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SST-PB3-CLX-RLL

User Reference Guide

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Preface

Preface Sections:

- Purpose of this Guide
- Special Notation

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Purpose of this Guide

This manual is a user's guide for the SST ControlLogix (CLX) PROFIBUS scanner module, commonly known as the SST-PB3-CLX-RLL. Use this guide if you are responsible for installing, programming or troubleshooting control systems that use Allen-Bradley CLX processors or Honeywell PlantScape Control processors and the SST-PB3-CLX-RLL scanner. For more information on Honeywell's PlantScape system, refer to Section D2, Reference Documents. It is assumed that you have a basic understanding of PLCs and are familiar with PROFIBUS modules and the PROFIBUS network.

Special Notation

The following special notations are used throughout this guide:



Warning

Warning messages alert the reader to situations where personal injury may result. Warnings are accompanied by the symbol shown, and precede the topic to which they refer.



Caution

Caution messages alert the reader to situations where equipment damage may result. Cautions are accompanied by the symbol shown, and precede the topic to which they refer.



Note

A note provides additional information, emphasizes a point, or gives a tip for easier operation. Notes are accompanied by the symbol shown, and follow the text to which they refer.

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1
System Overview

Chapter Sections:

- System Overview

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1.1 System Overview

1.1.1 Scanner Capabilities

The SST-PB3-CLX-RLL is the PROFIBUS scanner for the 1756 (ControlLogix) backplane and Honeywell PlantScape system. It enables communication between a CLX processor and DP remote I/O devices on a PROFIBUS network, acting as a PROFIBUS DP remote I/O scanner. It:

- DP Master and Slave Certified (with Profibus Firmware Revision 7.25)
- Supports up to 15 listen-only connections plus 1 output connection
- As a Master supports Sync and Freeze commands
- Supports Rockwell's RSLogix 5000 Add-on-Profile (AOP)
- Can scan up to 125 slaves
- Supports and scans up to 122 words of input data and 122 words of output data per slave
- Can reside in any slot in the local or remote CLX chassis. You can have up to 8 scanners in a rack.
- Supports all standard PROFIBUS baud rates (9600, 19200, 31.25k, 45.45k, 93.75k, 187.5k, 500k, 1.5M, 3M, 6M, 12M)
- Supports the following DPV1 Master services:
    - Class 1: MSAC1_Read, MSAC2_Write
    - Class 2: MSAC2_Initiate, MSAC2_Read, MSAC2_Write, MSAC2_Idle, MSAC2_Abort
- Can handle up to 16 Class 1 and 16 Class 2 commands simultaneously
- Can handle up to 16 Class 2 connections (to 16 Class 2 DPV1 Slaves) when using DPV1 Class 2 Communication only
- Can act as a DPV0 slave
- Allows for simultaneous operation of PROFIBUS Master and Slave (up to 12M)
- As a Master, supports a maximum of 1984 bytes of input data and 1968 bytes of output data with in 4 I/O pages
- As a Master, supports configurations with up to 256 I/O modules

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1.1.2 Configuring the Scanner

Use the SST PROFIBUS Configuration Tool to configure the scanner. You can have up to 4 pages of 248 words of input data and 4 pages of 246 words of output data.

The Tool also allows you to configure I/O on the DP network, enabling you to download the configuration to the scanner via the serial port or an RSLinx driver. The scanner stores this configuration in its flash memory, so you don't need to download it every time you start the CLX.

The input and output data for the slaves is mapped into the ControlLogix 5550 Controller's I/O Data arrays, starting at byte offset 4. The mapping depends on the addresses you assign in your Master configuration.

1.1.3 Scanning Network and I/O Status

The scanner maintains the following status information about the network and the I/O modules on the network:

- Active Slave Station Bit table
- Configured Slave Station Bit table
- Network diagnostic counters
- DP master diagnostic counters

1.1.4 Operating Modes

The SST-PB3-CLX operates in Asynchronous Mode. The Module starts scanning as soon as the card comes online; PB3-CLX does not wait for an RPI to trigger the Profibus scan like the PFB-CLX does. This is the only behavior difference between SST-PFB-CLX and SST-PB3-CLX after the card has gone online.

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2
Hardware Overview

Chapter Sections:

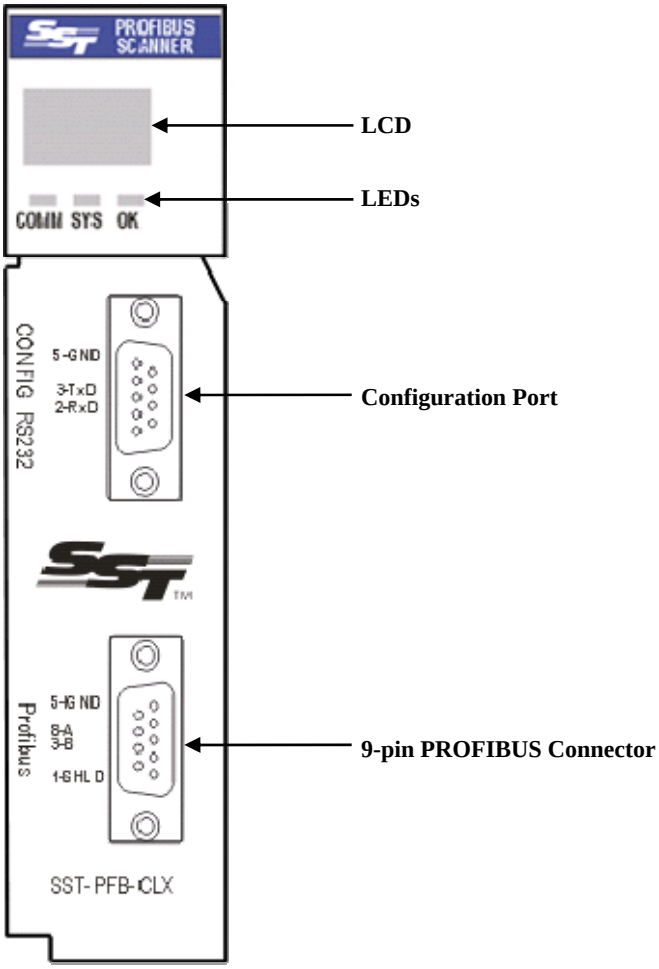
- Hardware Features

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2.1 Hardware Features

The scanner's features are shown here. The LCD displays the firmware version at power up, and connection status and errors during operation. The three LEDs (COMM, SYS and OK) display PROFIBUS and module behavior. For more detailed information on LEDs, refer to Section 4.3, PROFIBUS LED and Display States.

Figure 1: Scanner Features



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Table 1: Description of Features

Feature	Description
Status LEDs	Display the communication and system status
Front label	Identifies the scanner
9-pin PROFIBUS Connector	For connection to the PROFIBUS network
Self-locking tabs	Secure the scanner in the chassis slot
Side label (nameplate)	Provides module information
Display	CLX Connection status faults, operation status
Configuration port	For downloading I/O configuration data and upgrading firmware

2.1.1 Status LEDs

There are three LEDs on the scanner, the COMM LED, SYS LED and the OK LED. For detailed information, refer to Section 4.3, PROFIBUS LED and Display States.

COMM LED

The COMM LED indicates the health of the PROFIBUS network and flashes green when the PROFIBUS scanner is token passing or being monitored via the Configuration Tool. The LED is solid green when there are no network errors. If a network error occurs, the COMM LED can either be off, solid red, or flashing red periodically while it is green.

SYS LED

At powerup, the SYS LED shines red, then green for two seconds. While it shines, you can enter System Configuration mode to download new firmware to the scanner.

When the scanner acts as a Master, the SYS LED indicates the communication status with PROFIBUS slaves. A solid red SYS LED indicates that one or more slaves are in error, and solid green means that all slaves are being scanned on the network in Run mode. When it's amber, all slaves are being scanned in Clear mode (outputs are all zeroes).

When the scanner acts as a slave, the SYS LED indicates the communication status with the PROFIBUS Master. When the SYS LED is solid red, the PROFIBUS Master is no longer scanning, and when it is solid green, the PROFIBUS Master is successfully scanning the module as a slave in Run mode. An amber SYS LED indicates that the PROFIBUS Master is scanning the module as a slave in Clear mode.

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OK LED

The OK LED indicates that initialization is complete and that the module is OK.

2.1.2 9-Pin PROFIBUS Connector

The 9-pin PROFIBUS Connector connects the scanner to the PROFIBUS network.

2.1.3 Configuration Port

Use the configuration port to download I/O configurations via the Configuration Tool or HyperTerminal and to upgrade scanner firmware.

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3
Quick Start

Chapter Sections:

- Purpose
- Equipment and Tools
- Package Contents
- Power Requirements
- Procedures

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3.1 Purpose

Although this section does not include detailed information in its procedures, other chapters are referenced where more information is available. These procedures are written with the assumption that you have a basic understanding of process control and are fully able to interpret the ladder logic instructions that control the applications.

3.2 Equipment and Tools

Have the following tools and equipment ready:

- CLX programming equipment
- Rockwell's Generic Profile sample ladder code
    - Sample RSLogix 5000 v.11 Ladder program (SSTPFBCLX_Preview_2_Example.ACD)
    - Sample RSLogix 5000 v.11 Ladder Program (DPV1_Class1.ACD & DPV1_Class2.ACD)
    - Sample RSLogix 5000 v.11 Ladder Program (sstpfbclx_IO_Expansion.ACD)
- Rockwell's RSLogix 5000 AOP version 15 sample ladder code
    - sstpb3clx_main_AOP_example.ACD
    - DPV1_ReadClass1_AOP.ACD
    - DPV1_ReadClass2_AOP.ACD
    - sstpfbclx_IO_Expansion_AOP.ACD
- SST PROFIBUS Configuration Tool
- Terminal Software (Optional)
- Null modem cable
- PROFIBUS cable to connect the scanner to the PROFIBUS network
- PROFIBUS DB-9 connector. Suggestion: Brad Harrison PA9D01-42.

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3.3 Package Contents

Unpack the SST-PB3-CLX-RLL scanner module. Make sure that the contents include:

- PROFIBUS scanner
- PDF version of this manual included on the CD
- Serial null modem cable for downloading I/O configurations
- CD with files for Windows NT/2000/XP installations

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3.4 Power Requirements

Review your system's power requirements to see that your chassis supports placement of the scanner module.



Note

The scanner consumes 850 mA @ 5VDC, 1.75 mA @ 24VDC.

For modular systems, calculate the total load on the system power supply using the procedure described in the CLX 5000 Modular Style Installation & Operation Manual, Allen-Bradley Publication 1747-6.2

3.5 Procedures

The setup of the SST-PB3-CLX-RLL scanner is divided into two parts:

- Setting up the scanner
- Getting the scanner running

3.5.1 Setting up the Scanner

The following steps describe the SST-PB3-CLX-RLL scanner setup procedure:

1. Insert the scanner module into your 1756 CLX chassis.
2. Connect the scanner to the PROFIBUS devices using the appropriate cabling and termination. Refer to Section 4.2, PROFIBUS Wiring, for more detailed information.
3. From the CD, open the supplied sample RSLogix 5000 Ladder program that you need to include with the rest of your control program to operate the scanner.



Note

You may need to change the rack size and scanner location in the I/O configuration. Changing the slot location will update the existing controller tags.

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If you are using PlantScape, refer to Section 5.1.2, Configuring Through PlantScape Control Builder.

4. Set up your system's I/O configuration for the particular slot in which you installed the scanner. Refer to Section 5.1, Configuring the Scanner, for more information.

5. Save your program.

6. Apply power to the CLX.

7. Put the CLX PLC in Program mode and transfer the program to the CLX PLC. See your programming software manuals for details.

3.5.2 Getting the Scanner Running

The following steps describe how to install and set up the SST-PB3-CLX-RLL scanner:

1. Install Profibus Backplane Products Installation.



Note

Ensure that you uninstall any previous PROFIBUS installation and reboot your PC before installing a new version of the software.

Refer to Section 5.1.1, Configuring Through RSLogix 5000, for more detailed information. If you are using PlantScape, refer to refer to Section 5.1.2, Configuring Through PlantScape Control Builder.

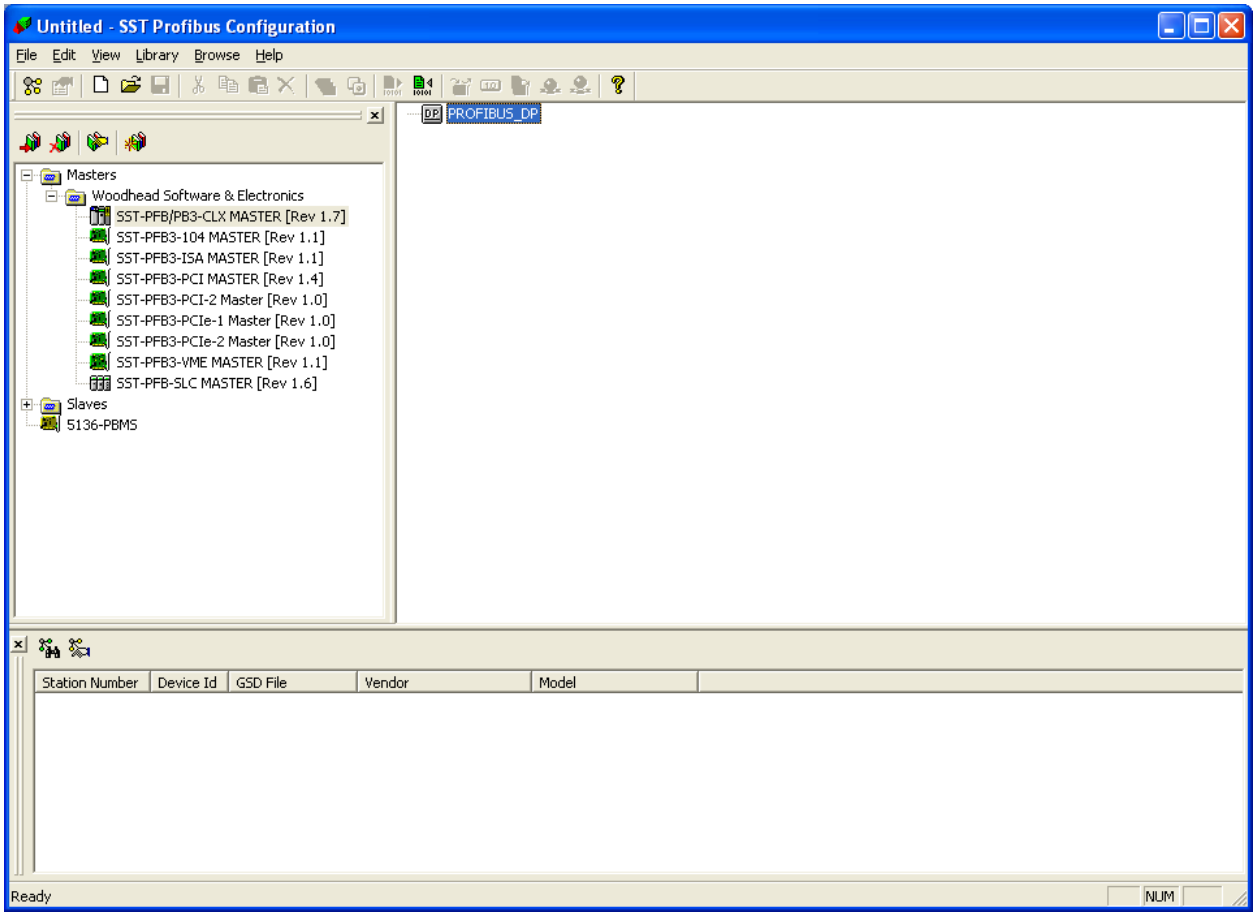
2. Run the setup.exe file from the supplied Windows 2000/XP/Server 2003 installation CD. This installation script has an option to install a set of tools for use with SST PROFIBUS backplane modules. The SST-PB3-CLX-RLL scanner is a backplane module and this option should be used to install the Configuration Tool and associated software.

3. Open the SST PROFIBUS Configuration Tool window by selecting: Start Menu > SST PROFIBUS Configuration.

4. Select File > New.

5. In the PROFIBUS Device library (left-most pane), select and drag the SST-PB3-CLX master into the Network view (right-most pane) to add it. Select AOP option if using Add-on-Profile.

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6. Select the Master Station number.

7. Configure the bus parameters and set the network baud rate.

8. From the PROFIBUS Device library, select and drag the slave into the Network view to add the slave to the configuration.

9. For each slave:

    a. Set the slave station number
    b. Set the slave module type
    c. Assign I/O addresses to the slave
    d. Configure the slave parameters



Note

The I/O addresses determine where the slave data maps into the CLX data table. You can use the Print Preview feature under the File menu to determine where each I/O module for all your slaves is mapped to in the input and output data arrays in the CLX processor.

10. Connect the PROFIBUS Configuration Tool to the scanner using the null modem cable supplied, or by configuring an RSLinx driver.

11. While the CLX PLC is in Program mode or PBIM Block with Clear mode enabled is inactive, right-click on CLX Master and select Connect from the shortcut menu.



Note

Before connecting to the CLX scanner, make sure that it has completed its initialization (green OK LED displays on the front of the scanner) and the CLX PLC is in Program mode or PBIM Block with Clear mode enabled is inactive.

12. One you are communicating, the COMM LED flashes at one-second intervals on the scanner.

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13. To download the I/O configuration to the scanner, right-click on the CLX Master and select the Load Configuration option from the shortcut menu. If the scanner is online at the time, select Yes when prompted with the "**Card is ONLINE do you want to load configuration?"** message. When the download is complete, the Master Status displays **Configured Program**.

14. Select the Online icon located in the toolbar to put the SST-PB3-CLX-RLL online (COMM and SYS LEDs turn ON). The online module begins to scan I/O in Clear mode (output is all zeroes).



Warning

Do not put the CLX PLC in Run mode or have the PBIM block active in Honeywell's Control Builder while connected to the scanner. This may cause an unrecoverable serial communications failure, requiring you to cycle the power on the scanner before being able to connect to it again.

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4

Installing the SST-PB3-CLX-RLL Scanner

Chapter Sections:

- Installing the Scanner Module
- PROFIBUS Wiring
- PROFIBUS LED and Display States

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4.1 Installing the Scanner Module

4.1.1 Installation Procedure

The following procedure describes how to install the scanner module:

1. You can, but do not necessarily need to disconnect the power, as the scanner supports insertion under power.
2. Using the chassis card guides, align the full-sized circuit board.
3. Slide the module into the chassis until the top and bottom latches catch.
4. Attach the PROFIBUS cable.
5. Turn on connector termination as required.
6. Route the cable down and away from the scanner.

4.1.2 Removal Procedure

The following procedure describes how to uninstall the scanner module:

1. You can, but do not necessarily need to disconnect the power, as the scanner supports removal under power.
2. Remove all cabling from the scanner.
3. Press the releases at the top and bottom of the module and slide the module out of the module slot.

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4.2 PROFIBUS Wiring

The module contains a standard DB9 connector, which can be connected to a PROFIBUS bus terminal. The module has no built-in termination. If you require termination, you can use a Bus terminal that has built-in selectable termination.

Table 2: DB9 Instructions

Pin #	Pin Description	DB9 Line * Termination When Using the SST-PB3-CLX-RLL
1	Chassis ground	
2	Reserved	
3	Data +	Connect this pin to pin 8 (data -) with 220 ohm resistor
4	TX Enable	
5	Isolated ground	Connect this pin to pin 8 (data -) with 390 ohm resistor
6	Isolated +5V	Connect this pin to pin 3 (data +) with 390 ohm resistor
7	Reserved	
8	Data -	
9	Reserved	

* For line A cable (135-165 ohm impedance)



Caution

Do not connect devices to the +5V line. It is there for termination purposes only.

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4.2.1 Selecting the Proper Line Type

Use this table to determine which line type best suits your system requirements.

Table 3: Line Types

Baud Rate (Bits/s)	Line A Distance (Max)	Line B Distance (Max)	Register Value
9k6, 19.2k, 31.25 k, 45.45 k and 93.75k	1200 m**	1200 m**	0, 1, 10, 11, 2
187.5k	1000 m**	600 m**	3
500k	400 m**	200 m**	4
1.5M	200 m**	NA	6
3, 6 and 12M	100 m**	NA	7, 8, 9
NA = Not Applicable *If using a combination of both line types, divide the lengths shown by two. **This is the sum of all bus segment and drop cable lengths.			



Note

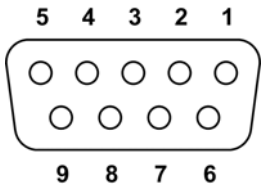
The two physical ends of the PROFIBUS network should be terminated. There should be only two terminators on a network.

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4.2.2 PROFIBUS Connector

The card has one standard PROFIBUS DB9 female connector per channel. Pin numbers are identified in the following figure.

Figure 2: The PROFIBUS DB9 Female Connector



Note

The recommended male connector is the Brad Harrison PA9D01-42 Diagnostic D-Sub Connector.

The recommended cable is a Beldon3079A. Examples include:

- Brad Harrison 85-001 PVR2 conductor with shield, UL-listed PROFIBUS cable
- Bosch Comnet DP #913 548 Flexible PROFIBUS cable
- Bosch Comnet DP #917 201 Trailing PROFIBUS cable
- Bosch Comnet DP #917 202 Massive PROFIBUS cable

Note

Allen Bradley blue hose, which has an impedance of 78 ohms, is not recommended.

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4.3 PROFIBUS LED and Display States

The following tables show how the LEDs and the display work together to provide detailed information on the operation of the scanner.

Table 4: COMM LED Behavior

LED State	Description
Solid Green	The PROFIBUS network is healthy. No network errors exist.
Flashing Green	Token passing is occurring while monitoring scanner in PROFIBUS Configuration Tool.
Flashing Red	Periodically flashes red while green at one second intervals to indicate that a network error exists.
Solid Red	Network errors exist. Check your cabling and termination.

Table 5: SYS LED Behavior

LED State	Description
Solid Green	The PROFIBUS master is healthy and is scanning all slaves in Run mode.
*Solid Red	During powerup, indicates when to connect to scanner's serial port in System Configuration mode. Otherwise, one or more slaves are reporting a fault condition.
Amber	The PROFIBUS master is scanning all slaves in Clear mode (output is all zeroes).

* Refer to Section 5.3.5, Diagnosing Slave Errors in the SST PROFIBUS Configuration Tool, for further information.

Table 6: OK LED Behavior

LED State	Description
Solid Green	Initialization is complete and module is ready
Solid Red	Hardware error

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4.3.1 LED and Display Combinations

While a connection is open, COPN shows on the LCD Display. From left to right, the LEDs are COMM, SYS and OK.

Table 7: LED and Display Combinations

COPN State	Description
 COMM, SYS and OK LEDs are green.	Card is online and is scanning all slaves in Run mode. The connection is open.
 OK LED is green and COMM and SYS are off.	Card is offline and the connection is open.
 SYS and OK LEDs are green. COMM is off.	Card is online and is configured as a passive station (no Master configuration in flash or Active Parameter is set to 0. Type SHOWNET and SHOWMAS in HyperTerminal to check this.).
 COMM and OK LEDs are green, SYS LED is amber.	Card is online and is scanning all slaves in Clear mode (outputs are zero). Connection is open.
 COMM and SYS LEDs are red, OK LED is green.	Card is online. Network errors exist. Connection is open. Pull the PROFIBUS connector off and if the COMM LED goes back to green, there's a cable or termination problem.
 COMM and OK LEDs are green, SYS LED is red.	Card is online and is not scanning all slaves. Connection is open.

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4.3.2 Display Tables

The following tables show how the display works to provide detailed information on the scanner's operation:

Table 8: SST-PB3-CLX-RLL Display

Display	Meaning/Description
Ver x.xx	Power up message. This message appears briefly during power up. x.xx is the firmware version.
Invalid Serial Number	The serial number has not yet been programmed on this module.
CLX INIT FALT 0xYY	ControlLogix Initialization fault. The ControlLogix Backplane startup routines failed, with failure code YY (hex).
CONNCLSD	There are no open ControlLogix Backplane connections.
NVLD XMIT SIZE	Invalid transmit size. The size of the transmitted data for a new connection does not match that of an existing connection.
NVLD OUT CNPT	Invalid output connection point.
NVLD RCV SIZE	Invalid receive size. The size of the received data for the connection is invalid.
NVLD RCV BUFF	Invalid receive buffer. Failed to allocate a receive buffer. This should never happen.
CONN BLKED	Connections blocked (not allowed). The Connection Manager is in a Connections not allowed state. This should never happen.
DUPLCONN DTCT	Duplicate connection detected. Connection is already open.
RSRC ERR1 INCM	Resource error # 1 in Connection Manager: Out of memory. This should never happen.
NVLD FWD OPEN	Invalid forward open. CM was unable to parse the Forward open. May be a key segment mismatch.
NVLD SRVC CODE	Invalid service code. Service code in CLX Forward Open was invalid.
WDOG	Watchdog timeout. The module watchdog has timed out.
OFPT	Scanner firmware operational fault.
Backplane OK	SST-PB3-CLX-RLL resides in the rack that is powered on but not configured in the CLX Controller.
Booting	SST-PB3-CLX-RLL is just powering up and initializing.
COPN	Connection open.
MULT	Multiple processors are attempting to connect to the scanner.
IDMSM	There is a Profibus Slave ID Mismatch. The DP Master is trying to configure module with wrong Slave ID



Note

The default LCD display is COPN when the scanner is working correctly.

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5

Configuring and Programming the DP Master

Chapter Sections:

- Configuring the Scanner
- Creating an I/O Configuration
- Downloading to the Scanner
- Troubleshooting
- Importing the DP Master Binary Configuration (.bss) Using the Configuration Tool
- Downloading the I/O Configuration to the Scanner Using HyperTerminal
- Errors
- Running the Scanner
- SST-PB3-CLX-RLL I/O and Status Images
- Making Changes to the CLX Configuration File while the PROFIBUS card is Online

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5.1 Configuring the Scanner

5.1.1 Configuring Through RSLogix 5000

There are two ways of configuring the SST-PB3-CLX-RLL in RSLogix 5000; Generic 1756 Module type and AOP (Add-on-Profile). Generic 1756 Module is supported in all versions of RSLogix 5000. AOP is supported in RSLogix 5000 versions 15 and higher. AOP is the recommended method since it allows you to configure all options on the SST-PB3-CLX-RLL via a GUI. AOP generates data tags that are more specific to the module. Diagnostic tags are easier to identify and the I/O tags are separated from the command control registers. You no longer have to edit values in the module's configuration array to configure the module as a DP Slave or DP Master and Slave. The configuration file is automatically updated when you select options in the AOP interface. For customers with existing applications, the project can be upgraded to use the AOP profile but it will be necessary to delete the Generic profile prior to using AOP profile. This includes updating ladder logic to use AOP tags instead of generic tags and then deleting the generic tags. AOP and generic sample ladder code is available.

If you need to reduce the size of the I/O tables you must use 1756-Generic profile. I/O sizes are fixed at their maximum sizes in AOP. To configure through RSLogix 5000 using 1756-Generic profile, see section on Generic 1756 Module.

5.1.2 AOP Requirements

- Rockwell RSLogix 5000 Version 15 or later.

The following are available on the SST Backplane Communication Module Products CD v1.7.0.0 and on our webs site www.wooodhead.com.

- Backplane firmware module Pbfclx.ss4 version 8.6
- Profibus firmware module Pfbclx.ss3 7.26
- Rockwell's RSLogix 5000 AOP installation 1.21.1.0
- SST Profibus Configuration Tool v 3.13.13.0
- RSLogix 5000 Ladder sample code using AOP (Created in RSLogix 5000 Version 15)
    - sstpb3clx_main_AOP_example.ACD
    - DPV1_ReadClass1_AOP.ACD
    - DPV1_ReadClass2_AOP.ACD
    - sstpfbclx_IO_Expansion_AOP.ACD

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5.1.3 Using the Add-on-Profiles

This procedure was tested with versions 15.00, 16.03 and 17.00 of RSLogix 5000.

Note

When you are configuring the Module, ensure that the CLX is in Program mode.

1. From the SST Backplane Communication Module Products CD, run the SST Profibus backplane Products installation by going to Product Menu/SST-PB3-CLX-RLL. This will install the following components to configure the module for AOP:
   - SST Profibus Configuration Tool
   - Firmware modules Pfbclx.ss4 and pfbclx.ss3. Default install directory is Program Files\BradCommunications\SST Profibus\Firmware
   - RSLogix 5000 AOP sample ladder code. Default install directory is Program Files\BradCommunications\SST Profibus\Ladder Sample Codes for ControlLogix\AOP
2. From the SST Backplane Communication Module Products CD, select Product Menu/ SST-SST-PB3-CLX-RLL and run Rockwell's RSLogix 5000 AOP install and follow the instructions.
3. AOP requires the SST-PB3-CLX-RLL to be loaded with firmware modules Pbfclx.ss4 v8.6 or higher and Pfbclx.ss3 7.26 or higher. The version of pfbclx.ss4 is displayed at power-up. To determine the version of pfbclx.ss3, execute the command string "ver pfbclx.ss3" in HyperTerminal. To determine the version of pfbclx.ss3 or if you need to upgrade the firmware modules see chapter 8, section Upgrading the Scanner Firmware.

Note

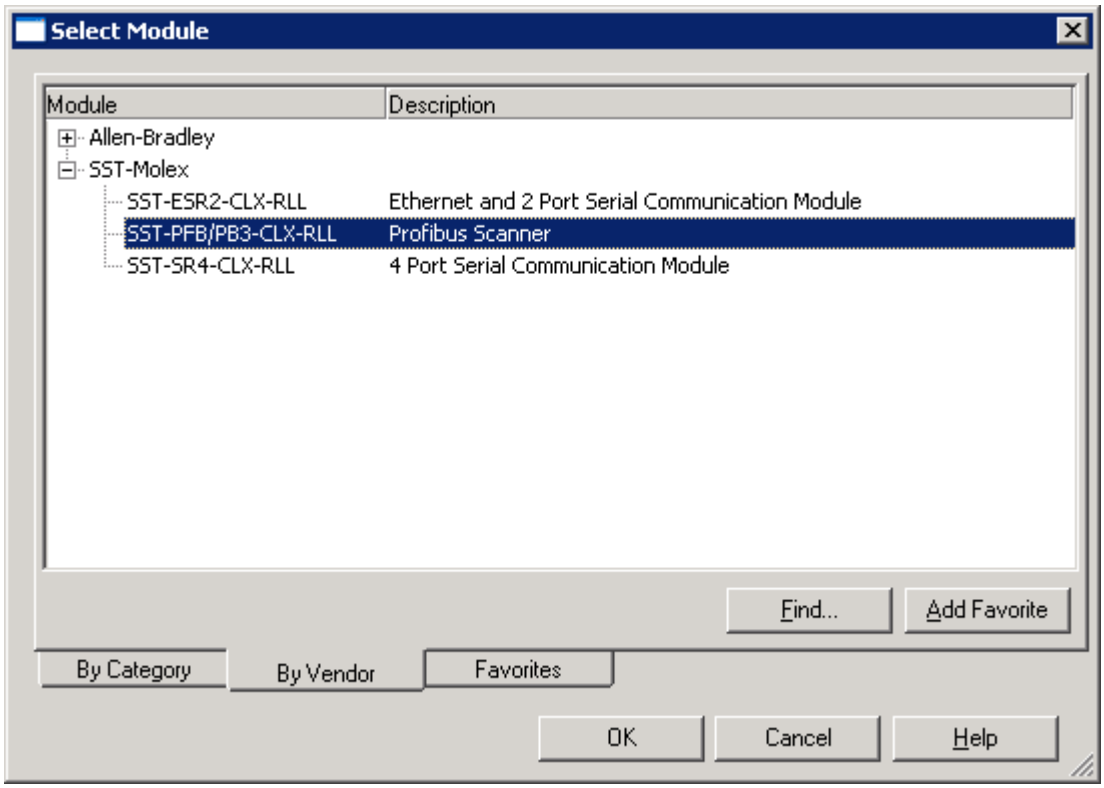
After upgrading firmware on module to support AOP, the **Profibus ID** number will change from **0x0876 to 0x0C44**. This new ID affects the module as a DP Slave. If needed, you can force the module to still use Profibus ID 0x0876 by enabling the option called Legacy_ID_0876 on the Module Configuration tab when you configure its Add-on-Profile in RSLogix 5000.

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To configure through RSLogix 5000, follow these steps:

4. In RSLogix 5000, from the project tree, right-click on 1756-Backplane and select New Module…

5. Scroll down until you see the Vendor Name “SST-Molex”. Select SST-PFB/PB3-CLX-RLL.The module is also displayed under Category\Communications.



If you are going to have more than one PLC communicating with the same SST-PB3-CLX-RLL (output connection plus listen only connection), all must use the Generic Module type or AOP. Generic module and AOP types cannot be mixed.

6. Double click on SST-PFB/PB3-CLX-RLL, The following window will appear.

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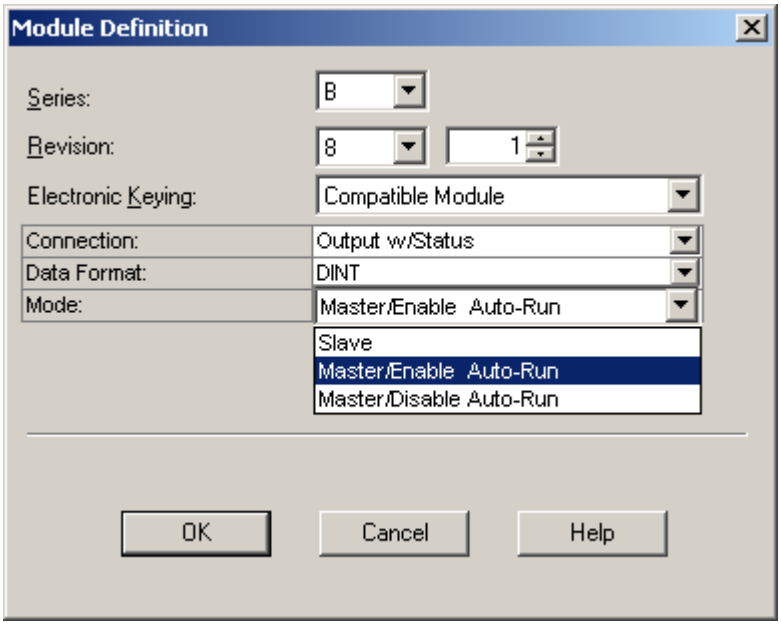
7. Enter a name in the Name field. This parameter must begin with a letter.

8. Enter a description. This is optional.

9. Click on the Down Arrow to configure the slot number of module.

10. The SST-PFB-PB3-CLX-RLL can be configured in three different modes; as a DP Master, DP Slave, or as a DP Master and DP Slave. The default is DP Master with Auto-Run enabled. If you require a different mode, different Connection type such as Listen-Only or different data format click on the **Change…** button. The following Module Definition window will appear.

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11. Series B represents the SST-PB3-CLX-RLL module. This is the default. Series A represents the legacy SST-PFB-CLX-RLL.

12. The Revision refers to the backplane firmware version on module. The revision contains a Major and Minor revision number. The defaults for Major and Minor are 8 and 1.This revision is displayed on the SST-PB3-CLX-RLL LCD display at power-up and is displayed in RSLinx when viewing the properties of our module in RSWho.

13. Electronic keying is a feature that allows a consistency check to be done between the physical module and software configuration of the module. The consistency check involves checking attributes Vendor, Product Type, Catalog number, Major and Minor Revision. There are three modes available: Compatible, Exact Match, and Disable Keying. The default is compatible mode. In compatible mode, a COPN to the module is only successful when:

    - Module type and Catalog Number and Major revision must match
    - The Minor revision of the physical module must be equal to or greater than the one specified in the software.

    If you want to make use of the Exact Match option for the Electronic keying, all of the attributes of the SST-PB3-CLX-RLL module and the module created in software must match. If the module's firmware is upgraded later, the Revision setting must be updated so that it matches exactly.

    The "Disable Keying" option allows a COPN to the module without performing a consistency check. This option is not recommended.

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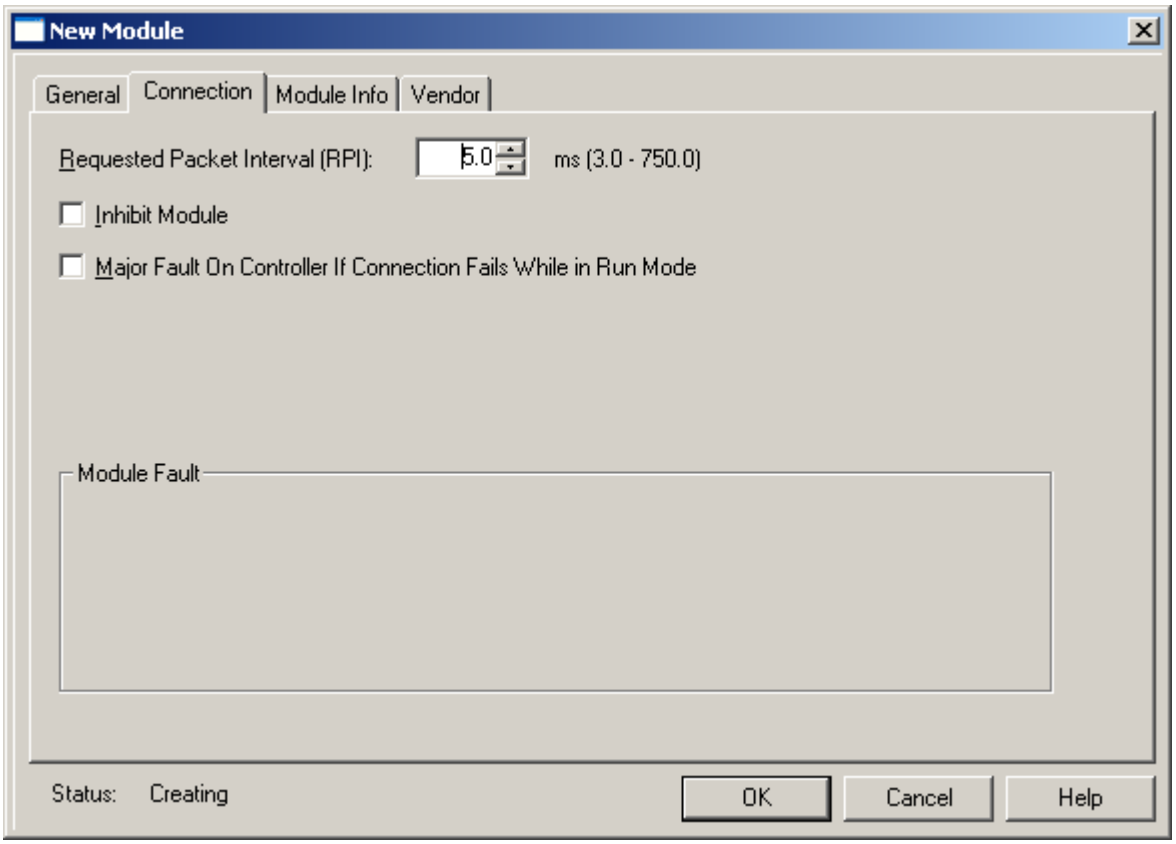
14. The default connection type is Output w/ Status. Listen-only connection is also available.

