

# **SST-ASI-SLC**

## **User Reference Guide**

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**This document applies to the SST-ASI-SLC AS-Interface (As-i) scanner module for the SLC 500 interface card.**

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**Written and designed at Woodhead Software & Electronics, 50 Northland Road, Waterloo, Ontario, Canada N2V 1N3.**

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# Preface

## Preface Sections:

- Purpose of this Guide
- Who Should Use this Guide?
- Conventions



### Warning

Only qualified electrical personnel familiar with the construction/operation of this equipment and the hazards involved should install, adjust, operate, and/or service this equipment. Read and understand this guide in its entirety before proceeding. Failure to observe this precaution could result in severe bodily injury or, in extreme cases, loss of life.

## Purpose of this Guide

This manual explains how to install, configure and operate the SST-ASI-SLC scanner.

## Who Should Use this Guide?

Use this manual if you are designing, installing, programming or troubleshooting control systems that use Allen-Bradley SLC processors and the SST-ASI-SLC scanner.

You should understand PLCs and have basic knowledge of SLC products. Familiarity with AS-Interface (AS-i) modules and the AS-I network would be an asset.

Refer to your RS Logix 500 documentation for help on that software.

## Conventions

This guide uses stylistic conventions, special terms, and special notation to help enhance your understanding.

## Style

The following stylistic conventions are used throughout this guide:

<b>Bold</b>	indicates field names, button names, tab names, and options or selections
<i>Italics</i>	indicates keywords (indexed) or instances of new terms and/or specialized words that need emphasis
CAPS	indicates a specific key selection, such as ENTER, TAB, CTRL, ALT, DELETE
Code Font	indicates command line entries or text that you would type into a field
<u>Underlining</u>	indicates a hyperlink
“>” delimiter	indicates how to navigate through a hierarchy of menu selections/options
“0x” or “-H”	indicates a hexadecimal value

## Terminology

The following special terms are used throughout this guide:

<i>Card</i>	the SLC 500 network interface card
<i>Channel</i>	an AS-i network interface on the card
<i>Firmware</i>	the embedded software module that gets loaded to the scanner's memory and runs on the scanner, enabling it to respond to commands from the host and manage network communications.
<i>Module</i>	a synonym for <i>Scanner</i>
<i>Scanner</i>	the SST-ASI-SLC scanner module, consisting of hardware and firmware.

## 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

## Overview

### Chapter Sections:

- System Overview
- Hardware Features

## 1.1 System Overview

The SST-ASI-SLC is the AS-Interface (AS-i) scanner for the SLC 500. It allows an SLC processor (SLC 5/03 or later) and AS-i modules to communicate on the AS-i network. The scanner supports 2 AS-i channels.

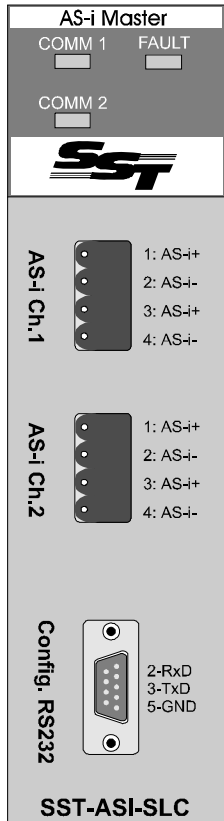
You can configure the AS-i network with the SLC G file or with the scanner's Config RS-232 port.

The scanner can occupy any slot in the local SLC chassis except slot 0, which is reserved for the SLC processor. You can have multiple scanners in the same rack.

The digital input and output data for the slaves is mapped into SLC I and O files. SLC M0 and M1 files store analog data and network status information.

## 1.2 Hardware Features

Figure 1: Front of AS-i Scanner



The following table describes the parts of the scanner. The side label of the scanner provides module information.

Table 1: Scanner Parts

Feature	Description
COMM 1 and COMM 2 LEDs	Display the communication status for each channel.
FAULT LED	Displays the fault status.
4-pin Phoenix connectors (AS-i Ch 1 and AS-i Ch 2)	Connections to AS-i networks.
Config RS232 port	Used for configuring I/O.

## 1.2.1 LEDs

The scanner has three LEDs: the FAULT LED, and one COMM LED for each AS-i network. Refer to Section 8.1, [LED Status and SLC Fault Codes](#), for detailed information on what these LEDs indicate.

When the SLC is in Program mode, all LEDs are normally off.

### FAULT LED

The FAULT LED indicates the overall status of scanner operations. At power-up, it flashes for 1 second. While it flashes, you can enter system configuration mode to download new firmware to the scanner.

Refer to Chapter 7, [Upgrading the Scanner Firmware](#), for detailed information on upgrading the scanner firmware.

### COMM LEDs

The COMM LED displays the status of the respective channel. If there are no network errors and the SLC is in Run mode, the COMM LEDs are green.

## 1.2.2 4-pin Phoenix Combicon Connectors

Each connector allows you to connect the scanner to an AS-i network, and consists of 2 sets of 2 pins. Pins 1 and 3 are internally connected, as are 2 and 4.

You can connect AS-i power to one set of pins and the AS-i network to the other.

## 1.2.3 Configuration Port

The configuration port is a standard RS-232, DB9-style connector. It is used for field upgrades of module firmware and for configuration of AS-i slave addresses and information.

# 2

## Scanner Quick Start

### Chapter Sections:

- Overview
- Equipment and Tools
- Procedures

## 2.1 Overview

This chapter provides all the necessary information to get you up and running quickly. It:

- Tells you which tools and equipment you need
- Describes how to configure and program the scanner module
- Explains how to install the scanner module
- Discusses system power-up procedures

This chapter does not include detailed explanations of these procedures, but refers to later sections and chapters. If you have any questions or are unfamiliar with the terms used or concepts presented, read the referenced chapters and other documentation before you proceed.

## 2.2 Equipment and Tools

Have the following tools and equipment ready:

- SLC programming equipment
- Terminal emulation software
- Null modem cable, 9-pin female-to-female (provided by Woodhead)
- AS-i cable to connect the scanner to the AS-i network
- AS-i power supply

## 2.3 Procedures

To get the scanner up and running, follow these procedures:

1. Unpack the module. Make sure you received the AS-i scanner and a serial null modem cable for configuring I/O.
2. Review your system's power requirements to verify that your chassis supports the scanner module. The scanner consumes 500 mA at 5 VDC.
3. Calculate the total load on the system power supply using the procedure described in the SLC 500 Modular Style Installation & Operation Manual, Allen-Bradley Publication 1747-6.2, or the SLC 500 Family System Overview, Publication 1747-2.30.
4. Make sure system power is off.
5. Insert the scanner module into your 1746 chassis.
6. Connect AS-i power to the scanner. The slaves require AS-i power to be able to communicate with the scanner. Refer to Chapter 4, [Installing and Wiring the Scanner Module](#), for more details.
7. Set up your system I/O configuration for the relevant scanner slot. Using RSLogix 500 software, configure the scanner as **Other** and enter the scanner module ID (13635). Refer to Chapter 5, [Configuring the Master and Slaves](#), for details on configuring the scanner with several popular programming packages. Refer to Section 5.1, [Configuring the Scanner with RSLogix 500](#), for important information on dealing with a G file problem in RSLogix.
8. Set the M1 and M0 file sizes to 337 words.
9. Set scanned inputs and outputs to 32 words.
10. Set the G file size to 160 words.

11. Modify the G file. For details on G file layout and configuration, refer to Section 6.1, [G File](#). Set the following words to enable Channel 1:

- Word 1 - 1
- Word 80 - 0
- Word 159 - 3543h (13635 decimal) (scanner module ID)
- All other words can be set to 0000h

Once you verify your system is operating correctly, you can configure the rest of the network in the G file.

12. Use the provided null modem cable to connect the scanner to your configuration computer via the Config RS232 port.

13. Run your terminal emulation software.

14. Set the baud rate to 38400 and the parameters to No parity, 8 data bits and one Stop bit, no flow control.

15. Press the [\*] key to get the scanner's attention, and choose **Network 1** to configure.

16. Hook up AS-i power and add an AS-i slave.

17. In your terminal software, perform a **List** command and verify that the slave appears on the network. If the slave is listed at Address 0, use the **Address** command to change it to the desired address. Refer to Section 5.3, [Example of Slave Configuration](#), for an example of configuring a slave. Continue adding slaves and setting their addresses.

18. Save the configuration and exit Config mode.

19. Put the SLC in Run mode. The scanner module begins scanning I/O.

20. Verify that you can read inputs and write outputs.

# 3

## Theory of Operation

### Chapter Sections:

- The AS-Interface
- Scanner Overview
- Configuring the AS-i Scanner
- Configuring Slaves
- LAS/LDS/SDL/LPF
- AS-i Modes
- Power-up Sequence
- AS-i Faults
- Clearing Faults

### 3.1 The AS-Interface

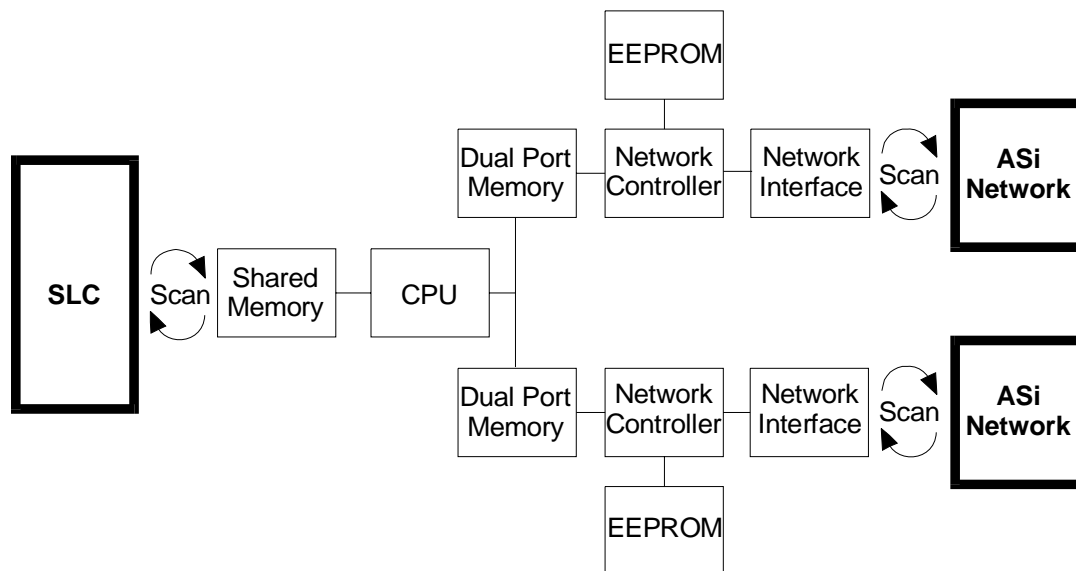
The AS-Interface (AS-i) is a master-slave network that offers reliable, inexpensive digital communications, to sensors and actuators, for low-level automation.

