameters, refer to Chapter 3, *Configuring the DeviceNet to SCANport Communication Module with Digital Inputs.*

#	Name	Valid Values/ Settings	Default	Writable	Reset or Power Cycle	Description
22	*Reset Adapter*	Ready Enable Set Defaults	Ready	Yes	No	Ready = No change or reset. Enable = Resets the module. Set Defaults = Sets all parameters to their factory-default values.
23	*Active I/O Cfg*	0 or 1 for each bit	N/A	No	No	Displays what I/O is activated in the adapter.  0 = Off. 1 = On.
24	*M-S Input*	0 or 1 for each bit	xxx0, 0001	Yes	Yes	Determines the source of the bits for input.  0 = Peer or other input. 1 = Master-Slave input. For more information, refer to the “M-S Input Parameter Configurations” section in this chapter.
25	*M-S Output*	0 or 1 for each bit	xxx0, 0001	Yes	Yes	Determines the source of the bits for output.  0 = Peer or other output. 1 = Master-Slave output. For more information, refer to the “M-S Output Parameter Configurations” section in this chapter.

Important: For information on accessing and editing parameters, refer to Chapter 3, *Configuring the DeviceNet to SCANport Communication Module with Digital Inputs.*

#	Name	Valid Values/ Settings	Default	Writable	Reset or Power Cycle	Description
26	*COS Status Mask*	0 or 1 for each bit	0	Yes	No	Provides a mask of the Logic Status word to define which bits are checked for changes during COS allocation. 0 = Off (not checked). 1 = On (checked). **Important:** Refer to your SCANport product's documentation for information on its Logic Status word.
27	*COS Feedback Change*	0 = disable	0 = disable	Yes	No	Determines how much (+/-) the feedback word can change before a message is sent during COS operations.
28	*COS/Cyc Interval*	N/A	N/A	No	No	Displays the interval used by the controller to check for data in the adapter during COS or Cyclic allocation.
29	*Peer A Input*	Off, Cmd/Ref DL A Input DL B Input DL C Input DL D Input	Off	Yes	No	Determines where the peer A input is sent in the SCANport product. **Important:** This parameter cannot be changed when the *Peer Inp Enable* (36) parameter is On.
30	*Peer B Input*	Off Cmd/Ref DL A Input DL B Input DL C Input DL D Input	Off	Yes	No	Determines where the peer B input is sent in the SCANport product. **Important:** This parameter cannot be changed when the *Peer Inp Enable* (36) parameter is On.
31	*Peer Cmd Mask*	0 or 1 for each bit	0	Yes	Yes	Provides a mask for the Logic Status word when it is received through peer input. 0 = Off (input received from Master). 1 = On (input received from Peer).
32	*Peer Ref Adjust*	0-200.00%	0	Yes	No	Provides the percentage of the Reference value received through peer input that will be applied to the SCANport reference value.

Important: For information on accessing and editing parameters, refer to Chapter 3, *Configuring the DeviceNet to SCANport Communication Module with Digital Inputs.*

#	Name	Valid Values/ Settings	Default	Writable	Reset or Power Cycle	Description
33	*Peer Flt Action*	Fault Zero Data Hold Last Fault Cfg	Fault	Yes	No	Determines the action the adapter should instruct the SCANport product to take if the adapter does not receive peer input in the allowed time.  **ATTENTION:**Risk of severe bodily injury or equipment damage exists. The *Peer Flt Action* (33) parameter allows the user to change the default configuration that would allow the module and associated drive to continue to operate if communication is lost. Precautions should be taken to assure that your settings for these parameters and your application do not create a hazard of bodily injury or equipment damage.
34	*Peer Node to Inp*	0-63	0	Yes	No	Determines the node address of the node producing I/O for the adapter to receive. **Important:** This parameter cannot be changed when the *Peer Inp Enable* (36) parameter is On.
35	*Peer Inp Time-out*	.01-180.00 sec	10.00	Yes	No	Determines the time out time. If the adapter does not receive input from the peer node in this amount of time, it will do what is selected in *Peer Flt Action* (33) parameter.
36	*Peer Inp Enable*	Off, On	Off	Yes	No	Off = Disables peer input communications. On = Enables peer input communications.
37	*Peer Inp Status*	Off Waiting Running Faulted	NA	No	No	Displays the status of the consumed peer input connection.
38	*Peer A Output*	Off Cmd/Ref DL A Input DL B Input DL C Input DL D Input DL A Output DL B Output DL C Output DL D Output	Off	Yes	No	Determines the source of peer A output data in the SCANport product. **Important:** This parameter cannot be changed when the *Peer Out Enable* (40) parameter is On.

Important: For information on accessing and editing parameters, refer to Chapter 3, *Configuring the DeviceNet to SCANport Communication Module with Digital Inputs.*

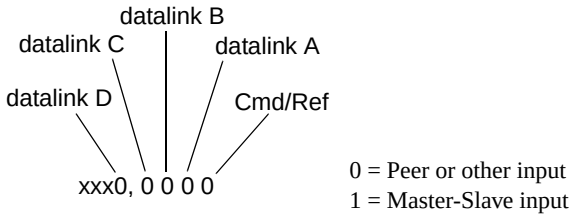
#	Name	Valid Values/ Settings	Default	Writable	Reset or Power Cycle	Description
39	*Peer B Output*	Off Cmd/Ref DL A Input DL B Input DL C Input DL D Input DL A Output DL B Output DL C Output DL D Output	Off	Yes	No	Determines the source of peer B output data in the SCANport product. **Important:** This parameter cannot be changed when the *Peer Out Enable* (40) parameter is On.
40	*Peer Out Enable*	On, Off	Off	Yes	No	Off = Disables peer output communications. On = Enables peer output communications.
41	*Peer Out Time*	0.01 – 10.00	1.00	Yes	No	Determines the minimum interval of time between peer transmissions.
42	*Peer Out Skip*	1 – 16	1	Yes	No	Determines the maximum interval of time between peer transmissions by multiplying this value by the value in the *Peer Out Time* (41) parameter.

Important: For information on accessing and editing parameters, refer to Chapter 3, *Configuring the DeviceNet to SCANport Communication Module with Digital Inputs.*

M-S Input Parameter Configurations

The *M-S Input* (24) parameter has the following five configurable bits.

Figure 7.2
Bits and Corresponding I/O



When you enable the *Cmd/Stat* (4) or *datalink* (5-8) parameter(s) in the adapter, you must set the corresponding bit in the *M-S Input* (24) parameter if you want the input data to come from the scanner or master device.

The following table lists possible configurations for the *M-S Input* (24) parameter and the types of allocation associated with each.

ADAPTER CONFIGURATION		ALLOCATION (Number Of Words)				
		Data Size Sent From The Controller To The Adapter				
M-S Input	M-S Output	Poll Only	COS Only	Cyclic Only	Poll & COS	Poll & Cyclic
00000	xxxx0	0	NA	NA	NA	NA
00001	xxxx0	2	NA	NA	NA	NA
00010	xxxx0	2	NA	NA	NA	NA
00011	xxxx0	4	NA	NA	NA	NA
00100	xxxx0	2	NA	NA	NA	NA
00101	xxxx0	4	NA	NA	NA	NA
00110	xxxx0	4	NA	NA	NA	NA
00111	xxxx0	6	NA	NA	NA	NA
01000	xxxx0	2	NA	NA	NA	NA
01001	xxxx0	4	NA	NA	NA	NA
01010	xxxx0	4	NA	NA	NA	NA
01011	xxxx0	6	NA	NA	NA	NA
01100	xxxx0	4	NA	NA	NA	NA
01101	xxxx0	6	NA	NA	NA	NA
01110	xxxx0	6	NA	NA	NA	NA

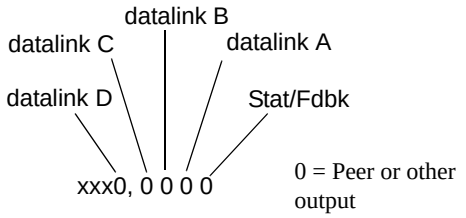
ADAPTER CONFIGURATION		ALLOCATION (Number Of Words)				
		Data Size Sent From The Controller To The Adapter				
M-S Input	M-S Output	Poll Only	COS Only	Cyclic Only	Poll & COS	Poll & Cyclic
01111	xxxx0	8	NA	NA	NA	NA
10000	xxxx0	2	NA	NA	NA	NA
10001	xxxx0	4	NA	NA	NA	NA
10010	xxxx0	4	NA	NA	NA	NA
10011	xxxx0	6	NA	NA	NA	NA
10100	xxxx0	4	NA	NA	NA	NA
10101	xxxx0	6	NA	NA	NA	NA
10110	xxxx0	6	NA	NA	NA	NA
10111	xxxx0	8	NA	NA	NA	NA
11000	xxxx0	4	NA	NA	NA	NA
11001	xxxx0	6	NA	NA	NA	NA
11011	xxxx0	8	NA	NA	NA	NA
11100	xxxx0	6	NA	NA	NA	NA
11101	xxxx0	8	NA	NA	NA	NA
11110	xxxx0	8	NA	NA	NA	NA
11111	xxxx0	10	NA	NA	NA	NA
00000	xxxx1	0	0	0	0/0	0/0
00001	xxxx1	2	2	2	2/0	2/0
00010	xxxx1	2	2	2	2/0	2/0
00011	xxxx1	4	4	4	4/0	4/0
00100	xxxx1	2	2	2	2/0	2/0
00101	xxxx1	4	4	4	4/0	4/0
00110	xxxx1	4	4	4	4/0	4/0
00111	xxxx1	6	6	6	6/0	6/0
01000	xxxx1	2	2	2	2/0	2/0
01001	xxxx1	4	4	4	4/0	4/0
01010	xxxx1	4	4	4	4/0	4/0
01011	xxxx1	6	6	6	6/0	6/0
01100	xxxx1	4	4	4	4/0	4/0
01101	xxxx1	6	6	6	6/0	6/0

ADAPTER CONFIGURATION		ALLOCATION (Number Of Words)				
		Data Size Sent From The Controller To The Adapter				
M-S Input	M-S Output	Poll Only	COS Only	Cyclic Only	Poll & COS	Poll & Cyclic
01110	xxxx1	6	6	6	6/0	6/0
01111	xxxx1	8	8	8	8/0	8/0
10000	xxxx1	2	2	2	2/0	2/0
10001	xxxx1	4	4	4	4/0	4/0
10010	xxxx1	4	4	4	4/0	4/0
10011	xxxx1	6	6	6	6/0	6/0
10100	xxxx1	4	4	4	4/0	4/0
10101	xxxx1	6	6	6	6/0	6/0
10110	xxxx1	6	6	6	6/0	6/0
10111	xxxx1	8	8	8	8/0	8/0
11000	xxxx1	4	4	4	4/0	4/0
11001	xxxx1	6	6	6	6/0	6/0
11011	xxxx1	8	8	8	8/0	8/0
11100	xxxx1	6	6	6	6/0	6/0
11101	xxxx1	8	8	8	8/0	8/0
11110	xxxx1	8	8	8	8/0	8/0
11111	xxxx1	10	10	10	10/0	10/0

M-S Output Parameter Configurations

The *M-S Output* parameter has the following five configurable bits.

Figure 7.3
Bits and Corresponding I/O



When you enable the *Cmd/Stat* (4) or *datalink* (5-8) parameter(s) in the adapter, you must set the corresponding bit in the *M-S Output* (25) parameter if you want the output data to be sent to the scanner or master device.

The following table lists possible configurations for the *M-S Output* (25) parameter and the types of allocation associated with each.

M-S Output	ALLOCATION (Number Of Words) Data Size Sent From The Adapter To The Controller				
	Poll Only	COS Only	Cyclic Only	Poll & COS	Poll & Cyclic
00000	0	NA	NA	NA	NA
00010	3	NA	NA	NA	NA
00100	3	NA	NA	NA	NA
00110	5	NA	NA	NA	NA
01000	3	NA	NA	NA	NA
01010	5	NA	NA	NA	NA
01100	5	NA	NA	NA	NA
01110	7	NA	NA	NA	NA
10000	3	NA	NA	NA	NA
10010	5	NA	NA	NA	NA
10100	5	NA	NA	NA	NA
10110	7	NA	NA	NA	NA
11000	5	NA	NA	NA	NA
11010	7	NA	NA	NA	NA
11100	7	NA	NA	NA	NA
11110	9	NA	NA	NA	NA
00001	3	3	3	3/3	3/3
00011	5	3	3	5/3	5/3
00101	5	3	3	5/3	5/3
00111	7	3	3	7/3	7/3
01011	7	3	3	7/3	7/3
01101	7	3	3	7/3	7/3
01111	9	3	3	9/3	9/3
10001	5	3	3	5/3	5/3
10011	7	3	3	7/3	7/3
10101	7	3	3	7/3	7/3
10111	9	3	3	9/3	9/3
11001	7	3	3	7/3	7/3

M-S Output	ALLOCATION (Number Of Words) Data Size Sent From The Adapter To The Controller				
	Poll Only	COS Only	Cyclic Only	Poll & COS	Poll & Cyclic
11011	9	3	3	9/3	9/3
11101	9	3	3	9/3	9/3
11111	11	3	3	11/3	11/3

DeviceNet Objects

Appendix Objectives

Appendix C defines the DeviceNet object classes, class services, and attributes that are supported by the DeviceNet to SCANport Communication Module with Digital Inputs. These objects can be used to develop programs for the module.

This appendix assumes that you have experience in object programming.

Object Classes

The DeviceNet to SCANport Communication Module with Digital Inputs supports the following object classes:

Class Code 0x01 — Identity Object

The identity object provides identification and general information about the device.

Class Attributes

Attribute ID	Access Rule	Name	Data Type	Description
2	Get	Max Instance	UINT	Maximum instance number of an object currently created in this class level of the device.

Instances

The total number of instances depends on the number of microprocessors in the SCANport product connected to the module.

- Instance 1 includes information on both the adapter and the product.
- The instances for the SCANport product's microprocessors start at instance 2.
- The instance for the adapter is present after all the instances for the SCANport product's microprocessors.

Instance	Description
1	Total Product
2 through n - 1①	Product components
n ①	DeviceNet to SCANport Communication Module with Digital Inputs

① The value of n is the maximum instance in the object. This value is obtainable via class attribute 2.

Instance Attributes

Attribute ID	Access Rule	Name	Data Type	Description
1	Get	Vendor ID	UINT	Identification of each vendor by number. 1 = Allen-Bradley
2	Get	Device Type	UINT	Indication of general type of product. 0x69 = Sub-Component 0x7A = SCANport Device
3	Get	Product Code	UINT	Identification of a particular product of an individual vendor. 0xXX02 = 1336 PLUS 0.5 – 10 HP -S/B 0xXX02 0xXX03 = 1336 PLUS 7.5 – 800 HP -S/B 0xXX03 0xXX07 = 1336 PLUS II -S/B 0xXX07 0xXX10 = 1336 FORCE w/ PLC Adapter -S/B 0xXX10 0xXX11 = 2364F RGU -S/B 0xXX11 0xXX12 = 1394 Motion Drive -S/B 0xXX12 0xXX13 = 1557 Medium Voltage AC Drive -S/B 0xXX13 0xXX14 =193 SMP-3 -S/B 0xXX14 0xXX15 = 150 SMC Dialog Plus -S/B 0xXX15 0xXX17 = 1305 AC Drive -S/B 0xXX17 0xXX18 = 1397 DC Drive -S/B 0xXX18 0xXX19 = 1336 VSC -S/B 0xXX19 0xXX20 = 1336T Force w/ Std Adapter -S/B 0xXX20 0xXX22 = 1336 IMPACT -S/B 0xXX22 Note: the high byte of each code indicates a particular size or configuration within a product family.
4	Get	Revision	STRUCT of	Revision of the item that this instance of the Identity Object represents. Value varies based on product.
		Major Revision	USINT	
		Minor Revision	USINT	
5	Get	Status	WORD	Summary status of product. Value varies based on product.
6	Get	Serial Number	UDINT	Serial number of product. Value varies based on product.
7	Get	Product Name	SHORT_ STRING	Human readable identification. Value varies based on product.