15. Select the data format required (INT, SINT, DINT). INT is the default.

16. Click on the next to the Mode field and select one of the three available modes. The default is Master/Enable Auto-Run. If you require Master mode but do not want the card to come online automatically, select Master/Disable Auto-Run. Select Slave mode if you want to configure the module as a DP slave only or as a Master and Slave. Selecting Slave mode will create an additional dialog called “Module Configuration” to configure the Slave or Master-Slave parameters.

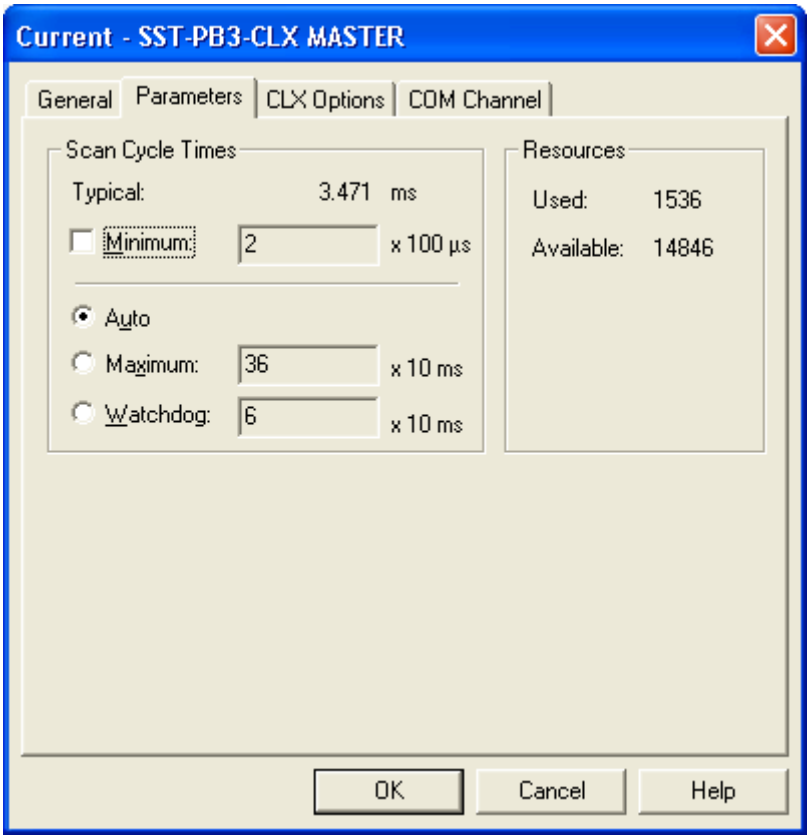
17. Click OK to accept the changes.

18. If required, click on the Connection tab to modify the Rate Packet Interval (RPI) time. The default is 5ms. The valid range is 3ms to 750ms.



When the SST-PB3-CLX-RLL is configured as a Master, the RPI should be at minimum, 2 times the Profibus typical scan time. The typical scan time is displayed in the SST Profibus configuration tool under the SST-PB3-CLX-RLL Master properties. Double-Click on the SST-PB3-CLX Master in your configuration to open the properties dialog and select parameters tab. You will get the screenshot below. Here the typical scan time is 3.471ms. So the recommended RPI would be 2 x 3.471 = 6.942 rounded up would be 7ms.

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Note

The PB3-CLX is not synchronized to the RPI time. The PB3-CLX starts scanning as soon as it goes online. This is the only behavioral change as a DP Master from the PFB-CLX card.

19. See chapter 10, section Configuring the CLX Slave in RSLogix 5000 using Add-on-Profile (AOP) if configuring the module as DP slave or as DP Master and Slave. Otherwise Click on OK. The SST-PFB/PB3-CLX-RLL will appear in your I/O configuration.

Note

Our web address, online help and technical support phone numbers are available on the Vendor tab.

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Now begin creating your ladder code using the detailed tags created by AOP for the SST-PB3-CLX-RLL. For a more detailed description of I/O and status file tags see CLX interface layout later in this chapter.

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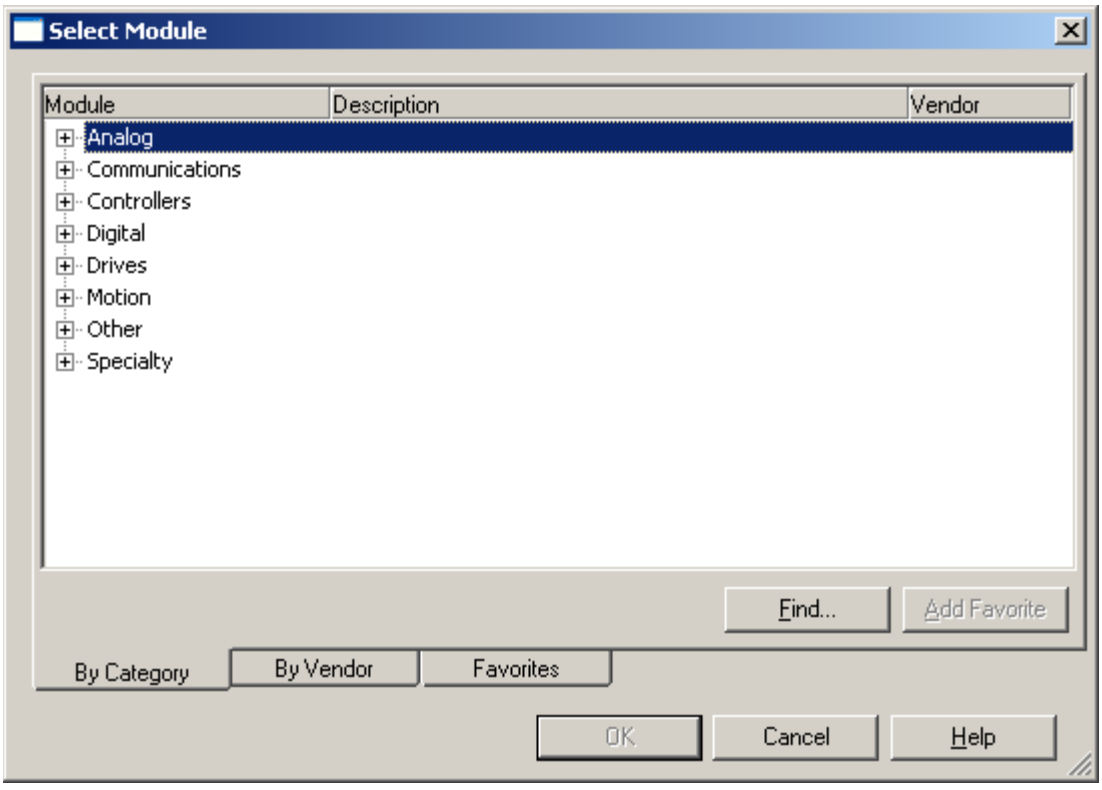
5.1.4 Using Generic 1756 Module Profile

This procedure was tested with versions 11.00, 12.00, 13.00, 15.00, 16.03, 17.00 of RSLogix 5000.

Note

When you are configuring the scanner, ensure that the ControlLogix CPU is in Program mode.

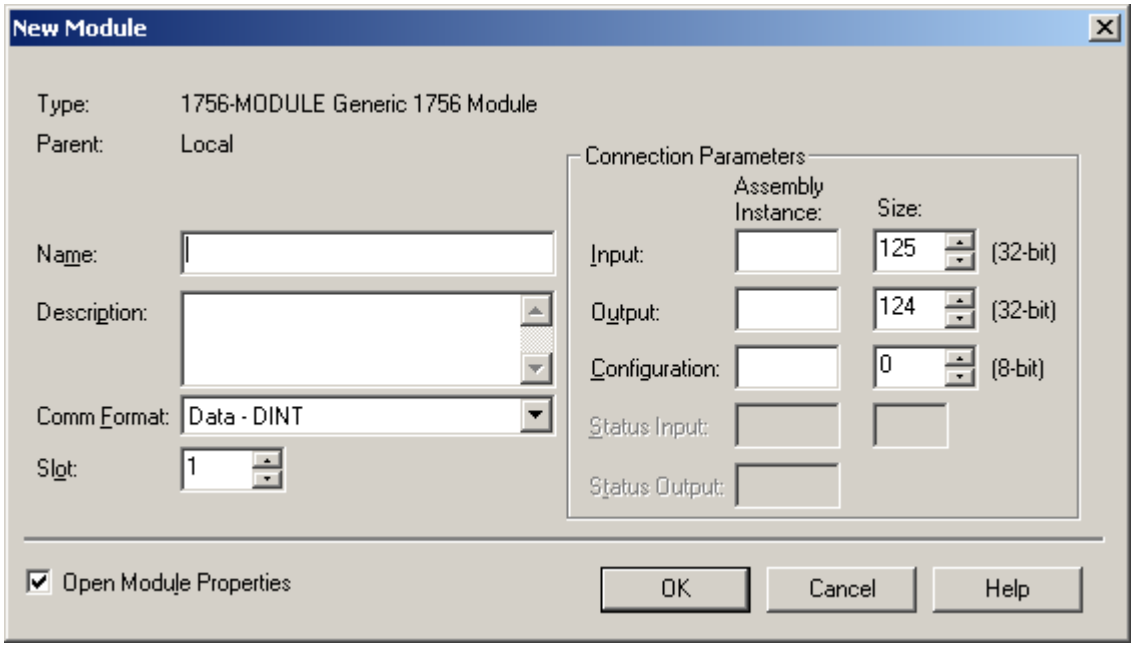
1. Create a new program offline.
2. Select the 1756 CLX ControlLogix Controller as the Controller type.
3. Select the correct Chassis type that you are using from the list.
4. In the project tree, right-click on I/O Configuration and select New Module from the shortcut menu. The Select Module Type window displays.



5. Select the category "**Other**" and expand it to select the Generic 1756 Module option from the module Type list.

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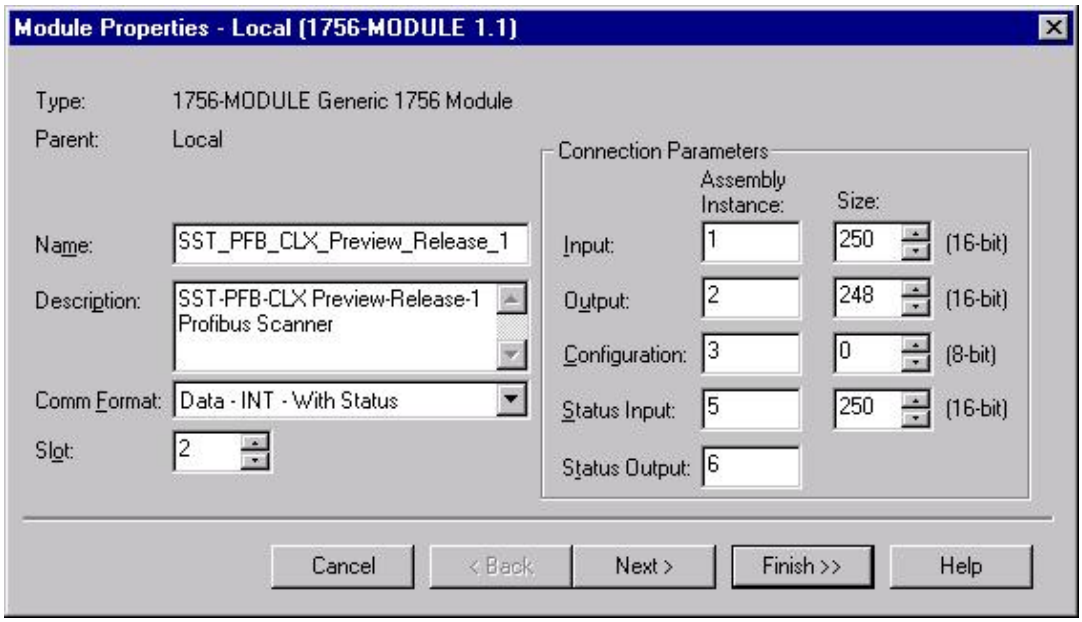
6. Select OK. The corresponding Module Properties window displays.



7. In the Name field, type in the new name for the Controller.
8. Set the COMM Format to one of the following:
    - Data-DINT-with status
    - Data-INT-with status (recommended)
    - Data-SINT-with status
9. In the Slot field, set the correct slot number.
10. From the Connection Parameters frame, set the following values:
    - **Input** - Assembly Instance to 1 and Size to 250 16-bit elements
    - **Output** - Assembly Instance to 2 and a Size to 248 16-bit elements
    - **Configuration** - Assembly Instance to 3 and Size to 0 (zero). When configured as a Master only, this will be size is 0 if AUTORUN is not required, and 2 if it is required. As a Slave only, the size must be 24. As a Master and Slave, the size must be 26.
    - **Status Input** - Assembly Instance to 5 and a Size to 250 elements
    - **Status Output** - Assembly Instance to 6

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An example screenshot below using Data INT – With Status



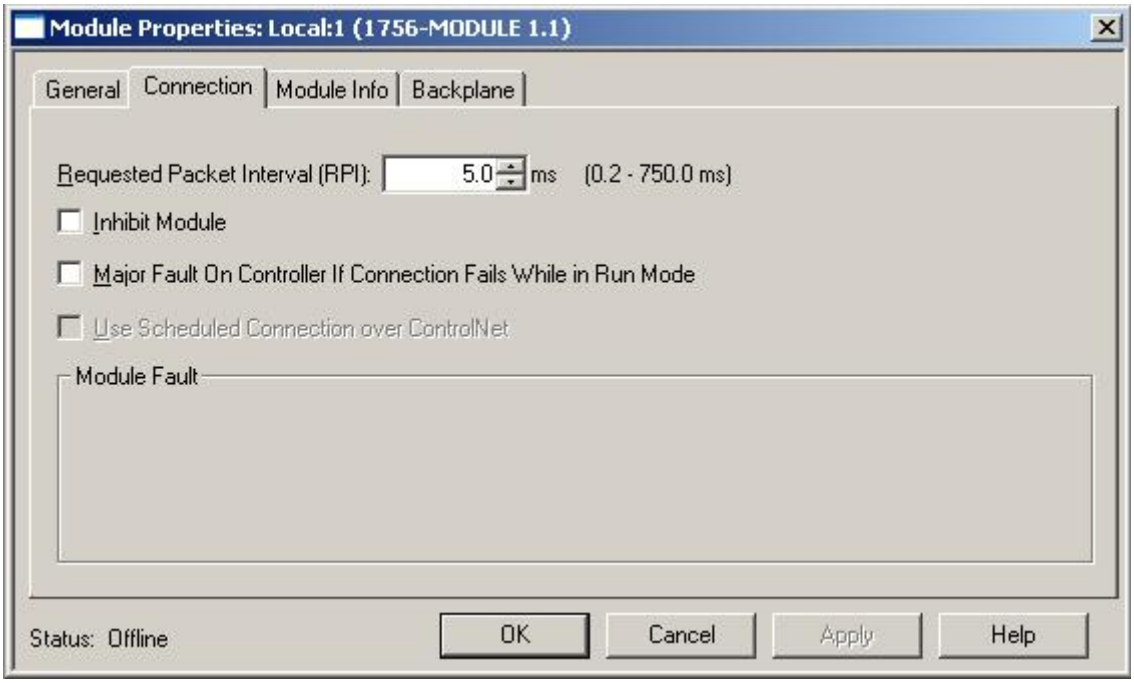
Note

When using the scanner as a slave only, the Configuration Size should be set to 24.

11. Click OK.

12. Select Next >. The corresponding Modules Properties window displays.

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Set the Requested Packet Interval (RPI) accordingly. The RPI value must not be any lower than 3ms.



Note

The PB3-CLX is not synchronized to the RPI time. The PB3-CLX starts scanning as soon as it goes online. This is the only behavioral change as a DP Master from the PFB-CLX card.

The estimated PROFIBUS typical scan cycle time can be generated by the Configuration Tool once the Profibus network has been created. To find the typical scan cycle time, right-click on the CLX Master in the Tool and select Properties. Next, click the Parameters tab. The typical scan cycle time is displayed in milliseconds in the upper-left corner. Refer to Section 5.2, Creating an I/O Configuration, for more information on using the Configuration Tool.

13. Select Finish >> to save the configuration.

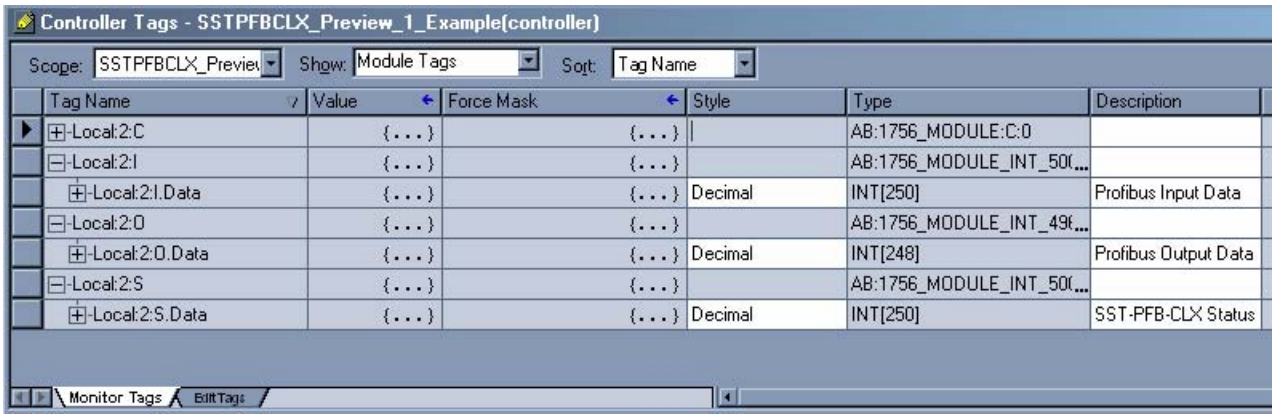
14. Create the rest of your Control program and all of the logic.

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Note

You must include the SST sample RSLogix 5000 program (SSTPFBCLX_Preview_2_Example.ACD or SSTPFBCLX_AOP.ACD), located on the CD, or see Section 7.2, Main CLX Example, to interface to the scanner.

15. Save the configuration file and download it to the CLX scanner.



The above graphic shows the data areas created in the ControlLogix 5550 Controller as a result of the SST-PB3-CLX-RLL scanner's Generic Profile configuration.

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5.1.5 Configuring Through PlantScape Control Builder

If you are using the PlantScape System, perform the following steps to configure the SST-PB3-CLX-RLL scanner:

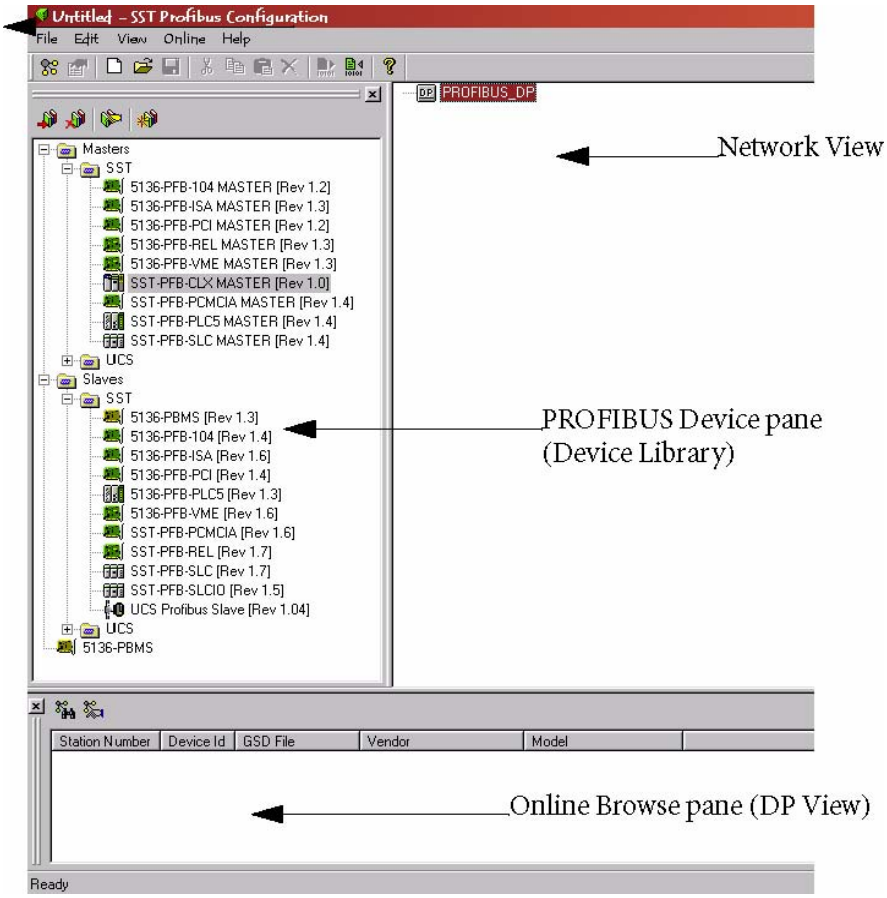
1. Open the PlantScape Control Builder by navigating to Programs > PlantScape Engineering Tools > Control Builder.
2. Close one of the project windows that displays.
3. Select CPM block.
4. Select the Load with Contents option from the Tools menu.
5. Select the Continue button.
6. Select the Monitoring tab located on the bottom of the Project window.
7. Select CEE.
8. From the Operate menu, select Activate.
9. From the sub-menu, select the This CEE and its 10M and CM's option.
10. Select YES in the Change State dialog box. This procedure places the processor in Run mode and the SST-PB3-CLX-RLL scanner online and in Run mode. For detailed information, refer to Honeywell's PlantScape PROFIBUS Implementation guide.

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5.2 Creating an I/O Configuration

The SST PROFIBUS Configuration Tool window consists of a main or Network view and two panes: the PROFIBUS Devices pane (Device Library) and the Online Browse pane (DP view). Both of these are floating panes; drag and drop them to move them anywhere inside the Network view.

Figure 3: SST PROFIBUS Configuration Tool Window

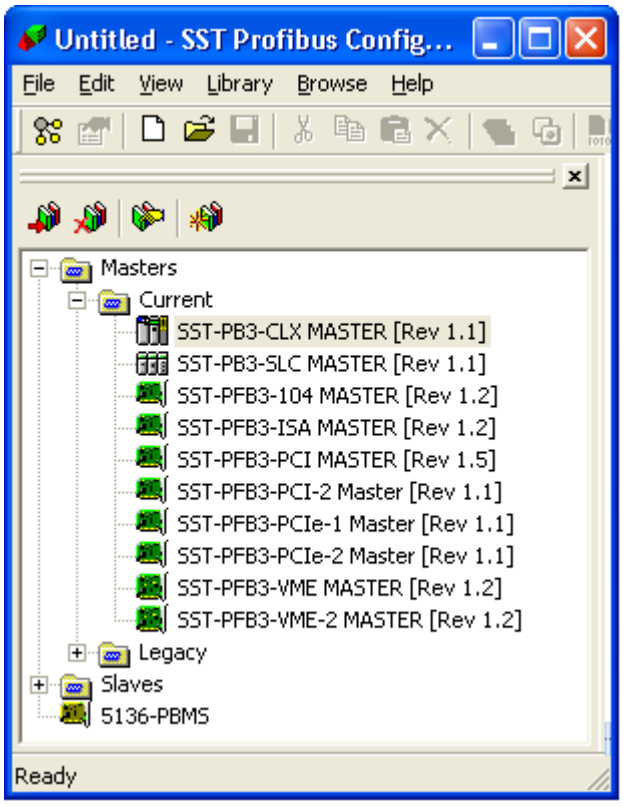


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5.2.1 Configuring the SST-PB3-CLX-RLL Card as a DP Master

The following procedure was done using SST Profibus Configuration Tool Version 3.13.13.0

1. Click the Windows Start button.
2. Navigate to the SST PROFIBUS Configuration option to run the SST PROFIBUS Configuration Tool.
3. Select File > New to create a new configuration.
    - To open the Device library (left-most pane), select View > Library. This pane appears by default in the upper left-hand side of the window.
    - To open the Online Browse pane or DP view, choose View > Online. This pane appears by default at the bottom of the window.
4. Locate and select the SST-PB3-CLX Master device in the Device library (left-most pane).



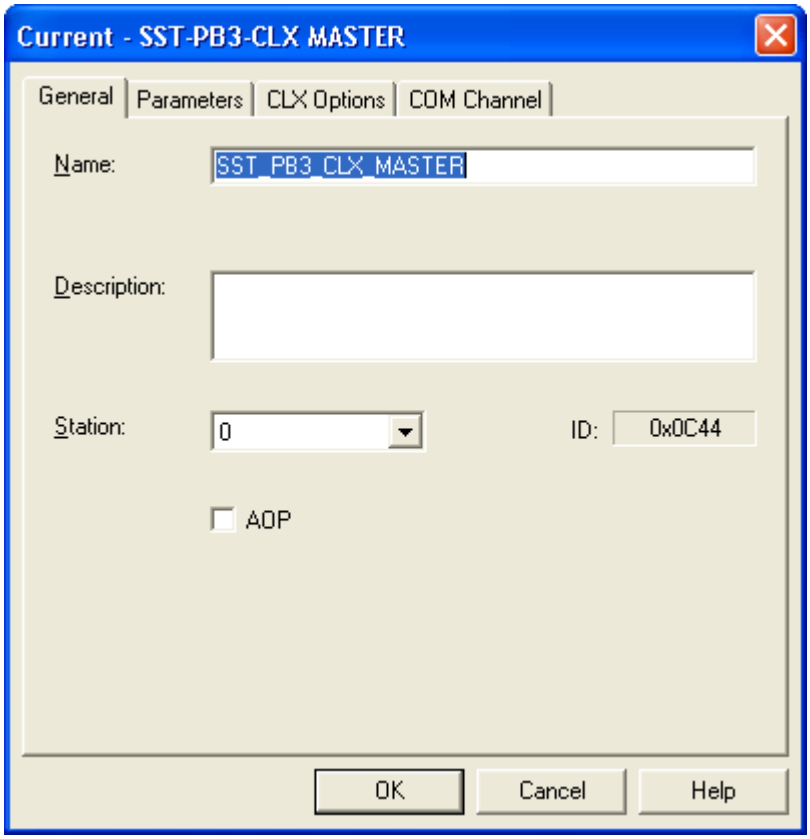
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5. To add this Master device to the Network view:

   - Drag and drop it into the Network view.

   OR:

   - Click on the Add to Network  icon on the main toolbar. A Configuration window displays for the selected device.

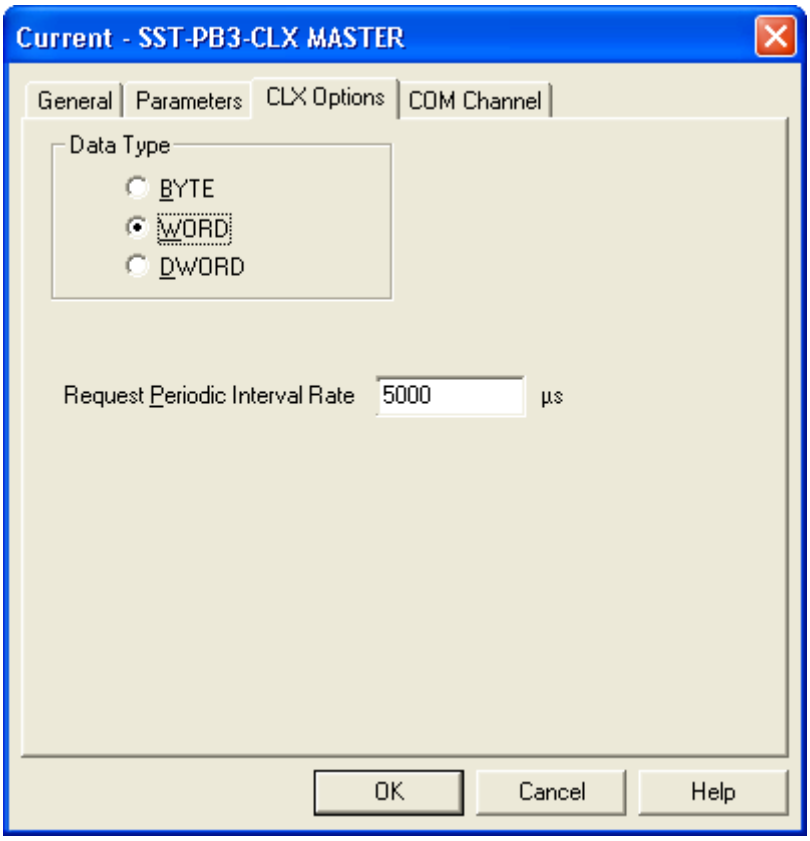


6. Select the station number in the Station field on the General tab for the selected Master.

7. Enable the AOP option if you plan to use Rockwell's Add-on-Profile in RSLogix 5000 to configure the SST-PB3-CLX Master. See Chapter 5 for more details on AOP.

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8. Select the CLX Options tab.



9. Select the corresponding radio button for the data type. WORD is the default and the preferred data type for PROFIBUS. If you are using PlantScape, select the BYTE radio button for the data type.

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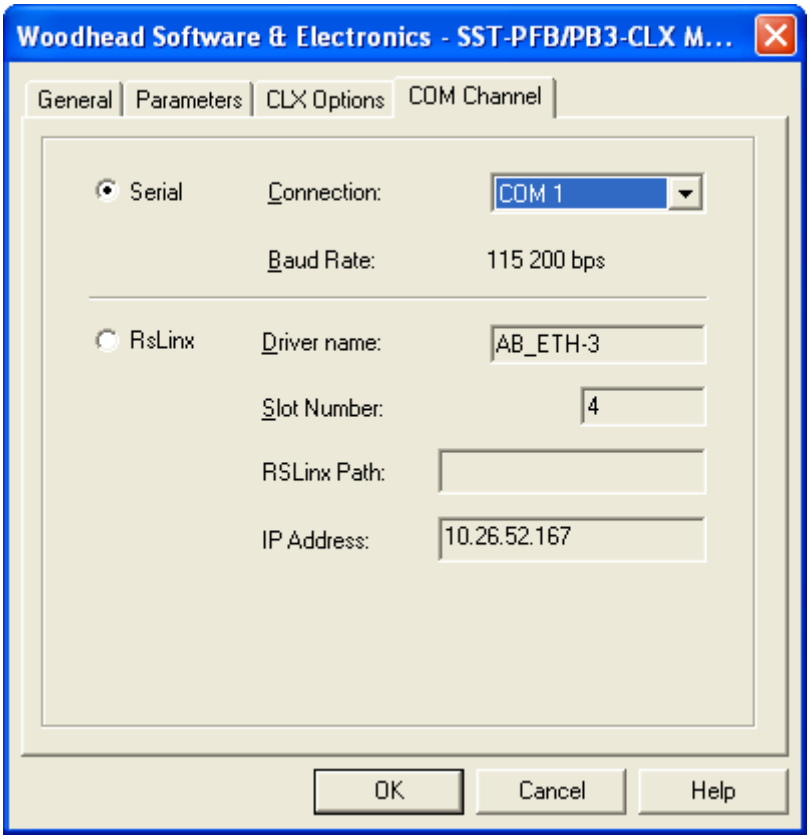
10. Set the RPI time to match the RPI configured in RSLogix (refer to Section 5.1, Configuring Through RSLogix 5000), in the Request Periodic Interval field for the PROFIBUS ControlLogix system. Ensure that you have set the Requested Periodic Interval Rate for PFB-CLX. For PB3-CLX, this box can be left at default 5000us (5 ms). For the PlantScape system, set the RPI time to 5 ms or higher if you are using it in the Local rack. If you are using it in the Remote rack, set it to 12.5 ms. or higher.



Note

Honeywell has validated the SST-PB3-CLX-RLL card with firmware pfbclx.ss4 v7.30 and pfbclx.ss3 v7.11 for use in the Experion PKS system.

11. Select the COM Channel tab to configure the connection. For details on configuring an RSLinx connection, refer to Section 12.3, Configuring the RSLinx Connection.



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12. Select the COM port you want to use to download the Master Configuration from the Connection: field.

13. Click OK to save the setting. The Master device is added to the Network view (right-most pane).

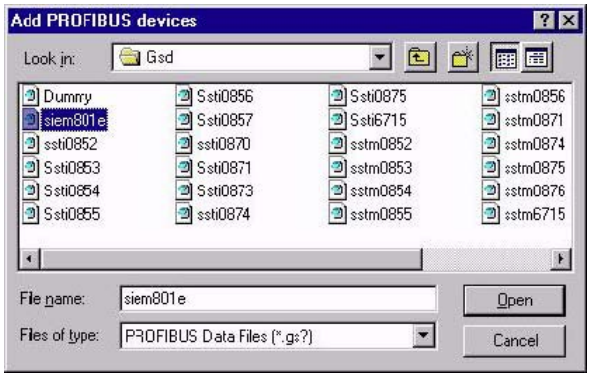


Note

To edit device properties, right-click on the device and choose Properties from the shortcut menu or select the device from the Network view and select the Properties icon on the main toolbar.

14. Find and select your slave device from the Device library. If your slave device is not listed:

    a) Click on the New Device icon in the Device library to add the GSD file for your device. The Add PROFIBUS Devices window opens.



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b) Locate the GSD file and click Open.

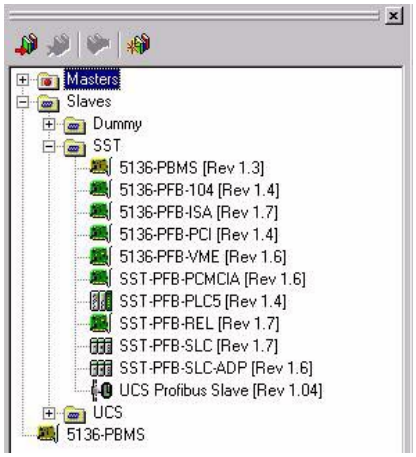
Note

A GS* file should have been supplied with your slave device. If not, contact the vendor or search for it on the internet at:

http://www.profibus.com/products/gsd-files/

* signifies the language

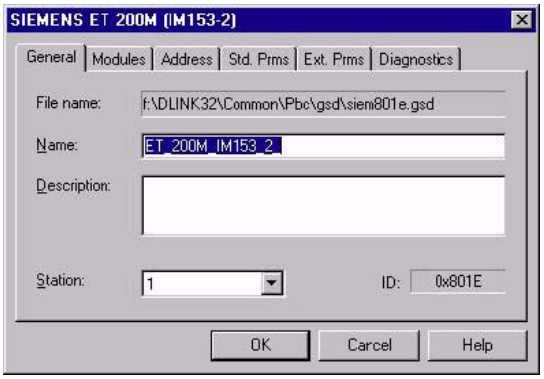
The GSD file is added to the Device library (left-most pane).



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15. You can now add the device to the Network view in one of two ways.

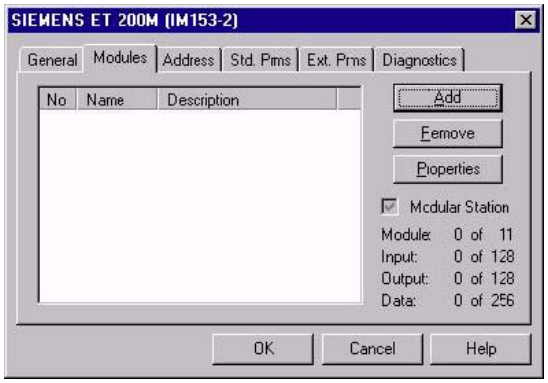
    - If you are connected to your PROFIBUS network, use the Online Browse feature to search for your slaves on your network. Refer to Section 5.2.2, Online Browsing with DP View in the SST PROFIBUS Tool, for detailed information on how to perform this procedure.
    - If you are not connected to your PROFIBUS network, you can do the following:
    - Drag and drop each slave to the network view under the Master device
    - Click on the Add to Network icon  on the main toolbar to display a configuration window for the selected slave. By default, this window displays the General tab.



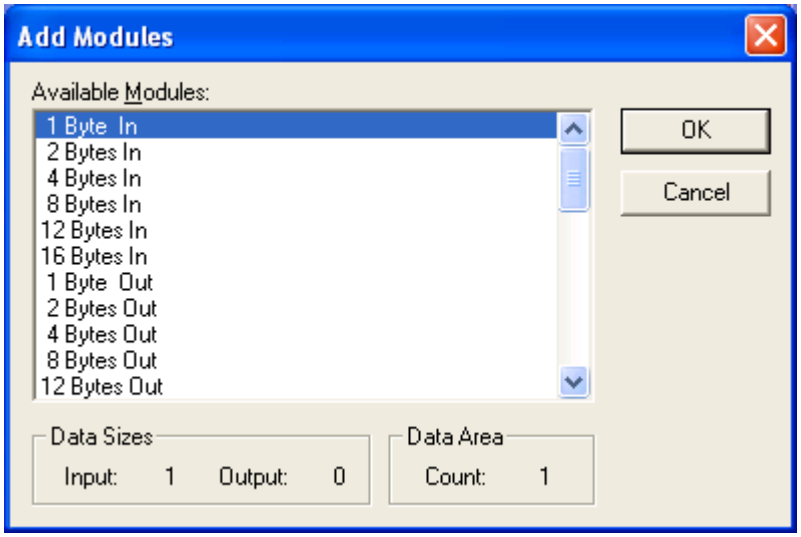
16. Set the station address of the slave in the Station field.

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17. Select the Modules tab.



If your slave is modular, insert the modules that your slave device uses. To do this, select the Add button to display the Add Modules window.



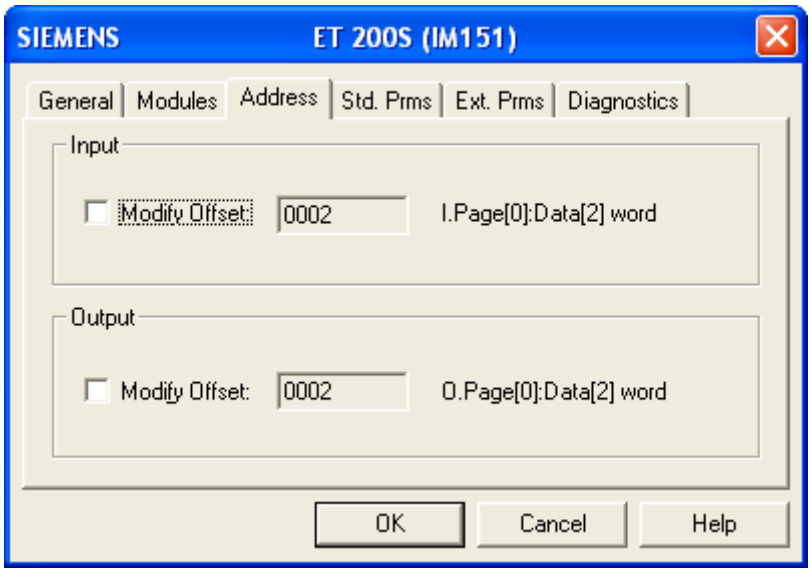
If your slave is not modular (compact device), the modules have already been configured.