The network supports up to 31 slaves or up to 62 slaves with extended addressing, and a maximum cable length of 100 m.

With repeaters (2 maximum), the length can reach a maximum of 300m. The AS-i cabling contains data and power on a single cable, making setup extremely easy.

### 3.2 Scanner Overview

Figure 2: Scanner Block Diagram



The scanner firmware is stored in flash memory on the module. The current version is 2.x.x, and it supports AS-i 2.1 functions.



### Note

Although this version is compatible with SLC programs written for version 1.x., we recommend using the scanner's new features. Refer to Section 6.4, [Compatibility Mode](#), for more details.

Each channel's EEPROM contains the network configuration. You can store a network configuration in the EEPROM in one of two ways:

- Connect to the serial port, select a channel and save
- Set the G bit in the G file, create a configuration in the G file and download the program to the SLC. When you put the SLC in Run mode, it writes the configuration from the G file to the EEPROM.

In either case, when you switch the SLC to Run mode, the SLC compares the contents of the EEPROM with the network and, if they match, it starts updating I/O. If they don't match, it generates a fault.

## 3.3 Configuring the AS-i Scanner

When you first configure your AS-i system, you must initially set some basic options in the G file. Then you may enter and manipulate the rest of your network configuration, using either the G file or the serial port. This section discusses both methods of configuration.

### 3.3.1 G File vs. Serial Port Configuration

When you are connecting the scanner to an existing (and present) network, the serial port method is much quicker than the G file method. However, it does not save the network configuration as part of the SLC program.

The G file method saves the configuration and allows you to archive and load it onto another system. If the scanner fails, you can easily replace the failed device and reconfigure the system with the archived G file. To configure the G file more easily, you can connect to an existing network, and using the serial port, have the scanner display a compatible G file configuration for entry into your program.

### 3.3.2 G File Configuration

Option bits in the G file affect the way the scanner operates with respect to parameters and I and O file usage.

You must do at least some configuration via the G file. At a minimum, you must set the scanner ID and indicate the AS-i channel(s) you are using. If you try to run without setting these bits in the G file, the scanner will fault with a G file error (70H).

There are 3 parts within the G file. The first two are the configuration for each of the two channels. The third is a single word containing the module ID, which indicates the end of the G file. This word is usually contained in word 159.

The first word in each channel's configuration contains options bits. These are:

- Bit 0 – enables the channel
- Bit 1 – enables extended addressing (expands the number of slaves from 31 to 62 – requires special slaves to work).
- Bit 2 – enables auto address programming
- Bit 3 – enables the SLC to write parameters to the slaves; WParam from the M file is used, and slave Param echoes are put into different locations in M file (refer to M file layout).  
If you do not set the bit(s), the M file parameters are ignored.
- Bit 4 – mLAS – if set, the top portion of the channel's input table is replaced with the channel's list of active slaves. Refer to Section 6.2, [Input and Output Files](#), for more details.
- Bit 5 – mSDL – if set, the top portion of the channel's input table is replaced with the list of missing slaves. Refer to Section 6.2, [Input and Output Files](#), for more details.
- Bit 6 – mLPF – if set, the top portion of the channel's input table is replaced with list of slaves' peripheral fault status. Refer to Section 6.2, [Input and Output Files](#), for more details.
- Bit 8 – Fault Bit – if set, the SLC will continue to operate when any AS-i fault on this channel occurs.
- Bit 12 – G file – if set, the G file contains slave configuration data.
- Bit 13 – Parameter – if set, the slave parameters from the G file are used.
- Bit 14 – Compress G file – if set, the G file length is reduced by skipping unused portions for this channel.
- Other bits are reserved and should be left as 0.

### 3.3.3 Serial Port Configuration

You can use the serial port to set slave addresses, to configure the list of slaves in the EEPROM or to update the firmware.

When configuring from or exiting the serial port, slave address changes are recorded in the slave but not in the EEPROM. Slave parameter changes are sent to the slave when they are made, but they are not stored in EEPROM until you use the **Save** command, or exit and choose the **Save** command.

When the AS-Interface enters Protected mode, only those slaves in the EEPROM are activated.

### 3.3.4 Saving to the EEPROM

Information is only saved to the EEPROM in three instances:

- When the configuration in the G file is different than the network's, the G bit is set and the SLC is set to run
- When you issue the **Save** command from the serial port
- When you exit and choose the **Save** command

## 3.4 Configuring Slaves

### 3.4.1 Programming Slaves

“Out of the box” slaves are programmed for Address 0. Use one of two methods to set the module address:

- Program the address using a handheld programmer before attaching the slave to the network.
- Attach the slave to the network and use the AS-i scanner serial port to change the slave address. Slaves must be attached and addressed one at a time in this method.

### 3.4.2 Replacing Slaves

If Auto Addressing is enabled, slaves can be replaced while the network is running. For example, if a slave has failed and must be changed, you can remove it and add a new one with an address of 0 and matching I/O and IDs. The new slave will be automatically reprogrammed to the old slave's address; you don't have to configure it.

To enable Auto Address Programming, the Auto Address Programming bit (bit 2 of the option's word) must be set in the G file. You must be in AS-i Protected mode (see Section 3.6, [AS-i Modes](#)) and have network and SLC power ON when you replace the slave.

### 3.4.3 Slave Parameters

Slave parameters allow you to change the way a device operates. They are determined by the manufacturer's specifications and are not permanently stored in the slave.

You can set slave parameters in 3 ways: via the serial port, via the G file and via the M file.

The scanner initially uses the slave parameters stored in EEPROM. If bit 13 of the Option word is set, the G file parameter entries override and update the EEPROM entries. If Bit 3 of the Option word is set, the M file parameters override any other entries. If neither bit is set, the scanner continues to use the EEPROM entries.

When Bit 3 is set, and you change parameters in the M file, the parameters are written to the slave during a subsequent AS-i bus scan. Before any change-dependent logic is executed, the user program should check the M file to ensure that the slave has successfully echoed the parameter change.

When you configure via the serial port, the parameters are sent to the slave as soon as a change is made. You must use the **Save** command to update the EEPROM.

### 3.5 LAS/LDS/SDL/LPF

The LAS, LDS, SDL and LPF lists represent network slave status, and are maintained in Run mode. These lists are stored in the scanner M files: M0 for Channel 1, and M1 for Channel 2.

The List of Detected Slaves (LDS) indicates the slaves that were found on the network, whether they appear in the EEPROM or not. When AS-i enters Configuration mode, all slaves, regardless of their presence in the EEPROM, are activated and listed in the LDS.

The List of Activated Slaves (LAS) contains the slaves listed in both the EEPROM of the AS-I scanner and the LDS. Slaves on the network are activated on AS-i power-up. Only those slaves present in the EEPROM and found on the network are activated and only activated slaves exchange IO data.

Slaves must match ID and I/O codes stored in the EEPROM to be activated. The Slave Delta List (SDL) contains the slaves listed in either the EEPROM or the LDS, but not in both. When a slave is detected but doesn't match any slave listed in the EEPROM, it is listed in the SDL.

The List of Peripheral Faults (LPF) contains the slaves that have declared a peripheral fault.

For each bit of the LAS, LDS and LPF, 1 represents a present slave and 0 represents an absent slave. For SDL, 1 indicates a discrepancy between EEPROM and LDS and 0 indicates a match between EEPROM and LDS. Refer to Section 6.3, [M0 and M1 Files](#), for more information.

For details on mapping the above bits to the input table, refer to Section 6.1, [G File](#).

## 3.6 AS-i Modes

AS-i has 2 operating modes: *Configuration* and *Protected*. Normally, the system is in Protected mode. You can enter Configuration mode only if you are configuring via the serial port. The following sections describe each mode.

### 3.6.1 Configuration Mode

In Configuration mode, you can:

- Change slave addresses
- Save to EEPROM

In Configuration Mode, you cannot:

- Perform data exchanges
- Use Auto Address Programming

All slaves are active, regardless of the EEPROM. In other words, the LDS and the LAS are identical. Refer to Section 3.5, [LAS/LDS/SDL/LPF](#), for more information on LDS and LAS.

### 3.6.2 Protected Mode

In Protected mode, you can:

- Exchange data
- Use Auto Address Programming (if enabled)

In Protected mode, you cannot:

- Write to EEPROM
- Enter protected mode with Slave 0 (zero) present
- Change slave addresses

Only those slaves present in the EEPROM and matching the ID and I/O codes in the EEPROM are activated for data exchange.

## 3.7 Power-up Sequence

The Power-up sequence is as follows:

1. The SST-ASI-SLC boot loader checks for a valid firmware module loaded into the card's flash. If no valid module exists, the boot loader will prompt you to load one. If a module is detected, the boot loader waits one second for you to enter an "!", before passing control to the module.
2. The module downloads the firmware to the AS-i network controller and then waits for a command from the SLC or serial port.
3. When the SLC goes into Run mode, the module parses the G file and configures the network controller appropriately. If the G file specifies a change from the current projected network, the module updates the EEPROM on the network controller to update the list of projected slaves.
4. The module sends the parameters to the slaves and begins bus scanning.

## 3.8 AS-i Faults

If an error occurs in Run mode, the scanner interrogates bit 8 of the channel's options word in the G File to determine whether to fault the SLC processor. This fault may be a recoverable major fault. If an error handler routine is installed (S:29), it can determine the type of fault (S:6) and act appropriately. If the error routine clears the major error flag (S2:1/13), the SLC will try to continue in Run mode.

AS-i faults cannot be corrected by the scanner, as user intervention is required. However, if you want to continue scanning, you can set the Fault Acknowledge bits and the scanner will ignore the error until it reoccurs. The Fault Acknowledge bits are the 4 least significant bits of word 0 in the Output file. Set Bit 0 to acknowledge error 61h, bit 1 for 62h, bit 2 for 63h and bit 3 for 64h.



### Note

63h and 64h are reserved for future use.

The fault bits may be set ahead of time (at start-up) or during the error handling routine. If they are set during the error handling routine, you will have to do an IOM instruction, which performs an immediate write. Refer to Figure 3, [IOM Ladder Logic Instruction](#), for more details.



