RELIANCE ELECTRIC

Interbus™ Communications Module

M/N RECOMM-IBUS

Instruction Manual D2-3480-1

Rockwell Automation

The information in this manual is subject to change without notice.

Throughout this manual, the following notes are used to alert you to safety considerations:

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

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

The thick black bar shown on the outside margin of this page will be used throughout this instruction manual to signify new or revised text or figures.

ATTENTION: The drive may contain high voltages that can cause injury or death. Remove all power from the drive, and then verify power has been removed before installing or removing an Interbus module. Failure to observe these precautions could result in severe bodily injury or loss of life.

ATTENTION: Only qualified electrical personnel familiar with drive and power products and the associated machinery should plan or implement the installation, start up, configuration, and subsequent maintenance of the product using an Interbus module. Read and understand this manual in its entirety before proceeding. Failure to observe these precautions could result in bodily injury and/or damage to equipment.

ATTENTION:DPI host products must not be directly connected together via RECBL-xxx cables. Unpredictable behavior due to timing and other internal procedures can result if two or more devices are connected in this manner. Failure to observe this precaution could result in bodily injury and/or damage to equipment.

ATTENTION: Comm Flt Action (6) lets you determine the action of the module and connected drive if communications are disrupted. By default, this parameter faults the drive. You can set this parameter so that the drive continues to run. Precautions should be taken to ensure that the setting of this parameter does not create a hazard of injury or equipment damage. Failure to observe this precaution could result in bodily injury and/or damage to equipment.

ATTENTION: When a system is configured for the first time, there may be unintended or incorrect machine motion. Disconnect the motor from the machine or process during initial system testing. Failure to observe this precaution could result in bodily injury and/or damage to equipment.

ATTENTION: If the Interbus module is transmitting control I/O to the drive, the drive may fault when you reset the module. Determine how your drive will respond before resetting the module. Failure to observe this precaution could result in bodily injury and/or damage to equipment

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CHAPTER 1
Introduction

The Interbus™ module (RECOMM-IBUS) is an embedded communication option for DPI™ AC drives, such as the SP600™ drive. The module is mounted in the drive and receives its required power from the drive and from the network.

The module can be used with other products that implement DPI, a peripheral communication interface. Refer to the documentation for your product for specific information about how it works with the module.

This manual is intended for qualified electrical personnel familiar with installing, programming, and maintaining AC drives and networks.

1.1 Interbus Module Features

The Interbus module features the following:

- A number of configuration tools that can be used to configure the module and connected drive. The tools include the LCD Operator Interface Module (OIM) on the drive and drive-configuration software such as VS Utilities™ (version 1.01 or later).
- Status indicators that report the status of the drive communications, module, and network. They are visible both when the cover is opened and when it is closed.
- I/O, including Logic Command/Reference and up to four pairs of Datalinks, that may be configured for your application using a parameter.
- Explicit messages (PCP Read/Write.)
- User-defined fault actions that determine how the module and the drive respond to communication disruptions on the network.

1.2 Related Documentation

Refer to the following related publications as necessary for more information. All of the publications are available from **http://www.theautomationbookstore.com**.

- D2-3485 SP600 AC Drive User Manual
- D2-3488 VS Utilities Getting Results Manual
  Online help installed with the software
- 1747-6.2 SLC 500 Modular Hardware Style Installation and Operation Manual
- 1747-6.15 SLC 500 and MicroLogix 1000 Instruction Set

Documentation about the scanner, SST-IBS-SLC User's Guide, Version 1.20, can be obtained online at **http://www.mysst.com/download.**

1.3 Conventions Used in This Manual

The following convention is used throughout this manual:

- Parameters are referenced as follows:

  Parameter Name (Parameter Number)

  For example: DPI Port (1)

1.4 Getting Assistance from Reliance Electric

If you have any questions or problems with the products described in this instruction manual, contact your local Reliance Electric sales office.

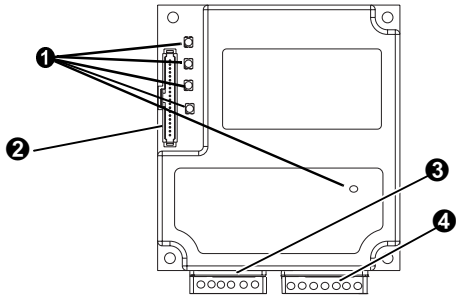
For technical assistance, call 1-800-726-8112.

CHAPTER 2
Getting Started

This chapter provides:

- A description of the Interbus module components
- A list of parts shipped with the module
- A list of user-supplied parts required for installing the module
- An installation checklist

2.1 Interbus Module Components



❶	Status Indicators	Five LEDs that indicate the status of the connected drive, module, and network. Refer to chapter 8, Troubleshooting the Interbus Module and Network, for more information.
❷	DPI Connector	A 20-pin, single-row shrouded male header. An Internal Interface cable is connected to this connector and a connector on the drive.
❸	Bus In Interbus Connector	One 6-pin plug-in connector.
❹	Bus Out Interbus Connector	One 7-pin plug-in connector.

Figure 2.1 – Components of the Interbus Module

2.2 Required Equipment

Table 2.1 lists the equipment shipped with the Interbus module. When you unpack the module, verify that the package includes all of these items.

Table 2.1 – Equipment Shipped with the Interbus Module

Item Description
One RECOMM-IBUS Interbus module
A 2.54 cm (1 in) and a 15.24 cm (6 in) Internal Interface cable (only one cable is needed to connect the module to the drive)
LED labels
Interbus Module User Manual (D2-3480)

Table 2.2 lists user-supplied equipment also required to install and configure the Interbus module.

Table 2.2 – Required User-Supplied Equipment

Item Description
A small flathead screwdriver
A grounding wrist strap
Interbus cable
Configuration tool, such as: • LCD OIM • VS Utilities (version 1.01 or later)   • with RECOMM-232 Serial Converter
Interbus configuration software (CMD)

2.3 Installation Checklist

This section is designed to help experienced users start using the Interbus module. If you are unsure about how to complete a step, refer to the referenced chapter.

✓	Step	Action	Refer to
❒	1	**Review the safety precautions for the module.**	Throughout this manual
❒	2	**Verify that the drive is properly installed.**	SP600 AC Drive User Manual
❒	3	**Install the module.** Verify that the drive is not powered. Then, connect the module to the network using a Interbus cable and to the drive using the Internal Interface cable. Use the captive screws to secure and ground the module to the drive.	Chapter 3, Installing the Interbus Module
❒	4	**Apply power to the module.** The module receives power from the drive. Apply power to the drive. Refer to chapter 8, Troubleshooting the Interbus Module and the Network, if there is a problem.	Chapter 3, Installing the Interbus Module
❒	5	**Configure the module for your application.** Set the parameters for the following features as required by your application: • I/O configuration. • Fault actions.	Chapter 4, Configuring the Interbus Module
❒	6	**Apply power to the Interbus master and other devices on the network.** Verify that the master and network are installed and functioning in accordance with Interbus standards, and then apply power to them.	
❒	7	**Configure the scanner to communicate with the module.** Use a network tool for Interbus to configure the master on the network.	Chapter 5, Configuring the Interbus Scanner
❒	8	**Create a ladder logic program.** Use a programming tool to create a ladder logic program that enables you to do the following: • Control the module and connected drive. • Monitor or configure the drive using Explicit Messages.	Chapter 6, Using I/O Messaging. Chapter 7, Using Explicit Messaging (Parameter Protocol)

CHAPTER 3

Installing the Interbus Module

Chapter 3 provides instructions for installing the Interbus module on an SP600 drive.

3.1 Preparing for an Installation

Before installing the Interbus module, verify that you have all required equipment. Refer to chapter 2, Getting Started, for a list of equipment.

ATTENTION: The Interbus module contains ESD- (Electrostatic Discharge) sensitive parts that can be damaged if you do not follow ESD control procedures. Static control precautions are required when handling the module. Failure to observe these precautions could result in damage to equipment.

3.2 Connecting the Module to the Network

ATTENTION: The drive may contain high voltages that can cause injury or death. Remove all power from the drive, and then verify power has been removed before installing or removing an Interbus module. Failure to observe these precautions could result in severe bodily injury or loss of life.

Step 1. Remove power from the drive.

Step 2. Use static control precautions.

Step 3. Route the Interbus cables through the bottom of the SP600 drive. (See figure 3.1.)

Step 4. Connect the Interbus connectors to the cables. (See figure 3.1 and tables 3.1 and 3.2.)

Table 3.1 – Bus In Connector (From Previous Node on the Network)

Terminal	Name	Description
1	/DO1	Receive
2	DO1	Receive
3	/DI1	Transmit
4	DI1	Transmit
5	GND	Ground Connection
6	PE	Protective Earth

Table 3.2 – Bus Out Connector (To Next Node on the Network)

Terminal	Name	Description
1	/DO2	Receive
2	DO2	Receive
3	/DI2	Transmit
4	DI2	Transmit
5	GND[1]	Ground Connection
6	RBST[1]	Termination
7	PE	Protective Earth

[1] Connect GND to RBST if the module is NOT the last module on the bus. If the connection is not made, the module will terminate the outgoing bus.

See figure 3.1 for an explanation of wiring an Interbus network.

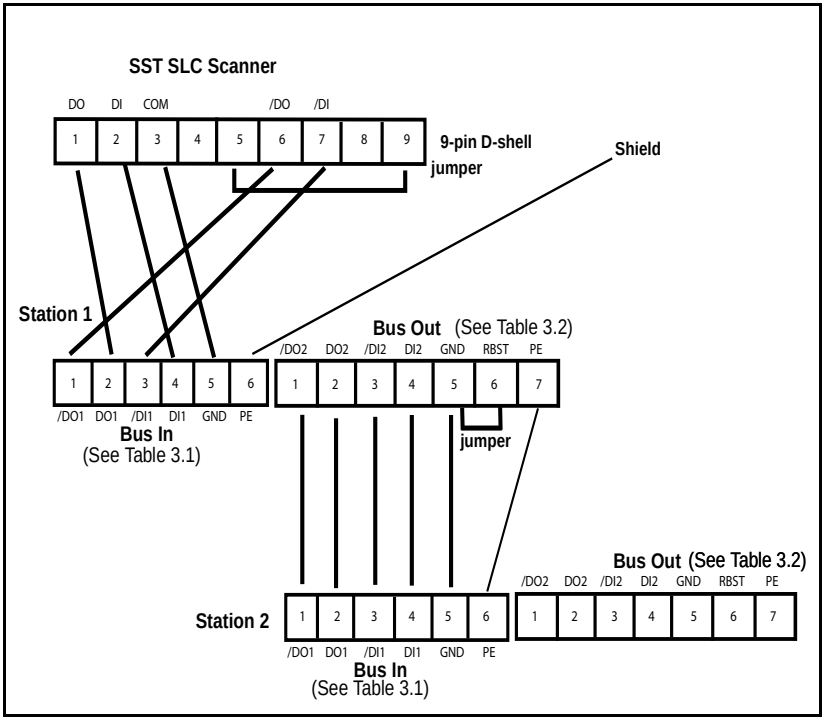


Figure 3.1 – Sample Network Wiring

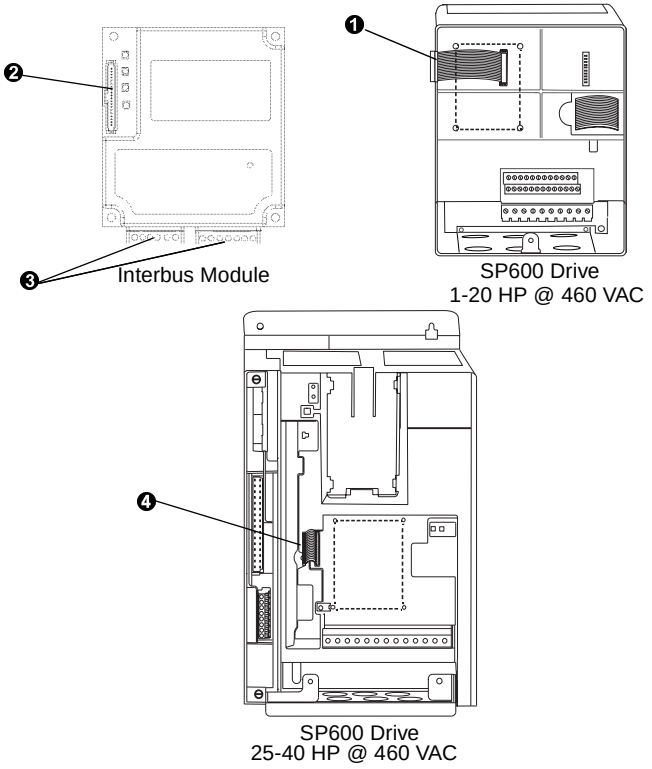
Step 5. Connect the Interbus connector to the module.

3.3 Connecting the Module to the Drive

Step 1. Remove power from the drive.

Step 2. Use static control precautions.

Step 3. Connect the Internal Interface cable to the DPI port on the drive and then to the DPI connector on the module.



#	**Description**
❶	15.24 cm (6 in) Internal Interface cable
❷	DPI Connector
❸	Interbus Connectors
❹	2.54 cm (1 in) Internal Interface Cable

Figure 3.2 – DPI Ports and Internal Interface Cables

Step 4. For 1-20 HP SP600 drives: Fold the Internal Interface cable behind the module and mount the module on the drive using the four captive screws to secure and ground it to the drive. See figure 3.2.

For 25-40 HP SP600 drives: Mount the module in the drive using the four captive screws to secure and ground it to the drive.

Important: All screws must be tightened to ground the module.

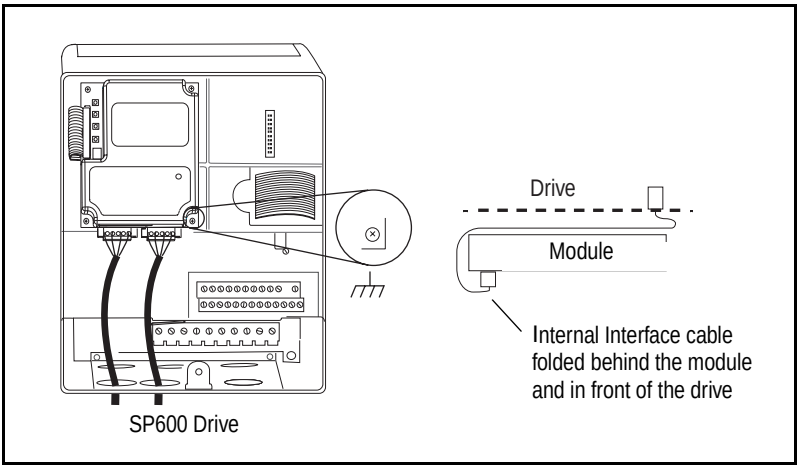


Figure 3.1 – Mounting and Grounding the Interbus Module

3.4 Applying Power

ATTENTION: Unpredictable operation may occur if parameter settings and switch settings are not compatible with your application. Verify that settings are compatible with your application before applying power to the drive. Failure to observe these precautions could result in severe bodily injury or loss of life.

Step 1. Close the door or reinstall the cover on the drive. Key status indicators can be viewed on the front of the drive after power has been applied.

Important: Interbus compliance requires different LED functions than what is normally displayed on the front of the drive (DRIVE, MS, Net A, and Net B LEDs). LED labels are provided with the module for application to the drive cover.

Step 2. Apply power to the SP600 drive. The module receives its power from the connected drive. When you apply power to the product for the first time, the status indicators should be green or off after initialization. Refer to chapter 8, Troubleshooting the Interbus Module and Network, for more information.

Step 3. Apply power to the master device and other devices on the network.

CHAPTER 4

Configuring the Interbus Module

Chapter 4 provides instructions and information for setting the parameters in the module.

For a list of parameters, refer to Appendix B, Interbus Module Parameters. For definitions of terms in this chapter, refer to the Glossary.

4.1 Configuration Tools

The Interbus module stores parameters and other information in its own non-volatile memory. Therefore, you must access the module to view and edit its parameters. Table 4.1 lists the tools that can be used to access the module parameters.

Table 4.1 – Configuration Tools

Tool	Refer to:
VS Utilities Software (version 1.01 or later)	VS Utilities online help
LCD OIM	Section 4.2

4.2 Using the LCD OIM to Configure the Module

Use the procedure in figure 4.1 to access the parameters on the Interbus module using the LCD OIM. If you are unfamiliar with the operation of the LCD OIM, refer to the SP600 AC Drive User Manual (D2-3485) for more information.

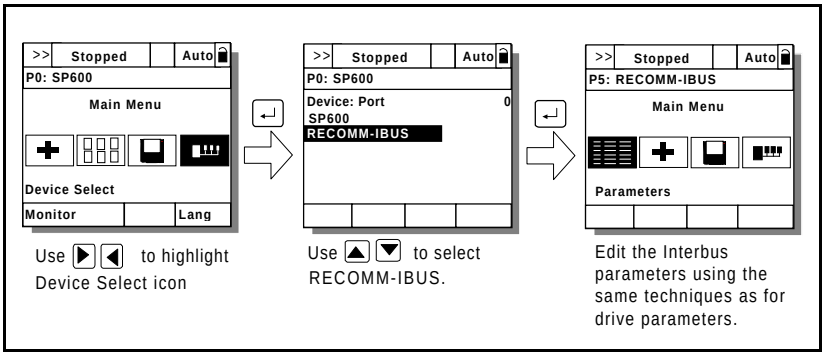
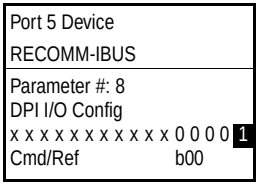


Figure 4.1 – Accessing the Interbus Parameters using the LCD OIM

4.3 Setting the I/O Configuration

The I/O configuration determines the data that is sent to and from the drive. This is a two part process: enabling/disabling the data transmitted between the module and drive, and identifying the data transmitted between the module and the scanner.

Step 1. Enable or disable the data transmitted between the module and drive by setting the bits in DPI I/O Config (8). A “1” enables the I/O. A “0” disables the I/O.



LCD OIM Screen

Bit	Description
0	Logic Command/Reference (Default)
1	Datalink A
2	Datalink B
3	Datalink C
4	Datalink D
5 - 16	Not Used

Figure 4.2 – I/O Configuration Screen on an LCD OIM

Bit 0 is the right-most bit. In figure 4.2, it is highlighted and equals “1.”

Step 2. If Logic Command/Reference is enabled, configure the parameters in the drive to accept the Logic and Reference from the module. For example, set Speed Ref A Sel (90) in an SP600 drive to “Network” so that the drive uses the Reference from the module. Also, verify that the mask parameters (for example, Manual Mask (286)) in the drive are configured to receive the desired logic from the module.

Step 3. If you enabled one or more Datalinks, configure parameters in the drive to determine the source and destination of data in the Datalink(s). Also, ensure that the Interbus module is the only module using the enabled Datalink(s).

Step 4. Interbus requires the network I/O mapping to be configured first in the module. CMD software will read this configuration online when it is configuring the scanner.

Process Input Data Description (PIDD) words map input data on the network (data seen as inputs to the scanner and controller program). Example input data includes Logic Status, Feedback and Datalinks (Datalink x1 Out). Up to 9 words of input data can be mapped.

Process Output Data Description (PODD) words map output data on the network (data sent as outputs from the scanner and controller program). Example output data includes Logic Command, Reference and Datalinks (Datalink x1 In). Up to 9 words of output data can be mapped.

Table 4.2 lists the indexes used to select the I/O data.

Table 4.2 – PIDD / PODD Indexes

Input			Output		
Value (Hex)	**Value (Dec)**	**Selects**	**Value (Hex)**	**Value (Dec)**	**Selects**
2F9A	12186	Logic Status	2F98	12184	Logic Command
2F9B	12187	Feedback	2F99	12185	Reference
2FA4	12196	Datalink A1 Out	2F9C	12188	Datalink A1 In
2FA5	12197	Datalink A2 Out	2F9D	12189	Datalink A2 In
2FA6	12198	Datalink B1 Out	2F9E	12190	Datalink B1 In
2FA7	12199	Datalink B2 Out	2F9F	12191	Datalink B2 In
2FA8	12200	Datalink C1 Out	2FA0	12192	Datalink C1 In
2FA9	12201	Datalink C2 Out	2FA1	12193	Datalink C2 In
2FAA	12202	Datalink D1 Out	2FA2	12194	Datalink D1 In
2FAB	12203	Datalink D2 Out	2FA3	12195	Datalink D2 In

To configure the module for Logic Command/Status, Reference/Feedback and the maximum number of Datalinks enabled in see the example in table 4.3.