18. Select the module you want the slave to use.

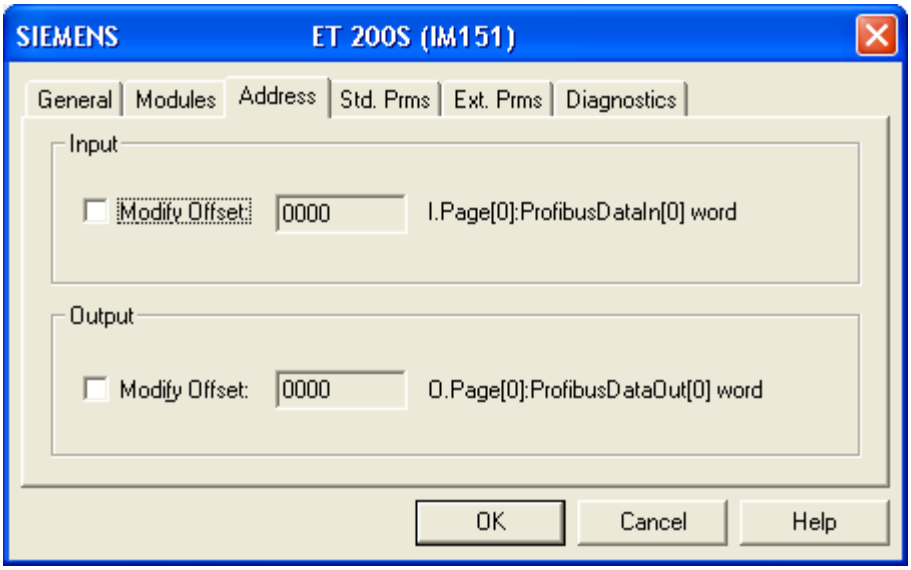
19. Select OK to set the module and return to the Slave Properties window.

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20. Select the Address tab and assign input and/or output addresses. The RSLogix 5K destination tags displayed on right-hand side are for 1756 Generic module I/O configuration format. The data offsets begin at 2 (Word Format).



If using AOP, the RSLogix 5K destination tags will look like below and the data offsets begin at 0 for all data formats (BYTE, WORD, and DWORD).



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You have the option of using the default values that display in the Modify Offset fields or selecting the Modify Offset checkboxes and entering your own values.



Note

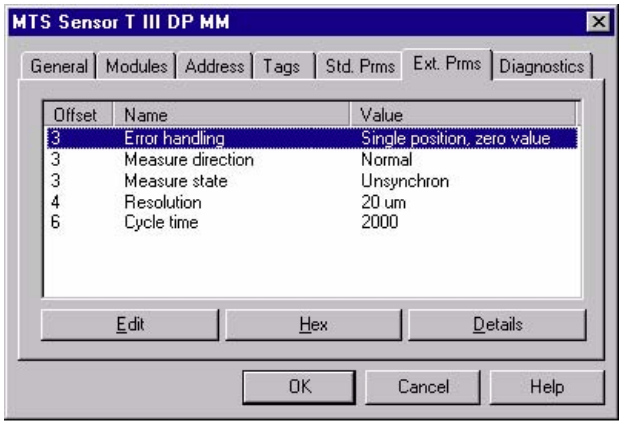
The first four bytes of input and output arrays are reserved for handshaking.

There are 4 input and 4 output pages (0 – 3) for data mapping. The available sizes are 496 bytes for each input page, and 492 bytes for each output page. For the range of data offsets that can be used, refer to Chapter 13, I/O Expansion.

You may now need to configure the slave and module parameters.

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21. Select the Ext. Prms tab (if it exists).



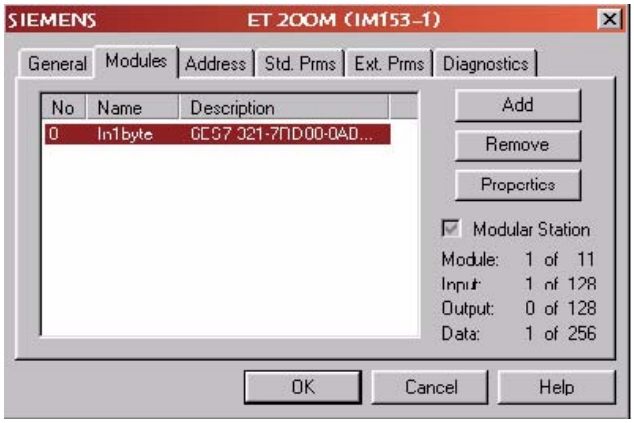
You can also select the following buttons:

- **Edit** - Allows you to change value of parameter. You can also double-click on a parameter to edit.
- **Hex** - Displays parameters data in hex format
- **Details** - Displays parameter characteristics
- **Offset** - Parameter byte offset. First parameter starts at offset 0
- **Name** - Parameter name
- **Value** - Displays as text (where available) or a numeric value

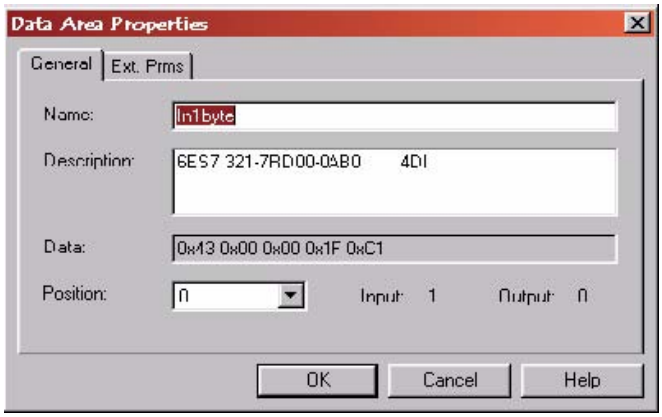
22. Configure any necessary parameters. You may now need to configure the module parameters.

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23. Select the Module tab.

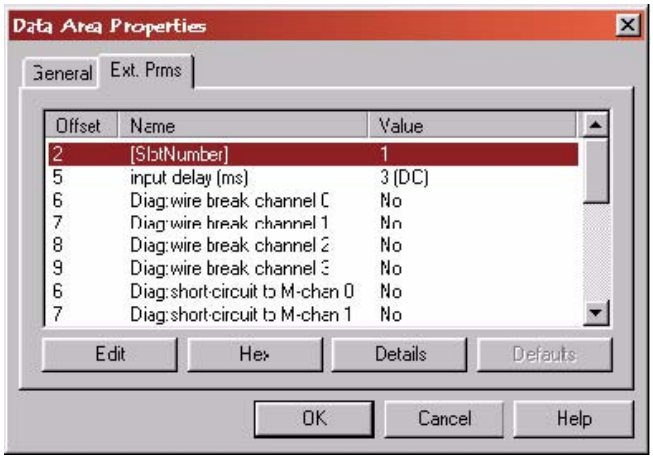


24. Select the module that needs parameterization and select Properties. The Data Area Properties window opens, with the General tab displayed.



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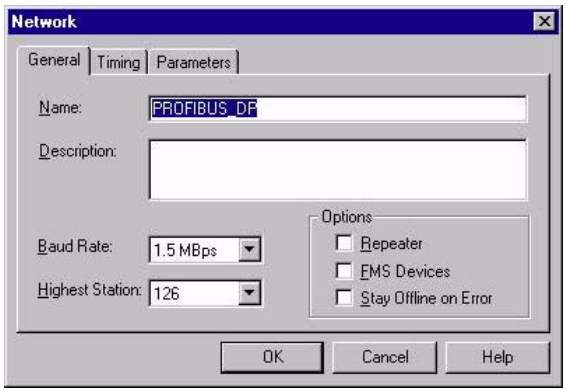
25. Select the Ext. Prms. tab (if it exists) and set the parameters according to your device.



26. Select OK.

27. Repeats steps 13-25 for each slave device on your network.

28. To set the parameters for your network, right-click on the highest level of the Network view (default is PROFIBUS_DP) and choose Properties from the shortcut menu. The Network window displays (opens in General tab), allowing you to set the Baud Rate and other parameters found in the Timing and Parameters tabs.



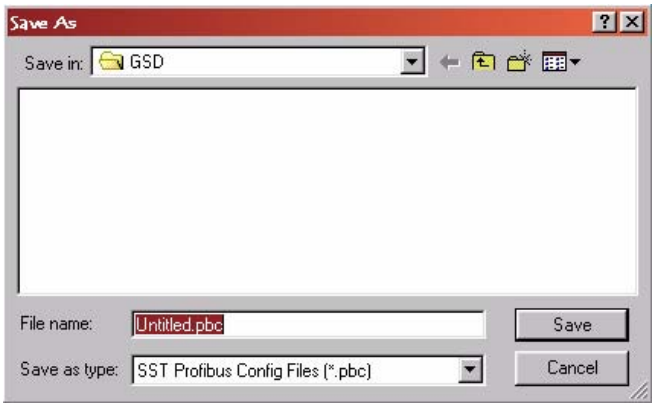
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29. Configure the following parameters according to your PROFIBUS network.

    - **Name** - Name of the network
    - **Description** - Description of the network
    - **Baud Rate** - Baud rate of the PROFIBUS network
    - **Highest Station** - Highest allowed station address for any active station on the network. The highest station affects how much time is spent soliciting for new nodes.
    - **Options** - These affect the network parameters that the Configuration Tool assigns:
    - **Repeater** - indicates whether or not there are any repeaters on the network.
    - **FMS Devices** - indicates whether or not there are any FMS devices on the network.
    - **Stay Offline on Error** - indicates whether or not the card stays offline when Token Error Limit or Response Error Limit is exceeded within 256 token cycles.

30. Once you finish setting the parameters, select OK to save the new settings.

31. Chose File > Save to save your configuration (.pbc file). The Save As window displays.



32. Specify a filename and location for your configuration and select Save. This saves your project as a .pbc file.

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33. To download your configuration, refer to Section 5.3, Downloading to the Scanner.

34. You now have the option of exporting your configuration to a binary (.bss) file using one of the following methods:

    - Select Edit/Export Binary... to export your configuration to a (.bss) file

    OR

    - Right-click on the SST-PB3-CLX-RLL Master and select the Export Binary... option from the shortcut menu.

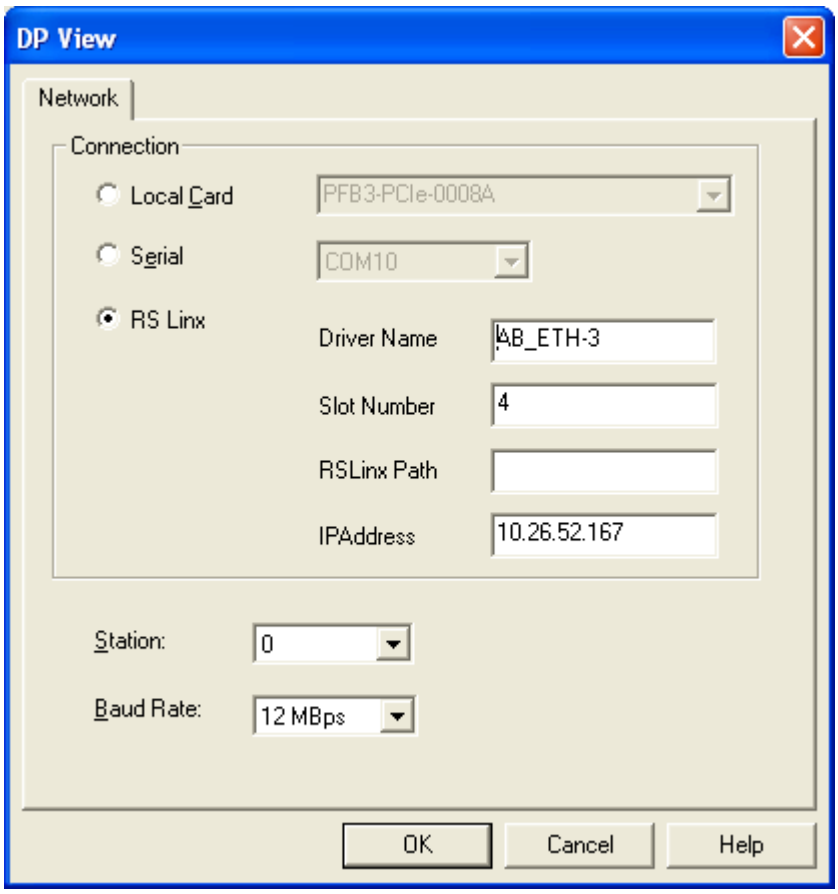
5.2.2 Online Browsing with DP View in the SST PROFIBUS Tool

1. Verify that the CLX PLC is in Program mode or the PBIM block with the Clear mode enabled is inactive in the PlantScape Control Builder.

2. If you're using a serial connection, connect your null modem cable between the scanner's serial port and your PC COM port and verify that you are connected to the PROFIBUS network. If you're using an RSLinx connection, refer to Section 12.3, Configuring the RSLinx Connection for details.

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3. Select the Network Search Properties  icon. The DP View window displays.



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4. Configure the network by specifying the following:

    - **Local Card** - Default radio button selection only. Select the Serial radio button.
    - **Serial** - Select this radio button for serial communication. This is the COM port to which your serial cable is connected.
    - **RSLinx** – If you have a licensed RSLinx installed, specify the Driver Name and the scanner module slot in the rack. For more details, refer to Section 12.3, Configuring the RSLinx Connection.
    - Driver Name – Name of the RSLinx Driver set up to communicate over Ethernet with the scanner module
    - Slot Number – location of the scanner module in the rack
    - RSLinx Path – If the scanner is in a remote rack, this is the relevant path. For more details, refer to Section 12.3, Configuring the RSLinx Connection.
    - IP Address - The IP address of the 1756-ENBT when using the Ethernet Devices and Ethernet/IP drivers.

    Note

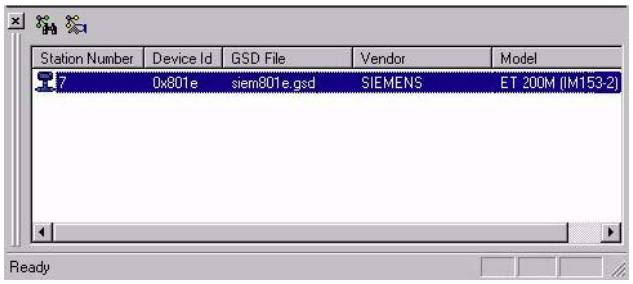
    Remote Devices via Linx Gateway driver is not supported with the RSLinx Classic Profession/Gateway v2.54 or higher.

    The IP Address field can be left blank when using the 1756-ENET Ethernet TCP/IP Communications ControlLogix module or when RSLinx path contains an IP address.

    - **Station** - Set a unique station number, one not used by any of the slaves on the network
    - **Baud Rate** - Slaves that do not support the selected baud rate will not be detected

5. Select OK to save your settings.
6. Select the Search for Slave  icon when you are ready to browse. Slaves that have been detected display in station address order, as shown:

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7. Right-click on each slave to assign its GSD file. A shortcut window displays with the following options:

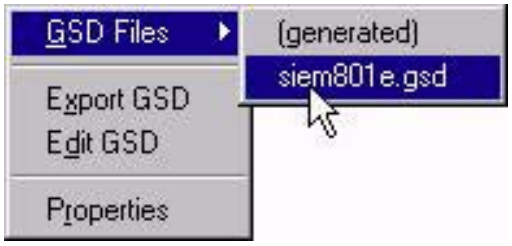
   - **GSD Files** - Displays GSD file(s) found with the corresponding slave ID and a default-generated GSD file, in case no ID match found
   - **Export GSD** - Export a GSD file that will be saved with a new name, which by default is the station number-slave ID
   - **Edit GSD** - Edit the selected GSD file. The generated GSD is the default if another
     GSD file is not selected. Here you can specify the vendor and model name, slave-specific options such as freeze, sync, auto baud and set slave address; and user parameters.
   - **Properties** - Displays module information for the slave



Note

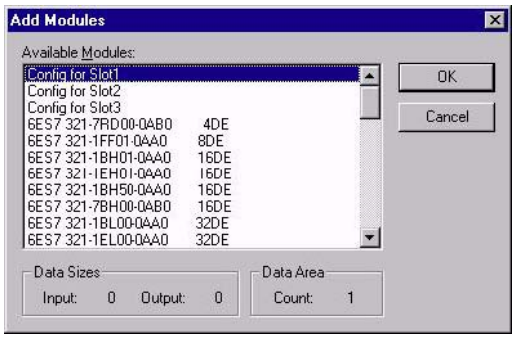
To create a configuration with these slaves, you must first have a Master in your configuration and then you can drag over the slaves from the DP library to your Network view.

8. Select the GSD File from the shortcut menu.

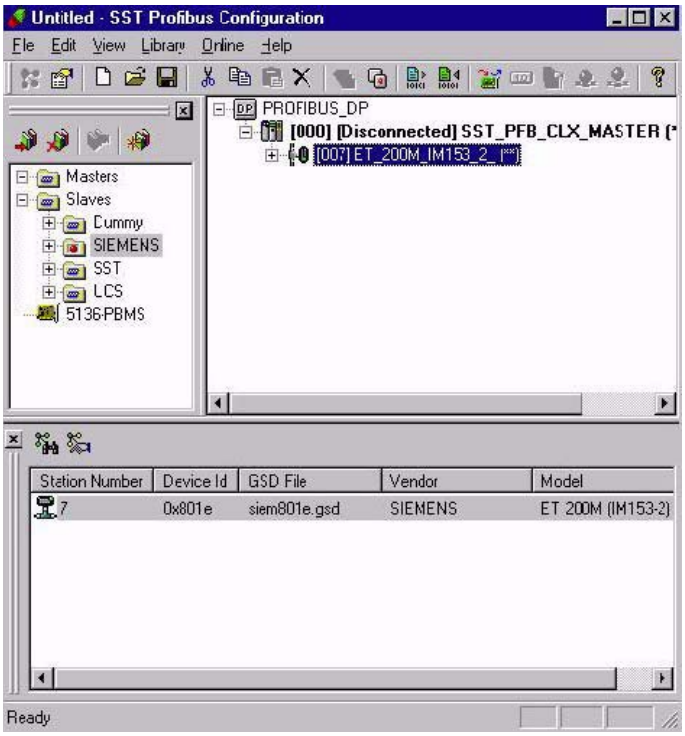


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9. Drag and drop each slave from DP View to the Network view, underneath the Master. You may be prompted with the following window to select the correct I/O modules for the slave.



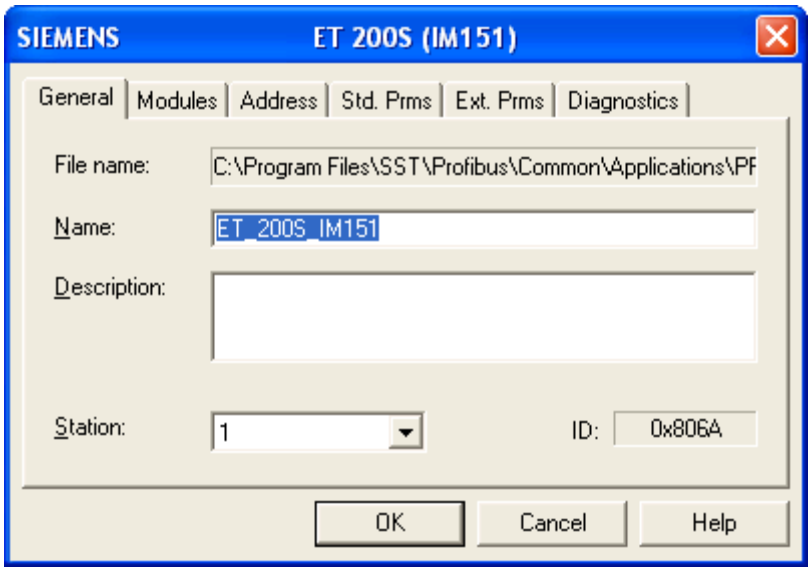
10. Select OK. The slave is then added and appears in your Network view.



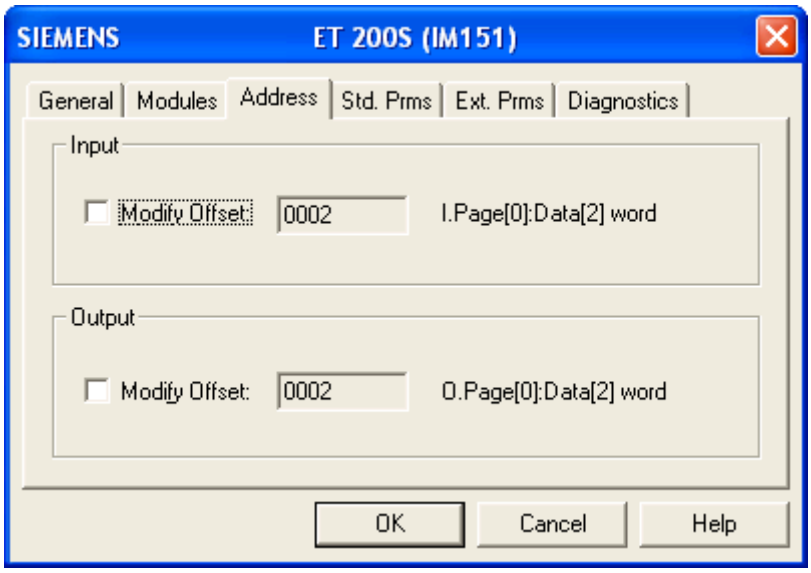
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11. Right-click on the slave in your Network view.

12. Select Properties from the shortcut menu to display the Slave Properties window.



13. Select the Address tab and assign the I/O offset(s). If you are using AOP to configure the module in RSLogix 5000, make sure to enable AOP option under Master Properties.



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You have the option of using the default values that display in the Modify Offset fields, or selecting each Input and Output Modify Offset checkbox and entering your own values.



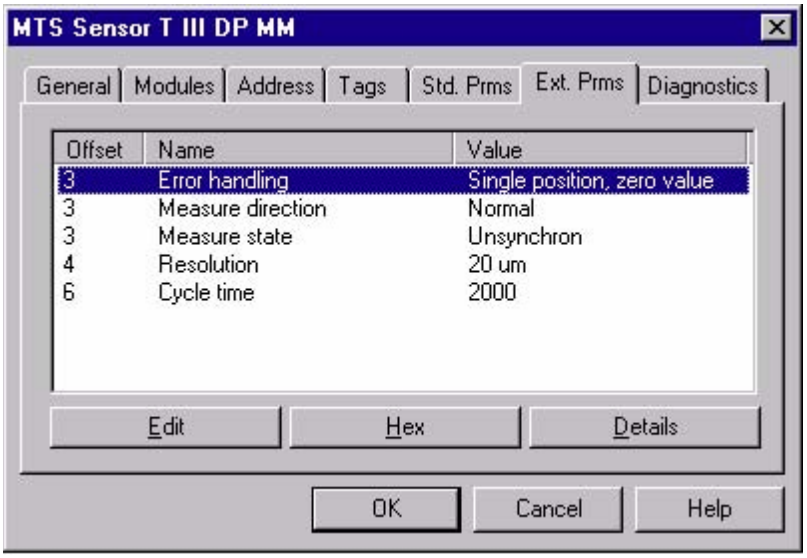
Note

The first four bytes of input and output arrays are reserved for handshaking.

There are 4 input and 4 output pages (0 – 3) for data mapping. The available sizes are 496 bytes for each input page, and 492 bytes for each output page. For the range of data offsets that can be used, refer to Chapter 13, I/O Expansion.

You may now need to configure the slave and module parameters.

14. Select the Ext. Prms tab (if it exists).



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15. Configure any necessary parameters:

    - **Edit** - Allows you to change value of parameter. You can also double-click on a parameter to edit it.
    - **Hex** - Displays parameters data in hex format
    - **Details** - Displays parameter characteristics
    - **Offset** - Parameter byte offset. First parameter starts at offset 0.
    - **Name** - Parameter name
    - **Value** - Displays as text (where available) or a numeric value

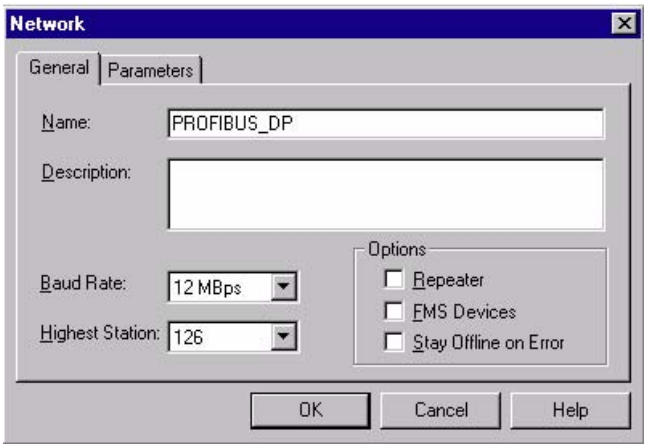
    You may now need to configure the module parameters. This is done via the Modules tab.

16. Select the OK button to close the Slave Properties window.

17. Repeat steps 8-15 until all of your slaves are configured and exist under your Master in the Network View.

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18. Right-click on PROFIBUS-DP in the Network view to configure the Network Parameters (baud rate and so on), and select Properties from the shortcut menu. The Network window displays.



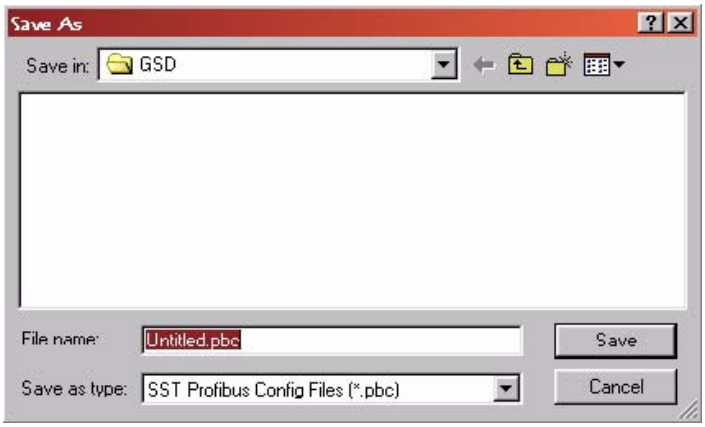
19. Configure the following parameters according to your PROFIBUS network:

- **Name** - Name of the network
- **Description** - Description of the network
- **Baud Rate** - Baud rate of the PROFIBUS network
- **Highest Station** - Highest allowed station address for any active station on the network. The highest station affects how much time is spent soliciting for new nodes.
- **Options** - These affect the network parameters that the Configuration Tool assigns
- **Repeater** - Indicates whether or not there are any repeaters on the network
- **FMS Devices** - Indicates whether or not there are any FMS devices on the network.
- **Stay Offline on Error** - Indicates whether or not the card stays offline when the Token Error Limit or Response Error Limit is exceeded within 256 token cycles.

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20. Select OK to save the new settings.

21. Choose File > Save to save your configuration. The Save As window displays.



22. Specify a filename and location for your configuration and select Save. This saves your project as a .pbc file.

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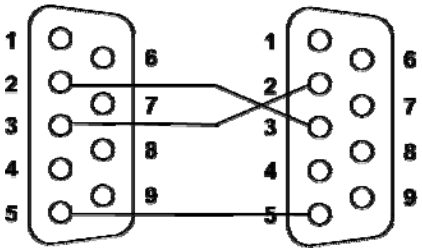
5.3 Downloading to the Scanner

5.3.1 Downloading the DP Master Configuration File to the Scanner

Use the serial CONFIG port on the front of the scanner to download configuration files to the scanner.

The serial cable for a standard PC COM port must have lines 2 and 3 swapped. No handshaking is required. Pins 2 and 3 are wired the same as a PC 9-pin COM port.

Figure 4: Serial Port Wiring



If you are using HyperTerminal, refer to Section 5.6, Downloading the I/O Configuration to the Scanner Using HyperTerminal, for detailed information.

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5.3.2 Downloading to the Scanner via the SST PROFIBUS Configuration Tool

1. Verify that the CLX PLC is in Program mode, or if you are using PlantScape, the PBIM block with the Clear mode enabled must be inactive in Control Builder.

2. Connect the modem serial cable between the PC COM port and the scanner serial port (top one).

3. In your Master configuration, right-click on Master to display the shortcut menu.



4. Select Connect from the shortcut menu. You can also select the first icon  above PROFIBUS-DP*. If you do not have a mouse, select Connect from the Edit menu.

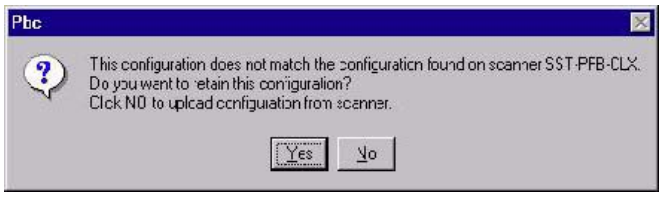


Note

*Wait for the OK LED on the scanner to display green before connecting.

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You may be prompted with a message indicating a configuration mismatch between what is in the scanner and your current PROFIBUS project. In this case, select Yes to retain your configuration.



Any configuration mismatches are listed under the Master status.



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5. Load the configuration to the Master through one of the following methods:

   - Right-click on the Master and select Load Configuration from the shortcut menu.



   OR

   - Select the Load configuration  icon in the toolbar. If the scanner is online, the following message displays:

     —Card is online. Do you want to load configuration?

6. Select Yes to load your new configuration. The Master status now changes to the Configured Program mode.



   Your scanner is now configured and ready.

7. Right-click on the Master and select Disconnect from the shortcut menu to disconnect from the network.

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5.3.3 Monitoring the Scanner via the SST PROFIBUS Configuration Tool

1. Verify that the scanner is online by switching the CLX PLC to Run mode, or if you're using PlantScape, ensure that the PBIM block with Clear mode enabled is active in Control Builder. Both the COMM (green) and SYS (red) LEDs should be ON.

2. Switch the CLX PLC back to Program mode. For PlantScape, ensure that the PBIM block is inactive with the Clear mode enabled.

3. To connect to the Master in your PROFIBUS configuration, right-click on the Master.

4. Select Connect from the shortcut menu.



Note

You may get a message indicating a configuration mismatch. Select YES to retain and download the configuration.

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5. Select the Online  icon in the toolbar to place the scanner online. The master should now display either:



OR



If this displays, refer to Section 5.3.5, Diagnosing Slave Errors in the SST PROFIBUS Configuration Tool.



Caution

Do not switch the CLX PLC to Run mode or activate the PBIM block in PlantScape while monitoring the scanner in the Configuration Tool. This may result in unrecoverable serial communication failure.

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5.3.4 Reconnecting to the Scanner when it's Already Configured and Online

1. Switch the CLX PLC to Program mode, or if you're using PlantScape, ensure that the PBIM block with the Clear mode enabled is inactive in Control Builder.
2. To connect to the Master in your PROFIBUS configuration, right-click on the Master.
3. Select Connect from the shortcut menu.

Note

You may get a message indicating a configuration mismatch. Select YES to retain the configuration and download the configuration. Select the Online icon in the toolbar to go online.

Caution

If the only difference between your offline and online configuration is slave data offsets, you will not get a Configuration Mismatch status for the Master. You can fix this by re-downloading the configuration.



OR



If this displays, refer to Section 5.3.5, Diagnosing Slave Errors in the SST PROFIBUS Configuration Tool, for further information.

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5.3.5 Diagnosing Slave Errors in the SST PROFIBUS Configuration Tool

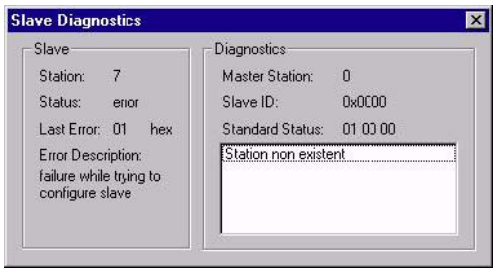
1. To diagnose slaves in error (Red status), right-click on the slave with the error.



2. Select Diagnostics from the shortcut menu.



A Slave Diagnostics window displays, indicating the errors specific to that slave.



3. Troubleshoot your slave errors as required (refer to Section 5.4, Troubleshooting). Once you have verified that all errors have been corrected, right-click on the Master and select Disconnect from the shortcut menu.

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5.4 Troubleshooting

Station Non Existent

Check the slave's PROFIBUS interface to ensure that it is powered on and connected to your network. Ensure that the slave supports the configured baud rate. Also, verify that you are using the Correct GSD file for the slave device by checking the slave's part number.

Configuration Data Fault

Check that the I/O modules are configured in the order they appear in the slave device and that the I/O modules match the exact description of the modules you selected (i.e., module serial number).

Station Not Ready

If there are still outstanding errors, this is always present. Also, you may be trying to scan the slave too quickly. This may be caused by using a wrong GSD file.

Extended Diagnostic Data

This is device specific. Retrieve the data by requesting the slave diagnostics in your RSLogix 5000 sample program. Extended diagnostic data starts at byte 7 of the slave diagnostics. Compare the values with the descriptions that may be available for the slave by viewing the slave's properties and selecting the Diagnostics tab in the Configuration Tool.

Function Not Supported

The slave does not support commands like SYNC or FREEZE coming from the Master. Check that you are using the correct GSD file.

Invalid Slave Response

This usually occurs when the slave is returning more diagnostic information than the Master can handle. Check your GSD file.

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Parameter Fault

This usually means an incorrect Indent - Number or Invalid parameter sent to the slave. Check that you have set the slave and module parameters correctly by selecting the Ext. Prms. tab under the slave/module's properties.

Master Lock

The DP slave has been parameterized by another Master. Take the controlling Master offline.

Param/Config Required

This remains present until the parameterization has completed properly. You may be using the incorrect GSD file or you haven't set the slave and module parameters to the correct values. Check the slave and module parameters by selecting the Ext. Prms. tab under the slave/module's properties.

Static Diagnostics

Check your slave diagnostic data in the scanner status area using the RSLogix 5000 sample Ladder Logic, which already includes the logic to retrieve this. Write xx05 (xx = station number) to the CMD Argument register (Local:Slot:O.Data [1], AOP tag Local:Slot:O.ModuleControl. CMD_Argument). The slave diagnostics display, starting at Local:Slot:S.Data [59], AOP tag SlaveStatus1.

DP Slave Set

This is OK and is set by the slave.

WatchDog

This is OK and should be set when the slave status is OK.

Ext Diags Overflow

More Diagnostic data is being returned from the slave than what is specified in its GSD file. You may be using an incorrect GSD file.

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5.5 Importing the DP Master Binary Configuration (.bss) Using the Configuration Tool

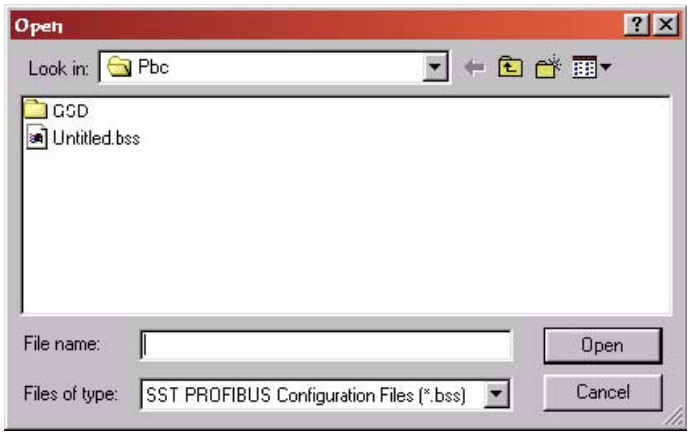
1. Select File > New.

2. Right-click on the Master in your Network view (right-most pane) and select Import Binary from the shortcut menu.



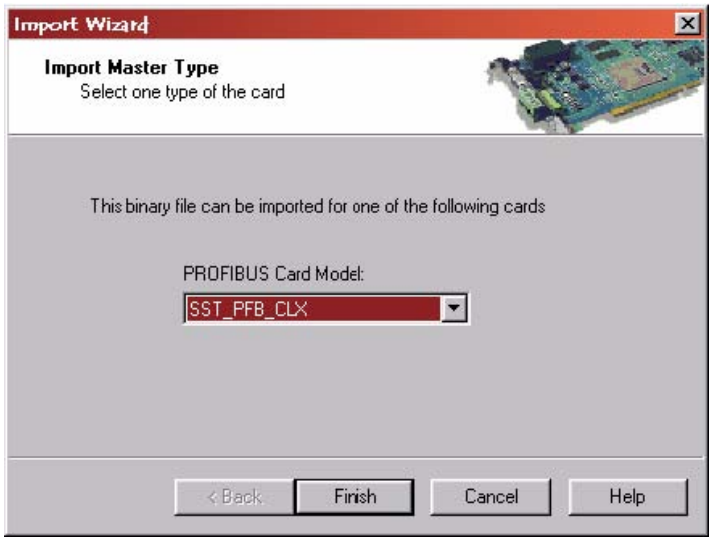
OR:

Select the Import Binary  icon from the toolbar. The Open window displays.



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3. Select and open your .Bss file. The Import Wizard displays.



4. Select SST-PFB-CLX.

5. Select the Next > or Finish >> button. If you have multiple GSD files for the same slave in your binary configuration, select the Next > button and follow the process to assign the correct GSD file to the slave.

6. When you are done, select Finish >>.

7. If you are using Rockwell's RSLogix 5000 Add-on-Profile, double-click on master and enable AOP then click OK.

8. Select File > Save.

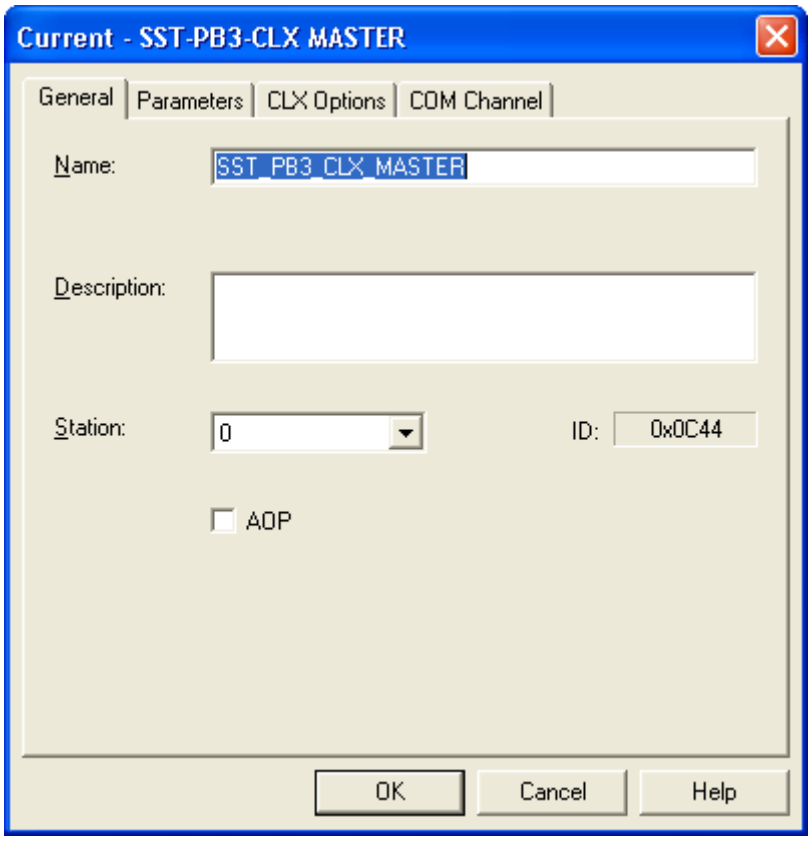
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5.5.1 Uploading the DP Master Configuration File from the Scanner Using the SST PROFIBUS Configuration Tool

1. Verify that you are connected to the scanner module via a serial cable or RSLinx. For an RSLinx connection, go to the Communications menu in RSLinx and select RSWho. You can upload the configuration while you are online or offline.

