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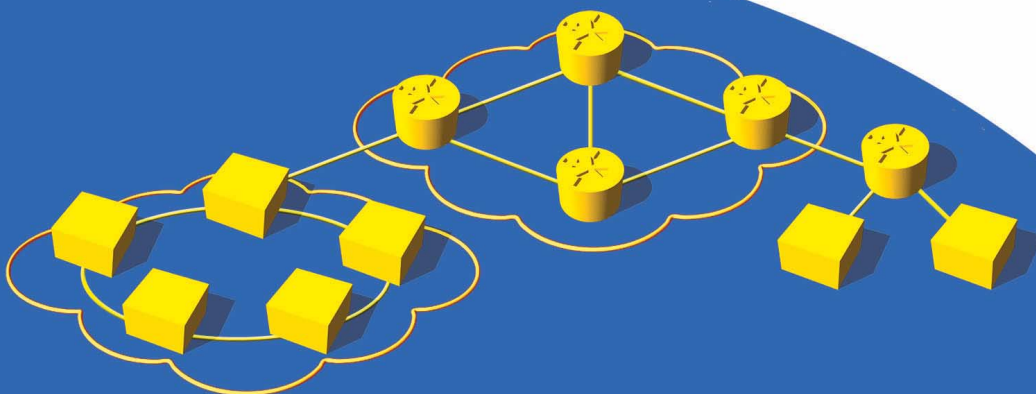
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Installation Guide

SmartBits 600x/6000x

October 2004



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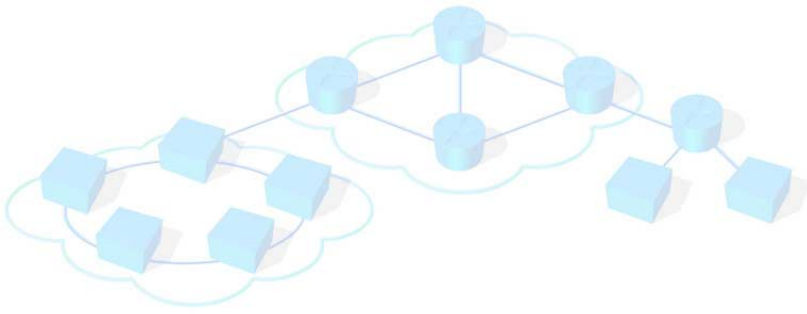
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About This Guide

In About this Guide . . .

This section of the installation guide contains the following topics:

- Purpose 2
- Audience 2
- Manual Content 2
- Conventions 3
- Related Manuals 5
- Online Help 5
- SmartBits Hardware Handling/Cleaning Practices 5
- How to Contact Us 6

Purpose

This installation guide provides information for first-time SmartBits chassis connections and installation.

Audience

This installation guide is designed for engineers and technicians who are familiar with PCs and have a working knowledge of telecommunications equipment.

Manual Content

This installation guide contains the following sections:

Section	Description
<i>“About This Guide”</i>	Provides information on this guide including its purpose, intended audience, content and organization, conventions used, and related documentation and online Help. Also explains how to contact technical support.
<i>Chapter 1, “About SmartBits Chassis”</i>	Introduces the SmartBits 600x/6000x chassis.
<i>Chapter 2, “Installation and Setup”</i>	Describes the installation and set up of the SmartBits chassis.
<i>Chapter 3, “LED Indicators”</i>	Describes the LED status indicators on the chassis and different card types.
<i>Chapter 4, “Troubleshooting and Maintenance”</i>	Describes troubleshooting, error messages, and maintenance conditions.
<i>Appendix A, “Multiple Chassis Local Connect”</i>	Provides details for setting up, connecting, and powering up multiple SmartBits chassis used in stacking and expansion configurations. Also provides details for various Multi-chassis Extension Unit connections and configurations.
<i>Appendix B, “Cable Information”</i>	Provides cable information and connector pin assignments used with when making SmartBits chassis connections.
<i>Appendix C, “Download and Install Applications”</i>	Provides the general steps for downloading and updating Spirent Communications software applications.

Section	Description
<i>Appendix D, “Serial Port and Telnet Commands”</i>	Describes the serial port command set including Superuser, Netmask, Gateway, and External Time Reference commands.
<i>Appendix E, “ESD Requirements”</i>	Provides ESD guidelines and procedures.
<i>Appendix F, “Fiber Optic Cleaning Guidelines”</i>	Provides cleaning guidelines for fiber optic equipment.
<i>Appendix G, “Revision History”</i>	Provides a Revision History for this user guide including updates for this current revision.
<i>“Index”</i>	Comprehensive index listing.

Conventions

This section explains the typographical conventions used in this guide.

- *Italics* are used to indicate titles of books, volumes, documents, sections of documents (such as chapters), areas or panes within windows, tabs, options, field or parameter names, and for general emphasis. For example:
 - For additional information on SmartBits hardware, refer to the *SmartBits System Reference* manual.
 - The *Traffic* area of the window contains four options.
 - The test results provide information on the *frame loss* of the device.
- **Bold** type is used to indicate selections made during a procedure (such as menu options that you select, or tabs or buttons that you click). Bold type is also used for names of parameters being acted upon, for parameter options, and to indicate directory paths. For example:
 - To connect to your SmartBits chassis click the **Connect** button or select **Tools > Connect**.
 - To transmit traffic for 10 seconds for each iteration of the test, enter **10** in the **Test Duration** field.
 - The configuration files are automatically saved to the Config folder that was created when you installed the software application (**C:\Program Files\Config**).
- Courier text is used for code samples and to indicate text that you need to enter.
- *SmartBits 600x* refers to the SmartBits 600, 600B, or any later version of this chassis. *SmartBits 6000x* refers to the SmartBits 6000B, 6000C, or any later version of this

chassis. Specific versions of the SmartBits 600x/6000x chassis are mentioned only when required for clarification.

- The terms *DUT* and *device under test*, as well as *SUT* and *system under test*, are used interchangeably in this guide. *DUT/SUT* is also used to indicate either.
- The terms *packet* and *frame* are used interchangeably.
- The term *SmartCard* refers to a printed circuit board used in a SmartBits 200/2000 chassis. The term *module* generally refers to a printed circuit board used in a SmartBits 600x/6000x chassis. The term *card* is often used in SmartBits software applications and in this guide to refer to either type of circuit board.

Notes, cautions, warnings, and important information are indicated as follows:



Note: Calls attention to additional information or explanation.



Caution: Calls attention to procedures or practices that should be followed to avoid damage to hardware, or corruption and possible loss of software files and/or data.



Warning: Calls attention to operating procedures or practices that should be followed to avoid bodily injury or damage to equipment.



Important: Calls attention to important information or characteristics that might be overlooked.



Tip: Calls attention to helpful information about a product's operation or setup that eases its use.



Indicates the beginning of a procedure.

Related Manuals

Additional manuals related to the *SmartBits 600x/6000x Installation Guide* include:

- *SmartBits System Reference*: Explains SmartBits system architecture and hardware, basic concepts for using SmartBits systems, and general maintenance/upgrade procedures.
- All user guides supplied with both core and optional software applications.

Online Help

In each SmartBits GUI application, you can access online Help in two ways:

- Press the **F1** key in the window for which you require information.
- From the menu bar, select **Help > Contents** to view the entire contents of the Help file.

SmartBits Hardware Handling/Cleaning Practices

SmartBits cards and module contain electronic components that are sensitive to Electrostatic Discharge (ESD) damage. To prevent premature component failure or latent product damage, it is crucial that you handle this equipment following industry standard ESD handling practices. Refer to [Appendix E, “ESD Requirements,”](#) for further information.

Some SmartBits equipment contains fiber optic components that are very susceptible to contamination from particles of dirt and dust. Product performance may be damaged if these components are not kept clean. Refer to [Appendix F, “Fiber Optic Cleaning Guidelines,”](#) for proper cleaning practices for these components.

How to Contact Us

Technical support is available Monday through Friday between 06:00 and 18:00 Pacific Time.

To obtain technical support for any product, please contact our Technical Support Department using any of the following methods:

U.S.

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In addition, the latest versions of user manuals, application notes, and software and firmware updates are available on the Spirent Communications Customer Service Center website at <http://support.spirentcom.com>.

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USA



Chapter 1

About SmartBits Chassis

In this chapter . . .

This chapter contains the following topics:

- **Introduction 8**
- **SmartBits Overview 8**
- **SmartBits Chassis Models 9**
- **SmartBits 600x/6000x Chassis Features 9**
- **SmartBits 600 Chassis 11**
- **SmartBits 600B Chassis 11**
- **SmartBits 6000B Chassis 13**
- **SmartBits 6000C Chassis 14**
- **SmartBits Applications 17**
- **Supported Modules 18**
- **Specifications 21**
- **Safety Requirements 23**

Introduction

Networks and the communications industry are growing in size and complexity. Switches and routers contain faster ports and in response to this growth, networks have a greater number of nodes, with each node carrying more flows of traffic. In response to this growth, test system capabilities must also grow. Testing under real-world conditions can involve generating more than 64,000 flows of traffic. The SmartBits600x/6000x chassis are the next generation of test platforms that meet these growing requirements.

The SmartBits 600x/6000x chassis are high-density network performance analysis test systems. All chassis support most of the same features and functionalities, and use SmartBits modules to support a variety of port types.

This installation guide explains how to install and set up the SmartBits 600x/6000x chassis after a brief introduction to the systems' features. For more information about the hardware descriptions of the modules used in these chassis, refer to the *SmartBits System Reference* manual.

For installation details and a description of each software application, see the specific user guide and online help file for each application.

SmartBits Overview

SmartBits 600x/6000x chassis multiport performance analysis systems allow you to test, simulate, analyze, troubleshoot, quality assure, develop, and certify the following protocols:

- 10/100/1000 Mbps Ethernet
- 10 Gigabit Ethernet
- OC-3c, OC-12c, OC-48c, and OC-192c Packet over SONET (POS)
- OC-3c, OC-12c ATM
- Fibre Channel

The following network types are supported:

- Switching hubs, routers, repeaters, and bridges
- Live networks
- Network interface cards (NICs)
- VLANs and ELANs

SmartBits Chassis Models

This installation guide describes the following four chassis models:

- SmartBits 600 chassis with 2 slots, up to 16 ports.
- SmartBits 600B chassis with 2 slots, up to 16 ports.
- SmartBits 6000B chassis high-density model, 12 slots, up to 96 ports
- SmartBits 6000C chassis high-density model, 12 slots, up to 96 ports.

Additional SmartBits chassis models that are also available are listed below. Refer to the *SmartBits 200/2000 Installation Guide* for the description of these chassis.

- SmartBits 10 chassis, 20 slots, up to 80 ports (used as a slave chassis only).
- SmartBits 200 chassis, 4 slots, up to 16 ports.
- SmartBits 2000 chassis, 20 slots, up to 80 ports.

SmartBits 600x/6000x Chassis Features

The SmartBits 600x/6000x chassis provide the following features and capabilities:

- A default *IP Address*, *Gateway* address, and *Netmask* address allow for quick and easy connection of your chassis without the need for a serial cable connection.
- Serial console interface for easy configuration.
- The 10/100 Mbps Ethernet port allows you to test a remote device by connecting it to the SmartBits chassis over a local Ethernet network.
- Telnet support for remote access to all console functions.
- The Ethernet or Telnet port provides a link to your PC or UNIX workstation. The Ethernet port decreases the time it takes to update SmartBits chassis and module firmware, or to download configurations or upload data.
- High resolution and accuracy with internal clock.

This clock is used for latency and timestamps. The clock's oscillator is specified for an error rating of less than 2 parts per million (ppm). The high level of accuracy provides long-term measurements, which are especially important when using higher speed interfaces such as Gigabit Ethernet.

- Higher performance levels than the SmartBits 2000.
 - Faster downloads of test configurations.
 - Faster statistics data and captured traffic transfers to a PC or UNIX workstation.

- External Time Reference (ETR) support.

External Time References can be used to provide the 10 mHZ and 1 PPS clocks. This is typically used to synchronize multiple chassis that are separated by a greater distance than allowed when using an interchassis synchronization cable. The most common usage of these interfaces is for connecting to attached GPS or CDMA time reference receivers.

- External clock support.

You can use a standard 10 MHz external clock. Once the SmartBits detects the external clock through the BNC connector, it automatically switches to the external clock for timestamping of latency measurement tests.

The external clock allows you to:

- Synchronize measurements between different systems.
- Use the high-accuracy reference clock often available in large network control centers.

- Clock Synchronization on Multiple Connected SmartBits.

You can synchronize different systems to one clock by connecting multiple chassis as described in [Appendix A, “Multiple Chassis Local Connect.”](#)

- Reset button.

The Reset button is located above the LEDs on the front of the SmartBits 600x chassis (see [Figure 1-3 on page 11](#)) and the SmartBits 6000B chassis (see [Figure 1-4 on page 13](#)). It is the uppermost button on the SmartBits 600x/6000B chassis.

When pushed in, such as with a paper clip or other small object, the Reset button resets the chassis hardware and firmware and functions as a warm boot. The Reset Button on the SmartBits 600x/6000B chassis is recessed and requires the use of a small object (such as a paper clip or other sharp object).



Note: For information concerning the SmartBits 6000C chassis reset button and other improvements, see [“SmartBits 6000C Chassis Enhancements” on page 16](#).

SmartBits 600 Chassis

The SmartBits 600 chassis (see [Figure 1-1](#)) is a portable chassis that has been designed to combine high port density, portability, compact design, and high-performance in a single system. It is compatible with the SmartBits 600B/6000B/6000C chassis and can be synchronized to other chassis in an expansion connection to provide higher port density.

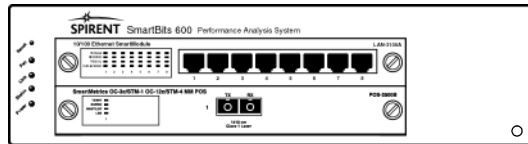


Figure 1-1. SmartBits 600 Chassis

SmartBits 600 Chassis with a SmartMetrics/TeraMetrics XD Module

When using SmartMetrics/TeraMetrics XD modules in a SmartBits 600 chassis, it is important you understand the restrictions listed in [Table 1-1 on page 12](#). An example of a SmartBits 600 housing a 4-port SmartMetrics/TeraMetrics XD module is shown in [Figure 1-2](#).

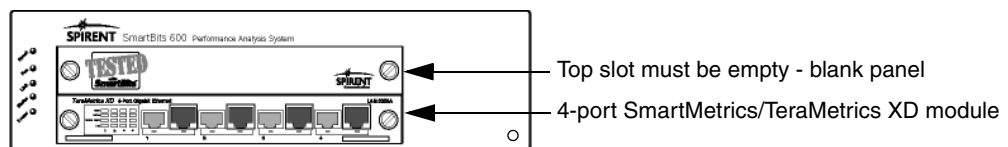


Figure 1-2. SmartBits 600 Chassis Utilizing a 4-port SmartMetrics/TeraMetrics XD Module

[Table 1-1 on page 12](#) describes the maximum number of ports and modules that can be used per chassis.

SmartBits 600B Chassis

The SmartBits 600B chassis (see [Figure 1-3](#)) is a portable ultra high-density network performance analysis chassis that has been designed to combine high port density, portability, compact design, and high-performance in a single system. It is compatible with the SmartBits 600/6000B/6000C chassis and can be synchronized with other chassis in an expansion connection to provide higher port density.