Table 4.3 – Module I/O Configuration Example

	Parameter #	Name	Value (Hex)	Value (Dec)	Description
Input	20	PIDD W0 Cfg	2F9A	12186	Logic Status (default)
	22	PIDD W1 Cfg	2F9B	12187	Feedback (default)
	24	PIDD W2 Cfg	2FA4	12196	Datalink A1 Out
	26	PIDD W3 Cfg	2FA5	12197	Datalink A2 Out
	28	PIDD W4 Cfg	2FA6	12198	Datalink B1 Out
	30	PIDD W5 Cfg	2FA7	12199	Datalink B2 Out
	32	PIDD W6 Cfg	2FA8	12200	Datalink C1 Out
	34	PIDD W7 Cfg	2FA9	12201	Datalink C2 Out
	36	PIDD W8 Cfg	2FAA	12202	Datalink D1 Out
Output	38	PODD W0 Cfg	2F98	12184	Logic Command (default)
	40	PODD W1 Cfg	2F99	12185	Reference (default)
	42	PODD W2 Cfg	2F9C	12188	Datalink A1 In
	44	PODD W3 Cfg	2F9D	12189	Datalink A2 In
	46	PODD W4 Cfg	2F9E	12190	Datalink B1 In
	48	PODD W5 Cfg	2F9F	12191	Datalink B2 In
	50	PODD W6 Cfg	2FA0	12192	Datalink C1 In
	52	PODD W7 Cfg	2FA1	12193	Datalink C2 In
	54	PODD W8 Cfg	2FA2	12194	Datalink D1 In

Note that Datalink D2 is not used in this example because maximum configuration has been reached. The maximum configuration is shown to illustrate utilizing all 9 words of inputs and 9 words of outputs. Depending on your application needs, any subset of the above example can be implemented.

The corresponding DPI I/O Config (8) setting would be “11111” for all of the above information to transfer between the module and the drive.

Step 5. Reset the module. Refer to the section 4.4.3, Resetting the Module, in this chapter.

The module is ready to receive I/O from the master (i.e., scanner). You must now configure the scanner to recognize and transmit I/O to the module. Refer to chapter 5, Configuring the Interbus Scanner.

4.4 Setting a Fault Action

By default, when communications are disrupted (for example, a cable is disconnected), the drive responds by faulting if it is using I/O from the network. You can configure a different response to communication disruptions using Comm Flt Action (6).

ATTENTION: Comm Flt Action (6) lets you determine the action of the module and connected SP600 drive if communications are disrupted. By default, this parameter faults the drive. You can set this parameter so that the drive continues to run. Precautions should be taken to ensure that the setting of this parameter does not create a hazard of injury or equipment damage. Failure to observe this precaution could result in bodily injury or damage to equipment.

4.4.1 Changing the Fault Action

Set the value of Comm Flt Action (6) to the desired response as shown in table 4.4. See figure 4.3 for a sample LCD OIM Fault Action screen.

Table 4.4 – Selections for Drive Response to Communication Fault

Value	Action	Description
0	Fault (default)	The drive is faulted and stopped. (Default)
1	Stop	The drive is stopped, but not faulted.
2	Zero Data	The drive is sent 0 for output data after a communications disruption. This does not command a stop.
3	Hold Last	The drive continues in its present state after a communications disruption.
4	Send Flt Cfg	The drive is sent the data that you set in the fault configuration parameters, Flt Cfg Logic (10) through Flt Cfg D2 (19).

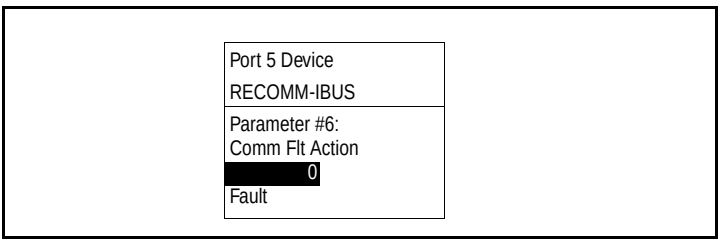


Figure 4.3 – Fault Action Screen on an LCD OIM

Changes to this parameter take effect immediately. A reset is not required.

4.4.2 Setting the Fault Configuration Parameters

If you set Comm Flt Action (6) to “Send Flt Cfg,” the values in the following parameters are sent to the drive after a communications fault occurs. You must set these parameters to values required by your application.

Table 4.5 – Fault Configuration Parameters

Number	Name	Description
10	Flt Cfg Logic	A 16-bit value sent to the drive for Logic Command.
11	Flt Cfg Ref	A 32-bit value (0 – 4294967295) sent to the drive as a Reference or Datalink. **Important:** If the drive uses a 16-bit Reference or 16-bit Datalinks, the most significant word of the value must be set to zero (0) or a fault will occur.
12 – 19	Flt Cfg x1 In	

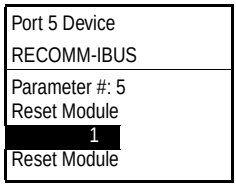
Changes to these parameters take effect immediately. A reset is not required.

4.4.3 Resetting the Module

Changes to switch settings or some module parameters require that you reset the module before the new settings take effect. You can reset the module by cycling power to the drive or by using Reset Module (5).

ATTENTION: If the module is transmitting control I/O to the drive, the drive may fault when you reset the module. Determine how your drive will respond before resetting a connected module. Failure to observe this precaution could result in bodily injury or damage to the equipment.

Set Reset Module (5) to Reset Module. See figure 4.4.



Value	Description
0	Ready (Default)
1	Reset Module
2	Set Defaults

Figure 4.4 – Reset Module Screen on an LCD OIM

When you enter **1 (Reset Module)**, the module will be immediately reset. When you enter **2 (Set Defaults)**, the module will set all module parameters to their factory-default settings. The value of this parameter will be restored to **0 (Ready)** after the module is reset.

4.5 Viewing the Module Configuration

The parameters in table 4.6 provide information about how the module is configured. You can view these parameters at any time.

Table 4.6 – Module Configuration Status Parameters

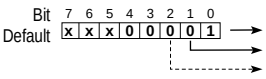
No.	Name and Description	Details
01	**DPI Port** Port to which the module is connected. This will usually be port 5.	Default: 0 Minimum: 0 Maximum: 7 Type: Read Only
03	**Ref/Fdbk Size** Size of the Reference/Feedback. The drive determines the size of the Reference/Feedback.	Default: 0 = 16-bit Values: 0 = 16-bit 1 = 32-bit Type: Read/Write
04	**Datalink Size** Size of each Datalink word. The drive determines the size of Datalinks.	Default: 0 = 16-bit Values: 0 = 16-bit 1 = 32-bit Type: Read Only
09	**DPI I/O Active** I/O that the module is actively transmitting. The value of this parameter will usually be equal to the value of parameter 8 - DPI I/O Config. 	Default: xxx0 0001 Bit Values: 0 = I/O disabled 1 = I/O enabled Type: Read Only **Bit Definitions** 0 = Cmd/Ref 1 = Datalink A 2 = Datalink B 3 = Datalink C 4 = Datalink D 5 = Not Used 6 = Not Used 7 = Not Used
21	**PIDD W0 Actual** Actual Process Input Description for Word 0 Displays the Actual PIDD Config being transmitted to word 0 in the Interbus Master.	Value: See table 4.2 Type: Read Only
23	**PIDD W1 Actual** Actual Process Input Description for Word 1 Displays the Actual PIDD Config being transmitted to word 1 in the Interbus Master.	Value: See table 4.2 Type: Read Only
25	**PIDD W2 Actual** Actual Process Input Description for Word 2 Displays the Actual PIDD Config being transmitted to word 2 in the Interbus Master.	Value: See table 4.2 Type: Read Only
27	**PIDD W3 Actual** Actual Process Input Description for Word 3 Displays the Actual PIDD Config being transmitted to word 3 in the Interbus Master.	Value: See table 4.2 Type: Read Only
29	**PIDD W4 Actual** Actual Process Input Description for Word 4 Displays the Actual PIDD Config being transmitted to word 4 in the Interbus Master.	Value: See table 4.2 Type: Read Only
31	**PIDD W5 Actual** Actual Process Input Description for Word 5 Displays the Actual PIDD Config being transmitted to word 5 in the Interbus Master.	Value: See table 4.2 Type: Read Only

Table 4.6 – Module Configuration Status Parameters (Continued)

No.	Name and Description	Details
33	**PIDD W6 Actual** Actual Process Input Description for Word 6 Displays the Actual PIDD Config being transmitted to word 6 in the Interbus Master.	Value: See table 4.2 Type: Read Only
35	**PIDD W7 Actual** Actual Process Input Description for Word 7 Displays the Actual PIDD Config being transmitted to word 7 in the Interbus Master.	Value: See table 4.2 Type: Read Only
37	**PIDD W8 Actual** Actual Process Input Description for Word 8 Displays the Actual PIDD Config being transmitted to word 8 in the Interbus Master.	Value: See table 4.2 Type: Read Only
39	**PODD W0 Actual** Actual Process Output Description for Word 0 Displays the actual PODD Configuration being received from word 0 in the Interbus Master.	Value: See table 4.2 Type: Read Only
41	**PODD W1 Actual** Actual Process Output Description for Word 1 Displays the actual PODD Configuration being received from word 1 in the Interbus Master.	Value: See table 4.2 Type: Read Only
43	**PODD W2 Actual** Actual Process Output Description for Word 2 Displays the actual PODD Configuration being received from word 2 in the Interbus Master.	Value: See table 4.2 Type: Read Only
45	**PODD W3 Actual** Actual Process Output Description for Word 3 Displays the actual PODD Configuration being received from word 3 in the Interbus Master.	Value: See table 4.2 Type: Read Only
47	**PODD W4 Actual** Actual Process Output Description for Word 4 Displays the actual PODD Configuration being received from word 4 in the Interbus Master.	Value: See table 4.2 Type: Read Only
49	**PODD W5 Actual** Actual Process Output Description for Word 5 Displays the actual PODD Configuration being received from word 5 in the Interbus Master.	Value: See table 4.2 Type: Read Only
51	**PODD W6 Actual** Actual Process Output Description for Word 6 Displays the actual PODD Configuration being received from word 6 in the Interbus Master.	Value: See table 4.2 Type: Read Only
53	**PODD W7 Actual** Actual Process Output Description for Word 7 Displays the actual PODD Configuration being received from word 7 in the Interbus Master.	Value: See table 4.2 Type: Read Only
55	**PODD W8 Actual** Actual Process Output Description for Word 8 Displays the actual PODD Configuration being received from word 8 in the Interbus Master.	Value: See table 4.2 Type: Read Only
57	**PCP Comm Act** Actual PCP configuration	Value: Enabled, Disabled

CHAPTER 5

Configuring the Interbus Scanner

A scanner is a separate module of a multi-module controller or a built-in component of a single-module controller that provides communication with a module connected to a network.

Interbus scanners are available from several manufacturers, including SST. Chapter 5 provides instructions on how to use Phoenix Contact CMD software to configure the network on an SST scanner.

5.1 Configuring a Simple Network: An Example

All examples in this manual are based on the following:

- SLC controller with an SST Interbus scanner (SST-IBS-SLC) in slot 1.
- SP600 drive at Device 1.0 / CR 2 (CR# is needed for PCP commands).
- SP600 drive at Device 2.0 / CR 3 (CR# is needed for PCP commands).
- Logic Command/Status, Reference/Feedback and Datalinks A-D are enabled in the RECOMM-IBUS and mapped to network I/O.
- Phoenix Contact CMD software is used to configure the network.

This chapter describes the steps to configure a simple network like the one featured in figure 5.1.

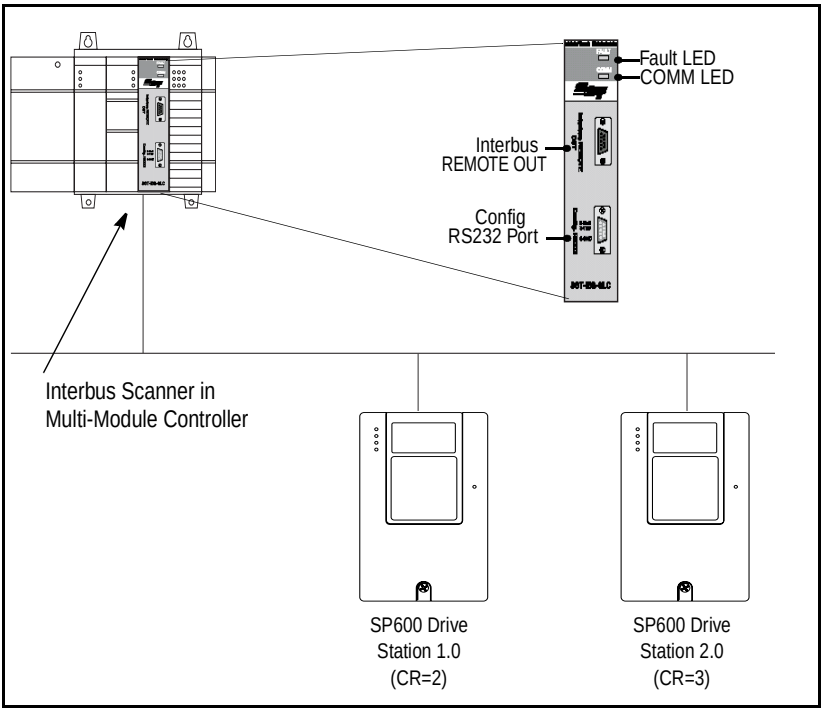


Figure 5.1 – Sample Interbus Network

5.2 Configuring the Module for use with the Ladder Examples

Prior to setting up the SST Interbus scanner with CMD software, the parameters listed in table 5.1 need to be configured to use the sample ladder logic program.

Table 5.1 – Module Parameter Settings for Ladder Example

Parameter	Name	Value		Description
		Binary/ Decimal	Hexadecimal	
8	DPI I/O Config	xxx1 1111	001F	Enable Cmd/Ref, Datalinks A-D
20	PIDD W0 Cfg	12186	2F9A	Logic Status
22	PIDD W1 Cfg	12187	2F9B	Feedback
24	PIDD W2 Cfg	12196	2FA4	Datalink A1 Out
26	PIDD W3 Cfg	12197	2FA5	Datalink A2 Out

Table 5.1 – Module Parameter Settings for Ladder Example (Continued)

Parameter	Name	Value		Description
		Binary/ Decimal	Hexadecimal	
28	PIDD W4 Cfg	12198	2FA6	Datalink B1 Out
30	PIDD W5 Cfg	12199	2FA7	Datalink B2 Out
32	PIDD W6 Cfg	12200	2FA8	Datalink C1 Out
34	PIDD W7 Cfg	12201	2FA9	Datalink C2 Out
36	PIDD W8 Cfg	12202	2FAA	Datalink D1 Out
38	PODD W0 Cfg	12184	2F98	Logic Command
40	PODD W1 Cfg	12185	2F99	Reference
42	PODD W2 Cfg	12188	2F9C	Datalink A1 In
44	PODD W3 Cfg	12189	2F9D	Datalink A2 In
46	PODD W4 Cfg	12190	2F9E	Datalink B1 In
48	PODD W5 Cfg	12191	2F9F	Datalink B2 In
50	PODD W6 Cfg	12192	2FA0	Datalink C1 In
52	PODD W7 Cfg	12193	2FA1	Datalink C2 In
54	PODD W8 Cfg	12194	2FA2	Datalink D1 In

PIDD and PODD parameters are used to identify what will be transmitted on the network and the amount of network I/O the CMD software will allocate on the scanner.

5.3 Configuring the Network Using CMD Software

Before starting the network configuration process, make sure the PC running CMD software is connected to the SST scanner (a null modem cable is supplied with the scanner). The SLC and drives need to be connected to the Interbus network and powered in order for CMD software to configure the network. The CMD software tool automatically creates a Reliance Electric sub-folder (in the Slaves folder), if it does not already exist.

CMD needs to be in Extended Mode to configure the network. A password (supplied by Phoenix Contact along with the CMD software), is requested for this functionality each time CMD is started. After CMD has started, you can also click Options/ Extended (Function Scope) to enter the password.

Step 1. Select File / New from the pull-down menu to create a new project. (See figure 5.2.)

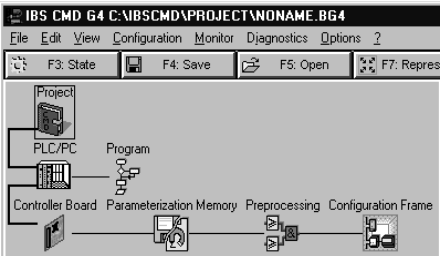


Figure 5.2 – Creating a New Interbus Project using CMD

Step 2. Right-click on the Project icon  and select Description. Enter a name for the project and any additional information desired, as shown in figure 5.3. Click OK when complete.

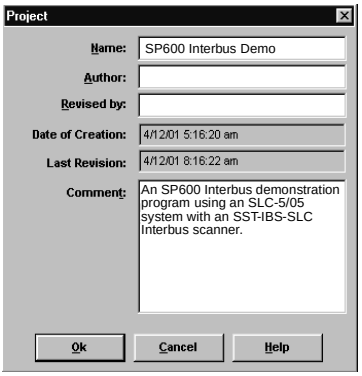


Figure 5.3 – Entering a Name for the New Interbus Project

Step 3. Right-click on the PLC/PC  icon and select Description. Enter a name for the controller and any additional information desired, as shown in figure 5.4. Click OK when complete.

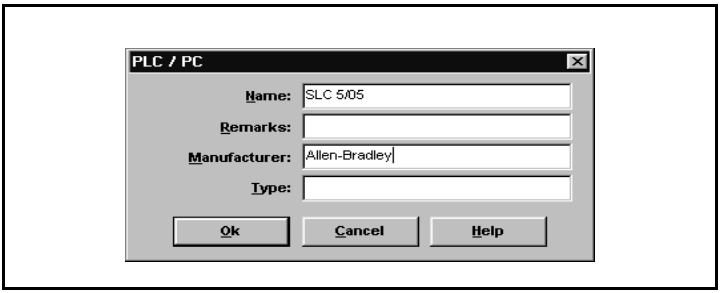


Figure 5.4 – Entering a Name for the Interbus Controller

Step 4. Right-click on the Program icon  and select Description. Enter a name for the program (the actual RSLogix500 file name is recommended), and any additional information desired, as shown in figure 5.5. Click OK when complete.

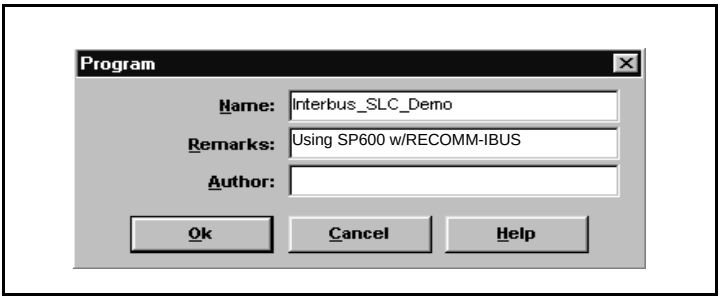


Figure 5.5 – Entering a Name for the Interbus Program

Step 5. When complete, the representation area will look as shown in figure 5.6.

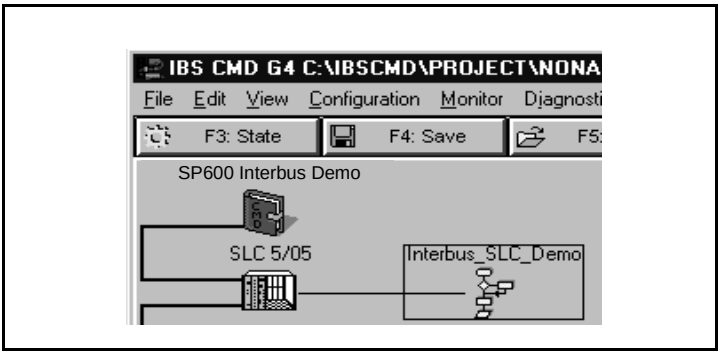


Figure 5.6 – Sample Interbus CMD Project

This provides useful information regarding the CMD project being created:

- "SP600 Interbus Demo" indicates what this project is for.
- "SLC 5/05" indicates the controller used.
- "Interbus_SLC_Demo" indicates that Interbus_SLC_Demo.RSS is the associated RSLogix500 program used with this system.

Step 6. To configure the PC Com Port that CMD will use to communicate with the SST scanner, click on Options/ Settings and then the Driver tab.

Step 7. Click on the Communication Path icon and then the Standard tab.

Step 8. Select the port communication path. Typically, this is "Serial Port" and "Com1" respectively, as shown in figure 5.7. Click OK until you return to the main screen.