Common Services

Service Code	Implemented for:		Service Name
	Class	Instance	
0x05	Yes	No	Reset
0x0E	Yes	Yes	Get_Attribute_Single
0x10	No	No	Set_Attribute_Single
0x11	Yes	N/A	Find_Next_Obj_Instance

Get_Attribute_All Response

None supported.

Class Code 0x02 — Message Router Object

The Message Router Object provides a messaging connection point through which a client may address to any object class or instance residing in the physical devices.

Class Attributes

Not supported.

Instances

Instance	Description
1	Message Router Object

Instance Attributes

Attribute ID	Access Rule	Name	Data Type	Description
2	Get	Number available	UINT	Maximum number of connections supported by the message router.
3	Get	Number active	UINT	Number of connections currently used by system components.
4	Get	Active connec-tions	ARRAY of UINT	A list of the connection IDs of the currently active connections. This attribute not used. Reserved for compatibility purposes.

Common Services

Service Code	Implemented for		Service Name
	Class	Instance	
0x0E	Yes	Yes	Get_Attribute_Single

Class Code 0x03 — DeviceNet Object

The DeviceNet Object is used to provide the configuration and status of a physical attachment to DeviceNet. A product must support one (and only one) DeviceNet Object per physical network attachment.

Class Attributes

Attribute ID	Access Rule	Name	Data Type	Description
1	Get	DeviceNet Specification	Word	Returns 2.

Instances

Not supported.

Instance Attributes

Attribute ID	Access Rule	Name	Data Type	Description
1	Get	Mac ID	USINT	Node Address.
2	Get	Data Rate	USINT	Data Rate.
3	Get	BOI	BOOL	Default = 0.
4	Set	Bus Off Counter	USINT	Increments if BOI is non-zero and Bus Off occurs. Can only be set to zero.
5	Get	Allocation Information	STRUCT of BYTE USINT	The allocation information a slave supports when the master allocates.
6	Get	Node Adx Switch Err	BOOL	If non-zero, the Node Address NVS value does not match the online value.
7	Get	Data Rate Switch Err	BOOL	If non-zero, the Data Rate NVS value does not match the online value.
8	Get	Node Adx Switch	USINT	The actual value in the EEPROM.
9	Get	Data Rate Switch Val	USINT	The actual value in the EEPROM or the operating value after an autobaud was completed.

Common Services

Not supported.

Class Code 0x05 — Connection

The Connection Class allocates and manages the internal resources associated with both I/O and Explicit Messaging Connections. The specific instance generated by the Connection Class is referred to as a *Connection Instance* or a *Connection Object*.

Important: An externally visible interface to the Connection Class across Explicit Messaging Connections **DOES** exist. Unless otherwise noted, all services/attributes noted in the following sections are accessible using Explicit Messaging.

A Connection Object within a particular module actually represents one of the end-points of a Connection. It is possible for one of the Connection end-points to be configured and "active" (e.g., transmitting) without the other end-point(s) being present. Connection Objects are used to model the communication specific characteristics of a particular Application-to-Applications(s) relationship. A specific Connection Object Instance manages the communication-specific aspects related to an end-point.

A Connection Object on DeviceNet uses the services provided by a Link Producer and/or Link Consumer to perform low-level data transmission and reception functions.

Class Attributes

Attribute ID	Access Rule	Name	Data Type	Description
1	Get	Revision	UINT	Revision of the Connection Object class definition upon which the implementation is based. Range 1 – 65535.

Instances

Instance	Description
1	Group 2 Messaging
2	Group 2 Polling
4	Group 2 COS/Cyclic
6	Group 3 Messaging
7	Group 3 Messaging
8	Group 3 Messaging
9	Group 3 Messaging
10	Group 3 Messaging

Instance Attributes

Attribute ID	Access Rule	Name	Data Type	Description
1	Get	State	USINT	State of the connection as defined in the DeviceNet specification.
2	Get	Instance type	USINT	Indicates I/O or Messaging connection.
3	Get	Transport Class Trigger	USINT	The Transport Class Trigger for this instance.
4	Get	Produced Cnxn ID	USINT	CAN Identifier to transmit on.
5	Get	Consumed Cnxn ID	USINT	CAN Identifier to receive on.
6	Get	Initial Comm Char	USINT	Defines the DeviceNet message groups that the tx/rx Cnxn's apply.
7	Get	Produced Cnxn Size	UINT	Max bytes to transmit across this connection.
8	Get	Consumed Cnxn Size	UINT	Max bytes to receive across this connection.
9	Get/Set	EPR	UINT	Expected Packet Rate.
12	Get/Set	Watchdog Action	USINT	How to handle inactivity/watchdog time-outs.
13	Get	Produced Path Length	UINT	Number of bytes in the produced connection path attribute.
14	Get	Produced Cnxn Path	ARRAY of USINT	Specifies the application object whose data is to be produced by this connection.
15	Get	Consumed Path Length	UINT	Number of bytes in the consumed connection path attribute.
16	Get	Consumed Cnxn Path	ARRAY of USINT	Specifies the application object to receive the data consumed by this application.
17	Get/Set	Production Inhibit Time	UINT	Defines minimum time between new data production for COS connections.

Common Services

Not supported.

Class Code 0x07 — Register Object

The Register Object is used to address individual bits or a range of bits. It may operate as either a producer (input) register or a consumer (output) register. A producer register object produces data onto the network. A consumer register object consumes data from the network.

Message writes to the Register Object can perform control functions. Therefore, message writes are only allowed when the controller is not actively controlling the module and the message write is done through a connection with a time-out value not equal to zero. Writes cannot be performed through an unconnected message. After a write, any time-out or closure of the connection may cause the SCANport product to fault.

Refer to Chapter 6, *Using DeviceNet Explicit Messaging*, for information about writing to the Register Object.

Class Attributes

Not supported.

Instances

Instance	Description
1	All polled data being read from the SCANport device (read-only)
2	All polled data written to the SCANport device (read/write)
3	Logic Status and Feedback data (read-only)
4	Logic Command and Reference data (read/write)
5	Datalink A input data (read-only)
6	Datalink A output data (read/write)
7	Datalink B input data (read-only)
8	Datalink B output data (read/write)
9	Datalink C input data (read-only)
10	Datalink C output data (read/write)
11	Datalink D input data (read-only)
12	Datalink D output data (read/write)
13	Logic Status and Feedback Data (read-only)
14	Logic Command and Reference Data① (read/write)

① The command word is set to the value of the first word of the data where there are ones in the second word of the data. Command = (word 1 and not word 2) or (word 1 and word 2). This only controls specified bits in the logic command data to the SCANport product and does not change the reference value.

Instance Attributes

Setting of an assembly attribute can only be accomplished through a connection. This feature is to prevent accidental control of the SCANport product.

Attribute ID	Access Rule	Name	Data Type	Description
1	Get	Bad Flag	BOOL	If set to 1, then attribute 4 may contain invalid, bad or otherwise corrupt data. 0 = good 1 = bad
2	Get	Direction	BOOL	Direction of data transfer. 0 = Producer Register 1 = Consumer Register
3	Get	Size	UINT	Size of register data in bits.
4	Condi-tional①	Data	ARRAY of BITS	Data to be transferred.

① The access rule of Set is optional if attribute 2, Direction = 1. If Direction = 0, the access rule is Get.

Common Services

Service Code	Implemented for		Service Name
	Class	Instance	
0x0E	Yes	Yes	Get_Attribute_Single
0x10	No	Yes	Set_Attribute_Single

Class Code 0x0F — Parameter Object

The Parameter Object provides a known, public interface for device configuration data. This object also provides all the information necessary to define and describe each individual configuration parameter of a device.

Class Attributes

Attribute ID	Access Rule	Name	Data Type	Description
1	Get	Revision	UINT	Revision of this object. First revision, value = 1.
2	Get	Max Instance	UINT	Maximum instance number of an object currently created in this class level of the device.
8	Get	Parameter Class Descriptor	WORD	Bits that describe parameters.
9	Get	Configuration Assembly Instance	UINT	Instance number of the configuration assembly. This attribute is set to zero because a configuration assembly is not supported.
10	Set	Native Language	USINT	Language ID for all character array accesses. 0 = English 1 = French 2 = Spanish 3 = Italian 4 = German 5 = Japanese 6 = Portuguese

Instances

The number of instances varies based on the number of parameters in your SCANport product. The adapter parameters immediately follow the SCANport product parameters.

Instance	Description
1 through n - 41①	SCANport Product Parameters
n - 41 through n ①	Module Parameters

① The value of n is the maximum instance in the object. This value is obtainable via class attribute 2.

Instance Attributes

Attribute ID	Access Rule	Stub/Full	Name	Data Type	Description
1	①	Stub	Parameter Value	Specified in Descriptor, Data Type, and Data Size attributes.	Actual value of parameter. Data type specified in descriptor, data type, and data size.①②
2	Get	Stub	Link Path Size	USINT	Size of Link Path attribute. If this attribute is 0, then no link is specified. Number of BYTEs in attribute 3.
3	Get	Stub	Link Path	ARRAY of path segments	Path to the object from where this parameter value is retrieved. The link path is limited to 255 BYTEs.
			Segment type/port	BYTE	
			Segment Address	Path (format depends on data contained in segment type/port)	
4	Get	Stub	Descriptor	WORD	Descriptor of parameter. Refer to the table on page C-12.
5	Get	Stub	Data Type	USINT	Data type code. Refer to the table on page C-13.
6	Get	Stub	Data Size	USINT	Number of BYTEs in attribute 1, Parameter Value.
7	Get	Full	Parameter Name String	SHORT_ STRING	A human readable string representing the parameter name. For example, “frequency #1.” The maximum number of characters is 16. (The first byte is a length code.)
8	Get	Full	Units String	SHORT_ STRING	Engineering unit string. The maximum number of characters is 4. (The first byte is a length code.)
9	Get	Full		SHORT_ STRING	The maximum number of characters is 64. (The first byte is a length code.) Always returns 0.
10	Get	Full	Minimum Value	Same as attribute 1	The minimum valid actual value to which attribute 1, Parameter Value, can be set.
11	Get	Full	Maximum Value	Same as attribute 1	The maximum valid actual value to which attribute 1, Parameter Value, can be set.

① The access rule is defined in bit 4 of instance attribute 4, the Descriptor. If bit 4 is 0, the access rule is Set and the Parameter Value can be read and written. If bit 4 is 1, the access rule is Get and the Parameter Value can only be read.

② Data type specified in instance attributes 4 (Descriptor), 5 (Data Type), and 6 (Data Size).

Attribute ID	Access Rule	Stub/Full	Name	Data Type	Description
12	Get	Full	Default Value	Same as attribute 1	The actual value attribute 1, Parameter Value, should be set to when the user wants the default for the parameter.
13	Get	Full	Scaling Multiplier	UINT	Multiplier for scaling formula.
14	Get	Full	Scaling Divisor	UINT	Divisor for scaling formula.
15	Get	Full	Scaling Base	UINT	Base for scaling formula.
16	Get	Full	Scaling Offset	UINT	Offset for scaling formula.
17	Get	Full	Multiplier Link	UINT	Parameter object instance number of multiplier source.
18	Get	Full	Divisor Link	UINT	Parameter object instance number of base source.
19	Get	Full	Base Link	UINT	Parameter object instance number of offset source.
20	Get	Full	Offset Link	UINT	Parameter object instance number of offset source.
21	Get	Full	Decimal Precision	USINT	Specifies number of decimal places to use when displaying the scaled engineering value. Also used to determine actual increment value so that incrementing a value causes a change in scaled engineering value to this precision.

① The access rule is defined in bit 4 of instance attribute 4, the Descriptor. If bit 4 is 0, the access rule is Set and the Parameter Value can be read and written. If bit 4 is 1, the access rule is Get and the Parameter Value can only be read.

② Data type specified in instance attributes 4 (Descriptor), 5 (Data Type), and 6 (Data Size).

Bit Definitions for Instance Attribute 4

Bit	Definition	Value
0	Supports settable path	0 = Link path cannot be set. 1 = Link path can be set.
1	Supports enumerated strings	0 = Enumerated strings are not supported. 1 = Enumerated strings are supported and may be read with the Get_Enum_String service.
2	Supports scaling	0 = Scaling not supported. 1 = Scaling is supported. The scaling attributes are implemented and the value presented is in engineering units.
3	Supports scaling links	0 = Scaling links not supported. 1 = The values for the scaling attributes may be retrieved from other parameter object instances.
4	Read only parameter	0 = Parameter value attribute can be written (set) and read (get). Access rule is set. 1 = Parameter value attribute can only be read. Access rule is get.
5	Monitor parameter	0 = Parameter value attribute is not updated in real time by the device. 1 = Parameter value attribute is updated in real time by the device.
6	Supports extended precision scaling	0 = Extended precision scaling is not supported. 1 = Extended precision scaling should be implemented and the value presented to the user in engineering units.

Data Types for Instance Attribute 5

Attribute ID Value	Definition	Data Type Description	Scaling Supported on this Data Type
1	WORD	16-bit word	No
2	UINT	16-bit unsigned integer	Yes
3	INT	16-bit signed integer	Yes
4	BOOL	Boolean	No
5	SINT	Short integer	Yes
6	DINT	Double integer	Yes
7	LINT	Long integer	Yes
8	USINT	Unsigned short integer	Yes
9	Not Supported	Unsigned double integer	Yes
10	Not Supported	Unsigned long integer	Yes
11	Not Supported	Single floating point format (IEEE 754)	Yes
12	Not Supported	Double floating point format (IEEE 754)	Yes
13	Not Supported	Duration (short)	Yes
14	Not Supported	Duration	Yes
15	Not Supported	Duration (high resolution)	Yes
16	Not Supported	Duration (long)	Yes
17	Not Supported	Date	No
18	Not Supported	Time of Day	No
19	Not Supported	Date and time	No
20	Not Supported	8-bit per character string	No
21	Not Supported	16-bit per character string	No
22	Not Supported	N-byte per character string	No
23	Not Supported	Short N-byte character string	No
24	Not Supported	8-bit string	No
25	Not Supported	32-bit string	No
26	Not Supported	64-bit string	No

Common Services

Service Code	Implemented for		Service Name
	Class	Instance	
0x01	No	Yes	Get_Attribute_All
0x0E	Yes	Yes	Get_Attribute_Single
0x10	No	Yes	Set_Attribute_Single
0x4B	No	Yes	Get_Enum_String
0x05	Yes	No	Reset_Request (sets all parameters to default values)
0x15	Yes	No	Restore_Request
0x16	Yes	No	Save_Request

Get_Attribute_All Response

Not supported.