2. Select File > New.

3. Drag and drop the SST-PB3-CLX scanner device from the Device Library (upper left-hand side) into the Network view. The Master Properties window displays.

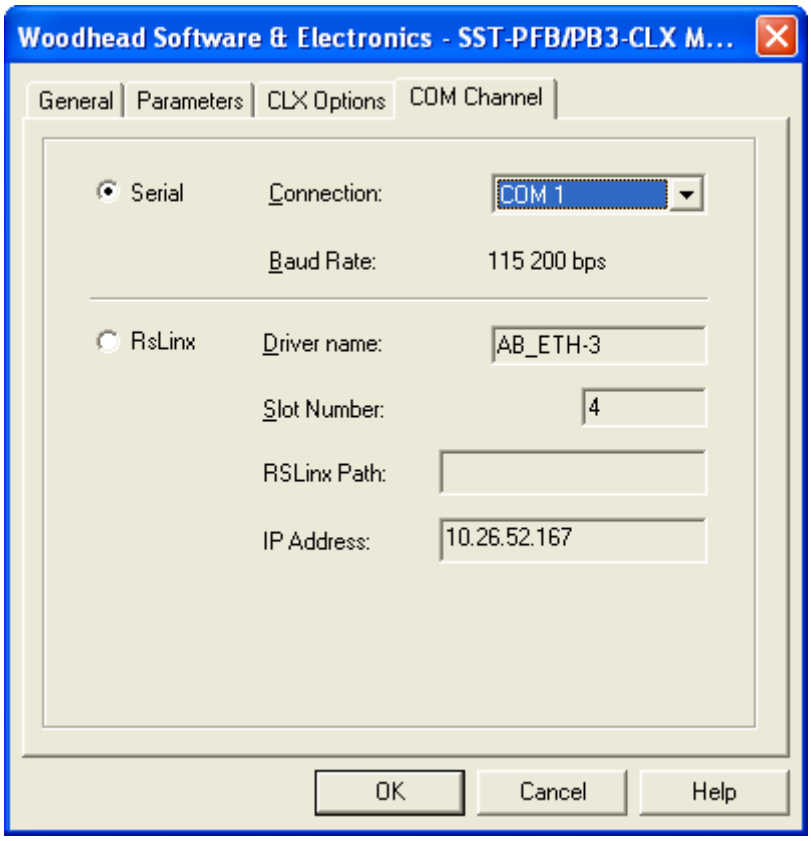


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4. Enable the AOP option if you are using Rockwell's RSLogix 5000 Add-on-Profile.

5. Select the COM Channel tab.

6. Specify the COMM port or RSLinx connection you want to use. For an RSLinx connection, specify the Driver Name and scanner module slot in the rack. For more details, refer to Section 12.3, Configuring the RSLinx Connection.



7. Select OK to save the setting.

8. Right-click on the Master and select Connect from the shortcut menu.

9. Select NO in response to the message —"Do you want to ignore configuration?". You may be prompted to go through the Configuration wizard to assign the correct GSD files.

10. Select Finish if you went through the Configuration wizard process. You can now save this uploaded configuration as a .pbc file.

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11. Select File > Save, assign a filename and location, and select Save.

12. Right-click on the Master and select Disconnect from the shortcut menu.

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5.6 Downloading the I/O Configuration to the Scanner Using HyperTerminal

If you are using HyperTerminal, here is how to set up a connection:

1. Start HyperTerminal and create a new connection.
2. For Connect using:, select Direct to Comn, where "n" is the serial port you are using.
3. Select 115200 Bits per second, 8 Data bits, set Parity to None, select 1 Stop Bit, and set Flow control to None. You should now be able to communicate with the scanner serial port.
4. Connect to the serial port using your communication software. The scanner serial port supports any baud rate from 9600 baud to 115 Kbaud, with no parity, 8 data bits, 1 stop bit and flow control set to None. The scanner automatically detects the baud rate you are using.



Note

When configuring the scanner, the CLX PLC must be in Program mode, or if you’re using PlantScape, the PBIM block with the Clear mode enabled must be inactive in Control Builder.

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5. Type an asterisk (*) to get the scanner's attention. You may need to type several asterisks (*) to let the scanner auto-detect the baud rate being used. The scanner displays the message:

```
;Copyright (c) 1995-2008 WSE, a division of Molex
For SST-PB3-CLX Card
Version 7.10

Reading Configuration from FLASH...
```



Note

If the module has no configuration in flash, one of two possible warning messages may be displayed in HyperTerminal:

- With no connection to the CPU, the error will be:

  Reading Configuration from FLASH...
  Error '23' while Reading FLASH

- With a connection to CPU, the error will be:

  Reading Configuration from FLASH...
  Error '20' while Reading FLASH

Once a configuration is saved in flash, these errors will no longer occur.

A greater than symbol (>) prompts you at the terminal.

The scanner is now in Config mode. While in Config mode, the scanner COMM and SYS LEDs are off. You cannot put the scanner online until you exit from Config mode.

6. Issue the RecBssXmodem command, then initiate an XModem file download from your communication software. Refer to the documentation supplied with your Communication software for more detailed information.

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7. Type Exit to end the Serial communication if prompted with:

   Configuration has changed. Do you want to UPDATE PLASH? (y/ n)

8. Type "y" and press ENTER to accept.



Note

When you download a Configuration file to the scanner, the configuration is stored in memory on the scanner. Use the UpdFlash command to store the configuration into flash memory.

5.6.1 Listing Available Commands

Once you are talking to the scanner, type `Help` at the terminal to view a summary of the available commands. Not all available commands are listed in the main Help. There are several additional Help commands to show the other commands.

The following table lists commonly used serial port commands:

Table 9: Commonly Used Port Commands

Command	Description
HelpNet	Lists commands to set network parameters.
HelpMas	Lists commands related to DP master operation.
ShowNet	Displays network parameters.
ShowMas	Displays the DP master configuration.
UpdFlash	Stores the current network and DP master configuration into flash memory.
Ver	Displays the version number of the firmware running on the scanner.
RecBssXmodem	Receives a DP master configuration exported as a binary file from the SST PROFIBUS Configuration Tool. Initiates the download of your DP master Binary configuration exported from the SST PROFIBUS Configuration Tool.
Exit	Exits terminal mode and places the module in offline configuration state.

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5.6.2 Exiting Config Mode

To exit Config mode and let the scanner complete its start-up, issue the Exit command. You must do this before the scanner can be put online. The scanner turns off both LEDs when it is no longer in Config mode.

If there have been changes to the Configuration, the scanner will ask you whether you want to store those changes in flash before you exit.

5.7 Errors

5.7.1 Network Parameter Errors

The following status errors may occur when setting the Network parameters. Values are in hexadecimal.

Table 10: Network Parameter Errors

Value	Error Type
02h	STS_BAD_BAUD
03h	STS_BAD_STN_ADR
04h	STS_BAD_HI_STN_ADR
05h	STS_BAD_TOK_ROT
06h	STS_BAD_SLOT_TME
07h	STS_BAD_IDLE_1
08h	STS_BAD_IDLE_2
09h	STS_BAD_RDY_TME
0ah	STS_BAD_QUI_TME
0bh	STS_BAD_GAP_UPD
0ch	STS_BAD_TOK_RETRY
0dh	STS_BAD_MSG_RETRY
0eh	STS_BAD_TOK_ERR_LIM
0fh	STS_BAD_RSP_ERR_LIM
10h	STS_BAUD_DET_ERROR

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5.7.2 Binary File Configuration Errors

The following errors occur when configuring the scanner using a binary file generated by the Configuration Tool and downloading it through the HyperTerminal. Error 23h typically occurs when new firmware was just loaded. Issue the ClrMas command and try to download again.

Table 11: Binary File Configuration Errors

Value	Error Type
20h	STS_CFG_BAD_CHK_PATTERN
21h	STS_CFG_BIN_TOO_SHORT
22h	STS_CFG_BIN_TOO_LONG
23h	STS_CFG_BAD_CHKSUM
24h	STS_CFG_INVALID_CPU_HDR
25h	STS_CFG_INVALID_SLV_REC_TYP
26h	STS_CFG_RX_OVERFLOW
27h	STS_CFG_TX_OVERFLOW
35h	STS_CFG_MAS_EXT_ALLOC_ERROR

5.7.3 Flash Programming Errors

The following errors may occur when programming flash memory.

Table 12: Flash Programming Errors

Value	Error Type	Meaning/Description
30h	STS_CFG_NO_CONFIG	No configuration present to program into flash
31h	STS_FLASH_BAD_ID	Internal flash error
32h	STS_FLASH_ERASE_ERR	Internal flash error
33h	STS_FLASH_PROG_ERR	Internal flash error
34h	STS_FLASH_VRFY_ERR	Internal flash error

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5.7.4 Fatal Errors

The following are fatal errors. You must power down the system and restart to clear these errors.

Table 13: Fatal Errors

Value	Error Type	Meaning/Description
80h	STS_CFG_INTERNAL_ERROR	Internal error
81h	STS_OUT_OF_APBS	Out of application blocks
83h	STS_HEAP_ALLOC_FAIL	Internal error
84h	STS_SH_HEAP_ALLOC_FAIL	Internal error

If the status register contains STS_CFG_INTERNAL_ERROR (80h), there has been an internal error on the scanner. Record the contents of the errInternal and errArg registers and contact Technical Support (refer to Section D.3, Technical Support, for details). When the Data Type is INT, these two status registers are located in the high byte of Word offset 24 and the low byte of Word offset 25 in the Status area

5.8 Running the Scanner



Warning

Attempting to upload while the CLX PLC is in RUN mode or the PBIM block is activated and Run mode is enabled in Control Builder may result in unrecoverable serial communication failure.

You can now begin accessing the data at the addresses that have been assigned to your slaves in your Master configuration.

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5.8.1 CLX Modes

The scanner's mode of operation follows the CLX PLC mode of operation (Program, Test, and Run).

- When the CLX is in Program mode, the scanner outputs are off and inputs hold their last state.
- When the CLX is in Test mode, inputs are read and updated but outputs are off.
- When the CLX is in Run mode, the scanner updates inputs and outputs.

5.8.2 PBIM Modes

The scanner's mode of operation follows the operation state of the PBIM block in Control Builder (Active or Inactive).

- When the PBIM Block is active with Clear mode enabled, the scanner outputs are off and inputs continue to get updated.
- When the PBIM Block is active with Run mode enabled, the scanner updates inputs and outputs.
- When the PBIM block is inactive, the scanner input and output areas in the Control Builder are not updated.

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5.9 SST-PB3-CLX-RLL I/O and Status Images

Specifically, the I/O interface consists of the following areas:

Table 14: Controller Interface Image (**For Add-on-Profile**)

Area Description	Area Layout	Meaning/Description	Size
Output Area	CMD Control Register Local:Slot:O.ModuleControl. CMD_Cntrl	Issue a command to scanner	1 x 8 bits
	Local:Slot:O.ModuleControl. ChangePage Upper nibble of (bits 4 - 7) is for changing the Output Page. Write value 0 – 3 to change to that page. Lower nibble of (bits 0 - 3) is for changing the Input Page. Write value 0 – 3 to change to that page	Used by the Host to change the current input and output page that is read/written to module.	1 x 8 bits
	CMD Argument Local:Slot:O.ModuleControl. CMD_Argument	Scanner commands (Run mode, Clear mode, Offline, Online, Clear Counters, Get Slave Diagnostics, Acknowledge Slave Diagnostics): See below for all available commands under CMD Argument Register	1 x 8 bits
	Local:Slot:O.ModuleControl. CMD_Additional_Parameter	This is only required for commands that require an additional parameter “station address”. These are: Get Slave Diagnostics PFB_DISABLE_SLAVE PFB_ENABLE_SLAVE PFB_GET_SLAVE_ID PFB_SET_SLAVE_ADDRESS SEND_SYNC_COMMAND SEND_UNSYNC_ COMMAND SEND_FREEZE_ COMMAND SEND_UNFREEZE_ COMMMAND	1 x8 bits
	Output Data Area Local:Slot:O.ProfibusDataOut [0] to Local:Slot:O.ProfibusDataOut [245]	For AOP, PROFIBUS output data starts at tag ProfibusDataOut[0].4 Pages of output Data are available in the module but only one page can be accessed at a time via the host.	246 x 16 bits

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Input Data Area	Module Status register Local:Slot:I.ModuleStat. ModuleStatus	Card status register	1 x 8 bits
	Local::Slot:I:.ModuleStat. CurrentPage is for the firmware to copy the page number of the valid Input and Output data that is mapped into the host. Upper nibble (bits 4 - 7) is for the firmware to copy the page number of the valid output data that is mapped into the host. Lower nibble (bits 0 - 3) is for the firmware to copy the page number of the valid Input data that is mapped into the host	Displays current input and output page number mapped into Host (Pages 0 - 3)	1 x 8 bits
	Module Cmd Reply register Local:Slot:I.ModuleStat.CMD_Reply	Echo of CMD Argument above	1 x 8 bits
	Reserved	Reserved - Do not use	1 x 8 bits
	Input Data Area Local:Slot:I.ProfibusDataIn[0] to Local:Slot:I.ProfibusDataIn [247]	PROFIBUS input area starts at Tag ProfibusDataIn[0]. 4 Pages of Input Data are available in the module but only one page can be accessed at a time via the host.	248 x 16 bits
Status Area See Status table	Module Static Counters/ Error Counters	Indicates module behavior	26 x 16 bits
	Active Slave Status Bit Array PfbActStnList0_15 to PfbActSnList112_126	1 bit set for each slave that has OK status. Up to 125 slaves ActSlv_1 = Station 1, ActSlv_126 = Station 126	8 x 16 bits
	Configured Slave Status Bit Array PfbCfgStnList0_15 to PfbCfgStnList112_126	1 bit is set for each slave configured. Up to 125 slaves CfgSlv_1 = Station 1, CfgSlv_126 = Station 126	8 x 16 bits
	Local Slave Status registers SlvStatus,SlvError	See Description below	2 x 8 Bits
	MasDiagUpdate	See Description below	1 x 16 bit
	MasDiagStn	See Description below	1 x 16 bit
	DiagLen	See Description below	1 x 16 bit
	Slave Diagnostic Buffer Consists of Tags: SlaveStatus1 SlaveStatus2 SlaveStatus3 MasterStnAddr SlvID DiagDataBuffer[0-118]	Area to where the slave diagnostic data is dumped. See Reading the Slave Diagnostics for more detailed information.	122 x 16bits

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Table 15: ControlLogix Controller Interface Image (**for Generic Profile)**

Area Description	Area Layout	Meaning/Description	Size
Output Area	CMD Control Register High Byte (bits 8-15) is for controlling which input and output page are mapped into the Host Data table. Upper nibble of (bits 12-15) is for changing the Output Page. Write value 0 – 3 to change to that page. Lower nibble of (bits 8-11) is for changing the Input Page. Write value 0 – 3 to change to that page.	Issue a command to scanner	16 bits
	CMD Argument (low byte, bits 0 -7) (High Byte (bits 8 – 15) is only required for commands that require an additional parameter “station address”. These are: Get Slave Diagnostics PFB_DISABLE_SLAVE PFB_ENABLE_SLAVE PFB_GET_SLAVE_ID SEND_SYNC_COMMAND SEND_UNSYNC_COMMAND SEND_FREEZE_COMMAND SEND_UNFREEZE_COMMMAND	Scanner commands (Run mode, Clear mode, Offline, Online, Clear Counters, Get Slave Diagnostics, Acknowledge Slave Diagnostics): PFB_DISABLE_SLAVE, PFB_ENABLE_SLAVE, PFB_GET_SLAVE_ID, PFB_SET_SLAVE_ADDRESS)	16 bits
	Output Data Area	PROFIBUS output data starts at word offset 2. 4 Pages of output Data are available in the module but only one page can be accessed at a time via the host.	246 x 16 bits
Input Data Area	Module Status register (bits 0 -7) High Byte (bits 8-15) is for the firmware to copy the page number of the valid Input and Output data that is mapped into the host. Upper nibble (bits 12-15) is for the firmware to copy the page number of the valid output data that is mapped into the host. Lower nibble (bits 8-11) is for the firmware to copy the page number of the valid Input data that is mapped into the host	Card status register	16 bits
	Module Cmd Reply register	Echo of CMD Argument above	16 bits
	Input Data Area	PROFIBUS input area starts at word offset 2. 4 Pages of Input Data are available in the module but only one page can be accessed at a time via the host.	248 x 16 bits
Status Area See Status table	Module Static Counters/ Error Counters	Indicates module behavior	48 x 16 bits
	Active Slave Status Bit Array	1 bit set for each slave that has OK status. Up to 125 slaves	8 x 16 bits
	Configured Slave Status Bit Array	1 bit is set for each slave configured. Up to 125 slaves	8 x 16 bits
	Slave Diagnostic Buffer	Area to where the slave diagnostic data is dumped	122 x 16bits

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Table 16: CMD Control Register
(Local:Slot:O.Data[0], AOP Tag Local:Slot:O.ModuleControl.CMD_Control)

Value, Hex	Meaning/Description
00	No Command in CMD Argument register
01	Issue the command that is in the CMD Argument register

Table 17: CMD Argument Register
(Local:Slot:O.Data[1].0 – 7, AOP Tag Local:Slot:O.ModuleControl.CMD_Argument)

For Generic Profile, all commands that require an additional parameter (**BOLD**), the high byte of Local:Slot:O.Data[1] is used. For AOP, the tag ModuleControl.CMD_Additional_Parameter is used.

Value, Hex	Meaning/Description
00	No Command
01	PFB_BUS_RUN_MODE- Put PROFIBUS in run mode
02	PFB_BUS_CLR_MODE- Put PROFIBUS in clear mode
03	PFB_CLR_ERR_CNT- Clear counters in Status area
04	PFB_START_BUS- Put scanner online with PROFIBUS bus
05	PFB_READ_SLV_DIAGS- Read a slave station's diagnostic data. The station address of the slave from which to read diagnostics is in the most significant byte of this register. For example, reading from station 2 would require a value of 0205 hex in this register.
06	PFB_SLV_DIAG_ACK- Acknowledge a slave diagnostic update indication (For generic profile see Local: Slot: S.Data [46] and Local: Slot: S.Data [47]. For AOP see tags MasDiagUpdate and MasDiagStn).
07	PFB_STOP_BUS - Put scanner offline with the PROFIBUS bus
08	PFB_DISABLE_SLAVE- This command stops the Profibus Master from scanning the specified slave. The station address of the slave to be disabled is in the most significant byte of this register. For example, disabling station 5 would require a value of 0508 hex in this register.
09	PFB_ENABLE_SLAVE- This command re-enables a slave that has been previously disabled. The station address of the slave to be enabled is in the most significant byte of this register. For example, enabling station 5 would require a value of 0509 hex in this register.
0a	PFB_GET_SLAVE_ID- This command must be called before PFB_SET_SLAVE_ADDRESS in order to load the station address and slave ID of the station to be changed. The station address of the slave is in the most significant byte of this register. For example, to get the slave ID of station 126, a value of 7e0a hex is required in this register.
0b	PFB_SET_SLAVE_ADDRESS- Once PFB_GET_SLAVE_ID has been called, the user may set that slave's address with this command. The new station address is in the most significant byte of this register. For example, to change the slave ID of station 126 to 9, a value of 090b hex is required in this register.
C	SEND_SYNC_COMMAND – This command sends the SYNC command along with Group ID on Profibus network. The Group ID is in the most significant byte

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	of this register. This command is for updating output data on slaves. Slaves will not accept output data again until the next SYNC command is sent again or the UNSYNC command is sent.. Group ID is 8 bit field (0 – 7 and each of the bits represent a Group. Group 0 (Bit 0) is for sending to all slaves in Master scanlist.
D	SEND_UNSYNC_COMMAND – This command sends the UNSYNC command along with Group ID on Profibus network. The Group ID is in the most significant byte of this register. This command causes outputs on slave to continue to get updated cyclically again.
E	SEND_FREEZE_COMMAND – This command sends the FREEZE command along with Group ID on Profibus network. The Group ID is in the most significant byte of this register. The command causes slave inputs to freeze and until the next FREEZE command is received.
F	SEND_UNFREEZE_COMMAND – This command sends the UNFREEZE command along with the Group ID on Profibus network. The Group ID is in the most significant byte of this register. The command removes the FREEZE on slave inputs and allows them to get updated cyclically again.

Table 18: Changing Input Page
(Local:Slot:O.Data[0].8 - 11, Local:Slot:O.ModuleControl.ChangePage, Bits 0 - 3)

Value, Hex	Meaning/Description
0-3	Change to that Input Page

Table 19: Changing Output Page
(Local:Slot:O.Data[0].12 – 15, AOP Tag Local:Slot:O.ModuleControl.ChangePage, Bits 4 - 7)

Value, Hex	Meaning/Description
0-3	Change to that Output Page

Table 20: Module Status Register
(Local:Slot:I.Data[0].0 -7, AOP Tag Local:Slot:I.ModuleStat.ModuleStatus)

Value, Hex	Meaning/Description
E0	Scanner is not online with PROFIBUS bus. Issue the PFB_START_BUS command to put it online.
E1	Scanner is online with the PROFIBUS bus.
E2	Scanner is in serial configuration mode. A terminal is being used to download PROFIBUS configuration files.
FF	The CLX processor has lost its connection to the scanner. All data in the Input and Status tables should be considered invalid.

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Caution

The Module Status Register should be monitored for 0xFF in ladder code. If this condition occurs, the processor has lost the connection to the scanner and should assume a safe state.

Table 21: CMD Reply Register
(Local:Slot:I.Data[1], AOP Tag Local:Slot:I.ModuleStat.CMD_Reply)

Value, Hex	Meaning/Description
00	No Command
01	PFB_BUS_RUN_MODE has been processed
02	PFB_BUS_CLR_MODE has been processed
03	PFB_CLR_ERR_CNT has been processed
04	PFB_START_BUS-Put has been processed
05	PFB_READ_SLV_DIAGS has been processed
06	PFB_SLV_DIAG_ACK has been processed
07	PFB_STOP_BUS has been processed
A	PFB_GET_SALVE_ID has been processed
B	PFB_SET_SLAVE_ADDRESS has been processed
C	SEND_SYNC_COMMAND has been processed
D	SEND_UNSYNC_COMMAND has been processed
E	SEND_FREEZE_COMMAND has been processed
F	SEND_UNFREEZE_COMMAND has been processed

Table 22: Active Input Page
(Local:Slot:I.Data[0]. 8 – 11, AOP Tag Local:Slot:I.ModuleStat.CurrentPage, Bits 0 - 3)

Value, Hex	Meaning/Description
0-3	Current Input Page number that firmware has mapped to the Host

Table 23: Active Output Page
(Local:Slot:I.Data[0]. 12 – 15, AOP Tag Local:Slot:I.ModuleStat.CurrentPage, Bits 4 -7)

Value, Hex	Meaning/Description
0-3	Current Output Page number that firmware has mapped to the Host

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An example of the handshaking that occurs between the CMD Control (Local:Slot:O.Data[0]), CMD Argument (Local:Slot:O.Data[1]) and CMD Reply (Local:Slot:I.Data[1]) registers is provided in the sample program:

SSTPFBCLX_Preview_2_Example.ACD CLX PFB Scanner Status Array

Table 24: Structure of Status Area for Add-on-Profile (AOP) (Local:Slot:S)

Status Name	Meaning/Description
PfbStatus	Card status register
PfbModVer	Module Firmware Version (ex. 0x0102 = 1.02)
PfbMasSts	Global status for all master blocks
PfbStnAddr	PFB Local station address
PfbFmsSts	Global status for all FMS blocks
PfbMasCntrlCfg	DP Master options and configuration
ReconfigStatus	Status of Reconfig message that is sent when applying configuration change while a connection is open to module in RSLogix 5000.
ErrLanOffline	LAN encountered errors and went into offline state
DiagConf	Total confirmations (to requests from us) (MAS,LAY2,FMS)
DiagInd	Total indications (requests to us) (MAS,LAY2,FMS)
ErrNotOk	Total Not OK confirmations and/or indications (MAS,LAY2,FMS)
DiagTokHldTimeLO	Instantaneous token hold time in Tbits (Low Word)
DiagTokHldTimeHI	Instantaneous token hold time in Tbits (High Word)
DiagMinTokHldTimeLO	Minimum Actual token hold time in Tbits (Low Word)
DiagMinTokHldTimeHI	Minimum Actual token hold time in Tbits (High Word)
DiagMasterUpdate	Master I/O update cycles completed
ErrMasErr	Master->DP slave communication errors
ErrReConfig	Master->DP went offline and had to be reconfigured
DiagMasScanTimeLO	Instantaneous master scan time in microseconds (Low Word)
DiagMasScanTimeHI	Instantaneous master scan time in microseconds (High Word)
DiagMasMaxScanTimeLO	Maximum master scan time in microseconds (Low Word)
DiagMasMaxScanTimeHI	Maximum master scan time in microseconds (High Word)
ErrInvReqLen	Invalid request length errors
ErrFifo	FIFO overflow errors
ErrRxOverun	Receive overrun errors
ErrDblTok	Double token errors (bad wiring or hardware)
ErrRespErr	Response errors (bad wiring or hardware)
ErrSyniErr	Syni errors (bad wiring or hardware)
ErrNetTout	Network timeout errors
ErrHsa	Station higher than HSA was heard

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Status Name	Meaning/Description
ErrStn	Duplicate Station Detected
ErrPasTok	Unable to Pass Token (bad wiring or hardware)
ErrLasBad	Active station list invalid (bad wiring or hardware)
ErrInternal	Internal Error Code (configuration error or runtime fault). Call Technical Support.
ErrArg	Additional information about the internal error code
ErrEventOverun	Event queue has overflowed
pfbActStnList0_15	Active Slave station bit table for stations 0 to 15
pfbActStnList16_31	Active Slave station bit table for stations 16 to 31
pfbActStnList32_47	Active Slave station bit table for stations 32 to 47
pfbActStnList48_63	Active Slave station bit table for stations 48 to 63
pfbActStnList64_79	Active Slave station bit table for stations 64 to 79
pfbActStnList80_95	Active Slave station bit table for stations 80 to 95
pfbActStnList96_111	Active Slave station bit table for stations 96 to 111
pfbActStnList112_126	Active Slave station bit table for stations 112 to 126
pfbCfgStnList0_15	Configured Slave station bit table for stations 0 – 15
pfbCfgStnList16_31	Configured Slave station bit table for stations 16 – 31
pfbCfgStnList32_47	Configured Slave station bit table for stations 32 – 47
pfbCfgStnList48_63	Configured Slave station bit table for stations 48- 63
pfbCfgStnList64_79	Configured Slave station bit table for stations 64- 79
pfbCfgStnList80_95	Configured Slave station bit table for stations 80 – 95
pfbCfgStnList96_111	Configured Slave station bit table for stations 96 – 111
pfbCfgStnList112_126	Configured Slave station bit table for stations 112 – 126
SlvStatus	Local slave status register
SlvError	Local slave error register contains error code
MasDiagUpdate	A non-zero value here means a DP slave has updated diagnostic information
MasDiagStn	The station address of the slave that updated diagnostics above
DiagLen	The length of the slave diagnostic data to follow in SlvStnStatus1, SlvStnStatus2, SlvStnStatus3, MasterStnAddr, SlvID DiagDataBuffer. These tags are filled in when command PFB_READ_SLV_DIAGS is executed.
SlvStnStatus1	Station Status Byte 1. The first byte of slave diagnostic data. See description below.
SlvStnStatus2	Station Status Byte 2. The second byte of slave diagnostic data. See description below.
SlvStnStatus3	Station Status Byte 3. The third byte of slave diagnostic data. See description below.
MasterStnAddr	Master Station Address (Master that configured the slave. OxFF means that no master has configured this slave)
SlvID	Profibus Slave ID number
DiagDataBuffer	The slave's diagnostic data bytes 7 - 244.

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Table 25: Structure of Status Area for Generic Profile (Local:Slot:S.Data[])

Status Name	Meaning/Description	CLX Addr (INT16 Array)
PfbStatus	Card status register	Local: Slot: S.Data [00]
PfbModVer	Module Firmware Version (ex. 0x0102 = 1.02)	Local: Slot: S.Data [01]
PfbMasSts	Global status for all aster blocks	Local: Slot: S.Data [02].00-07
PfbStnAddr	PFB Local station address	Local: Slot: S.Data [02].8-15
PfbFmsSts	Global status for all FMS blocks	Local: Slot: S.Data [03].00-07
PfbMasCntrlCfg	DP Master options and configuration	Local: Slot: S.Data [03].8-15
Reserved	Reserved	Local: Slot: S.Data [04].00 - 07
ReconfigStatus	Status of Reconfig message that is sent when applying configuration change while a connection is open to module in RSLogix 5000.	Local: Slot: S.Data [04].8-15
ErrLanOffline	LAN encountered errors and went into offline state	Local: Slot: S.Data [05].00-07
Reserved	Reserved	Local: Slot: S.Data [05].08-15
DiagConf	Total confirmations (to requests from us) (MAS,LAY2,FMS)	Local: Slot: S.Data [06]
DiagInd	Total indications (requests to us) (MAS,LAY2,FMS)	Local: Slot: S.Data [07]
ErrNotOk	Total Not OK confirmations and/or indications (MAS,LAY2,FMS)	Local: Slot: S.Data [08]
DiagTokHldTime	Instantaneous token hold time in Tbits	Local: Slot: S.Data [09] (LSW) œ Local: Slot: S.Data [10] (MSW)
DiagMinTokHldTime	Minimum Actual token hold time in Tbits	Local: Slot: S.Data [11] (LSW) œ Local: Slot: S.Data [12] (MSW)
DiagMasterUpdate	Master I/O update cycles completed	Local: Slot: S.Data [13]
ErrMasErr	Master->DP slave communication errors	Local: Slot: S.Data [14].00-07
ErrReConfig	Master->DP went offline and had to be reconfigured	Local: Slot: S.Data [14].08-15
DiagMasScanTime	Instantaneous master scan time in microseconds	Local: Slot: S.Data [15] (LSW) œ Local: Slot: S.Data [16] (MSW)
DiagMasMaxScanTime	Maximum master scan time in microseconds	Local: Slot: S.Data [17] (LSW) œ Local: Slot: S.Data [18] (MSW)
ErrInvReqLen	Invalid request length errors	Local: Slot: S.Data [19].00-07
ErrFifo	FIFO overflow errors	Local: Slot: S.Data [19].08-15
ErrRxOverun	Receive overrun errors	Local: Slot: S.Data [20].00-07
ErrDblTok	Double token errors (bad wiring or hardware)	Local: Slot: S.Data [20].08-15
ErrRespErr	Response errors (bad wiring or hardware)	Local: Slot: S.Data [21].00-07
ErrSyniErr	Syni errors (bad wiring or hardware)	Local: Slot: S.Data [21].08-15
ErrNetTout	Network timeout errors	Local: Slot: S.Data [22].00-07

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Status Name	Meaning/Description	CLX Addr (INT16 Array)
ErrHsa	Station higher than HSA was heard	Local: Slot: S.Data [22].08-15
ErrStn	Duplicate Station Detected	Local: Slot: S.Data [23].00-07
ErrPasTok	Unable to Pass Token (bad wiring or hardware)	Local: Slot: S.Data [23].08-15
ErrLasBad	Active station list invalid (bad wiring or hardware)	Local: Slot: S.Data [24].00-07
ErrInternal	Internal Error Code (configuration error or runtime fault). Call Technical Support.	Local: Slot: S.Data [24].08-15
ErrArg	Additional information about the internal error code	Local: Slot: S.Data [25].00-07
ErrEventOverun	Event queue has overflowed	Local: Slot: S.Data [25].08-15
Reserved	Reserved	Local: Slot: S.Data [26]
pfbActStnList	Active Slave station bit table	Local: Slot: S.Data [27]-Local: Slot: S.Data [34]
pfbCfgStnList	Configured Slave station bit table below	Local: Slot: S.Data [35]-Local: Slot: S.Data [42]
Reserved	Reserved	Local: Slot: S.Data [43]
SlvStatus	Local slave status register	Local: Slot: S.Data [44].00-07
SlvError	Local slave error register contains error code	Local: Slot: S.Data [44].08-15
Reserved	Reserved	Local: Slot: S.Data [45]
MasDiagUpdate	A non-zero value here means a DP slave has updated diagnostic information	Local: Slot: S.Data [46]
MasDiagStn	The station address of the slave that updated diagnostics above	Local: Slot: S.Data [47]
DiagLen	The length of the slave diagnostic data to follow in the DiagDataBuffer	Local:Slot:S.Data[56]
DiagDataBuffer	The slave's diagnostic data. This is filled in using the PFB_READ_SLV_DIA GS described above.	Local:Slot:S.Data[59] to Local:Slot:S.Data[180] maximum

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Table 26: Active Slave Station List (Generic Profile)

Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Local:Slot:S.Data[27]	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Local:Slot:S.Data[28]	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16
Local:Slot:S.Data[29]	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32
Local:Slot:S.Data[30]	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	48
Local:Slot:S.Data[31]	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65	64
Local:Slot:S.Data[32]	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81	80
Local:Slot:S.Data[33]	111	110	109	108	107	106	105	104	103	102	101	100	99	98	97	96
Local:Slot:S.Data[34]		126	125	124	123	122	121	120	119	118	117	116	115	114	113	112

When a logical 1 appears in one of the above bit positions, that slave station is configured and is returning no errors

Table 27: Active Slave Station List (Add-on-Profile)

Active Station Group Tags	Tag ActSlv_X , X = Station Number															
pfbActStnList0_15	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
pfbActStnList16_31	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16
pfbActStnList32_47	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32
pfbActStnList48_63	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	48
pfbActStnList64_79	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65	64
pfbActStnList80_95	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81	80
pfbActStnList96_111	111	110	109	108	107	106	105	104	103	102	101	100	99	98	97	96
pfbActStnList112_126		126	125	124	123	122	121	120	119	118	117	116	115	114	113	112

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Table 28: Configured Slave Station List (using Generic Profile)

Active Station Group Tags	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Local:Slot:S.Data[35]	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Local:Slot:S.Data[36]	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16
Local:Slot:S.Data[37]	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32
Local:Slot:S.Data[38]	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	48
Local:Slot:S.Data[39]	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65	64
Local:Slot:S.Data[40]	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81	80
Local:Slot:S.Data[41]	111	110	109	108	107	106	105	104	103	102	101	100	99	98	97	96
Local:Slot:S.Data[42]		126	125	124	123	122	121	120	119	118	117	116	115	114	113	112

When a logical 1 appears in one of the above bit positions, that slave station is configured.

Table 29: Configured Slave Station List (using Add-on-Profile)

Configured Station Group Tags	Tag CfgSlv_X , X = Station Number															
pfbCfgStnList0_15	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
pfbCfgStnList16_31	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16
pfbCfgStnList32_47	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32
pfbCfgStnList48_63	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	48
pfbCfgStnList64_79	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65	64
pfbCfgStnList80_95	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81	80
pfbCfgStnList96_111	111	110	109	108	107	106	105	104	103	102	101	100	99	98	97	96
pfbCfgStnList122_126		126	125	124	123	122	121	120	119	118	117	116	115	114	113	112

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Table 30: PfbStatus (Card Status register)
Local:Slot:S.Data[0], AOP Tag Local:Slot:S.PfbStatus

Status Name	Meaning/Description	Value
STS_NO_ERROR	The SST-PB3-CLX-RLL has no errors	0x0000
STS_BAD_BAUD	The configured baud rate is not valid	0x0002
STS_BAD_STN_ADR	The configured station address is not valid	0x0003
STS_BAD_HI_STN_ADR	The configured Highest Station Address is not valid	0x0004
STS_CFG_INTERNAL_ERROR	The SST-PB3-CLX-RLL has encountered a fatal internal error	0x0080
STS_OUT_OF_APBS	The SST-PB3-CLX-RLL has run out of internal resources	0x0081
STS_HEAP_ALLOC_FAIL	The SST-PB3-CLX-RLL has run out of internal resources	0x0083
STS_SH_HEAP_ALLOC_FAIL	The SST-PB3-CLX-RLL has run out of internal resources	0x0084

Table 31: PfbMasSts (DP Master Global Status)
Local:Slot:S.Data[0], AOP Tag Local:Slot:S.PFB_MAS_STS_ALL_OK

Status Name	Meaning/Description	Value
PFB_MAS_STS_ALL_OK	All the configured DP slave devices are online and operating	0x01
PFB_MAS_STS_ALL_NOTOK	At least one DP Slave is not configured or not present on the bus	0x00

Table 32: PfbMasCntrlCfg
Local:Slot:S.Data[3].8-15, AOP Tag Local:Slot:S.PfbMasCntrlCfg

Status Name	Meaning/Description	Value
PFB_MAS_CTRL_SYNC_SCAN	Sync Scan mode is enabled	0x01
PFB_MAS_CTRL_RUN_MODE	The DP Bus state is Run (Operate)	0x02
PFB_MAS_CTRL_USR_OFS	The DP slave data addresses have been assigned to PLC memory	0x04
PFB_MAS_CTRL_ENABLE	DP Master mode is enabled	0x08
PFB_MAS_CTRL_ADDR_ASIGNED	The DP slave data to PLC memory addresses are valid	0x80

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Table 33: ReconfigStatus
Local:Slot:S.Data[4].8-12, AOP Tag Local:Slot:S.ReconfigStatus.0-4

Generic Bit	AOP Bit	Meaning/Description
8 -11	0 – 3	Reply message counter. Verify counter has changed to confirm reply has been returned. Then check bit 4 (Tag Error) to see if applying configuration data update was successful. This counter rolls over to 0 after It reaches 15
12	4	Bit is 1 means configuration rejected (Bad configuration data) Bit is 0 means configuration data was accepted

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5.10 Making Changes to the CLX Configuration File While the Profibus Card is Online

1. Put the PLC into PROG mode.
2. Connect serially to the module via the PROFIBUS Configuration Tool.
3. Issue the Offline command by right-clicking on the Master and selecting the Offline command.
4. Edit the ControlLogix file.
5. Download the PLC program.
6. Put the PLC into RUN.

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6
System Diagnostics

Chapter Sections:

- PFB Status Register
- Diagnostic Counters
- Summary of Diagnostic Locations



Note

The scanner maintains a variety of diagnostic information in its Status area from Local:Slot: S.Data[0] to Local:Slot: S.Data[180].