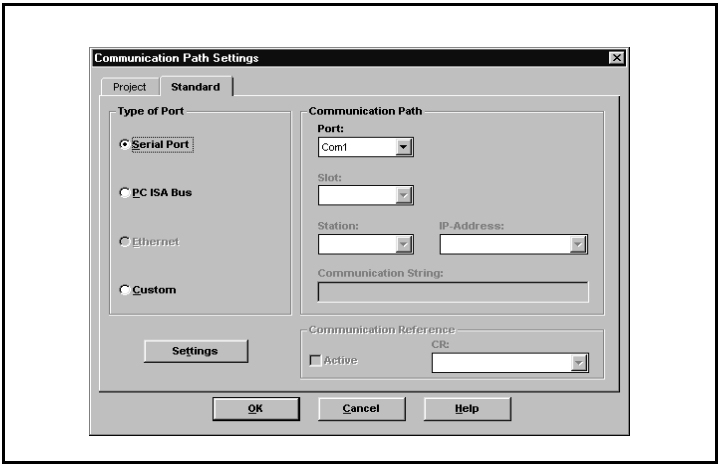


Figure 5.7 – Selecting the Port Communication Path

Step 9. Right-click on the Controller Board icon  and select Type. Set the type to "IBS USC/4(4K)" and click OK. This identifies the type of Interbus controller used on the SST scanner. (See figure 5.8.)

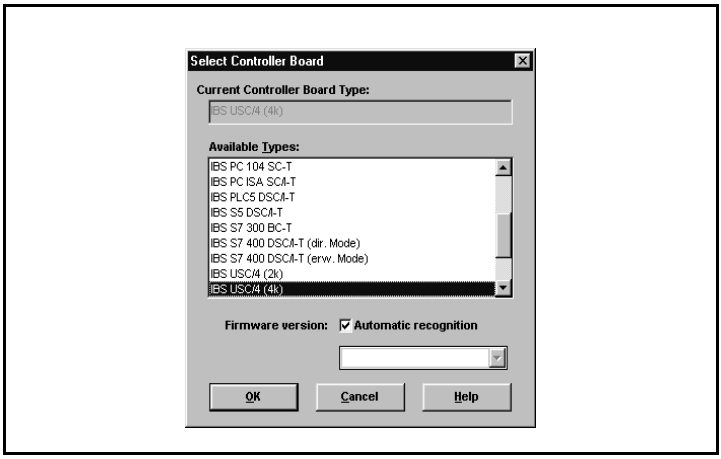


Figure 5.8 – Selecting the Interbus Controller Type

Step 10. Right-click on the Controller Board icon and select Description. Enter “SST-IBS-SLC” in the name field, as shown in figure 5.9.

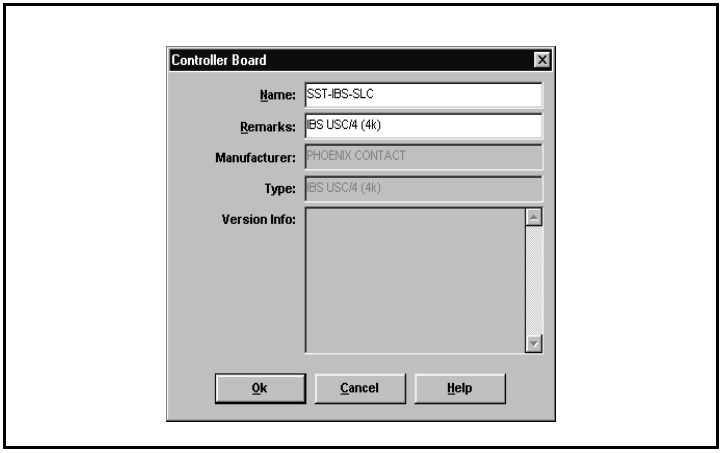


Figure 5.9 – Entering a Description for the Controller Board

Step 11. When complete, the representation area will look as shown in figure 5.10.

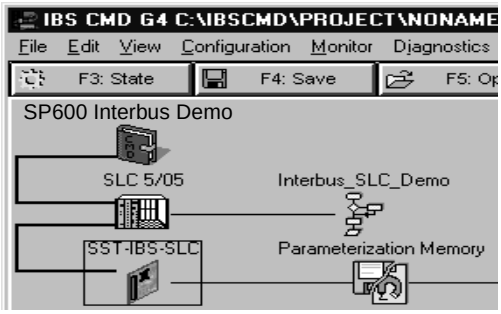


Figure 5.10 – Sample Interbus CMD Project

Step 12. From the pull-down menu select Configuration/ Configuration Frame/Read In and answer Yes to changing the operating state to Configuration Online. If there are additional prompts, answer OK or Yes to perform the read anyway. CMD will then read the bus configuration. (See figure 5.11.)

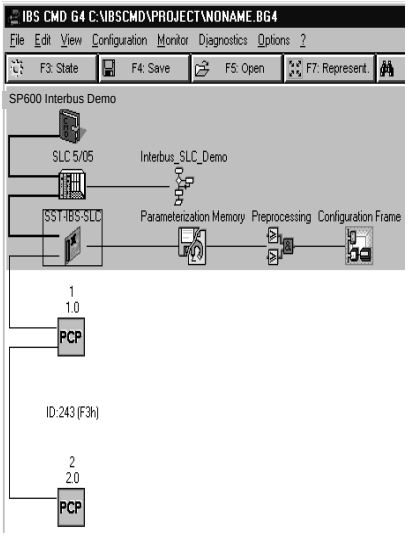


Figure 5.11 – CMD Bus Configuration

The gray PCP icons represent each SP600 drive. The first SP600 drive has a Device Number of 1.0 and the second has a Device Number of 2.0.

Step 13. Right-click on the SST-IBS-SLC scanner and select Process Data. This shows the Interbus I/O mapping for each device on the network, as shown in figure 5.12.

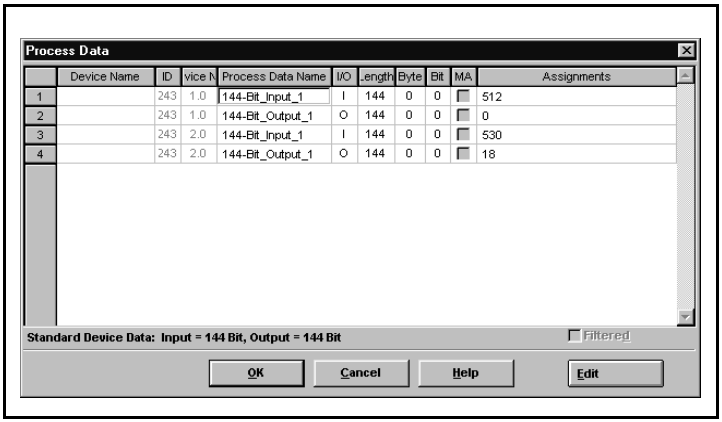


Figure 5.12 – Sample Interbus I/O Mapping

In the example, the length is 144 bits (9 words) because the RECOMM-IBUS was previously configured for the maximum I/O configuration. (See section 4.3, Setting the I/O Configuration. Depending on your application needs, this length may be less.) The scanner mapping correlates to SLC addressing as shown in figure 5.13.

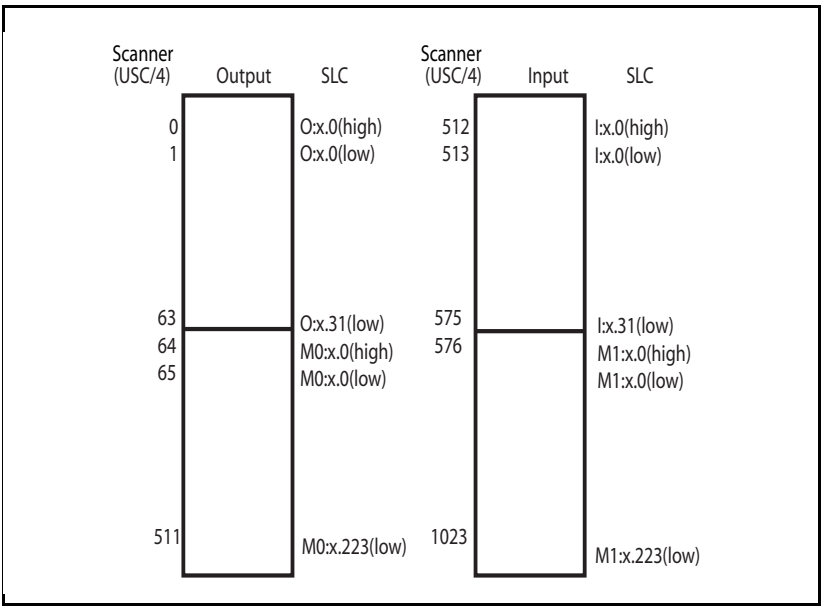


Figure 5.13 – Scanner Mapping / SLC Addressing

The mapping in the scanner is set up in bytes. Inputs to the scanner start at byte #512 and outputs start at byte #0.

PIDD/PODD parameter settings in the module determine the length of I/O data mapped. In the example, each device is configured for 9 words (144 bits) of inputs and 9 words (144 bits) of outputs, the maximum allowed for each device.

Using the PIDD/PODD values previously set in the RECOMM-IBUS module, the I/O layout in the scanner is as shown in table 5.2.

Table 5.2 – Scanner I/O Layout

Word	Inputs (Data to Master)	Station		Outputs (Data from Master)	Station	
		1.0	2.0		1.0	2.0
0	Logic Status	512	530	Logic Command	0	18
1	Feedback	514	532	Reference	2	20
2	Datalink A1 Out	516	534	Datalink A1 In	4	22
3	Datalink A2 Out	518	536	Datalink A2 In	6	24
4	Datalink B1 Out	520	538	Datalink B1 In	8	26
5	Datalink B2 Out	522	540	Datalink B2 In	10	28
6	Datalink C1 Out	524	542	Datalink C1 In	12	30
7	Datalink C2 Out	526	544	Datalink C2 In	14	32
8	Datalink D1 Out	528	546	Datalink D1 In	16	34

Device 1.0's SLC addressing is as follows:

Table 5.3 – SLC Addressing for Device 1.0

Word	Inputs (Data to Master)	Assignment		Outputs (Data from Master)	Assignment	
		Scanner	SLC		Scanner	SLC
0	Logic Status	512	I:1.0	Logic Command	0	O:1.0
1	Feedback	514	I:1.1	Reference	2	O:1.1
2	Datalink A1 Out	516	I:1.2	Datalink A1 In	4	O:1.2
3	Datalink A2 Out	518	I:1.3	Datalink A2 In	6	O:1.3
4	Datalink B1 Out	520	I:1.4	Datalink B1 In	8	O:1.4
5	Datalink B2 Out	522	I:1.5	Datalink B2 In	10	O:1.5
6	Datalink C1 Out	524	I:1.6	Datalink C1 In	12	O:1.6
7	Datalink C2 Out	526	I:1.7	Datalink C2 In	14	O:1.7
8	Datalink D1 Out	528	I:1.8	Datalink D1 In	16	O:1.8

Device 2.0's SLC addressing starts immediately after 1.0 addressing (I:1.9 and O:1.9).

Step 14. Right-click on the 1.0 PCP icon PCP and select Description. Enter a Station Name such as “SP600 Demo #1”. Note the Communication Reference (CR) is 2. The CR needs to be known when using PCP communication services (explicit messaging). (See figure 5.14.)

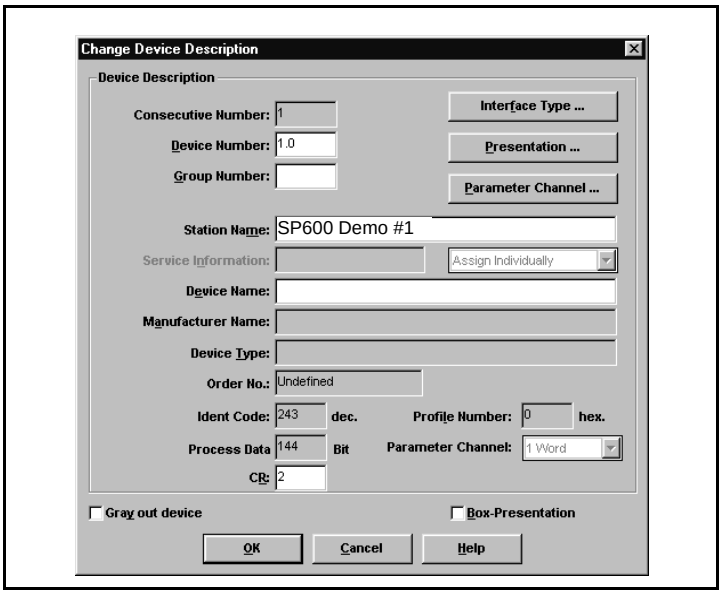


Figure 5.14 – Entering a Station Name

Step 15. Click on the Parameter Channel button. Set Transmit and Receive to 128 bytes and enable Read, Write, and Get-0D (long format) services, as shown in figure 5.15. Click OK when complete.

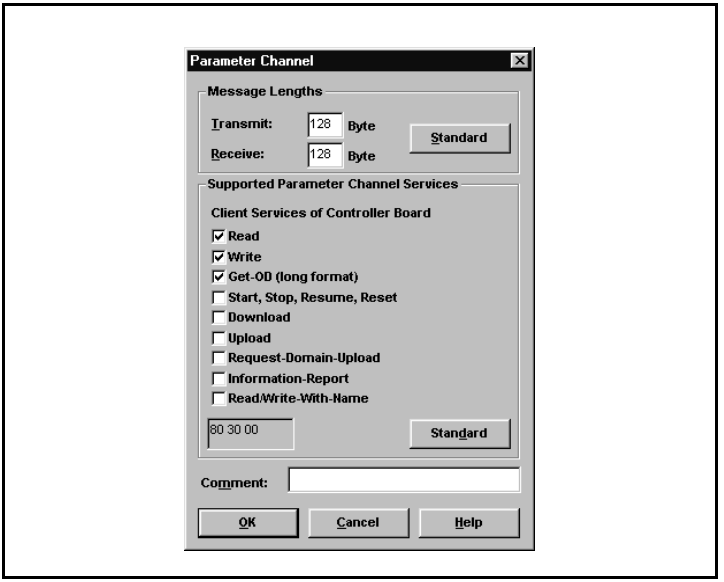


Figure 5.15 – Selecting Data for the Parameter Channel Screen

Step 16. Repeat steps #14 and #15 using the 2.0 PCP icon PCP. Enter a Station name such as “SP600 Demo #2”. Note the Communication Reference (CR) is 3. The CR needs to be known when using PCP communication services (explicit messaging). Click OK when complete.

Step 17. When complete, the representation area will look as shown in figure 5.16.

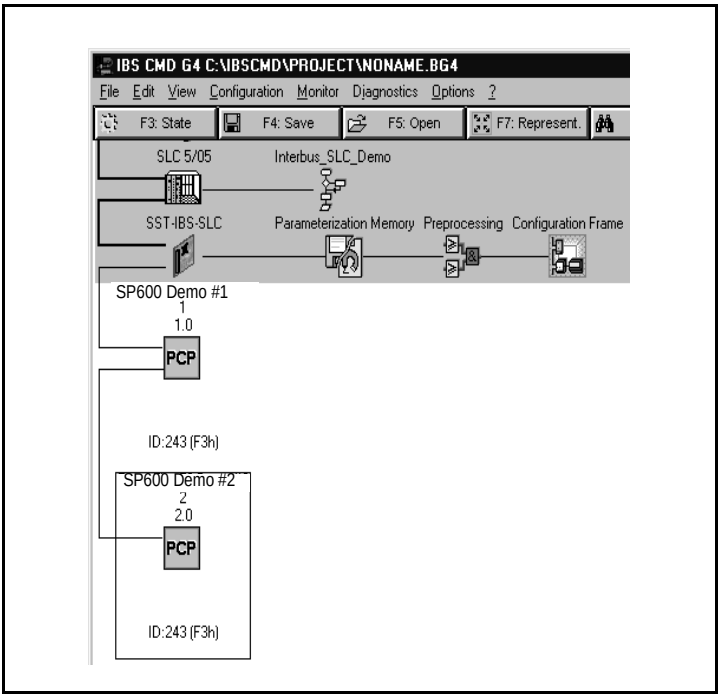


Figure 5.16 – Sample SP600 Demo #2

Step 18. Right-click on the SST-IBS-SLC icon and select Parameterization/Execute. Select “Startup without PDP” as shown in figure 5.17, and click OK. This uses the mapping already set up in the scanner and does not allow re-mapping by the software tool.

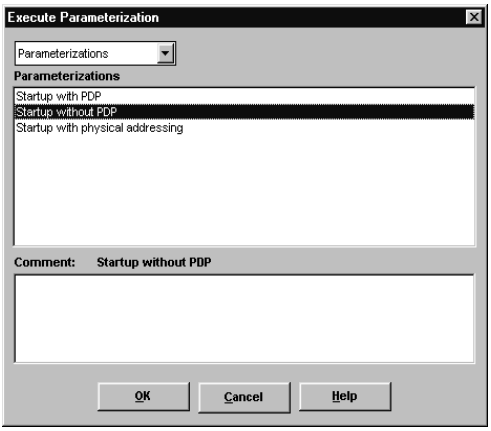


Figure 5.17 – Selecting Data for Parameterization/Execute Screen

If parameterization execution is successful, there will be a prompt to click OK. Click OK.

Step 19. When complete, the representation area will look as shown in figure 5.18.

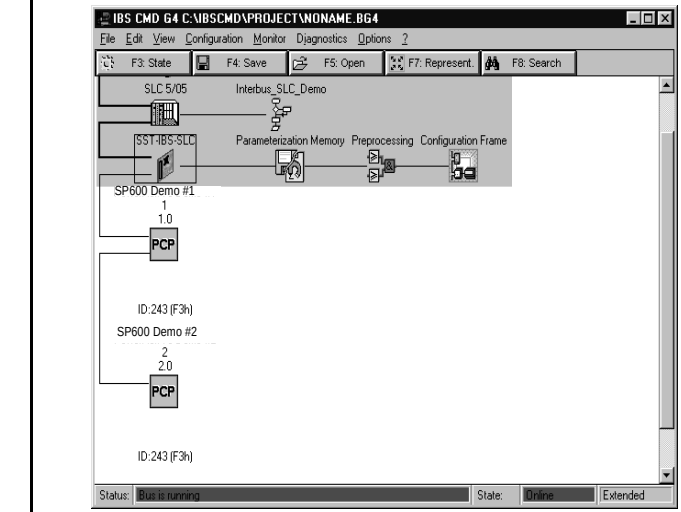


Figure 5.18 – Sample Parameterization Execution

Step 20. Click File/Save from the pull-down menu and save the project.

5.4 Configuring the SP600 Drive for use with the Ladder Examples

Configure the parameters as shown in table 5.4 to use the sample ladder logic program.

Table 5.4 – SP600 Parameter Settings for Ladder Examples

Parameter	Name	Value	Description
90	Speed Ref A Sel	22	Network (RECOMM-IBUS) provides the Reference
300	Data In A1	140	Accel Time 1 (140)
301	Data In A2	142	Decel Time 1 (142
302	Data In B1	100	Jog Speed (100)
303	Data In B2	155	Stop Mode A (155)
304	Data In C1	101	Preset Speed 1 (101)
305	Data In C2	102	Preset Speed 2 (102)
306	Data In D1	103	Preset Speed 3 (103)
310	Data Out A1	140	Accel Time 1 (140)
311	Data Out A2	142	Decel Time (142)
312	Data Out B1	100	Jog Speed (100)
313	Data Out B2	155	Stop Mode A (155)
314	Data Out C1	101	Preset Speed 1 (101)
315	Data Out C2	102	Preset Speed 2 (102)
316	Data Out D1	103	Preset Speed 3 (103)

5.5 Configuring the RSLogix 500 SST Interbus Scanner

The SST Interbus scanner is configured by clicking on the I/O Configuration in RSLogix500. The SST-IBS-SLC scanner has an ID Code of 13635. The settings in figures 5.19 and 5.20 are used by the sample ladder logic program.