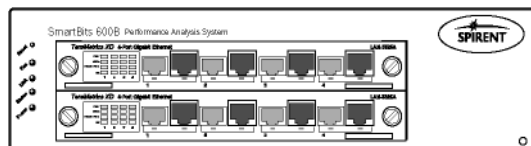


Figure 1-3. SmartBits 600B Chassis Utilizing Two 4-port SmartMetrics/TeraMetrics XD Modules

Table 1-1 describes the maximum number of ports and modules that can be used per chassis.

Table 1-1. Maximum Number of Ports and Modules per SmartBits 600/600B Chassis

Type of Module	SmartBits 600 ¹			SmartBits 600B ²		
	Maximum Ports per Module	Maximum Modules per Chassis	Maximum Total Ports per Chassis	Maximum Ports per Module	Maximum Modules per Chassis	Maximum Total Ports per Chassis
10/100 Mbps Ethernet						
non-XD modules only	8	2	16	8	2	16
Gigabit Ethernet						
1000 Mbps Ethernet (non-XD modules only)	4	2	8	4	2	8
10/100/1000 Mbps and Gigabit Ethernet Fiber SmartMetrics/TeraMetrics XD						
LAN-3306A, LAN-3324A, LAN-3325A	4	1 ¹	4	4	2	8
LAN-3320A, LAN-3321A	2	2 ³	4	2	2	4
LAN-3327A	1	2 ⁴	2	1	2	2
10 Gigabit Ethernet						
LAN-3710AL/AE	1	1	1	1	1	1
XLW-3720A/XLW-3721A	1	1	1	1	1	1
XFP-3730A/XFP-3731A	Not Supported			1	2	2
Fibre Channel						
1 and 2Gigabit Fibre Channel (FBC-3601A/ FBC-3602A)	2	2	4	2	2	4
POS Modules						
OC-3c/OC-12c POS	2	2	4	2	2	4
OC-48c POS	1	2	2	1	2	2
OC-192c POS	1	1	1	1	1	1

- 1 You must leave an **empty slot above** any 4-port SmartMetrics/TeraMetrics XD module. Cover the empty slot with a blank panel. When using a 4-port XD module, a second module is not allowed.
- 2 Supports any combination of SmartMetrics/TeraMetrics XD modules or other SmartBits compatible modules.
- 3 When installing a LAN-3321A with an XD Security Module in a SmartBits chassis, you must leave an **empty slot above** each module.
- 4 The SmartBits 600 chassis supports only one LAN-3327A with an XD Security Module. The other module slot can contain either a LAN-3321A or a LAN-3327A without an XD Security Module.

SmartBits 6000B Chassis

Designed to meet ever-increasing port density, the SmartBits 6000B chassis ([Figure 1-4](#)) delivers high port density and functionality at the lowest cost per port. A single SmartBits 6000B chassis holds up to 12 modules that can support up to 96 10/100 Ethernet ports, 24 Gigabit Ethernet ports, 6 10 Gbps Ethernet ports, 24 POS ports, 12 Fibre Channel ports, or a combination of these port types. SmartBits 6000B chassis can be daisy-chained in an expansion connection to achieve higher port density.

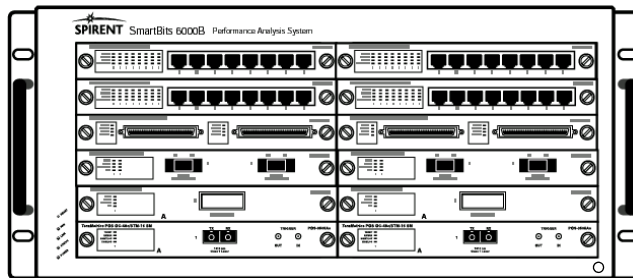


Figure 1-4. SmartBits 6000B Chassis

[Table 1-2 on page 14](#) describes the maximum number of ports and modules that can be used per chassis.

SmartBits 6000C Chassis

The SmartBits 6000C chassis (*Figure 1-5*) is an ultra high-density network performance analysis test system with enhanced cooling and power capabilities that support full loads (up to 96 ports) of Spirent's powerful SmartBits modules. The SmartBits 6000C chassis performs the same functions, uses the same modules, and uses the same applications as the SmartBits 600x/6000B chassis.

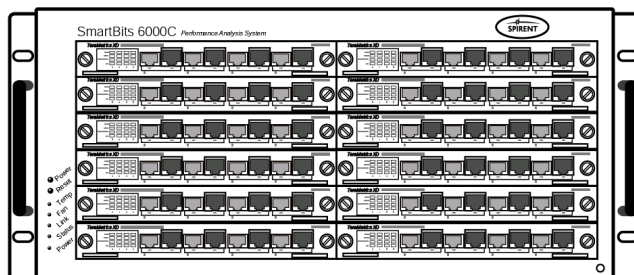


Figure 1-5. SmartBits 6000C Chassis

Table 1-2 on page 14 describes the maximum number of ports and modules that can be used per chassis.

Table 1-2. Maximum Number of Ports and Modules per SmartBits 6000B/6000C Chassis

Type of Module	SmartBits 6000B ^{1,2}			SmartBits 6000C ³		
	Maximum Ports per Module	Maximum Modules per Chassis	Maximum Total Ports per Chassis	Maximum Ports per Module	Maximum Modules per Chassis	Maximum Total Ports per Chassis
10/100 Mbps Ethernet						
non-XD modules only	8	12	96	8	12	96
Gigabit Ethernet						
1000 Mbps Ethernet (non-XD modules only)	4	12	48	4	12	48
10/100/1000 Mbps and Gigabit Ethernet Fiber SmartMetrics/TeraMetrics XD						
LAN-3306A, LAN-3324A, LAN-3325A	4	6 ⁴	24	4	12	48
LAN-3320A, LAN-3321A	2	12 ⁵	24	2	12	24
LAN-3327A	1	12	12	1	12	12

Table 1-2. Maximum Number of Ports and Modules per SmartBits 6000B/6000C Chassis (continued)

Type of Module	SmartBits 6000B ^{1, 2}			SmartBits 6000C ³		
	Maximum Ports per Module	Maximum Modules per Chassis	Maximum Total Ports per Chassis	Maximum Ports per Module	Maximum Modules per Chassis	Maximum Total Ports per Chassis
10 Gigabit Ethernet						
LAN-3710AL/AE	1	6	6	1	6	6
XLW-3720A/XLW-3721A	1	6	6	1	6	6
XFP-3730A/XFP-3731A	Not Supported			1	12	12
Fibre Channel						
1 and 2 Gigabit Fibre Channel (FBC-3601A/ FBC-3602A)	2	12	24	2	12	24
POS Modules						
OC-3c/OC-12c POS	2	12	24	2	12	24
OC-48c POS	1	12	12	1	12	12
OC-192c POS	1	6	6	1	6	6

- 1 You must leave an **empty slot above** any 4-port SmartMetrics/TeraMetrics XD module. Cover the empty slot with a blank panel. Other available chassis slots can be filled with any 1- or 2-port SmartMetrics/TeraMetrics XD modules, or any other SmartBits 600x/6000x compatible modules.
- 2 It is recommended that all SmartBits 6000B chassis received an enclosure upgrade prior to operating SmartMetrics/TeraMetrics XD modules. Contact your Spirent Communications sales representative.
- 3 Supports any combination of SmartMetrics/TeraMetrics XD modules or other SmartBits compatible modules.
- 4 Due to cooling requirements, you must leave an empty slot above each of these XD modules if used with this SmartBits chassis. Be sure to cover the empty slots with blank panels.
- 5 When installing a LAN-3321A with an XD Security Module in a SmartBits 6000B chassis, you must leave an **empty slot above** each module.

SmartBits 6000B Cover Replacement

The SmartBits 6000B chassis offers a new cover replacement (P/N 300-4181-011) that maximizes optimal ventilation, thereby allowing more flexibility in the use of SmartBits modules.

This cover removes the previous restriction of not being able to use more than four POS-3518As/AR or POS-3519As/AR modules per chassis. This cover also optimizes the chassis cooling when the chassis is populated with XLW-3720A and XLW-3721A XENPAK modules.

It is also recommended that all SmartBits 6000B chassis receive a cover replacement upgrade prior to operating SmartMetrics/TeraMetrics XD modules.

To purchase a new cover, contact your Spirent Communications Sales Representative.

SmartBits 6000C Chassis Enhancements

The SmartBits 6000C chassis ([Figure 1-6](#)) is like the SmartBits 6000B but with the following enhancements:

- Front panel Power button. This allows safe removal and insertion of SmartBits modules without having to use the master (AC) power switch on the rear of the chassis.
- Over-temperature thermal sense circuitry and front panel (TEMP) indicator. (See [“Over-temperature Sequence Condition \(SmartBits 6000C\)” on page 72.](#))
- New SmartBits 6000C front panel Power and Reset buttons, and LEDs. The LEDs are described in [Table 3-1 on page 71.](#)
- Rear panel power switch. Contains a circuit breaker eliminating the use of fuses (see [“SmartBits 6000C Circuit Breaker” on page 83.](#))
- Stronger power supply – maximum AC power consumption: 1600W.
- Increased cooling.

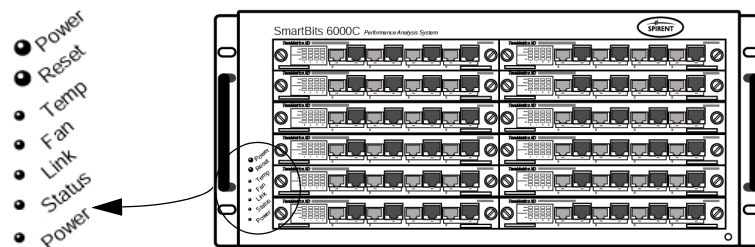


Figure 1-6. Front Panel on a SmartBits 6000C Chassis

SmartBits Applications

The following SmartBits software applications are available for use on the SmartBits 600x/6000x chassis:

- AST II (Advanced Switch Tests)
- Avalanche SmartBits
- Block Storage Tester
- Fabric Services Tester
- SAN Routing Tester
- SmartApplications
- SmartBits Automation
- SmartCableModem Test
- SmartFabric
- SmartFlow
- SmartLibrary
- SmartMulticastIP
- SmartTCP
- SmartVoIPQoS
- SmartWindow
- SmartxDSL
- Spirent Connect
- TeraRouting Tester
- TeraVPN Tester
- Turn Up Connect
- WebSuite



Note: For the latest software applications, release notes, online help, and updates to manuals, check the Spirent Communications website at <http://support.spirentcom.com>.

Supported Modules

Table 1-3 is a list of SmartBits 600x/6000x chassis supported modules and their connector types. For a complete description of each module, plus cabling information, refer to the appropriate module chapter in the *SmartBits System Reference* manual.

Table 1-3. SmartBits 600x/6000x Supported Modules

Module	Description	Connector
ATM-3451A	ATM OC-3c (STM-1c), 2-port, multi-mode, 1300nm, TeraMetrics module	SC Fiber
ATM-3451As	ATM OC-3c (STM-1c), 2-port, single mode, 1310nm, TeraMetrics module	SC Fiber
ATM-3453A	ATM OC-3c/OC-12c (STM-1c/STM-4c), 2-port, multi-mode, 1300nm, TeraMetrics module	SC Fiber
ATM-3453As	ATM OC-3c/OC-12c (STM-1c/STM-4c), 2-port, single mode, 1310nm, TeraMetrics module	SC Fiber
FBC-3601A	Fibre Channel 1G, 2-port, SmartMetrics module	GBIC
FBC-3602A	Fibre Channel 1G and 2G, 2-port, SmartMetrics module	GBIC
LAN-3100A	10/100Base-TX Ethernet, 8-port module	RJ-45
LAN-3101B	10/100Base-TX Ethernet, 6-port, SmartMetrics module	RJ-45
LAN-3102A	10/100Base-TX Ethernet, 2-port, SmartMetrics module	RJ-45
LAN-3111A	100Base-FX Ethernet, 6-port, multi-mode, 1300nm, SmartMetrics module	LC Connector
LAN-3111As	100Base-FX Ethernet, 6-port, single mode, 1310nm, SmartMetrics module	LC Connector
LAN-3200A	1000Base-SX Ethernet, 2-port, multi-mode, 850nm module	SC Fiber
LAN-3200As	1000Base-LX Ethernet, 2-port, single mode, 1310nm module	SC Fiber
LAN-3201B	1000Base Ethernet, GBIC, 1-port, SmartMetrics module	GBIC
LAN-3201C	1000Base Ethernet, GBIC, 1-port, SmartMetrics module	GBIC
LAN-3300A	10/100/1000Base-T Ethernet, Copper, 2-port, SmartMetrics module	RJ-45
LAN-3301A	10/100/1000Base-T Ethernet, Copper, 2-port, TeraMetrics module	RJ-45
LAN-3302A	10/100Base-T Ethernet, Copper, 2-port, TeraMetrics module	RJ-45
LAN-3306A	10/100Base-T Ethernet, Copper, 4-port, TeraMetrics XD module	RJ-45
LAN-3310A	1000Base-X Ethernet, GBIC, 2-port, SmartMetrics module	GBIC

Table 1-3. SmartBits 600x/6000x Supported Modules (continued)

Module	Description	Connector
LAN-3311A	1000Base Ethernet, GBIC, 2-port, TeraMetrics module	GBIC
LAN-3320A	10/100/1000 Mbps and Gigabit Ethernet Fiber, 2-port, SmartMetrics XD module	RJ-45/SFP MSA Dual Media
LAN-3321A	10/100/1000 Mbps and Gigabit Ethernet Fiber, 2-port, TeraMetrics XD module	RJ-45/SFP MSA Dual Media
LAN-3324A	10/100/1000 Mbps and Gigabit Ethernet Fiber, 4-port, SmartMetrics XD module	RJ-45/SFP MSA Dual Media
LAN-3325A	10/100/1000 Mbps and Gigabit Ethernet Fiber, 4-port, TeraMetrics XD module	RJ-45/SFP MSA Dual Media
LAN-3327A	10/100/1000 Mbps and Gigabit Ethernet Fiber, 1-port, TeraMetrics XD module	RJ-45/SFP MSA Dual Media
LAN-3710AL	10GBase-LR Ethernet, 1-port, 2-slot, single mode, 1310nm module	SC Fiber
LAN-3710AE	10GBase-ER Ethernet, 1-port, 2-slot, single mode, 1550nm module	SC Fiber
POS-3500B	POS OC-3c/OC-12c (STM-1c/STM-4c), 1-port, multi-mode, 1300nm, SmartMetrics module	SC Fiber
POS-3500Bs	POS OC-3c/OC-12c (STM-1c/STM-4c), 1-port, single mode, 1310nm, SmartMetrics module	SC Fiber
POS-3504As	POS OC-48c (STM-16c), 1-port, single mode, 1310nm, SmartMetrics module	SC Fiber
POS-3504AR	POS OC-48c (STM-16c), 1-port, single mode, 1550nm, SmartMetrics module	SC Fiber
POS-3505As	POS OC-48c (STM-16c), 1-port, single mode, 1310nm, TeraMetrics module	SC Fiber
POS-3505AR	POS OC-48c (STM-16c), 1-port, single mode, 1550nm, TeraMetrics module	SC Fiber
POS-3510A	POS OC-3c/OC-12c (STM-1c/STM-4c), 2-port, multi-mode, 1300nm, SmartMetrics module	SC Fiber
POS-3510As	POS OC-3c/OC-12c (STM-1c/STM-4c), 2-port, single mode, 1310nm, SmartMetrics module	SC Fiber
POS-3511A	POS OC-3c/OC-12c (STM-1c/STM-4c), 2-port, multi-mode, 1300nm, TeraMetrics module	SC Fiber
POS-3511As	POS OC-3c/OC-12c (STM-1c/STM-4c), 2-port, single mode, 1310nm, TeraMetrics module	SC Fiber

Table 1-3. SmartBits 600x/6000x Supported Modules (continued)

Module	Description	Connector
POS-3518As	POS OC-192c (STM-64c), 1-port, 2-slot, single mode, 1310nm, SmartMetrics module	SC Fiber
POS-3518AR	POS OC-192c (STM-64c), 1-port, 2-slot, single mode, 1550nm, SmartMetrics module	SC Fiber
POS-3519As	POS OC-192c (STM-64c), 1-port, 2-slot, single mode, 1310nm, TeraMetrics module	SC Fiber
POS-3519AR	POS OC-192c (STM-64c), 1-port, 2-slot, single mode, 1550nm, TeraMetrics module	SC Fiber
XFP-3730A	10GBase Ethernet, XFP MSA, 1-port, 1-slot, SmartMetrics module	SC Fiber
XFP-3731A	10GBase Ethernet, XFP MSA, 1-port, 1-slot, TeraMetrics module	SC Fiber
XLW-3720A	10Gbps Ethernet, XENPAK MSA, 1-port, 2-slot, SmartMetrics module	XENPAK MSA SC
XLW-3721A	10Gbps Ethernet, XENPAK MSA, 1-port, 2-slot, TeraMetrics module	XENPAK MSA SC

Specifications

Specifications for the SmartBits 600x/6000x chassis are the same except as noted in [Table 1-4](#).