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6.1 PFB Status Register

Local:Slot:S.Data[0] , AOP Tag Local:Slot:S.PfbStatus

The first 16-bit INT in the Status area is the Card Status register. The following tables show possible status register values.

Table 34: PfbStatus

Status Name	Meaning/Description	Value
STS_NO_ERROR	The SST-PB3-CLX-RLL has no errors	0x0000
STS_BAD_BAUD	The configured baud rate is not valid	0x0002
STS_BAD_STN_ADR	The configured station address is not valid	0x0003
STS_BAD_HI_STN_ADR	The configured Highest Station Address is not valid	0x0004
STS_CFG_INTERNAL_ERROR	The SST-PB3-CLX-RLL has encountered a fatal internal error	0x0080
STS_OUT_OF_APBS	The SST-PB3-CLX-RLL has run out of internal resources	0x0081
STS_HEAP_ALLOC_FAIL	The SST-PB3-CLX-RLL has run out of internal resources	0x0083
STS_SH_HEAP_ALLOC_FAIL	The SST-PB3-CLX-RLL has run out of internal resources	0x0084

If the status register contains STS_CFG_INTERNAL_ERROR (80h), there has been an internal error on the scanner. Record the contents of the ErrInternal and errArg registers and contact Technical Support. ErrInternal is stored in the high byte of status area offset 24. ErrArg is stored in the low byte of status area offset 25.

If the status register contains STS_OUT_OF_APBS (81h), the scanner has run out of application blocks. The DP master uses 2 application blocks per configured slave. There are a total of 835 application blocks. If you get this error, reduce the number of application blocks you use.

If the status register contains STS_HEAP_ALLOC_FAIL (83h) or STS_SH_HEAP_ALLOC_ FAIL (84h), there has been an internal error in allocating memory. Contact Technical Support.

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6.1.1 Scanner Firmware Version Number

The version number of the scanner firmware is stored in status area offset 1. For example, if the Word corresponding to the value is 0122h, then the firmware is version 1.22.

Local:Slot:S.Data[2].00-07, AOP Tag Local:Slot:S.PfbMasSts

Table 35: PfbMasSts (DP Master Global Status)

Status Name	Meaning/Description	Value
PFB_MAS_STS_ALL_OK	All the configured DP slave devices are online and operating	0x01
PFB_MAS_STS_ALL_NOT OK	At least one DP Slave is not configured or not present on the bus	0x00

Local:Slot:S.Data[3].8-15 , AOP tag Local:Slot:S.PfbMasCntrlCfg

Table 36: PfbMasCntrlCfg

Status Name	Meaning/Description	Value
PFB_MAS_CTRL_SYNC_SCAN	Sync Scan mode is enabled	0x01
PFB_MAS_CTRL_RUN_MODE	The DP Bus state is Run (Operate)	0x02
PFB_MAS_CTRL_USR_OFS	The DP slave data addresses have been assigned to PLC memory	0x04
PFB_MAS_CTRL_ENABLE	DP Master mode is enabled	0x08
PFB_MAS_CTRL_ADDR_ASIGNED	The DP slave data to PLC memory addresses are valid	0x80

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6.1.2 DP Master Active and Configured Slave Station Bit Tables

There are two Slave Status tables available in the Status area of the CLX scanner. One is the Active Slave Station bit table, which starts at Local:Slot:S.Data[27] to [34] and contains one bit per slave. For example, if slave station 10 is set to 1, then that slave is configured and returns no errors.

The other table is the Configured Slave Station bit table, which starts at Local:Slot: S.Data[35] to [42] and contains one bit per slave.

If using AOP, the Active Slave Station bit table and Configured Slave Station bit table have descriptive tags for all stations from 0 – 126.

Table 37: Active Slave Station List

Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Local:Slot:S.Data[27]	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Local:Slot:S.Data[28]	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16
Local:Slot:S.Data[29]	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32
Local:Slot:S.Data[30]	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	48
Local:Slot:S.Data[31]	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65	64
Local:Slot:S.Data[32]	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81	80
Local:Slot:S.Data[33]	111	110	109	108	107	106	105	104	103	102	101	100	99	98	97	96
Local:Slot:S.Data[34]		126	125	124	123	122	121	120	119	118	117	116	115	114	113	112

When a logical 1 appears in one of the bit positions above, that slave station is configured and returns no errors.

Table 38: Configured Slave Station List

Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Local:Slot:S.Data[35]	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Local:Slot:S.Data[36]	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16
Local:Slot:S.Data[37]	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32
Local:Slot:S.Data[38]	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	48
Local:Slot:S.Data[39]	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65	64
Local:Slot:S.Data[40]	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81	80
Local:Slot:S.Data[41]	111	110	109	108	107	106	105	104	103	102	101	100	99	98	97	96
Local:Slot:S.Data[42]		126	125	124	123	122	121	120	119	118	117	116	115	114	113	112

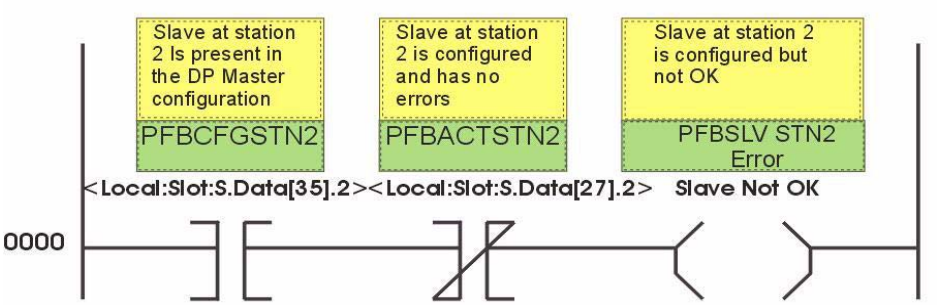
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When a logical 1 appears in one of the above bit positions, the slave station is configured.

In addition, if the status of all slaves is acceptable, then bit 0 of location Local:Slot: S.Data[2](PfbMasSts) is set to 1. If this bit is 0, one or more slaves are in error.

To determine that a slave has faulted, use the following ladder logic example:

Figure 5: Ladder Logic Example



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6.1.3 Reading the Slave Diagnostics

Refer to Figure 11 to see how Slave Diagnostics are retrieved. There are 4 important locations:

- **MasDiagUpdate** - a non-zero value means a DP Slave has updated diagnostic information
    - Local:Slot:S.Data[46]
- **MasDiagStn** - Station address of the slave that updated the Diagnostics
    - Local:Slot:S.Data[47]
- **DiagLen** -the length of the Slave diagnostic data to follow in the DiagData buffer
    - Local:Slot:S.Data[56]
- **DiagDataBuffer** - the Slave diagnostic data
    - Local:Slot:S.Data[59] to [180]

The first 6 slave Diagnostic bytes are common to all DP slaves, as follows:

Table 39: Diagnostic Bytes Common to all DP Slaves

Location	AOP Tag Name	Meaning/Description
Local:Slot:S.Data[59].0-7	SlvStnStatus1	Station status byte 1
Local:Slot:S.Data[59].8-15	SlvStnStatus2	Station status byte 2
Local:Slot:S.Data[60].0-7	SlvStnStatus3	Station status byte 3
Local:Slot:S.Data[60].8-15	MasterStnAddr	Master Station Address (Master that configured the slave. OxFF means that no master has configured this slave
Local:Slot:S.Data[61].0-15	SlvID	Slave ID

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The bits in station status byte 1are defined as follows:

Local:Slot:S.Data[59].0-7, AOP Tag Local:Slot:S.SlvStnStatus1

Table 40: Bits in Station Status Byte 1

Bit	AOP Tag Name	Meaning/Description
7	SlaveParamMaster	DP slave has been parameterized by another master
6	SlaveInvalidParam	Slave received an invalid parameter frame, wrong Ident, wrong length, invalid parameters, and so on
5	SlaveResponseInvalid	Invalid response from the slave
4	SlaveFunctionNonExist	Master requested a function that the slave does not support
3	SlaveDiagEntry	An entry exists in the slave-specific diagnostic area.
2	SlaveCfgInvalid	Configuration check data for the slave was incorrect
1	SlaveNotRdyXFER	Slave is not ready for data transfer
0	SlaveNonExist	DP slave non-existent

The station status byte 1 should always be zero (0) when the master is scanning the slave. Otherwise, a non-zero value indicates errors.

The bits in station status byte 2 are defined as follows:

Local:Slot:S.Data[59].8-15, AOP Tag Local:Slot:S.SlvStnStatus2

Table 41: Bits in Station Status Byte 2

Bit	AOP Tag Name	Meaning/Description
7	SlaveInactive	Slave has been marked inactive by the master
6	SlaveReserved	Reserved
5	SlaveSyncCmd	The slave has received a Sync command
4	SlaveFreezeCmd	The slave has received a freeze command
3	SlaveWDActive	The slave watchdog has been activated
2	SlaveSetThisBt	The slave has set this bit to 1
1	SlaveDiagRead	The slave is requesting a diagnostic read
0	SlaveReParam	The slave is requesting reparameterization

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Station status byte two is 0x0C when the master is scanning a DP slave.

The bits in Station status byte 3 are defined as follows:

Local:Slot:S.Data[60].0-7, AOP Tag Local:Slot:S.SlvStnStatus3

Table 42: Bits in Station Status Byte 3

Bit	AOP Tag Name	Meaning/Description
7	SlaveDiagBufOverun	The DP slave is returning more diagnostic information than the DP Master can enter in its diagnostic buffer
0-6	SlaveReserved0 – SlaveReserved6	Reserved

6.2 Diagnostic Counters

The scanner maintains a variety of diagnostic counters to indicate:

- General statistics on messages sent and received
- The state of the master
- Network statistics

The counters are located in Local:Slots:S.Data[5] to [24].

To reset these counters to 0, write 0x03 to CMD Argument register (Local:Slots:O.Data[1], AOP Tag Local.Slot:O.Module.CMD_Argument). The scanner clears the counters to 0.



Note

In order for the commands to execute properly, you must include the SST Main CLX Example sample Ladder Logic in your Control program.

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In the following table, counters with a name beginning with "diag" roll over to zero when they reach their maximum value. Counters with a name beginning with "err" hold their maximum value.

Table 43: Description of Diagnostic Counters

Name	Location	Meaning/Description
ErrLanOffline	Local:Slot:S.Data[05].00-07	LAN went offline because of errors
DiagConf	Local:Slot:S.Data[06]	Total confirmations (to requests from us)
DiagInd	Local:Slot:S.Data[07]	Total indications
ErrNotOk	Local:Slot:S.Data[08]	Total not OK confirmations and indications
DiagTokHldTime	Local:Slot:S.Data[09](LSW) - Local:Slot:S.Data[10](MSW)	Instantaneous token hold time
DiagMinTokHldTime	Local:Slot:S.Data[11](LSW) - Local:Slot:S.Data[12](MSW)	Minimum token hold time in Tbits
DiagMasterUpdate	Local:Slot:S.Data[13]	Master I/O update cycles completed
ErrMasErr	Local:Slot:S.Data[14].00-07	Master->DP slave errors
ErrMasReConfig	Local:Slot:S.Data[14].8-15	Master->DP went offline and had to be reconfigured
DiagMasScanTime	Local:Slot:S.Data[15](LSW) - Local:Slot:S.Data[16](MSW)	Master scan time (us) in microseconds
DiagMasMaxScanTime	Local:Slot:S.Data[17](LSW) - Local:Slot:S.Data[18](MSW)	Maximum master scan time (us) in microseconds
ErrInvReqLen	Local:Slot:S.Data[19].00-07	Invalid request length errors
ErrFifo	Local:Slot:S.Data[19].08-15	FIFO overflow errors
ErrRxOverun	Local:Slot:S.Data[20].00-07	Receive overrun errors
ErrDblTok	Local:Slot:S.Data[20].08-15	Double token errors (bad wiring or hardware)
ErrRespErr	Local:Slot:S.Data[21].00-07	Response errors (bad wiring or hardware)
ErrSyniErr	Local:Slot:S.Data[21].08-15	SYNI errors (bad wiring or hardware)
ErrNetTout	Local:Slot:S.Data[22].00-07	Network timeout errors
ErrHsa	Local:Slot:S.Data[22].08-15	Station higher than HSA was heard
ErrStn	Local:Slot:S.Data[23].00-07	Duplicate station detected
ErrPasTok	Local:Slot:S.Data[23].08-15	Unable to pass token (bad wiring or hardware)
ErrLasBad	Local:Slot:S.Data[24].00-07	Active station list invalid (bad wiring or hardware)

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6.2.1 General Statistics

These counters relate to the overall operation of the scanner on PROFIBUS.

The following is a list of general counter statistics:

- The ErrLanOffline counter, register Local:Slot:S.Data[05].0-7, increments when the LAN encounters errors and goes offline
- The DiagConf counter, register Local:Slot:S.Data[06], counts total confirmations, that is, good replies to messages that this station has generated
- The DiagInd counter, register Local:Slot:S.Data[07], counts total indications, that is, unsolicited messages to this station
- The ErrNotOk counter, register Local:Slot:S.Data[08], counts the Total Not OK confirmations and indications, that is, total bad replies and bad unsolicited messages (indications)
- The scanner stores the instantaneous token hold time, in Tbits, in DiagTokHldTime, registers Local:Slot:S.Data[09](LSW) and Local:Slot:S.Data[10](MSW). This is the time available to send messages when the scanner gets the token.
- The scanner stores the minimum actual token hold time, in Tbits, in DiagMinTokHldTime, registers Local:Slot:S.Data[11](LSW) and Local:Slot: S.Data[12](MSW). This time is the minimum value of diagTokHldTime. If this number is 0, you may need to increase the target token rotation time in your configuration.

To increase the target token rotation time, do the following:

1. Open your DP Master Configuration in the Configuration Tool.
2. Select and highlight the PROFIBUS.DP.
3. Right-click and select Properties from the shortcut menu that displays.
4. Select the Timing tab in the Network Dialog box.
5. Select the Token Rotation Time checkbox.
6. Enter the new value (the sum of ALL masters or Active Station’s token rotation time) in the Token Rotation Time field.

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6.2.2 DP Master Statistics

These counters relate to the operation of the scanner as a DP master.

The following is a list of DP Master Statistics:

- The DiagMasterUpdate counter, register Local:Slot:S.Data[13], is the number of Master I/O update cycles completed
- The ErrMasErr counter, the low byte of register Local:Slot:S.Data[14], bits 00-07, is the number of DP master to DP slave communication errors. It increments anytime the message failed because of retries exceeded, and so on.
- The ErrMasReConfig counter, the high byte of register Local:Slot:S.Data[14], bits 08-15, is the number of times a DP slave went offline and had to be reconfigured, that is, the scanner was actively updating a node and got a faulty message
- The DiagMasScanTime register, registers Local:Slot:S.Data[15](LSW) and Local:Slot:S.Data[16](MSW). It contains the instantaneous master scan time in micro-seconds, that is, the time to scan all the slaves assigned to this master. The scanner adds 100 micro-seconds to the measured time to allow for overhead in starting the timer, and so on.



Note

See the typical scan time given in your SST PROFIBUS Master configuration. As a safety margin, the RPI should be 2 times the typical scan time. Therefore, if the DiagMasMaxScanTime is higher than your RPI time, you will miss slave updates each PROFIBUS scan. For example if your typical scan time is 1.5ms then your RPI should be 3ms or higher.

The DiagMasMaxScanTime registers contains the maximum value that DiagMasScanTime reached since it was last cleared:

Local:Slot:S.Data[17](LSW) to Local:Slot:S.Data[18](MSW)

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6.2.3 ASPC2 PROFIBUS Controller Statistics

The ASPC2 LAN controller maintains the following counters. They are all 1 byte long. When these counters reach 255, they hold at 255 until cleared. For AOP, the counter name is the same as the AOP tag name.

The ErrInvReqLen Counter

The low byte of register Local:Slot:S.Data[19], bits 0-7, counts invalid request length errors. These errors occur when the scanner software gives the LAN controller a message that is too long. This is an internal error and should never occur.

The ErrFifo Counter

The high byte of register Local:Slot:S.Data[19], bits 8-15, counts FIFO overflow errors. These errors occur when the LAN controller cannot write to memory fast enough. This is an internal error and should never occur.

The ErrRxOverun Counter

The low byte of register Local:Slot:S.Data[20], bits 0-7, counts receive overrun errors. This is an internal error and should never occur.

The ErrDblTok Counter

The high byte of register Local:Slot:S.Data[20], bits 8-15, counts double token errors. These errors may occur when more than one node thinks it has the token or there are wiring errors, duplicate nodes, and so on. The scanner withdraws to the “not hold token” state (decides it doesn't have the token) and waits until it gets the token passed to it again.

The ErrRespErr Counter

The low byte of register Local:Slot:S.Data[21], bits 0-7, counts response errors when a message fails or there is no response from the destination. This error may be due to bad hardware or faulty wiring.

The ErrSyniErr Counter

The high byte of register Local:Slot:S.Data[21], bits 8-15, indicates general network errors. These errors occur when there are problems on the network, but before you get a network timeout error.

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The ErrNetTout Counter

The low byte of register Local:Slot:S.Data[22], bits 0-7, counts network timeout errors. These errors occur when the network is dead. If a timeout occurs, the scanner enters the claim token state.

The ErrHsa Counter

The high byte of register Local:Slot:S.Data[22], bits 8-15, increments when a station higher than the set high station address is heard. If the scanner is going online, it increments the counter and stays offline.

The ErrStn Counter

The low byte of register Local:Slot:S.Data[23], bits 0-7, increments when a duplicate station is detected. If this error occurs when the scanner is going online, the scanner increments the errStn counter and stays offline.

The ErrPasTok Counter

The high byte of register Local:Slot:S.Data[23], bits 8-15, increments when the scanner is unable to pass the token. This is usually caused by bad wiring (shorted) or other hardware problems. The scanner tries to pass the token, fails to hear its own token pass message, and puts itself offline.

The ErrLasBad Counter

The low byte of register Local:Slot:S.Data [24], bits 0-7, increments when the active station list on the ASPC2 LAN controller is invalid because of multiple network errors. This error is caused by bad wiring or hardware.

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6.3 Summary of Diagnostic Locations

The following table summarizes the locations used:

Table 44: Diagnostic Locations Used

Locations	Meaning/Description
Local:Slot:S.Data[00]	Card status register
Local:Slot:S.Data[01]	CLXPROFI Module firmware version (i.e. 0x0102 = 1.02)
Local:Slot:S.Data[02]	Global station for all Master blocks
Local:Slot:S.Data[5] - Local:Slot:S.Data[12]	General statistics
Local:Slot:S.Data[13] - Local:Slot:S.Data[18]	DP Master statistics
Local:Slot:S.Data[19] - Local:Slot:S.Data[24]0-7	ASPC2 PROFIBUS Controller statistics
Local:Slot:S.Data[24]8-15- Local:Slot:S.Data[25]	Firmware diagnostics
Local:Slot:S.Data[27] - Local:Slot:S.Data[34]	Active slave station list
Local:Slot:S.Data[35] - Local:Slot:S.Data[42]	Configured slave station list
Local:Slot:S.Data[46]	Master Diagnostic update
Local:Slot:S.Data[47]	Master Diagnostic station
Local:Slot:S.Data[56]	Diagnostic length
Local:Slot:S.Data[59] - Local:Slot:S.Data[180]	Diagnostic buffer

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7
DP Master Application Examples

Chapter Sections:

- Addressing
- Main CLX Example
- Reading Slave Diagnostics
- Sync and Freeze Example (Optional)

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7.1 Addressing

7.1.1 I/O Data Packing Examples

Table 45: ControlLogix Assembly Object Array Packing, Example for INT16 Array

Area Description	PROFIBUS Module Size	Output Array Location	Input Array Location
Slave One, Output array	8 discrete outputs	Local:Slot:O.Data[0]	N/A
DataType is INT16, input	2 words I/O	Local:Slot:O.Data[1..2]	Local:Slot:I.Data[0..1]
Array data type is INT 16	24 discrete inputs	N/A	Local:Slot:I.Data[2..3]
Slave Two	16 discrete I/O	Local:Slot:O.Data[3]	Local:Slot:I.Data[4]
	2 words I/O	Local:Slot:O.Data[4..5]	Local:Slot:I.Data[5..6]

Table 46: ControlLogix Assembly Object Array Packing, Example for INT32 Array

Area Description	PROFIBUS Module Size	Output Array Location	Input Array Location
Slave One, Output array	8 discrete outputs	Local:Slot:O.Data[0]	N/A
DataType is INT32, input	2 words I/O	Local:Slot:O.Data[1]	Local:Slot:I.Data[0]
Array data type is INT32	24 discrete inputs	N/A	Local:Slot:I.Data[1]
Slave Two	16 discrete I/O	Local:Slot:O.Data[2]	Local:Slot:I.Data[2]
	2 words I/O	Local:Slot:O.Data[3]	Local:Slot:I.Data[3]

Table 47: ControlLogix Assembly Object Array Packing, Example for INT8 Array

Area Description	PROFIBUS Module Size	Output Array Location	Input Array Location
Slave One, Output array	8 discrete outputs	Local:Slot:O.Data[0]	N/A
DataType is INT8, input	2 words I/O	Local:Slot:O.Data[1..4]	Local:Slot:I.Data[0..3]
Array data type is INT8	24 discrete inputs	N/A	Local:Slot:I.Data[4..6]
Slave Two	16 discrete I/O	Local:Slot:O.Data[5..6]	Local:Slot:I.Data[7..8]
	2 words I/O	Local:Slot:O.Data[7..10]	Local:Slot:I.Data[9..12]

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7.2 Main CLX Example

Handshaking between the Host CPU and the scanner module is done using the CMD Control (Local:Slot: O.Data[0]), CMD Argument (Local:Slot: O.Data[1]), and CMD Reply (Local:Slot: I.Data[1]) registers.

The following example shows how to interface with the card:

- Check to see if the Card is offline by reading the ModuleStatus register (Local:Slot: I.Data[0]). If it is (0xE0), wait one 1 second and then put the Card online.
- Put the Bus in Run mode once the Card is running and the Bus is not already in Run mode
- Issue commands that are outstanding by setting the command bit in the CMD Control register (Local:Slot: S.Data[0].0)



Note

The Main CLX Example must be included with your Control Logic unless you are using the AutoRun bit. If using the AutoRun bit you should still use rungs 4 and 5 from the Main CLX Example to be able to issue commands through the Command Argument register. See section 10.2.3 for more information on the AutoRun bit.

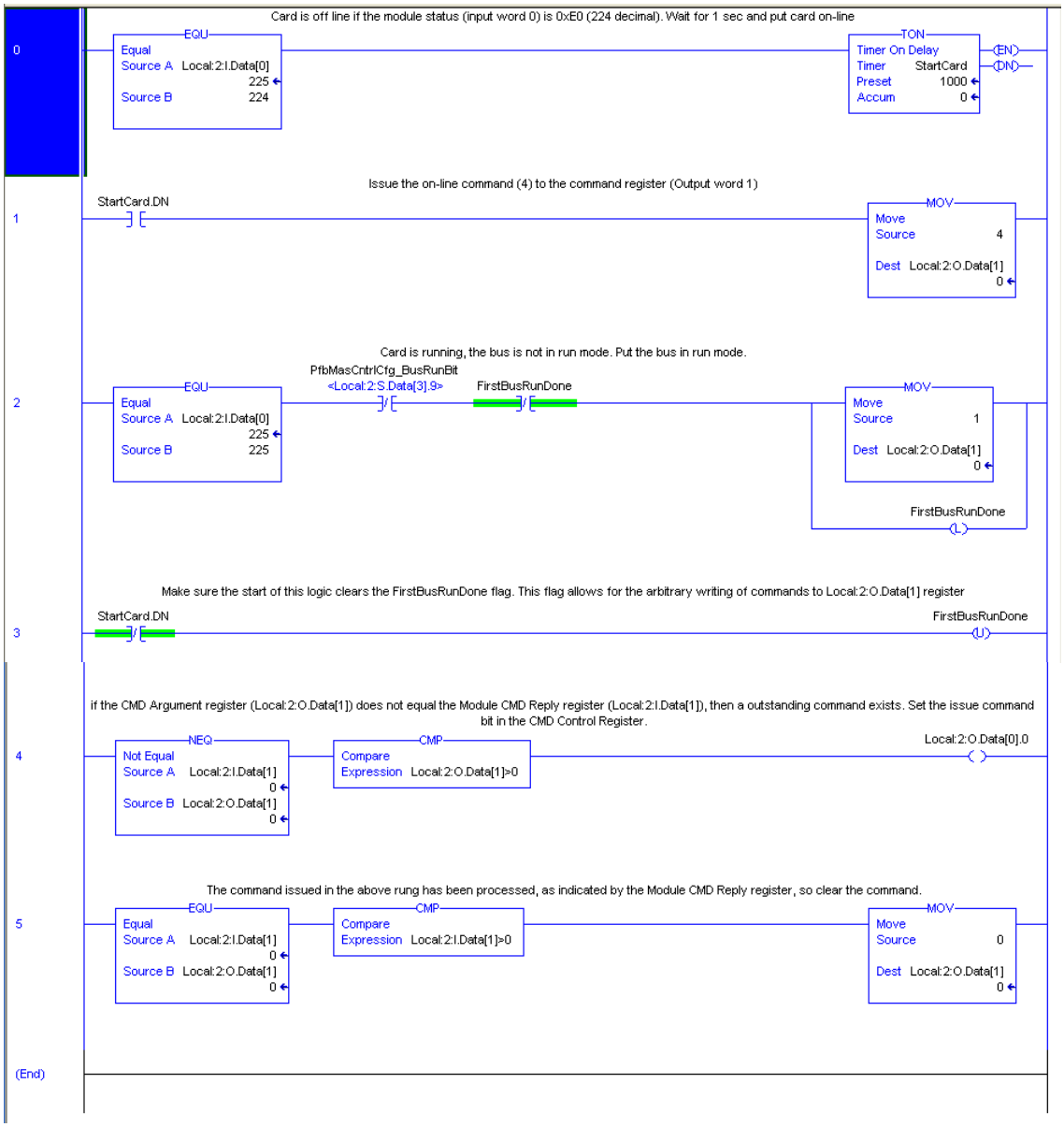


Note

The PfbMasSts_Bit is the Global Status bit. It will be set only if all slaves are present and in data exchange with the Master. If you do not want to enter Run mode while some slaves are missing or not communicating, you should add this bit as an Examine On contact to rung 2.

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Figure 6: Main CLX Example



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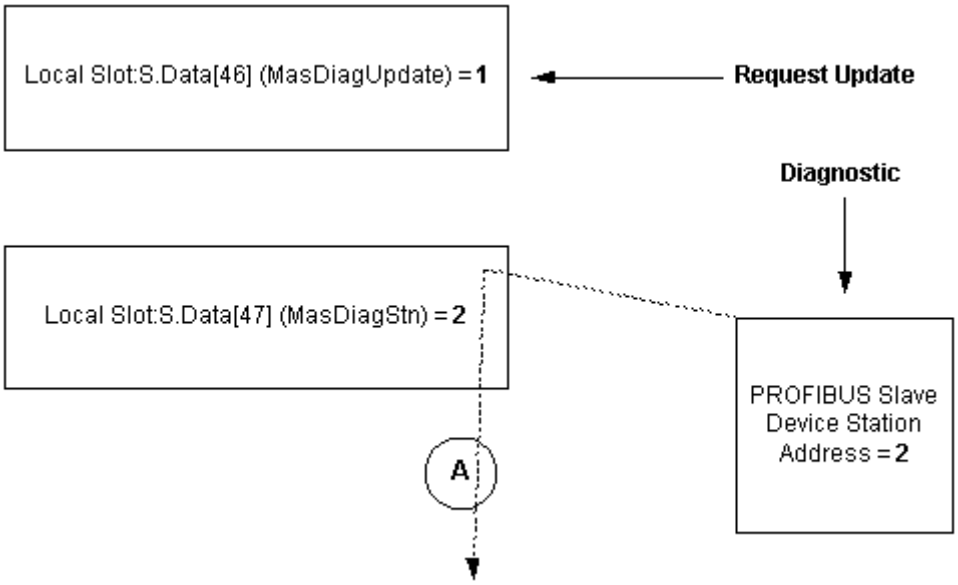
7.3 Reading Slave Diagnostics

The SST-PB3-CLX-RLL scanner allows the PLC program to read the diagnostic data from any DP slave that is in the master's configuration. This data can be read at any time by the PLC program. A slave diagnostic indication is active if the MasDiagUpdate register of the Status area contains a non-zero value (see the CLX PFB Scanner Status array for details). When this register is non-zero, the PLC program should read the diagnostics from the slave station and clear the diagnostic indication by using the PFB_SLV_DIAG_ACK command.

This procedure is outlined in the diagram shown below, as well as in a sample Ladder Logic program, which includes SSTPFBCLX_preview_2_Example.ACD:

1. Slave request diagnostic read. Scanner reads the diagnostics data and places the update indication and the slave station address in the Status array.

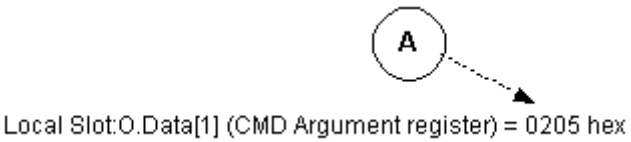
Figure 7: Slave Request Diagnostic Read Flow



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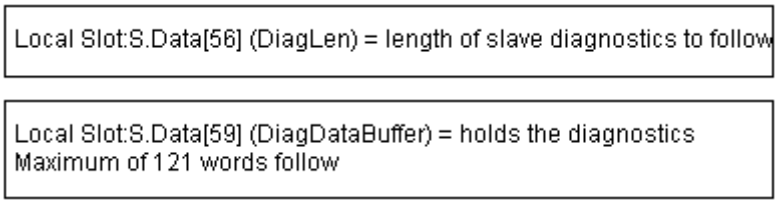
2. PLC program sees the MasDiagUpdate register > 0 and issues a PFB_READ_SLV_DIAGS to CMD Argument (Local:Slot:O.Data[1]) register.

Figure 8: Output Buffer, Offset 1



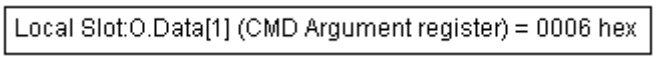
Scanner reads the diagnostics data from the local diagnostics buffer and places it at the DiagDataBuffer. The length of the data in this buffer is placed in the DiagLen register.

Figure 9: Status Buffer, Offsets 56 & 59



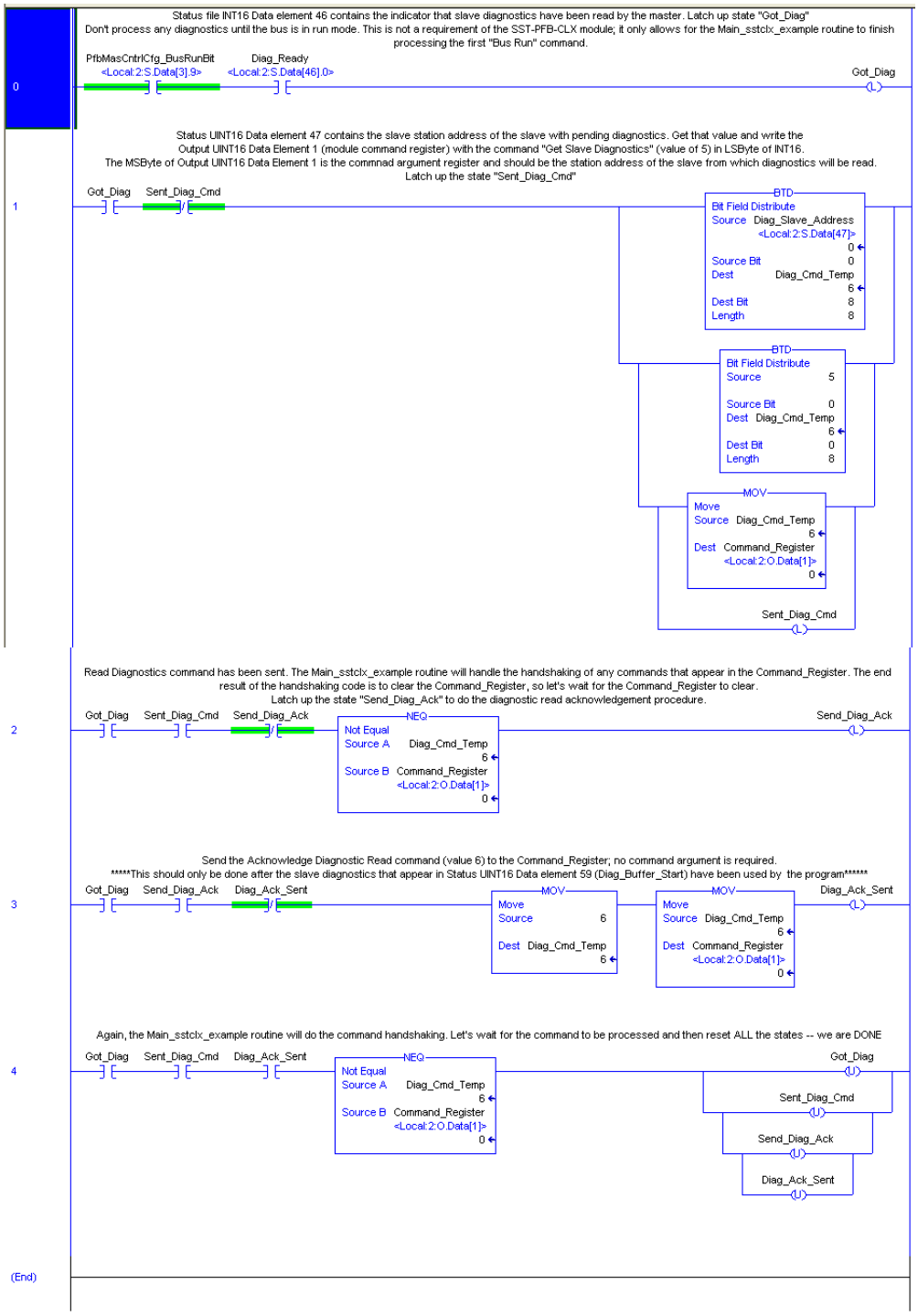
3. Once the PLC program copies the DiagDataBuffer data to a safe spot, the PLC program should issue a PFB_SLV_DIAG_ACK command to retire the current slave diagnostic indication.

Figure 10: Output Buffer, Offset 1



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Figure 11: Reading Slave Diagnostics



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7.3.1 Example: Using Flex I/O

When you configure the Flex I/O using the Configuration Tool, always configure 18 slots, even if the slots are empty. The first two slots are used for status, with the first slot configured as an input word and the second slot as an output word. The remaining 16 slots are used for I/O modules. For each module, configure two slots.

The following table shows how to configure the various Flex I/O modules. An entry of "000" means do not configure a length for that slot.

Table 48: Configuration for Flex I/O Modules

Module	First Slot	Second Slot
1794-IB16	1 word in	1 word out
1794-OB16	000	1 word out
1794-IB8S	1 word in	1 word out
1794-IA8	1 word in	1 word out
1794-OA8	000	1 word out
1794-OW8	000	1 word out
1794-IE8	9 words in	1 word out
1794-OE4	1 word in	6 words out
1794-IEX4OE2	5 words in	4 words out
1794-IR8	11 words in	3 words out
1203-FM1	6 words in	5 words out
1794-IB16 full format	1 word in	000
1794-OB16 full format	000	1 word out
1794-IB8S full format	1 word in	000
1794-IA8 full format	1 word in	000
1794-OA8 full format	000	1 word out
1794-OW8 full format	000	1 word out
1794-IE8 full format	9 words in	000
1794-OE4 full format	1 word in	4 words out
1794-IEX4OE2 full format	5 words in	2 words out
1794-IR8 full format	11 words in	000
1203-FM1 full format	4 words in	3 words out

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In the following example, the first module is a 1794-IB16, the second is a 1794-OB16, and the third is a 1794-IE8. The scanner is in slot 2 of the CLX rack. The Data Type used is INT16.

Table 49: Configuration Example

Module	Slot	Assigned Type	Input Offset	Output Offset
Pre-assigned	0	1AI	local:Slot:I.Data[2]	-
Pre-assigned	1	1AO	-	local:Slot:O.Data[2]
1794-IB16	2	1AI	local:Slot:I.Data[3]	-
	3	1AO	-	local:Slot:O.Data[3]
1794-OB16	4	000	-	-
	5	1AO	-	local:Slot:O.Data[4]
1794-IE8	6	9AI	local:Slot:I.Data[4]	-
	7	1AO	-	local:Slot:O.Data[5]
Empty	8	000	-	-
	9	000	-	-
Empty	10	000	-	-
	11	000	-	-
Empty	12	000	-	-
	13	000	-	-
Empty	14	000	-	-
	15	000	-	-
Empty	16	000	-	-
	17	000	-	-

These offsets are set in the user's DP Master Configuration, created in the Configuration Tool.