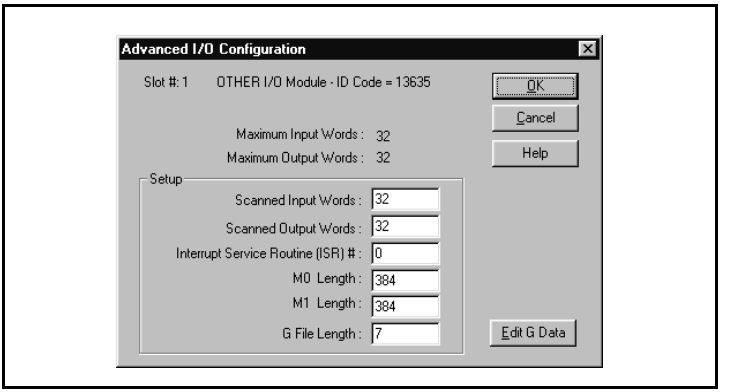


Figure 5.19 – Scanner I/O Configuration

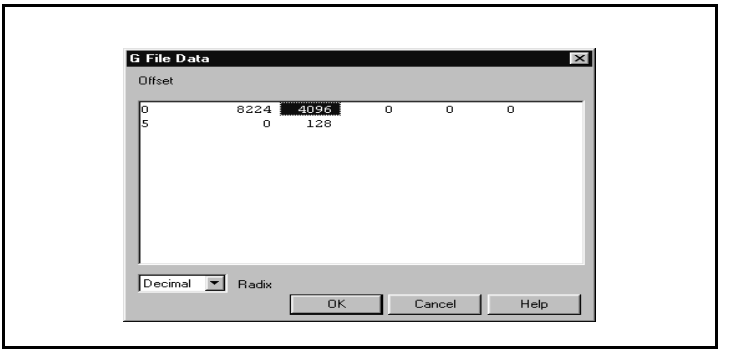


Figure 5.20 – Scanner_G_Files

Table 5.5 – G File Data Information

Word	Value (Decimal)	Value (Hexadecimal)	Description
0	8224	2020	Fixed to 2020h by the SLC
1	4096	1000	Enables the command interface between the SLC and the USC/4
2	0	0	Use the CMD specified Bus Update Time
3	0	0	Use the CMD specified Bus Warning Time
4	0	0	Use the CMD specified Bus Timeout
5	0	0	The number of words used at the beginning of the M files for Inputs and Outputs
6	128	80	Maximum data size for commands and replies sent between the SLC and the scanner

Refer to the SST_IBS_SLC User's Guide for more information.

CHAPTER 6

Using I/O Messaging

Chapter 6 provides information and examples that explain how to use I/O Messaging to control an SP600 drive.

ATTENTION: The examples in this publication are intended solely for purposes of example. There are many variables and requirements with any application. Rockwell Automation does not assume responsibility or liability (to include intellectual property liability) for actual use of the examples shown in this publication. Failure to observe this precaution could result in bodily injury or damage to equipment.

6.1 About I/O Messaging

I/O messaging is used to transfer the data which controls the SP600 drive and sets its Reference. I/O can also be used to transfer data to and from Datalinks in SP600 drives.

The Interbus module provides options for configuring and using I/O, including the following:

- The size of I/O can be configured by enabling or disabling the Logic Command/Reference and Datalinks.

Chapter 4, Configuring the Interbus Module, and chapter 5, Configuring the Interbus Scanner, discuss how to configure the module and scanner on the network for these options. The Glossary defines the different options. This chapter discusses how to use I/O after you have configured the module and scanner.

6.2 Understanding the I/O Image

The terms **input** and **output** are defined from scanner's point of view. Therefore, Output I/O is data that is output from the scanner and consumed by the Interbus module. Input I/O is status data that is produced by the module and consumed as input by the scanner.

The I/O image table will vary based on the following:

- Size (either 16-bit or 32-bit) of the Reference/Feedback word and Datalink words used by the drive.
- Configuration of DPI I/O Config (8) in the module. If all I/O is not enabled, the image table is truncated. The image table always uses consecutive words starting at word 0.

Figure 6.1 illustrates an example of an I/O image with 16-bit words.

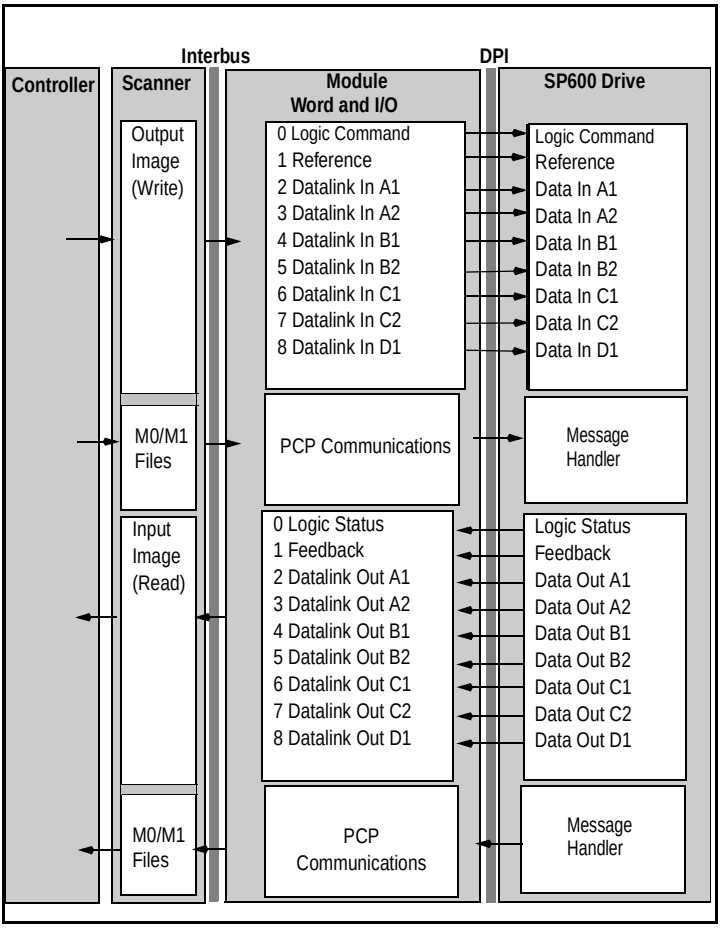


Figure 6.1 – Sample I/O Image with All I/O Enabled

An image that uses 32-bit words for Reference and Datalinks would change the I/O image as follows:

Word	I/O
0	Logic Command/Status
1 - 2	Reference/Feedback
3 - 6	Datalink A1/A2
7 - 10	Datalink B1/B2

Figure 6.2 illustrates an example of an I/O image that does not use all of the I/O data. Only the Logic Command/Reference and Datalink B are enabled. In this example, the Reference is a 32-bit word, and Datalinks are 16-bit words.

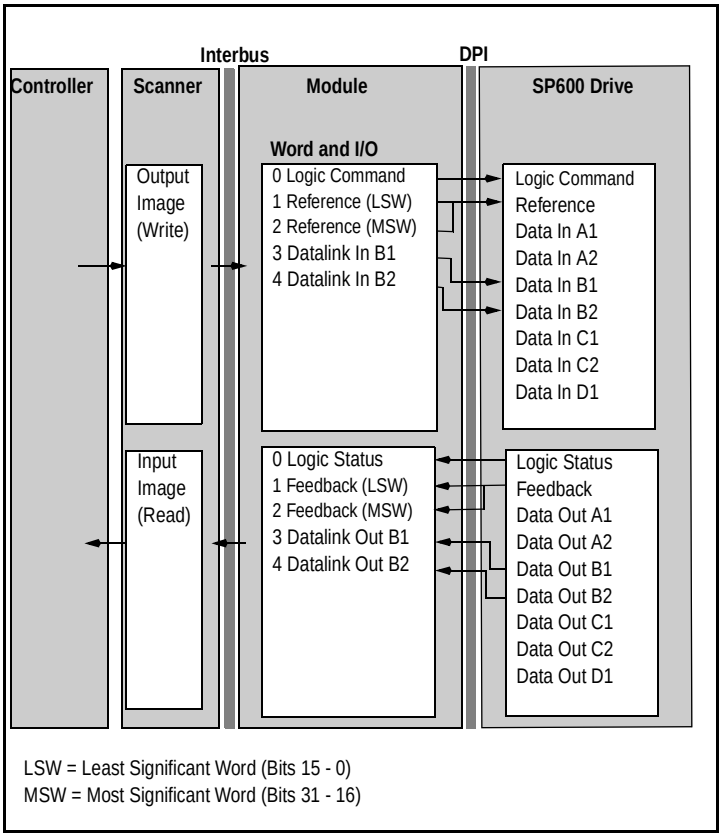


Figure 6.2 – Sample I/O Image with Only Logic/Reference and Datalink B Enabled

6.3 Using Logic Command/Status

When enabled, the Logic Command/Status word is always word 0 in the I/O image. The **Logic Command** is a 16-bit word of control produced by the scanner and consumed by the module. The **Logic Status** is a 16-bit word of status produced by the module and consumed by the scanner.

This manual contains the bit definitions for compatible products available at the time of publication in Appendix C, Logic Command/ Status Words. For other products, refer to their documentation.

6.4 Using Reference/Feedback

When enabled, Reference/Feedback always begins at word 1 in the I/O image. The **Reference** (16 bits or 32 bits) is produced by the controller and consumed by the module. The **Feedback** (16 bits or 32 bits) is produced by the module and consumed by the controller. The size of the Reference/Feedback is determined by the product and displayed in Ref/Fdbk Size (3) in the module.

Size	Valid Values	In I/O Image	Example
16-bit	-32768 to 32767	Word 1	Figure 6.1
32-bit	-2147483648 to 2147483647	Word 1 and Word 2	Figure 6.2

6.5 Using Datalinks

A Datalink is a mechanism used by SP600 drives to transfer data to and from the controller. Datalinks allow a parameter value to be changed without using an Explicit Message.

When enabled, each Datalink consumes either two 16-bit or 32-bit words in both the input and output image depending on its size. The size of Datalinks (16-bit words or 32-bit words) is determined by the drive and displayed in Datalink Size (4) in the module.

6.5.1 Rules for Using Datalinks

- Each set of Datalink parameters in an SP600 drive can be used by only one module. If more than one module is connected to a single drive, multiple modules must not try to use the same Datalink.
- Parameter settings in the drive determine the data passed through the Datalink mechanism. Refer to the documentation for your product.

- When you use a Datalink to change a value, the value is not written to the Non-Volatile Storage (NVS). The value is stored in volatile memory and lost when the drive loses power.

6.5.2 32-Bit Parameters using 16-Bit Datalinks

To read (and/or write) a 32-bit parameter using 16-bit Datalinks, typically both Datalinks (x1 and x2) are set to the 32-bit parameter.

For example, to read Elapsed MWh (9) in an SP600 drive, both Datalink A1 and A2 are set to "9." Datalink A1 will contain the least significant word (LSW) and Datalink A2 the most significant word (MSW). In this example, the parameter 9 value of 5.8 MWh is read as a "58" in Datalink A1.

Datalink	Most/Least Significant Word	Parameter	Data (decimal)
A1	LSW	9	58
A2	MSW	9	0

Regardless of the Datalink combination, x1 will always contain the LSW and x2 will always contain the MSW. In the following examples, Power Up Marker (242) contains a value of 88.4541 hours.

Datalink	Most/Least Significant Word	Parameter	Data (decimal)
A1	LSW	242	32573
A2	- Not Used -	0	0

Datalink	Most/Least Significant Word	Parameter	Data (decimal)
A1	- Not Used -	0	0
A2	MSW	242	13

Datalink	Most/Least Significant Word	Parameter	Data (decimal)
A2	MSW	242	13
B1	LSW	242	32573

32-bit data is stored in binary as follows:

MSW	2^{31} through 2^{16}
LSW	2^{15} through 2^{0}

Example:

Power Up Marker (242) = 88.4541 hours

MSW = $13_{decimal} = 1101_{binary} = 2^{19} + 2^{18} + 2^{16} = 851968$

LSW = 32573

851968 + 32573 = 884541

6.6 Sample SLC Ladder Logic Program

The sample Interbus program uses an SLC processor with an SST Interbus scanner (SST-IBS-SLC) in the first slot of the rack and works with SP600 drives.

Function of the Sample Program

The program is written for (2) drives on the network and demonstrates using:

- Logic Command / Reference
- Logic Status / Feedback
- Datalinks
- PCP Read / Write (See chapter 5.)

Module Settings

The RECOMM-IBUS node addresses are set via CMD software to:

- “1.0” (CR=2) for Station 1
- “2.0” (CR=3) for Station 2

See section 5.2, Configuring the Module for use with the Ladder Examples.

SP600 Settings

See section 5.4, Configuring the SP600 Drive for use with the Ladder Examples.

SST Scanner Settings

See section 5.5, Configuring the RSLogix 500 SST Interbus Scanner.

SLC Data Table

Read Data

The scanner is configured for 18 bytes (9 words) of inputs for each drive, the maximum amount allowed. Two drives require 36 bytes (18 words) maximum.

Station 1 Address	Station 2 Address	Function
I:1.0	I:1.9	Logic Status
I:1.1	I:1.10	Feedback
I:1.2	I:1.11	Datalink A1
I:1.3	I:1.12	Datalink A2
I:1.4	I:1.13	Datalink B1
I:1.5	I:1.14	Datalink B2
I:1.6	I:1.15	Datalink C1
I:1.7	I:1.16	Datalink C2
I:1.8	I:1.17	Datalink D1

Write Data

The scanner is configured for 18 bytes (9 words) of outputs for each drive, the maximum amount allowed. Two drives require 36 bytes (18 words).

Station 1 Address	Station 2 Address	Function
O:1.0	O:1.9	Logic Command
O:1.1	O:1.10	Reference
O:1.2	O:1.11	Datalink A1
O:1.3	O:1.12	Datalink A2
O:1.4	O:1.13	Datalink B1
O:1.5	O:1.14	Datalink B2
O:1.6	O:1.15	Datalink C1
O:1.7	O:1.16	Datalink C2
O:1.8	O:1.17	Datalink D1

Logic Command/Status Words

These examples use the Logic Command word and Logic Status word for SP600 drives. Refer to Appendix C, Logic Command/ Status Words to view these. The definition of the bits in these words may vary if you are using a different DPI product. Refer to the documentation for your product.

6.6.1 Sample SLC Ladder Logic - Main Program

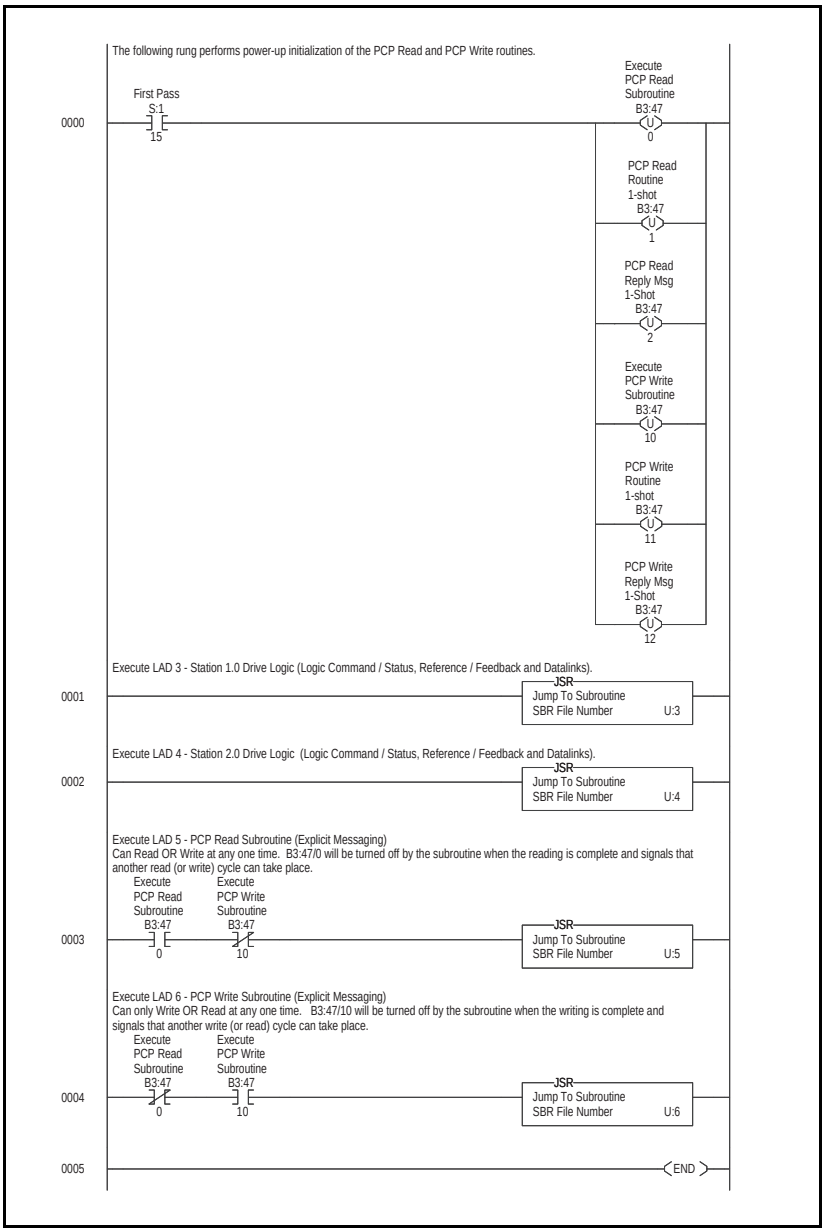


Figure 6.3 – Sample SLC Ladder Logic - Main Program

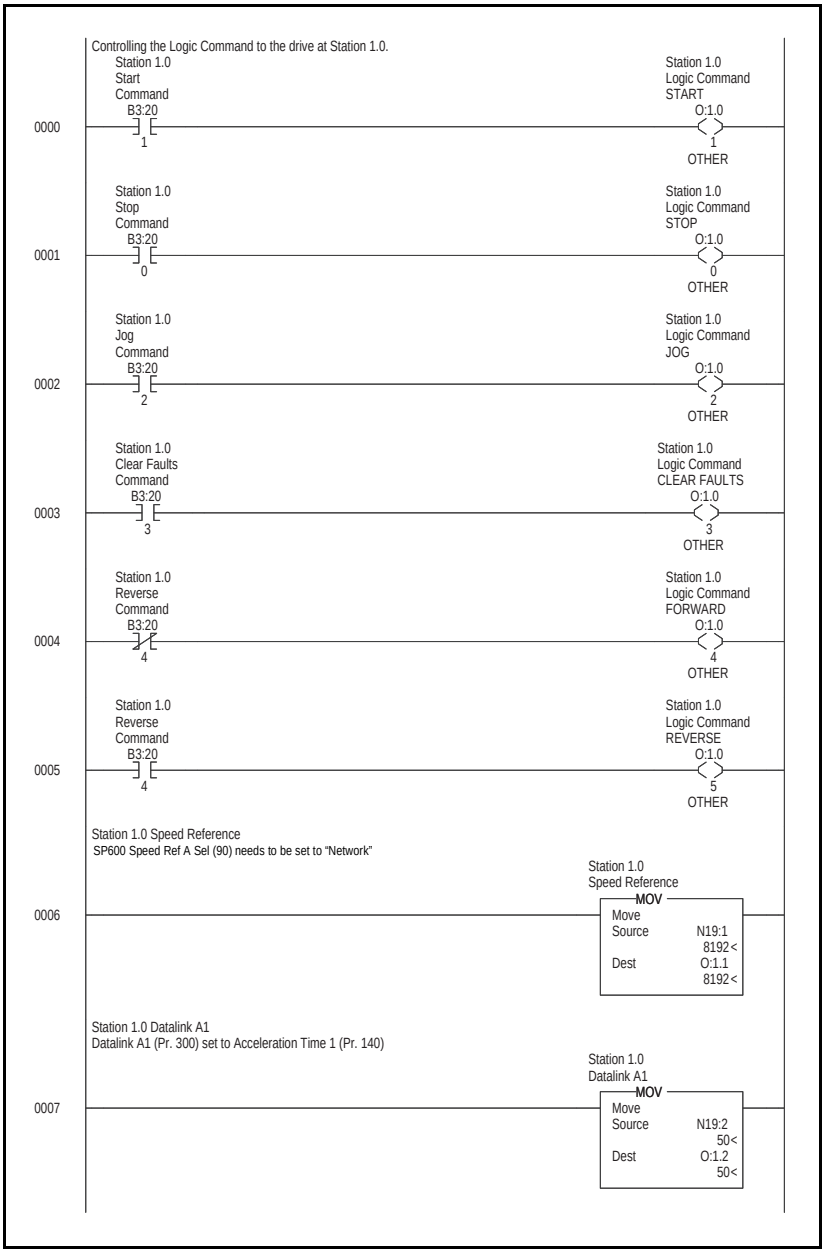


Figure 6.4 – Sample SLC Ladder Logic - Station 1 Program

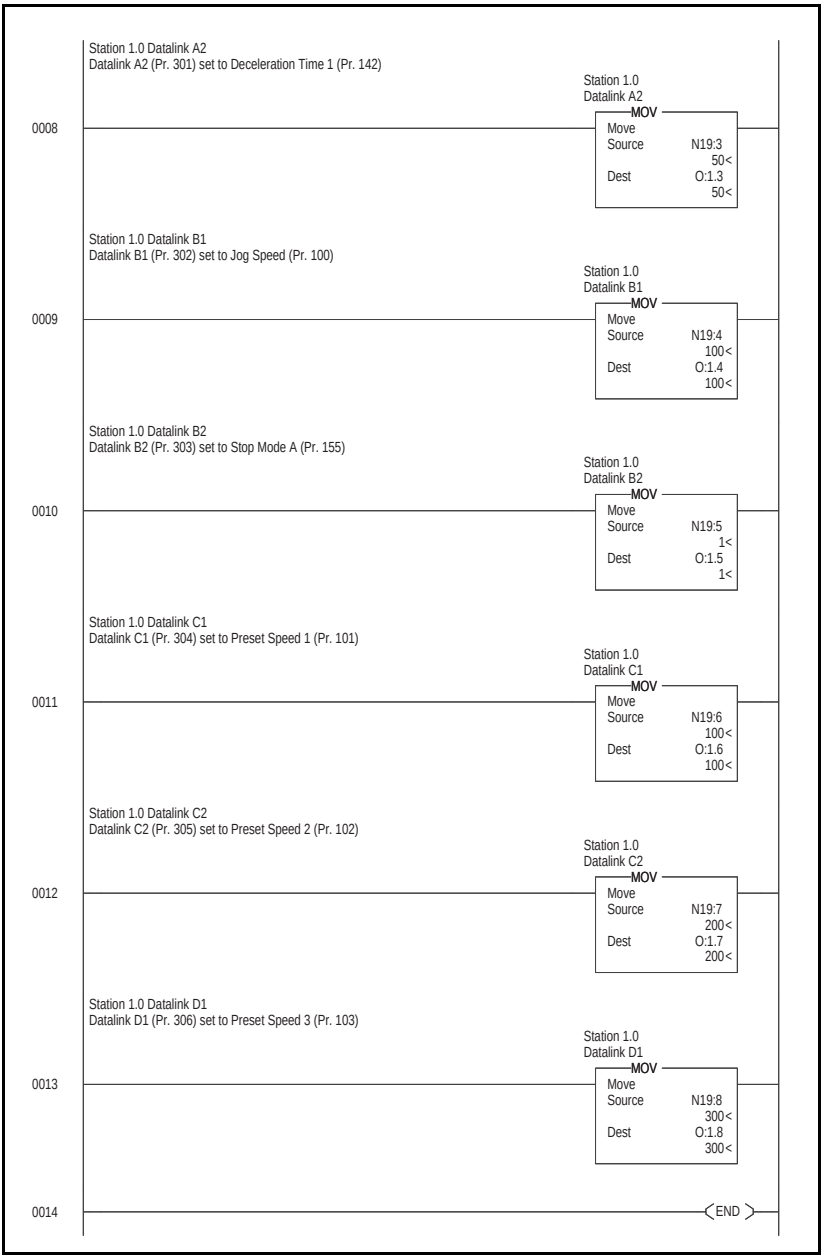


Figure 6.5 – Sample SLC Ladder Logic - Station 1 Program (Continued)