Table 1-4. SmartBits 600x/6000x Specifications

Category	Description
Dimensions	<p>SmartBits 600x chassis:</p> <p>Height: 3.26 in. (8.280 cm) without legs Height: 3.42 in. (8.687 cm) with legs Width: 12.25 in. (31.115 cm) Depth: 12.56 in. (31.910 cm) Weight: 5.25 lb (2.4 kg) fully loaded Shipping weight, approximately 7 lb. 12.7 oz. (3.535 kg) with two blank panels Shipping weight, approximately 7 lb. 9 oz. (3.430 kg) without blank panels</p> <p>SmartBits 6000B chassis:</p> <p>Height: 8.5 in. (21.59 cm) Width: 19 in. (48.26 cm) Depth: 16.5 in. (41.91 cm) Weight: 45 lb (20.41 kg) fully loaded Shipping weight, approximately 48 lb (21.77 kg)</p> <p>SmartBits 6000C chassis:</p> <p>Height: 8.5 in. (21.59 cm) Width: 19 in. (48.26 cm) Depth: 19.75 in. (50.16 cm) Weight: 54 lb (24.49 kg) fully loaded Shipping weight, approximately 58 lb (26.31 kg)</p>
Input Power	<p>SmartBits 600x: 2 Amp, 250V AC, 50-60 Hz SmartBits 6000B: 10 Amp, 250V AC, 50-60 Hz SmartBits 6000C: 15 Amp, 250V AC, 50-60 Hz circuit breaker</p> <p>Controllable over the Internet or from a PC with Windows 2000/NT/XP</p>
Number of Slots	<p>SmartBits 600x – 2 SmartBits 6000B/6000C – 12</p>
Max number of Ports	<p>SmartBits 600x – 16 SmartBits 6000x – 96</p>

Table 1-4. SmartBits 600x/6000x Specifications (continued)

Category	Description
Front Panel LEDs	SmartBits 600x – POWER, FAN, LINK, STATUS SmartBits 6000B – POWER, FAN, LINK, STATUS SmartBits 6000C – POWER and RESET switches; TEMP, FAN, LINK, STATUS, POWER indicators
Back Panel LEDs	SmartBits 600x/6000x – ACT/COL (Activity/Collision), LINK/ ERR (Link/Error), HDX/FDX (Full/Half Duplex), and 10/100M (10/100 Base Ethernet)
Connectors	RS-232 for workstation connection RJ-45 10/100Base-T connector for Ethernet connection RJ-45 Expansion In/Out connectors for multiple chassis connection Connectors to attach to an optional GPS/CDMA receiver
Layout Requirements	Must have unimpeded airflow into the fans at the side of the chassis Must meet EMI guidelines (see “Safety Requirements” on page 23) Must be positioned to meet ESD requirements (see Appendix E, “ESD Requirements”) See Appendix A, “Multiple Chassis Local Connect” for connection and layout information.
GPS/CDMA Option	Available Cabling Interface Kits – ACC-1020, ACC-1040, ACC-1060
NTP Operation	Available
Operating temperature	59-104°F (15-40°C). Must have unimpeded airflow into the fans at the side of the chassis.
Operating Humidity	20 to 80% relative humidity, non-condensing.
Applications Supported	See “SmartBits Applications” on page 17
Modules Supported	See “Supported Modules” on page 18

Safety Requirements

Emissions

- FCC Part 15 Compliant
- EMI Class A Standard

Safety

- CSA Listed (CSA 22.2 No. 22)
- TUV (IEC 950) approved

The SmartBits 600x/6000x chassis are marked in conformity with the following European Commission Directives:

- The Low Voltage Directive (72/23/EEC)
- The Electromagnetic Compatibility Directive (89/336/EEC)
- The CE Marking Directive (93/68/EEC)

FCC PART 15 Statement

This equipment has been tested and found to comply with the limits for a CE Mark class A digital devices, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Re-orient or re-locate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

SmartBits Compliance with CE Requirements

All SmartBits products, including chassis and SmartCards/modules, are designed and manufactured in compliance with CE directives on EMI and EMC Class A standards, as indicated by the CE Mark on the products. The CE Mark and declaration of conformity are made by submitting each product to an independent, EU-certified test lab. In this lab, each SmartBits card/module is tested individually while installed in the chassis that supports it. All certifications (including details of test configuration with photographs) are available to any customer who requires a copy.

The CE mark establishes a generic compatibility among different equipment in terms of EMI emissions. The CE directive (as with the equivalent FCC Part 15 directives) is an established standard in terms of laboratory support, available tools, and resources. It is currently the most commonly recognized and accepted engineering practice in designing electronic equipment. Spirent Communications designs and produces its products in conformance with CE directives in order to quantify performance measurements, with the ultimate goal of designing the best possible products in every respect.

To obtain the CE Mark declaration of conformity, each SmartBits product must pass the following standard tests:

- EN 50081-1 Electro-Magnetic Emission Standard
- EN 50082-1 Electro-Magnetic Immunity Standard
- EN-55022 Radiated and Conducted Emissions Standard
- IEC 801-2 Electro-Static Discharge Standard
- IEC 801-3 Radiated Immunity Standard
- IEC 801-4 Electrical Fast Transients/Burst Standard
- EN 61000 Power Analysis Harmonics and Flicker Standard

Guidelines on Equipment Use

In general, any equipment that is in compliance with the tests listed above will work well in a standard industrial environment. Such equipment will present minimum interference and similarly will experience minimum interference from other nearby equipment. Having passed the above tests, however, does not guarantee that the equipment will work in a “strong” EMI environment. Furthermore, it is difficult to specify what constitutes a “strong” EMI environment in the absence of any measurement standard.

With respect to SmartBits systems and cards, a typically equipped operating lab should cause no interference provided that all other equipment is in minimum compliance with CE Mark requirements.

To ensure that SmartBits systems perform well in your environment, observe the following guidelines when installing and using SmartBits in your lab:

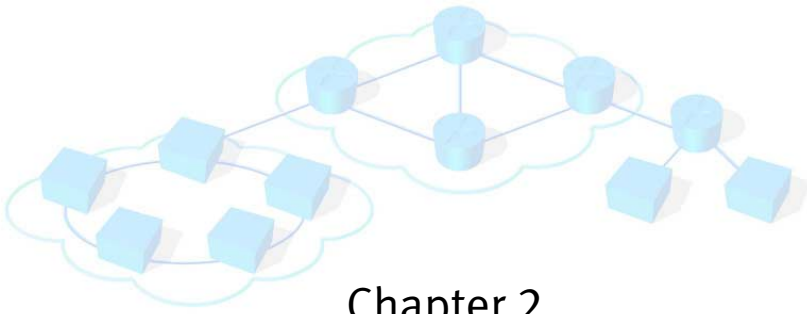
- All cables must be terminated, both at the SmartBits and at the DUT. Do not leave an unused port with a cable plugged in and dangling.
- Use only certified cable in any SmartBits Ethernet port (both control port and test ports).
- Use only yellow optical cable with SmartBits ports that support single-mode optics.
- Use only orange or gray optical cable with SmartBits ports that support multi-mode optics.
- All SmartBits cards and modules should be fully inserted into the chassis, and all thumb screws should be tightened.
- In a crowded engineering prototype lab, be careful of the layout of test cables used to connect the SmartBits and devices under test. Avoid passing test cables over or under other DUT or live equipment. If test cables are very long, avoid looping cables around live equipment.



Important: Use the ferrite clamp supplied with each SmartBits chassis on one end of the Ethernet cable connecting the SmartBits to the LAN or to the PC.

- Use common sense. For example, a test or control cable laid over the AC power supply of an open DUT will most likely produce faulty measurement results.





Chapter 2

Installation and Setup

In this chapter . . .

This chapter contains the following topics:

- **Summary of Installation Procedures 28**
- **Procedure 1: Check the System Requirements 29**
- **Procedure 2: Check the Chassis and Package 30**
- **Procedure 3: Install SmartBits Applications 32**
- **Procedure 4: Connect SmartBits to PC, Power, and LAN 34**
- **Procedure 5: Install the Ferrite Block 36**
- **Procedure 6: Connect the SmartBits Power Cord 38**
- **Procedure 7: Start SmartWindow 38**
- **Procedure 8: Set the IP Address 41**
- **Procedure 9: Confirm the Ethernet Link 51**
- **Procedure 10: Update Firmware Version (optional) 56**
- **Procedure 11: Connect SmartBits to an Application 65**
- **Procedure 12: Connect to the DUT and Check Cabling 67**

Summary of Installation Procedures

This chapter explains how to install your SmartBits 600x/6000x chassis. A description of the following procedures is provided:

Check SmartBits Requirements and Package Contents

- 1 Check the system requirements (see [page 29](#)).
- 2 Check the SmartBits chassis and package (see [page 30](#)).

Install Application and Review Documentation

- 3 Install the SmartBits application software onto your PC. Print/review important Release Notes for the chassis and module firmware, and for the applications. Print user documentation now or later, as needed (see [page 32](#)).

Set up SmartBits

- 4 Connect the SmartBits to a power outlet, to a PC for initial IP address configuration and software management, and to your LAN (see [page 34](#)).
- 5 Install the ferrite block onto the Ethernet cable (see [page 36](#)).
- 6 Start SmartWindow (see [page 38](#)).
- 7 Set up the SmartBits IP address (see [page 41](#)).
- 8 Assign the *Netmask* and *Gateway* values for the SmartBits chassis using HyperTerminal or Telnet. (See [Appendix D](#), “*Serial Port and Telnet Commands*.”)
- 9 Confirm the Ethernet link: Ping the Ethernet link between the PC and SmartBits; if unsuccessful, check the TCP/IP stack on the PC and add the appropriate IP address (see [page 51](#)).
- 10 Update module or chassis firmware if needed (optional) (see [page 56](#)).

Connect SmartBits to an Application

- 11 Configure the SmartWindow-to-SmartBits Ethernet connection (see [page 65](#)).

Connect SmartBits to the DUT

- 12 Connect SmartBits to the device(s) under test, check cabling, and ensure that EMI guidelines are met. Then use SmartWindow, SmartLibrary, or any other SmartBits test software to access and use the capabilities of the SmartBits system (see [page 67](#)).

For more detailed explanations of these procedures, refer to the sections that follow.

Procedure 1: Check the System Requirements

You must have the following hardware and software in order to use a SmartBits 600x/6000x chassis. Review these requirements carefully to ensure successful installation.

PC/UNIX Workstation Requirements

- An IBM compatible PC (400 MHz Pentium III recommended) or a UNIX workstation with the following items:
 - One 10/100Base-T UTP cable and a 10 Mbps or 10/100 Mbps Ethernet NIC card installed in the PC.
 - Minimum of 128 MB RAM; 256 MB RAM is recommended.
 - Minimum 40 MB space on the hard drive; a 4 GB (or larger) hard drive is recommended.
 - A 3.5 in. (8.9 cm.) high density floppy disk drive, a mouse, and a SVGA color monitor or equivalent.
 - Serial port capable of running at least 38,400 baud.
 - CD-ROM drive
- Microsoft Windows 2000 Pro SP4, NT SP6a, XP SP1a (for PCs)
- Solaris OS 7.0 (aka 2.7) and 8.0 (aka 2.8)
- Linux OS Red Hat 7.3 and Red Hat EL 3
- TCL 8.3.5 and 8.4.5 support
- Microsoft Terminal or HyperTerminal or another communications application.
- Acrobat Reader 5.0 **or later** with extended Search functionality for Windows. Required by Windows users who want to view and search SmartBits documentation, including the SmartLibrary Documentation Catalog.
- Acrobat Reader 5.0 with extended Search functionality for UNIX. Required by UNIX users who want to view and search SmartBits documentation, including the SmartLibrary Documentation Catalog. (Versions of Acrobat Reader later than 5.0 do not currently support the extended Search function on UNIX operating systems.) When using Acrobat Reader 5.0, Linux and Solaris users may experience limitations in the extended Search capabilities used to navigate the SmartLibrary Documentation Catalog. Please refer to the *SmartLibrary Release Notes* for more information.

SmartBits Minimum Requirements

- A SmartBits 600x/6000x chassis (with one or more ordered modules, card panels, and firmware installed).
- Chassis firmware version 2.60 or higher.
- SmartWindow, SmartLibrary, or SmartApplications (supplied and to be installed on the PC that is connected to the SmartBits chassis). Use these applications to configure SmartBits to test your device.



Note: SmartBits systems can be controlled by using the various SmartBits Windows-based applications (including SmartWindow and SmartApplications) or by using SmartBits applications that support both Windows and UNIX (including SmartLibrary). For details regarding each of these application's specific PC/workstation memory and operating system requirements, refer to the Release Notes shipped with each software product.

Procedure 2: Check the Chassis and Package

Review the contents of the SmartBits package and follow these important guidelines if you are rearranging any modules in the chassis.

Checking the SmartBits Package

The following standard items are shipped with each SmartBits chassis. Check your package to ensure you have received all of the items listed here:

- A SmartBits 600x/6000x chassis (with two or more ordered modules, with card panels and firmware installed).
- Cable Kit 620-5000-003, which includes:
 - One black power cord, either domestic or European.
 - One white 10 ft. (3.048 m.) crossover Ethernet LAN cable (RJ-45); used to connect the SmartBits chassis directly to a PC.
 - One blue 10 ft. (3.048 m.) straight-through Ethernet LAN cable (RJ-45); used to connect SmartBits chassis to a LAN.
 - One purple 3 ft. (.9144 m.) straight-through Ethernet LAN cable (RJ-45); used to connect one SmartBits chassis to another SmartBits chassis.
 - One DB9-to-DB9 cable; used to connect the SmartBits auxiliary serial port to a PC serial port when setting the first-time IP address of the SmartBits chassis.
 - Two DB9-to-DB25 adapters; if using the optional serial port cable connection.
 - One Ferrite block; connects onto the Ethernet cable that attaches the SmartBits chassis to your network or a hub. The ferrite block reduces potential EMI interference.