At the instance level, the order of attributes returned in the Get_Attributes_All response is as follows:

Class Attribute ID	Attribute Name and Default Value
1	Parameter Value
2	Link Path Size
3	Link Path
4	Descriptor
5	Data Type
6	Data Size
7	Parameter Name String, default character count = 0
8	Units String, default character count = 0
9	Help String, default character count = 0
10	Minimum Value default = 0
11	Maximum Value default = 0
12	Default Value default = 0
13	Scaling Multiplier Default = 1
14	Scaling Divisor Default = 1
15	Scaling Base Default = 1
16	Scaling Offset Default = 0
17	Multiplier Link Default = 0
18	Divisor Link Default = 0
19	Base Link Default = 0
20	Offset Link Default = 0
21	Decimal Precision Default = 0

Object Specific Services

Service Code	Implemented for		Service Name
	Class	Instance	
0x4B	No	Yes	Get_Enum_String

Enumerated strings are human-readable strings that describe either a bit or a value, depending on the data type of instance attribute 1, the Parameter Value. If the data type is a BYTE or WORD, the enumerated string is a bit enumerated string. If the data type is INT or UINT, the enumerated string is a value enumerated string. Any other data type does not have enumerated strings.

The table below lists the parameters for the Get_Enum_String request service.

Name	Data Type	Description of Attribute
Enumerated String Number	USINT	Number of enumerated string to retrieve (MAX value is 255).

- If the string to be returned is a bit enumerated string, then the enumerated string number represents a bit position and the Get_Enum_String service returns a string from that bit.
- If the string to be returned is a value enumerated string, then the enumerated string number represents a value and the Get_Enum_String service returns a string for that value.

The enumerated string is returned in the form of a SHORT_STRING and is 16 characters long plus the preceding length byte.

Class Code 0x10 — Parameter Group Object

The Parameter Group Object identifies and provides access to groups of parameters in a device grouping. The Parameter Group Object provides convenient access to related sets of parameters.

Class Attributes

Attribute ID	Access Rule	Name	Data Type	Description
1	Get	Parameter group version	UINT	Returns 1.
2	Get	Max Instance	UINT	Maximum instance number of an object currently created in this class level of the device.
8	Get	Native Language	USINT	Language ID for all STRING accesses. 0 = English 1 = French 2 = Spanish (Mexican) 3 = Italian 4 = German 5 = Japanese 6 = Portuguese

Instances

The number of instances varies based on the number of groups in the SCANport product. One additional group is added for the module.

Instance	Description
1 – (n - 1)	SCANport product groups
n①	Module group

① n is the value returned by a get from class attribute 2 (max instance).

Instance Attributes

Attribute ID	Access Rule	Name	Data Type	Description
1	Get	Group Name String	SHORT_ STRING	A human-readable string representing the group name (e.g., set-up, frequency set). Maximum number of characters = 16.
2	Get	Number of Members in Group	UINT	Number of parameters in group.
3	Get	1st Parameter Number in Group	UINT	Parameter instance number.
4	Get	2nd Parameter Number in Group	UINT	Parameter instance number.
n	Get	(n-2)th Parameter Number in Group	UINT	Parameter instance number.

Common Services

Service Code	Implemented for		Service Name
	Class	Instance	
0x0E	Yes	Yes	Get_Attribute_Single

Get_Attribute_All Response

Not supported.

Class Code 0x93 — SCANport Pass-Through Parameter Object

The SCANport Pass-Through Parameter Object lets you perform a scattered read or write.

Class Attributes

Not supported.

Instance Attributes

Not supported.

Common Services

Service Code	Implemented for Parameter Number	Service Name
0x0E	21 (digital inputs)	Get_Attribute_Single

Object-Specific Services

Service Code	Implemented for		Service Name
	Class	Instance	
0x32	Yes	No	Scattered_Parameter_Value_Read①
0x34	Yes	No	Scattered_Parameter_Value_Write①

① Must be directed to Attribute 0, Instance 0.

The table below lists the parameters for the Scattered_Parameter_Value_Read and Scattered_Parameter_Value_Write object-specific services:

Name	Data Type	Description
Scattered Parameters	STRUCT of	
Parameter Number	WORD	Parameter to read or write
Parameter Value	WORD	Parameter value to write (zero when reading)

Important: The STRUCT may repeat up to 32 times in a single message.

Class Code 0x97 — SCANport Pass-Through Fault Object

The SCANport Pass-Through Fault Object provides information on the product's fault queue.

Class Attributes

Attribute ID	Access Rule	Name	Data Type	Description
0	Set	Write Fault Command	BYTE	1 = Clear Faults 2 = Clear Fault Queue 3 = Reset Product
1	Get	Read Number of Fault Queue Entries	BYTE	Reads the number of fault queue entries.
2	Get	Read Fault Queue Trip Index	BYTE	Reads the index of the fault that tripped the product.

Instance Attributes

Attribute ID	Access Rule	Name	Data Type	Description
0	Get	Read Fault Queue Entry Full/All Info	STRUCT of	
		Fault Text	ARRAY of BYTE	16 character string (no length information, no terminating null).
		Fault Code	WORD	Fault Code.
		Fault Time Stamp	STRUCT	
			BYTE	1/100 Second (0 – 99).
			BYTE	Second (0 – 59).
			BYTE	Minute (0 – 59).
			BYTE	Hour (0 – 23).
			BYTE	Day of Week (0 – 6).①
			BYTE	Date (1 – 31).
			BYTE	Month (1 – 12).
			BYTE	Year (0 – 99②).
128	Get	Fault Code and Time Stamp	STRUCT of	
		Fault Code	WORD	Fault Code.
		Fault Time Stamp	STRUCT of	
			BYTE	1/100 Second (0 – 99).
			BYTE	Second (0 – 59).
			BYTE	Minute (0 – 59).
			BYTE	Hour (0 – 23).
			BYTE	Day of Week (0 – 6).①
			BYTE	Date (1 – 31).
			BYTE	Month (1 – 12).
			BYTE	Year (0 – 99②).
129	Get	Read Fault Text String Only	ARRAY of BYTE	16 character string (no length information, no terminating null).

① Sunday is a value of zero.

② Year is an offset from 1990.

Common Services

Service Code	Implemented for		Service Name
	Class	Instance	
0x0E	Yes	Yes	Get_Attribute_Single
0x10	Yes	Yes	Set_Attribute_Single

Class Code 0x98 — SCANport Pass-Through Warning Object

The SCANport Pass-Through Warning Object provides information on the product's warning queue.

Class Attributes

Attribute ID	Access Rule	Name	Data Type	Description
0	Set	Write Warning Command	BYTE	Write Warning Command. 1 = Clear Warnings 2 = Clear Warning Queue 3 = Reset Product
1	Set	Read Number of Warning Queue Entries	BYTE	

Instance Attributes

Attribute ID	Access Rule	Name	Data Type	Description
0	Get	Read Warning Queue Entry Full/ All Info	STRUCT of	
		Warning Text	ARRAY of BYTE	16 character string (no length information, no terminating null).
		Warning Code	WORD	Fault Code.
		Warning Time Stamp (Time Stamps not available in all products)	STRUCT	
			BYTE	1/100 Second (0 – 99).
			BYTE	Second (0 – 59).
			BYTE	Minute (0 – 59).
			BYTE	Hour (0 – 23).
			BYTE	Day of Week (0 – 6).①
			BYTE	Date (1 – 31).
			BYTE	Month (1 – 12).
			BYTE	Year (0 – 99②).

① Sunday is a value of zero.

② Year is an offset from 1990.

Attribute ID	Access Rule	Name	Data Type	Description
128	Get	Warning Code and Time Stamp (Time Stamps not available in all products)	STRUCT of	
		Warning Code	WORD	Fault Code.
		Warning Time Stamp (Time Stamps not available in all products)	STRUCT of	
			BYTE	1/100 Second (0 – 99).
			BYTE	Second (0 – 59).
			BYTE	Minute (0 – 59).
			BYTE	Hour (0 – 23).
			BYTE	Day of Week (0 – 6).①
			BYTE	Date (1 – 31).
			BYTE	Month (1 – 12).
			BYTE	Year (0 – 99②).
129	Get	Read Warning Text String Only	ARRAY of BYTE	16 character string (no length information, no terminating null).

① Sunday is a value of zero.

② Year is an offset from 1990.

Common Services

Service Code	Implemented for		Service Name
	Class	Instance	
0x0E	Yes	Yes	Get_Attribute_Single
0x10	Yes	Yes	Set_Attribute_Single

Class Code 0x99 — SCANport Pass-Through Link Object

The SCANport Pass-Through Link Object lets you perform a scattered read or write of a number of links or a single read or write of a link.

Class Attributes

Attribute ID	Access Rule	Name	Data Type	Description
0	Set	Link Command	BYTE	1 = Clear all links.
1	Get	NVS Link Diagnostic Value	WORD	Checksum.

Instance Attributes①

Attribute ID	Access Rule	Name	Data Type	Description
0	Set	Parameter Link Reference②	WORD	

① An instance in this class is the number of a parameter that is to get its value from another parameter.

② The Parameter Link Reference value is the number of the parameter whose value is to be transferred.

Common Services

Service Code	Implemented for		Service Name
	Class	Instance	
0x0E	Yes	Yes	Get_Attribute_Single
0x10	Yes	Yes	Set_Attribute_Single

Object-Specific Services

Service Code	Implemented for		Service Name
	Class	Instance	
0x32	Yes	No	Scattered_Link_ Reference_Value_Read①
0x34	Yes	No	Scattered_Link_ Reference_Value_Write①

① Must be directed to Attribute 0, Instance 0.

The table below lists parameters for Scattered_Link_Reference_Read and Scattered_Link_Reference_Write object-specific services.

Name	Data Type	Description
Scattered Link Read/Write	STRUCT of	
Parameter Number	WORD	Parameter Link Reference to read or write.
Parameter Link Reference	WORD	Link Reference value to write (zero when reading).

Important: The STRUCT may repeat up to 32 times in a single message.

Class Code 0x67 — PCCC Object

The PCCC Object is used to process encapsulated PCCC messages from DeviceNet. The PCCC Object does not implement any specific class or instance attributes, so the instance field for any received messages is ignored.

Class Attributes

Not supported.

Instance Attributes

Not supported.

Common Services

Not supported.

Object Specific Services

Service Code	Implemented for		Service Name
	Class	Instance	
0x4B	No	Yes	Execute_PCCC
0x4D	No	Yes	Execute_Local_PCCC

Message Structure for Execute_PCCC

Request			Response		
Name	Data Type	Description	Name	Data Type	Description
Length	USINT	Length of requestor ID	Length	USINT	Length of requestor ID
Vendor	UINT	Vendor number of requestor	Vendor	UINT	Vendor number of requestor
Serial Number	UDINT	ASA serial number of requestor	Serial Number	UDINT	ASA serial number of requestor
Other	Product Specific	Identifier of user, task, etc. on the requestor	Other	Product Specific	Identifier of user, task, etc. on the requestor
CMD	USINT	Command byte	CMD	USINT	Command byte
STS	USINT	0	STS	USINT	Status byte
TNSW	UINT	Transport word	TNSW	UINT	Transport word. Same value as the request.
FNC	USINT	Function code. Not used for all CMD's.	EXT_STS	USINT	Extended status. Not used for all CMD's.
PCCC_params	ARRAY of USINT	CMD/FNC specific parameters	PCCC_results	ARRAY of USINT	CMD/FNC specific result data

Message Structure for Execute_Local_PCCC

Request			Response		
Name	**Data Type**	**Description**	**Name**	**Data Type**	**Description**
CMD	USINT	Command byte	CMD	USINT	Command byte
STS	USINT	0	STS	USINT	Status byte
TNSW	UINT	Transport word	TNSW	UINT	Transport word. Same value as the request.
FNC	USINT	Function code. Not used for all CMD's.	EXT_STS	USINT	Extended status. Not used for all CMD's.
PCCC_params	ARRAY of USINT	CMD/FNC specific parameters	PCCC_results	ARRAY of USINT	CMD/FNC specific result data

N-File Addresses

Appendix Objectives

Appendix D provides information on the N-File addresses used when accessing the PCCC object. When using messages, you can use the N-file addresses to locate information about the adapter or SCANport product.

N-File Addresses

The 2100-GK61 support the N-file addresses shown below:

Address	N-File Addresses
N10:0	Number of SCANport product parameters
N10:1 – 999	SCANport product parameters 1 – 999 (value only)
N11:0 – 999	SCANport product parameters 1000 – 1999 (value only)
N12:0 – 999	SCANport product parameters 2000 – 2999 (value only)
N13:0	Number of SCANport adapter parameters
N13:1 – 999	SCANport adapter parameters 1 – 999 (value only)
N30:1 – 999	SCANport product parameters 1 – 999 (all information — read only)
N31:1 – 999	SCANport product parameters 1000 – 1999 (all information — read only)
N32:1 – 999	SCANport product parameters 2000 – 2999 (all information — read only)
N33:1 – 999	SCANport adapter parameters 1 – 999 (all information — read only)
N40:0 – 63	Block Transfer Emulation file
N42:5	1203-Gx2 Firmware Emulation Version — the firmware version of the 1203-Gx2 this adapter emulates for DriveTools compatibility.
N42:6	Max Network Node — the maximum DeviceNet Node Number
N42:7	Adapter Port # — the SCANport adapter port number the adapter is connected to on the SCANport product
N42:8	Reserved for future use — always zero
N50:0	Number of SCANport product parameters
N50:1 – 249	SCANport product parameters 1 – 249 (value only)

Rockwell Automation Support

Rockwell Automation provides technical information on the Web to assist you in using its products. At http://support.rockwellautomation.com, you can find technical manuals, a knowledge base of FAQs, technical and application notes, sample code and links to software service packs, and a MySupport feature that you can customize to make the best use of these tools.

For an additional level of technical phone support for installation, configuration, and troubleshooting, we offer TechConnect support programs. For more information, contact your local distributor or Rockwell Automation representative, or visit http://support.rockwellautomation.com.

Installation Assistance

If you experience a problem within the first 24 hours of installation, please review the information that's contained in this manual. You can also contact a special Customer Support number for initial help in getting your product up and running.

United States	1.440.646.3434 Monday – Friday, 8am – 5pm EST
Outside United States	Please contact your local Rockwell Automation representative for any technical support issues.

New Product Satisfaction Return

Rockwell Automation tests all of its products to ensure that they are fully operational when shipped from the manufacturing facility. However, if your product is not functioning and needs to be returned, follow these procedures.

United States	Contact your distributor. You must provide a Customer Support case number (call the phone number above to obtain one) to your distributor in order to complete the return process.
Outside United States	Please contact your local Rockwell Automation representative for the return procedure.

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Document Update

DeviceNet to SCANport Communications Module with Digital Inputs Additions and Corrections

Reference

DeviceNet to SCANport Communications Module with Digital Inputs, Publication 2100-UM001B-EN-P - January 2001

How to Use

This document is intended to replace Chapter 5 completely and Page 7, 20, 24 and 26 of Appendix B in Publication 2100-UM001B-EN-P, *DeviceNet to SCANport Communications Module with Digital Inputs.*

When using Publication 2100-UM001B-EN-P, *DeviceNet to SCANport Communications Module with Digital Inputs,* reference the material within this document and disregard the information in the book.