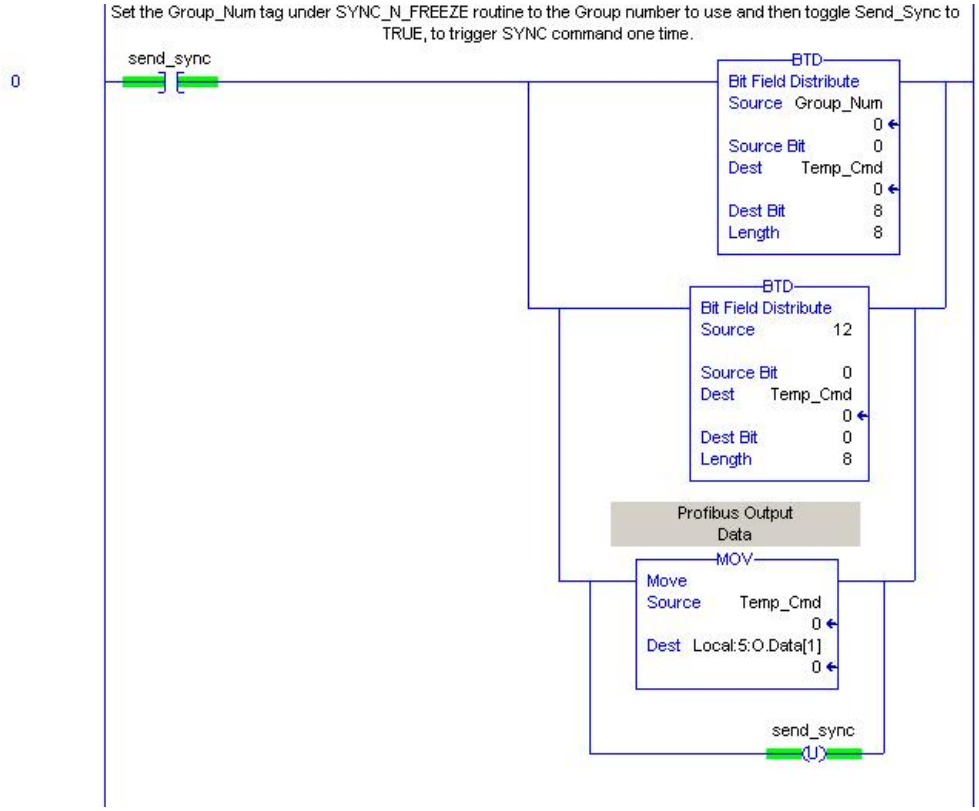
The input data for the 1794-IB16 maps into: **Local:Slot:I.Data[3].0-15**

The output data for the 1794-OB16 module maps into: **Local:Slot:O.Data[4].0-15**

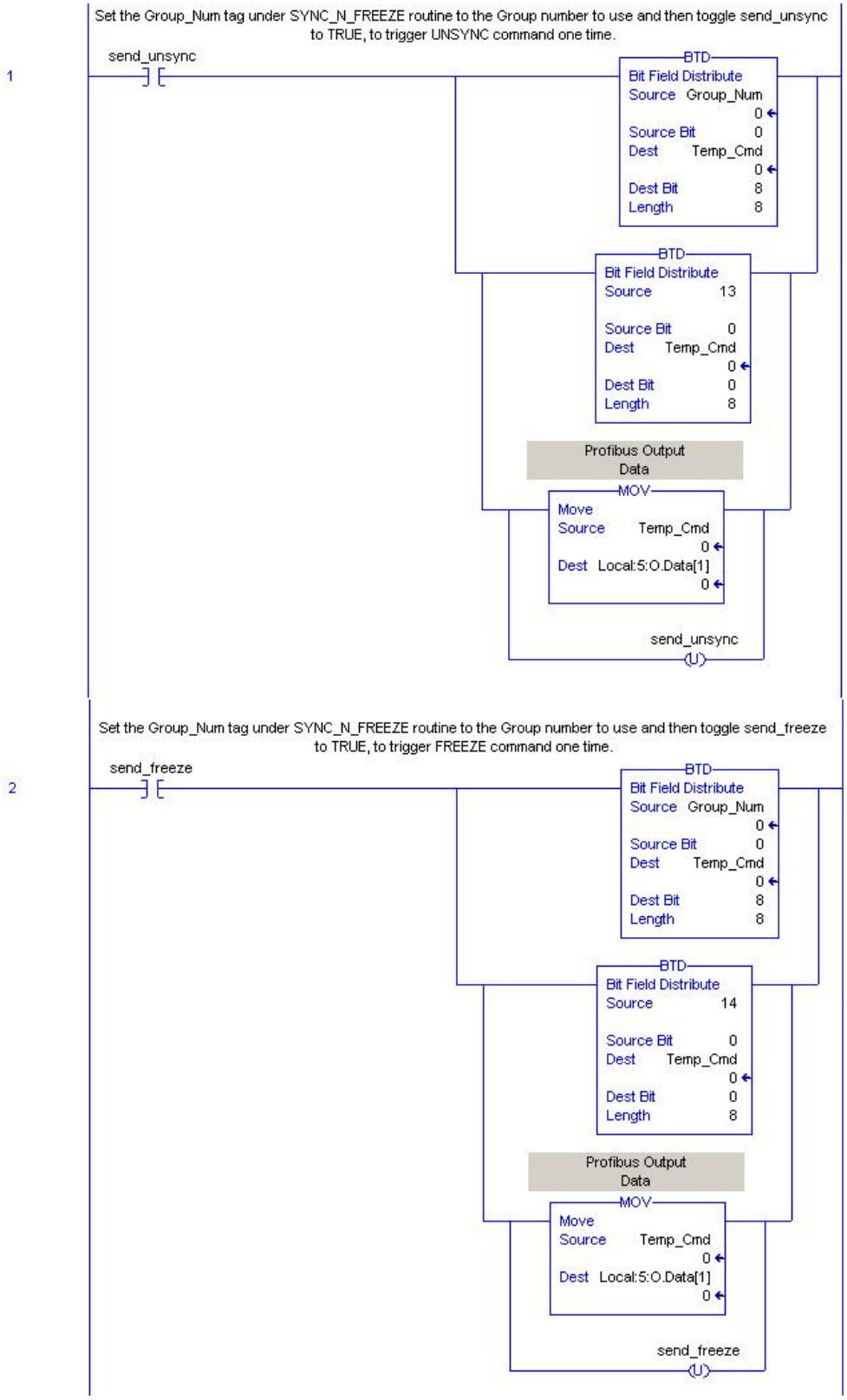
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7.4 Sync and Freeze

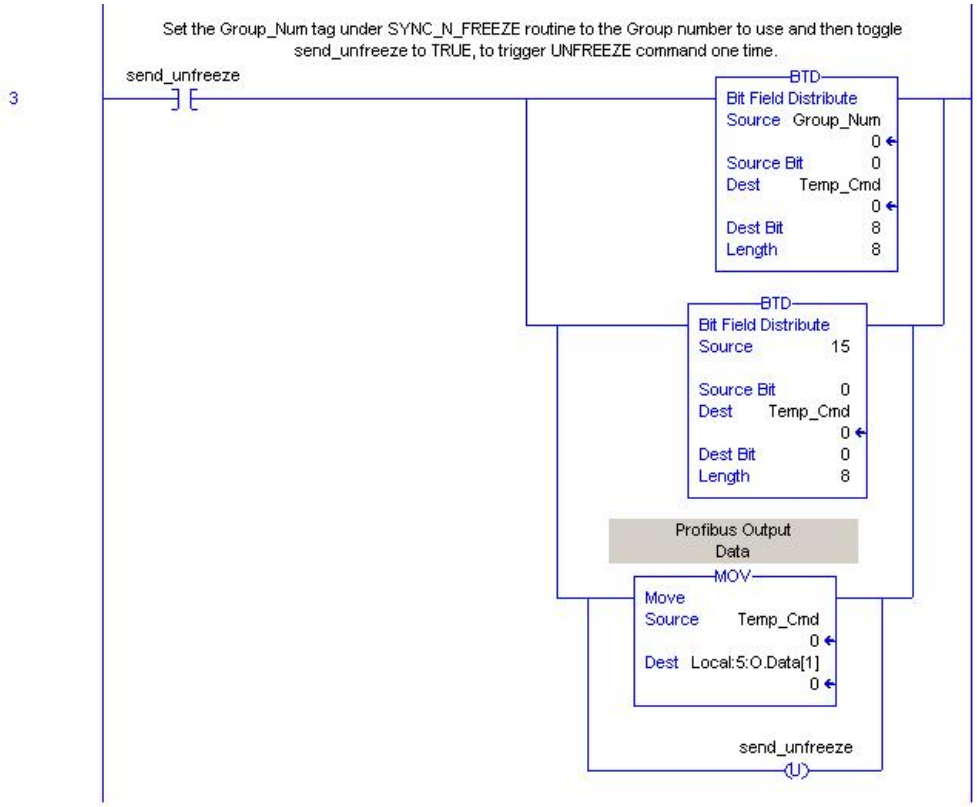
The PB3-CLX Master supports Sync, Unsync, Freeze and Unfreeze commands. The optional sample routine below describes how trigger any one of these commands. These commands require an additional parameter called the Group ID. This Group ID is an 8-bit field with each bit representing a group Number (0 to 7). To broadcast to command to all slaves, Group ID 0 would be used. To send one of these commands to a specific group of slave, use Group ID 1 - 7.



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7.5 AutoRun Bit

The PB3-CLX will come online automatically and will enter the mode that the CLX CPU is in when the AutoRun bit is set. In AutoRun Mode, when the user takes the card offline in the SST Profibus Configuration Tool, the user must put the card back online. When the user switches the CLX CPU to run, the PB3-CLX will enter Run Mode automatically. When the user un-inhibits the module while it is online with the PLC in Run Mode, the module will enter Run Mode.

Note

When AutoRun is used, the first 4 rungs of Figure 6: Main CLX are not needed. The last 2 rungs are required for other commands. See section 10.2.3.

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8

Upgrading the Scanner Firmware

Chapter Sections:

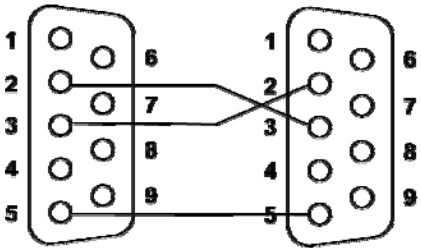
- Upgrading the Scanner Firmware

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8.1 Upgrading the Scanner Firmware

The serial cable for a standard PC COM port must have lines 2 and 3 swapped. It doesn't require handshaking. Pins 2 and 3 are wired the same as a PC 9-pin COM port.

Figure 12: Serial Port Wiring



Connect to the serial port using your communication software. The scanner serial port supports any baud rate from 9600 baud to 115 kbaud, with no parity, 8 data bits, 1 stop bit and flow control is set to None. The scanner automatically detects the baud rate being used.

If you are using HyperTerminal, here is how to set up a connection:

1. Start HyperTerminal and create a new connection.
2. For Connect using:, select "Direct to Com n" where "n" is the serial port you are using.
3. Select 115200 Bits per second, 8 Data bits, set Parity to None, select 1 Stop Bit, and set Flow control to None. You should now be able to communicate with the scanner serial port.
4. Cycle power on the CLX rack. When the CLX is powering up, the SYS LED shines solid red for 2 seconds before turning off.

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5. While the SYS LED is red after powerup, hit the exclamation mark (!) in your communication software to tell the scanner that you want to download software. You may need to press it several times while the scanner tries to auto-detect the baud rate. The SYS LED will alternately flash red and green when COPN or be solid green (NO COPN) to tell you the scanner is in System Configuration mode.

   The available commands are:

   Table 50: Download Commands

Command	Meaning/Description
ver Pfbclx.ss3	Displays the current ss3 firmware revision number. Typing “ver” by itself displays boot code version
help	Displays the available commands
Ry Pfbclx.ss3	Loads new Pfbclx.ss3 into flash
Burn	Load new ss4 firmware into flash
Run Pfbclx.ss3	Exits system configuration mode

   The SST-PB3-CLX-RLL has two firmware modules. Pfbclx.ss3 manages the Profibus communication. Pfbclx.ss4 manages the backplane communication.

   To program new **pfbclx.ss3** firmware into flash, do the following steps:

   1. Type “Ry pfbclx.ss3”. The the scanner responds with a query.
   2. Initiate an Ymodem send of the module firmware file (Pfbclx.ss3) using your communication software. When the download is complete, the module automatically programs it into flash.
   3. When the module has been programmed into flash, use the “ver pfbclx.ss3” command to confirm that the version number is correct.
   4. Use the “Run pfbclx.ss3” command to exit System Configuration mode and startup. The scanner turns off the SYS LED.

   To program new **pfbclx.ss4** firmware into flash, do the following steps:

   1. Type “Burn”.
   2. Initiate a Ymodem send of the firmware module, “pfbclx.ss4”, using the connection software.
   3. Wait for a “Success!! Please Restart Module” message.
   4. Cycle power on the module.

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5. At startup, use the LCD to verify that the new firmware version is displayed (i.e., v7.27).

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9
Network Parameter Defaults

Chapter Sections:

- Network Parameter Default Values

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9.1 Network Parameter Default Values

The following tables show the default values assigned by the scanner for the network parameters. The values depend on:

- The baud rate
- Whether there are repeaters on the network
- Whether there are FMS devices on the network

Idle time 1 is the time the scanner waits after it receives a response before it sends. This corresponds to the PROFIBUS Idle Time.

Idle time 2 is the time the scanner waits after it sends and before it sends again. This corresponds to the PROFIBUS Max TSDR.

Table 51: No Repeater, No FMS

Baud Rate	Slot Time	Idle Time 1	Idle Time 2	Ready Time	Quit Time
9600	100	37	60	11	0
19200	100	37	60	11	0
31.25 K	100	37	60	11	0
45.45 K	100	37	60	11	0
93.75 K	100	37	60	11	0
187.5K	100	37	60	11	0
500K	200	37	100	11	0
1.5M	300	37	150	11	0
3M	400	45	250	11	3
6M	600	55	450	11	6
12M	1000	75	800	11	9

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Table 52: Repeater, No FMS

Baud Rate	Slot Time	Idle Time 1	Idle Time 2	Ready Time	Quit Time
9600	100	37	60	11	0
19200	100	37	60	11	0
31.25 K	100	37	60	11	0
45.45 K	100	37	60	11	0
93.75 K	100	37	60	11	0
187.5K	100	37	60	11	0
500K	200	37	100	11	0
1.5M	300	37	150	11	0
3M	400	45	250	11	3
6M	600	55	450	11	6
12M	1000	75	800	11	9

Table 53: No Repeater, FMS

Baud Rate	Slot Time	Idle Time 1	Idle Time 2	Ready Time	Quit Time
9600	125	37	60	30	0
19200	250	61	120	60	0
31.25 K	300	61	120	60	0
45.45 K	400	61	120	60	0
93.75 K	600	126	250	125	0
187.5K	1500	251	500	250	0
500K	3500	251	1000	250	0
1.5M	3000	151	980	150	0
3M	400	45	250	11	3
6M	600	55	450	11	6
12M	1000	75	800	11	9

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Table 54: Repeater, FMS

Baud Rate	Slot Time	Idle Time 1	Idle Time 2	Ready Time	Quit Time
9600	125	37	60	30	0
19200	250	61	120	60	0
31.25 K	300	61	120	60	0
45.45 K	400	61	120	60	0
93.75 K	600	126	250	125	0
187.5K	1500	251	500	250	0
500K	3500	251	1000	250	0
1.5M	3000	151	980	150	0
3M	400	45	250	11	3
6M	600	55	450	11	6
12M	1000	75	800	11	9

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10

Slave Functionality

Chapter Sections:

- SST-PB3-CLX-RLL DP Slave Features
- Register Definitions and Layout
- Slave Configuration and Programming

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10.1 SST-PB3-CLX-RLL DP Slave Feaures

The SST-PB3-CLX-RLL DP Slave has the following features:

- A maximum of 244 bytes input and 244 bytes output for slave functionality
- A maximum total input data size of 1984 bytes and output size of 1976 bytes combined, for DP master and slave
- Support for all standard PROFIBUS baud rates
- Slave configuration via the ControlLogix configuration file
- Slave configuration via AOP interface which updates the configuration file automatically

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10.2 Register Definitions and Layout

10.2.1 DP Slave Status Table Entries

The following table shows the additions to the CLX status file to support the DP slave functionality:

Table 55: Additions to CLX File That Support DP Slave Functionality

Name	Location	AOP Tag Name	Meaning/Description
DP slave status and error register	Local:Slot:S:Data[44]	SlvStatus, SlvError	Returns DP slave status and error information to the CLX processor. Status byte -> bits 0-7. Error byte -> bits 8-15.



Note

The above table assumes that the scanner is configured as a 16-bit device in RSLogix5000.

Table 56: DP Slave Status and Error Register

Name	Location	AOP Tag Name	Meaning/Description
DP slave status bit 0 - 5	Local:Slot:S:Data[44].0 - 5	None	Reserved for future use
DP slave status SLV_STS_RUN_MODE bit	Local:Slot:S:Data[44].6	SlvStsRunMode	Set to True if the slave is being scanned by a remote master in "RUN" mode.
DP slave status SLV_STS_OK bit	Local:Slot:S:Data[44].7	SlvStatusOk	Set to True if the current slave status is OK. This means parameterization was successful and the slave watchdog has not timed out.
DP slave error byte	Local:Slot:S:Data[44].8-15	SlvError	The scanner sets the error byte to report various error conditions. If there are multiple errors, the register contains the value of the last error encountered.

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Table 57: DP Slave Error Byte
(Local:Slot:S:Data[44].8-15, AOP tag Local:Slot.S.SlvError)

Value	Error	Meaning/Description
01h	SLV_ERR_ID_MISM	Slave ID does not match the slave ID configured in the master. If there is a mismatch, the slave won't communicate with the master.
02h	SLV_ERR_READY_TIME_MISM	Ready time for the card is different from the value configured in the master. The card can communicate as a slave even if the times are different, but you may experience network errors.
03h	SLV_ERR_UNSUP_REQ	Master has requested Sync or Freeze during parameterization, which the card does not support.
04h	SLV_ERR_RX_LEN_MISM	Data received from the master has a length different from the length configured on the card. If there is a receive length mismatch, the card won't communicate as a slave.
05h	SLV_ERR_TX_LEN_MISM	Master has requested data from the slave with a length different from the length configured for the slave. If there is a transmit length mismatch, the card won't communicate as a slave.
06h	SLV_ERR_WD_FACT_INV	One of the two slave watchdog factors is zero, which is not allowed.
07h	SLV_ERR_TIME_OUT	Slave's watchdog timed out. The slave goes offline and must be reinitialized by the master.
08h	SLV_ERR_WARN_WD_DIS	Master has disabled the slave watchdog.



Note

All errors (except SLV_ERR_TIME_OUT) occur when the slave is being parameterized by the master.

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10.2.2 I/O Table Additions/Modifications



Note

If you are using AOP to configure module as a slave, you do not have to edit the CLX configuration table manually. Editing the CLX configuration table is only required when using Generic 1756 Module Profile.

If the slave is configured, the slave I/O is always mapped into the CLX I/O table after the master data. By default, the slave data will be mapped immediately following the master data; however, "hard addresses" can be specified in the CLX config file. This adds the ability to specify the starting slave data address in the I/O files. This can be used to leave a gap between master and slave data. This way, if the master network configuration changes, it does not affect the offsets of the slave data in the CLX I/O files. If the master is not configured, the default mapping of slave data is the beginning of the CLX I/O tables where the master data usually starts. Again, this default can be changed by assigning "hard addresses" in the CLX config file.

Received data is data received from the remote master. This data is mapped into the CLX input table. Transmit data is data that the scanner module sends to the remote master. This data is mapped into the CLX output table.

10.2.3 Config Table Additions

The CLX config table will be used to configure the slave functionality. If using Rockwell's AOP to do the configuration, see section Configuring the CLX Slave in RSLogix 5000. The slave table entries follow the config area used by the master. This maintains backward compatibility in the config file.

The slave config file entries start at 10H (16D).



Note

The CLX config file is always configured as byte locations. The CLX config file must be set to at least 24 bytes in size for Slave-only Mode. For Master and Slave mode, the minimum size is 26 bytes.

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The following table shows the additions to the CLX config table that support the DP slave functionality:

Table 58: Additions to CLX Config Table Supporting DP Slave Functionality

Name	Location	Meaning/Description
AUTORUN	Local:Slot:C:Data[1]	If 2, the module comes online automatically after powerup and enters the mode that the CLX processors is in (RUN or PROG)
ScannerConfig	Local:Slot:C:Data[16]	This register configures the scanner to be a DP master, master/slave, or slave only. See the ScannerConfig Register table (follows this table).
SlvRxLen	Local:Slot:C:Data[17]	The length of slave receive data (in words)
SlvTxLen	Local:Slot:C:Data[18]	The length of slave transmit data (in words)
SlvRxOffset	Local:Slot:C:Data[19]	If 0, the DP slave Rx data will be mapped into the CLX Input file immediately following the master data. If set to a non-zero value, it specifies the word offset into the CLX Input file where the slave Rx data should be mapped.
SlvTxOffset	Local:Slot:C:Data[20]	If 0, the DP slave Tx data will be mapped into the CLX Output file immediately following the master data. If set to a non-zero value, it specifies the word offset into the CLX Output file where the slave Tx data should be mapped.
LocStn	Local:Slot:C:Data[21]	If the scanner is configured as a DP slave only, "LocStn" defines the scanner's local station number. If the scanner is configured as a DP master or master/slave, this value is ignored. In this case, the local station number is configured in the Configuration Tool. The valid range is 1-125.
Baud	Local:Slot:C:Data[22]	If the scanner is configured as a DP slave only, "Baud" defines the scanner's baud rate. If the scanner is configured as a DP master or master/slave, this value is ignored. In this case, the baud rate is configured in the Configuration Tool. The following table defines the valid PFB network rates and the corresponding value that is written into the Baud register. BAUD Rate — Register Value BAUD_9k6 — 0 BAUD_19k2 — 1 BAUD_93k75 — 2 BAUD_187k5 — 3 BAUD_500k — 4 BAUD_1m5 — 6 BAUD_3m — 7 BAUD_6m — 8 BAUD_12m — 9 BAUD_31k25 — 10 BAUD_45k45 — 11
Reptr	Local:Slot:C:Data[23]	Local:Slot:C:Data[23].0 tells the scanner if there is a repeater on the network. All other bits in this register are reserved.
Input Page Number	Local:Slot:C:Data[24]	Local:Slot:C:Data[24].0 – 3 tells the scanner which page to map the slave input data to. This register is ignored if configured as a slave only.
Output Page Number	Local:Slot:C:Data[25]	Local:Slot:C:Data[25].0 – 3 tells the scanner which page to map the slave output data to. This register is ignored if configured as a slave only.

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Table 59: AUTORUN / LEGACY_ID_0876 Register (Local:Slot:C:Data[1].1)

Name	Location	Meaning/Description
LEGACY_ID_0876	Local:Slot:C:Data[1].0	If set, Profibus ID 0x0876 will be used instead of 0x0C44 for backward compatibility. This option is only available in backplane f/w version 8.6 and higher
AUTORUN	Local:Slot:C:Data[1].1	If set, AUTORUN is enabled. The Slave will come online automatically after powerup.

Table 60: ScannerConfig Register (Local:Slot:C:Data[16])

Name	Location	Meaning/Description
SlvEna	Local:Slot:C:Data[16].0	If set, the DP slave functionality is enabled
MasDisAbl	Local:Slot:C:Data[16].1	If set, and the SlvEna bit is set, the scanner is configured as DP slave only
Rx Data Swap	Local:Slot:C:Data[16].2	If Set, Slave Rx Data (from Master) will get swapped prior to copying to ControlLogix input table
Reserved	Local:Slot:C:Data[16].3-7	Reserved

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10.2.4 LED and LCD Behavior Modifications

SYS LED

If the scanner is configured as both a DP master and slave, the SYS LED shows the status of both operations. It sequentially flashes the master status, then the slave status.

For the DP master, the SYS LED displays status in the already-defined CLX DP master format.

If the module is configured as DP slave only, the SYS LED shows only the status of the slave, as indicated in the table below:

Table 61: DP Slave SYS LED States

Color	State	Meaning/Description
Red	SLAVE_IDLE	Not being scanned or error
Yellow	SLAVE_CLEAR	Slave is being scanned in Clear mode
Green	SLAVE_ACTIVE	Slave is being scanned in Run mode

COMM LED

If the scanner is configured as DP slave only, the COMM LED is off. If the scanner is configured as a DP master only, or DP master and slave, the COMM LED behavior does not change from its normal master-only behavior.

OK LED

The OK LED behavior does not change from its normal master-only behavior.

LCD Display

The LCD Display behavior does not change from its normal master-only behavior.

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10.3 Slave Configuration and Programming



Note

If you're defining your own offsets for CLX slave data in the ControlLogix configuration file, they must be greater than the highest data offset of the slave in the master configuration. So, for example, if the highest input offset the CLX master uses for a slave is 20 with 1 word input, then the slave RX offset could be set to 21 or greater.

CLX slave data can be mapped to a page other than 0. The Configuration Tool will not know which offsets you mapped your slave data to, so if you are mapping Master data to the same page, do not overlap the addresses assigned by the Tool.

The CLX slave accepts the ControlLogix configuration only once after power-up. This means that if after power-up you change the ControlLogix configuration file settings (Station number, baud rate and so on) in your RSLogix 5000 Program and download it to the ControlLogix PLC, the new setting will not take effect.

There are three ways to have the new configuration settings accepted:

1. Cycle power on the module before new configuration settings are accepted.
2. Follow these steps:
    a. Put the PLC into PROG mode
    b. Connect serially to the module via the Configuration Tool
    c. Issue the Offline command
    d. Edit the ControlLogix file
    e. Download the PLC program
    f. Put the PLC into RUN mode
3. Follow these steps:
    a. Put the PLC into PROG mode
    b. Connect serially to the module via the Configuration Tool
    c. Issue the Offline command
    d. Edit the ControlLogix file while Online with PLC via RSLogix
    e. Disable and enable connection by using the inhibit function in RSLogix 5000 under I/O configuration > Module Properties > Connection tab

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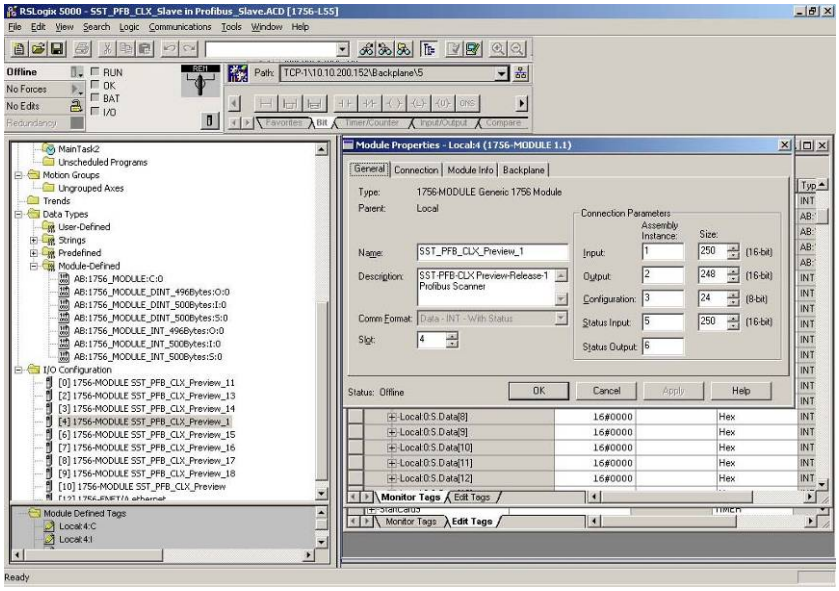
10.3.1 Configuring the CLX Slave in RSLogix 5000 using Generic Profile

When configuring the CLX slave in RSLogix 5000, you must set up the following connection parameters:

1. Navigate to the I/O configuration.

2. Double-click on SST PROFIBUS module. The Module Properties dialog box appears, allowing you to set connection parameters.

3. Assembly Instance for the configuration must be set to 3 and Size to 24 (by default, the size is Zero). All other assembly instances and sizes are the same as what is required for the CLX Master.

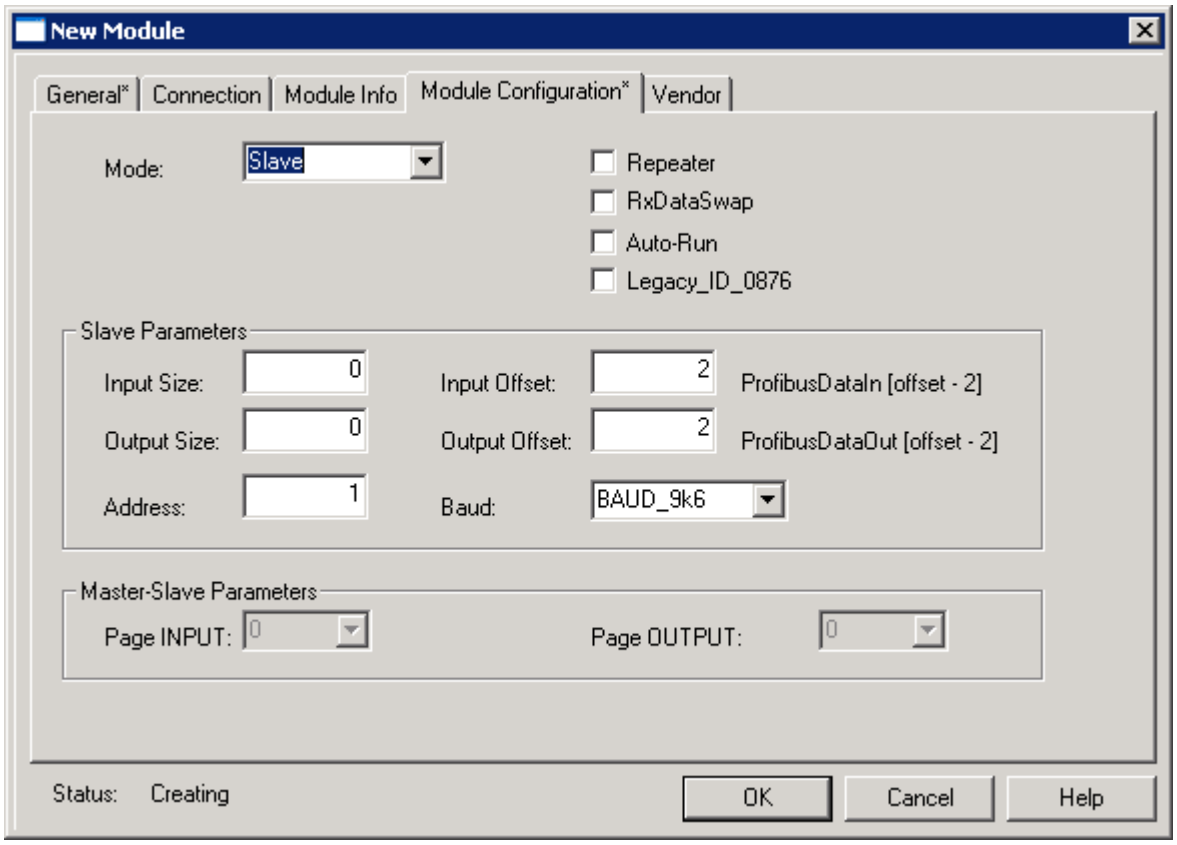


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10.3.2 Configuring the CLX Slave in RSLogix 5000 using Add-on-Profile (AOP)

With AOP, the configuration file is automatically updated and adjusted to the correct length to configure the module successfully. Follow the steps below to configure module as DP Slave.

1. To configure the module as Slave only, Click on the Module Configuration tab and configure the following parameters:



Mode: Select Slave. Master-Slave mode is also available.

Repeater: Select Repeater if there is a repeater on the network.

RxDataSwap: RxDataSwap option is for Slave operation only. Set this if you want to swap the data coming from the master (Slave Rx data).

Auto-Run: Enable Auto-Run if you want the SST-PB3-CLX-RLL to come online automatically and enter the mode the CLX CPU is in. If enabling Auto-Run while online in RSLogix 5000 and the SST-PB3-CLX-RLL is currently offline, The SST-PB3-CLX-RLL

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will still remain offline after being reconfigured. In order for the Auto-Run to take effect, the SST-PB3-CLX-RLL must be reset. This can be done by sending a RESET message to the module by going to the Module Info tab and clicking on module Reset button and then selecting OK to warning message. When in AutoRun, if the SST-PB3-CLX-RLL is taken offline in the SST Profibus Configuration Tool, the SST-PB3-CLX-RLL must be put back online by the user. This can be done by issuing the online command in the SST Profibus Configuration Tool (Right-click on Master and select online).

Legacy_ID_0876: Enable this option if you want the module to use legacy ID 0x0876 instead of 0xOC44 when it's operating in Slave or Master and Slave mode. You must use the correct slave GSD file that goes with this Slave ID. Use slave GSD file ssti0876.gse for ID 0x0876 and slave GSD file ssti0c44.gse for ID 0x0C44.

Slave Parameters

Input Size: This is the length of slave receive data in Words. Valid input size is 1- 122.

Output Size: This is the length of slave transmit data in Words. Valid output size is 1- 122.

Input Offset: Specifies the word offset into the CLX input file where the slave Rx data should be mapped. The input offset range is 2 to 249. The actual tag offset will be the offset – 2. By default, the input data begins at tag Local:Slot.ProfibusDataIn[0].

If configuring the module as a Master and Slave, make sure offsets do not overlap with offsets configured in your master configuration (created in SST Profibus Configuration Tool).

Output Offset: Specifies the word offset into the CLX output file where the slave Tx data should be mapped. The output offset range is 2 to 247. The actual tag offset will be the offset – 2. By default, the output begins at tag Local:Slot.ProfibusDataOut[0].

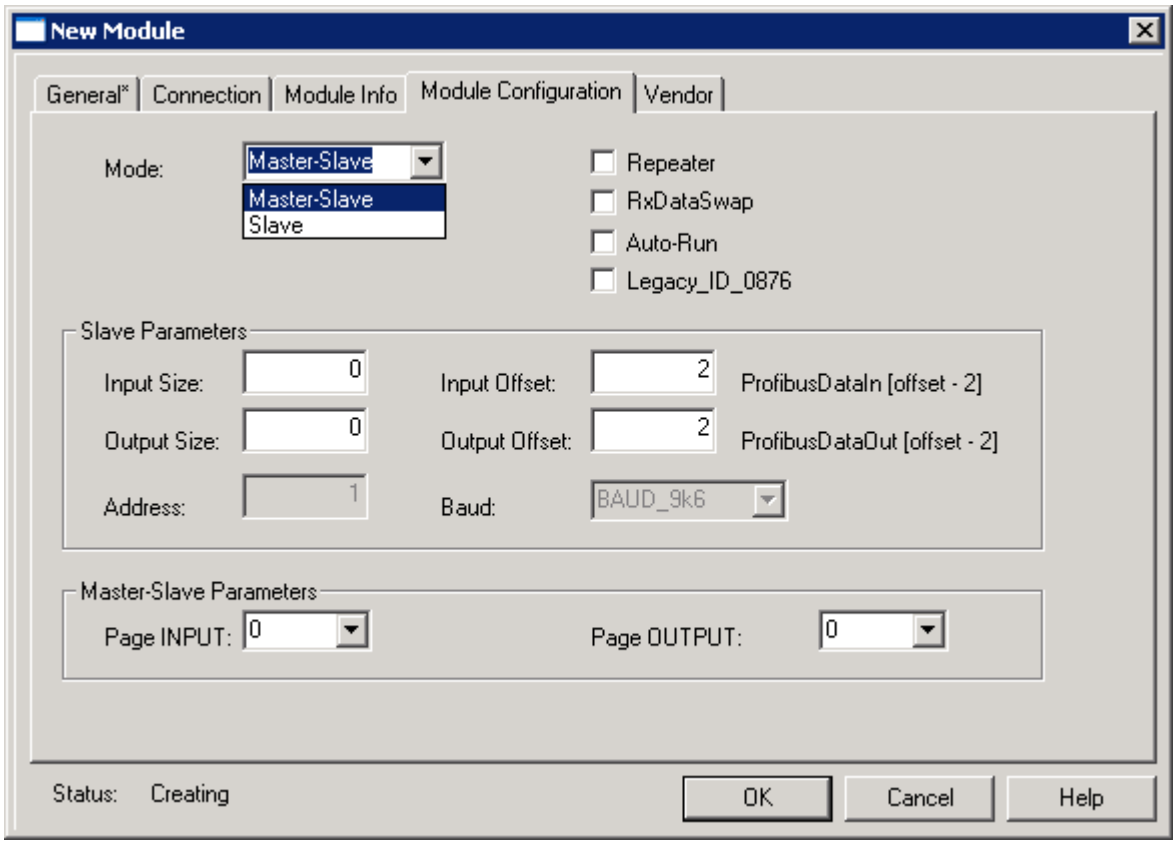
If configuring the module as a Master and Slave, make sure offsets do not overlap with offsets configured in your master configuration (created in SST Profibus Configuration Tool).

Address: – This is the local station number configured for the slave. The valid range is 1-125. If the module is configured as Master and Slave, the station address used for the Master is also used for the slave address and this field is ignored.

Baud: This is the Baud rate and can be set to any one of these baud rates (9K6, 19K2, 93K75, 187K5, 500K, 1M5, 3M, 6M, 12M, 31k25, 45k45). This is settable for DP Slave operation only. If Master-Slave is configured, this field is ignored and the baud rate configured on DP Master (using SST Profibus Configuration Tool) is used.

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2. If you are configuring the module as a DP Master and Slave, select Master-Slave for the mode and configure all the active parameters.



Note

The **Address** and **Baud** fields will be inactive when Master-Slave mode selected. The address and baud come from the master configuration that is loaded on card from SST Profibus Configuration Tool.

3. Configure the additional parameters listed under Master-Slave Parameters.

Master-Slave Parameters

PAGE-INPUT: Tells the scanner which page to map the slave input data to. This field is ignored if configured as a slave only. Range is 0 – 3. 0 is the default.

PAGE-OUTPUT: Tells the scanner which page to map the slave output data to. This field is ignored if configured as a slave only. Range is 0 – 3. 0 is the default.

4. Click on OK.

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When the module is used in Slave or Master-Slave mode, AOP allows you to make modifications to you configuration and apply them while you have an open connection to module.



Warning

Be aware that applying changes while the SST-PB3-CLX-RLL is operational will interrupt Profibus communication. The card will go offline and online so new configuration will take effect

If you apply changes with AutoRun disabled, the SST-PB3-CLX-RLL will stay offline until the ladder code issues the online command. If the CLX CPU is in PROG mode and AutoRun is enabled, the module will come back online. To see if applying the new configuration was successful, check the ReconfigStatus register in the module's status file.

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11

DPV1 Master Functionality

Chapter Sections:

- General Features
- DPV1-Supported Functions
- DPV1 Command Description
- Creating a CIP Generic Message for Transmitting a DPV1 Command
- DPV1 Sample Code

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11.1 General Features

The SST-PB3-CLX-RLL can act on a PROFIBUS network as a DPV1 Class 1 & Class 2 master. The DPV1 module is able to:

- Manage up to 16 simultaneous Class 1 commands and up to 16 simultaneous Class 2 commands
- Manage up to 32 simultaneous Class 2 connections
- Communicate, via the backplane CPU, with the SST-PB3-CLX-RLL scanner through CIP generic messages

11.2 DPV1-Supported Functions

The following table lists the supported DPV1 functions.

Table 62: Supported DPV1 Functions

Supported DPV1 Functions	CIP Service
MSAC1_Read	0x52
MSAC1_Write	0x53
MSAC2_Initiate	0x54
MSAC2_Idle	0x58
MSAC2_Abort	0x55
MSAC2_Read	0x56
MSAC2_Write	0x57

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11.3 DPV1 Command Description

11.3.1 Overview

The backplane CPU can send DPV1 commands to slaves through the scanner. To do this, the backplane CPU issues CIP generic messages to the SST-PB3-CLX-RLL. Object 0x101, Instance 1 is used.

To process a DPV1 command, the scanner should be initialized by the backplane CPU with the DPV1_INIT Command (it must be in offline configured mode to accept this command). DPV1 Class 1 commands can be sent after initialization when the scanner is online.

To set up a DPV1 Class 2 communication, the backplane CPU should send an Initiate command. The scanner maintains Class 2 communication automatically, until a network error occurs. The backplane CPU should close the class communication via an Abort command. The CPU can restart the Class2 communication with an Initiate command if needed.

When DPV1 communication is no longer needed, the backplane CPU should stop the DPV1 module via a DPV1 Close command.



Note

The following arrays assume an alignment of 1 byte; make sure that the ladder program's set parameters at the correct offsets.

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11.3.2 DPV1 Init Command

This command initializes DPV1 functionality in the scanner. One block corresponds to one DPV1 frame simultaneously on the PROFIBUS network. If 3 blocks are allocated, the firmware is able to send 3 DPV1 frames simultaneously to 3 different slaves. This command should be called in offline mode.

The backplane CPU should use an MSG instruction of the CIP generic message type.