- SmartBits application CDs for bundled and optional software packages.
- SmartBits 3.5 in. (8.9 cm) firmware disks or a SmartBits firmware CD.
- SmartBits 3.5 in. (8.9 cm) Key File disk(s) (for optional applications ordered; not required for SmartWindow, SmartLibrary, or SmartApplications).
- SmartBits Documentation CD (for SmartWindow, SmartLibrary, and SmartApplications user guidess).
- *SmartBits 600x/6000x Installation Guide* (this document).

Adding or Rearranging Modules

Each SmartBits 600x chassis can hold up to two modules; each SmartBits 6000x chassis can accommodate up to 12 modules. The connector and interface for each module slot on either chassis is configured identically. Therefore, any SmartBits module may be installed into any SmartBits 600x/6000x chassis module slot. (Note that some SmartBits modules require two SmartBits 600x/6000x chassis slots or have other special installation requirements.



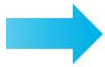
- Warnings:**
- Always turn the power off to the SmartBits chassis before inserting or removing modules.
 - All unused slots **MUST BE COVERED** with the provided blank face-plates to maximize airflow inside the chassis and reduce ambient noise level.

Procedure 3: Install SmartBits Applications

Before proceeding with the chassis setup and installation, you should:

- Install the SmartBits applications software.
- Print/review the Release Notes, which sometimes have important last-minute installation and test setup details not included in this installation guide.
- Print user documentation now or later, as needed.

Installing the SmartBits Applications



To install SmartBits applications:

- 1 To install the core applications (SmartWindow, SmartLibrary, and SmartApplications), insert each SmartBits CD into the CD-ROM drive of your PC.
- 2 If the autoplay on your PC does not automatically start the installation, click on the **setup.exe** file in the *Setup* folder on the CD. The Installation Wizard will prompt you to install the specific application.

To install the SmartLibrary programming library, follow the instructions in the SmartLibrary documentation or Release Notes.



Note: Documentation for the SmartBits chassis, as well as for SmartWindow, SmartLibrary, and SmartApplications (user guides and reference manuals), is provided on the SmartBits Documentation CD. Documentation for additional software applications is provided on the CD for each application.

- 3 If you have purchased any optional SmartBits software applications, such as SmartFlow, you will have an additional CD per application, which will provide both the software and the user guide for that application. You may wish to install those applications now.
- 4 If you purchased any optional SmartBits applications, such as SmartFlow, you should also have a 3.5 in. (8.9 cm.) disk which contains one or more key files needed to run the optional application. Be sure to copy the licensed **<application>key.txt** file into the program directory of each optional application. (Also refer to “*Key Files*” on page 117.)



Important: If you do not install the required key file for an optional application and you access the software, you will receive an error message and automatically be placed in demo mode.

Printing/Reviewing the Release Notes

It is important to check the Release Notes for your SmartBits products and highlight key items that may affect your installation, test configuration, or test results. Release Notes will inform you of important last-minute requirements or changes in each product.

Locate the appropriate Release Notes (readme.pdf files):

- On the SmartBits firmware CD.
- In the applications directory of each installed application.
- At the Spirent Communications Customer Service Center website located at <http://support.spirentcom.com>.

Take a few minutes to review the Release Notes for critical information.

Printing User Guide and Reference Manuals

For each application, programming library, or script option, you may wish to print the related documentation either now or later, as needed.

Core documentation resides on the *SmartBits Documentation CD* (for SmartWindow, SmartLibrary, and SmartApplications). The user guide for each optional application resides on the CD for each application.



Important: To view and search SmartBits documentation, including the SmartLibrary Documentation Catalog, Adobe Acrobat Reader must be installed on your PC or workstation. Please see “*PC/UNIX Workstation Requirements*” on page 29 for the versions of Acrobat Reader required for use on Windows and UNIX platforms. The required versions of Adobe Acrobat Reader are provided on the SmartBits Documentation Set CD that is shipped with your SmartBits chassis. This software is also available on the Internet at www.adobe.com.

For the best print quality, use a postscript printer. The print driver you use may also affect the print quality. For the best results, use one of the Adobe postscript print drivers for your printer model. You can download these print drivers from the Internet at www.adobe.com.

Procedure 4: Connect SmartBits to PC, Power, and LAN

This procedure explains how to connect the back panel connectors on your SmartBits chassis. We recommend that you complete Procedures 4 through 10 before you connect to an application or device under test (Procedures 11/12).

The back panel connectors of the SmartBits 600x/6000x chassis are identical. The chassis differ only in the location of the power supply connector and the ON/OFF switch.

Figure 2-1 shows the back panel on a SmartBits 6000C chassis.

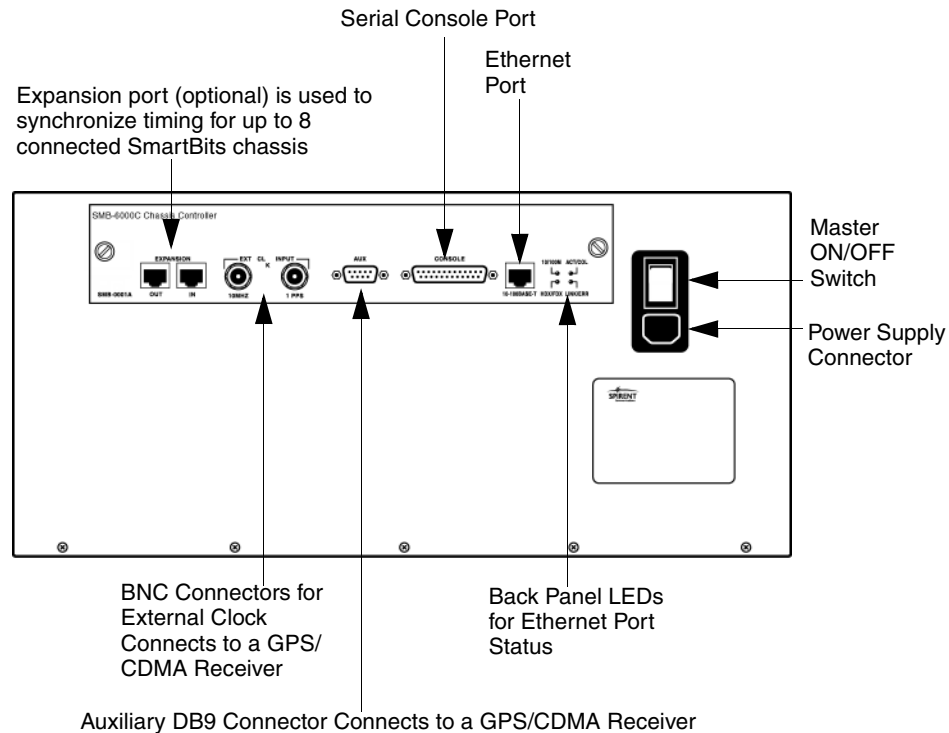


Figure 2-1. SmartBits 6000C Chassis Back Panel Connectors

Table 2-1 describes the back-panel connectors, their functions, and the cables to be used for each connector.

Table 2-1. SmartBits Chassis Connections and Cables

Connect the SmartBits chassis...	to ...	using this cable...
Power supply connector located on the back panel	Power outlet	Power cord
CONSOLE port (DB25) – for IP address assignment and other administrative uses	PC Serial port (RS-232)	DB9-to-DB9 cable (plus two DB9-to-DB25 adapters if needed)
10/100BASE-T (RJ-45) port – to connect a SmartBits chassis to applications and to the network	Your hub or LAN	Blue 10 ft. (3.048 m.) straight-through Ethernet LAN cable
10/100BASE-T (RJ-45) port – To connect a SmartBits chassis directly to a PC using the Default IP Address	PC	White 10 ft. (3.048 m.) Ethernet crossover cable
EXPANSION OUT or IN RJ-45 port (optional)	Another SmartBits chassis and its RJ-45 EXPANSION IN port	Purple 3 ft. (.9144 m.) straight-through LAN cable
EXT CLK INPUT port 10 MHz ¹ 1 PPS	An external timing device	RG58 coaxial cable (BNC)
AUX (DB9) (for GPS/CDMA)	A GPS or CDMA external time reference receiver	Not included with the chassis. ¹

¹ These specifications are for interfacing to specific External Time Reference devices. For further information, see the *Using GPS/CDMA with SmartBits Chassis User Guide* (P/N 340-0106-001)



Important: If you are connecting multiple SmartBits chassis for your test environment, it is critical to power up the chassis in the correct sequence or the test results may be invalid. Refer to *Appendix A, “Multiple Chassis Local Connect”* for details. To connect multiple chassis remotely via GPS/CDMA or a modem, refer to the *Using GPS/CDMA with SmartBits Chassis User Guide*.

Procedure 5: Install the Ferrite Block

This procedure describes how to attach the ferrite block to the Ethernet cable **before** connecting the cable to your SmartBits chassis.

The ferrite block is designed to absorb excess electronic magnetic interference (EMI) that is transferred through the Ethernet cable to your SmartBits chassis. This prevents potential damage to your SmartBits chassis and module and helps ensure that test data is not corrupted.

The ferrite block (see [Figure 2-2](#)) is packaged as part of the Base Unit Cable Kit that is sent with your SmartBits chassis.



Figure 2-2. Ferrite Block



Warning: Before you begin using your SmartBits chassis, make sure that you have attached the ferrite block to the Ethernet cable using the procedure below.

Installing the Ferrite Block



To install the ferrite block:

- 1 Remove the ferrite block and the Ethernet cable from the Base Unit Cable Kit package.
- 2 Release the built-in clip on the side of the ferrite block and open it so that the center of the ferrite block faces up. Place the Ethernet cable in the open ferrite block (see [Figure 2-3 on page 37](#), #1).
- 3 Clamp the ferrite block around the Ethernet cable making sure the built-in clip snaps together (see [Figure 2-3 on page 37](#), #2).
- 4 Connect the Ethernet cable to the chassis (see [Figure 2-3 on page 37](#), #3).

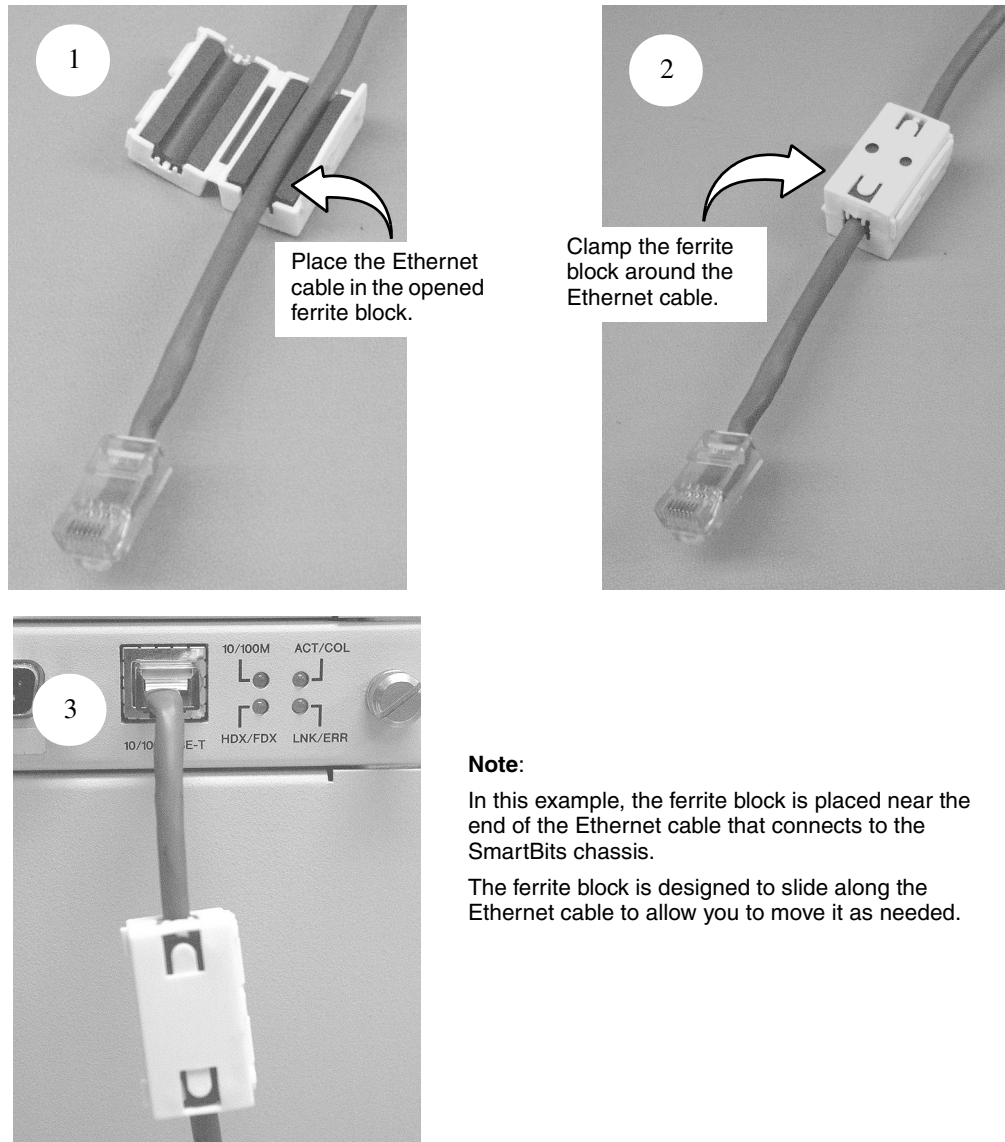


Figure 2-3. Ferrite Block Installation

Procedure 6: Connect the SmartBits Power Cord

Before establishing actual SmartBits-to-PC communication, you need to connect the power cord to the SmartBits back panel and then activate power. Based on your order, your shipment will contain either a standard 110 AC power cord (USA), or an international 220 AC power cord (either for Continental Europe or the United Kingdom). (Other locations may require a customer-provided cable or adapter.



To connect the power cord and activate power:

- 1 Plug the female end of the power cord into the power cord connector on the back of the SmartBits chassis.
- 2 Plug the other end of the power cord into the electrical outlet.
- 3 Activate power by switching the SmartBits chassis power switch to ON (I).

Procedure 7: Start SmartWindow

Once SmartWindow is installed (see “[Procedure 3: Install SmartBits Applications](#)” on [page 32](#)), you can launch the program in two ways:

- Double-click on the SmartWindow icon on your desktop.
- Use the **Start** button on the task bar. Select **Start > Programs > SmartBits Systems Applications > SmartWindow**.



Note: The information contained in this procedure only describes the basic start-up information when using a SmartBits chassis and SmartWindow. For a complete description of SmartWindow configuration and other options, refer to the *SmartWindow User Guide* or the SmartWindow online Help.

SmartWindow Launcher

When SmartWindow opens, it displays the *SmartWindow Launcher*. Use the Launcher to select the target SmartBits chassis.



Note: Use a single mouse-click to select any icon from the Launcher.