6.6.2 Sample SLC Ladder Logic - Station 2 Program

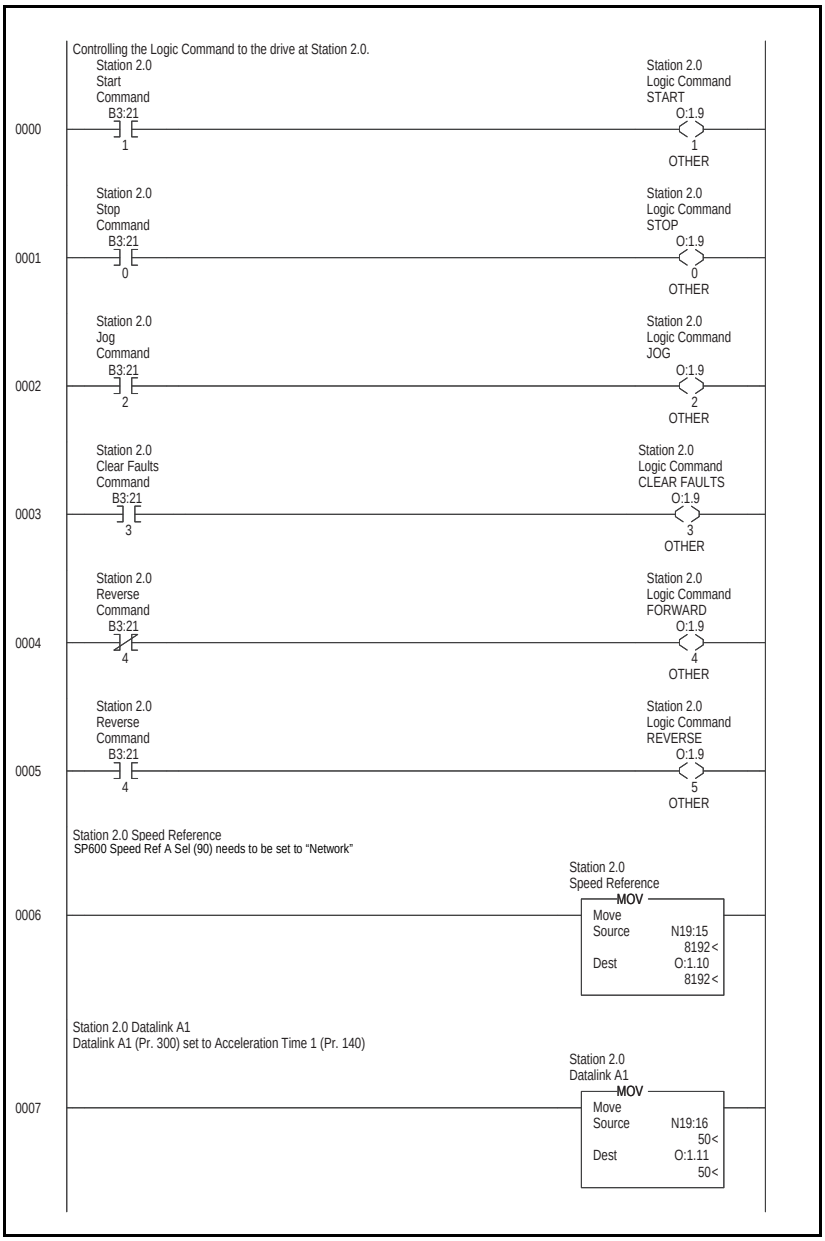


Figure 6.6 – Sample SLC Ladder Logic - Station 2 Program

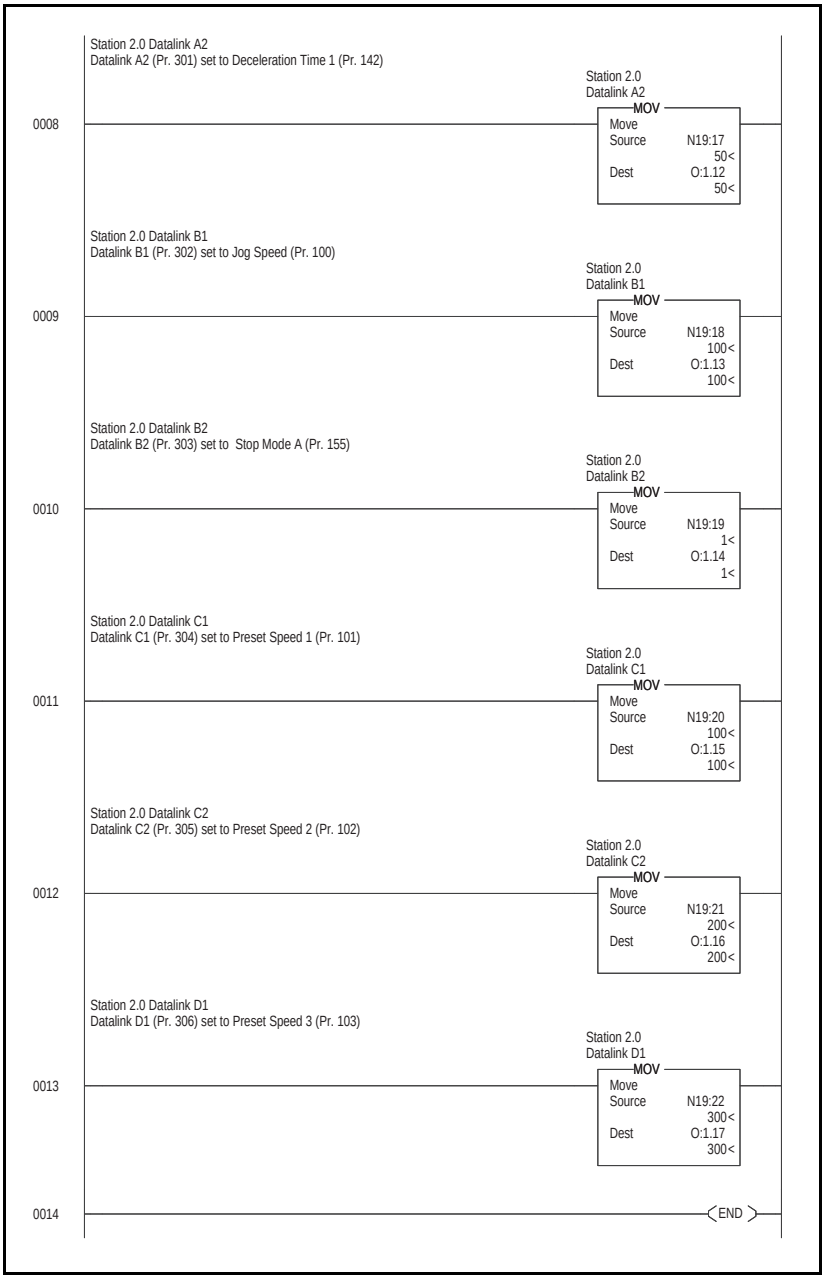


Figure 6.7 – Sample SLC Ladder Logic - Station 2 Program (Continued)

CHAPTER 7

Using Explicit Messaging (PCP Communications)

Chapter 7 provides information and examples that explain how to use Explicit Messaging to monitor and configure the module and connected SP600 drive, as well as other peripherals.

ATTENTION: The examples in this publication are intended solely for purposes of example. There are many variables and requirements with any application. Rockwell Automation does not assume responsibility or liability (to include intellectual property liability) for actual use of the examples shown in this publication. Failure to observe this precaution could result in bodily injury or damage to equipment.

ATTENTION: If Explicit Messages are programmed to write parameter data to Non-Volatile Storage (NVS) frequently, the NVS will quickly exceed its life cycle and cause the drive to malfunction. Do not create a program that frequently uses Explicit Messages to write parameter data to NVS. Datalinks do not write to NVS and should be used for frequently changed parameters. Failure to observe this precaution could result in damage to, or destruction of, equipment.

7.1 About Explicit Messaging

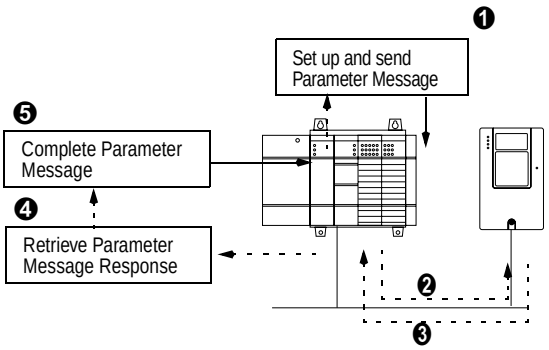
Explicit Messaging (PCP Communications) is used to transfer data that does not require continuous updates. With Explicit Messaging, you can configure and monitor a slave device's parameters on the Interbus network.

To be able to use Explicit Messaging in the module, PCP Comm Act (57) must be set to "Enabled".

7.2 Running Explicit Messages

There are five basic events in the Explicit Messaging process as shown in figure 7.1. The details of each step will vary depending on the controller. Refer to the documentation for your controller.

Important: There must be a request message and a response message for all Explicit Messages, whether you are reading or writing data.



❶	Format the required data and set up the ladder logic program to send an Explicit Message request to the scanner module (download).
❷	The scanner module transmits the Explicit Message Request to the slave device over the Interbus network.
❸	The slave device transmits the Explicit Message Response back to the master.
❹	The controller retrieves the Explicit Message Response.
❺	The Explicit Message is complete.

Figure 7.1 – Explicit Message Process

7.3 PCP Communications

Peripheral Communications Protocol (PCP) messages are used for Explicit Messaging, which is not part of the normal Interbus I/O data scan. The scanner takes care of all of the details of establishing a connection for PCP communication services. PCP communications can be used to:

- Read or write DPI Host (SP600 drive, etc.) parameters
- Read or write RECOMM-IBUS parameters
- Read DPI Host (SP600 drive, etc.) faults
- Read RECOMM-IBUS events

See table 7.1.

Table 7.1 – PCP Message Definition

Name	PCP - Index Value Range		Access Rights	Description
	Hex	Decimal		
Host Parameters	3001 to (3001 +n)	12289 to (12289 + n)	Host Parameter Dependent	3001 (12289 Dec) = Parameter 1 - etc.
Host Fault Queue	2FF9 to 3000	12281 to 12288	Read Only	Host fault queue containing up to 8 faults
RECOMM-IBUS Parameters	2FB6 to 2FEE	12214 to 12270	Parameter Dependent	2FB6 (12214 Dec) = Parameter 1 - etc.
RECOMM-IBUS Event Queue	2FAE to 2FB5	12206 to 12213	Read Only	Module event queue (8 events)

The Command Interface for the SST SLC Interbus scanner must be enabled for PCP Communications to take place:

- Bit 12 of word 1 in the G File must be set
- Word 5 in the G File must be set to the length of process data required in the M Files. This value can range from 0 to 224.
- Word 6 in the G File must be set to the maximum length of the command buffer. This value can range from 0 to 128 and must be non-zero to enable the buffer.

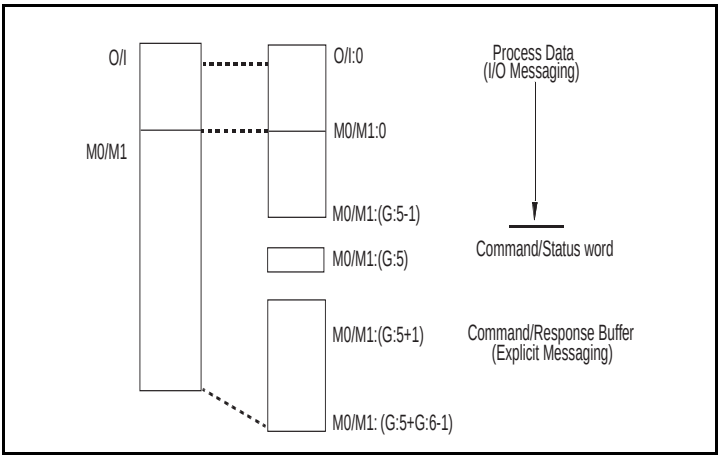


Figure 7.2 – Memory Map

The ladder example used in this manual uses Input (I:) and Output (O:) files for I/O messaging (Logic Command/Status, Reference/Feedback, and Datalinks) and M Files for PCP messaging (See section 5.5, Configuring the RSLogix 500 SST Interbus Scanner.)

The first word in the Command Interface memory area is the Command (M0) or Status (M1) word. The remaining words form a buffer to pass command data to and from the scanner. The M0 file contains the buffer for the command written by the SLC and the M1 file contains the reply to the SLC written by the scanner.

The lower six bits in the Command word are command bits to the scanner. Commands are initiated by setting bits in this Command word. The scanner acknowledges the command by setting bits in the Status word. The high bit is either the Message Acknowledge bit (command word) or the Message Present bit (Status word).

Table 7.2 – Command Word Bit Descriptions

Bit	Description
0	PCP Start
1	PCP Stop
2	PCP Read
3	PCP Write
4	PCP Command
5	IBS Command
15	Message acknowledge (Command) / Message present (Status)

The ladder example used in this manual performs PCP Reads and PCP Writes.

7.3.1 PCP Read Message Format

PCP Reads require the following Command and Reply message formats:

Command

Table 7.3 – Command Message Format

Word	Name	Description
0	CR	The Communication Reference (CR #) to read from
1	Index	The index of the variable to read
2	Sub Index	The sub-index of the variable to read (not used)

Reply

Table 7.4 – Reply Message Format

Word	Name	Description
0	Command Word Echo	Echo of the Command Word (0004h)
1	Message Length	Number of words following
2	CR	The Communication Reference (CR #) the Reply is from
3	Result	Result Code: 0=Success FFFFh = Timeout FFFEh = Out of buffers to store the reply FFFDh = Invalid CR FFFCh = Could not connect to device with CR FFFBh = Reply of Command bigger than buffer
4	Data Length	The # of bytes of data following (1, 2 or 4 bytes)
5	Data Word 1	Contains 8-bit (1 byte) data reads (stored in the high byte), 16-bit (2 byte) data reads, and the most significant word for 32-bit (4 byte) data reads
6	Data Word 2	Least significant word for 32-bit (4 byte) data reads

The sample ladder logic program simplifies addressing the various PCP indexes. Before calling the PCP Read Subroutine (figure 7.9), three registers are loaded to identify the variable to be read:

Table 7.5 – PCP Read Main Program Data

Register	Description
N22:0	The Communication Reference (CR) to read from: Set to “2” to access Station 1.0 (CR=2) Set to “3” to access Station 2.0 (CR=3)
N22:1	The desired Parameter / Event / Fault area to be accessed: Set to “0” to read SP600 parameters Set to “1” to read RECOMM-IBUS parameters Set to “2” to read SP600 Fault Queue Set to “3” to read RECOMM-IBUS Event Queue
N22:2	The actual Parameter number or Event / Fault Queue item number to read. Set to “1” to read Parameter number 1 or Fault / Event Queue item number 1....etc....

The PCP Read Subroutine uses the data in table 7.5 to create the following Command Message (table 7.6):

Table 7.6 – PCP Read Subroutine Command Message

Register	Description
N22:10	The PCP Command word (set to “4” for PCP Read).
N22:11	The Communication Reference (CR) to read from.
N22:12	The PCP Index of the variable to read (“3001h”= Host parameter 1, etc.).
N22:13	Sub Index not used (set to “0”).

Table 7.7 – PCP Read Subroutine Reply Message

Register	Description
N22:20	= PCP Status Word.
N22:21	= Echo of the Command word (0004h).
N22:22	= Number of words following.
N22:23	= CR.
N22:24	= Result (“0”=good).
N22:25	= Number of bytes read (1-byte for 8-bit parameters, 2-bytes for 16-bit parameters, 4-bytes for 32-bit parameters).
N22:26	= Data Word #1 (1-byte & 2-byte reads, MSW of 4-byte read).
N22:27	= Data Word #2 (LSW of 4-byte read).