Publication 2100-DU021B-EN-P - January 2004

Ladder Logic Programming—Including Reading Inputs

Chapter Objectives

Chapter 5 provides information needed to create the PLC, SLC, or ControlLogix Ladder Logic program that the controller will use to transmit control I/O and messages to and from the SCANport product. In this chapter, you will read about the following:

- Software needed to create a PLC, SLC or ControlLogix ladder logic program.
- PLC, SLC, and ControlLogix ladder logic programs.
- Creating a PLC, SLC, or ControlLogix ladder logic program.

This chapter assumes you are familiar with the hardware components and programming procedures necessary to operate DeviceNet and SCANport devices, including the following:

- PLC-5, SLC-500, or ControlLogix.
- 1771-SDN, 1747-SDN, or 1756-DNB scanner.
- Ladder programming.
- RSLogix5 (for PLC-5), RSLogix500 (for SLC-5/02 through SLC 5/05), and RSLogix 5000 (for ControlLogix).

You may need to refer to the documentation associated with these products to create a ladder logic program.

Required Equipment

Before creating a ladder logic program for the PLC, SLC, or ControlLogix, your PC must be:

- Running RSLogix5 and RSLinx if using a PLC. Refer to http://www.software.rockwell.com for more information on these products.
- Running RSLogix500 and RSLinx if using an SLC. Refer to http://www.software.rockwell.com for more information on these products.
- Running RSLogix5000 and RSLinx if using a ControlLogix. Refer to http://www.software.rockwell.com for more information on these products.
- Connected to and communicating with the DeviceNet network using a 1784-PCD card, 1784-PCID card, 1784-PCID5 card, or a 1770-KFD adapter.

What is RSLogix?

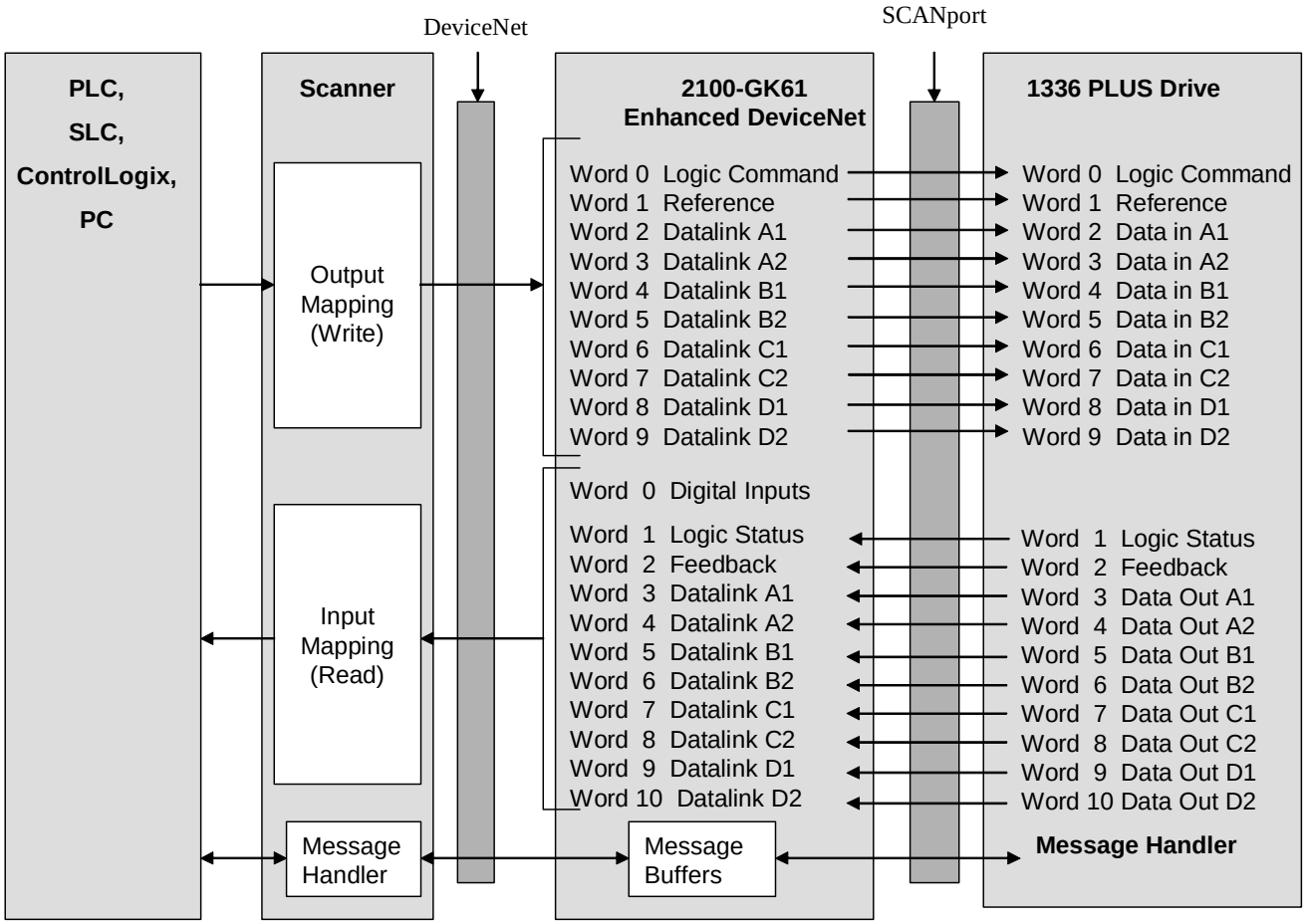
RSLogix5 (for the PLC-5), RSLogix500 (for the SLC-5/03), and RSLogix5000 (for ControlLogix) software let you create the ladder logic programs you need and download them to the processor. They also let you monitor the program as the processor is using it.

For more information on RSLogix5, RSLogix500, or RSLogix5000, consult the respective software's documentation.

What are Ladder Logic Programs?

A PLC, SLC, or ControlLogix ladder logic program lets you control the drive and the messaging from the processor to the drive. Figure 5.1 shows how the I/O image table for a DeviceNet scanner relates to the 1336 PLUS drive when a DeviceNet to SCANport Communication Module with Digital Inputs is used.

Figure 5.1 I/O Image Table



IMPORTANT: Datalinks are optionally enabled in the adapter and configured in the product. Refer to Chapter 3, and your product's user manual for more information.

2100-GK61 Scanner Output: See Chapter 4 for configuring a scanner. The 1st word consists of command bits for the SCANport product (such as Drive, SMC or SMP-3). The 2nd word is an analog reference supported for Drives, but not for an SMC or SMP-3.

Table 5.A Scanner Output Map (PLC Example)

Bits 15 - 0	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
N10:1	SCANport Device Command															
N10:2	Analog Reference (For Drives)															

Table 5.B Scanner Output Map (SLC Example)

Bits 15 - 0	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
O:1.1	Command or Logic Control Data for a Drive, SMC or SMP-3															
O:1.2	Analog Reference (For Drives)															

Table 5.C Scanner Output Map (ControlLogix Example)

Bits 15 - 0	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1:I.Data[0]	Analog Reference (For Drives)																Command or Logic Control Data for a Drive, SMC or SMP-3															

2100-GK61 Scanner Input: See Chapter 4 for configuring a scanner. The scanner's first (4) bits of 1st word are 2100-GK61 discrete inputs. Bit 4 through 15 of 1st word are not used. The 2nd word is status of SCANport product (such as a Drive or SMC) and the 3rd word is the analog feedback.

Table 5.D Scanner Input Map (PLC Example)

Bits 15 - 0	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
N9:1	Not Used												2100-GK61 Discrete Inputs			
N9:2	Status Data for a Drive, SMC or SMP-3															
N9:3	Analog Feedback for a Drive, SMC or SMP-3															

Table 5.E Scanner Input Map (SLC Example)

Bits 15 - 0	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
I:1.1	Not Used												2100-GK61 Discrete Inputs			
I:1.2	Status Data for a Drive, SMC or SMP-3															
I:1.3	Analog Feedback for a Drive, SMC or SMP-3															

Table 5.F Scanner Input Map (ControlLogix Example)

Bits 15 - 0	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1:I.Data[0]	SCANport Device Status																Not Used												2100-GK61 discrete inputs			
1:I.Data[1]																	Analog Feedback for a Drive, SMC, or SMP-3															

Example Ladder Logic Programs

The following are example ladder logic programs.

ATTENTION

ATTENTION: The example ladder logic program shown in this manual is intended solely for purpose of example. Because there are many variables and requirements associated with any particular installation, Rockwell Automation does not assume responsibility or liability (to include intellectual property liability) for actual use based upon the example shown in this publication.

IMPORTANT: Refer to the user manual for your SCANport product for specific I/O definitions. Different SCANport products have different Logic Command, Logic Status, Reference, and Feedback I/O interpretations.

NOTE: Prior to the programming examples are logic control structure tables and logic status structure tables for various products.

Figure 5.2 The 1305, 1336 PLUS or 1336 PLUS II Drive in this example sends the following logic status to the PLC via the scanner.

Drive Status Structure

This provides the drive status information that will be sent to the logic controller's input image table when the Communication Module is set to control the drive.

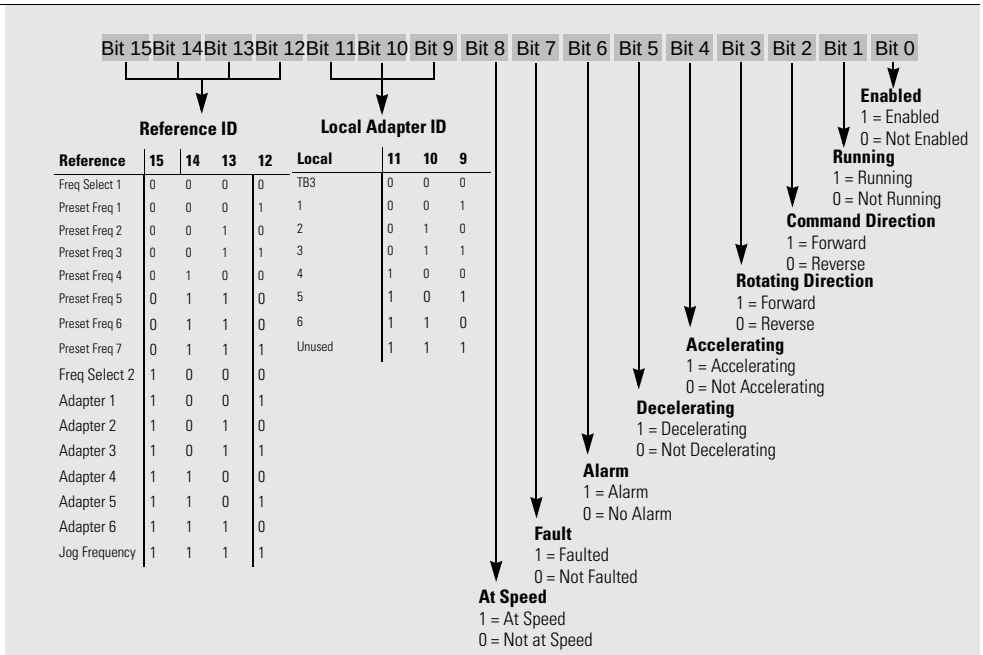


Figure 5.3 The 1305, 1336 PLUS or 1336 PLUS II Drive in this example accepts the following logic command data from the PLC via the scanner.

Logic Control Structure

This information provides the control logic information that is sent to the drive through the logic controller's output image table when the Communication Module is set to control the drive.

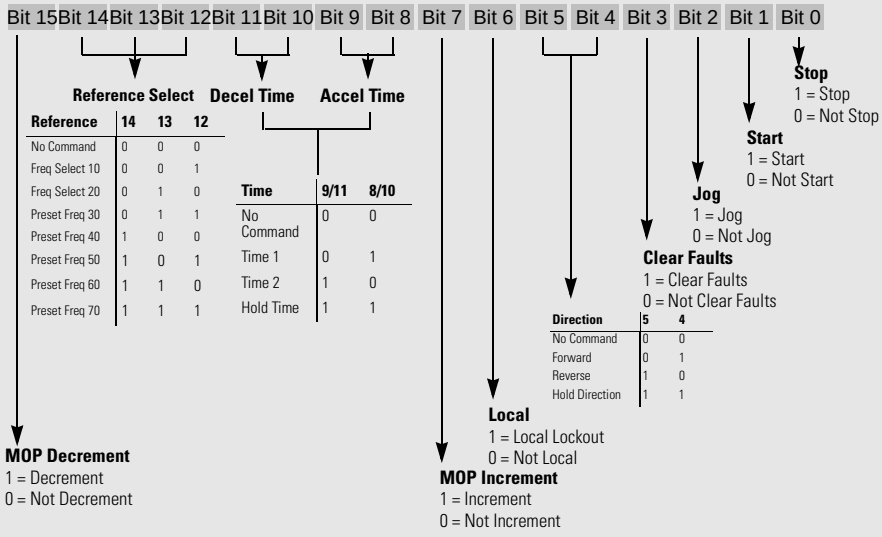


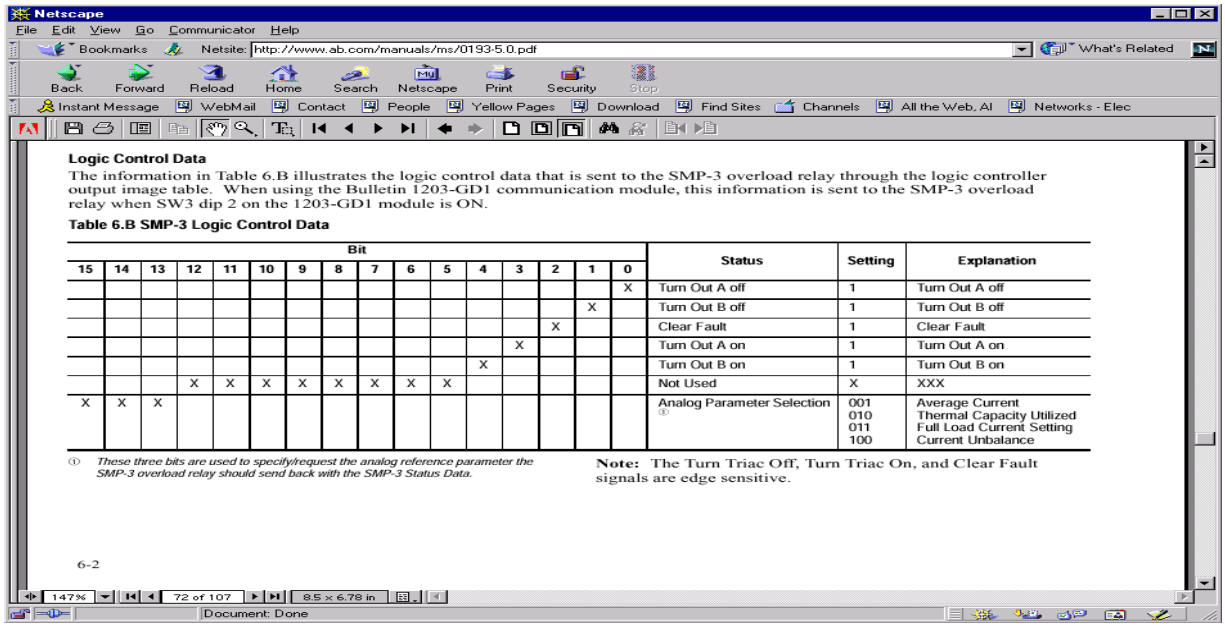
Table 5.G PowerFlex 70 and PowerFlex 700 Drives Logic Status