## Note

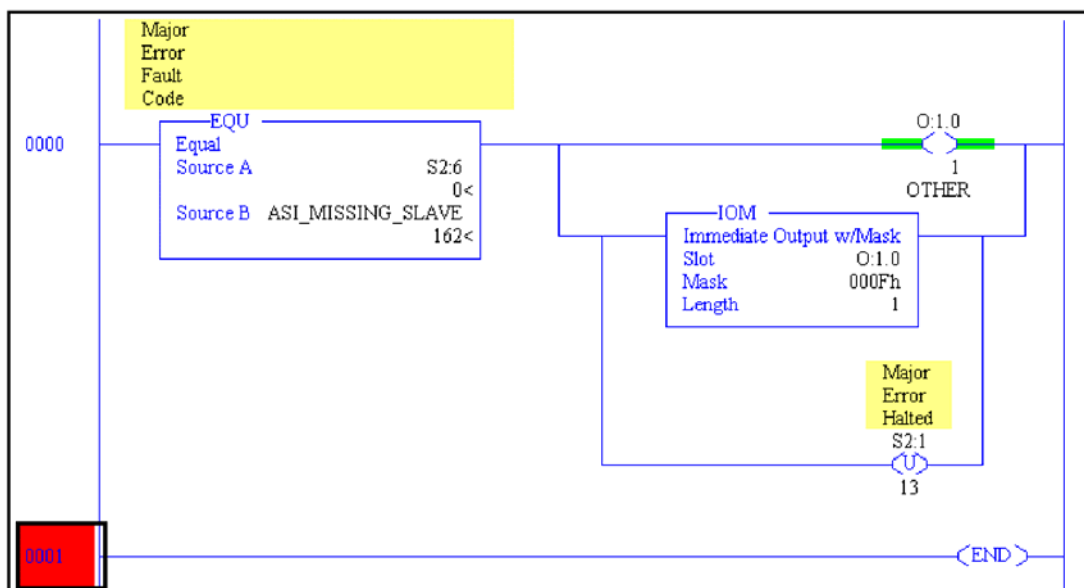
With some versions of the SLC, if your program clears the main error flag (S2:1/13), subsequent faults on other modules or the SLC processor might not be reported to the scanner and the scanner will continue scanning, even if the SLC is faulted.

If an error occurs during the error recovery process or is found in the G file, the fault will be indicated as non-recoverable. The error handler will still execute, but the SLC will be unable to clear the major error flag and the scanner will stop.

## 3.9 Clearing Faults

When you cycle the SLC from Program to Run, the fault is cleared if the cause of the fault has been removed.

Figure 3: IOM Ladder Logic Instruction





# 4

## Installing and Wiring the Scanner Module

### Chapter Sections:

- Installing the Scanner Module
- Wiring

## 4.1 Installing the Scanner Module

Installation procedures for the scanner module are the same as for any other module. Refer to Figure 4 to identify the chassis and module components listed in the installation procedures.



### Caution

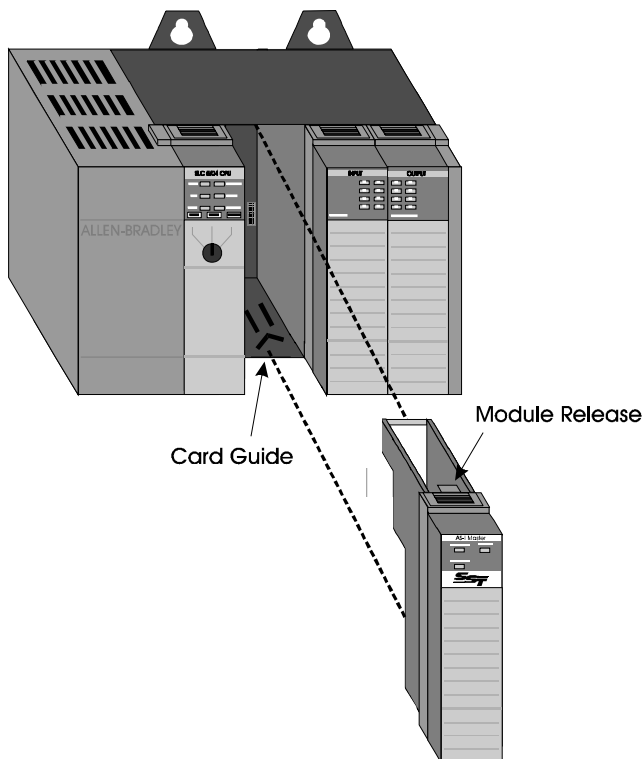
Disconnect system power before attempting to install, remove or wire the scanner. Adding or removing the module with the power on may cause electrical damage.



### Note

Before installation, make sure that your modular SLC power supply has adequate reserve current capacity. The scanner requires 500 mA at 5 VDC.

Figure 4: Chassis and Module Components



To install the scanner module:

1. Disconnect power.
2. Align the full-sized circuit board with the chassis card guides.



### Note

The first slot (slot 0) of the first rack is reserved for the SLC 500 processor.

3. Slide the scanner module into the chassis until the top and bottom latches catch.
4. Attach the AS-i cable. Refer to Section 4.2.1, [AS-i Wiring](#), for cabling information.
5. Route the cable down and away from the scanner.
6. Cover all unused slots with the card slot filler, Allen-Bradley catalog number 1746-N2.
7. Attach the serial cable between your PC and the scanner module. For more information, refer to Section 4.2.2, [Serial Port Wiring](#).
8. Power up the system.



### Note

If there is a lot of electrical noise in your installation, you need to install an isolating transformer. For instructions, refer to Allen-Bradley's Installation and Operation Manual for Modular Hardware Style Programmable Controller, AB 1747-6.2.

### 4.1.1 Removing the Scanner Module

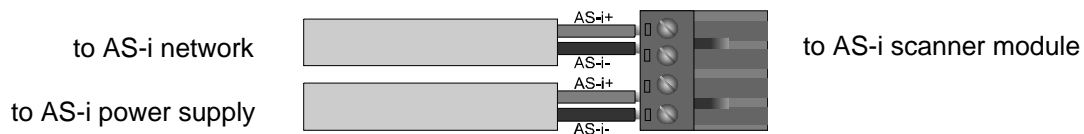
1. Disconnect power.
2. Remove all cabling from the scanner.
3. Press the releases at the top and bottom of the module and slide the module out of the slot.
4. Cover all unused slots with the card slot filler, Allen-Bradley catalog number 1746-N2.
5. Place the scanner into the static protective bag supplied with shipment packaging and store in the original box. Store the scanner in a dry and cool environment.

## 4.2 Wiring

### 4.2.1 AS-i Wiring

The scanner module uses two 4-pin Phoenix connectors, one for each AS-I channel. Pins 1 and 3 and pins 2 and 4 are internally connected for your convenience.

Figure 5: Daisy-Chained Phoenix Connector



The cable type is Siemens P/N 3RX9010-0AA00. To scan I/O, you must have a certified AS-i power supply connected to the scanner.

If the network is daisy-chained through the scanner, as in the above diagram, the maximum pass-through current is 6 Amps. If the scanner is connected in a mode other than daisy chain, this limit is eliminated.

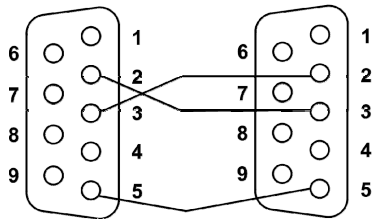
If you accidentally reverse the polarity on the AS-i line, it will not work but it should not be damaged.

The SST-ASI-SLC has been tested with power sources from Woodhead (TAS-PWR-4A), Siemens (types 3RX9303-0AA00 and 3RX9301-0AA00) and Pepperl + Fuchs (Type VAN-115/230AC-K8).

## 4.2.2 Serial Port Wiring

Before you can scan I/O, you must configure your slaves using either an Addressing Unit or the scanner serial port. Since pins 2 and 3 of the serial port are wired the same as a PC 9-pin COM port, the serial cable for a standard PC COM port must have lines 2 and 3 swapped. The serial connection doesn't require handshaking. The serial cable provided with the SST-ASI-SLC swaps the pins. Use this cable to connect your computer to the scanner module or make and use a cable that matches the following diagram (the provided cable has additional connections that are not required).

Figure 6: Serial Port Wiring



For an example of configuring slaves using a communications software package over the serial port, refer to Section 5.3, [Example of Slave Configuration](#).



# 5

## Configuring the Master and Slaves

### Chapter Sections:

- Configuring the Scanner with RSLogix 500
- Using Hyperterminal to Access the Scanner via the Serial Port
- Example of Slave Configuration
- Running the Scanner

## 5.1 Configuring the Scanner with RSLogix 500

Follow these steps to set up the scanner when you program your SLC system in RSLogix 500:

1. Create a new file or load an existing file.
2. Open the I/O Configuration editor.
3. Select the proper rack for your setup.
4. Highlight the slot where the AS-i scanner is installed.
5. From the list of available cards, select **Other**.
6. Enter an ID number of 13635.
7. Right-click on the newly configured slot and select **Adv. Config**.
8. Set Scanned Input Words and Scanned Output Words to 32.
9. Set M0 and M1 lengths to 337 words. Refer to Section 6.3, [M0 and M1 Files](#), for additional information on the M files.
10. Set G file size to 160 words.
11. Select **Edit G file Data** and edit the G file to match your network configuration. Refer to Section 6.1, [G File](#), for details on G file setup.
12. Click **OK** for G file editor and **OK** for Adv. Config.
13. Close the I/O Configuration window.
14. Write the rest of the ladder logic. Refer to Section 6.2, [Input and Output Files](#), and Section 6.3, [M0 and M1 Files](#), for information on the I, O and M files.
15. Transfer the program to the SLC.

## 5.2 Using Hyperterminal to Access the Scanner via the Serial Port

To access the scanner via the serial port:

1. Connect the AS-i scanner to the PC, using the provided null modem cable.
2. Start HyperTerminal and create a new connection.
3. For Connect using:, select **Direct to Com n**, where n is the serial port you are using.
4. Select **38400 Bits per second** and **8 Data bits**.
5. Set Parity to **None**, select **1 Stop Bit**, and set Flow Control to **None**.
6. Type "\*" several times.

You should now be able to communicate with the scanner serial port. Once you have configured the scanner, you can configure the AS-i slaves.

## 5.3 Example of Slave Configuration

1. Make sure the SLC is in Program mode and run your communication software.
2. Set your communications software to use **38400 Bits per second** and **8 Data bits**. Set Parity to **None**, select **1 Stop Bit** and set Flow control to **None**. The scanner automatically detects the baud rate you are using by adjusting it until an "\*" has been received correctly.

You may have to type the asterisk several times so that the scanner can detect the baud rate. When the scanner properly receives your "\*", the following prompt appears:

```
***** Slave Configuration Activated *****
SST-ASI-SLC Module
Firmware version 2.15
Which Channel do you want to configure? (1 or 2) _
```

The FAULT and COMM 1 LEDs will now be alternately blinking red to indicate Configuration mode is active.