7.3.2 Read Examples

Message	SLC Address	Value (Dec)	Value (Hex)	Description
Command	N22:10	4	4	Command word = 4 = PCP Read (bit 2 ON)
	N22:11	2	2	CR# = 2 (Station 1.0)
	N22:12	12428	308C	Index = 3000h + 8Ch = Accel Time (140) 3001h is the start of SP600 parameters (1) 8C hex = 140 dec = Accel Time (140)
	N22:13	0	0	Sub Index not used
Reply	N22:20	-32,764	8004	Status word: "8000" (bit 15 ON) indicates Reply message present "0004" (bit 2 ON) echo's the command (PCP Read)
	N22:21	4	4	Echo of the Command Word (PCP Read)
	N22:22	4	4	Number of words following = 4
	N22:23	2	2	CR# = 2 (Station 1.0)
	N22:24	0	0	Result = 0 (success)
	N22:25	2	2	Number of bytes read = 2
	N22:26	50	32	Data word 1 = 32 hex = 50 dec = 5.0 seconds
	N22:27	0	0	Data word 2 not used

Figure 7.3 – Reading Accel Time 1 (140) from an SP600 Drive (DPI Host)

In the sample ladder logic program, the user would load these registers before calling the subroutine to perform the PCP Read:

Message	SLC Address	Value (Dec)	Value (Hex)	Description
Request	N22:0	2	2	CR# =2 (Station 1.0)
	N22:1	0	0	0 = SP600 (DPI Host)
	N22:3	140	8C	Parameter # = 140 [Accel Time]

Message	SLC Address	Value (Dec)	Value (Hex)	Description
Command	N22:10	4	4	Command word = 4 = PCP Read (bit 2 ON)
	N22:11	2	2	CR# = 2 (Station 1.0)
	N22:12	12532	30F4	Index = 3000h + F4h = Fault 1 Time (244) 3001h is the start of SP600 parameters (1) F4 hex = 244 dec = Fault 1 Time (244)
	N22:13	0	0	Sub Index not used
Reply	N22:20	-32,764	8004	Status word: "8000" (bit 15 ON) indicates Reply message present "0004" (bit 2 ON) echo's the command (PCP Read)
	N22:21	4	4	Echo of the Command Word (PCP Read)
	N22:22	5	5	Number of words following = 5
	N22:23	2	2	CR# =2(Station 1.0)
	N22:24	0	0	Result = 0 (success)
	N22:25	4	4	Number of bytes read = 4
	N22:26	59	3B	3B235B hex = 3875675 decimal = 387.5675 hours
	N22:27	9051	235B	

Figure 7.4 – Reading Fault 1 Time (244) from an SP600 Drive (DPI Host)

In the example ladder logic program, the user would load these registers before calling the subroutine to perform the PCP Read:

Message	SLC Address	Value (Dec)	Value (Hex)	Description
Request	N22:0	2	2	CR# =2 (Station 1.0)
	N22:1	0	0	0 = SP600 (DPI Host)
	N22:3	244	F4	Parameter # = 244 (Fault 1 Time)

Message	SLC Address	Value (Dec)	Value (Hex)	Description
Command	N22:10	4	4	Command word = 4 = PCP Read (bit 2 ON)
	N22:11	2	2	CR# = 2 (Station 1.0)
	N22:12	12234	2FCA	Index = 2FB5h + 15h = PIDD W0 Actual (21) 2FB6h is the start ofRECOMM-IBUS parameters . 15 hex = 21 dec = PIDD W0 Actual (21)
	N22:13	0	0	Sub Index not used
Reply	N22:20	-32,764	8004	Status word: "8000" (bit 15 ON) indicates Reply message present "0004" (bit 2 ON) echo's the command (PCP Read)
	N22:21	4	4	Echo of the Command Word (PCP Read)
	N22:22	4	4	Number of words following = 4
	N22:23	2	2	CR# = 2 (Station 1.0)
	N22:24	0	0	Result = 0 (success)
	N22:25	2	2	Number of bytes read = 2
	N22:26	12186	2F9A	Data word 1 = 2F9A hex = Logic Status
	N22:27	0	0	Data word 2 not used

Figure 7.5 – Reading PIDD W0 Actual (21) from an RECOMM-IBUS Interbus Module

In the sample ladder logic program, the user would load these registers before calling the subroutine to perform the PCP read:

Message	SLC Address	Value (Dec)	Value (Hex)	Description
Request	N22:0	2	2	CR# = 2 (Station 1.0)
	N22:1	1	1	1 = RECOMM-IBUS
	N22:3	21	15	Parameter # = 21 [PIDD W0 Actual]

7.3.3 PCP Write Message Format

PCP Writes require the following Command and Reply message formats:

Command

Table 7.8 – Command Message Format for PCP Writes

Word	Name	Description
0	CR	The Communication Reference (CR #) to write to
1	Index	The index of the variable to write
2	Sub Index	The sub-index of the variable to write (not used)
3	Data Length	The # of bytes of data following (1, 2, or 4 bytes)
4	Data Word 1	Contains 8-bit (1 byte) write data (stored in the high byte), 16-bit, (2 byte) write data, and the most significant word for 32-bit (4 byte) write data
5	Data Word 2	Least significant word for 32-bit (4 byte) write data

Reply

Table 7.9 – Reply Message Format for PCP Writes

Word	Name	Description
0	Command Word Echo	Echo of the Command Word (0008h)
1	Message Length	Number of words following
2	CR	The Communication Reference (CR #) the Reply is from
3	Result	Result Code: 0=Success FFFFh = Timeout FFFEh = Out of buffers to store the reply FFFDh = Invalid CR FFFCh = Could not connect to device with CR FFFBh = Reply of Command bigger than buffer

The sample ladder logic program simplifies addressing the various PCP indexes. Before calling the PCP Write Subroutine (figure 7.13), six registers are loaded to identify the variable to write:

Table 7.10 – PCP Write Main Program Data

Register	Description
N23:0	The Communication Reference (CR) to write to: Set to “2” to access Station 1.0 (CR=2) Set to “3” to access Station 2.0 (CR=3)
N23:1	The desired parameter area to be accessed: Set to “0” for DPI Host parameters Set to “1” for RECOMM-IBUS parameters
N23:2	The actual parameter number to write to (1, 2, ...n).
N23:3	The number of bytes of data to write: Set to either “1” (1 byte), “2” (2 bytes) and “4” (4 bytes)
N23:4	Data Word #1 (1 and 2-byte writes, MSW of 4 byte write).
N23:5	Data Word #2 (LSW of 4-byte write).

The PCP Write Subroutine uses the data in table 7.10 to create the following Command Message:

Table 7.11 – PCP Write Subroutine Command Message

Register	Description
N23:10	The PCP Command word (set to “8” for PCP Write).
N23:11	The Command Reference (CR) to write to.
N23:12	The PCP Index of the variable to write (“306Ah” = Host parameter 106, etc.).
N23:13	Sub Index not used.
N23:14	The number of bytes of data to write (set to “1”, “2” or “4”).
N23:15	Data word 1.
N23:16	Data word 2.

Note that writing to parameters causes a non-volatile storage (NVS) write cycle and therefore must NOT be done frequently (can exceed the maximum number of allowable write cycles and cause the product to malfunction).

Table 7.12 – PCP Write Subroutine Reply Message

Register	Description
N23:20	= PCP Status Word.
N23:21	= Echo of the Command word (0008h).
N23:22	= Number of words following.
N23:23	= CR.
N23:24	= Result (“0” = good).

Write Examples:

Message	SLC Address	Value (Dec)	Value (Hex)	Description
Command	*N23:10*	*8*	*8*	*Command word = 8 = PCP Write (bit 3 ON)*
	N23:11	*2*	*2*	*CR# = 2 (Station 1.0)*
	N23:12	*12394*	*306A*	*Index = 3000h + 6Ah = Preset Speed 6 (106) 3001h is the start of SP600 parameters (1) 6A hex = 106 dec = Preset Speed 6 (106)*
	N23:13	*0*	*0*	*Sub Index not used*
	N23:14	*2*	*2*	*2 bytes of data following*
	N23:15	*123*	*7B*	*Data word 1 = 123 = 12.3 Hz*
	N23:16	*0*	*0*	*Data word 2 not used*
Reply	*N23:20*	*-32,760*	*8008*	*Status word: "8000" (bit 15 ON) indicates Reply message present "0008" (bit 3 ON) echo's the command (PCP Write)*
	N23:21	*8*	*8*	*Echo of the Command Word (PCP Write)*
	N23:22	*2*	*2*	*Number of words following = 2*
	N23:23	*2*	*2*	*CR# = 2 (Station 1.0)*
	N23:24	*0*	*0*	*Result = 0 (success)*

Figure 7.6 – Writing Preset Speed 6 (106) to an SP600 Drive (DPI Host)

In the sample ladder logic program, the user would load these registers before calling the subroutine to perform the PCP Write.

Message	SLC Address	Value (Dec)	Value (Hex)	Description
Request	N23:0	2	2	CR# =2 (Station 1.0)
	N23:1	0	0	0 = SP600 drive (DPI Host)
	N23:2	106	6A	Parameter # = 106
	N23:3	2	2	2 byte data write
	N23:4	123	7B	Data Word 1 = 123 = 12.3 Hz
	N23:5	0	0	Data Word 2 not used

Message	SLC Address	Value (Dec)	Value (Hex)	Description
Command	N23:10	8	8	Command word = 8 = PCP Write (bit 3 ON)
	N23:11	2	2	CR# = 2 (Station 1.0)
	N23:12	12219	2FBB	Index = 2FB5h+6h = Comm Flt Action (6) 2FB6h is the start of RECOMM-IBUS parameters 6 hex = 6 dec = Comm Flt Action (6)
	N23:13	0	0	Sub Index not used
	N23:14	1	1	1 byte of data following
	N23:15	512	200	Data Word 1 (upper byte) = 2 (Zero Data)
	N23:16	0	0	Data word 2 not used
Reply	N23:20	-32,760	8008	Status word: "8000" (bit 15 ON) indicates Reply message present "0008" (bit 3 ON) echo's the command (PCP Write)
	N23:21	8	8	Echo of the Command Word (PCP Write)
	N23:22	2	2	Number of words following = 2
	N23:23	2	2	CR# = 2 (Station 1.0)
	N23:24	0	0	Result = 0 (success)

Figure 7.7 – Writing Comm Flt Action (6) to a RECOMM-IBUS Interbus Module

In the sample ladder logic program, the user would load these registers before calling the subroutine to perform the PCP Write:

Message	SLC Address	Value (Dec)	Value (Hex)	Description
Request	N23:0	2	2	CR# = 2 (Station 1.0)
	N23:1	1	1	1 = RECOMM-IBUS
	N23:2	6	6	Parameter # = 6
	N23:3	1	1	1 byte data write
	N23:4	2	2	Data Word 1 = 2 (Zero Data)
	N23:5	0	0	Data Word 2 not used

Message	SLC Address	Value (Dec)	Value (Hex)	Description
Command	N23:10	8	8	Command word = 8 = PCP Write (bit 3 ON)
	N23:11	2	2	CR# = 2 (Station 1.0)
	N23:12	12225	2FC1	Index = 2FB5h + Ch = Flt Cfg A1 In (12) 2FB6h is the start of RECOMM-IBUS parameters C hex = 12 dec = Flt Cfg A1 In (12)
	N23:13	0	0	Sub Index not used
	N23:14	4	4	4 bytes of data following
	N23:15	0	0	00000800 hex = 2048 decimal
	N23:16	2048	800	
Reply	N23:20	-32,760	8008	Status word: "8000" (bit 15 ON) indicates Reply message present "0008" (bit 3 ON) echo's the command (PCP Write)
	N23:21	8	8	Echo of the Command Word (PCP Write)
	N23:22	2	2	Number of words following = 2
	N23:23	2	2	CR# = 2 (Station 1.0)
	N23:24	0	0	Result = 0 (success)

Figure 7.8 – Writing Flt Cfg A1 (12) to an RECOMM-IBUS Interbus Module

In the sample ladder logic program, the user would load these registers before calling the subroutine to perform the PCP Write:

Message	SLC Address	Value (Dec)	Value (Hex)	Description
Request	N23:0	2	2	CR# = 2 (Station 1.0)
	N23:1	1	1	1 = RECOMM-IBUS
	N23:2	12	12	Parameter # = 12
	N23:3	4	4	4 byte data write
	N23:4	0	0	Data Word 1 = 0
	N23:5	2048	800	Data Word 2 = 2048

7.4 Sample SLC Ladder - Peripheral Communications Protocol (PCP)

PCP Read Subroutine (Explicit Messaging)

The PCP Read Subroutine is executed from the Main Program (chapter 6) by turning on bit B3:47/0. Only one PCP Read or Write can be performed at any one time. B3:47/0 will be turned off by the subroutine when the reading is complete and signals that another read (or write) cycle can take place.

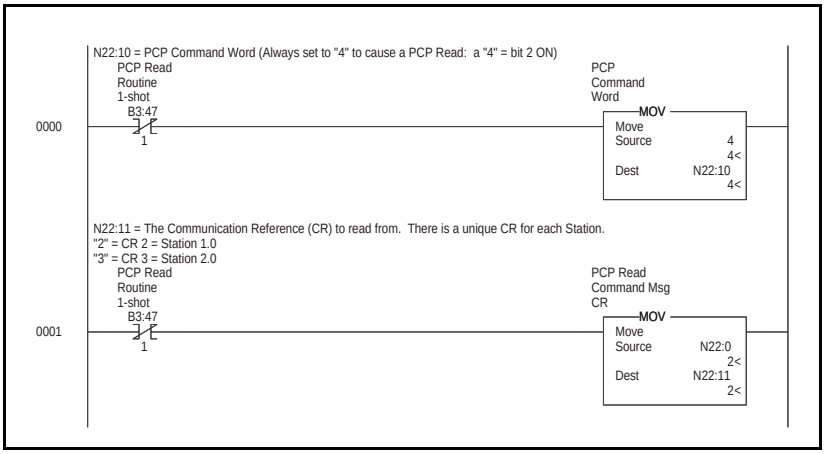


Figure 7.9 – LAD5 - PCP Read Subroutine

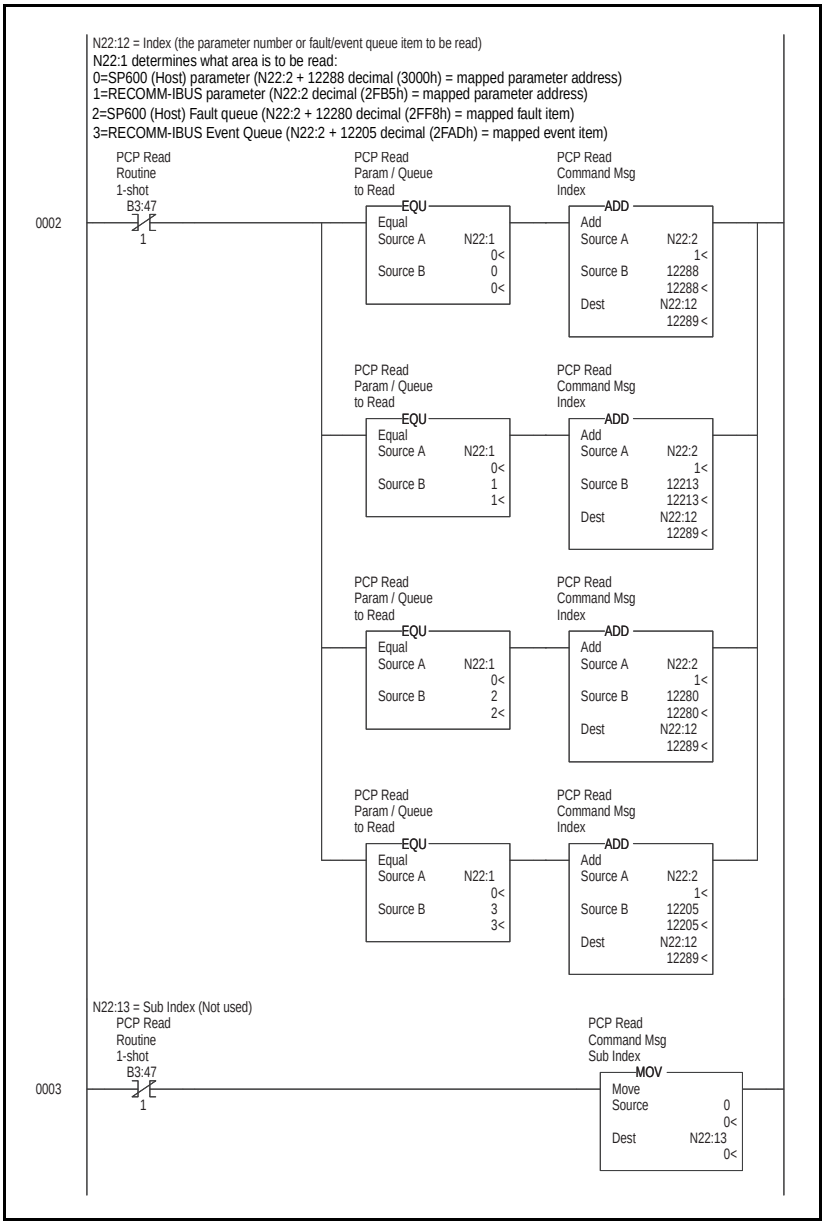


Figure 7.10 – LAD5 - PCP Read Subroutine (Continued)

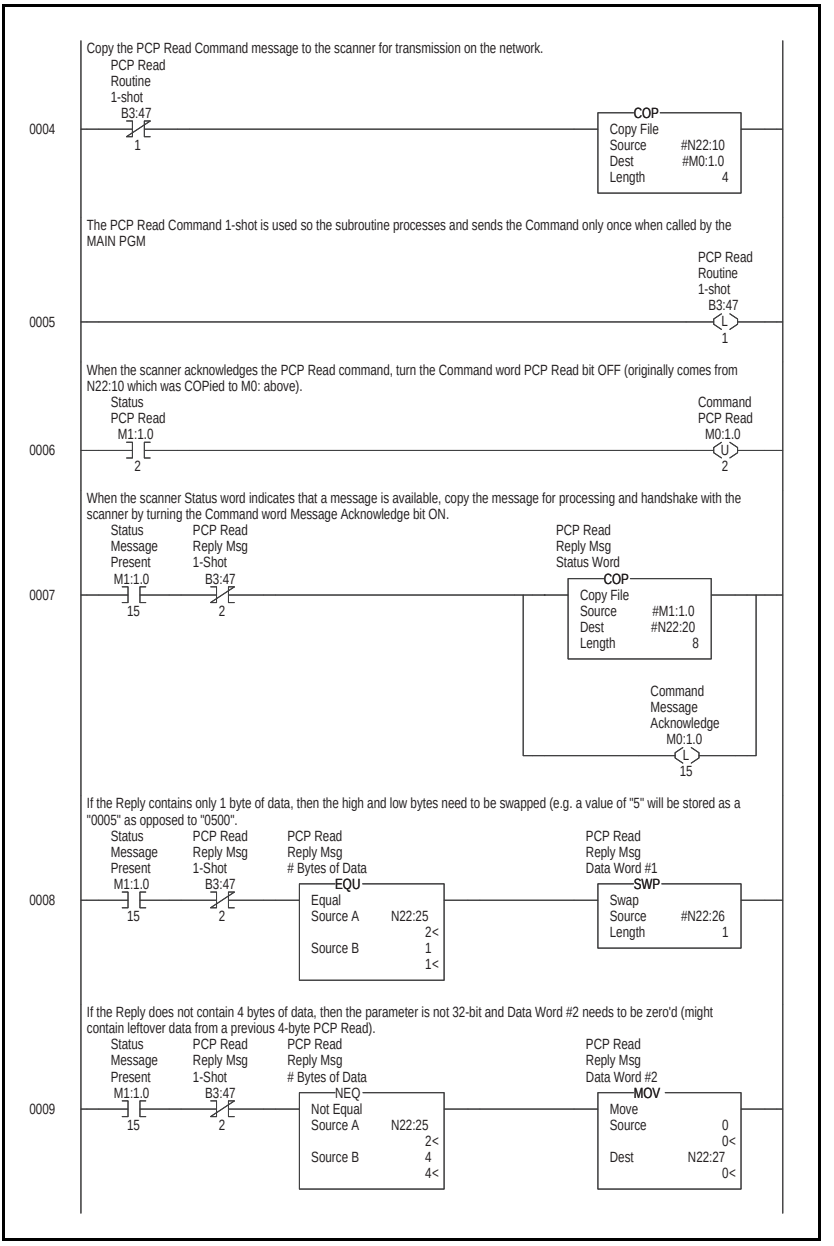


Figure 7.11 – LAD5 - PCP Read Subroutine (Continued)

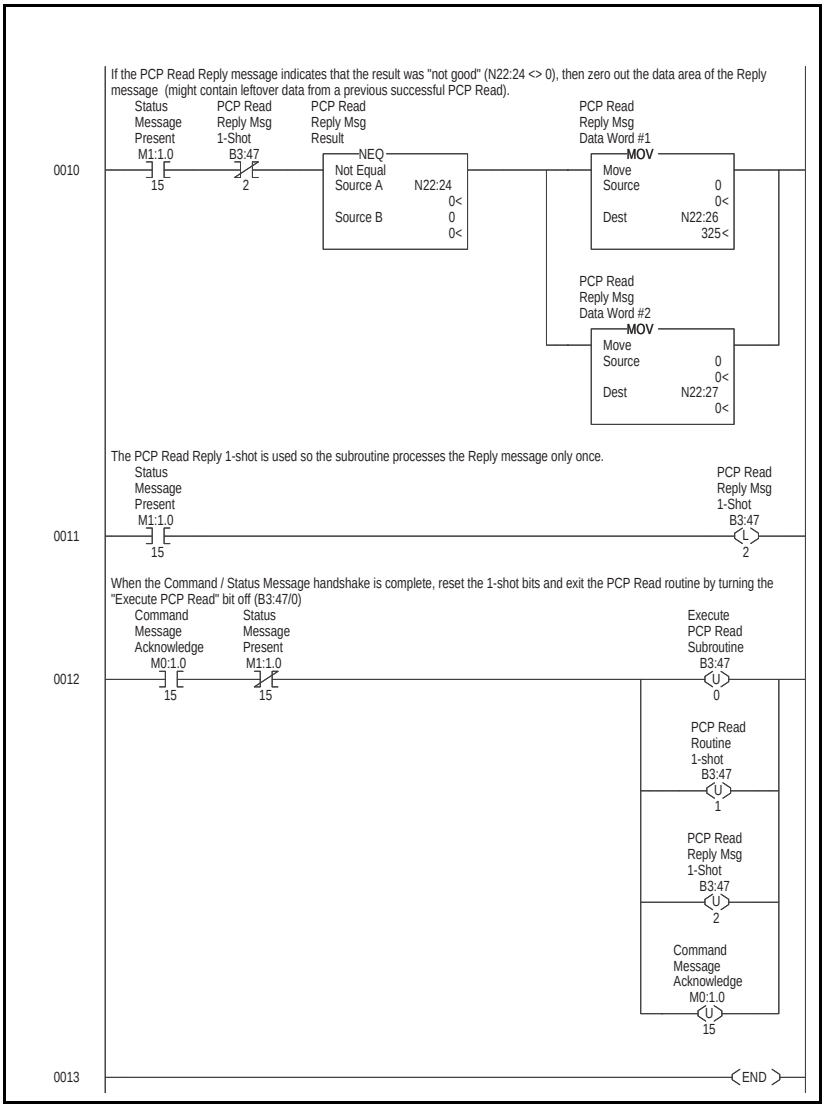


Figure 7.12 – LAD5 - PCP Read Subroutine (Continued)

7.4.1 PCP Write Subroutine (Explicit Messaging)

The PCP Write Subroutine is executed from the Main Program (chapter 6) by turning on bit B3:47/10. Only one PCP Read or Write can be performed at any one time. B3:47/10 will be turned off by the subroutine when the reading is complete and signals that another read (or write) cycle can take place.