Logic Bits																	
15	**14**	**13**	**12**	**11**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**	**Status**	**Description**
															X	Ready	0 = Not Ready 1 = Ready
														X		Active	0 = Not Active 1 = Active
													X			Command Direction	0 = Reverse 1 = Forward
												X				Actual Direction	0 = Reverse 1 = Forward
											X					Accel	0 = Not Accelerating 1 = Accelerating
										X						Decel	0 = Not Decelerating 1 = Decelerating
									X							Alarm	0 = No Alarm 1 = Alarm
								X								Fault	0 = Fault 1 = Fault
							X									At Speed	0 = Not At Reference 1 = At Reference
				X	X	X										Local Control	000 = Port 0 (TB) 001 = Port 1 010 = Port 2 011 = Port 3 100 = Port 4 101 = Port 5 110 = Port 6 111 = No Local
X	X	X	X													Reference	0000 = Ref A Auto 0001 = Ref B Auto 0010 = Preset 2 Auto 0011 = Preset 3 Auto 0100 = Preset 4 Auto 0101 = Preset 5 Auto 0110 = Preset 6 Auto 0111 = Preset 7 Auto 1000 = Term Blk Manual 1001 = DPI 1 Manual 1010 = DPI 2 Manual 1011 = DPI 3 Manual 1100 = DPI 4 Manual 1101 = DPI 5 Manual 1110 = DPI 6 Manual 1111 = Jog Ref

Table 5.H PowerFlex 70 and PowerFlex 700 Drives Logic Control

Logic Bits																	
15	**14**	**13**	**12**	**11**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**	**Status**	**Description**
															X	Stop	0 = Not Stop 1 = Stop
														X		Start	0 = Not Start 1 = Start
													X			Jog	0 = Not Jog 1 = Jog
												X				Clear Faults	0 = Not Clear Faults 1= Clear Faults
										X	X					Direction	00 = No Command 01 = Forward 10 = Reverse Command 11 = Hold Direction Control
									X							Local Control	0 = Not Local Control 1 = Local Control
								X								MOP Increment	0 = Not Increment 1 = Increment
						X	X									Accel Rate	00 = No Command 01 = Accel Rate 1 Command 10 = Accel Rate 2 Command 11 = Hold Decel Rate
				X	X											Decel Rate	00 = No Command 01 = Decel Rate 1 Command 10 = Decel Rate 2 Command 11 = Hold Decel Rate
	X	X	X													Reference Select	000 = No Command 001 = Ref. 1 (Ref A Select) 010 = Ref. 2 (Ref B Select) 011 = Ref. 3 (Preset 3) 100 = Ref.4 (Preset 4) 101 = Ref.5 (Preset 5) 110 = Ref. 6 (Preset 6) 111 = Ref. 7 (Preset 7)
X																MOP Decrement	0 = Not Decrement 1 = Decrement

For reference, Logic Control Data and Status Data tables from the SMP-3 manual are included below.



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Logic Control Data

The information in Table 6.B illustrates the logic control data that is sent to the SMP-3 overload relay through the logic controller output image table. When using the Bulletin 1203-GD1 communication module, this information is sent to the SMP-3 overload relay when SW3 dip 2 on the 1203-GD1 module is ON.

Table 6.B SMP-3 Logic Control Data

Bit															Status	Setting	Explanation
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0			
															X	Turn Out A off	1	Turn Out A off
														X		Turn Out B off	1	Turn Out B off
													X			Clear Fault	1	Clear Fault
												X				Turn Out A on	1	Turn Out A on
											X					Turn Out B on	1	Turn Out B on
			X	X	X	X	X	X	X	X						Not Used	X	XXX
X	X	X														Analog Parameter Selection ①	001 010 011 100	Average Current Thermal Capacity Utilized Full Load Current Setting Current Unbalance

① *These three bits are used to specify/request the analog reference parameter the SMP-3 overload relay should send back with the SMP-3 Status Data.*

Note: The Turn Triac Off, Turn Triac On, and Clear Fault signals are edge sensitive.

6-2

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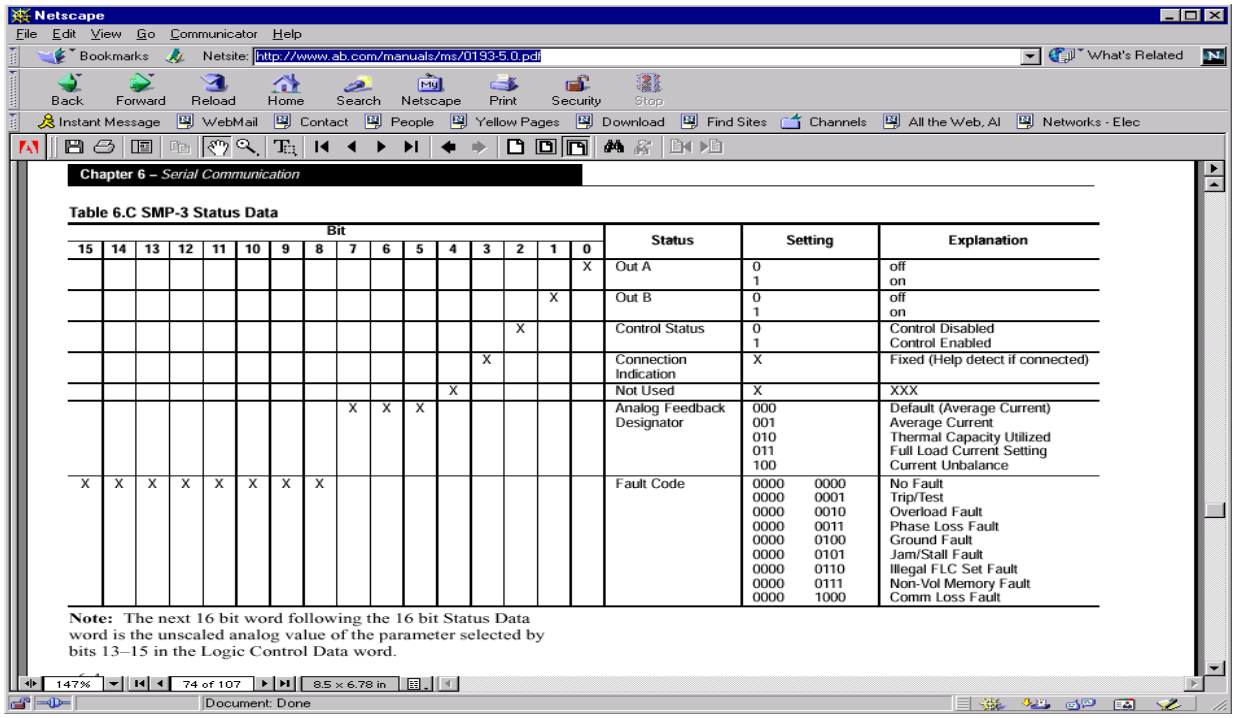

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Chapter 6 – *Serial Communication*

Table 6.C SMP-3 Status Data

Bit															Status	Setting	Explanation
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0			
															X	Out A	0 1	off on
														X		Out B	0 1	off on
													X			Control Status	0 1	Control Disabled Control Enabled
												X				Connection Indication	X	Fixed (Help detect if connected)
											X					Not Used	X	XXX
								X	X	X						Analog Feedback Designator	000 001 010 011 100	Default (Average Current) Average Current Thermal Capacity Utilized Full Load Current Setting Current Unbalance
X	X	X	X	X	X	X	X									Fault Code	0000 0000 0000 0001 0000 0010 0000 0011 0000 0100 0000 0101 0000 0110 0000 0111 0000 1000	No Fault Trip/Test Overload Fault Phase Loss Fault Ground Fault Jam/Stall Fault Illegal FLC Set Fault Non-Vol Memory Fault Comm Loss Fault

Note: The next 16 bit word following the 16 bit Status Data word is the unscaled analog value of the parameter selected by bits 13–15 in the Logic Control Data word.

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PLC Ladder Logic Example

The following example uses a PLC-5, a 1771-SDN DeviceNet scanner, and a 2100-GK61 to control a 1305, 1336 PLUS, or 1336 PLUS II drive.

The example program shows how to obtain status information from the drive and how to control it (e.g., starting the drive, stopping the drive, jogging the drive, sending reference, and clearing faults). When you understand this example, you should be able to customize the program to fit your application needs.

The example assumes that there is an operator's station wired to an I/O module in slot zero of module group zero of rack zero.

IMPORTANT: You may want to verify a device has not failed using word 0 of block transfer 62 before sending control data. If a device has failed, use block transfer 52 to find out which device failed. Refer to the *1771-SDN DeviceNet Scanner Module Manual*, Publication 1771-5.14, for more information.

Figure 5.4 Example PLC Ladder Logic Program

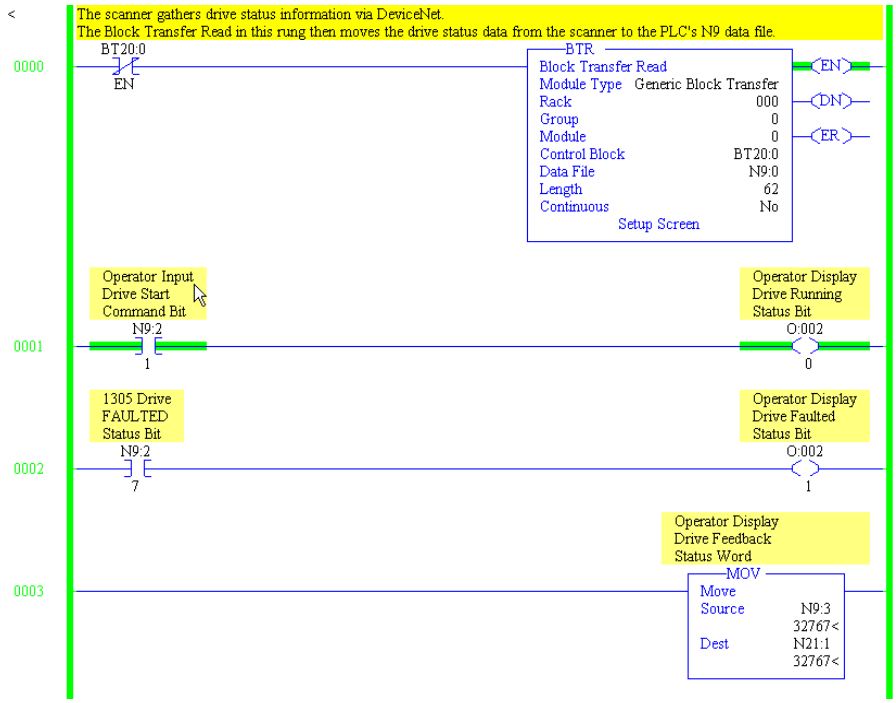
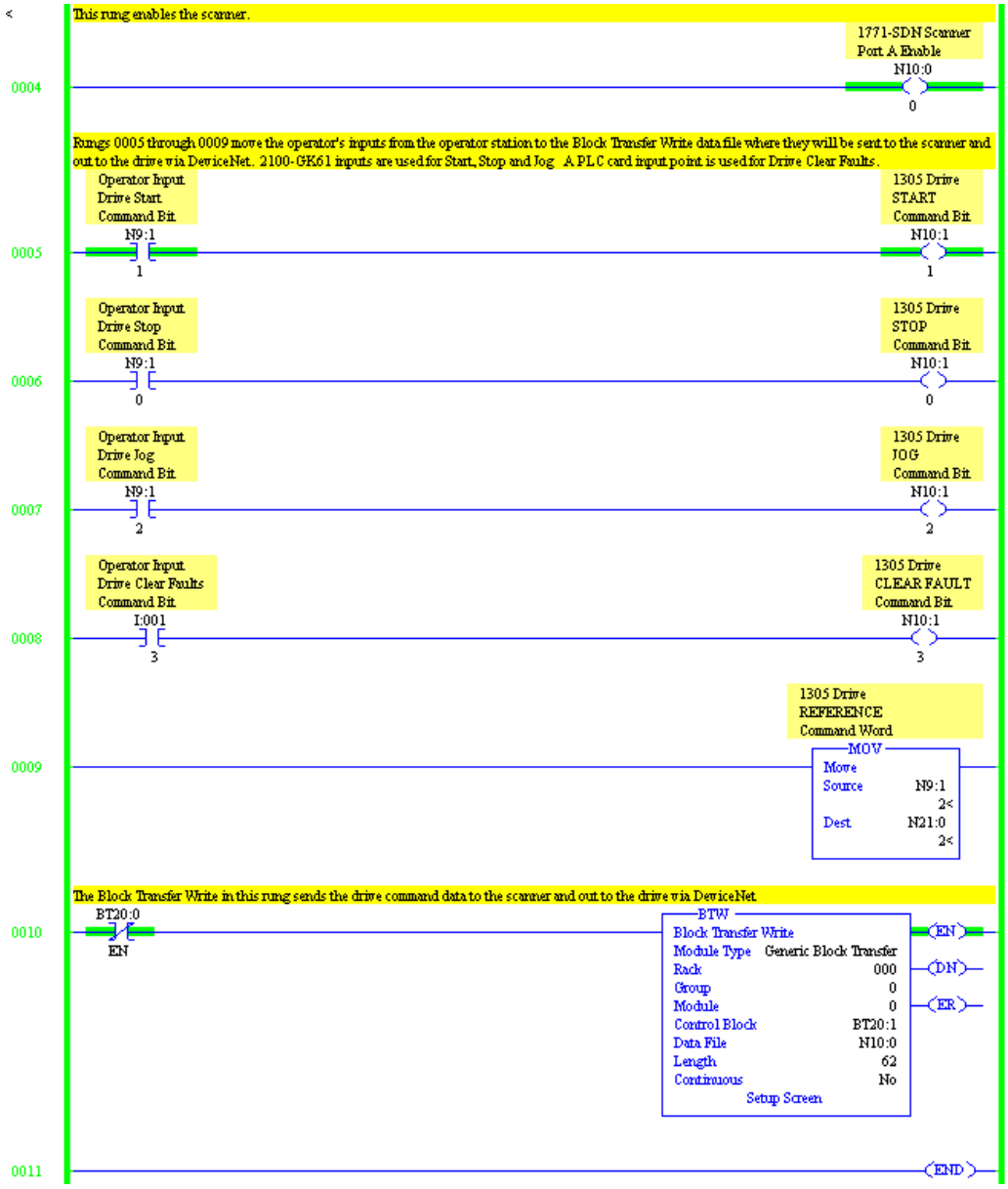


Figure 5.5 Example PLC Ladder Logic Program (continued)