Shortcuts Tab

The Launcher opens with the *SmartBits Shortcuts* tab displayed. Use this to organize access to the SmartBits that you use frequently. Select **Add New SmartBits Shortcut** to set up access to a chassis (*Figure 2-4, left*).

If you have already added shortcuts, they appear on the tab (*Figure 2-4, right*). When you select one of these, SmartWindow opens your saved configuration file.

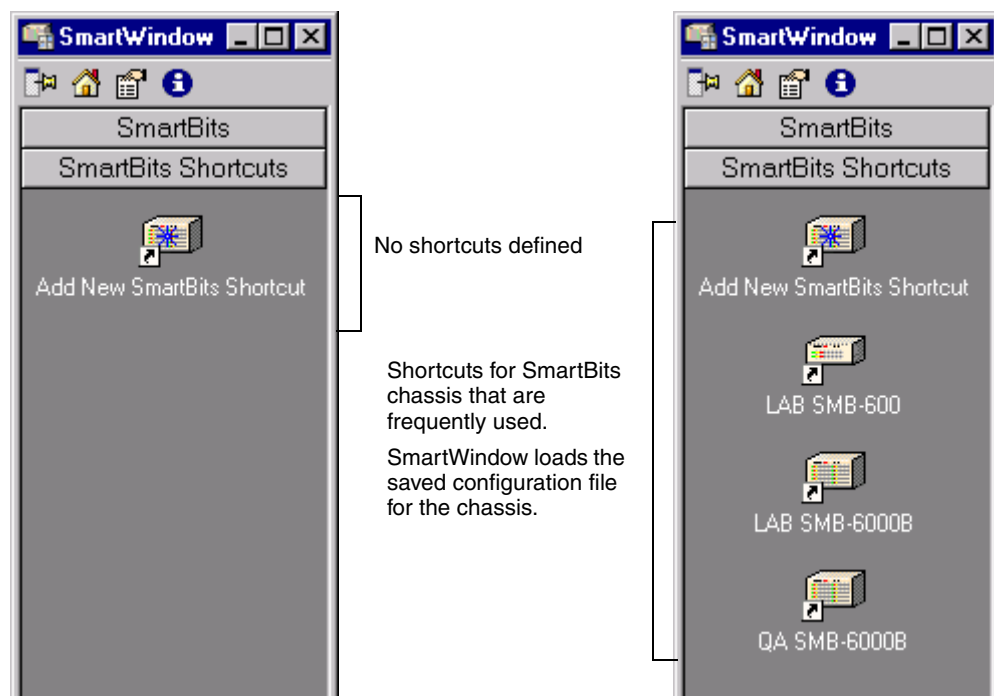


Figure 2-4. SmartBits Tab (SmartWindow Launcher)

SmartBits Tab

The *SmartBits* tab displays icons for each type of SmartBits chassis:

- SMB-200 – SmartBits 200
- SMB-2000 – SmartBits 2000
- SMB-600(B) – SmartBits 600 or SmartBits 600B
- SMB-6000(B/C) – SmartBits 6000B or SmartBits 6000C

When you select one of these, the Launcher displays the GUI for that chassis type (*Figure 2-5*). It opens a default configuration file. This tab can be used to set up a test configuration offline, before connecting to the SmartBits chassis to run a test.

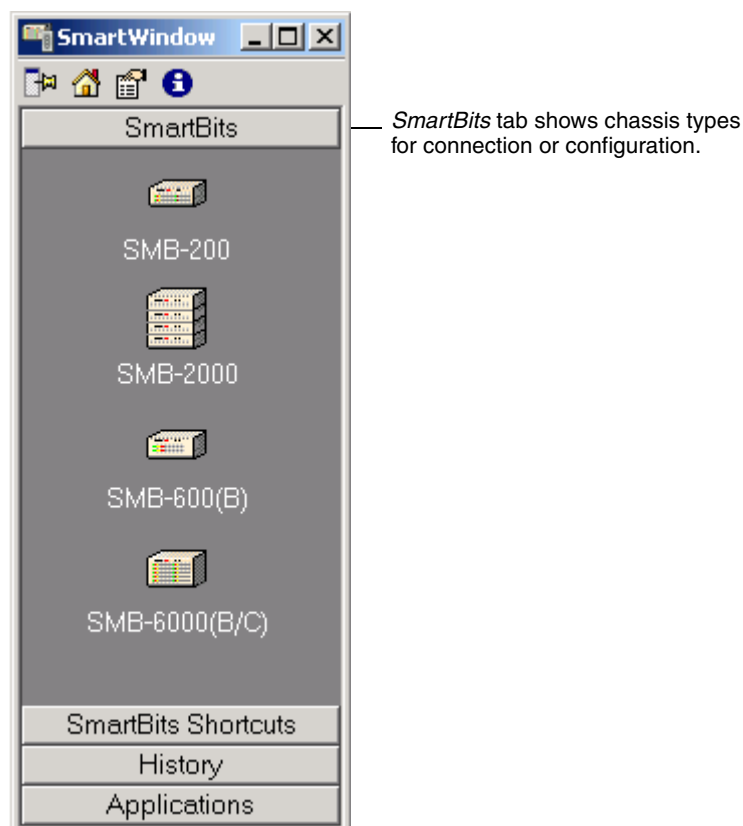


Figure 2-5. SmartBits Tab (SmartWindow Launcher)

Connecting to the SmartBits Chassis

When you select an icon on the *SmartBits* tab, SmartWindow tries to find an accessible SmartBits chassis of the selected type and connect to it.

The Launcher informs you of its progress (*Figure 2-6*). If it cannot find a chassis, you may need to check the setup connections shown in “*Procedure 4: Connect SmartBits to PC, Power, and LAN*” on page 34.



Figure 2-6. Connection Status Messages (SmartBits Tab)

Procedure 8: Set the IP Address

All SmartBits chassis are now designed with a default IP address of 192.168.0.100. This feature enables quick and easy connection/start up of your chassis without the need of a serial cable connection. This procedure is described on *page 42*.

If you prefer not to use the default IP address and want to set a unique IP address in an unconfigured SmartBits chassis, you can use any of the following means to do so:

- HyperTerminal (serial port) – see *page 43*
- Telnet (Ethernet) – see *page 47*
- SmartWindow (Ethernet) – see *page 48*.

Default IP Address Connection

To establish a default IP Address connection, you need to connect the chassis directly to a PC using the white, 10-foot (3.048 m), RJ-45 Ethernet crossover cable (Spirent part number 620-0083-001), included in your SmartBits shipment.



To connect the chassis to a PC using the crossover cable:

- 1 Locate the blue, 10-foot, RJ-45 Ethernet crossover cable included in your SmartBits package.
- 2 Plug the chassis to its power source.
- 3 Turn the chassis ON (I).
- 4 Connect the crossover cable between the SmartBits chassis' Ethernet Management Port (10/100BASE-T) connector and the PC NIC card.
- 5 Reconfigure the PC to use the same Subnet as the SmartBits chassis (example: reconfigure the NIC card to 192.168.0.101 with a Mask of 255.255.255.0).
- 6 If needed, reset the PC in order for the new IP address to take effect. (For some PC operating systems this step is necessary.)
- 7 Verify that the status light on the front of the chassis is green (see [Table 3-1 on page 71](#)).
- 8 When the PC is ready, use the DOS prompt and ping the SmartBits chassis (see [“Pinging the SmartBits IP Address” on page 52](#)). At the DOS prompt type in:
> ping 192.168.0.100.



Important: If the ping does not work, refer to the following sections of this manual for more information:

- Check that your cable connection is in place from [“Procedure 4: Connect SmartBits to PC, Power, and LAN” on page 34](#).
- [“Checking the TCP/IP Stack/Address/Gateway on Your PC” on page 53](#).
- [“Procedure 9: Confirm the Ethernet Link” on page 51](#).
- [Chapter 4, “Troubleshooting and Maintenance.”](#)

You may now connect a SmartBits application (such as SmartWindow) to the chassis.

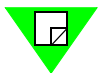
Setting the IP Address via HyperTerminal

The following procedure references the HyperTerminal application, which is included with Microsoft Windows. However, you can use any equivalent ASCII terminal emulator application.

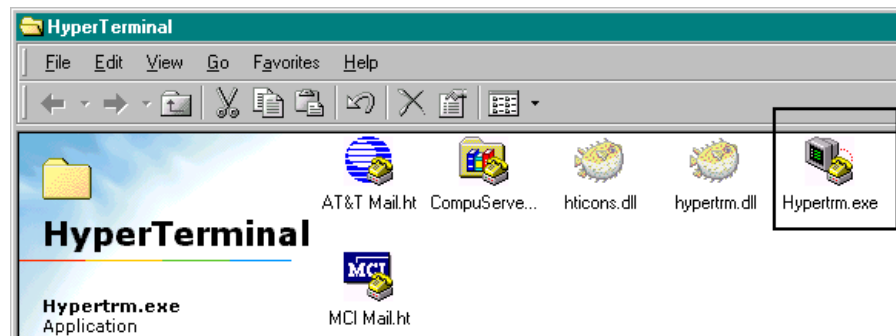


To set the IP Address via HyperTerminal:

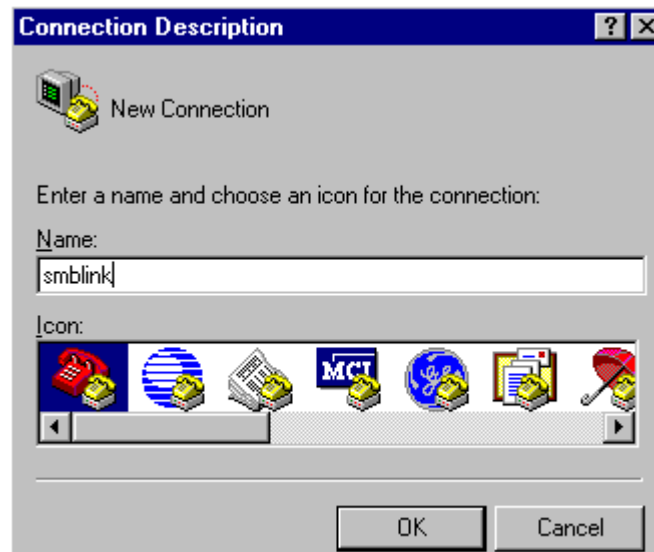
- 1 Select **Start > Programs > Accessories > HyperTerminal**. The following window opens.



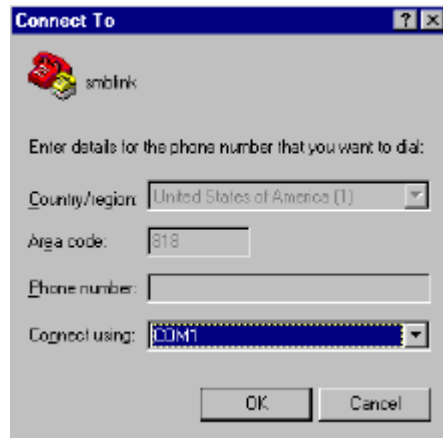
Note: Depending on the Windows version that you are running, you may see another menu after the **Start > Programs > Accessories > HyperTerminal** menu. Select **HyperTerminal** from that menu. This will bring you directly to Step 3.



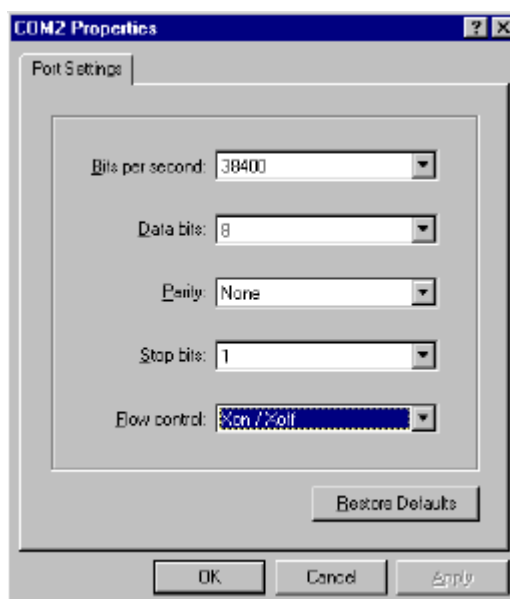
- 2 Double-click on **Hypertrm.exe** to see the Connection Description window.
- 3 In the Connection Description window, enter a name for the new connection. Select the link you are making. In this example, we are using **smbblink**. Click **OK**.



- 4 In the Connect To window beside the *Connect using* field, select **COM** (1, 2, 3, or 4). Click **OK** to access the COM Properties window.



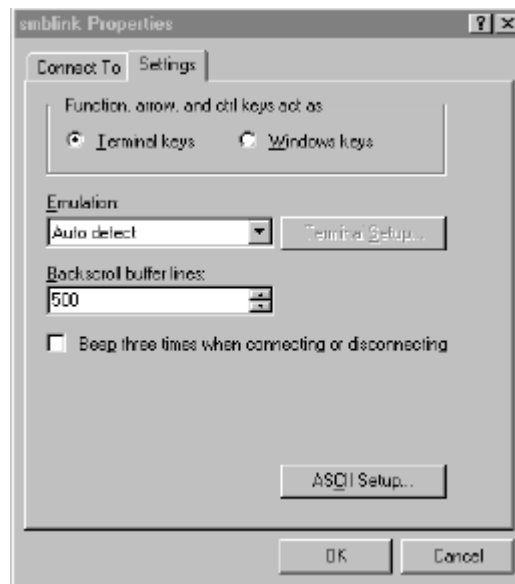
- 5 Set the port settings (38400, 8, None, 1, and Xon/Xoff) as shown in the Properties window below, and then click **OK**.



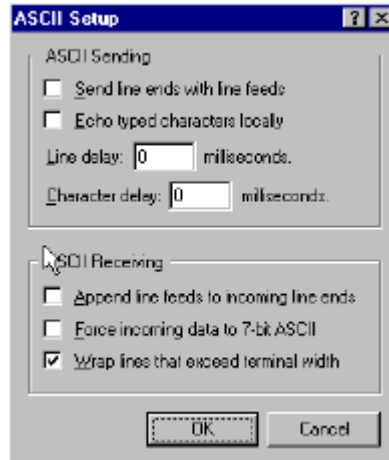
- 6 In the HyperTerminal Console Command window which then appears, click the **Properties** button as shown below (or choose **File > Properties**).



- 7 In the Properties window on the *Settings* tab, set the *Emulation* field to **Auto detect** or **VT100**. Click **OK**.



- 8 Click the **ASCII Setup** button. To enable local echo (which allows characters to appear in the terminal window), make sure the *Echo typed characters locally* box is unchecked. Click **OK**.



- 9 Save your settings by using the **File** menu **Save** or **Save As** command in the HyperTerminal Console Command window.
- 10 Close HyperTerminal and then reopen HyperTerminal with the saved configuration (for the settings to take effect).
- If you receive garbled characters, check your settings shown in the Properties window in [Step 5 on page 44](#).



Important: If the chassis has already completed its startup before HyperTerminal is open, press **Esc** for a menu prompt.

- 11 To display the current or default IP address, enter **ipaddr**, and then press **Return**. The terminal window will look similar to the following screen:

```
>>ipaddr
Unmodified IP Address is: 192.169.100.27.
```

- 12 Set the IP address after you have checked with your system or network administrator for the correct IP address. For example, to set the IP address to 192.169.100.19, you would enter `ipaddr 192.169.100.19`.
- 13 Assign the Gateway and Netmask values for the chassis. (See [Appendix D, “Serial Port and Telnet Commands.”](#))
- 14 When you have finished, you can check to be sure the IP address was entered correctly by entering **ipaddr** and then press **Return**.
- 15 Save the configuration setup using the **SAVE** command.
- 16 Power off the SmartBits chassis and then power it back on.