3. Enter 1 or 2 to select the channel to configure. This example configures Channel 1:

```
Configuring Channel 1
```

```
Commands: Address, Parameter, ID, List, GFile, Save, Exit, Help
```

```
Config :>
```

The Config:> prompt lets you know that you are currently in Configuration mode. The available commands are listed above the prompt. Use the **Help** command for more information.

4. Attach a slave with an address of 0 to the network and type List to verify its presence:

```
Config :> list
```

Slave	IO	ID	ID2	ID1	P	Sts	PF	PIO	PID	ID2	ID1	P	In	Out
00	8	0	F	F	F	0								

PID, PIO and the following ID2 and ID1 fields are Projected ID and I/O values. The fields are empty at this time because the values are not yet stored in EEPROM.

5. Once you have verified that your slave is present, you can change its network address using the **Address** command. In this example, Slave 0 is changed to Slave 3:

```
Config :> address
```

```
Enter slave # to change: 0
```

```
Enter new # for slave 00: 3
```

For slaves that don't accept extended addressing, you can assign addresses 1 to 31. For slaves that accept extended addressing, you can assign addresses 1 to 31 and 1B to 31B.

6. Verify the operation using the **List** command:

```
Config :> list
```

Slave	IO	ID	ID2	ID1	P	Sts	PF	PIO	PID	ID2	ID1	P	In	Out
03	8	0	F	F	F	0								

7. If everything is OK, add a new slave at Address 0. Verify using the **List** command:

```
Config :> list
```

Slave	IO	ID	ID2	ID1	P	Sts	PF	PIO	PID	ID2	ID1	P	In	Out
00	8	0	F	F	F	0								
03	0	0	F	F	F	0								

8. Continue to add slaves, assign addresses and verify operations until all slaves have been added:

```
Config :> address
```

```
Enter slave # to change: 0
```

```
Enter new # for slave 00: 1
```

```
Config :> list
```

Slave	IO	ID	ID2	ID1	P	Sts	PF	PIO	PID	ID2	ID1	P	In	Out
01	8	0	F	F	F	0								
03	0	0	F	F	F	0								

9. Save the configuration and perform a **List** command:

```
Config :> save

Saving....

EEPROM write was successful.

Config :> list
```

Slave	IO	ID	ID2	ID1	P	Sts	PF	PIO	PID	ID2	ID1	P	In	Out
01	8	0	F	F	F	0		8	0	F	F	F		
03	0	0	F	F	F	0		0	0	F	F	F		

The PID, PIO and projected ID1 and ID2 values are now saved in EEPROM so they appear in the display. If a slave has PID and PIO values displayed without corresponding ID and I/O values, that slave has failed or is missing.

10. When you are finished, type **Exit**. You will be prompted to save any outstanding changes. These will be saved to the EEPROM on the module:

```
Config :> exit

SAVE changes before exiting? (Y or N) y

Saving...

EEPROM write was successful.
```

With ASI 2.1-compatible slaves, there are 2 additional fields (ID1 and ID2). When the scanner performs slave comparisons (auto addressing to replace a slave or going online) it compares ID, IO, ID1 and ID2 for a match. ID2 allows manufacturers to further discriminate between different types of slaves

To allow you to discriminate as well, ID1 has been provided and can be set in the field. You can modify the ID1 by using the ID command in Configuration mode. If you are using slaves that have the same profile, yet are different in some physical manner, you can use ID1 to allow the scanner to tell them apart. That way, if someone tries to auto address a physically incompatible slave, the scanner will not allow it.

Slave	IO	ID	ID2	ID1	P	Sts	PF	PIO	PID	ID2	ID1	P	In	Out
31B	0	A	E	A	2	0		0	A	E	A	2		

If you have set up a network, you can use the **G file** command to list the contents of a G file which reproduces the network configuration. This G file can then be copied into your program.

```
Config :> gfile
```

```
Offset 001: 7003
```

```
Offset 002: FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF
```

```
Offset 010: 00EF 70FF FFFF FFFF FFFF FFFF FFFF FFFF
```

```
Offset 018: FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF
```

```
Offset 026: FFFF FFFF FFFF FFFF FFFF 736F FFFF FFFF
```

```
Offset 034: FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF
```

```
Offset 042: FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF
```

```
Offset 050: FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF
```

```
Offset 058: FFFF FFFF FFFF FFFF FFFF 0AEA
```

```
Offset 064: 0000 E000 0ABC 0007 0000 0000 0000 0500
```

```
Offset 072: 0700 0000 0000 0000 0000 0000 0000 2AAA
```

```
Offset 080: 7001
```

```
Offset 081: 70FF 70FF 70FF 70FF 70FF 70FF FFFF FFFF
```

```
Offset 089: FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF
```

```
Offset 097: FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF
```

```
Offset 105: FFFF FFFF FFFF FFFF FFFF FFFF FFFF
```

```
Offset 112: 1230 0456 0000 0000 0000 0000 0000 0000
```

```
Offset 120: 3543
```

```
GFile Size: 121 M0 Size: 345 M1 Size: 337
```

Slaves with profile 0.a.x can be used in Extended Addressing mode. These slaves can be added in pairs (i.e. addresses 1 and 1B), allowing a maximum of 62 slaves. When you're working with these slaves in the Configuration menus, the address for the pair's second slave is postfixed with a B. The address of the primary slave can be entered with an optional A, for example, 1A and 1B. To access B slaves during Run mode, Extended Addressing mode must be enabled in the G file options for that channel (bit 1 in the Configuration word).

Once you have set up a network and successfully gone into Run mode with the SLC, you can return to Configuration mode (by putting the SLC in Program mode) to get more information.

The **List** command now shows 2 additional fields: “In” and “Out”. These fields indicate where in the SLC to find that slave's data. The format 015/012 indicates word 15, with bit 12 as the starting bit for that slave.

In certain configurations, a slave's input data may not be available (refer to your G file options). This will be indicated by a blank “in” field.

Slave	IO	ID	ID2	ID1	P	Sts	PF	PIO	PID	ID2	ID1	P	In	Out
31B	0	A	E	A	2	0		0	A	E	A	2	015/012	015/012

## 5.4 Running the Scanner

When you put the SLC in Run mode, the scanner starts scanning the AS-Interface. You can then begin accessing data in the I/O files.

### 5.4.1 SLC Modes

The scanner's operating mode follows that of the SLC (Program, Test or Run):

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

### 5.4.2 SLC Fault Codes

SLC fault codes are listed in the LED Status and SLC Fault Codes table in Section 8.1, [LED Status and SLC Fault Codes](#).

# 6

## SLC File Reference

### Chapter Sections

- G File
- Input and Output Files
- M0 and M1 Files
- Compatibility Mode

## 6.1 G File

For the G file layout, refer to Table 2: [G File Layout Table](#).

### 6.1.1 Option Bit Description

1. Set word 159 of the G file to 13635 decimal. This is the scanner ID.
2. Set the C bits. These are the Channel Enable bits. The C bits are bit 0 of words 1 (Channel 1) and 80 (Channel 2). If the C bit is 1, the channel is active. If the C bit is 0, the channel is inactive. If the C bit is not set for both channels, the SLC faults with error code 70h (G file error) and the FAULT LED flashes red when you go to Run mode.
3. Set the A bits if required. These are the Auto Address Programming bits. The A bits are bit 2 of words 1 (Channel 1) and 80 (Channel 2). If the A bit is 1, Auto Address Programming is enabled. If the A bit is 0, Auto Address Programming is disabled.

Auto Address Programming allows you to replace one failed slave with a matching slave at Address 0. The scanner will automatically reprogram the new slave to the missing address.

If more than one slave is at fault, Auto Address Programming is unavailable.

4. Set the W bits if required. The W bits are the Write Parameter Enable bits.

The W bits are bit 3 of words 1 (Channel 1) and 80 (Channel 2). If the W bit is 1, you can change the parameters while running, via the M file. These “runtime parameters” are valid only as long as the PLC is in Run mode. If the bit is 0, you cannot change parameters while running.

5. Set the G bits if required. These are the G file enable bits. The G bits are bit 12 of words 1 (Channel 1) and 80 (Channel 2). If you want to use the network configuration from the G file, set the G bit to 1. Otherwise, you must configure your network using the Config port on the AS-i scanner module.



#### Note

When the G bit is 0, the C, A and W bits of the G file are still used.

6. Set the F bits if required. These are the “don’t fault” bits. The F bits are bit 8 of words 1 (Channel 1) and 80 (Channel 2). Set these bits if you want the SLC to keep operating when an AS-I fault occurs.
7. Set the Ext bit if you are using extended addressing (1B to 31B). The Ext bits are bit 1 of words 1 (Channel 1) and 80 (Channel 2). For extended addressing, you can use only slaves of type 0.A.x.
8. Set the PG bit if you want to set the slaves' parameters through G file. The PG bits are bit 13 of words 1 (Channel 1) and 80 (Channel 2). If you don’t set this bit, the parameters from the scanner’s EEPROM will be loaded into the slaves at power-up and when the SLC is switched to Run.
9. Set the mLPF OR mSDL OR mLAS bits if required. These bits are bits 6, 5 and 4 of words 1 (Channel 1) and 80 (Channel 2). If you set one of these bits, the top portion of the channel's input table is replaced with the LPF or SDL or LAS list (only one at a time).



### Note

This feature overwrites the input data if there are I/O slaves in that addressing area (15B to 28B).

10. Set the cG bits (bit 14) of words 1 (Channel 1) and 80 (Channel 2) to 1 if you want to enable G file compressing.
11. If you are configuring the network in the G file, edit the rest of the G file to match your network setup. Words 2 to 63 are used to configure the slaves on Channel 1; 81 to 142 on Channel 2. Each slave has 1 word. If the slave is not present in your configuration, enter FFFF in the appropriate G file word. If the slave is present, enter the slave ID/IO information in hex. For example, if you have a slave of profile 0.E.3 with the ID1 left at F, you would enter 0E3F into the Configuration word for that slave.

If you want to initialize the parameters from the G file, set bit 13 in the options and enter the parameters into words 64 to 79 (143-158 for Channel 2). Each word holds the parameters for 4 slaves



### Note

Slave 0’s parameter is not set, but a space is reserved for it in the G file layout (the least significant nibble (4 bits) of word 64 for Channel 1) to simplify calculations.