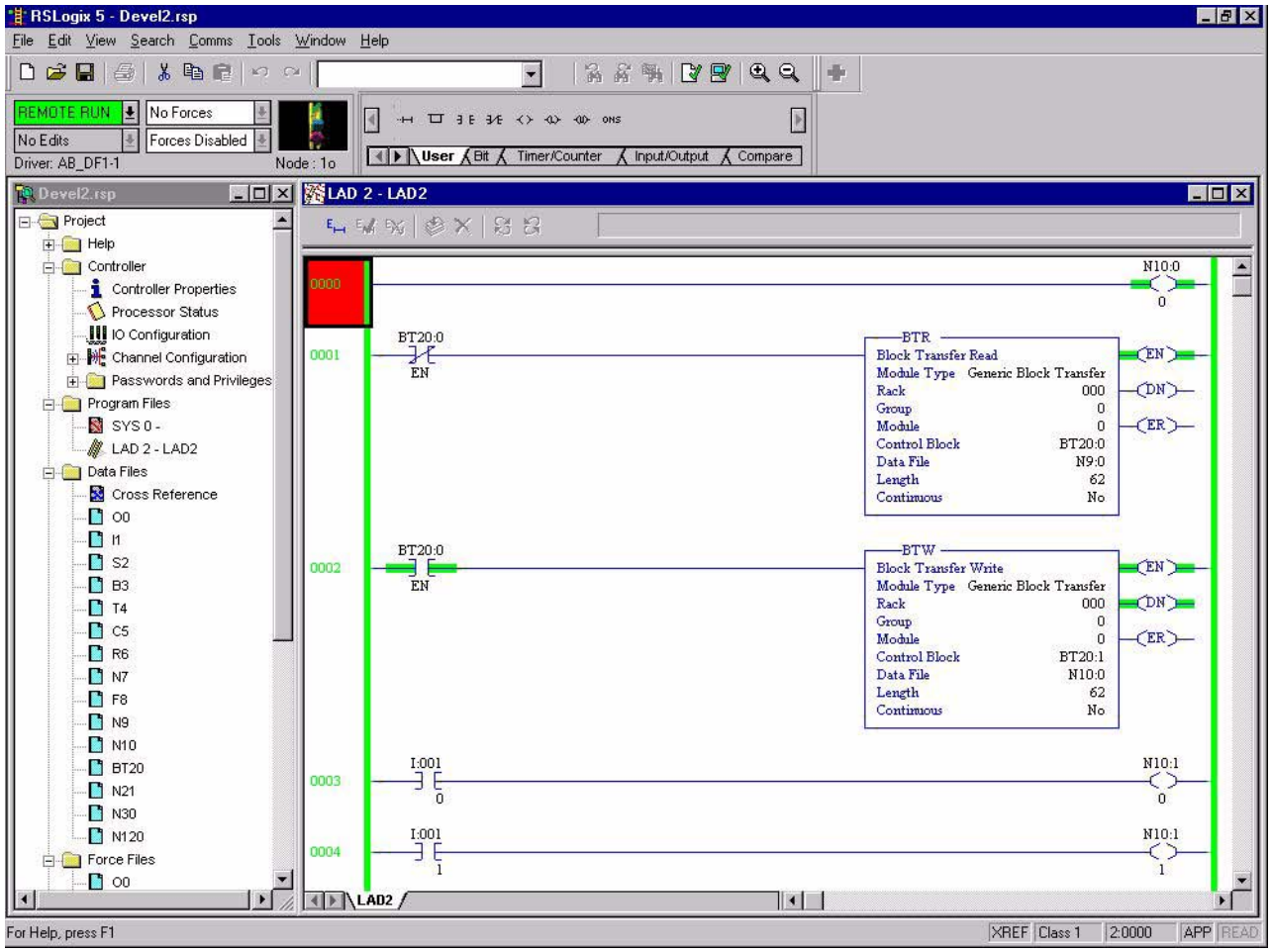
The following table represents the control file for the block transfers.

Offset	EN	ST	DN	ER	CO	EW	NR	TO	RW	RLEN	DLEN	FILE	ELEM	R	G	S
BT20:0	0	0	0	0	0	0	0	0	0	62	0	9	0	00	0	0
BT20:1	0	0	0	0	0	0	0	0	0	62	0	10	0	00	0	0

In the following programming example, a PLC is used to read the inputs of a 2100-GK61 and control the outputs of an SMP-3 electronic overload relay.

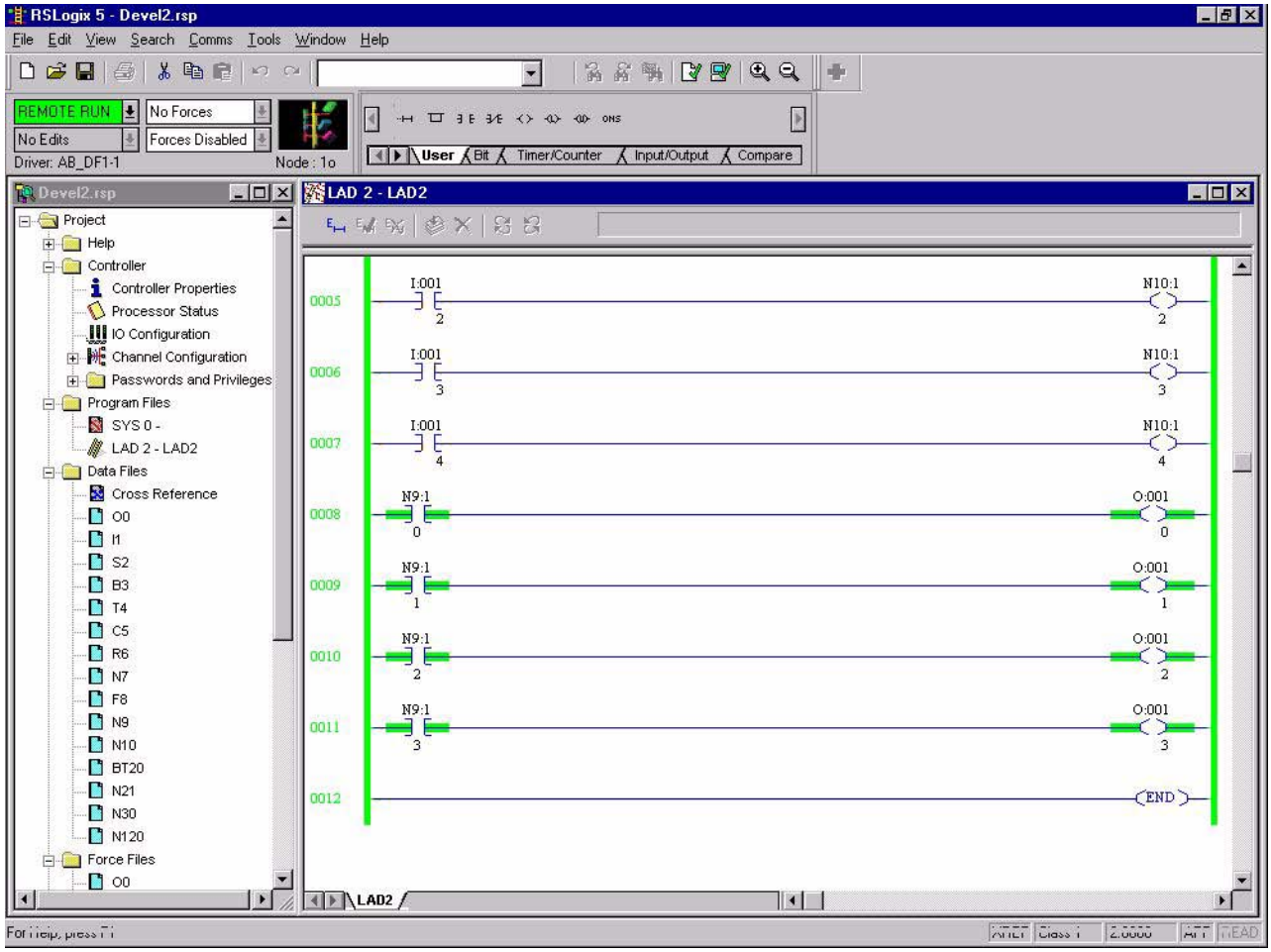
PLC Code: Rung 0 enables scanner; Rungs 1 and 2 are Block Transfer Read & Write. SMP-3 Output A is turned OFF when I:001/0 in Rung 3 is momentarily turned ON. SMP-3 output B is turned OFF when I:001/1 in Rung 4 is momentarily turned ON.

Figure 5.6



PLC Code: SMP-3 is RESET when I:001/4 in Rung 5 is turned ON. SMP-3 Output A is turned ON when I:001/3 in Rung 6 is momentarily turned ON. SMP-3 output B is turned ON when I:001/4 in Rung 7 is momentarily turned ON. Rungs 8-11 read GK61 inputs and turn on respective LED in SIM card located in PLC Chassis Slot 1.

Figure 5.7



SLC Ladder Logic Program Example

The following example uses an SLC-5/03, a 1747-SDN DeviceNet scanner, and a 2100-GK61 to control a 1336 PLUS, 1336 PLUS II or 1305 drive.

The example assumes that there is an operator's station wired to an I/O module in slot two of module group zero of rack zero.

IMPORTANT: You may want to verify a device has not failed using word I:S.0. If a device has failed, read the appropriate M1 File to find out which device failed. Refer to the *1747-SDN DeviceNet Scanner Module Manual*, Publication 1747-5.8, for more information.

Figure 5.8 Example SLC Ladder Logic Program (continued on next page - 5-14

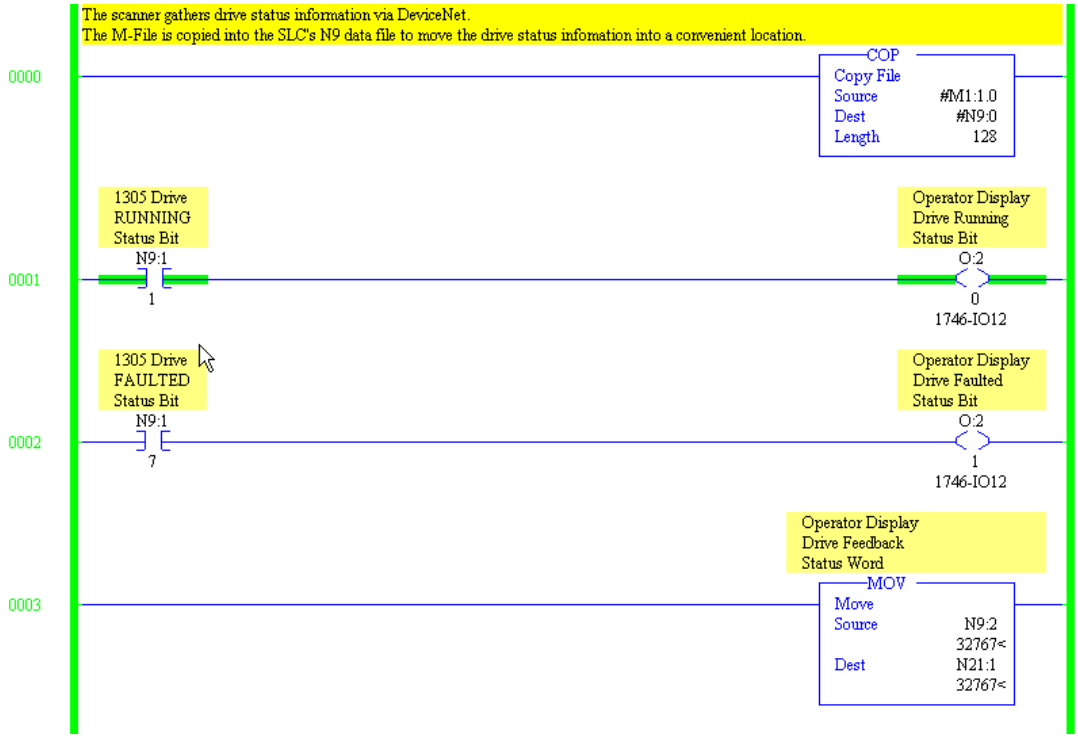
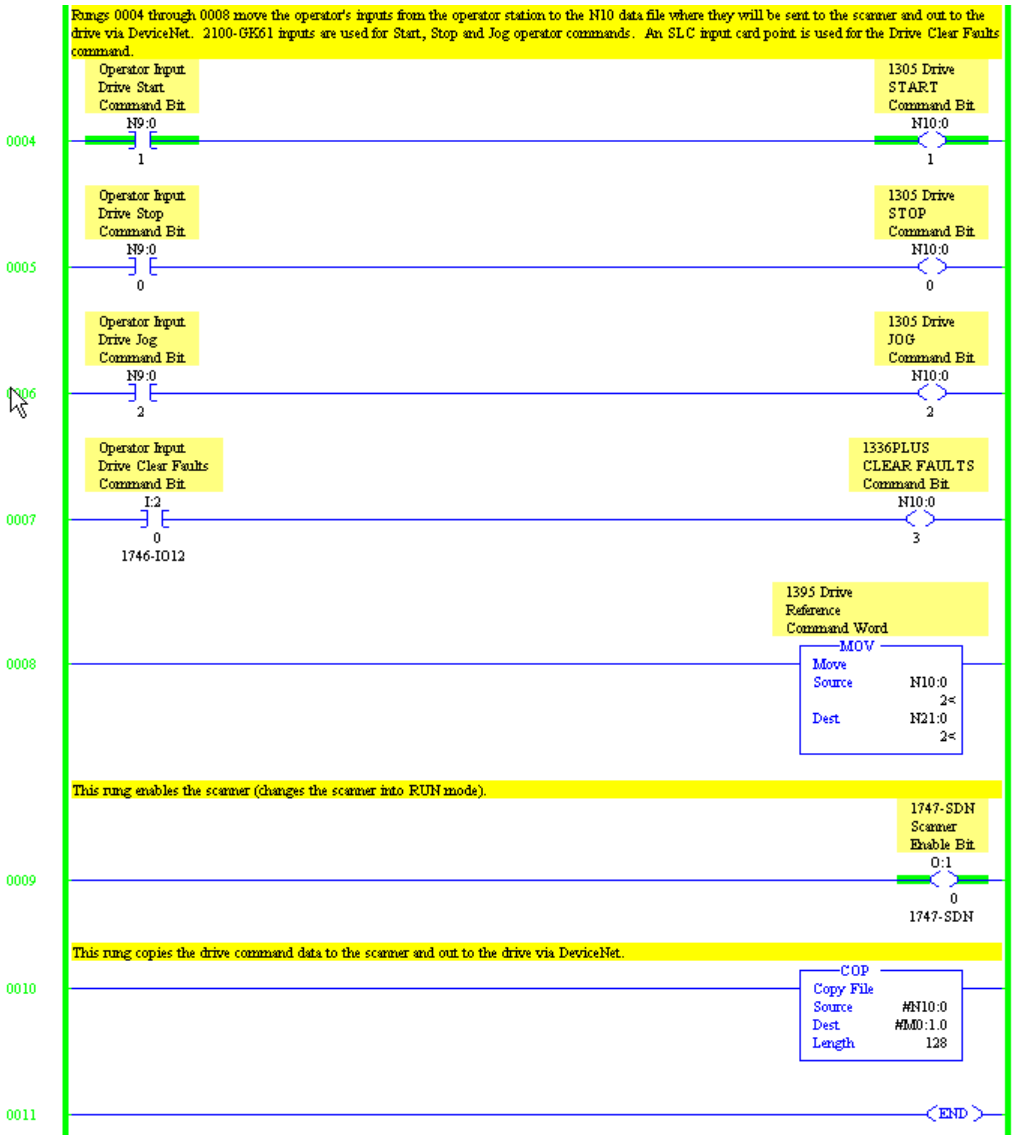


