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SST-PB3-CLX-RLL

User Reference Guide

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This document applies to the SST-PB3-CLX-RLL scanner module.

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Hardcopies are not controlled.

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Preface

Preface Sections:

- Purpose of this Guide
- Special Notation

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.

1
System Overview

Chapter Sections:

- System Overview

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

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.

2
Hardware Overview

Chapter Sections:

- Hardware Features

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

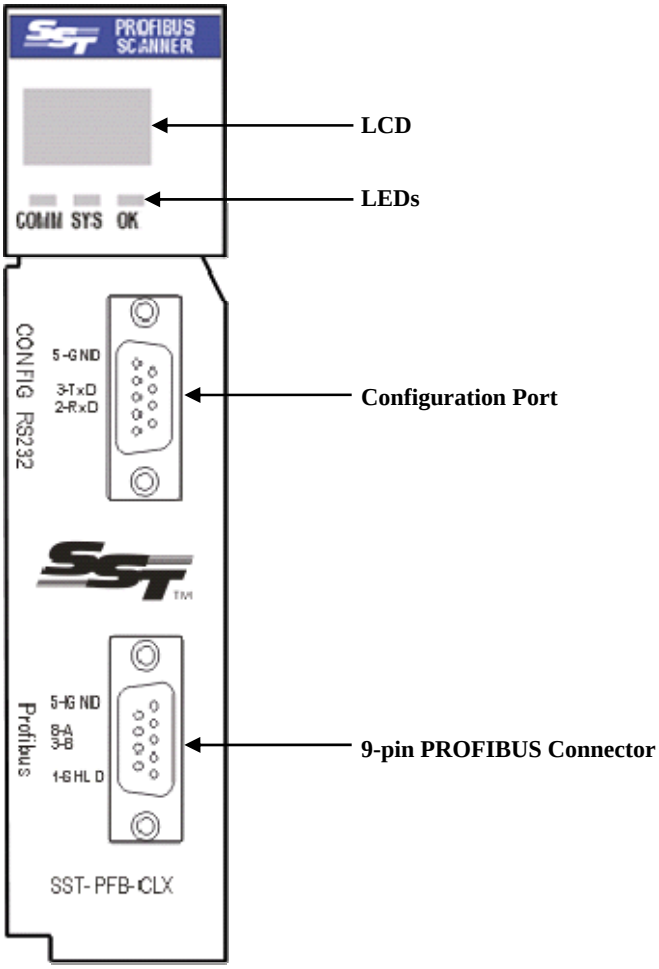


Table 1: Description of Features

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.

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.

3
Quick Start

Chapter Sections:

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

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.

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

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.

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.

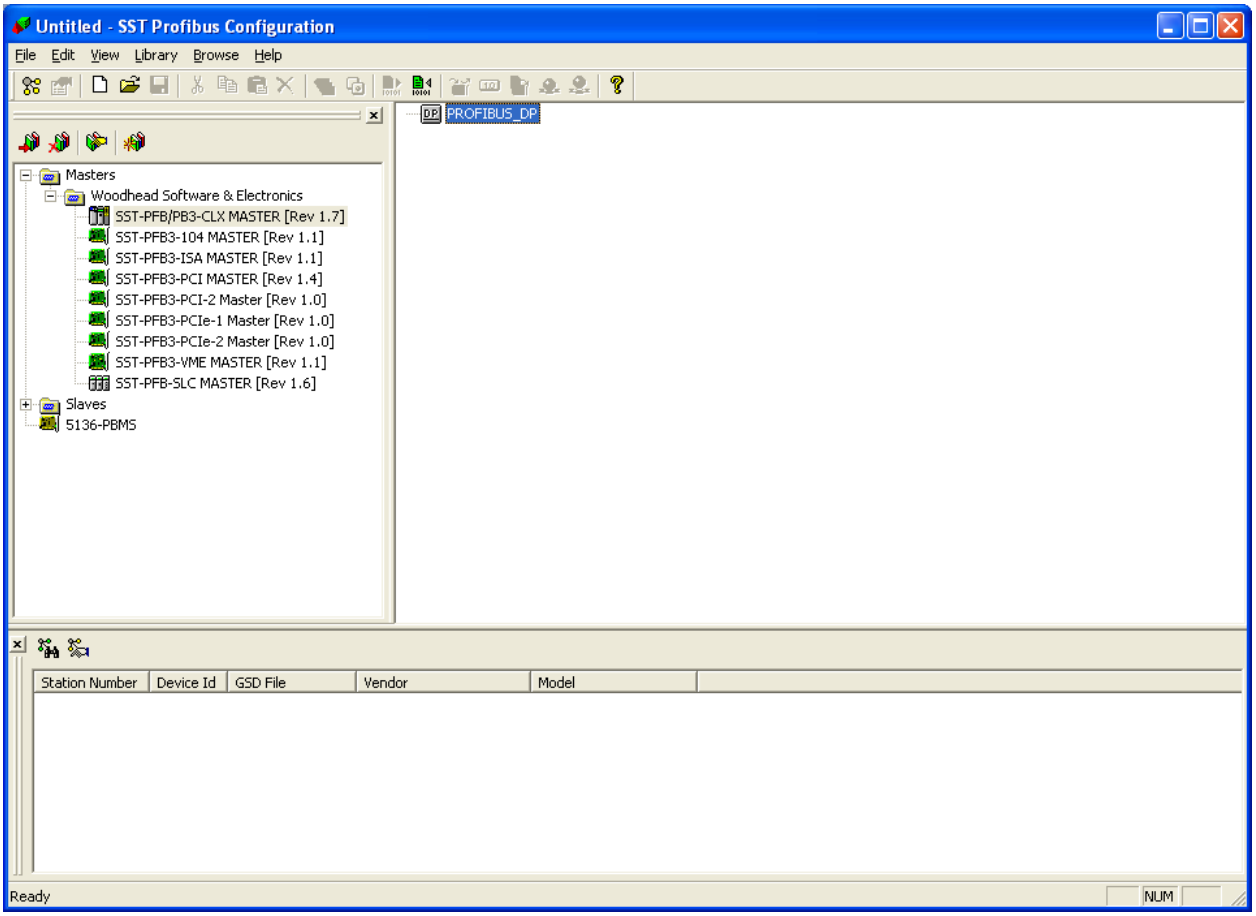
Refer to Section 5.1.1, Configuring Through RSLogix 5000, for more detailed information. If you are using PlantScape, refer to refer to Section 5.1.2, Configuring Through PlantScape Control Builder.

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.



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.

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.

4

Installing the SST-PB3-CLX-RLL Scanner

Chapter Sections:

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

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.

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.

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.