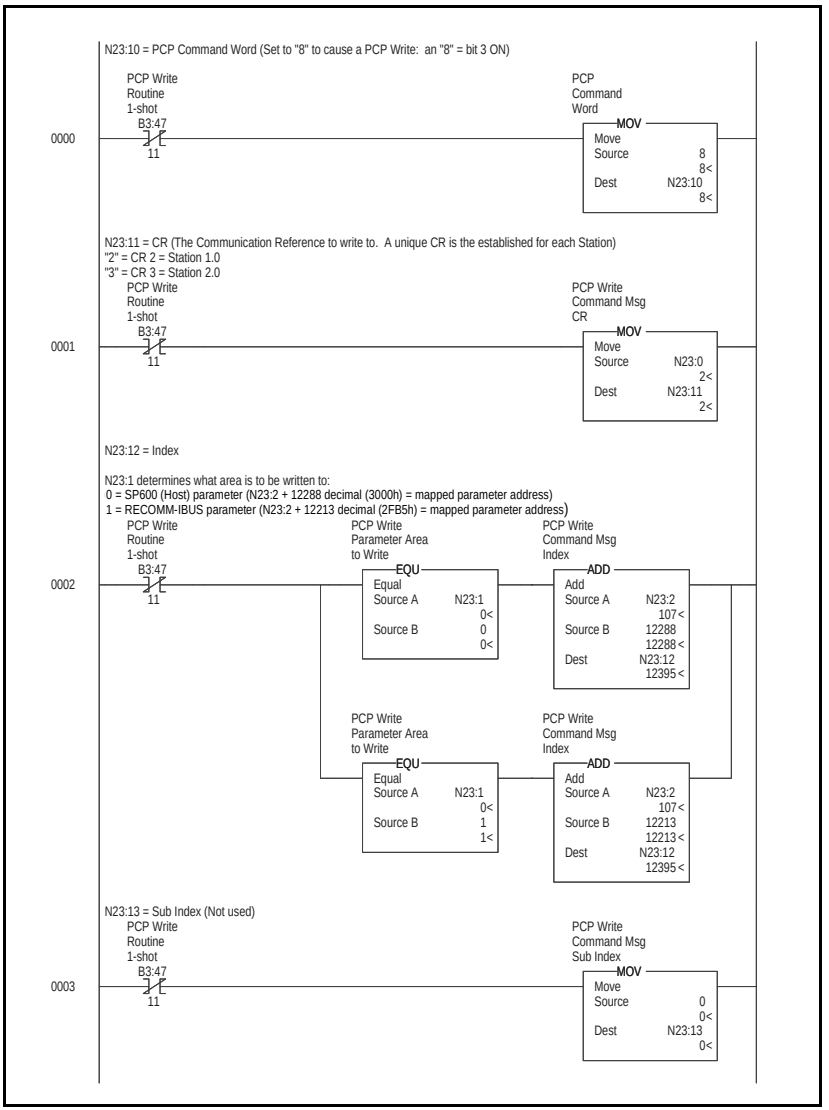


Figure 7.13 – LAD6 - PCP Write Subroutine

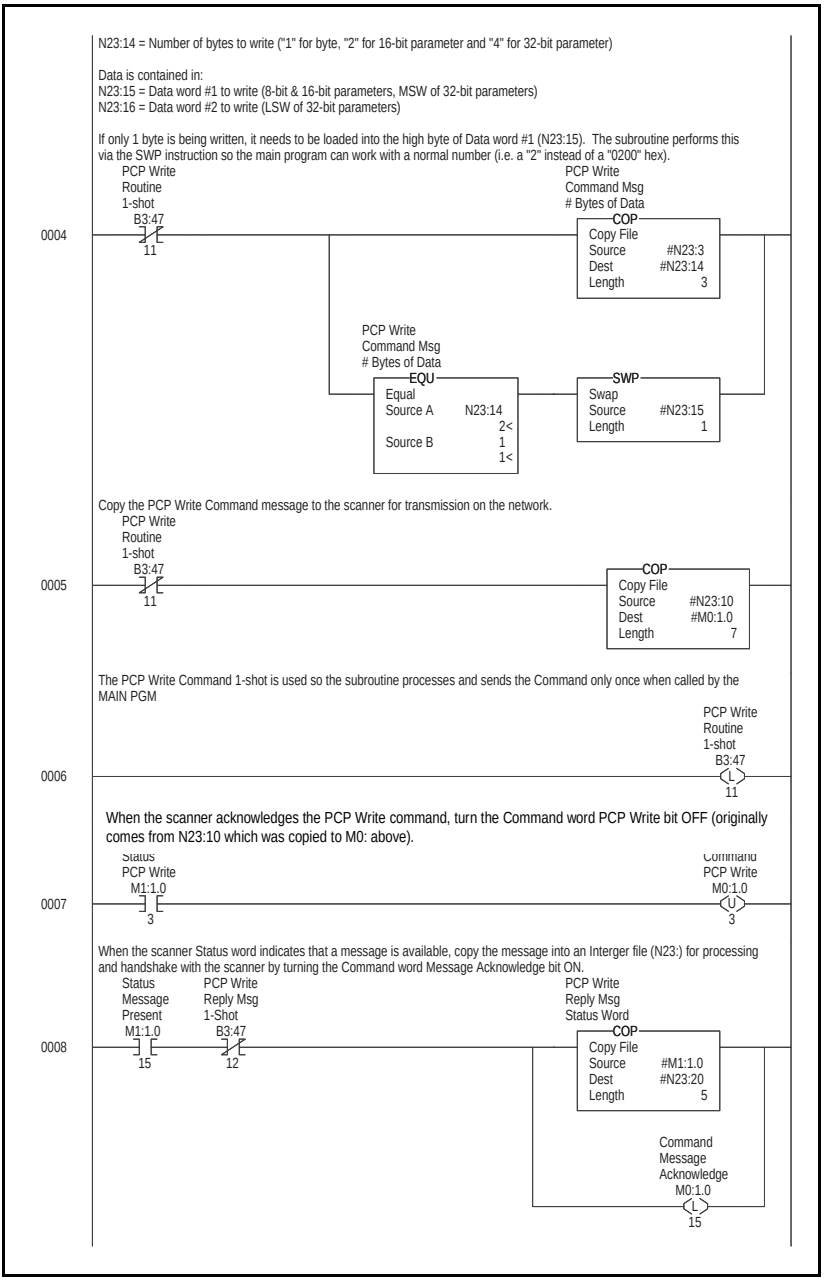


Figure 7.14 – LAD6 - PCP Write Subroutine (Continued)

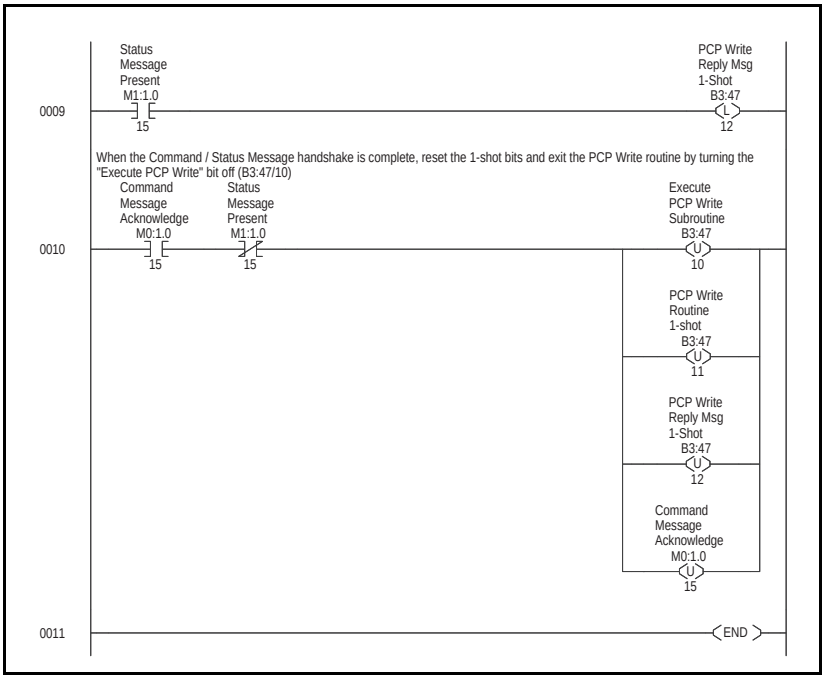


Figure 7.15 – LAD6 - PCP Write Subroutine (Continued)

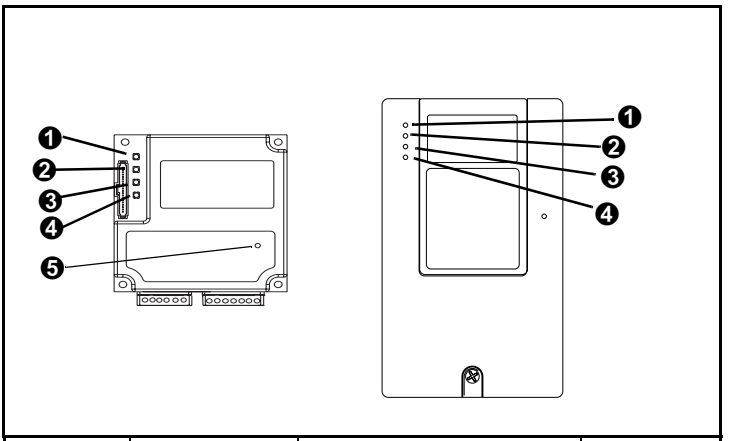
CHAPTER 8

Troubleshooting the Interbus Module and Network

Chapter 8 contains information for troubleshooting the Interbus module and the network.

8.1 Understanding the Status Indicators

The Interbus module has five status indicators. They can be viewed on the module or through the drive cover. See figure 8.1.



Number	Status Indicator	Description	Section
❶	CC	Cable Check	8.1.1
❷	RD	Remote Bus Disable	8.1.2
❸	TR	Transmit/Receive	8.1.3
❹	BA	Bus Active	8.1.4
❺	UL[1]	Bus Voltage	8.1.5

Figure 8.1 – Status Indicators (Location on Drive May Vary)

[1] The UL indicator cannot be seen when the drive cover is installed or closed.

Important: Interbus compliance requires different LED functions than what is normally displayed on the front of the drive (Port, Mod, Net A and Net B LEDs). LED labels are provided with the module for application to the drive cover.

8.2 Cable Check (CC) Status Indicator

Table 8.1 – Cable Check (CC) Status Indicator: State Definitions

Status	Cause	Corrective Action
Off	Master is reset or no cable connection.	• Connect the module to the network using an Interbus cable. • Verify master not in reset.
Solid Green	Cable connection good.	• No action required.

8.3 Remote Bus Disable (RD) Status Indicator

Table 8.2 – Remote Bus Disable (RD) Status Indicator: State Definitions

Status	Cause	Corrective Action
Off	Outgoing remote bus is not switched off.	• No action required.
Solid Red	Outgoing remote bus is switched off.	• Read configuration or start data transmission. Master may have to be reset first.

8.4 Transmit/Receive (TR) Status Indicator

Table 8.3 – Transmit/Receive (TR) Status Indicator: State Definitions

Status	Cause	Corrective Actions
Off	No PCP connection is carried out.	• Verify that master is sending PCP messages.
Solid Green	A PCP connection is being carried out. Flashes when a new PCP frame has been received.	• No action required.

8.5 Bus Active (BA) Status Indicator

Table 8.4 – Bus Active (BA) Status Indicator: State Definitions

Status	Cause	Corrective Actions
Off	Bus not active.	• Set master to start data transmission.
Solid Green	Bus active, exchanging data.	• No action required.
Flash Green	Bus active, but no data exchange.	• Set master to start data transmission.

8.6 Bus Voltage (UL) Status Indicator

Table 8.5 – Bus Voltage (UL) Status Indicator[1]: State Definitions

Status	Cause	Corrective Actions
Off	Bus voltage is not OK.	• Securely connect the module to the drive using the Internal interface cable • Apply power to the drive.
Solid Green	Bus active.	• No action required.

[1] LED is visible only when the drive cover is open.

8.7 Module Diagnostic Items

Module Diagnostic Items can be viewed using VS Utilities software or an LCD OIM. Diagnostic items show current data being transmitted and received by the Host device (e.g., drive), and other diagnostic information regarding the RECOMM-IBUS module.

Table 8.6 – Module Diagnostic Items

No.	Event	Description
1	Common Logic Cmd	The current value of the Common Logic Command being transmitted to the Host.
2	Prod Logic Cmd	The current value of the Product-Specific Logic Command being transmitted to the Host.
3	Reference	The current value ofthe Product-Specific Reference being transmitted to the Host.
4	Common Logic Sts	The current value of the Product-Specific Logic Status being received from the Host.

Table 8.6 – Module Diagnostic Items (Continued)

No.	Event	Description
5	Prod Logic Sts	The current value of the Product-Specific Status being received from the Host.
6	Feedback	The current value of the Product-Specific Feedback being received from the Host.
7	Datalink A1 In	The current value of Datalink A1 being transmitted to the Host. (Value of 0 if Datalink is not used).
8	Datalink A2 In	The current value of Datalink A2 being transmitted to the Host. (Value of 0 if Datalink is not used).
9	Datalink B1 In	The current value of Datalink B1 being transmitted to the Host. (Value of 0 if Datalink is not used).
10	Datalink B2 In	The current value of Datalink B2 being transmitted to the Host. (Value of 0 if Datalink is not used).
11	Datalink C1 In	The current value of Datalink C1 being transmitted to the Host. (Value of 0 if Datalink not used).
12	Datalink C2 In	The current value of Datalink C2 being transmitted to the Host. (Value of 0 if Datalink is not used).
13	Datalink D1 In	The current value of Datalink D1 being transmitted to the Host. (Value of 0 if Datalink is not used).
14	Datalink D2 In	The current value of Datalink D2 being transmitted to the Host. (Value of 0 if Datalink is not used).
15	Datalink A1 Out	The current value of Datalink A1 being received from the Host.
16	Datalink A2 Out	The current value of Datalink A2 being received from the Host.
17	Datalink B1 Out	The current value of Datalink B1 being received from the Host.
18	Datalink B2 Out	The current value of Datalink B2 being received from the Host.
19	Datalink C1 Out	The current value of Datalink C1 being received from the Host.
20	Datalink C2 Out	The current value of Datalink C2 being received from the Host.
21	Datalink D1 Out	The current value of Datalink D1 being received from the Host.
22	Datalink D2 Out	The current value of Datalink D2 being received from the Host.
23	Field Flash Cntr	The number of times this device has been flash updated.

Table 8.6 – Module Diagnostic Items (Continued)

No.	Event	Description
24	DPI Rx Err Cntr	The current value of the DPI CAN Receive error counter.
25	DPI Tx Err Cntr	The current value of the DPI CAN Transmit error counter.
26	IbusImage Siz	Amount of process data bytes used on the Interbus network by the module.

8.8 Viewing and Clearing Events

The module maintains an event queue that reports the history of its actions. You can view the event queue using an LCD OIM or VS Utilities software.

To View and Clear Events Using an LCD OIM

Use the procedure shown in figure 8.2 to access the event queue using the LCD OIM. Note that you must have the RECOMM-IBUS module as the selected device to access the event queue.

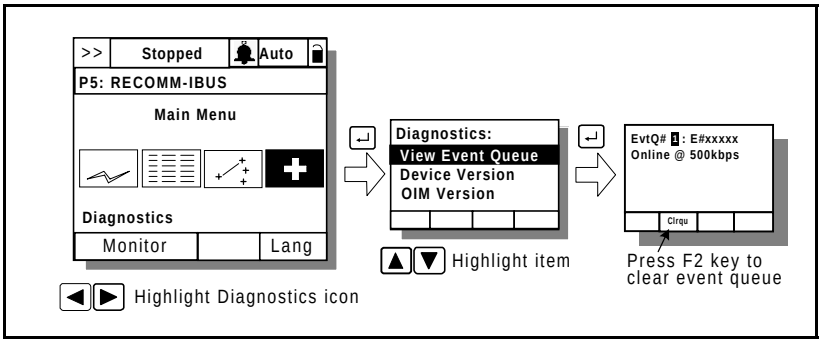


Figure 8.2 – VIewing and Clearing Events Using an LCD OIM

Events

Many events in the event queue occur under normal operation. If you encounter unexpected communications problems, the events may help you or Reliance Electric personnel troubleshoot the problem. Table 8.7 lists events that may appear in the event queue.

Table 8.7 – Event Codes and Descriptions

Code	Event	Description
1	No Event	Empty event queue entry.
2	DPI Bus Off Flt	A bus-off condition was detected on DPI. This event may be caused by loose or broken cables or by noise.
3	Ping Time Flt	A ping message was not received on DPI within the specified time.
4	Port ID Flt	The module is not connected to a correct port on a DPI product.
5	Port Change Flt	The DPI port changed.
6	Host Sent Reset	The DPI product issued this because it was reset.
7	EEPROM Sum Flt	The EEPROM in the module is corrupt.
8	Online @ 125kbps	The module and DPI product are communicating at 125kbps.
9	Online @ 500kbps	The module and DPI product are communicating at 500kbps.
10	Bad Host Flt	The module was connected to an incompatible product.
11	Dup. Port Flt	Another peripheral with the same port number is already in use.
12	Type 0 Login	The module has logged in for type 0 control.
13	Type 0 Time Flt	The module has not received a type 0 status message within the specified time.
14	DL Login	The module has logged into a Datalink.
15	DL Reject Flt	The host rejected an attempt to log in to a Datalink because the Datalink is not supported or is used by another peripheral.
16	DL Time Flt	The module has not received a Datalink message within the specified time.
17	Control Disabled	The module has sent a “Soft Control Disable” command to the DPI product.
18	Control Enabled	The module has sent a “Soft Control Enable” command to the DPI product.

Table 8.7 – Event Codes and Descriptions (Continued)

Code	Event	Description
19	Message Timeout	A Client-Server message sent by the peripheral was not completed.
20	DPI Fault Msg	The DPI Host has faulted.
21	DPI Fault Clear	The user cleared a fault in the module.
22	Normal Startup	Peripheral completes a normal startup.
23	Net Comm Flt	The module detected a fault condition on the Interbus network.
24	Fault Cfg Error	The peripheral detected a 32-bit fault configuration Reference when the Host supports only a 16-bit Reference, or vice-versa.
25	IB Online	The Interbus module has gone on-line the Interbus network.
26	IB Offline	The Interbus module has gone off-line the Interbus network.
27	Lang CRC Bad	Language file CRC is Bad

APPENDIX A

Technical Specifications

Communications

Network	
Protocol	Interbus
Data Rates	500 K
Drive	
Protocol	DPI
Data Rates	125 K or 500 K

Electrical

Consumption	450 mA at 5 V supplied through the drive

Mechanical

Dimensions	
Height	19 mm (0.75 in)
Length	86 mm (3.33 in)
Width	78.5 mm (3.09 in)
Weight	65 g (2.3 oz)

Environmental

Temperature	
Operating	-10 to +50°C (14 to 149°F)
Storage	-40 to +85°C (-40 to 185°F)
Relative Humidity	5 to 95% non-condensing

Regulatory Compliance

UL	508C and CUL
CE	EN50081-2 (1993) and EN61000-6-2 (1999)

APPENDIX B

Interbus Module Parameters

The following information is provided for each Interbus module parameter along with its description:

Parameter Number:	Unique number assigned to each parameter.
Parameter Name:	Unique name assigned to each parameter.
Range:	Predefined parameter limits or selections.
Default:	Factory default setting.
Type:	Read Only or Read/Write
Reset Required:	Module must be reset before parameter value is recognized.