Table 2: G File Layout Table

Slave#	Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	0	Reserved by SLC processor															
Channel 1 Slaves																	
	1		cG	PG	G				F		mLPP	mSDL	mLAS	W	Auto	Ext	C
1	2	IO_1			ID_1			ID2_1			ID1_1						
2	3	IO_2			ID_2			ID2_2			ID1_2						
Channel 1 Slaves (continued)																	
62	63	IO_31B			ID_31B			ID2_31B			ID1_31B						
	64	Param_3			Param_2			Param_1									
	65	Param_7			Param_6			Param_5			Param_4						
	66	Param_11			Param_10			Param_9			Param_8						
	67	Param_15			Param_14			Param_13			Param_12						
	68	Param_19			Param_18			Param_17			Param_16						
	69	Param_23			Param_22			Param_21			Param_20						
	70	Param_27			Param_26			Param_25			Param_24						
	71	Param_31			Param_30			Param_29			Param_28						
	72	Param_3B			Param_2B			Param_1B									
	73	Param_7B			Param_6B			Param_5B			Param_4B						
	74	Param_11B			Param_10B			Param_9B			Param_8B						
	75	Param_15B			Param_14B			Param_13B			Param_12B						
	76	Param_19B			Param_18B			Param_17B			Param_16B						
	77	Param_23B			Param_22B			Param_21B			Param_20B						
	78	Param_27B			Param_26B			Param_25B			Param_24B						
	79	Param_31B			Param_30B			Param_29B			Param_28B						
Channel 2 Slaves																	
	80		cG	PG	G				F		mLPP	mSDL	mLAS	W	Auto	Ext	C
1	81	IO_1			ID_1			ID2_1			ID1_1						
2	82	IO_2			ID_2			ID2_2			ID1_2						
Channel 2 Slaves (continued)																	
62	142	IO_31B			ID_31B			ID2_31B			ID1_31B						
	143	Param_3			Param_2			Param_1									
	144	Param_7			Param_6			Param_5			Param_4						
	145	Param_11			Param_10			Param_9			Param_8						
	146	Param_15			Param_14			Param_13			Param_12						
	147	Param_19			Param_18			Param_17			Param_16						
	148	Param_23			Param_22			Param_21			Param_20						
	149	Param_27			Param_26			Param_25			Param_24						
	150	Param_31			Param_30			Param_29			Param_28						
	151	Param_3B			Param_2B			Param_1B									
	152	Param_7B			Param_6B			Param_5B			Param_4B						
	153	Param_11B			Param_10B			Param_9B			Param_8B						

Slave#	Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	154	Param_15B				Param_14B				Param_13B				Param_12B			
	155	Param_19B				Param_18B				Param_17B				Param_16B			
	156	Param_23B				Param_22B				Param_21B				Param_20B			
	157	Param_27B				Param_26B				Param_25B				Param_24B			
	158	Param_31B				Param_30B				Param_29B				Param_28B			
	159	Scanner ID= 13635 dec (3543h)															



## Note

The G file size can be variable. Setting the cG bit will force the G file into the uncompressed state, as shown in Table 2, [G File Layout Table](#).

## 6.1.2 Fixed G File Size Examples

### Example 1

In this example, we want:

- Channel 1 enabled
- Auto Address Programming enabled
- Run-time parameter changes enabled
- Configuration done via the G file
- Extended addressing enabled

The following slaves will be configured:

Table 3: Example 1 Slave Configurations

Slave	IO	ID	ID2	ID1	P
1	7	F	F	F	C
2	7	3	E	4	0
3	0	0	E	F	B
5	7	0	F	F	F
31	7	3	6	F	8
30B	0	A	E	A	2

To do this:

1. Write 13635 (=3543h) to word 159 in the G file.
2. Write 100Fh (=0001 0000 0000 1111) to word 1 to configure Channel 1.
3. Write 7FFF to word 2 to configure Slave 1.
4. Write 73E4 to word 3 to configure Slave 2.
5. Write 00EF to word 4 to configure Slave 3.
6. Write 70FF to word 6 to configure Slave 5.
7. Write 736F to word 32 to configure Slave 31.
8. Write 0AEA to word 62 to configure Slave 30B.
9. Write FFFF to all unused 2-63 words.

## Example 2

In this example we want:

- Channel 1 enabled
- Auto Address Programming enabled
- Parameters set via the G file
- Extended Addressing enabled
- Configuration performed via the serial port

To do this:

1. Write 13635 (=3543h) to word 159 in the G file.
2. Write 2007h (=0010 0000 0000 0111) to word 1 to configure Channel 1.
3. Write B0C0 to word 64 to set parameters for Slaves 1, 2 and 3.
4. Write F0 to word 65 to set parameters for Slave 5.
5. Write 8000 to word 71 to set parameters for Slave 31.
6. Write 200 to word 79 to set parameters for Slave 30B.

### Example 3

In this example, we want:

- Channel 1 enabled
- Map LPF into Input file
- SLC Faults disabled
- Configuration done via the G file

The following slaves will be configured:

Table 4: Example 3 Slave Configurations

Slave	IO	ID	ID2	ID1	P
1	7	F	F	F	C
2	7	3	E	4	0
3	0	0	E	F	B
5	7	0	F	F	F
31	7	3	6	F	8

To do this:

1. Write 13635 (=3543h) to word 159 in the G file.
2. Write 1141h (=0001 0001 0100 0001) to word 1 to configure Channel 1.
3. Write 7FFF to word 2 to configure Slave 1.
4. Write 73E4 to word 3 to configure Slave 2.
5. Write 00EF to word 4 to configure Slave 3.
6. Write 70FF to word 6 to configure Slave 5.
7. Write 736F to word 32 to configure Slave 31.
8. Write FFFF to all unused 2-63 words.

### **6.1.3 G File Variable Size (Compressed)**

If you are using compressed G file and you don't use certain parts of the table (Extended Addressing, Parameter, etc) all remaining table data will shift upwards, so the total length of the file will decrease.

To enable G file compression, set the cG bits of words 1 (Channel 1) and 80 (Channel 2) to 1. All other configuration bits have the same functionality as in un-compressed mode.

### 6.1.4 G File Variable Size (Compressed) Examples

The configuration bits that affect the size of the G file are PG, G and Ext. If you don't set one or more of these bits, the unused data in the G file is removed and the file size is decreased.

The following table provides a few possible G file configurations. Only the configuration bits that influence the G file size are used. Example A occurs if all the PG, G and Ext bits are set, and as a result, the compressed G file size and structure match the un-compressed one (refer to Table 2: [G File Layout Table](#)).

Table 5: Compressed G File Examples

	Example A		Example B		Example C		Example D	
Config. Bits set, Ch 1	cG, PG, G, Ext		cG, PG, G		cG, G, Ext		cG, PG	
Config. Bits set, Ch 2	cG, PG, G, Ext		cG, G		cG, PG, Ext		cG, Ext	
	Start Word #	Value (Hex)	Start Word #	Value (Hex)	Start Word #	Value (Hex)	Start Word #	Value (Hex)
Ch 1 Options	1	7003	1	7001	1	5003	1	6001
Ch 1 Config	2		2		2		N/A	
Ch 1 Param	64		33		N/A		2	
Ch 2 Options	80	7003	41	5001	64	6003	10	4003
Ch 2 Config	81		42		N/A		N/A	
Ch 2 Param	143		N/A		65		N/A	
ID (Hex)	159	3543	73	3543	71	3543	11	3543

## 6.2 Input and Output Files

The Input and Output files are stored and updated by the SLC. These files contain network data. Since Slave 0 can't exist in protected (Run) mode, the first 4 bits of words 0 and 8 are undefined.



### Note

The first 4 bits of word 0 in the Output file are used as fault bits. Refer to Section 3.8, [AS-i Faults](#), for more information.

The first half of the Input and Output Layout table contains the I/O data for Channel 1, and the second half pertains to Channel 2.

If you've selected mLAS, mSDL or mLFP for the Channel configuration, the Input table's top words are replaced by the selected Status table. If you've selected Extended addressing, the top 4 words (12, 13, 14 and 15 for Channel 1; 28, 29, 30 and 31 for Channel 2) are replaced. If extended addressing is not enabled, only the top 2 words are replaced.

Table 6: Input and Output File Layout Table

Word	Bit																
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
	I/O3	I/O2	I/O1	I/O0	I/O3	I/O2	I/O1	I/O0	I/O3	I/O2	I/O1	I/O0	I/O3	I/O2	I/O1	I/O0	
I/O Data for Channel 1 Slaves																	
0	3			2				1				Undefined					
1	7			6				5				4					
2	11			10				9				8					
3	15			14				13				12					
4	19			18				17				16					
5	23			22				21				20					
6	27			26				25				24					
7	31			30				29				28					
8	3B			2B				1B				Undefined					
9	7B			6B				5B				4B					
10	11B			10B				9B				8B					
11	15B			14B				13B				12B					
12	19B			18B				17B				16B					
13	23B			22B				21B				20B					
14	27B			26B				25B				24B					
15	31B			30B				29B				28B					
I/O Data for Channel 2 Slaves																	

Word	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	I/O3	I/O2	I/O1	I/O0	I/O3	I/O2	I/O1	I/O0	I/O3	I/O2	I/O1	I/O0	I/O3	I/O2	I/O1	I/O0
16	3				2				1				Undefined			
17	7				6				5				4			
18	11				10				9				8			
19	15				14				13				12			
20	19				18				17				16			
21	23				22				21				20			
22	27				26				25				24			
23	31				30				29				28			
24	3B				2B				1B				Undefined			
25	7B				6B				5B				4B			
26	11B				10B				9B				8B			
27	15B				14B				13B				12B			
28	19B				18B				17B				16B			
29	23B				22B				21B				20B			
30	27B				26B				25B				24B			
31	31B				30B				29B				28B			

## 6.3 M0 and M1 Files

The M0 file contains information about AS-i Channel 1, and the M1 file pertains to Channel 2. Both files must be set to a length of at least 337 words. M files cannot be edited. They are updated by the scanner once per network scan or when requested by the SLC program. M files are not updated in Program mode or when the SLC is faulted. To read the updated M file, the SLC program must explicitly access it. Accessing M files is time consuming and may greatly increase SLC scan time. To speed up the scan, copy the M files to a local SLC file and use the local file. Refer to Table 7, [M0 and M1 File Layout Table](#), for additional information.

The following short forms are used in the M0 and M1 File Contents table:

- LPF = List of Projected Faults (slaves with current faults)
- LDS = List of Detected Slaves (slaves actually found whether in EEPROM or not)
- LAS = List of Activated Slaves (slaves listed in both EEPROM and LDS)
- SDL = Slave Delta List (slaves listed in either EEPROM or LDS but not in both)

For each bit in the EEPROM, LDS and LAS lists, 1 means present and 0 means absent. For the SDL, 1 indicates a discrepancy between EEPROM and LDS, and 0 indicates a match between EEPROM and LDS.

If a slave is not present on the network, ID and I/O in the following table will be listed as FF (all bits set to 1).

For more information on the Status Flag Bytes (word 84), refer to Sections 6.3.1, [Status Flag Bytes - Byte 1](#), and 6.3.2, [Status Flag Bytes – Byte 2](#).