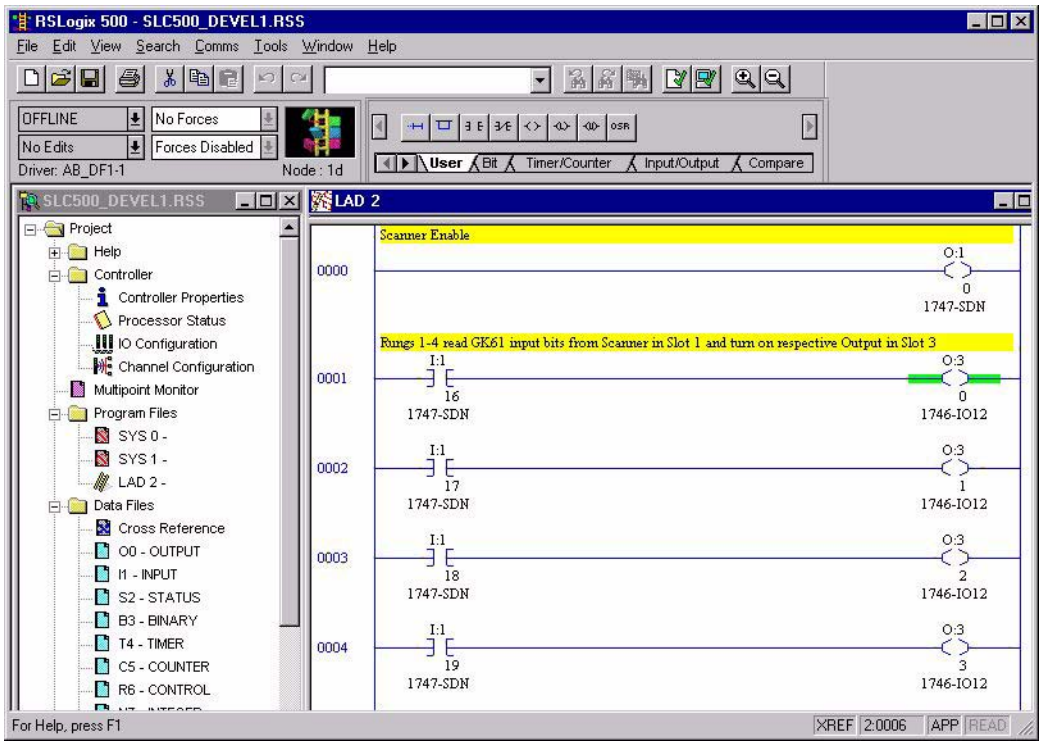
Figure 5.9 Example SLC Ladder Logic Program (continued)



The following programming example shows how to read 2100-GK61 inputs and control SMP-3 outputs with an SLC-500.

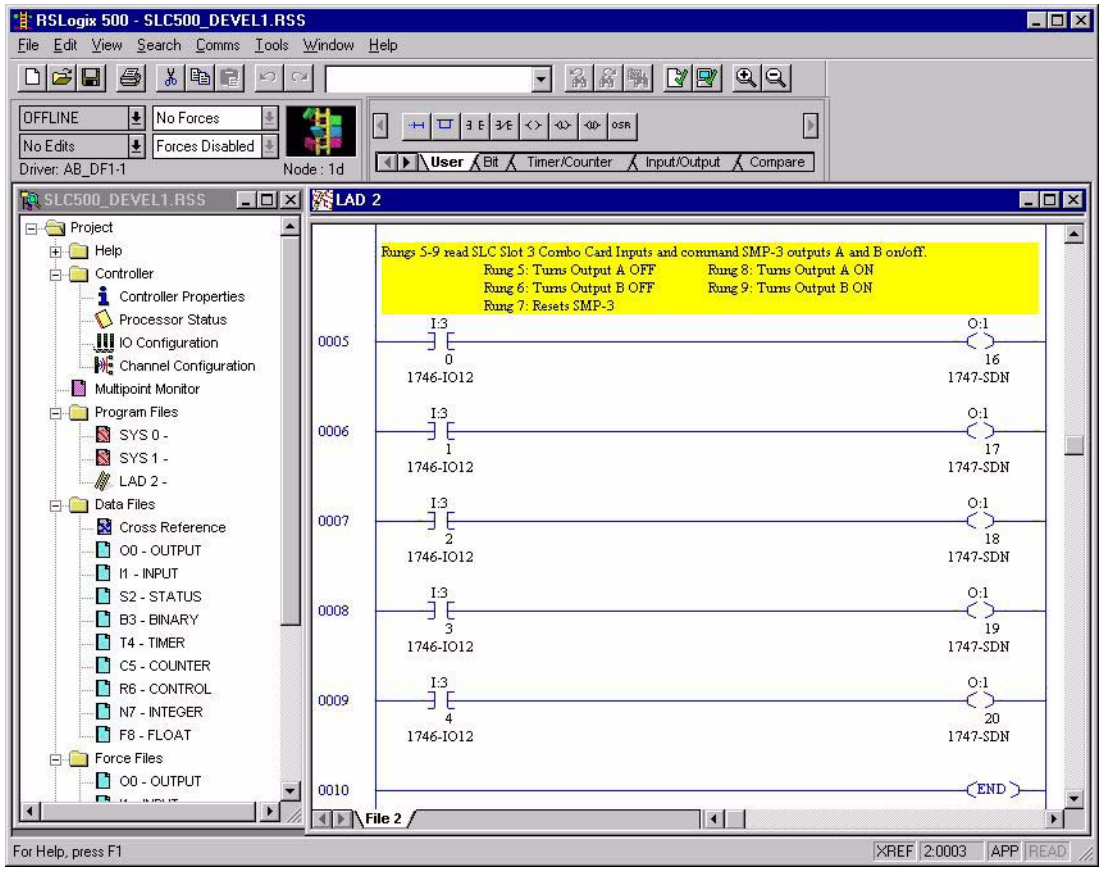
SLC Code: Rung 0 enables scanner; Rungs 1 through 4 read 2100-GK61 inputs and turn on respective output in Slot 3 I/O Card.

Figure 5.10



SLC Code: SMP-3 output A is turned OFF when Slot 3, Input 0 is true in Rung 5. SMP-3 output B is turned OFF when Slot 3, Input 1 is true in Rung 6. In Rung 7, SMP-3 is reset when input 2 of Slot 3 input card is true. Rungs 8 and 9 illustrate how SMP-3 outputs A and B are respectively turned ON when Inputs 3 and 4 of I/O card in slot 3 are true.

Figure 5.11



ControlLogix Programming Example

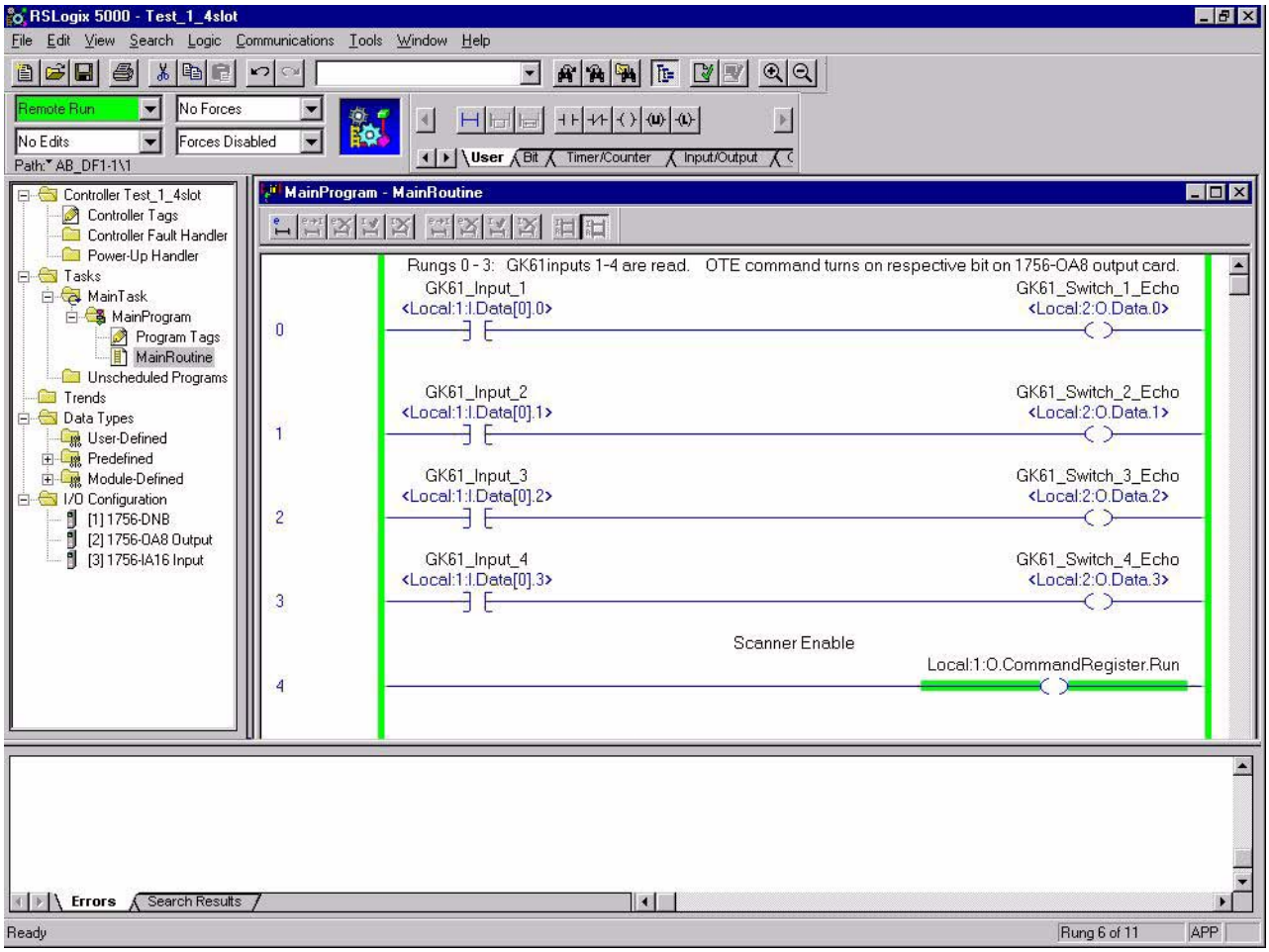
Unlike PLC and SLC programs, the ControlLogix utilizes a tag-based technique.

A ControlLogix is used to read 2100-GK61 inputs and control the outputs of an SMP-3 electronic overload relay.

Rungs 0 through 3 illustrate XIC (Examine if Closed) input instructions. Each 2100-GK61 input can be read by examining Scanner in slot 1. Therefore, the first input is Local:1:I.Data[0].0. The second input is located at Local:1:I.Data[0].1. In this example, status of each 2100-GK61 input is annunciated by the first four bits of the output card in slot 2. The first output is addressed as Local:2:O.Data.0.

Rung 4 enables the Scanner.

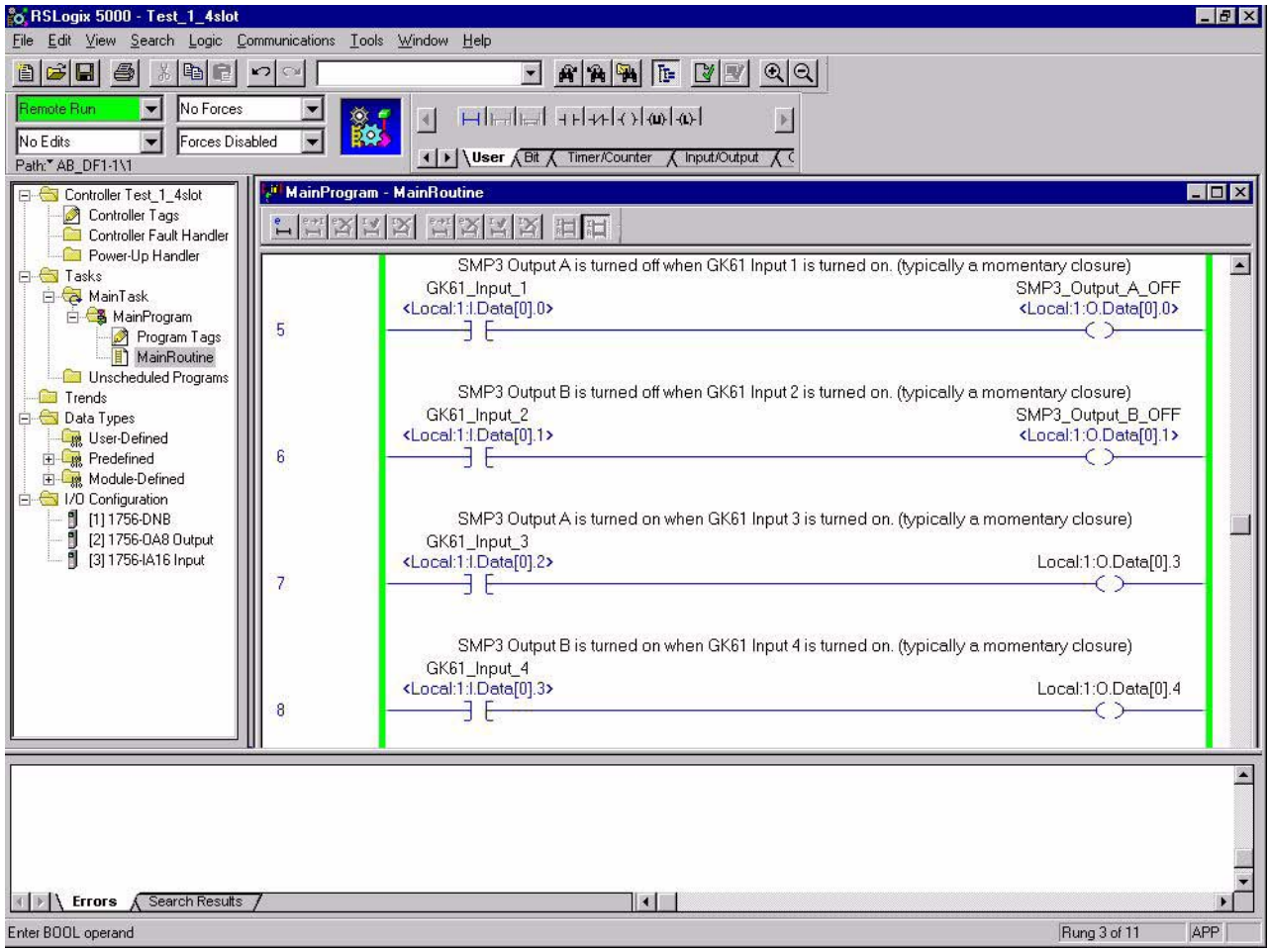
Figure 5.12



Rungs 5 through 8 also read 2100-GK61 inputs. In this case, however, control information is being sent to an area of the Scanner where SMP-3 Command Word is located. Commands pass through ScanPort to SMP-3, where Outputs A and B are turned on or off. For example, when 2100-GK61 input 3 is momentarily turned on in rung 7, SMP-3 Output A is energized via Local:1:0:Data[0].3.