Important: You must reset (power cycle) the SmartBits chassis to implement the IP address change.

Setting the IP Address via Telnet

Telnet uses the same commands that are available on the console port and provides a means for Spirent's Customer Support group to access a customer's SmartBits chassis for troubleshooting. In the following example we are using a SmartBits 600x chassis.



To set the IP Address via Telnet:

- 1 Start a telnet session on your PC or workstation using your preferred Telnet Interface software.
- 2 Connect to the SmartBits 600x chassis by providing the chassis default IP address (192.168.0.100) to the Telnet software. You should see the following prompt:

```
SmartBits SMB-600 Chassis  
Copyright @ 2003, Spirent Communications  
login:
```
- 3 At the prompt, type:
login <enter>
- 4 Once connected, you should see the same command prompt, ">>", as if you are connected over the console port.
- 5 Follow steps 10 through 13 on [page 46](#).
- 6 To disconnect from the chassis, type:
quit <enter>

Setting the IP Address via SmartWindow

To set the IP Address using SmartWindow, you can use the Serial CONSOLE port or the 10/100BASE-T Ethernet port for a point-to-point connection from your SmartBits chassis to your PC. This configuration is used to set up the SmartBits IP address for the first time, and can be used to run applications as well.



- Notes:**
- You must have SmartWindow 6.53 Build 19 or later to use this feature, and you must be *Offline* to access *Connection Setup*.
 - The Serial CONSOLE port is used for making a point-to-point connection only. To run SmartWindow, you must use the 10/100BASE-T port.

Make sure the SmartBits chassis is connected to the PC with the white Ethernet (RJ-45) crossover cable.

Setting or Changing the IP Address via SmartWindow

You can launch the program in two ways:

- Double-click on the SmartWindow icon on your desktop.
- Use the **Start** button on the task bar. Select **Start > Programs > SmartBits Systems Applications > SmartWindow**.



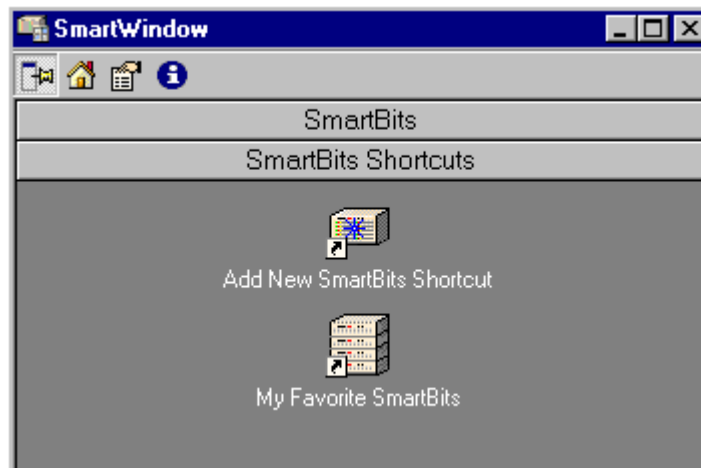
Note: Before you proceed any further, you must add *Allow Admin=1* to the Smartbit6k.ini file. To do this, open the SmartBit.ini file C:\WINNT\Smartbit6k.ini file, and add **Allow Admin=1** as follows:

```
smartbit6k.ini - Notepad
File Edit Format Help
[Preferences]
Allow Admin=1
Show Startup Help=0
Startup Connect=0
Autoinitialize Ports=1
Select VFDs using bits=0
Reserve All After Connect=0
MII Set on File/Open=0
MII Initialize on connect=0
Initialize on connect=0
```

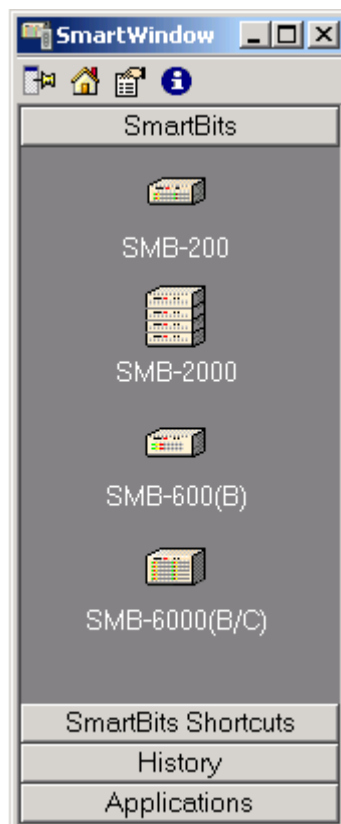


Important: After making the change to the Smartbit6k.ini file, reset the SmartBits chassis by closing and then reopening SmartWindow to enable the option.

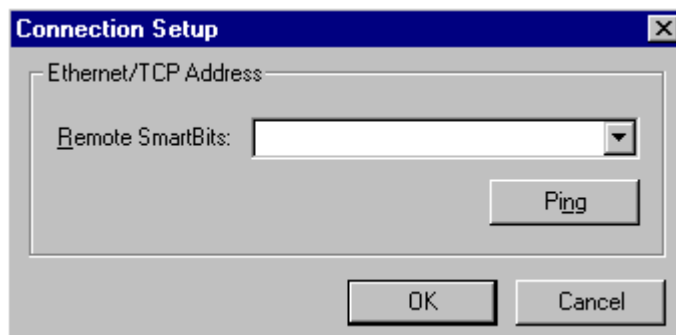
- 1 After launching SmartWindow, you will see the following window.



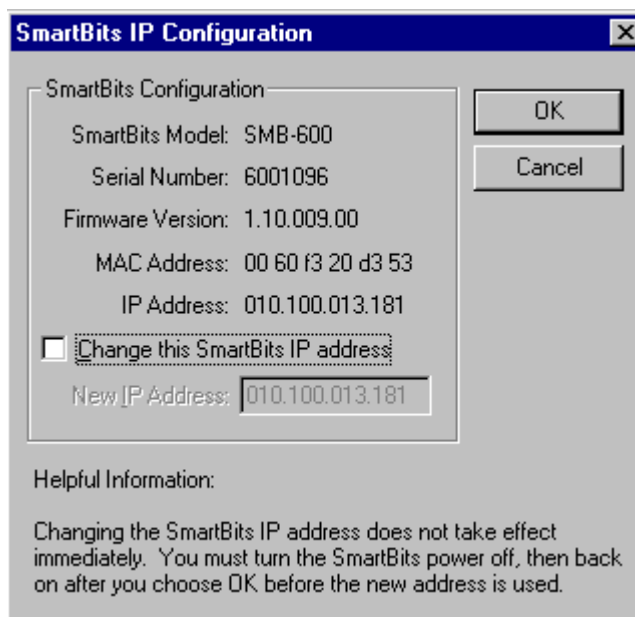
- 2 Click **SmartBits** and then select the type chassis you are using. (This example uses the **SMB-600**.)



- 3 Select **Options > Connection Setup**. You will see the following window.



- 4 Type in the default IP Address (192.168.0.100) and click **OK**.
- 5 Select **Actions > Connect** or choose the **Connect** icon.
- 6 Choose **Actions > Connect**, then choose **Admin > SmartBits IP Configuration**. The following window appears.



- 7 Click the box labeled **Change the SmartBits IP address**. Type in the IP address that you want to assign and click **OK**.
- 8 Choose **Actions > Disconnect**.
- 9 For the changes to take effect, reset the SmartBits chassis.

Procedure 9: Confirm the Ethernet Link



Note: If you have not already connected the chassis to a PC, hub, or network, do so now. Use a Category 5 UTP straight-through cable to connect the SmartBits Ethernet port to the local Ethernet network, or use a Category 5 UTP crossover cable to connect the SmartBits chassis to the PC's NIC.

Checking your Ethernet Cable Connection



To check the Ethernet link to the SmartBits chassis:

- 1 Check your Ethernet cable connection (from SmartBits to the PC, hub, or network).
- 2 Ping the Ethernet link between the PC and SmartBits.
- 3 If the ping does not work, check the TCP/IP stack on your PC. Set up the PC's IP address to be on the same subnet or on a different subnet from the SmartBits chassis, as needed. Add a gateway if needed.

Check that your Ethernet cable connection is in place from *“Procedure 4: Connect SmartBits to PC, Power, and LAN” on page 34*, or connect the cables now, as needed.

PC on Same Subnet as SmartBits 600x/6000x Chassis

To connect a PC on the same local subnet as the SmartBits chassis, you can connect the PC to the chassis locally through either of the following connections:

- A direct connection using a crossover Ethernet cable.
- Through a hub or other network device using a straight-through Ethernet cable.

Direct Connection Locally. You can connect the SmartBits chassis directly to the PC Network module using a crossover cable. A crossover (MDI-X) cable is made with the transmit and receive wires crossed to allow two PCs with 10 Base-T Ethernet modules to make a “back-to-back” connection without using a hub.

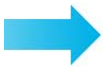
- 1 Connect one end of a crossover cable to the Ethernet module (NIC) in the PC.
- 2 Connect the other end of the crossover cable to the 10/100BASE-T (RJ-45) connector located on the back of the SmartBits chassis.

The LINK LED next to the 10/100BASE-T connector on the SmartBits chassis should light. If the LINK LED does not light, refer to *Chapter 4, “Troubleshooting and Maintenance.”*

Local Connection through a Hub. If you are connecting the controlling PC to a SmartBits chassis through a hub or network device, you must connect the chassis to the hub or network using a straight-through Ethernet cable (a blue Ethernet 10 inch [25.4 cm.] cable is provided).

The LINK LED will light when a cable is connected from the hub to the SmartBits chassis. If the LINK LED does not light, refer to [Chapter 4, “Troubleshooting and Maintenance.”](#)

Pinging the SmartBits IP Address



To ping the SmartBits chassis IP address to confirm that the Ethernet link is working:

- 1 On your PC, open an MS-DOS prompt by selecting **Start > Programs > MS-DOS Prompt.**
- 2 Ping the SmartBits IP address on the remote subnet as shown below, with the ping command followed by the IP address. A series of four replies indicates that the link is working.

```
Microsoft(R) Windows 95
(C)Copyright Microsoft Corp 1981-1996.
C:\WINDOWS>ping 192.169.100.19
Pinging 192.169.100.19 with 32 bytes of data:
Reply from 192.169.100.19: bytes=32 time=5ms TTL=255
Reply from 192.169.100.19: bytes=32 time=1ms TTL=255
Reply from 192.169.100.19: bytes=32 time=3ms TTL=255
Reply from 192.169.100.19: bytes=32 time=1ms TTL=255
C:\WINDOWS>_
```

- 3 If you were unable to ping the address, proceed to the next topic, [“Checking the TCP/IP Stack/Address/Gateway on Your PC” on page 53.](#)

Checking the TCP/IP Stack/Address/Gateway on Your PC

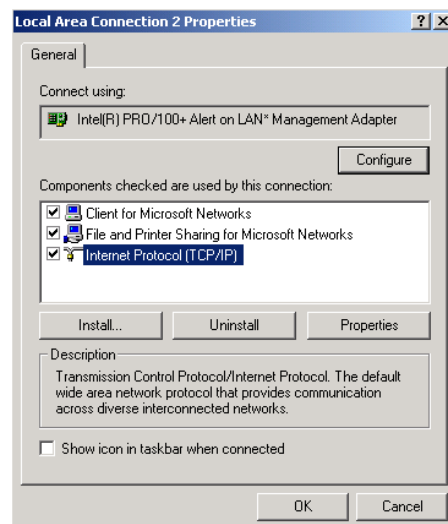
The PC must be configured for TCP/IP to be able to connect to the SmartBits chassis via Ethernet. If you are uncertain about how to configure TCP/IP on the controlling PC and how to specify the correct IP address, contact your local System Administrator.

To check these parameters, you must access the Network window and the related TCP/IP adapter for your Ethernet connection, and then define the PC's IP address and subnet mask as needed. If the PC is on a subnet different from that of the SmartBits chassis, you will also need to set a gateway address.



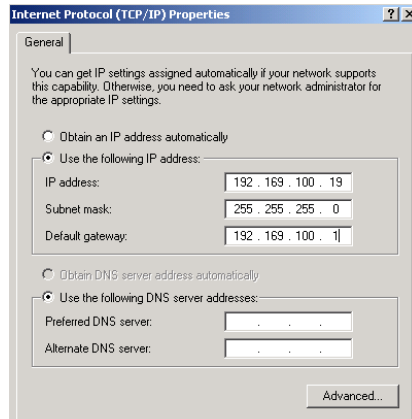
To check IP address parameters:

- 1 Select **Start > Settings > Control Panel**.
- 2 In the Control Panel window, click on **Network and Dial-up Connections**.
- 3 In the window that appears, right-click on **Local Area Connection** and select **Properties**.
- 4 In the next window, select the Ethernet interface to be used (e.g., Internet Protocol (TCP/IP) and click on **Properties**.



Note: Depending on the SmartWindow version you are running, you may see a different window after selecting **Start > Settings > Control Panel > Network**. For example, a PC Configuration window may appear. In this case, click on the **TCP/IP adapter card**, and then click on the **IP Address** tab to review IP address parameters.

- 5 Using the radio buttons, specify a new IP address for the PC if needed. For example, you can set an IP address of 192.169.100.19 and a subnet mask of 255.255.255.0. This means that systems on this same subnet will all have IP numbers that start with 192.169.100.

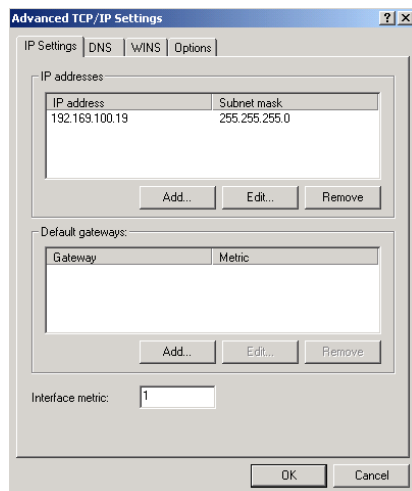


- 6 Set the Netmask and Gateway addresses (default for Netmask is 255.255.255.0 – default for Gateway is 192.169.100.1). Click **Apply**.

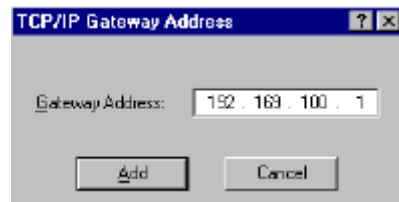


Note: The screens and procedures listed here may differ slightly depending on the SmartWindow version that you are running. You may see a different window after selecting **Start > Settings > Control Panel > Network**. For example, a PC Configuration window may appear. In this case, click on the **TCP/IP Adapter card**, and then click on the **IP Address Add** tab.