M files also contain data values for analog slaves. For each analog slave of type 7.3 and 7.4, the scanner reserves up to 4 words in the M file for analog input or output data. The size of the M file will vary, based on the analog slave configured. To determine the current size, use the **G file** command in the Config menu (refer to Section 5.3, [Example of Slave Configuration](#)). To determine where the scanner will access analog slave data, use the **List** command and review the **In** and **Out** fields.

### Example:

```
Config :> list
```

Slave	IO	ID	ID2	ID1	P	Sts	PF	PIO	PID	ID2	ID1	P	In	Out
01	7	3	E	F	8	0		7	3	E	F	8	M337 (4)	
30	7	3	6	F	F	0		7	3	6	F	F		M337 (4)

Table 7: M0 and M1 File Layout Table

Word	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	LAS 15-12				LAS 11-8				LAS 7-4				LAS 3-0			
1	LAS 31-28				LAS 27-24				LAS 23-20				LAS 19-16			
2	LAS 15B-12B				LAS 11B-8B				LAS 7B-4B				LAS 3B-0B			
3	LAS 31B-28B				LAS 27B-24B				LAS 23B-20B				LAS 19B-16B			
4	IO_0				ID_0				ID2_0				ID1_0			
5	IO_1				ID_1				ID2_1				ID1_1			
6	IO_2				ID_2				ID2_2				ID1_2			
7	IO_3				ID_3				ID2_3				ID1_3			
8	IO_4				ID_4				ID2_4				ID1_4			
9	IO_5				ID_5				ID2_5				ID1_5			
10	IO_6				ID_6				ID2_6				ID1_6			
11	IO_7				ID_7				ID2_7				ID1_7			
12	IO_8				ID_8				ID2_8				ID1_8			
13	IO_9				ID_9				ID2_9				ID1_9			
14	IO_10				ID_10				ID2_10				ID1_10			
15	IO_11				ID_11				ID2_11				ID1_11			
16	IO_12				ID_12				ID2_12				ID1_12			
17	IO_13				ID_13				ID2_13				ID1_13			
18	IO_14				ID_14				ID2_14				ID1_14			
19	IO_15				ID_15				ID2_15				ID1_15			
20	IO_16				ID_16				ID2_16				ID1_16			
21	IO_17				ID_17				ID2_17				ID1_17			
22	IO_18				ID_18				ID2_18				ID1_18			
23	IO_19				ID_19				ID2_19				ID1_19			
24	IO_20				ID_20				ID2_20				ID1_20			
25	IO_21				ID_21				ID2_21				ID1_21			
26	IO_22				ID_22				ID2_22				ID1_22			
27	IO_23				ID_23				ID2_23				ID1_23			
28	IO_24				ID_24				ID2_24				ID1_24			
29	IO_25				ID_25				ID2_25				ID1_25			
30	IO_26				ID_26				ID2_26				ID1_26			
31	IO_27				ID_27				ID2_27				ID1_27			
32	IO_28				ID_28				ID2_28				ID1_28			
33	IO_29				ID_29				ID2_29				ID1_29			
34	IO_30				ID_30				ID2_30				ID1_30			
35	IO_31				ID_31				ID2_31				ID1_31			
36																
37	IO_1B				ID_1B				ID2_1B				ID1B_1B			
38	IO_2B				ID_2B				ID2_2B				ID1_2B			
39	IO_3B				ID_3B				ID2_3B				ID1_3B			

Word	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
40	IO_4B				ID_4B				ID2_4B				ID1_4B			
41	IO_5B				ID_5B				ID2_5B				ID1_5B			
42	IO_6B				ID_6B				ID2_6B				ID1_6B			
43	IO_7B				ID_7B				ID2_7B				ID1_7B			
44	IO_8B				ID_8B				ID2_8B				ID1_8B			
45	IO_9B				ID_9B				ID2_9B				ID1_9B			
46	IO_10B				ID_10B				ID2_10B				ID1_10B			
47	IO_11B				ID_11B				ID2_11B				ID1_11B			
48	IO_12B				ID_12B				ID2_12B				ID1_12B			
49	IO_13B				ID_13B				ID2_13B				ID1_13			
50	IO_14B				ID_14B				ID2_14B				ID1_14B			
51	IO_15B				ID_15B				ID2_15B				ID1_15B			
52	IO_16B				ID_16B				ID2_16B				ID1_16B			
53	IO_17B				ID_17B				ID2_17B				ID1_17B			
54	IO_18B				ID_18B				ID2_18B				ID1_18B			
55	IO_19B				ID_19B				ID2_19B				ID1_19B			
56	IO_20B				ID_20B				ID2_20B				ID1_20B			
57	IO_21B				ID_21B				ID2_21B				ID1_21B			
58	IO_22B				ID_22B				ID2_22B				ID1_22B			
59	IO_23B				ID_23B				ID2_23B				ID1_23B			
60	IO_24B				ID_24B				ID2_24B				ID1_24B			
61	IO_25B				ID_25B				ID2_25B				ID1_25B			
62	IO_26B				ID_26B				ID2_26B				ID1_26B			
63	IO_27B				ID_27B				ID2_27B				ID1_27B			
64	IO_28B				ID_28B				ID2_28B				ID1_28B			
65	IO_29B				ID_29B				ID2_29B				ID1_29B			
66	IO_30B				ID_30B				ID2_30B				ID1_30B			
67	IO_31B				ID_31B				ID2_31B				ID1_31B			
68	Param_3				Param_2				Param_1							
69	Param_7				Param_6				Param_5				Param_4			
70	Param_11				Param_10				Param_9				Param_8			
71	Param_15				Param_14				Param_13				Param_12			
72	Param_19				Param_18				Param_17				Param_16			
73	Param_23				Param_22				Param_21				Param_20			
74	Param_27				Param_26				Param_25				Param_24			
75	Param_31				Param_30				Param_29				Param_28			
76	Param_3B				Param_2B				Param_1B							
77	Param_7B				Param_6B				Param_5B				Param_4B			
78	Param_11B				Param_10B				Param_9B				Param_8B			
79	Param_15B				Param_14B				Param_13B				Param_12B			
80	Param_19B				Param_18B				Param_17B				Param_16B			
81	Param_23B				Param_22B				Param_21B				Param_20B			
82	Param_27B				Param_26B				Param_25B				Param_24B			

Word	Bit															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
83	Param_31B				Param_30B				Param_29B				Param_28B			
84	Status flag byte 2								Status flag byte 1							
85	LDS 15-12				LDS 11-8				LDS 7-4				LDS 3-0			
86	LDS 31-28				LDS 27-24				LDS 23-20				LDS 19-16			
87	LDS 15B-12B				LDS 11B-8B				LDS 7B-4B				LDS 3B-0B			
88	LDS 31B-28B				LDS 27B-24B				LDS 23B-20B				LDS 19B-16B			
89	SDL 15-12				SDL 11-8				SDL 7-4				SDL 3-0			
90	SDL 31-28				SDL 27-24				SDL 23-20				SDL 19-16			
91	SDL 15B-12B				SDL 11B-8B				SDL 7B-4B				SDL 3B-0B			
92	SDL 31B-28B				SDL 27B-24B				SDL 23B-20B				SDL 19B-16B			
93	LPF 15-12				LPF 11-8				LPF 7-4				LPF 3-0			
94	LPF 31-28				LPF 27-24				LPF 23-20				LPF 19-16			
95	LPF 15B-12B				LPF 11B-8B				LPF 7B-4B				LPF 3B-0B			
96	LPF 31B-28B				LPF 27B-24B				LPF 23B-20B				LPF 19B-16B			
97	WParam_3				WParam_2				WParam_1							
98	WParam_7				WParam_6				WParam_5				WParam_4			
99	WParam_11				WParam_10				WParam_9				WParam_8			
100	WParam_15				WParam_14				WParam_13				WParam_12			
101	WParam_19				WParam_18				WParam_17				WParam_16			
102	WParam_23				WParam_22				WParam_21				WParam_20			
103	WParam_27				WParam_26				WParam_25				WParam_24			
104	WParam_31				WParam_30				WParam_29				WParam_28			
105	WParam_3B				WParam_2B				WParam_1B							
106	WParam_7B				WParam_6B				WParam_5B				WParam_4B			
107	WParam_11B				WParam_10B				WParam_9B				WParam_8B			
108	WParam_15B				WParam_14B				WParam_13B				WParam_12B			
109	WParam_19B				WParam_18B				WParam_17B				WParam_16B			
110	WParam_23B				WParam_22B				WParam_21B				WParam_20B			
111	WParam_27B				WParam_26B				WParam_25B				WParam_24B			
112	WParam_31B				WParam_30B				WParam_29B				WParam_28B			
113	S-7.4 Analog Slaves Command (see Section 6.3.3, <a href="#">Configuring Type S-7.4 Analog Profile Slaves</a> , for details)															
...																
224																
225	S-7.4 Analog Slaves Response (see Section 6.3.3, <a href="#">Configuring Type S-7.4 Analog Profile Slaves</a> , for details)															
...																
336																
337	Analog values															
...	Analog values															

### 6.3.1 Status Flag Bytes - Byte 1 (Low Byte of Word 84)

Table 8: Description of Status Flag Bytes – Byte 1

Bit	Description
7	ASI CONFIG OK. If this bit is 1, the configuration stored in EEPROM matches the current configuration.
6	ASI LDS 0. If this bit is 1, the slave with Address 0 exists.
5	RESERVED
4	ASI AUTO PROG AVAILABLE. If this bit is 1, Auto Address Programming is possible. This means that a slave has failed and can be immediately replaced with a new one of the same ID and I/O at Address 0. The new slave will be automatically re-addressed.
3	ASI OPERATION MODE. If this bit is 1, the scanner is in Configuration Mode; if it's 0, the scanner is in Protected mode.
2	ASI NORMAL OPERATION. If this bit is 1, the network is operating normally
1	ASI POWER FAIL. If this bit is 1, voltage on AS-Interface line is too low
0	ASI OFFLINE. If this bit is 1, it causes a 75h error. Usually, this is due to having an extra slave at Address 0.

### 6.3.2 Status Flag Bytes - Byte 2 (High Byte of Word 84)

Table 9: Description of Status Flag Bytes – Byte 2

Bit	Description
7 - 5	RESERVED
4	PERIPHERY FAULT
3	ASI AUTO ADDRESS ENABLE. If this bit is 1, Auto Address Programming is enabled. This means that if a slave fails, it can be replaced with a new one via Auto Address Programming.
2	ASI EEPROM OK. If this bit is 1, the EEPROM configuration is OK (there is something stored in EEPROM).
1	RESERVED
0	RESERVED

### 6.3.3 Configuring Type S-7.4 Analog Profile Slaves

Two areas of the M0 and M1 files are dedicated to provide support for type 7.4 analog slaves. As this data is required only for configuration and diagnostic of the 7.4 profile slaves, it only needs to be read or written occasionally.