Table 63: CIP Generic Message Parameters

Value	CIP Generic Message Parameter
0x101	Object
0x50	Service
1	Instance
1	Length

Source element: SINT tag, with the following properties:

Table 64: Source Element

Value	Size	Parameter Name
[1...32]	SINT	Number of block to allocate

Destination: SINT tag, with the following properties:

Table 65: Destination

Value	Size	Parameter Name
[0...32]	SINT	Number of allocated block

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The message error code can have the following values:

Table 66: Error Code

Value	CIP Message General Status
00h	Successful
E1h	Unknown command
E2h	Invalid command data length
E8h	Resources unavailable
EDh	DPV1 already initialized
EEh	Invalid number of bloc requested
F0h	OffLine state expected

11.3.3 DPV1 Exit Command

This command stops DPV1 functionality in the scanner. This command must be called in offline mode.

The backplane CPU should use an MSG instruction of the CIP generic message type.

Table 67: CIP Generic Message Parameters

Value	CIP Generic Message Parameter
0x101	Object
0x51	Service
1	Instance
0	Length

Source element: none

Destination: none

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The message error code can have the following values:

Table 68: Error Code

Value	General Status
00h	Successful
E1h	Unknown command
E2h	Invalid command data length
EFh	DPV1 is not initialized

11.3.4 DPV1 Class 1 Read Command

This command reads data from a DPV1 slave using Slot_Number and Index parameters.

The backplane CPU should use an MSG instruction of the CIP generic message type.

Table 69: CIP Generic Message Parameters

Value	Message Parameter Name
0x101	Object
0x52	Service
1	Instance
8	Length

Source element: DPV1_READ_C1_REQ tag, with the following properties:

Table 70: Source Element

Value	Size	Member Name	Meaning/Description
	DINT	Timeout	Command timeout
[0...126]	SINT	Rem_Add	Slave address (0 to 126)
[0...254]	SINT	Slot_Number	Slot number where the data should be read (0 to 254)
[0...254]	SINT	Index	Index where the data should be read (0 to 254)
[1...240]	SINT	Data_Length	Number of byte to read (1 to 240)

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Destination: DPV1_READ_C1_RES tag, with the following properties:

Table 71: Destination

Size	Member Name	Meaning/Description
SINT [1..240]	Data	Data read

The message error code can have the following values:

Table 72: Error Code

Value	General Status
00h	Successful
E1h	Unknown command
E2h	Invalid command data length
E5h	FDL error (see extended error code)
E6h	DPV1 Error (see extended error code)
E7h	Another command is already in progress for this slave / class 2 connection.
EAh	Invalid remote address
ECh	Invalid data length
EFh	DPV1 is not initialized
F1h	Online state expected
F3h	Invalid slave response
F6h	No space left on command queue

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11.3.5 DPV1 Class 1 Write Command

This command writes data to a DPV1 slave using Slot_Number and Index parameters.

The backplane CPU should use an MSG instruction of the CIP generic message type.

Table 73: CIP Generic Message Parameters

Value	CIP Generic Message Parameter
0x101	Object
0x53	Service
1	Instance
[9...248]	Length

Source element: DPV1_WRITE_C1_REQ tag, with the following properties:

Table 74: Source Element

Value	Size	Member Name	Meaning/Description
-	DINT	Timeout	Command timeout
[0...126]	SINT	Rem_Add	Slave address (0 to 126)
[0...254]	SINT	Slot_Number	Slot number where the data should be read (0 to 254)
[0...254]	SINT	Index	Index where the data should be read (0 to 254)
[1...240]	SINT	Data_Length	Number of byte to read (1 to 240)
-	SINT [1...240]	Data	Data to be written

Destination: DPV1_WRITE_C1_RES tag with the following properties:

Table 75: Destination

Size	Member Name	Meaning/Description
SINT	Data_Length	Number of bytes written (1 to 240)

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The message error code can have the following values:

Table 76: Error Code

Value	Meaning/Description
00h	Successful
E1h	Unknown command
E2h	Invalid command data length
E5h	FDL error (see extended error code)
E6h	DPV1 errors (see extended error code)
E7h	Another command is already in progress for this slave / class 2 connection.
EAh	Invalid remote address
ECh	Invalid data length
EFh	DPV1 is not initialized
F1h	Online state expected
F3h	Invalid slave response
F6h	No space left on command queue

11.3.6 DPV1 Initiate Command

This command initiates a DPV1 Class 2 connection to a slave.



Note

When using Class 2 communication only, up to 16 Class 2 connections can be initiated.

The backplane CPU should use an MSG instruction of the CIP generic message type.

Table 77: CIP Generic Message Parameters

Value	Message Parameter Name
0x101	Object
0x54	Service
1	Instance
[33..244]	Length

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Source element: DPV1_INITIATE_REQ tag, with the following properties:

Table 78: Source Element

Member Name	Size	Offset	Meaning/Description
Timeout	DINT	0000h	Time allowed for message reply in milliseconds.
Rem_Add	SINT	0004h	Slave Address (0 to 126).
Send_TimeOut	INT	0005h	Time expected, in 10ms.
Features_Supported	INT	0007h	Features supported by the master.
Profile_Features_Supported	INT	0009h	Service functionality supported by the master.
Profile_Ident_Number	INT	000Bh	Desired profile ID number (0 = no profile)
Add_Addr_Param	SINT[20 +x + y]	-	Subnet parameters
STYPE	SINT	000Dh	0 or 1; if STYPE = 1 the optional Net_addr and Mac_addr is present in S_Addr.
S_Addr_len	SINT	000Eh	Length of the S_Addr : if STYPE = 0, the S_Addr_Len = 2 if STYPE = 1, the S_Addr_Len = 8 + length of Mac_addr (x)
DTYPE	SINT	000Fh	0 or 1; if DTYPE = 1 the optional Net_addr and Mac_addr is present in D_Addr.
D_Addr_len	SINT	0010h	Length of the D_Addr : if DTYPE = 0, the D_Addr_Len = 2 if DTYPE = 1, the D_Addr_Len = 8 + length of Mac_addr (y)
S_Addr	SINT[8+x]	-	-
API	SINT	0011h	Application process instance
SCL	SINT	0012h	Access level
Net_addr	SINT[6]	0013h	Network address according to ISO/OSI-Network addresses
Mac_addr	INT[x]	0019h	MAC Address
D_Addr	SINT[8+y]	-	-
API	SINT	0019h + x	Application process instance
SCL	SINT	001Ah + x	Access level
Net_addr	SINT[6]	001Bh + x	Network address according to ISO/OSI-Network addresses
Mac_addr	INT[y]	0021h + x	MAC Address

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Destination: DPV1_INITIATE_RES tag, with the following properties:

Table 79: Destination

Size	Member Name	Meaning/Description
SINT	C_Ref	Connection reference
INT(*)	Send_TimeOut	Updated time by the slave in 10 ms unit
INT(*)	Features_Supported	Features supported by the slave.
INT(*)	Profile_Features_Supported	Service functionality supported by the slave
INT(*)	Profile_Ident_Number	Profile ID supported by the slave

(*) High byte is placed first. For example, for the Send_TimeOut word, you will find 0xF4 in 0x01, and 0x01 for a Send_TimeOut of 500 (0x01F4) in 0x02.

The message error code can have the following values:

Table 80: Error Code

Value	Meaning/Description
00h	Successful
E1h	Unknown command
E2h	Invalid command data length
E5h	FDL (see extended error code)
E6h	DPV1 (see extended error code)
E7h	Another command is already in progress for this slave / class 2 connection.
EAh	Invalid remote address
EFh	DPV1 is not initialized
F1h	Online state expected
F2h	Invalid Add_Addr parameter
F3h	Invalid slave response
F4h	Could not manage more Class 2 connections
F6h	No space left on command queue

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11.3.7 DPV1 Class 2 Abort Command

This command aborts a DPV1 Class 2 connection.

The backplane CPU should use an MSG instruction of the CIP generic message type.

Table 81: CIP Generic Message Parameters

Value	Message Parameter Name
0x101	Object
0x55	Service
1	Instance
7	Length

Source element: DPV1_ABORT_REQ tag, with the following properties:

Table 82: Source Element

Value	Size	Member Name	Meaning/Description
	DINT	Reserved	-
Returned by initiate	SINT	C_Ref	Connection reference
0	SINT	Subnet	Location of the source of the abort request
2	SINT	Instance_ReasonCode	Protocol instance and reason for the abort

Destination: none

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The message error code can have the following values:

Table 83: Error Code

Value	Meaning/Description
00h	Successful
E1h	Unknown command
E2h	Invalid command data length
E7h	Another command is already in progress for this slave / class 2 connection.
EBh	Invalid connection reference
EFh	DPV1 is not initialized
F1h	Online state expected
F5h	Class 2 connection is not initialized
F6h	No space left on command queue

11.3.8 DPV1 Class 2 Read Command

This command reads data from a DPV1 slave using Slot_Number and Index parameters through a Class 2 connection.

The backplane CPU should use an MSG instruction of the CIP generic message type.

Table 84: CIP Generic Message Parameters

Value	Message Parameter Name
0x101	Object
0x56	Service
1	Instance
8	Length

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Source element: DPV1_READ_C2_REQ tag, with the following properties:

Table 85: Source Element

Value	Size	Member Name	Meaning/Description
	DINT	Timeout	Command timeout
-	SINT	C_Ref	Connection reference
[0...254]	SINT	Slot_Number	Slot number where the data should be read (0 to 254)
[0...254]	SINT	Index	Index where the data should be read (0 to 254)
[1...240]	SINT	Data_Length	Number of byte to read (1 to 240)

Destination: DPV1_READ_C2_RES tag, with the following properties:

Table 86: Destination

Size	Member Name	Meaning/Description
SINT [1..240]	Data	Data read

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The message error code can have the following values:

Table 87: Error Code

Value	Meaning/Description
00h	Successful
E1h	Unknown command
E2h	Invalid command data length
E5h	FDL error (see extended error code)
E6h	DPV1 Error (see extended error code)
E7h	Another command is already in progress for this slave / class 2 connection.
ECh	Invalid data length
EFh	DPV1 is not initialized
F1h	Online state expected
F3h	Invalid slave response
F5h	Class 2 connection is not initialized
F6h	No space left on command queue

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11.3.9 DPV1 Class 2 Write Command

This command writes data to a DPV1 slave using Slot_Number and Index parameters through a DPV1 Class 2 connection.

The backplane CPU should use an MSG instruction of the CIP generic message type.

Table 88: CIP Generic Message Parameters

Value	Message Parameter Name
0x101	Object
0x57	Service
1	Instance
[9...248]	Length

Source element: DPV1_WRITE_C2_REQ tag, with the following properties:

Table 89: Source Element

Value	Size	Member Name	Meaning/Description
-	DINT	Timeout	Command timeout
-	SINT	C_Ref	Connection reference
[0...254]	SINT	Slot_Number	Slot number where the data should be read (0 to 254)
[0...254]	SINT	Index	Index where the data should be read (0 to 254)
[1...240]	SINT	Data_Length	Number of byte to read (1 to 240)
-	SINT [1...240]	Data	Data to be written

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Destination: DPV1_WRITE_C2_RES tag, with the following properties:

Table 90: Destination

Size	Member Name	Meaning/Description
SINT [1..240]	Data_Length	Number of bytes written (1 to 240)

The message error code can have the following values:

Table 91: Error Code

Value	Meaning/Description
00h	Successful
E1h	Unknown command
E2h	Invalid command data length
E5h	FDL error (see extended error code)
E6h	DPV1 error (see extended error code)
E7h	Another command is already in progress for this slave / class 2 connection.
ECh	Invalid data length
EFh	DPV1 is not initialized
E1h	Online state expected
F3h	Invalid slave response
F5h	Class 2 connection is not initialized
F6h	No space left on command queue

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11.3.10 DPV1 Class 2 Idle Command

This command sends an Idle command to the DPV1 Class 2 slave. The scanner automatically sends an Idle frame to the slave to keep the connection alive, however, this function can be used to force the Idle.

The backplane CPU should use an MSG instruction of the CIP generic message type.

Table 92: CIP Generic Message Parameters

Value	Message Parameter Name
0x101	Object
0x58	Service
1	Instance
5	Length

Source element: DPV1_IDLE_REQ tag, with the following properties:

Table 93: Source Element

Value	Size	Member Name	Meaning/Description
-	DINT	Timeout	Command timeout
-	SINT	C_Ref	Connection reference

Destination: none

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The message error code can have the following values:

Table 94: Error Code

Value	Meaning/Description
00h	Successful
E1h	Unknown command
E2h	Invalid command data length
E5h	FDL error (see extended error code)
E6h	DPV1 error (see extended error code)
E7h	Another command is already in progress for this slave / class 2 connection.
ECh	Invalid data length
EFh	DPV1 is not initialized
F1h	Online state expected
F3h	Invalid slave response
F5h	Class 2 connection is not initialized
F6h	No space left on command queue

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11.3.11 Extended Error Code

11.3.11.1 FDL Error (0xE5)

If an FDL error (0xE5) occurs, the extended error code contains the FDL error code.

The following table describes the meaning of the FDL_ErrorCode:

Table 95: FDL_ErrorCode Description

Value	Meaning/Description
0h	OK
1h	User error, SAP locked
2h	No resource for sending data, tried to send to SAP that was not configured
3h	No service available (SAP does not exist)
4h	Access point blocked
80h	Short character, problems with wiring, termination, etc
9Fh	No access
AFh	Double token detected, problems with wiring, termination, etc.
BFh	Response buffer too small
8Fh	Noise at SM command, problems with wiring, termination, etc.

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11.3.11.2 DPV1 Error (0xE6)

If a DPV1 error (0xE6) occurs, the extended error code contains the DPV1 error code.
3 bytes are significant:

- The first indicates the type of error (its value is always 0x80 : DPV1 error)
- The second consists of two parts:
  - The highest four bits represent the error class
  - The lowest four bits represent the error code
- The third contains a slave-specific error code

The following table describes the meaning of the error class and error code of the second error byte.

Table 96: DPV1 Errors

Error_Class	Meaning/Description	Error_Code
0 to 9	Reserved	
10=	Application	0 = read error 1 = write error 2 = module failure 3 to 7 = reserved 8 = version conflict 9 = features not supported 10 to 15 = user specific
11=	Access	0 = invalid index 1 = write length error 2 = invalid slot 3 = type conflict 4 = invalid area 5 = state conflict 6 = access denied 7 = invalid range 8 = invalid parameter 9 = invalid type 10 to 15 = user specific
12 =	Resource	0 = read constrain conflict 1 = write constrain conflict 2 = resource busy 3 = resource unavailable 4 to 7 = reserved 8 to 15 = user specific
13 to 15	User specific	

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11.4 Creating a CIP Generic Message for Transmitting a DPV1 Command

In the RSLogix 5000 software:

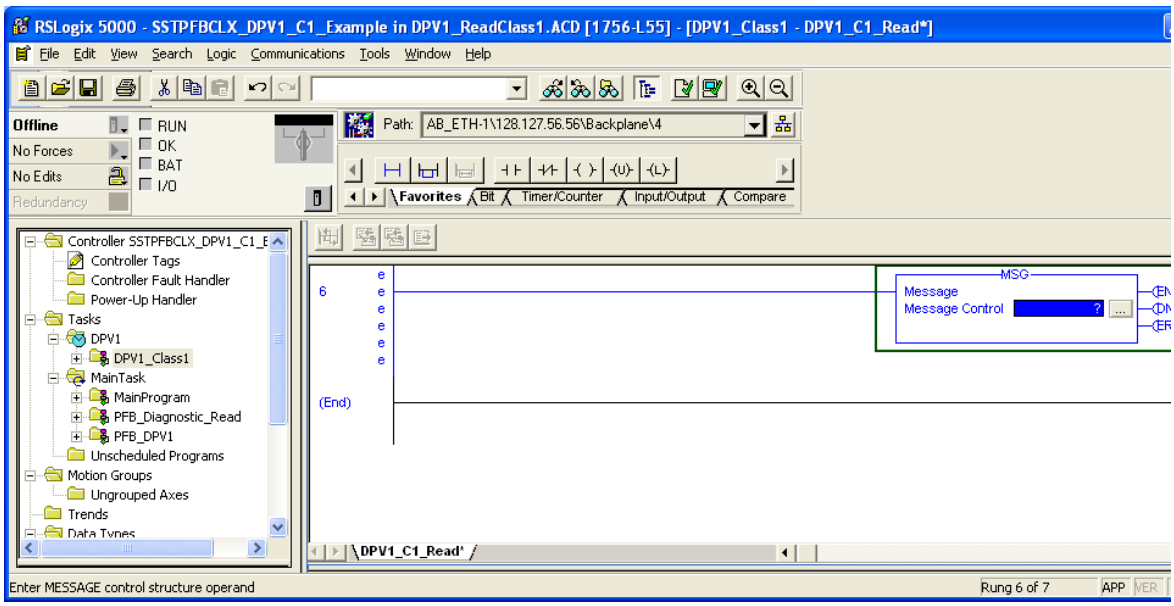


Note

There is limit to the number of MSG (cache connection) instructions you can leave as opened (cached) in RSLogix 5000. Check the online help to find the limitations.

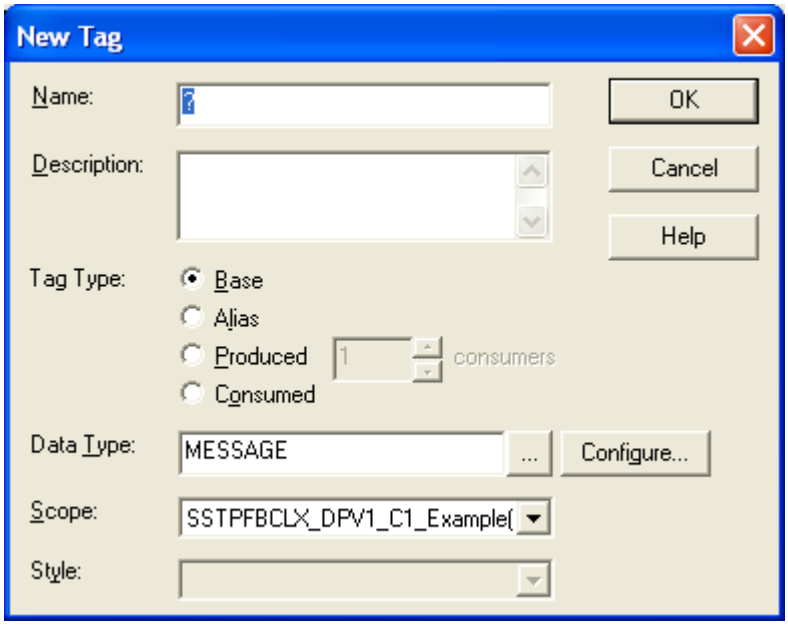
If you are using more than 16 MSG instructions in your ladder logic, we recommend that you disable the cache option for MSG instructions. For MSG instructions that only have to be executed once (i.e., DPV1 Init and DPV1 Class 2 Init commands) disabling the cache connection is recommended so that you can run more cache connection messages.

1. Select the MSG instruction from the Input/Output tab and place it into a rung of ladder code.



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2. If you haven't already created a tag for the message, right-click on “Message Control” inside the MSG instruction and select the Create Tag. The New Tag dialog box displays.

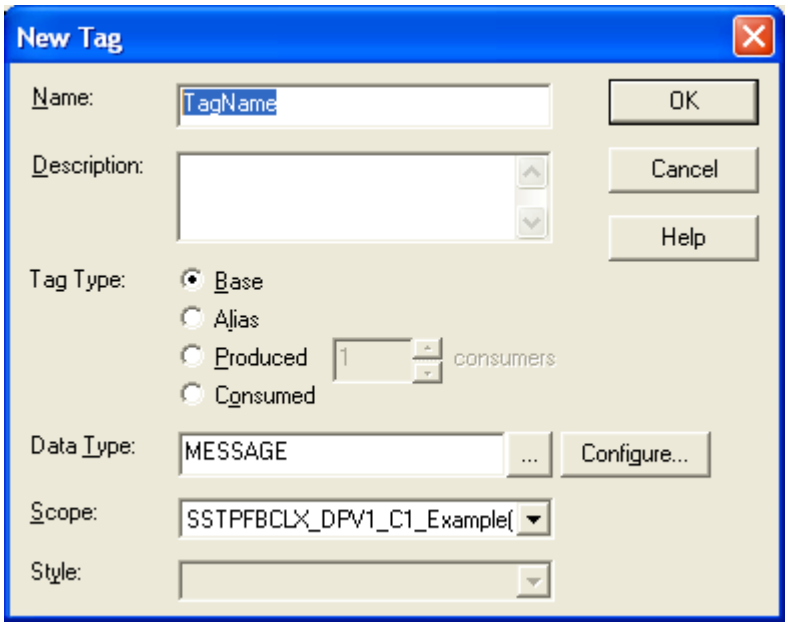


3. Enter a unique tag name in the Name field and click OK.

4. Right-click on Message Control again.

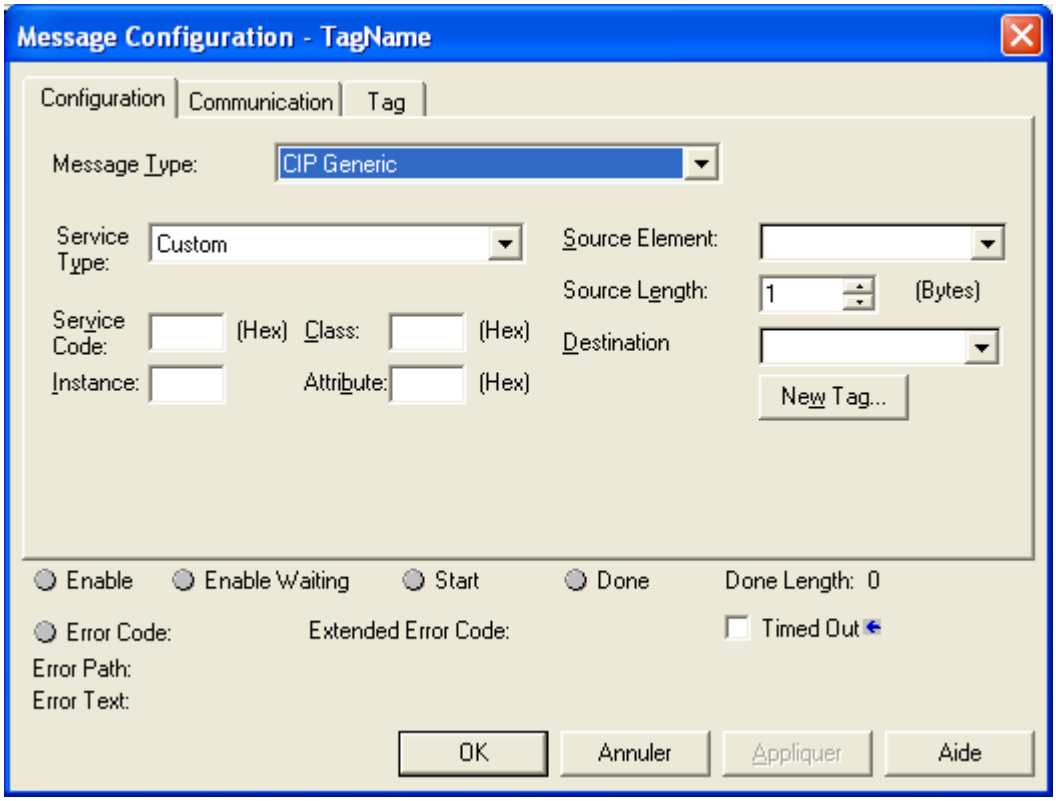
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5. Select Edit TagName Properties, where TagName is the name of your MSG tag. The Tag Properties dialog box opens.



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6. Click on the Configure button. The Message Configuration dialog box opens:



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7. Under the Configuration tab, enter the following information:

Message Type:	CIP Generic
Service Code:	Your desired DPV1 command code
Class:	Set to 101h
Instance:	Set to 1
Attribute:	Leave this field empty
Source Element:	Select the variable source you created to hold the DPV1 request
Source Length:	Select the number of bytes to transfer from the variable source
Destination:	Select the destination variable you created to hold the DPV1 response

8. Under the Communication tab, set the scanner path to where you want to send the message.
9. Click OK to return to the Tag Properties dialog box.
10. Click OK again to close the dialog box.
11. If you are disabling the cache connection, go to Controller tags > Message Tag and set your Message tagname: EN_CC to 0.

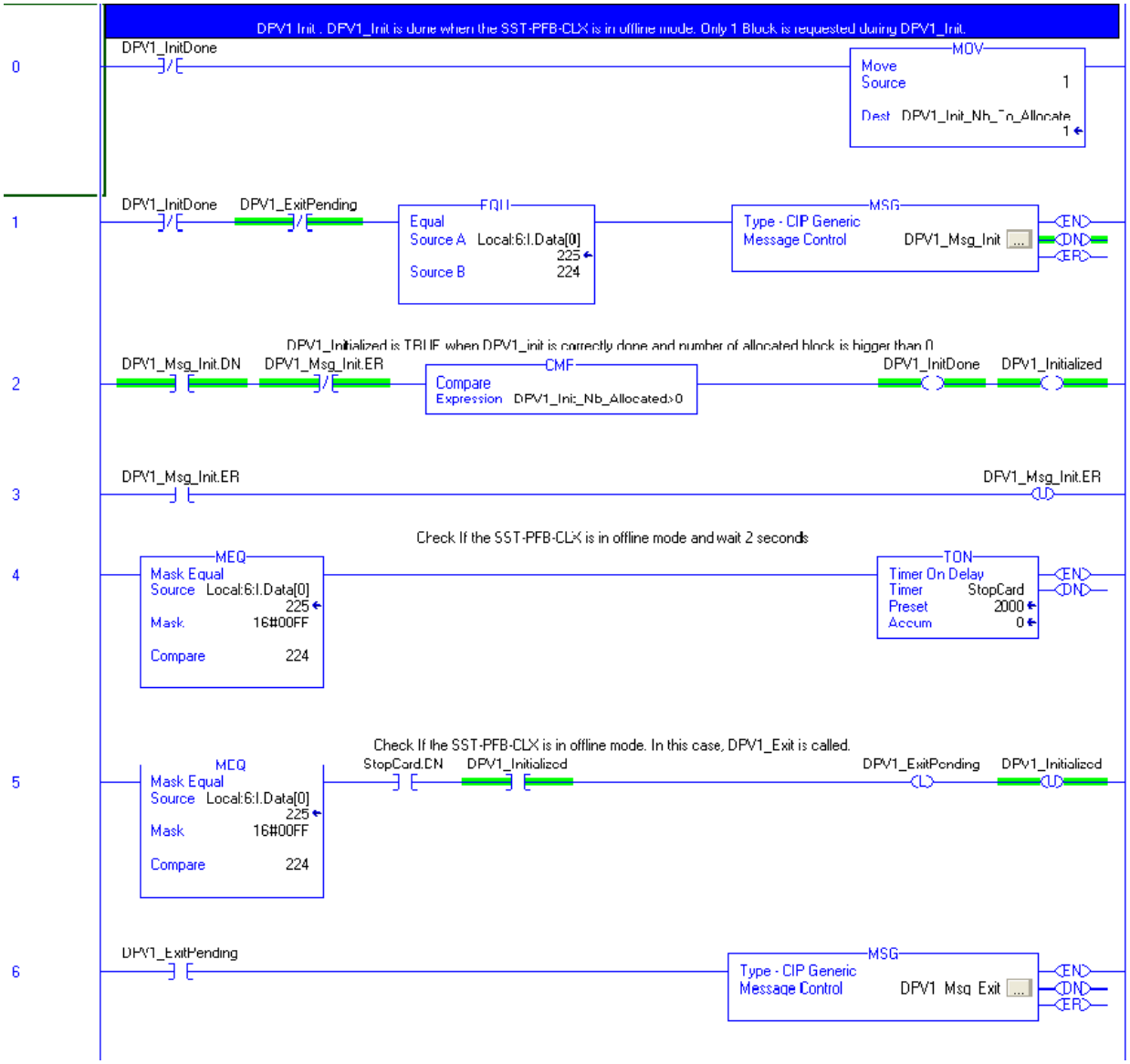
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11.5 DPV1 Sample Code

11.5.1 DPV1 MC1 Initialization Example

This sample logic shows the initialization of the DPV1 Class 1 communications.

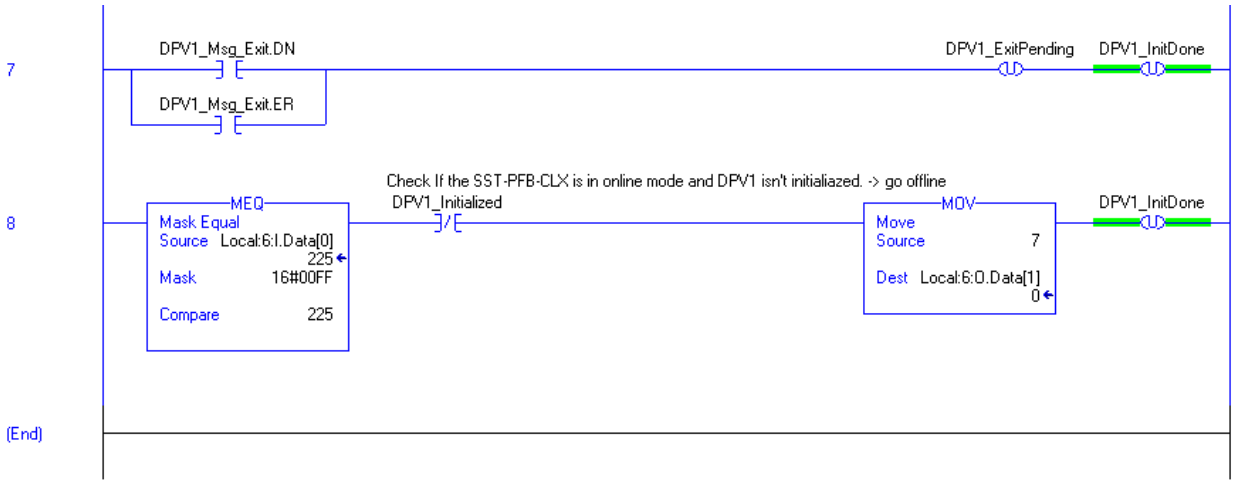
Figure 13: DPV1 MC1 Initialization Example



(Continued on following page)

(Figure 13, continued).

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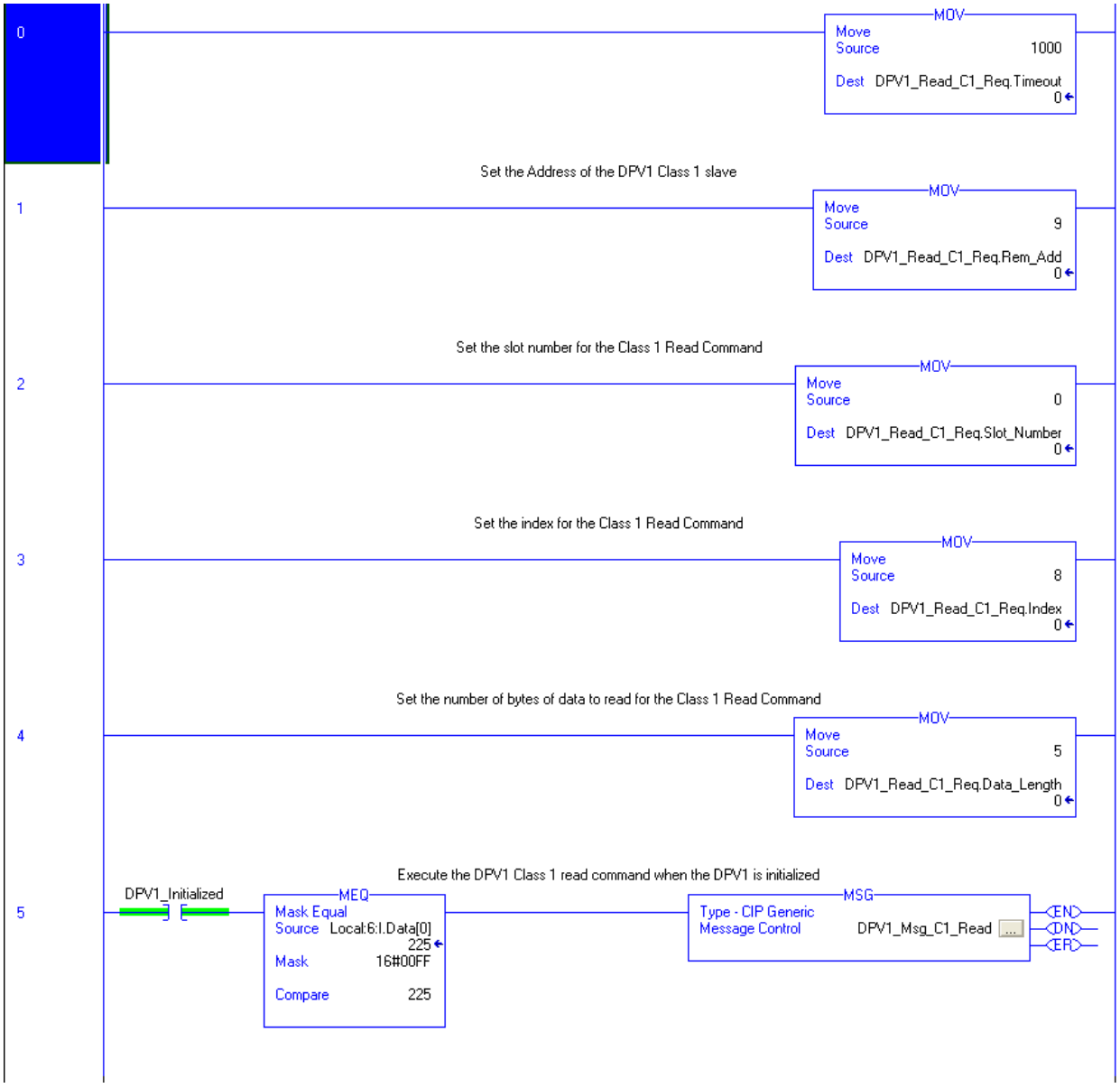


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11.5.2 DPV1 Class 1 Read Example

After the DPV1 communications have been initialized, you need to build a command and send it.

Figure 14: DPV1 Class 1 Read Example



(Continued on following page)

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(Figure 14, continued).



11.5.3 DPV1 MC2 Initialization Example

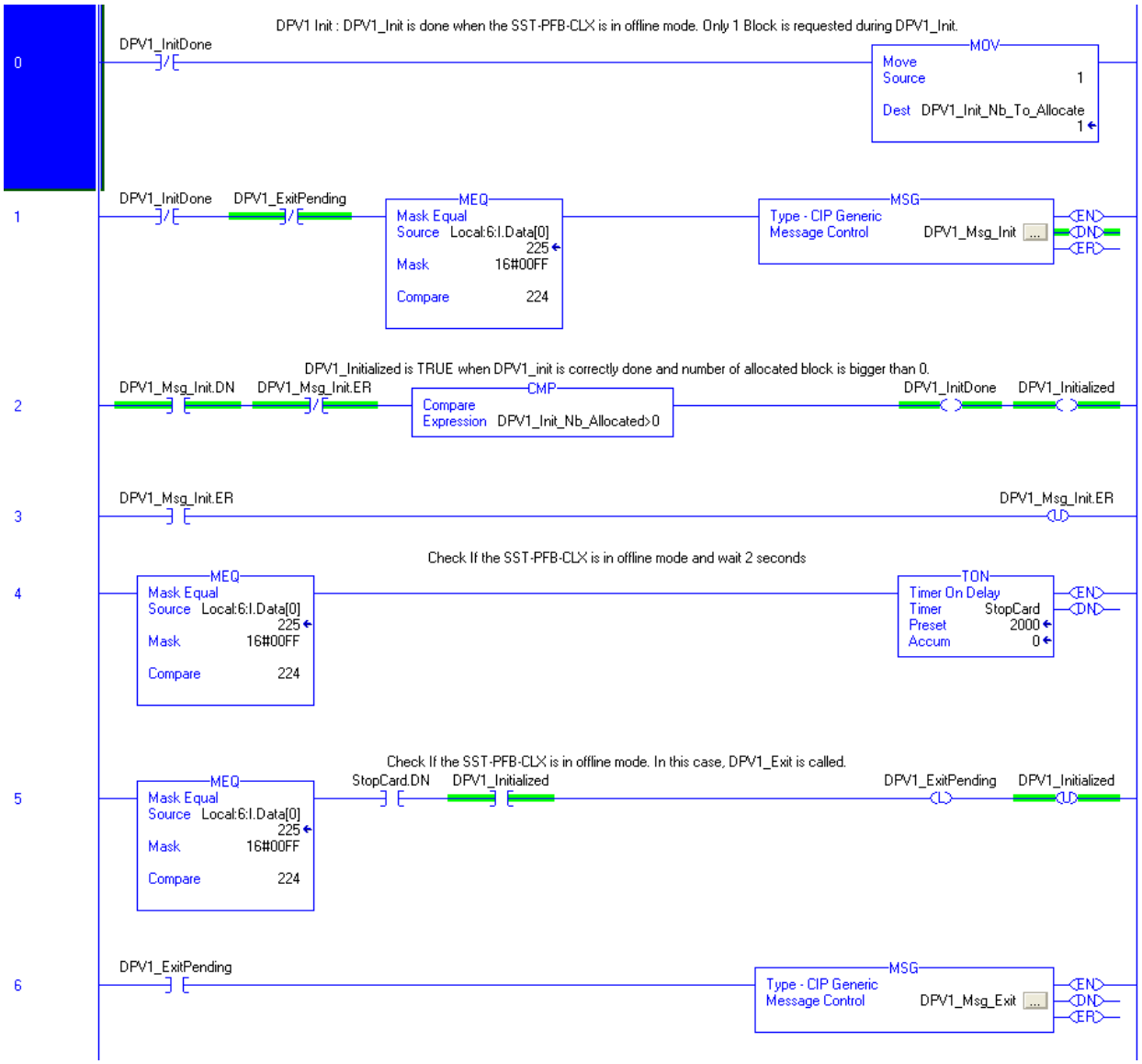
This sample logic shows the initialization of the DPV1 Class 2 communications.

Note

The only difference between this initialization routine and the one for the Class 1 communication is in Rungs 7 and 8, where the C2_Initiated tag is Unlatched.