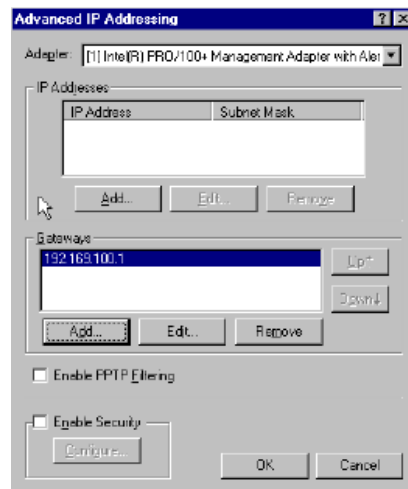
- 7 If your PC is on the same subnet as the subnet of your SmartBits chassis, proceed to step 9.
- 8 If your PC is on a different subnet from the subnet of your SmartBits chassis, you also need to add a gateway, which is the address of the connecting router. Select the **Advanced** tab in the window. The following window appears.



- 9 Click the **Add** button under the *Gateways* pane to add the new gateway address.
- 10 Enter the IP address of the router port for the subnet where the SmartBits chassis is located. In this example, the connecting chassis has an IP address of 192.169.100.19. Enter **192.169.100.19** and click **Add**.



The gateway address now appears in the *Gateways* pane (see the following figure).



- 11 Click **OK** to close the Advanced IP Addressing window.
- 12 Click **OK** to close the Network window.
- 13 Shut down and restart Windows 2000/NT/XP for the change to take effect.
- 14 Ping the SmartBits IP address again, as described on [page 52](#). If you are unable to ping the SmartBits chassis, refer to [Chapter 4, "Troubleshooting and Maintenance."](#)

Procedure 10: Update Firmware Version (optional)

Firmware for your new SmartBits has been factory installed and is also supplied on your firmware CD. However, when you purchase a new module, or wish to obtain the latest upgrade, you need to load new firmware. (See [Appendix C, “Download and Install Applications,”](#) for a detailed downloading/installing procedure.

You can obtain the firmware from these sources:

- Spirent Communications’ Customer Service Center website at: <http://support.spirentcom.com>.
- An email message from Spirent’s Technical Support department (no password required).

Checking the Current Firmware Version



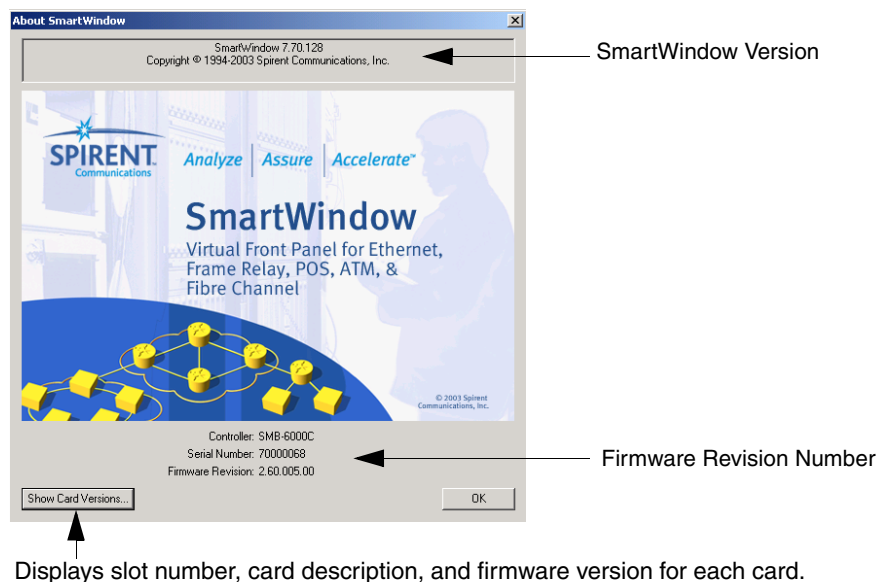
To determine the version level of the software you are using, look on the CD label, or:



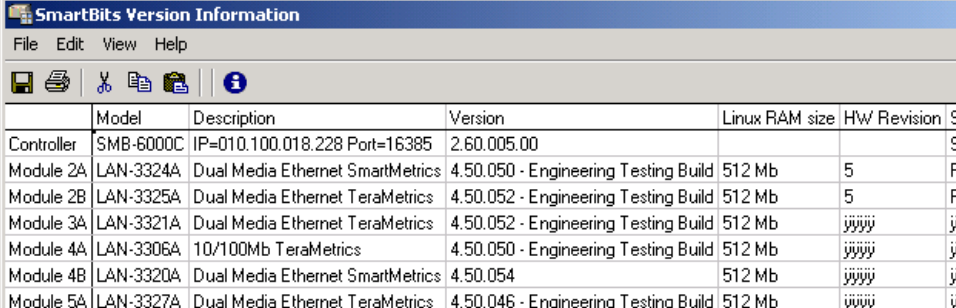
Note: You must be connected to a SmartBits chassis to perform the following tasks.

- 1 Select the **Help > About SmartWindow** option from the menu bar of the SmartWindow main menu.

You will see the following window. This window identifies the SmartWindow Version number, plus the Controller Type, Serial Number, and Firmware Revision number.



- Click **Show Card Versions** to display version information for the SmartBits chassis and installed cards. Below is an example of the window you will see. The window will vary depending on the modules you are using:

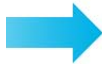


	Model	Description	Version	Linux RAM size	HW Revision	S
Controller	SMB-6000C	IP=010.100.018.228 Port=16385	2.60.005.00			S
Module 2A	LAN-3324A	Dual Media Ethernet SmartMetrics	4.50.050 - Engineering Testing Build	512 Mb	5	F
Module 2B	LAN-3325A	Dual Media Ethernet TeraMetrics	4.50.052 - Engineering Testing Build	512 Mb	5	F
Module 3A	LAN-3321A	Dual Media Ethernet TeraMetrics	4.50.052 - Engineering Testing Build	512 Mb	yyyyy	y
Module 4A	LAN-3306A	10/100Mb TeraMetrics	4.50.050 - Engineering Testing Build	512 Mb	yyyyy	y
Module 4B	LAN-3320A	Dual Media Ethernet SmartMetrics	4.50.054	512 Mb	yyyyy	y
Module 5A	LAN-3327A	Dual Media Ethernet TeraMetrics	4.50.046 - Engineering Testing Build	512 Mb	yyyyy	y



Note: In the multi-user interface, SmartWindow does not display card information unless the chassis is connected and the specified card is reserved. Only the component firmware version numbers are displayed in the SmartWindow Help About window, not the overall firmware release number. For information on reserving SmartCards/modules, refer to the documentation for the application that you are using.

Downloading Firmware from the Spirent Website or Email

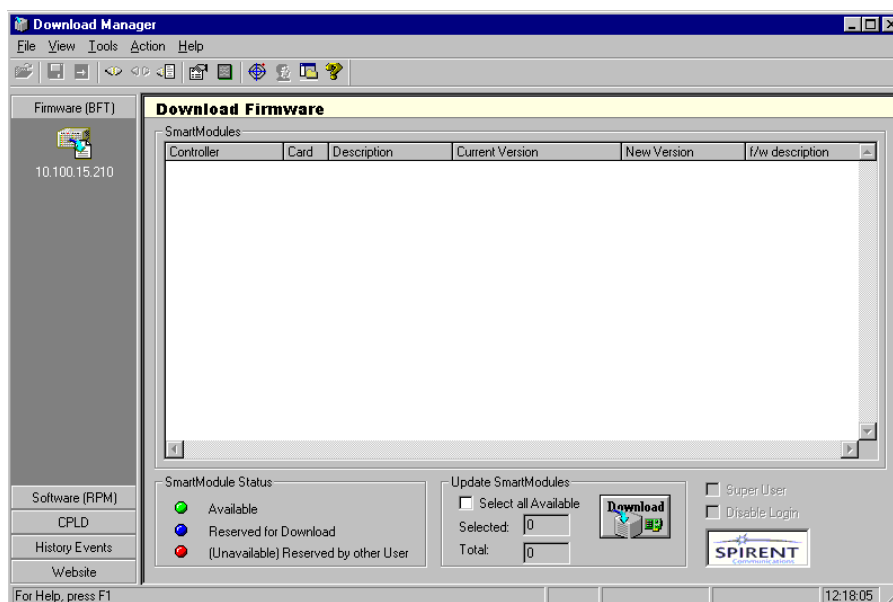


To download firmware updates from the Spirent website or an email message:



- Important:**
- Close all SmartBits applications such as SmartWindow and SmartApplications. If you keep an application open, the chassis connection will not be available.
 - All other users must be disconnected from the SmartBits chassis in order for files to be download to the chassis.
 - Firmware updates from the website are contained in **.exe** files that require a password obtained from Spirent Communications' Technical Support department.
- Contact Spirent Communications for one or more firmware passwords, by phone, fax, or email: support@spirentcom.com
 - Download the desired firmware **.exe** file(s) from the Spirent Communications' Customer Service Center website at <http://support.spirentcom.com> into the desired directory on your PC. Allow a minimum of 500 MB of free space on your local hard drive.
 - Select **Start > Run**. The Browse window appears.
 - In the Browse window, select the CD-ROM drive, select the **Setup.exe** file, and click **Open**.

- 5 Follow the on-screen prompts to install the firmware onto your hard drive. The firmware files are copied to the directory that you specify as shown below.
- 6 Once the firmware files are copied, locate the directory where the files were copied (see preceding window), and click on **fdlmgrr.exe**. This launches the Download Manager application, which you use to download the firmware. You will see the Download Firmware window shown below.



- 7 If you are downloading chassis firmware, make sure that Superuser mode is activated. To do this,
 - a Choose **Action > Preferences**. You will see the Download Manager Preferences window shown below.

Download Manager Preferences

At Login

☒ Enter SMB Superuser mode

Password: [REDACTED]

After Downloading files / After Update CPLD

☐ Reset Smartcard (owned) and disconnect.

☒ Go to History Events View

RPM Module

☒ Check RPM Installed versions when update

☐ Auto Mode:

Path to search BFT files / RPM files

☒ Same path as executable

Path to search: C:\Program Files\SmartBits\TeraMetrics Firmware\

Home page:

Address: http://www.netcomsystems.com/support/apps/smb6w/index.asp

SPIRENT

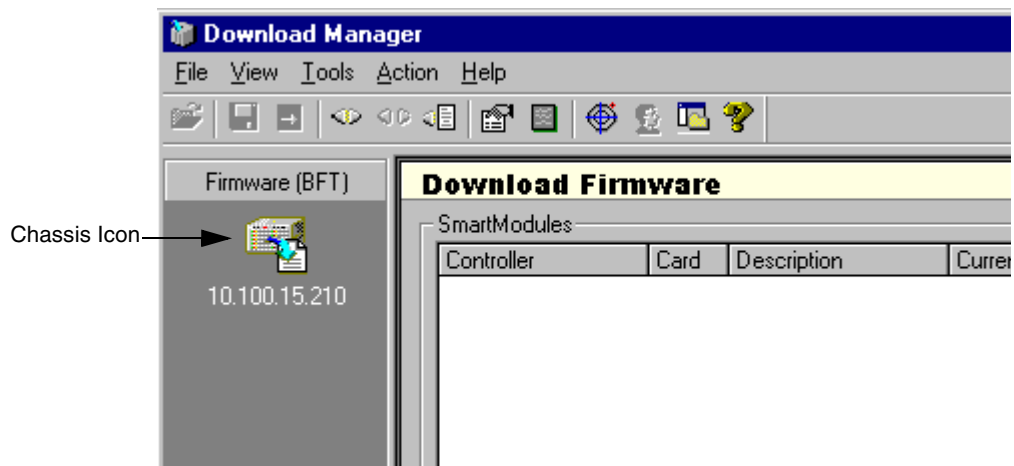
OK Cancel Default

- b Check the **Enter SMB Superuser mode** checkbox and enter the Superuser *Password* (default is **SMB-6000**). If you only plan to download module firmware, you do not need to activate the Superuser mode.
 - c Click **OK**. This takes you back to the Download Firmware window shown in Step 6 above.

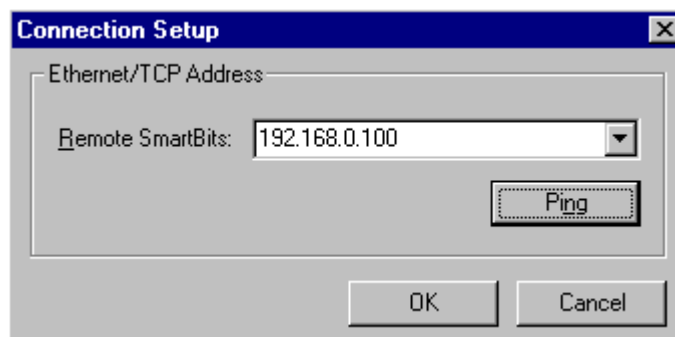


Important: It is important to record your password for easy reference. If you lose the password and later need the password to download new chassis firmware, you may need to return the chassis to the factory to reset the firmware.

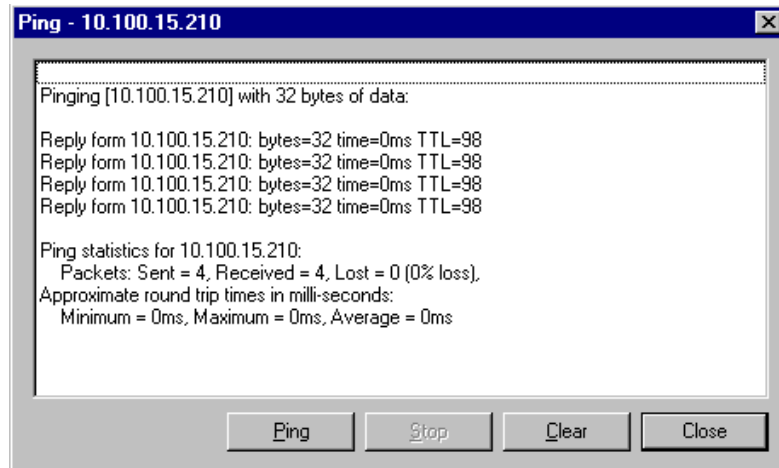
- 8 Click on the chassis icon.




The Connection Setup window appears.



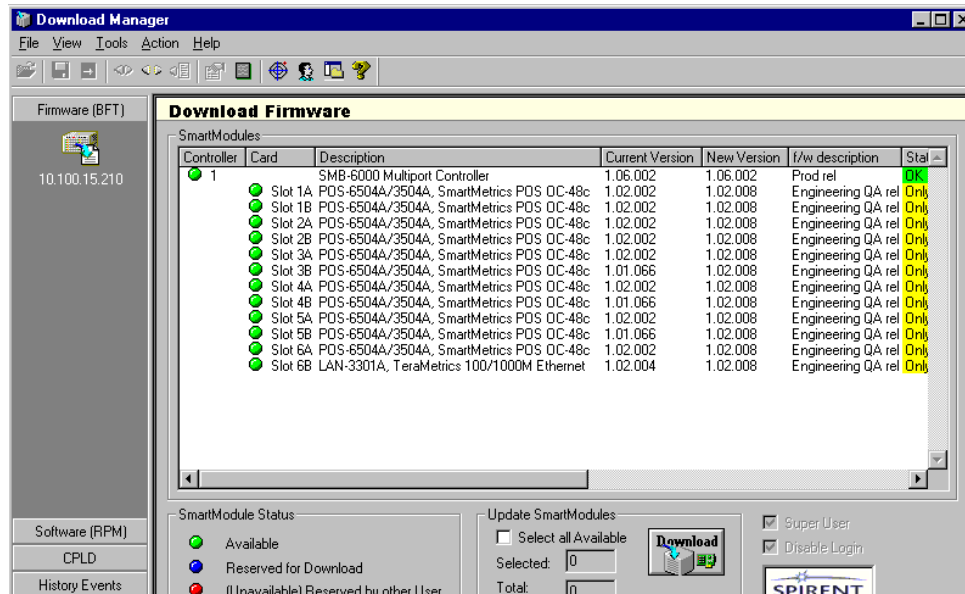
- 9 Enter the IP address of your SmartBits chassis (refer to “*Procedure 8: Set the IP Address*” on page 41). Click on the **Ping** button to make sure the connection is working properly. The following window appears.