Access to this non-time-critical data is made via 2 data structures in the M files:

Table 10: S-7.4 Analog Slaves Command Layout

In the following tables, "x" means not used.

Word\Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
113	Function								Toggle	x	x	x	x	x	x	x	x
114	address								Length								
115	byte1								byte2								
116	byte3								byte4								
...																	
224	byte219								byte220								

Table 11: S-7.4 Analog Slaves Result Layout

Word\Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
225	Result								Done	x	x	x	x	x	x	x
226	address								Length							
227	byte1								byte2							
228	byte3								byte4							
...																
336	byte219								byte220							

The Command structure starts in M file at word offset 113, the Response at offset 225.

The supported Command functions are:

Table 12: Command Functions

Function	Description
1	Read parameter string
2	Write parameter string
3	Read ID string
4	Read diagnostic string

The Result values are:

Table 13: Result Values

Result (Hex)	Description
0	Success
2	Wrong slave address
5	AS-i bus error
7	AS-I unknown error
8	AS-I not allowed
41	Command too long
42	Response too long
61	Command not supported

The data access procedure is:

1. Wait for the Done bit (in Response word 1) to be 0
2. Fill the Command data structure with the Function, slave Address, data length and desired data.
3. Set the Toggle bit to 1, leaving the remaining Word 1 bits unchanged (ex., 0x180 for a read parameter command).
4. Wait for the Done bit to be 1. This means that the command was processed by the scanner and the results are available for processing.
5. Read the Result in the Response structure.
6. If the Result is Success (0) and the Function was a read, the Length in Response shows the length of the returned data, which will start in the next word (word 3).
7. After processing the Response, clear the Toggle bit, so the scanner can clear the Done bit and prepare for a new command.



### Note

For reliable operations, the Command Data Buffer shouldn't be modified while the command Toggle bit is set.

## 6.4 Compatibility Mode

This version of the scanner has a memory map to provide access to the data of up to 62 AS-i extended slaves. If you are starting a new project, we recommend that you use this new memory map in your SLC program. If it's an existing project based on the old memory map, you can run this scanner in Compatibility mode. In this mode, the new scanner will look the same as the old one from your program's point of view.

SLC programs written for earlier versions of the scanner module (1.xx) had a G file that was 64 words long, with word 64 containing the scanner ID. If you install the scanner into an SLC running a program designed for that scanner version, the scanner will revert to Compatibility mode. If the scanner sees 13635 in word 64, it will run with the old G file, Input, Output and M file layouts. Refer to the SST-ASI-SLC User's Guide, Version 1.30 for more details.



# 7

## Upgrading the Scanner Firmware

### Chapter Sections:

- Overview
- Upgrading the Firmware

## 7.1 Overview

The following procedure describes the steps for uploading a new version of the scanner firmware into the scanner's flash memory.

## 7.2 Upgrading the Firmware

Use the serial Config port on the front of the scanner to upload firmware files to the scanner.

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

To upgrade the firmware, follow these steps:

1. Connect to the serial port using any communication software. The scanner serial port supports any baud rate from 9600 baud to 38.4 Kbaud, with no parity, 8 data bits and 1 Stop bit, no flow control. The scanner automatically detects the baud rate you are using.
2. Cycle power on the SLC.
3. When the scanner is powering up, the FAULT LED flashes for 1 second. While it is flashing, press the exclamation mark [!] in your communication software to tell the scanner that you want to upload software. You may need to press it several times while the scanner tries to auto-detect the baud rate.

The FAULT and COMM 1 LEDs flash red alternately to tell you the scanner is in boot utility mode. The available commands are:

- Ver - display the current firmware version number
  - Help - display available commands
  - LoadFlash - load new firmware into flash
  - Run - exit System Configuration mode
4. Type LoadFlash. The scanner responds with a query. Press Y to start.
  5. Initiate an Xmodem send of the module firmware file using your communication software.

6. When the upload is complete, the scanner asks if you want to program the new module into flash. Press **Y** to confirm.
7. When the module has been programmed into flash, use the **Ver** command to confirm that the version number is correct.
8. Cycle power on the SLC. If you don't cycle power, you may get unpredictable results.



# 8

## Troubleshooting

### Chapter Sections:

- LED Status and SLC Fault Codes
- AS-i Power Failure
- Slave Failure
- An Important Note on AS-i Faults
- Other Troubleshooting Tips

## 8.1 LED Status and SLC Fault Codes

SLC Fault Codes can be read from the SLC processor using Allen-Bradley's RSLogix 500 software.

Table 14: LED Status and SLC Fault Codes

FAULT LED	COMM LEDs	Description	Troubleshooting	SLC Fault Code
Flashing Red	Any	G File error. No network communication attempted.	Check for a missing scanner ID code in the last word of the G file. Make sure the network configuration is in the G File. Make sure at least one channel is enabled.	70h
		The SLC slot the scanner is in is disabled.	Enable the slot using your programming software.	N/A
Flashing Red	Flashing Green	G file configuration doesn't match current network setup. More than one configured slave on the network is inactive.	Make sure the network is properly configured in the G file and the slaves are properly attached to the network.	71h
		Saved configuration in EEPROM doesn't match network setup.	Using the Config port on the scanner, verify and save the network configuration.	72h
Flashing Red	Flashing Red	If you try to put the SLC into Run mode while configuring the network devices, the LEDs will continue to blink alternately and the SLC will show this fault code.	Finish configuring the network devices and exit the configuration utility.	73h
Any	Flashing Red	AS-Interface power is too low (less than 14.5V).	Make sure the cable is properly connected to the scanner and the power supply is properly connected to the network. See section 8.2, <a href="#">AS-i Power Failure</a> .	61h
		AS-Interface is in Configuration mode rather than Protected mode	Slave 0 is present and Auto Address Programming is disabled. Configure the slave address in the G file.	74h
		AS-Interface is off-line.	Call Woodhead Technical support with a description of the circumstances that caused this error.	75h
Any	Flashing Green	A slave on the network has failed or is missing.	Check that the G file is not in error. If the G file is OK, check the network setup for the missing slave. If Auto Address Programming is enabled, replace the missing slave with a matching slave at Address 0. Go to Config mode and perform a <b>List</b> command.	62h
Off	Green	Scanner is operating properly.	All OK.	N/A
Red	Both Red	Software error on scanner.	Call Woodhead Technical support with a description of the circumstances that caused this error.	N/A

## 8.2 AS-i Power Failure

If an AS-i power failure occurs, scanning of the AS-i network stops and the slave outputs turn off. The SLC faults with code 61h. Refer to Table 14, [LED Status and SLC Fault Codes](#). To return the SLC to Run mode, correct the power fault and switch from Program to Run mode.

## 8.3 Slave Failure

### 8.3.1 One Slave Has Failed

In the event of a single slave failure, Auto Address Programming may be available if you have enabled it in the G file. If you have enabled Auto Address Programming, the COMM LED on the affected channel flashes green and the SLC faults with error code 62h (refer to Table 14, [LED Status and SLC Fault Codes](#)).

If you want to replace the slave via Auto Address Programming, you must replace it with a slave at Address 0 and with an I/O type and ID code that match the defective slave's. Once this has been done, the SLC can be toggled from Program to Run and the network should return to normal operation.

If the M files have been scanned recently (i.e. immediately before the fault occurred), the slave delta list (SDL) will reflect which slave failed.

Normally, when using Auto Address Programming, the SLC will not be allowed to fault. This can be done by setting the Fault bit in the channel options, or by installing a fault handler on the SLC.

### 8.3.2 Multiple Slaves Have Failed

If multiple slaves fail and the M files have been scanned recently (i.e. immediately before the fault occurred), the SDL in the M files will indicate which slaves failed.

## 8.4 An Important Note on AS-i Faults



### Note

This information applies to hardware version 1.0 only.

With some versions of the SLC, if your program clears the main error flag (S2:1/13), subsequent faults on other scanners or SLC processors might not be reported to the scanner, and the scanner will continue scanning even if the SLC is faulted. Refer to Section 3.8, [AS-i Faults](#), for further details.

## 8.5 Other Troubleshooting Tips

### 8.5.1 Nothing Shows up in a List Command

A **List** command on the serial port should provide a list of addresses, IDs, I/Os and parameters of slaves on the network. If the command displays an empty list:

- Check that the AS-i power is connected
- Verify that you have an AS-i power supply. The supply must be a genuine AS-i power supply and not just a generic one.
- Verify that the power supply polarity is correct
- Check the AS-i cable to the master
- Try the **List** command with only one slave on the network. If there are duplicate slaves, you might not see any of the slaves.

## 8.5.2 Can't Find a Failed Slave

To find failed slaves, issue a **List** command on the serial port. A failed slave will have PID and PIO values displayed but no corresponding ID and I/O values.

## 8.5.3 Unable to go Online

Try running with a minimal G file. Set only the following items:

- Word 1 = 0001h
- Word 80 = 0000h
- Word 159 = 3543h = 13635 decimal

## 8.5.4 Slaves Don't Have AS-i power

If the slaves don't have AS-i power, check that the Phoenix connector is still plugged in to the scanner.

## 8.5.5 Two Masters on Network

Only one master is allowed on the network at once. Make sure that a scanner and hand-held programmer aren't plugged in simultaneously.

## 8.5.6 Error Message: "Error during transmission via AS-i bus"

You can't change a slave address (except Slave 0) while Slave 0 is present on the network.

This error can also be caused by bad connections. Verify all connectors and cables.

### 8.5.7 Replaced Slave Didn't Auto Address

For Auto Address Programming to work, you must replace the slave while the network is powered and running. To do this, follow these steps:

1. Remove the slave.
2. Add a new slave of same ID, ID1, ID2 and I/O at Address 0.
3. Cycle from Program to Run to clear the fault.

The slave is readdressed to replace the failed slave.

# A

## M0 and M1 Files

### Appendix Sections:

- Overview
- Addressing M0 and M1 Files

## A.1 Overview

The following data is based on information in the SLC 500 Instruction Set Reference Manual, Allen-Bradley publication 1747.6.15, and is provided here for reference.

M0 and M1 files reside in specialty I/O modules only. There is no image for these files in the processor memory. This means that when an application running on the SLC accesses the data, the SLC must go out to the module and read the data. The contents of these files depend on the specialty I/O module's function. Both M0 and M1 files are considered read/write files by the SLC processor. M0 and M1 files can be addresses in your ladder program and they can also be acted upon by the specialty I/O module, independent of the processor scan. It is important to keep the following in mind when creating and applying your ladder logic.