The parameters in the Interbus module are numbered sequentially. However, depending on the configuration tool used, they may have different numbers.

1 DPI Port

Range: 0 to 7

Default: 0

Type: Read Only

Reset Required: N/A

Port to which the module is connected. This will usually be port 5.

2 DPI Data Rate

Range: 0 = 125 K
1 = 500 K

Default: 0 = 125 K

Type: Read Only

Reset Required: N/A

Data rate used by the drive. This data rate is set in the drive and the module detects it.

3 Ref/Fdbk Size

Range: 0 = 16-bit
1 = 32-bit

Default: 0 = 16-bit

Type: Read Only

Reset Required: N/A

Size of the Reference/Feedback. The drive determines the size of the Reference/Feedback.

4 Datalink Size

Range: 0 = 16-bit
1 = 32-bit

Default: 0 = 16-bit

Type: Read Only

Reset Required: N/A

Size of each Datalink word. The drive determines the size of Datalinks.

5 Reset Module

Range: 0 = Ready (No action)
1 = Reset Module
2 = Set Defaults (Restores module to factory-default settings)

Default: 0 = Ready

Type: Read/Write

Reset Required: No

No action if set to “Ready.” Resets the module if set to “Reset Module.” Restores the module to factory default settings if set to “Set Defaults.” This parameter is a command. It will be reset to “0 = Ready” after the command has been performed.

ATTENTION: If the module is transmitting I/O that controls the drive, the drive may fault when you reset the module. Determine how your drive will respond before resetting a connected module. Failure to observe this precaution could result in bodily injury or damage to equipment.

6 Comm Flt Action

Range: 0 = Fault
1 = Stop
2 = Zero Data
3 = Hold Last
4 = Send Flt Cfg

Default: 0 = Fault

Type: Read/Write

Reset Required: No

Action that the module and drive take if the module detects that Interbus communications have been disrupted. This setting is effective only if I/O that controls the drive is transmitted though the module.

ATTENTION: Comm Flt Action (6) lets you determine the action the module and connected drive if communications are disrupted. By default, this parameter faults the drive. You can set this parameter so that the drive continues to run. Take precautions to ensure that the setting of this parameter does not create a hazard of injury or equipment damage. Failure to observe this precaution could result in bodily injury or damage to equipment.

7 Reserved

Range: N/A

Default: N/A

Type: N/A

Reset Required: N/A

8 DPI I/O Config

Range: See figure B.1.

Default: See figure B.1.

Type: Read/Write

Reset Required: N/A

I/O that is transferred through the module.

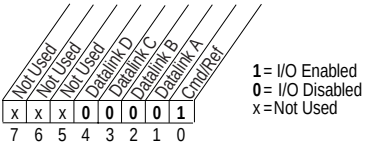


Figure B.1 – DPI I/O Config (8)

ATTENTION: If the module is transmitting I/O that controls the drive, the drive may fault when you reset the module. Determine how your drive will respond before resetting a connected module. Failure to observe this precaution could result in bodily injury or damage to equipment.

9 DPI I/O Active

Range: See figure B.2.

Default: See figure B.2.

Type: Read Only

Reset Required: N/A

I/O that the module is actively transmitting. The value of this parameter will usually be equal to the value of DPI I/O Config (8).

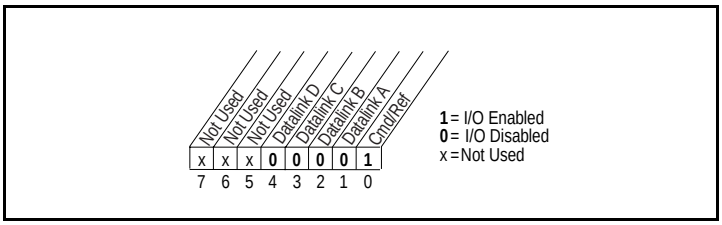


Figure B.2 – DPI I/O Active (9)

10 Flt Cfg Logic

Range: 0000 0000 0000 0000 to 1111 1111 1111 1111

Default: 0000 0000 0000 0000

Type: Read/Write

Reset Required: No

Sets the Logic Command data that is sent to the drive if the following is true:

- Comm Flt Action (6) is set to Send Flt Cfg and communications are disrupted.
- Idle Flt Action (7) is set to Send Flt Cfg and the scanner is put into Program or Test mode.

The bit definitions will depend on the product to which the module is connected.

11 Flt Cfg Ref

Range: 0 to 4294967295

Default: 0

Type: Read/Write

Reset Required: No

Sets the Reference data that is sent to the drive if any of the following is true:

- Comm Flt Action (6) is set to Send Flt Cfg and communications are disrupted.
- Idle Flt Action (7) is set to Send Flt Cfg and the scanner is put into Program mode.

Important: If the drive uses a 16-bit Reference, the most significant word of this value must be set to zero (0) or a fault will occur.

12 Flt Cfg A1
13 Flt Cfg A2
14 Flt Cfg B1
15 Flt Cfg B2
16 Flt Cfg C1
17 Flt Cfg C2
18 Flt Cfg D1
19 Flt Cfg D2

Range: 0 to 4294967295

Default: 0

Type: Read/Write

Reset Required: No

Sets the data that is sent to the Datalink in the drive if any of the following is true:

- Comm Flt Action (6) is set to Send Flt Cfg and communications are disrupted.
- Idle Flt Action (7) is set to Send Flt Cfg and the scanner is put into Program mode.

20 PIDD W0 Cfg

Range: See table B.1

Default: 0x2F9A (Logic Status)

Type: Read/Write

Reset Required: No (becomes active when Interbus network is restarted)

Configured Process Input Data Description for Word 0. PCP Object to use for Word 0 transmitted to Interbus master.

21 PIDD W0 Actual

Range: See table B.1

Default: N/A

Type: Read Only

Reset Required: N/A

Actual Process Input Data Description for Word 0.

22 PIDD W1 Cfg

Range: See table B.1

Default: 0x2F9B (Feedback)

Type: Read/Write

Reset Required: No (becomes active when Interbus network is restarted)

Configured Process Input Data Description for Word 1, PCP Object to use for Word 1 transmitted to Interbus master.

23 PIDD W1 Actual

Range: See table B.1

Default: N/A

Type: Read Only

Reset Required: N/A

Actual Process Input Data Description for Word 1.

24 PIDD W2 Cfg

Range: See table B.1

Default: 0

Type: Read/Write

Reset Required: No (becomes active when Interbus network is restarted)

Configured Process Input Data Description for Word 2. PCP Object to use for Word 2 transmitted to Interbus master.

25 PIDD W2 Actual

Range: See table B.1

Default: N/A

Type: Read Only

Reset Required: N/A

Actual Process Input Data Description for Word 2.

26 PIDD W3 Cfg

Range: See table B.1

Default: 0

Type: Read/Write

Reset Required: No (becomes active when Interbus network is restarted)

Configured Process Input Data Description for Word 3. PCP Object to use for Word 3 transmitted to Interbus master.

27 PIDD W3 Actual

Range: See table B.1

Default: N/A

Type: Read Only

Reset Required: N/A

Actual Process Input Data Description for Word 3.

28 PIDD W4 Cfg

Range: See table B.1

Default: 0

Type: Read/Write

Reset Required: No (becomes active when Interbus network is restarted)

Configured Process Input Data Description for Word 4. PCP Object to use for Word 4 transmitted to Interbus master.

29 PIDD W4 Actual

Range: See table B.1

Default: N/A

Type: Read Only

Reset Required: N/A

Actual Process Input Data Description for Word 4.

30 PIDD W5 Cfg

Range: See table B.1

Default: 0

Type: Read/Write

Reset Required: No (becomes active when Interbus network is restarted)

Configured Process Input Data Description for Word 5. PCP Object to use for Word 5 transmitted to Interbus master.

31 PIDD W5 Actual

Range: See table B.1

Default: N/A

Type: Read Only

Reset Required: N/A

Actual Process Input Data Description for Word 5.

32 PIDD W6 Cfg

Range: See table B.1

Default: 0

Type: Read/Write

Reset Required: No (becomes active when Interbus network is restarted)

Configured Process Input Data Description for Word 6. PCP Object to use for Word 6 transmitted to Interbus master.

33 PIDD W6 Actual

Range: See table B.1

Default: N/A

Type: Read Only

Reset Required: N/A

Actual Process Input Data Description for Word 6.

34 PIDD W7 Cfg

Range: See table B.1

Default: 0

Type: Read/Write

Reset Required: No (becomes active when Interbus network is restarted)

Configured Process Input Data Description for Word 7. PCP Object to use for Word 7 transmitted to Interbus master.

35 PIDD W7 Actual

Range: See table B.1

Default: N/A

Type: Read Only

Reset Required: N/A

Actual Process Input Data Description for Word 7.

36 PIDD W8 Cfg

Range: See table B.1

Default: 0

Type: Read/Write

Reset Required: No (becomes active when Interbus network is restarted)

Configured Process Input Data Description for Word 8. PCP Object to use for Word 8 transmitted to Interbus master.

37 PIDD W8 Actual

Range: See table B.1

Default: N/A

Type: Read Only

Reset Required: N/A

Actual Process Input Data Description for Word 8.

38 PODD W0 Cfg

Range: See table B.1

Default: 0X2F98

Type: Read/Write

Reset Required: No (becomes active when Interbus network is restarted)

Configured Process Output Data Description for Word 0. PCP Object to use for Word 0 received from Interbus master.

39 PODD W0 Actual

Range: See table B.1

Default: N/A

Type: Read Only

Reset Required: N/A

Actual Process Output Data Description for Word 0.

40 PODD W1 Cfg

Range: See table B.1

Default: 0X2F99

Type: Read/Write

Reset Required: No (becomes active when Interbus network is restarted)

Configured Process Output Data Description for Word 1. PCP Object to use for Word 1 received from Interbus master.

41 PODD W1 Actual

Range: See table B.1

Default: N/A

Type: Read Only

Reset Required: N/A

Actual Process Output Data Description for Word 1.

42 PODD W2 Cfg

Range: See table B.1

Default: 0

Type: Read/Write

Reset Required: No (becomes active when Interbus network is restarted)

Configured Process Output Data Description for Word 2. PCP Object to use for Word 2 received from Interbus master.

43 PODD W2 Actual

Range: See table B.1

Default: N/A

Type: Read Only

Reset Required: N/A

Actual Process Output Data Description for Word 2.

44 PODD W3 Cfg

Range: See table B.1

Default: 0

Type: Read/Write

Reset Required: No (becomes active when Interbus network is restarted)

Configured Process Output Data Description for Word 3. PCP Object to use for Word 3 received from Interbus master.

45 PODD W3 Actual

Range: See table B.1

Default: N/A

Type: Read Only

Reset Required: N/A

Actual Process Output Data Description for Word 3.

46 PODD W4 Cfg

Range: See table B.1

Default: 0

Type: Read/Write

Reset Required: No (becomes active when Interbus network is restarted)

Configured Process Output Data Description for Word 4. PCP Object to use for Word 4 received from Interbus master.

47 PODD W4 Actual

Range: See table B.1

Default: N/A

Type: Read Only

Reset Required: N/A

Actual Process Output Data Description for Word 4.

48 PODD W5 Cfg

Range: See table b.1

Default: 0

Type: Read/Write

Reset Required: No (becomes active when Interbus network is restarted)

Configured Process Output Data Description for Word 5. PCP Object to use for Word 5 received from Interbus master.

49 PODD W5 Actual

Range: See table B.1

Default: N/A

Type: Read Only

Reset Required: N/A

Actual Process Output Data Description for Word 5.

50 PODD W6 Cfg

Range: See table B.1

Default: 0

Type: Read/Write

Reset Required: No (becomes active when Interbus network is restarted)

Configured Process Output Data Description for Word 6. PCP Object to use for Word 6 received from Interbus master.

51 PODD W6 Actual

Range: See table B.1

Default: N/A

Type: Read Only

Reset Required: N/A

Actual Process Output Data Description for Word 6.

52 PODD W7 Cfg

Range: See table B.1

Default: 0

Type: Read/Write

Reset Required: No (becomes active when Interbus network is restarted)

Configured Process Output Data Description for Word 7. PCP Object to use for Word 7 received from Interbus master.

53 PODD W7 Actual

Range: See table B.1

Default: N/A

Type: Read Only

Reset Required: N/A

Actual Process Output Data Description for Word 7.

54 PODD W8 Cfg

Range: See table B.1

Default: 0

Type: Read/Write

Reset Required: No (becomes active when Interbus network is restarted)

Configured Process Output Data Description for Word 8. PCP Object to use for Word 8 received from Interbus master.

55 PODD W8 Actual

Range: See table B.1

Default: N/A

Type: Read Only

Reset Required: N/A

Actual Process Output Data Description for Word 8.

56 PCP Comm Cfg

Range: 0 = Disable
1 = Enable

Default: 1 = Enable

Type: Read/Write

Reset Required: Yes

Enable Interbus PCP communications.

57 PCP Comm Act

Range: 0 = Disable
1 = Enable

Default: 1 = Enable

Type: Read Only

Reset Required: N/A

Actual PCP configuration.

Table B.1 – PIDD / PODD Indexes

Input			Output		
Value (Hex)	**Value (Dec)**	**Selects**	**Value (Hex)**	**Value (Dec)**	**Selects**
2F9A	12186	Logic Status	2F98	12184	Logic Command
2F9B	12187	Feedback	2F99	12185	Reference
2FA4	12196	Datalink A1 Out	2F9C	12188	Datalink A1 In
2FA5	12197	Datalink A2 Out	2F9D	12189	Datalink A2 In
2FA6	12198	Datalink B1 Out	2F9E	12190	Datalink B1 In
2FA7	12199	Datalink B2 Out	2F9F	12191	Datalink B2 In
2FA8	12200	Datalink C1 Out	2FA0	12192	Datalink C1 In
2FA9	12201	Datalink C2 Out	2FA1	12193	Datalink C2 In
2FAA	12202	Datalink D1 Out	2FA2	12194	Datalink D1 In
2FAB	12203	Datalink D2 Out	2FA3	12195	Datalink D2 In

APPENDIX C

Logic Command/ Status Words

Appendix C provides the definitions of the Logic Command/Logic Status words that are used for some products that can be connected to the Interbus module. If you do not see the Logic Command/Logic Status for the product that you are using, refer to your product's documentation.

Logic Command Word

Logic Bits															Command	Description
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
															x	Stop	0 = Not Stop 1 = Stop
														x		Start[1]	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 Command 10 = Reverse Command 11 = Hold Direction Control
									x							Local Control	0 = No 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 Accel Rate
				x	x											Decel Rate	00 = No Command 01 = Decel Rate 1 Command 10 = Decel Rate 2 Command 11 = Hold Decel Rate

Logic Bits															Command	Description
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
	x	x	x													Reference Select	000 = No Command 001 = Ref. 1 (Ref A Select) 010 = Reserved 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

[1] A 0 = Not Stop condition (logic 0) must first be present before a 1 = Start condition will start the drive.

Logic Status Word

Logic Bits															Status	Description
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
															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 = No 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 “Network” 110 = Port 6 111 = No Local

Logic Bits															Status	Description
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
x	x	x	x													Reference	0000 = Ref A Auto 0001 = Reserved 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

CMD software - (IBS CMD G4) A software package that enables configuration, monitoring, and diagnostics of all connected devices in an Interbus network.

communications module - Devices such as drives, controllers, and computers usually require a module to provide a communication interface between them and a network such as Interbus. A module reads data on the network and transmits it to the connected device. It also reads data in the device and transmits it to the network.

The RECOMM-IBUS module is an module that connects SP600 drives to a Interbus network. Modules are sometimes also called “adapters,” “cards,” “embedded communication options,” “gateways,” and “peripherals.”

Communication Reference (CR) - Identifies an Interbus device in the parameter data channel (PCP). To send a PCP service to a device, its CR must be specified. The CRs begin at “2” and must be assigned in ascending order.

controller - Also called programmable logic controller. A solid-state control system that has a user-programmable memory for storage of instructions to implement specific functions such as I/O control, logic, timing, counting, report generation, communication, arithmetic, and data file manipulation. A controller consists of a central processor, input/output interface, and memory. *See also* scanner.

data rate - The data rate is the speed at which data is transferred on the Interbus network (fixed at 500 K).

Datalink - A type of pointer used by some SP600 drives to transfer data to and from the controller. Datalinks allow specified parameter value(s) to be accessed or changed without using explicit messages. When enabled, each Datalink consumes either four bytes or eight bytes in both the input and output image table of the controller. The drive determines the size of Datalinks.

DPI - A peripheral communication interface used by various Reliance Electric drives and power products.

DPI peripheral - A device that provides an interface between DPI and a network or user. Peripheral devices are also referred to as “adapters” and “modules.” The serial converter and SP600 OIM are examples of DPI peripherals.

DPI product - A device that uses the DPI communications interface to communicate with one or more peripheral devices. For example, a motor drive such as an SP600 drive is a DPI product. In this manual, a DPI product is also referred to as “product” or “host.”

Explicit Messaging - *see* Peripheral Communications Protocol (PCP) Messaging.

fault action - Determines how the module and connected product act when a communications fault (for example, a cable is disconnected) occurs or when the modules receives a “Stop Transmission” command from the scanner. The former uses a communications fault action, and the latter uses an idle fault action.

fault configuration - When communications are disrupted (for example, a cable is disconnected), the module and SP600 drive can respond with a user-defined fault configuration. The user sets the data that is sent to the drive in the fault configuration parameters (parameters 10 (Flt Cfg Logic) through 19 (Flt Cfg D2)). When a fault action parameter is set to use the fault configuration and a fault occurs, the data from these parameters is sent as the Command Logic, Reference, and/or Datalink(s).

flash update - The process of updating firmware in the module. The module can be flash updated using the X-Modem protocol and a RECOMM-232 serial converter.

hold last - When communications are disrupted (for example, a cable is disconnected), the module and SP600 drive can respond by holding last. Hold last results in the drive receiving the last data received via the Interbus connection before the disruption. If the drive was running and using the reference from the module, it will continue to run at the same reference.

I/O data - I/O data transmit time-critical data such as a Logic Command and Reference. The terms “input” and “output” are defined from the scanner’s point of view. Output is transmitted by the scanner and consumed by the module. Input is transmitted by the module and consumed by the scanner.

Interbus Network - An Interbus network uses RS485 to connect devices (for example, controllers, drives, and motor starters) and it can support a maximum of 126 devices in a daisy chain connection., Each device is assigned a unique node address and transmits data on the network at the same data rate.

General information about Interbus and the Interbus specification are maintained by the Interbus Club at http://www.ibsclub.com.

Logic Command/Logic Status - The Logic Command is used to control the SP600 drive (e.g., start, stop, direction). It consists of one 16-bit word of input to the module from the network. The definitions of the bits in this word depend on the drive.

The Logic Status is used to monitor the SP600 drive (for example, operating state, motor direction). It consists of one 16-bit word of output from the module to the network. The definitions of the bits in this word depend on the drive.

master - *see* scanner

non-volatile storage (NVS) - NVS is the permanent memory of a device. Devices such as the module and drive store parameters and other information in NVS so that they are not lost when the device loses power. NVS is sometimes called “EEPROM.”

operator interface module (OIM) - A device that can be used to configure and control an SP600 drive.

PIDD (Process Input Data Description) - Words used to mapping input data on the network. Examples of input data include Logic Status, Feedback, and Datalinks (Datalink x1 Out).

ping - A message that is sent by a DPI product to its peripheral devices. They use the ping to gather data about the product, including whether it can receive messages and whether they can log in for control.

reference/feedback - The reference is used to send a reference (for example, speed, frequency, torque) to the product. It consists of one word of input to the module from the network. The size of the word (either a 16-bit word or 32-bit word) is determined by the drive.

Feedback is used to monitor the speed of a product. It consists of one word of output from the module to the network. The size of the word (either a 16-bit word or 32-bit word) is determined by the drive.

scanner - A separate module (of a multi-module controller) or a built-in component (of a single-module controller) that provides communication with modules connected to a network. Also called a master. *See also* controller.

status indicators - LEDs that are used to report the status of the module, network, and drive. They are on the module and can be viewed on the front cover of the drive when the drive is powered.

VS Utilities software - A Windows-based software tool for monitoring and configuring Reliance Electric products and modules. VS Utilities can be used to configure the Interbus module and SP600 drives.

zero data - When communications are disrupted (for example, a cable is disconnected), the module and drive can respond with zero data. Zero data results in the drive receiving zero as values for command data. If the drive was running and using the reference from the module, it will stay running but at zero reference.

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