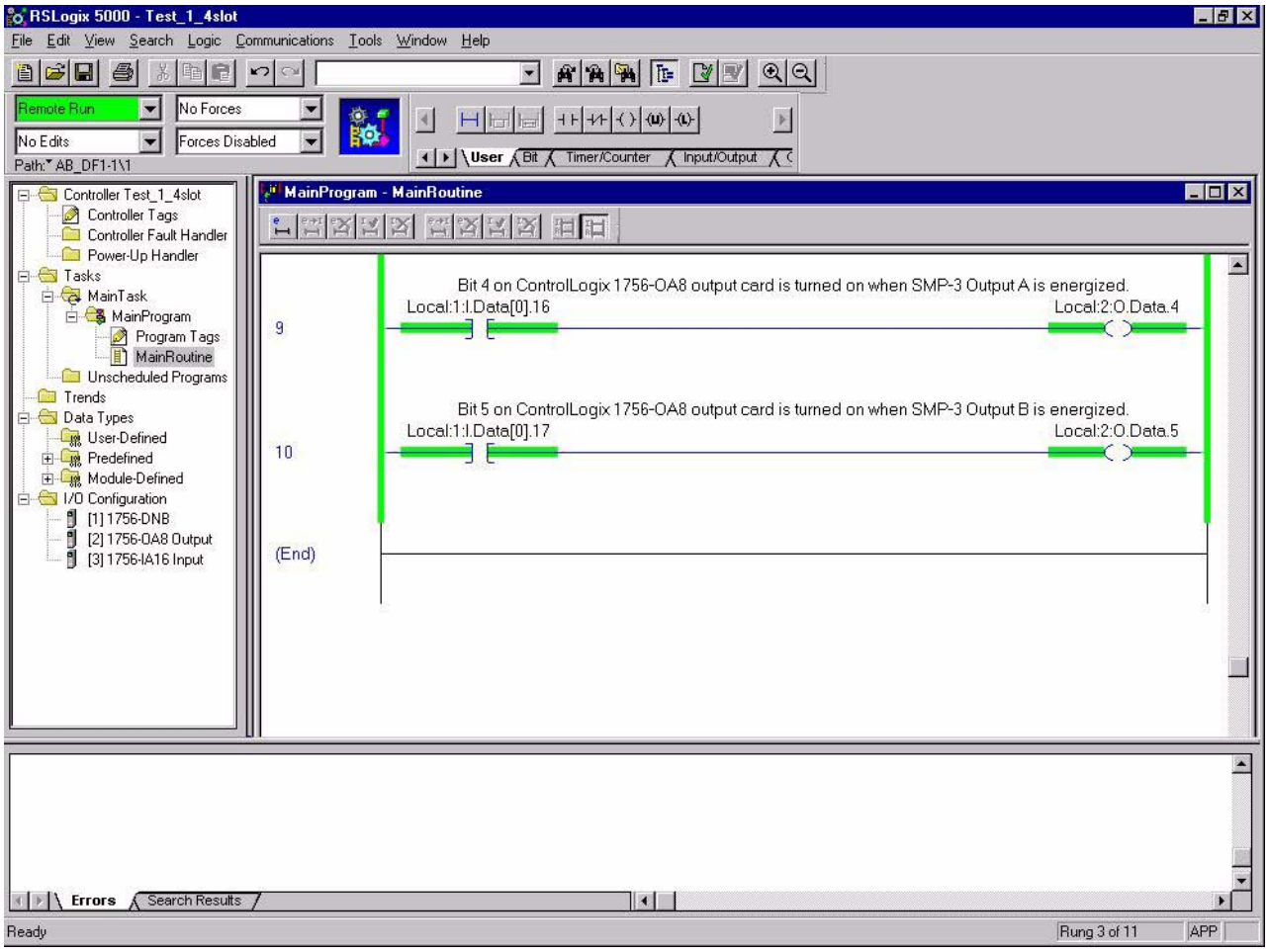
See Logic Control Data and Status Data tables from the SMP-3 manual on the last page of this Tech Note.

Figure 5.13



Rungs 9 and 10 show how SMP-3 Status Word information is read. The Output card in slot 2 shows status at bits 4 and 5.

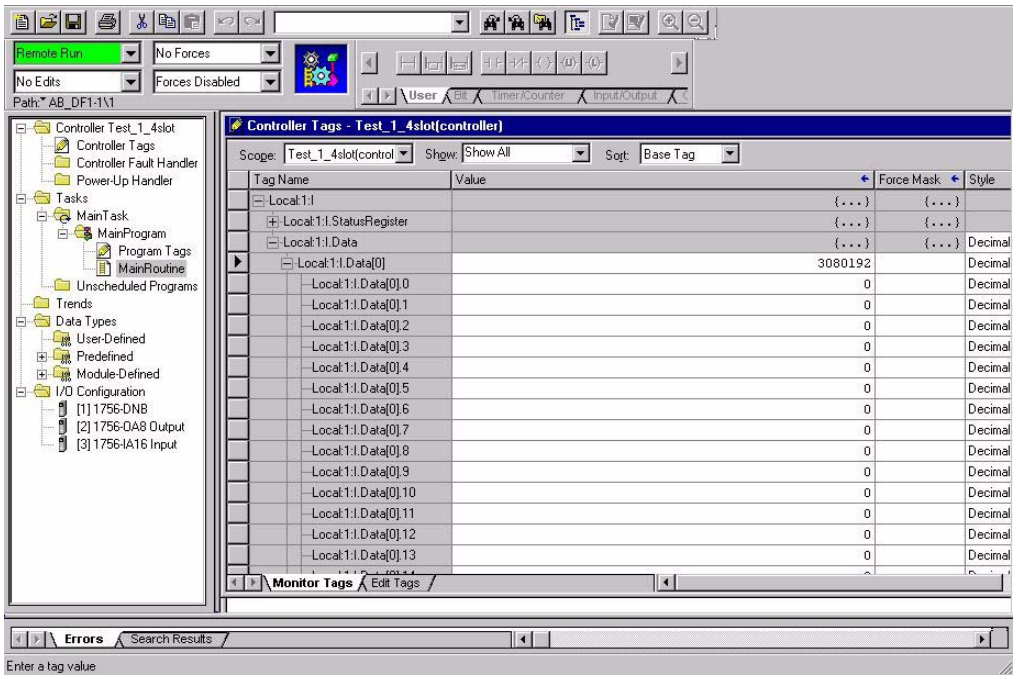
Figure 5.14



The next word after Status word is analog information from SMP-3. Average Current, Current Imbalance, Thermal Capacity Utilized, and Full Load Current Setting can be monitored. The parameter to be monitored is selected by logic state of bits 13-15 in the Logix Control Word.

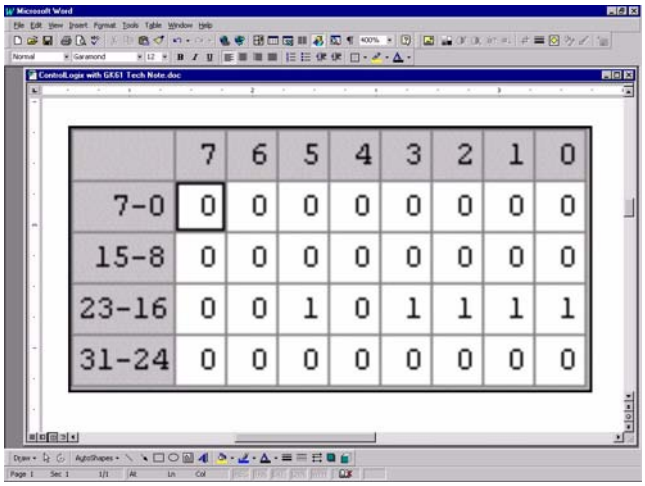
Input and Output states can be seen by selecting "Monitor Tag" Screen shown below.

Figure 5.15



Clicking on the appropriate tag can provide additional bit-level data.

Figure 5.16



	7	6	5	4	3	2	1	0
7-0	0	0	0	0	0	0	0	0
15-8	0	0	0	0	0	0	0	0
23-16	0	0	1	0	1	1	1	1
31-24	0	0	0	0	0	0	0	0

***** End of Chapter 5 *****

COS (Change of State) Allocation

When you set up a COS allocation, the scanner will send output data to the adapter when the data changes. If no changes occur the scanner will send the output data to the adapter at a constant rate (called a heartbeat). To use COS, you must enable COS in the adapter and in the scanner.

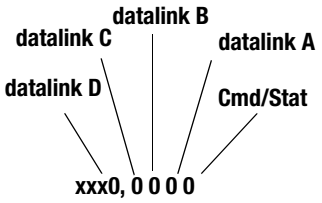
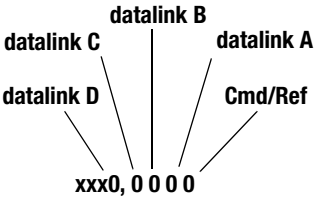
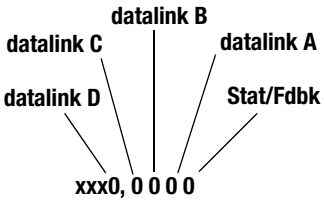
Enabling COS in the Adapter

1. Enable the desired I/O and datalinks (parameters 4 – 8).
2. Set the *M-S Input* (24) parameter. Refer to the "M-S Input Parameter Configurations" section in this chapter.
3. Set the *M-S Output* (25) parameter. Refer to the "M-S Output Parameter Configurations" section in this chapter.
4. Ensure the *Cmd/Stat Config* (4) parameter is **On**.
5. Ensure the lowest bit in the *M-S Output* (25) parameter is set to **1**. For example, xxx0, 0001. This enables status/feedback to be sent over the slave connection.
6. Set the *COS Status Mask* (26) parameter to specify which bits in the logic status word will trigger a message to the scanner when changed. (0 = do not check the corresponding bit.)
7. Set the *COS Fdbk Change* (27) parameter to specify the amount of change required in the reference word needed to trigger a message to the scanner. (0 = do not check the corresponding bit.)
8. Reset the adapter by setting the *Reset Adapter* (22) parameter to **Enable**.

Enabling COS in the Scanner

Use RSNetWorx to enable COS in the scanner. Refer to Chapter 4, *Configuring a Scanner to Communicate with the Adapter,* for more information on configuring the scanner.

COS must be enabled in the **Edit Device I/O Parameters** dialog box.

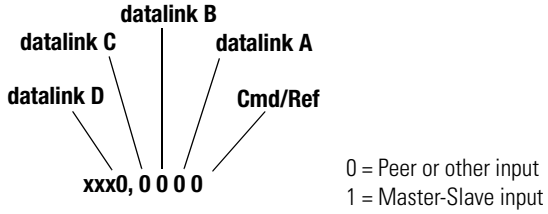
#	Name	Valid Values/ Settings	Default	Writable	Reset or Power Cycle	Description
22	Reset Adapter	Ready Enable Set Defaults	Ready	Yes	No	Ready = No change or reset. Enable = Resets the module. Set Defaults = Sets all parameters to their factory-default values.
23	Active I/O Cfg	0 or 1 for each bit	N/A	No	No	Displays what I/O is activated in the adapter.  0 = Off. 1 = On.
24	M-S Input	0 or 1 for each bit	xxx0, 0001	Yes	Yes	Determines the source of the bits for input.  0 = Peer or other input. 1 = Master-Slave input. For more information, refer to the "M-S Input Parameter Configurations" section in this chapter.
25	M-S Output	0 or 1 for each bit	xxx0, 0001	Yes	Yes	Determines the source of the bits for output.  0 = Peer or other output. 1 = Master-Slave output. For more information, refer to the "M-S Output Parameter Configurations" section in this chapter.

IMPORTANT: For information on accessing and editing parameters, refer to Chapter 3, *Configuring the DeviceNet to SCANport Communication Module with Digital Inputs.*

M-S Input Parameter Configurations

The *M-S Input* (24) parameter has the following five configurable bits.

Figure 5 Bits and Corresponding I/O



When you enable the *Cmd/Stat* (4) or *datalink* (5-8) parameter(s) in the adapter, you must set the corresponding bit in the *M-S Input* (24) parameter if you want the input data to come from the scanner or master device.

The following table lists possible configurations for the *M-S Input* (24) parameter and the types of allocation associated with each.

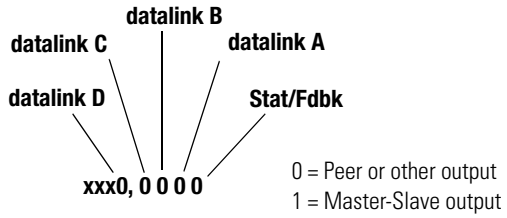
ADAPTER CONFIGURATION		ALLOCATION (Number Of Words)				
		Data Size Sent From The Controller To The Adapter				
M-S Input	M-S Output	Poll Only	COS Only	Cyclic Only	Poll & COS	Poll & Cyclic
00000	xxxx0	0	NA	NA	NA	NA
00001	xxxx0	2	NA	NA	NA	NA
00010	xxxx0	2	NA	NA	NA	NA
00011	xxxx0	4	NA	NA	NA	NA
00100	xxxx0	2	NA	NA	NA	NA
00101	xxxx0	4	NA	NA	NA	NA
00110	xxxx0	4	NA	NA	NA	NA
00111	xxxx0	6	NA	NA	NA	NA
01000	xxxx0	2	NA	NA	NA	NA
01001	xxxx0	4	NA	NA	NA	NA
01010	xxxx0	4	NA	NA	NA	NA
01011	xxxx0	6	NA	NA	NA	NA
01100	xxxx0	4	NA	NA	NA	NA
01101	xxxx0	6	NA	NA	NA	NA
01110	xxxx0	6	NA	NA	NA	NA

ADAPTER CONFIGURATION		ALLOCATION (Number Of Words)				
		Data Size Sent From The Controller To The Adapter				
M-S Input	M-S Output	Poll Only	COS Only	Cyclic Only	Poll & COS	Poll & Cyclic
01110	xxxx1	6	6	6	6/0	6/0
01111	xxxx1	8	8	8	8/0	8/0
10000	xxxx1	2	2	2	2/0	2/0
10001	xxxx1	4	4	4	4/0	4/0
10010	xxxx1	4	4	4	4/0	4/0
10011	xxxx1	6	6	6	6/0	6/0
10100	xxxx1	4	4	4	4/0	4/0
10101	xxxx1	6	6	6	6/0	6/0
10110	xxxx1	6	6	6	6/0	6/0
10111	xxxx1	8	8	8	8/0	8/0
11000	xxxx1	4	4	4	4/0	4/0
11001	xxxx1	6	6	6	6/0	6/0
11011	xxxx1	8	8	8	8/0	8/0
11100	xxxx1	6	6	6	6/0	6/0
11101	xxxx1	8	8	8	8/0	8/0
11110	xxxx1	8	8	8	8/0	8/0
11111	xxxx1	10	10	10	10/0	10/0

M-S Output Parameter Configurations

The *M-S Output* parameter has the following five configurable bits.

Figure 6 Bits and Corresponding I/O



When you enable the *Cmd/Stat* (4) or *datalink* (5-8) parameter(s) in the adapter, you must set the corresponding bit in the *M-S Output* (25) parameter if you want the output data to be sent to the scanner or master device.

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