During the processor scan, M0 and M1 data can be changed by the processor, according to ladder diagram instructions addressing the M0 and M1 files. During the same scan, the specialty I/O module can change the M0 and M1 data, independent of the rung logic applied during the scan.

## A.2 Addressing M0 and M1 Files

The addressing format for M0 and M1 files is  $M_f : e . s / b$ , where:

- $f$  = file type, 0 or 1
- $e$  = slot (1 to 30)
- $s$  = word (0 to maximum supplied by module)
- $b$  = bit (0 to 15)

## A.2.1 Restrictions on Using M0-M1 Data File Addresses

M0 and M1 data file addresses can be used in all instructions except the OSR instruction and the instruction parameters noted below:

Table 15: M0 and M1 File Access Restrictions

Instruction	Parameter (uses file indicator #)
BSL,BSR	File (bit array)
SQO, SQC, SQL	File (sequencer file)
LFL, LFU	LIFO (stack)
FFL, FFU	FIFO (stack)

## A.2.2 Monitoring Bit Addresses

### M0 and M1 Bit Monitoring Disabled

When you monitor a ladder program in Run or Test mode, the following bit instructions, addressed to an M0 or M1 file, are indicated as false (regardless of their actual true/false logical state):

```
--| |-- --|/|-- --( )-- --(L)-- --(U)--
```

### M0 and M1 Bit Monitoring Enabled

The SLC 5/03, SLC 5/04 and SLC 5/05 processors allow you to monitor the actual state of each addressed M0/M1 address (or data table). The highlighting appears normal when compared with other processor data files. The SLC 5/03's performance will be reduced to the degree of M0/M1 referenced screen data.

If you need to show the state of the M0 or M1 addressed bit, you can transfer the state to an internal processor bit.

### Transferring Data between Processor Files and M0/M1 Files

The SLC processor does not contain an image of the M0 or M1 file. As a result, you must edit and monitor M0 and M1 file data via instructions in your ladder program. For example, you can copy a block of data from a processor data file to an M0 or M1 data file or vice versa using the COP instruction in your ladder program.

## Access Time

During the program scan, the SLC processor must access the scanner card to read or write M0 or M1 data. This access time must be added to the execution time of each instruction referencing M0 or M1 data. The SLC 500 Instruction Set Reference Manual contains details about this access time.

## Minimizing the SLC Scan Time

You can limit the SLC processor scan time by minimizing the use of instructions that address M0 or M1 files.

# B

## Specifications

### Appendix Sections:

- Specifications

## B.1 Specifications

Table 16: SST-ASI-SLC Specifications

Part number	SST-ASI-SLC
Function	SLC-500 scanner for AS-Interface networks
Description	Intel 80C188 processor 128 Kbytes of local 80C188 RAM  512 Kbytes of sectored flash memory, for storage of firmware and configuration data
Environmental	Storage temperature -25 °C to 70°C Operating temperature 0 °C to 50°C Operating relative humidity (RH) level 5% to 95% Pollution degree 1 - no pollution or only non-conductive or non-corrosive pollution Isolation rating type tested at 560 VAC ESD severity level ESD-4 Vibration tested according to IEC 68-2-6 Test Fc Shock tested according to IEC 68-2-27
Backplane Current Consumption	500 mA at 5 VDC  The 5VDC backplane voltage must be from a supply delivering Separated Extra Low Voltage (SELV).
AS-i Power Consumption	50 mA
Phoenix Connector Part #	MSTB 2,5/4-ST-5,08



## Conformance Statement

### Appendix Sections:

- ASI Protocol Implementation Conformance Statement (PICS)

## C.1 ASI Protocol Implementation Conformance Statement (PICS)

Table 17: ASI Protocol Implementation Conformance Statement

<b>Vendor:</b>	Woodhead Software & Electronics
<b>Product name:</b>	SST-ASI-SLC
<b>Order No.:</b>	SST-ASI-SLC
<b>Release:</b>	2.15
<b>Date:</b>	June 13, 2005

## C.1.1 List of Implemented Functions

Table 18: AS-i Functions

No.	Function or Call to AS-i Network Interface	Profiles	Remark/ Implemented By
1	Image, Status = Read_IDI ()	X	Input
2	Status = Write_OD (Image)	X	Output
3	Status = Set_Permanent_Parameter (Addr, Param)	X	G File/Config
4	Param, Status = Get_Permanent_Parameter (Addr)	X	M file
5	Status, RParam = Write_Parameter (Addr, Param)	X	Output
6	Status, Param = Read_Parameter (Addr)	X	Input
7	Status = Store_Actual_Parameters ()	X	Config
8	Status = Set_Permanent_Configuration (Addr, Config)	X	G File/Config
9	Status, Config = Get_Permanent_Configuration (Addr)	X	M file
10	Status = Store_Actual_Configuration ()	X	Config
11	Status, Config = Read_Actual_Configuration (Addr)	X	Config
12	Status = Set_LPS (List31)	X	G file
13	Status, List31 = Get_LPS ()	X	M file
14	Status, List31 = Get_LAS ()	X	M file/Config
15	Status, List32 = Get_LDS ()	X	M file/Config
16.0	Status, Flags = Get_Flags ()	X	M file
16.1	Status, Flag = Get_Flag_Config_OK ()	X	M file
16.2	Status, Flag = Get_Flag_LDS.0 ()	X	M file
16.3	Status, Flag = Get_Flag_Auto_Address_Assign ()	X	M file
16.4	Status, Flag = Get_Flag_Auto_Prog_Available ()	X	M file
16.5	Status, Flag = Get_Flag_Configuration_Active ()	X	M file
16.6	Status, Flag = Get_Flag_Normal_Operation_Active ()	X	M file
16.7	Status, Flag = Get_Flag_APF ()	X	M file
16.8	Status, Flag = Get_Flag_Offline_Ready ()	X	M file
16.9	Status, Flag = Get_Flag_Periphery_OK ()	X	M file
17	Status = Set_Operation_Mode (Mode)	X	Automatic
18	Status = Set_Offline_Mode (Mode)	X	Automatic
19	Status = Activate_Data_Exchange (Mode)	X	Automatic
20	Status = Change_Slave_Address (Addr1, Addr2)	X	Config Port
21.1	Status = Set_Auto_Adress_Enable (Mode)	X	G file
21.2	Mode = Get_Auto_Adress_Enable ()	X	M file
22.1	Status, Resp = Cmd_Reset_ASI_Slave (Addr, RESET)	X	Config

No.	Function or Call to AS-i Network Interface	Profiles	Remark/ Implemented By
22.2	Status, Resp = Cmd_Read_IO_Configuration (Addr, CONF)	X	Config
22.3	Status, Resp = Cmd_Read_Identification_Code (Addr, IDCOD)	X	Config
22.4	Status, Resp = Cmd_Read_Status (Addr, STAT)	X	Config
22.5	Status, Resp = Cmd_Read_Reset_Status (Addr, STATRES)	-	-
22.6	Read Ext-Id code 1	X	Config
22.7	Read Ext-Id code 2	X	Config
23	Status, Flag = Get_LPF ()	X	M file
24	Write IDCode 1	X	Config
25	Read Analog Input –	X	M file
26	Write Analog Outputs	X	M file
27	Read Param String	X	M file
28	Write Param String	X	M file
29	Read Diag String	X	M file
30	Read Ident String	X	M file

Table 19: Key for Symbols in Column 3

Label	Meaning
X	Implemented
-	Not implemented

Table 20: Key for Symbols in Column 4

Label	Meaning
G file	Mapped to G file
Input	Mapped to Input table
Output	Mapped to Output table
Config	Accessible from Config port
M file	Mapped to M files

# D

## CE Compliance

### Appendix Sections:

- CE Compliance

## D.1 CE Compliance

This device meets or exceeds the requirements of the following standards:

- EN 50081-2:1994 - “Electromagnetic compatibility – Generic emission standard Part 2. Industrial Environment.”
- EN 50082-2:1995 - “Electromagnetic compatibility – Generic immunity standard Part 2. Industrial Environment.”




### 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 currents.

Marking of this equipment with the symbol  indicates compliance with European Council Directive 89/336/EEC - The EMC Directive.



### 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).

# E

## Warranty and Support

### Appendix Sections:

- Warranty
- Reference Documents
- Technical Support

## E.1 Warranty

For warranty information pertaining to this product, refer to <http://www.mysst.com/warranty.asp>.

## E.2 Reference Documents

Table 21: Reference Documents

For...	Read This Document	Document Number
An overview of SLC products	SLC 500 System Overview	A-B 1747-2.30
A description of how to install and use the SLC 500 PLC	Installation and Operation Manual for Modular Hardware Style Programmable Controllers	A-B 1747-6.2
An index of Allen-Bradley publications	Allen-Bradley Publication Index	A-B SD499
RSLogix information	Getting Results with RSLogix	500 9399-RL50GR
	Hardware Configuration Reference Guide	9399-HDWAREREF
	RSLinx Lite User's Guide	9399-WAB32LUG
AS-i information	ASI: The Actuator-Sensor Interface for Automation Eds. Kriesel and Madelung	ISBN # 3-446-18265-9

## E.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 and hardware configuration (other cards installed)
- Operating system type and version
- Details of the problem you are experiencing: firmware type and version, target network and circumstances that may have caused the problem

## E.3.1 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:

Tel: 1-519-725-5136

Fax: 1-519-725-1515

Email: [techsupportna@woodhead.com](mailto:techsupportna@woodhead.com)

### Europe

France:

Tel: 33-(0)2-32-96-04-22

Fax: 33-(0)2-32-96-04-21

Email: [supportfr@applicom-int.com](mailto:supportfr@applicom-int.com)

Germany:

Tel: 49-711-782-374-22

Fax: 49-711-782-374-11

Email: [supportde@applicom-int.com](mailto:supportde@applicom-int.com)

Italy:

Tel: 39-01-059-540-52

Fax: 39-0-10-59-56-925

Email: [supportit@applicom-int.com](mailto:supportit@applicom-int.com)

United Kingdom:

Tel: 33-(0)2-32-96-04-23

Fax: 44-161-285-8686

Email: [supportintl@applicom-int.com](mailto:supportintl@applicom-int.com)

**Asia-Pacific**

## Japan:

Tel: 81-452-24-3560

Fax: 81-52-745-7622

Email: [techsupport@woodhead.co.jp](mailto:techsupport@woodhead.co.jp)

## Singapore:

Tel: 65-64-67-96-52

Fax: 65-6261-3588

Email: [info@woodhead.com.sg](mailto:info@woodhead.com.sg)

## China:

Tel: 86-21-5032-8080

Fax: 86-21-5031-8833

Email: [techsupport@woodhead.co.jp](mailto:techsupport@woodhead.co.jp)

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

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