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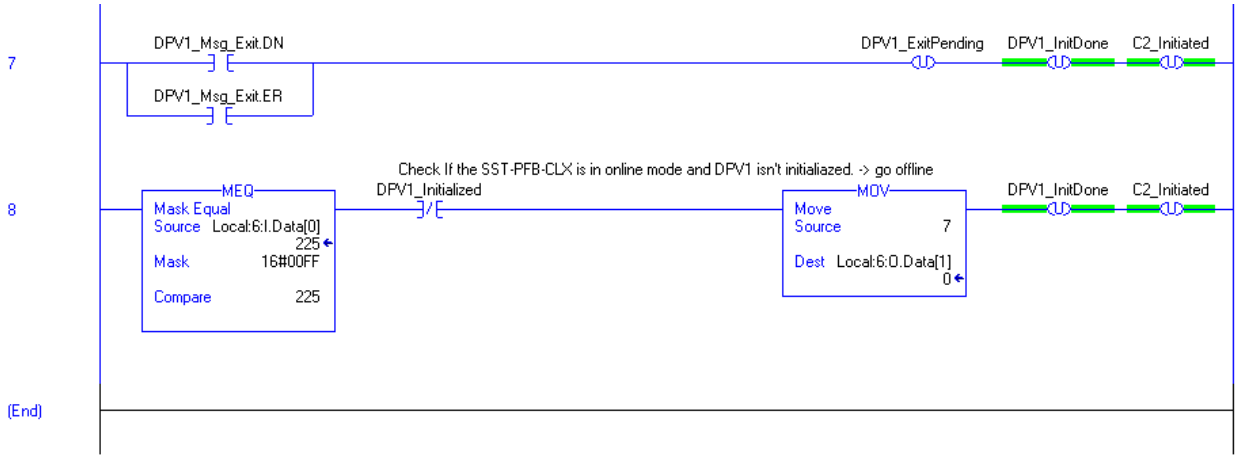
Figure 15: DPV1 MC2 Initialization Example



(Continued on following page)

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(Figure 15, continued).

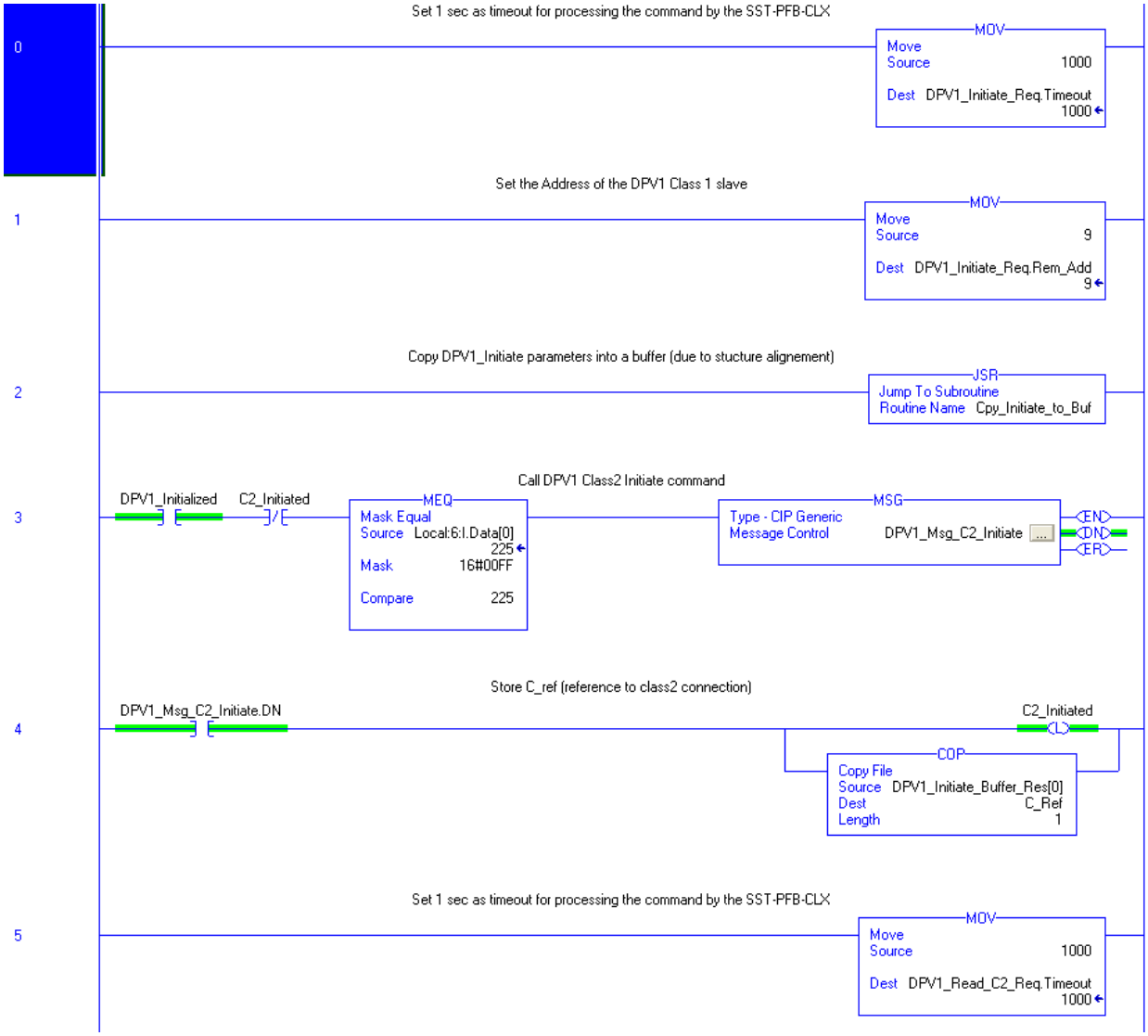


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11.5.4 DPV1 Class 2 Read Example

After the DPV1 communications have been initialized, you need to build a command and send it.

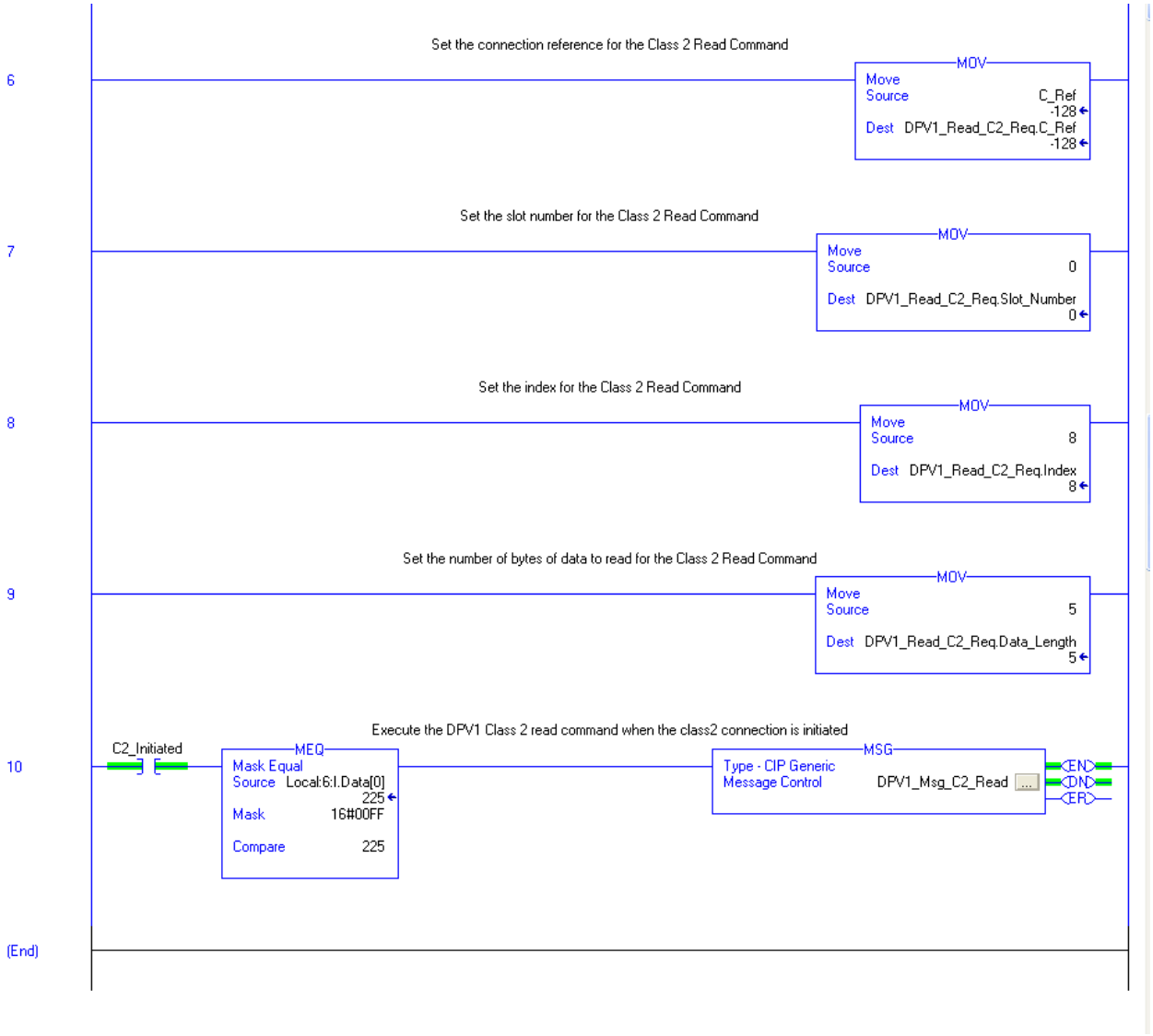
Figure 16: DPV1 Class 2 Read Example



(Continued on following page).

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(Figure 16, continued).



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11.5.5 Copy DPV1 Initiate Parameters

Due to structure alignment, DPV1_Initiate parameters are copied into a buffer. You will need to determine these values, based on the slave in use.

Figure 17: Copy DPV1 Class 2 Initiate Parameters



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(Figure 17, continued).



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12

Using the Configuration Tool through RSLinx

Chapter Sections:

- Configuration Tool Overview
- Functions
- Configuring the RSLinx Connection
- DPV1 Features

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12.1 Configuration Tool Overview

Through Ethernet, the SST PROFIBUS Configuration Tool can communicate with an SST-PB3-CLX-RLL scanner.

Note

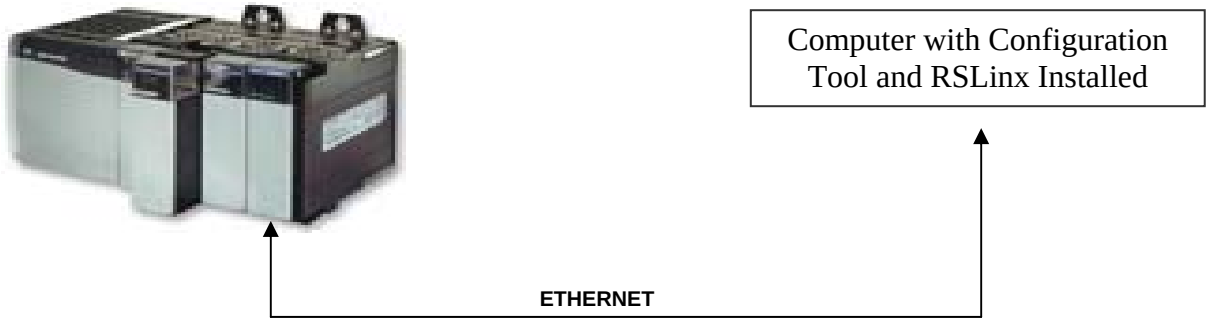
The following product versions must be used:

- Firmware version 7.27 or higher
- Configuration Tool version 3.12.1.0 or higher
- RSLinx driver version 2.2 OEM/Professional or higher

Note

Refer to Section A.1, Installing and Configuring the RSLinx Driver, for details on configuring the driver.

Figure 18: Scanner, Ethernet and Configuration Tool Relationship



12.2 Functions

All Configuration Tool functions are available through Ethernet:

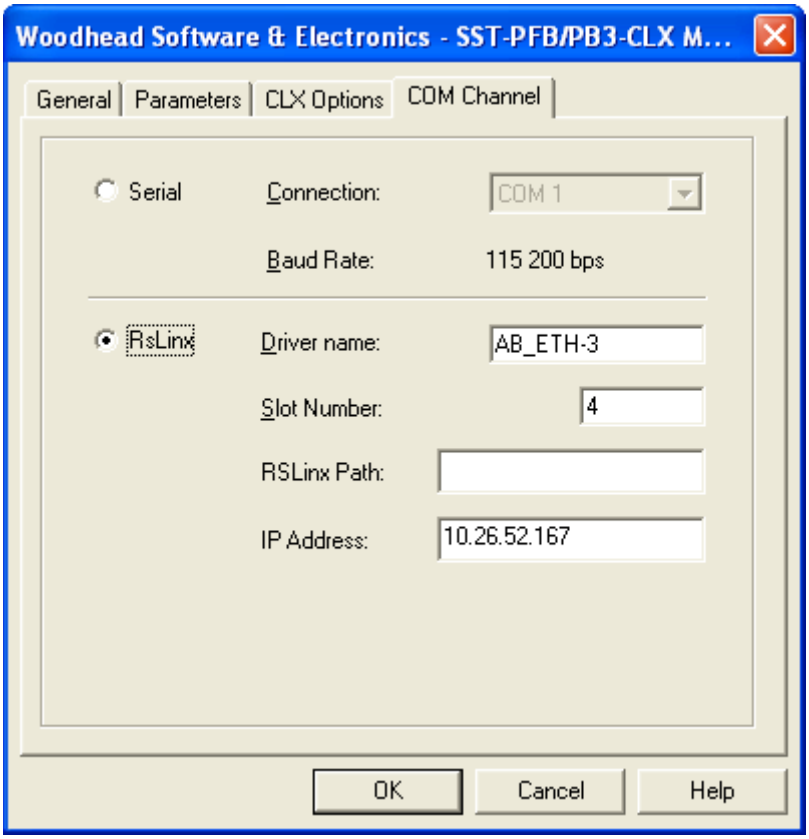
- Network detection
- Master configuration loading
- Slave diagnostics

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12.3 Configuring the RSLinx Connection

To use the Configuration Tool with an RSLinx connection, follow these steps:

1. Add an SST-PB3-CLX-RLL master to your configuration.
2. Under the COM Channel tab, select “RSLinx”.



3. Enter the RSLinx driver name.



Note

Refer to Section A.1, Installing and Configuring the RSLinx Driver, for details on configuring the driver.

4. Enter the SST-PB3-CLX-RLL scanner slot in the CLX chassis.

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5. If the scanner module is in a remote rack, enter the RSLinx path. Here is an example:

   The remote Ethernet module is in slot 6 and its address in the remote rack is 130.151.132.1. The SST-PB3-CLX module is in slot 8. So the string would be:

   ```
   01 06 12 0D 31 33 30 2e 31 35 31 2e 31 33 32 2e 31 00
   ```

   - 01h = Communication with the backplane
   - 06h = Slot of Remote Ethernet module (in local rack)
   - 12h = Port Address
   - 0Dh= Length Byte (Number of ASCII bytes in IP Address
   - 31 33 30 2e 31 35 31 2e 31 33 32 2e 31 00 = (IP Address in ASCII). If the number of bytes in the IP address in ASCII is odd, pad another byte (00h) on the end of the path, like in this example.

6. Enter the IP address of the 1756-ENBT when using Ethernet Devices and Ethernet/IP drivers for local racks.



Note

Remote Devices via Linx Gateway driver is not supported with the RSLinx Classic Profession/Gateway v2.54 or higher.

The IP Address field can be left blank when using the 1756-ENET Ethernet TCP/IP Communications ControlLogix module or when RSLinx path contains an IP address.

7. Click OK to save your configuration.
8. Connect to the scanner by clicking the  button or by selecting the Connect command in the master menu.

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12.4 DPV1 Features

Each slave must be configured to accept DPV1 commands. Using the Configuration Tool:

1. Open the slave's properties.
2. Under the Extended Parameters tab, select the DPV1 option.
3. Save the configuration and load it into the scanner.

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13

I/O Expansion

Chapter Sections:

- I/O Expansion Overview
- Assigning I/O Offsets in Your Configuration
- I/O Expansion Ladder Samples

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13.1 I/O Expansion Overview

The SST-PB3-CLX master supports I/O data up to a maximum of 1984 input bytes and 1968 output bytes within 4 I/O pages. There are 4 bytes reserved for control registers at the beginning of each page. Each input page is 500 bytes and each output page is 496 bytes.

The Host controls which page of I/O is mapped into the ControlLogix I/O table by writing to Byte 1 of the ControlLogix output table. To change the input page, (WORD Data type is used), update the lower nibble of byte 1 (Local:2:O.Data[0].8 – 11, AOP Tag Local:Slot:ModuleControl.ChangePage Bits 0 - 3) with page number (0 – 3). To change the output page, update the upper nibble of byte 1 (Local:Slot:O.Data[0].12 – 15, AOP Tag Local:Slot:ModuleControl.ChangePage Bits 4 - 7) with page number (0 -3).

When changing Output Pages, updating the Control register (Local:Slot:I.Data[0].12 – 15, AOP tag Local:Slot:ModuleControl.ChangePage Bits 4 - 7) with the output page number and output data at the same time is required before doing a Synchronous Copy to the ControlLogix Output table.

After changing the Input pages, the host should wait for the firmware to set the page number(s) in byte 1 of the Input table (Local:Slot:I.Data[0].8 – 11, AOP tag Local:Slot:ModuleControl.CurrentPage Bits 0 - 3). Input pages should not be read until the Inpute table's low nibble of byte 1 (Local:Slot:I.Data[0].8 – 11, AOP tag Local:Slot:ModuleControl.CurrentPage Bits 0 - 3) is equal to the Output table's low nibble of byte 1 (Local:Slot:O.Data[0].8 – 11, AOP tag Local:Slot:ModuleControl.ChangePage Bits 0 - 3).

To retrieve or update the data on a page, use the CPS instruction (Synchronous Copy File) in the RsLogix 5000 software. With the CPS instruction, an I/O update cannot change the data while you are copying to/from the local buffer. If you plan to read all used input pages into a local buffer prior to processing input data, below is sample logic that would be required to avoid data tearing.



Note

The ladder logic samples given are examples only.

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13.2 Assigning I/O Offsets in Your Configuration

You assign data offsets to each slave in your configuration using the SST PROFIBUS Configuration tool. The default offsets are based on 1756-Generic profile. If you plan on configuring the master in RSLogix 5000 using AOP (Add-on-Profile) then you should enable AOP option under Master Properties dialog box. For more details on AOP see Chapter 5. There are 4 pages of input and 4 pages of output available for data mapping. These page numbers are 0 -3.

If Modify Offset is enabled, you can assign the offset of the input or output data for the slave rather than have the Configuration Tool assign the address automatically.



Notes

Control register offsets cannot be used as I/O offsets when AOP is not enabled for Master. This AOP option can be enabled in the Master configuration created in the SST Profibus Configuration Tool under Master properties.

The Input/Output Offset is the address of the input/output data of a slave device. The offset assigned is based on the Data Type (BYTE, WORD, or DWORD) that is selected for the data type under the CLX Options tab. The default is WORD.

Below are the available/restricted offsets to use for each Data Type:

Control Register Offsets don't apply when using AOP. This is because the Control registers are separated from the I/O registers when using AOP in RSLogix 5000.

Input Range: (WORD)

Page	AOP offsetst	Generic Offsets	Control Register Offsets
0	0 to 247	2 to 249	0 to 1
1	250 to 747	252 to499	250 to 251
2	500 to 747	502 to 749	500 to 501
3	750 to 997	752 to 999	750 to 751

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Table 97: Input Range: (BYTE)

Page	AOP offsets	Generic Offsets	Control Register Offsets
0	0 to 495	4 to 499	0 to 3
1	500 to 995	504 to 999	500 to 503
2	1000 to 1495	1004 to 1499	1000 to 1003
3	1500 to 1995	1504 to 1999	1500 to 1503

Table 98: Input Range: (DWORD)

Page	AOP Offsets	Generic Offsets	Control Register Offsets
0	0 to 123	1 to 124	0
1	125 to 248	126 to 249	125
2	250 to 373	251 to 374	250
3	375 to 498	376 to 499	500

Table 99: Output Range: (WORD)

Page	AOP Offsets	Generic Offsets	Control Register Offsets
0	0 to 245	2 to 247	0 to 1
1	248 to 493	250 to 495	248 to 249
2	496 to 741	498 to 743	496 to 497
3	744 to 989	746 to 991	744 to 745

Table 100: Output Range: (BYTE)

Page	AOP Offsets	Generic Offsets	Control Register Offsets
0	0 to 491	4 to 495	0 to 3
1	496 to 887	500 to 991	496 to 499
2	992 to 1483	996 to 1487	992 to 995
3	1488 to 1979	1492 to 1983	1488 to 1491

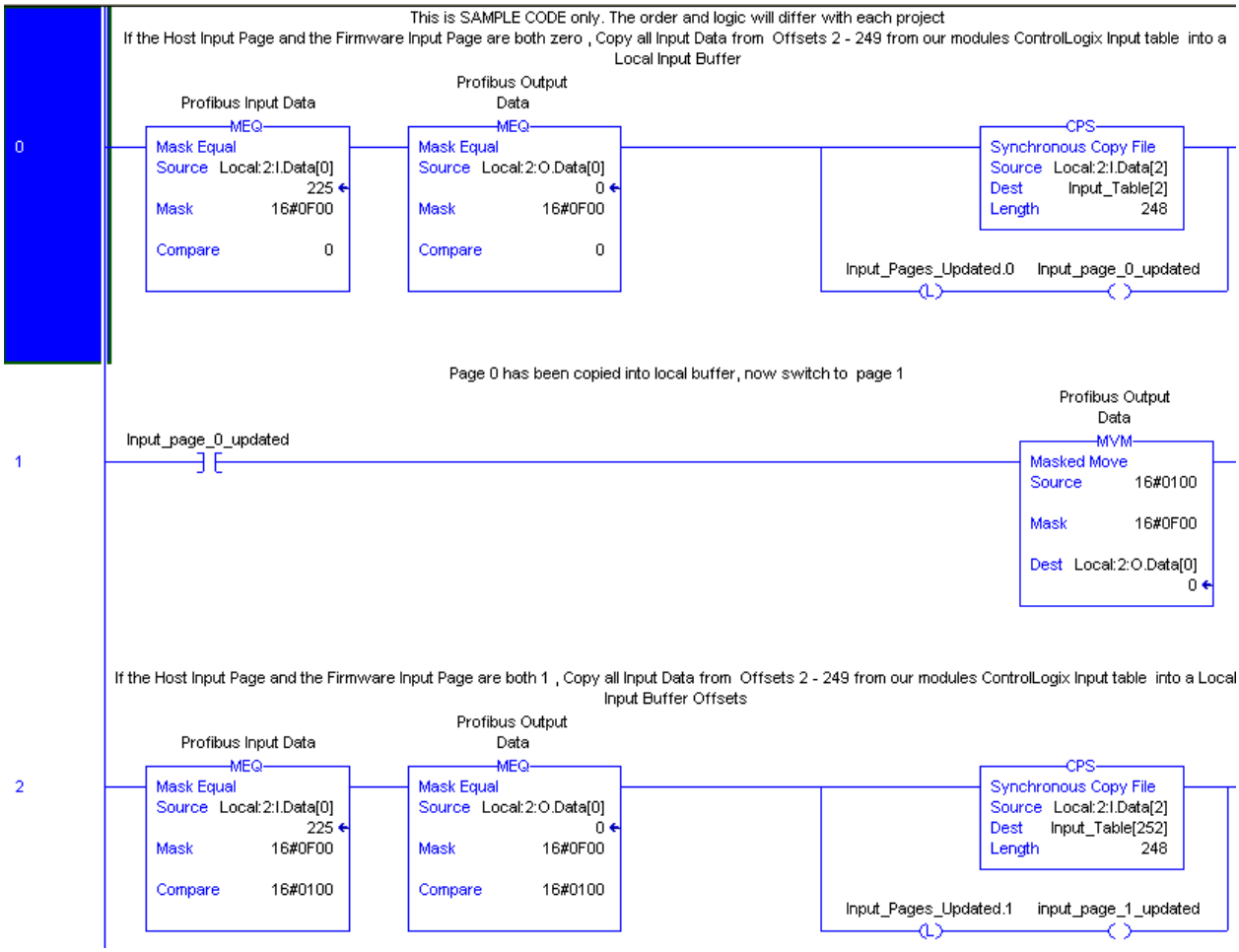
Table 101: Output Range: (DWORD)

Page	AOP Offsets	Generic Offsets	Control Register Offsets
0	0 to 122	1 to 123	0
1	124 to 246	125 to 247	124
2	248 to 370	249 to 371	248
3	372 to 494	373 to 495	372

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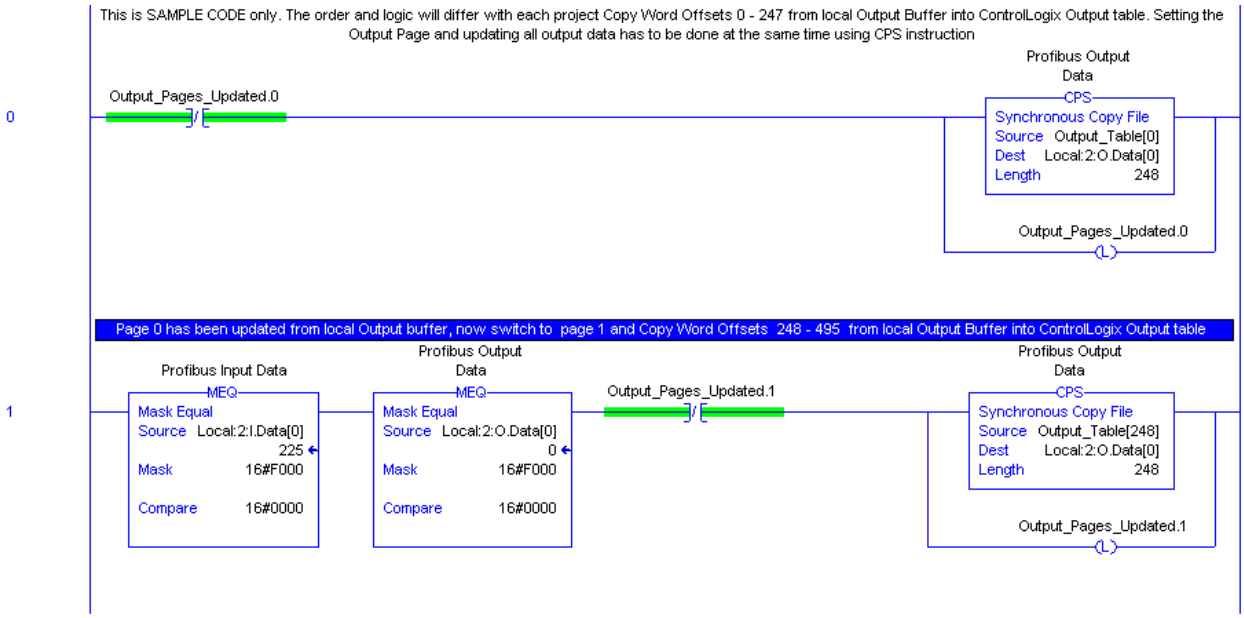
13.3 I/O Expansion Ladder Samples

Figure 19: Read Multiple Input Tables Ladder Sample (using generic profile)



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Figure 20: Write Multiple Output Tables Ladder Sample



For more details on I/O Control registers, refer to Section 5.9, SST-PB3-CLX-RLL I/O and Status Images

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14

Listen-Only Connection

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14.1 Listen-Only Connection

Listen-only connection refers to an input-only connection that is made to an SST-PB3-CLX-RLL module that is already configured with outputs from the main controller. A listen-only connection allows inputs on an SST-PB3-CLX-RLL module to be monitored from another CLX Processor. Up to 15 listen-only connections plus 1 output connection are supported on the SST-PB3-CLX-RLL.



Note

Listen-only support is available in backplane firmware PFBCLX.SS4 Version 7.33 and higher.

Up to the maximum 250 words in the CLX input table and 250 words in the Status table can be monitored from another CLX processor that has a listen-only connection to an SST-PB3-CLX-RLL module.

When setting up a listen-only connection in RSLogix 5000 makes sure to use the same data format that is configured on Main CLX controller with the output connection. Supported data formats for listen-only connections are:

- Input Data INT - With Status
- Input Data DINT - With Status
- Input Data SINT - With Status

With a listen-only connection, controlling an SST-PB3-CLX-RLL module is not possible. A listen-only connection could be used to trigger another CLX controller to take control of the SST-PB3-CLX-RLL module when the main controller with an output connection has gone down.

When the main output connection is lost to an SST-PB3-CLX-RLL while it has a listen-only connection, the SST-PB3-CLX-RLL will remain in RUN mode with outputs held in their last state. The SYS LED will remain GREEN to indicate the SST-PB3-CLX-RLL is still in RUN mode. This allows another CLX controller to take control over the SST-PB3-CLX-RLL module and resume updating output data on a Profibus network.

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Note

If the Listen-only connection is closed before the Output connection is reestablished, the SST-PB3-CLX-RLL will enter CLEAR mode (outputs will get cleared to zeros).

The following considerations should be taken into account when setting up a listen-only connection:

1. Input Data being monitored from Listen only connection should be analyzed to determine if any outputs should change prior to reestablishing a new output connection.

2. Output data on the CLX processor that is taking over the I/O connection must be updated prior to the connection being opened to the SST-PB3-CLX-RLL.

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A

Setting up the RSLinx Driver

Appendix Sections:

- Installing and Configuring the RSLinx Driver



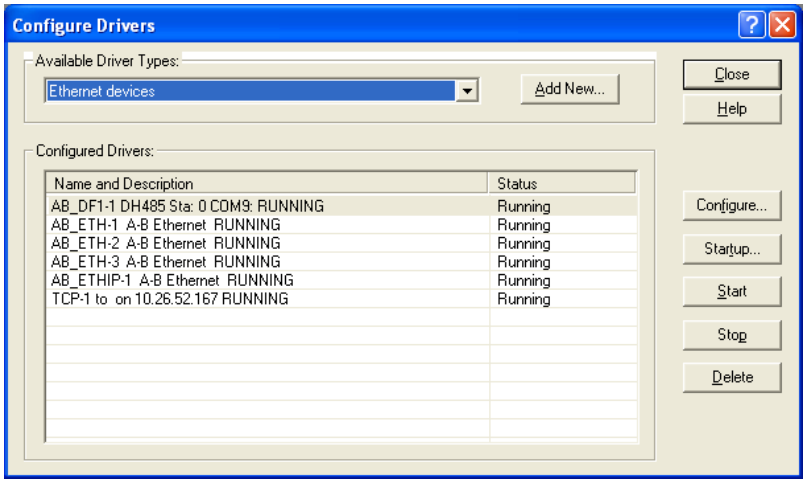
Note

This Appendix assumes that you are using RSLinx software OEM/Professional, version 2.54 and SST Profibus Configuration tool version 3.12.1.0 or later.

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A.1 Installing and Configuring the RSLinx Driver

1. Start the RSLinx software.
2. Under the Configuration menu, select Configure Drivers.
3. From the Available Driver Types list, select Ethernet devices, and click Add New.





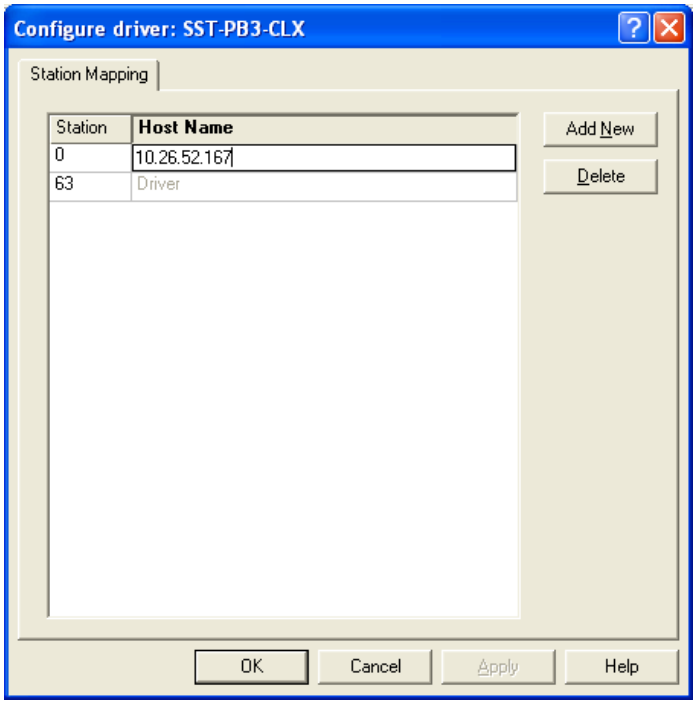
Note

The Remote Devices via Linx Gateway driver is not supported with the RSLinx Classic Profession/Gateway v2.54 or higher. Valid drivers are Ethernet devices or Ethernet/IP Driver.

4. Enter the name of the new driver. For example, “SST-PB3-CLX”.

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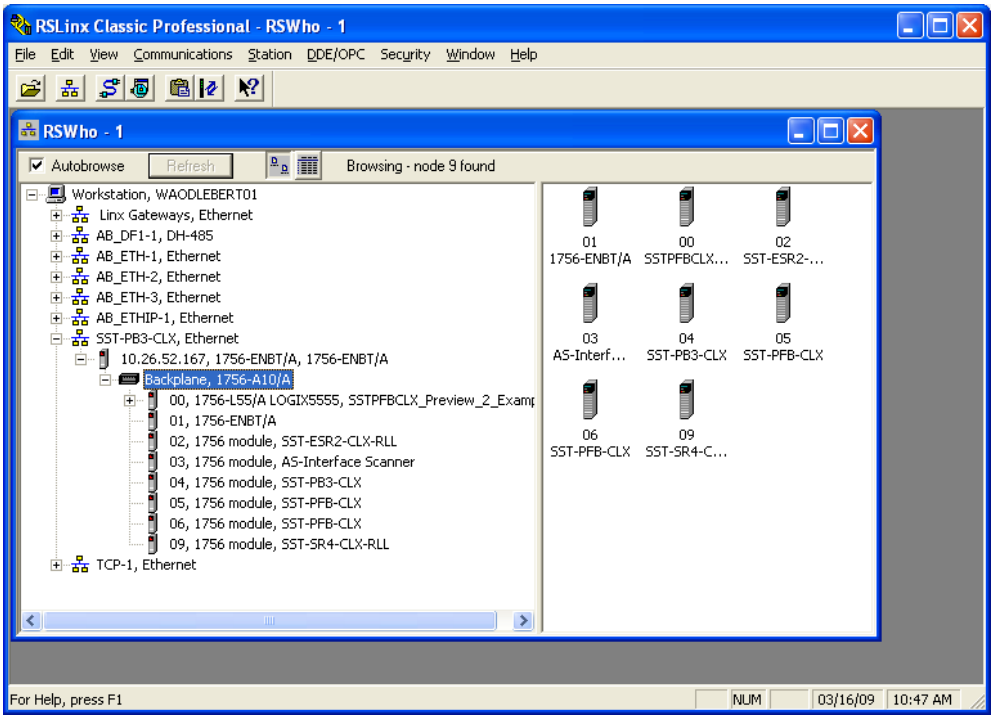
5. Enter the IP address of the ControlLogix backplane you want to communicate with, and click OK.



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6. To verify that all drivers are able to communicate with the backplane, follow these steps:

   - Under the Communication menu, select RSWho.
   - Click on the driver you created and check if the backplane unit is viewable.



You will be able to see the SST module installed on the backplane, along with any other modules.

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B

Technical Specifications

Appendix Sections:

- Technical Specifications

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B.1 Technical Specifications

Table 102: Technical Specifications for the SST-PB3-CLX-RLL Scanner

Part Number	SST-PB3-CLX-RLL
Function	CLX-5000 scanner for PROFIBUS networks
Description	• Freescale MCF5272 processor • 8 MB of MCF5272 local RAM • 512 KB of onboard shared memory • 512 KB of sectored flash memory for storage of program and configuration data • ASPC2 LAN controller
CLX Interface	4 Pages of 246 words Output data and 4 Pages of 248 words Input data. SST-PB3-CLX-RLL Master supports I/O data up to a maximum of 1984 input bytes and 1968 output bytes within 4 I/O pages.
	250 words Status
	DPV1 Class 1 & Class 2 Master via Generic CIP messages
Environmental	Storage temperature -40°C to 85°C
	Operating temperature 0°C to 60°C
	Operating RH level 5% to 95%, non-condensing
	Pollution Degree 1 - no pollution or only non-conductive or non-corrosive pollution
Backplane Current Consumption	850 mA @ 5 VDC 1.75 mA@24 VDC

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C

CE Compliance

Appendix Sections:

- CE Compliance

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C.1 CE Compliance

Marking of this equipment with the CE symbol indicates compliance with European Council Directive 2004/108/EC.



Warning

This is a Class A product. In a domestic environment, this product may cause radio interference, in which case you may be required to take adequate measures.



Caution

This equipment is neither designed for, nor intended for operation in installations where it is subject to hazardous voltages and hazardous current.



Note

To maintain compliance with the limits and requirements of the EMC Directive, it is required to use quality interfacing cables and connectors when connecting to this device. Refer to the cable specifications in the Hardware Guide for selection of cable types.



Note

The backplane voltage supply for this equipment must be delivered as Separated Extra Low Voltage (SELV).

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D

Warranty and Support

Appendix Sections:

- Warranty
- Reference Documents
- Technical Support

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D.1 Warranty

For warranty information, refer to http://www.mysst.com/warranty.asp.

D.2 Reference Documents

For...	Read this Document...	Document Number
General PROFIBUS information	http://www.profibus.com/	N/A
A-B power supply specifications	CLX 5000 Modular Style Installation & Operation Manual	Allen-Bradley Publication 1747-6.2
RSLogix information	ControlLogix 5000 Controllers General Instruction Set Reference Manual	AB Publication number 1756-6.4.1 and 1756-RM003A-US-P
CLX Chassis installation	ControlLogix Chassis Installation Instructions	AB Publication number 1756-5.80
Honeywell PlantScape information	PlantScape Process System and Controller Product Overview	PS03-140 Release 400
Implementing PROFIBUS on the Honeywell PlantScape System	PlantScape PROFIBUS Implementation Guide	N/A

For more information on PROFIBUS, refer to the following:

- PROFIBUS standard DIN 19245, parts 1 and 3. Part 1 describes the low-level protocol and electrical characteristics. Part 3 describes the DP protocol.
- European standard EN 50170
- ET 200 Distributed I/O system, 6ES5 998-3ES22
- IEEE 518 Guide for the Installation of Electrical Equipment to minimize Electrical Noise Input to Controllers

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D.3 Technical Support

Please ensure that you have the following information readily available before calling for Technical Support:

- Card type and serial number
- Computer's make, model, CPU speed and hardware configuration (other cards installed)
- Operating system type and version
- Details of the problem you are experiencing: firmware module type and version, target network and circumstances that may have caused the problem

D.4 Getting Help

Technical Support is available during regular business hours by telephone, fax or email from any Woodhead Software & Electronics office, or from http://www.woodhead.com. Documentation and software updates are also available on the website.

North America

Canada:
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Fax: +1-519-725-1515
Email: WoodheadSupportNA@molex.com

Europe

France:
Tel: +33 2 32 96 04 22
Fax: +33 2 32 96 04 21
Email: WoodheadIC.SupportEU@molex.com

Germany:
Tel: +49 7252 9496 555
Fax: +49 7252 9496 99
Email: WoodheadIC.SupportDE@molex.com

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Fax: +65 6264 6055
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Fax: +86 21 5835 9980
Email: WoodheadIC.SupportAP@molex.com

For the most current contact details, please visit http://www.woodhead.com.

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