Check to see if the system is “pinging;” click on **Close** and then click **OK** on the Connection Setup window.

- 10 There are three options for connecting to the chassis:
 - Select **Action > Connect** to connect to the chassis.
 - Press the **F8** key.
 - Click on the Connect icon  in the tool bar.

The Download Firmware window appears, displaying the current firmware versions for the chassis and for every module installed in the chassis.





Note: The letter *A* affixed to the slot number determines a left-hand port; the letter *B* affixed to the slot number determines a right-hand port.

11 Continue the firmware download procedure by following the steps in one of the following three sections:

- Download firmware to a non-TeraMetrics module
- Download firmware to an individual TeraMetrics module
- Download firmware to all TeraMetrics modules

Download Firmware to a Non-TeraMetrics Module



To download firmware to the chassis:

1 Maximize the Download Firmware window so that the *Status* column is displayed (if the Download Firmware window is not displayed, then select the **Firmware (BFT)** tab to display it).

Download Firmware						
SmartModules						
Controller	Card	Description	Current Version	New Version	f/w description	Status
1		SMB-6000 Multiport Controller	1.06.002	1.06.002	Prod rel	OK
	Slot 1A	POS-6504A/3504A, SmartMetrics POS OC-48c	1.02.002	1.02.008	Engineering QA rel	Only can be used by RPM Download...
	Slot 1B	POS-6504A/3504A, SmartMetrics POS OC-48c	1.02.002	1.02.008	Engineering QA rel	Only can be used by RPM Download...
	Slot 2A	POS-6504A/3504A, SmartMetrics POS OC-48c	1.02.002	1.02.008	Engineering QA rel	Only can be used by RPM Download...
	Slot 2B	POS-6504A/3504A, SmartMetrics POS OC-48c	1.02.002	1.02.008	Engineering QA rel	Only can be used by RPM Download...
	Slot 3A	POS-6504A/3504A, SmartMetrics POS OC-48c	1.02.002	1.02.008	Engineering QA rel	Only can be used by RPM Download...
	Slot 3B	POS-6504A/3504A, SmartMetrics POS OC-48c	1.01.066	1.02.008	Engineering QA rel	Only can be used by RPM Download...
	Slot 4A	POS-6504A/3504A, SmartMetrics POS OC-48c	1.02.002	1.02.008	Engineering QA rel	Only can be used by RPM Download...
	Slot 4B	POS-6504A/3504A, SmartMetrics POS OC-48c	1.01.066	1.02.008	Engineering QA rel	Only can be used by RPM Download...
	Slot 5A	POS-6504A/3504A, SmartMetrics POS OC-48c	1.02.002	1.02.008	Engineering QA rel	Only can be used by RPM Download...
	Slot 5B	POS-6504A/3504A, SmartMetrics POS OC-48c	1.01.066	1.02.008	Engineering QA rel	Only can be used by RPM Download...
	Slot 6A	POS-6504A/3504A, SmartMetrics POS OC-48c	1.02.002	1.02.008	Engineering QA rel	Only can be used by RPM Download...
	Slot 6B	LAN-3301A, TeraMetrics 100/1000M Ethernet	1.02.004	1.02.008	Engineering QA rel	Only can be used by RPM Download...



Note: For non-TeraMetrics modules, an OK in the Status column indicates that a file is available for download. TeraMetrics modules will display the message “Only can be used by RPM download.”

2 Click the green button next to a chassis or module to reserve it for download (the button turns blue to indicate reserved status), or click the **Select All Available** box to reserve all listed non-TeraMetrics modules.

3 Click the **Download** button to load the firmware to the selected chassis/modules.



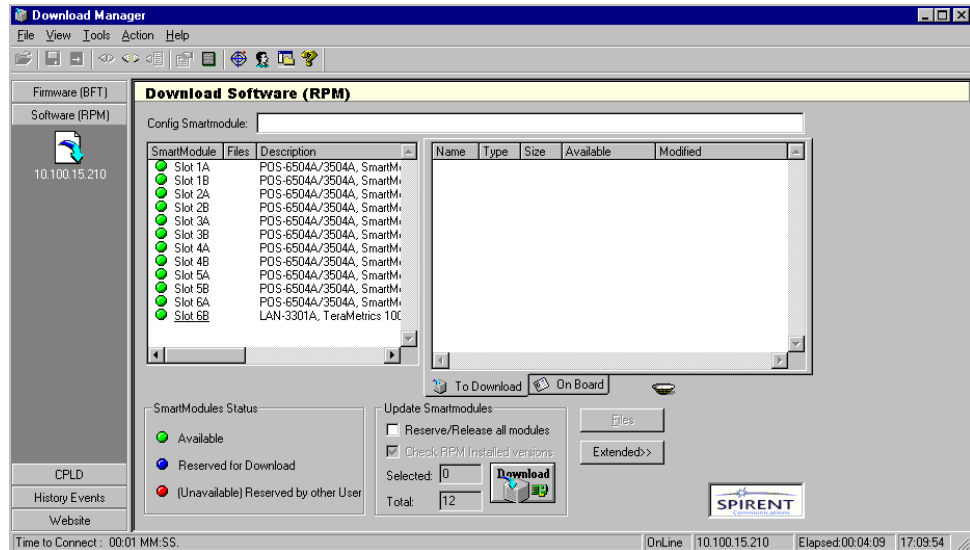
Note: To find out if there are other users active in the chassis, select **Action > Show Active Users**.

Download Firmware to an Individual TeraMetrics Module



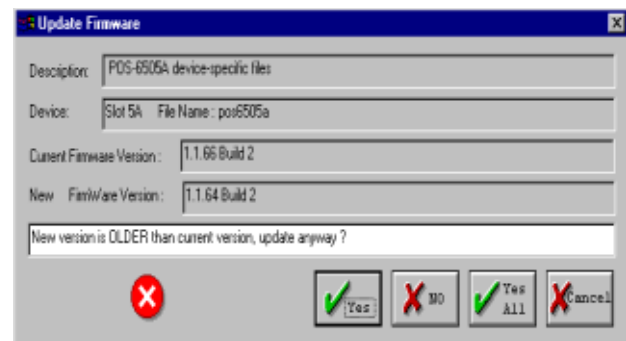
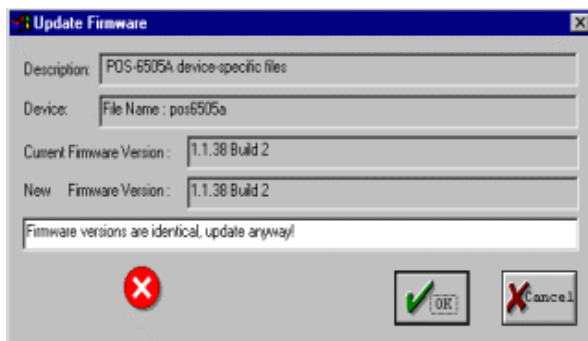
To download firmware to a TeraMetrics module:

- 1 Select the **Software (RPM)** tab. The Download Software (RPM) window appears, displaying the current firmware version of every TeraMetrics module installed in the chassis.



- 2 To reserve an individual TeraMetrics module, click the green button next to the module to reserve it for download (the button turns blue to indicate reserved status).
- 3 Select the **To Download** tab, then click the **Files** button and select **Add**.
- 4 Using the mouse and the Ctrl key or Shift key, select the .rpm file(s) that you want to download to the selected module and then select **Open**. You must select the appropriate .rpm file(s) for each TeraMetrics module.

If the version of the firmware that you are downloading is older or the same as the version you already are using, you will see one of the following windows:



- 5 Click the **Download** button to download the .rpm file(s).



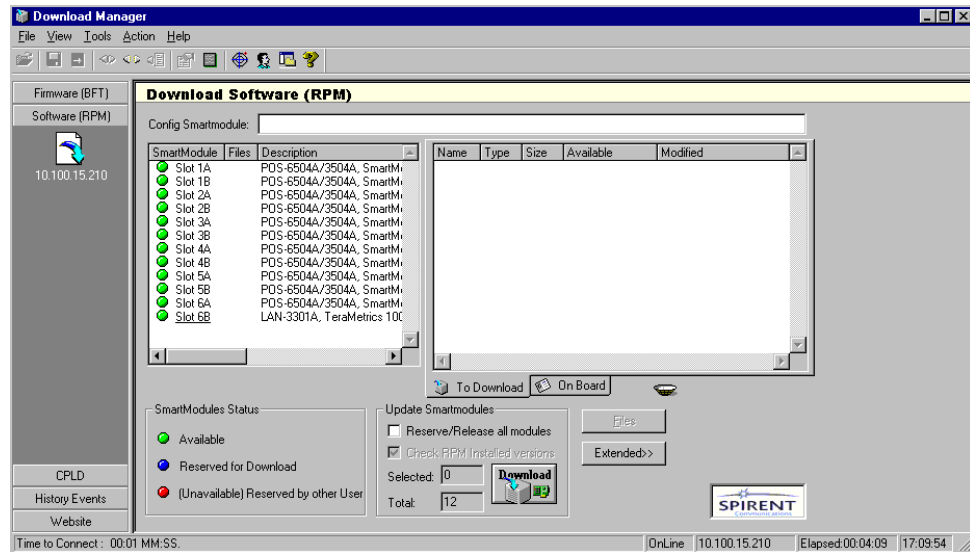
Note: To find out if there are other users active in the chassis, select **Action > Show Active Users**.

Download Firmware to All TeraMetrics Modules



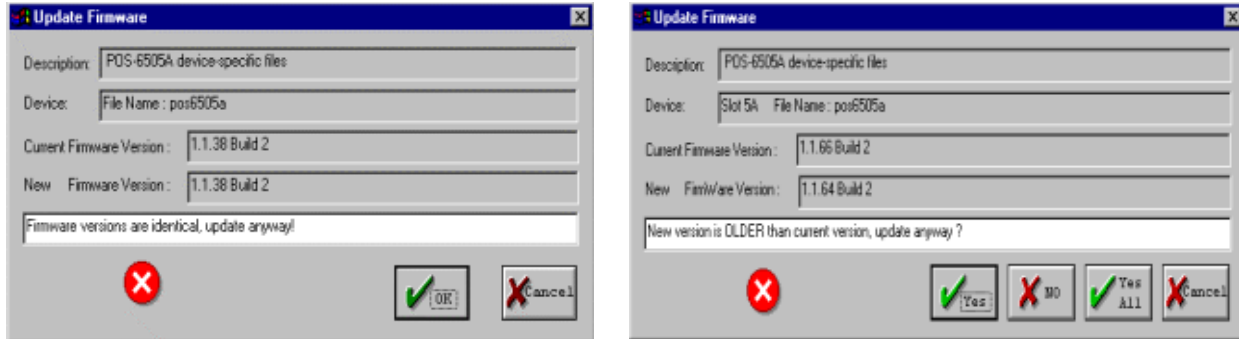
To download firmware to all TeraMetrics modules:

- 1 Select the **Software (RPM)** tab. The Download Software (RPM) window appears, displaying the current and new firmware versions for every TeraMetrics module installed in the chassis.



- 2 To reserve all TeraMetrics modules, click the **Reserve/Release All Modules** box. The green button next to each module turns blue to indicate reserved status.
- 3 Select the **To Download** tab, then click the **Files** button and select **Add to All Reserved Modules**.
- 4 Using the mouse and the Ctrl key or Shift key, select the .rpm file(s) that you want to download to the selected modules and then select **Open**. You must select the appropriate .rpm file(s) for the selected TeraMetrics modules.

If the version of the firmware that you are downloading is older or the same as the version you already are using, you will see one of the following windows:



- 5 Click the **Download** button to download the .rpm file(s).



Important: When conducting a Restart, all modules that have been reserved will restart. Therefore, be careful which modules you reserve (e.g., do not reserve a module that is in the middle of a test). The chassis and any other modules that are not reserved will not be restarted.

Procedure 11: Connect SmartBits to an Application

After the SmartBits IP address is set up via the serial console port, make sure that the PC is connected to the SmartBits chassis using the Ethernet cable (see *“Procedure 9: Confirm the Ethernet Link” on page 51*). Then you may proceed with configuration and testing.



- Notes:**
- The procedure detailed in this section is for installing SmartWindow. The installation of other applications may vary slightly. Refer to each application’s specific user documentation and Release Notes for details.
 - The serial cable **cannot** be used to connect any of the SmartBits software applications to the SmartBits 600x/6000x chassis. This feature is only available with the SmartBits 200/2000 chassis.

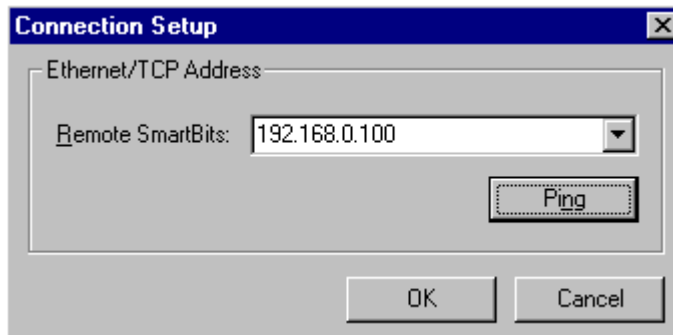


To connect a SmartBits application to a specific SmartBits chassis for the first time:

- 1 Check that you have:
 - Installed the application on your PC.
 - Connected the PC to SmartBits with the Ethernet cable.
 - Set the IP address for the SmartBits chassis.
 - Power up the SmartBits chassis.
- 2 Enter the application by selecting **Start > Programs > SmartBits Applications > <APPLICATIONname>**.

- 3 To change or enter chassis IP address, the application must be offline (disconnected from any chassis). To disconnect from other chassis, choose **Actions > Disconnect**.
- 4 Specify the IP address via the **Connection Setup** command of an application (located under the *Options* menu).

For example, in SmartWindow, select **Options > Connection Setup** from the menu bar. The Connection Setup window appears (see below).



- 5 Type in the IP address and select **Ping**.
- 6 For the Remote Host address, enter the SmartBits IP address that you loaded into SmartBits in *“Procedure 7: Start SmartWindow” on page 38*.
- 7 Ensure that the TCP port value is set to **16385**.
- 8 Click **OK** to close the Connection Setup window.
- 9 Select **Actions > Connect** to connect to the specific chassis. If a message box with “Unable to reach remote host” is displayed, refer to *Chapter 4, “Troubleshooting and Maintenance.”*



Note: If you close SmartWindow now and then re-open it, the application will automatically try to connect to the IP address last specified in the Connection Setup window.

Procedure 12: Connect to the DUT and Check Cabling

To connect the SmartBits chassis either to your PC or to the network to which your PC is connected, use the SmartBits 600x/6000x chassis Ethernet port labeled 10/100BASE-T located on the backplane.

Connect the SmartBits chassis to the desired device(s) or network to be tested via one of the following methods:

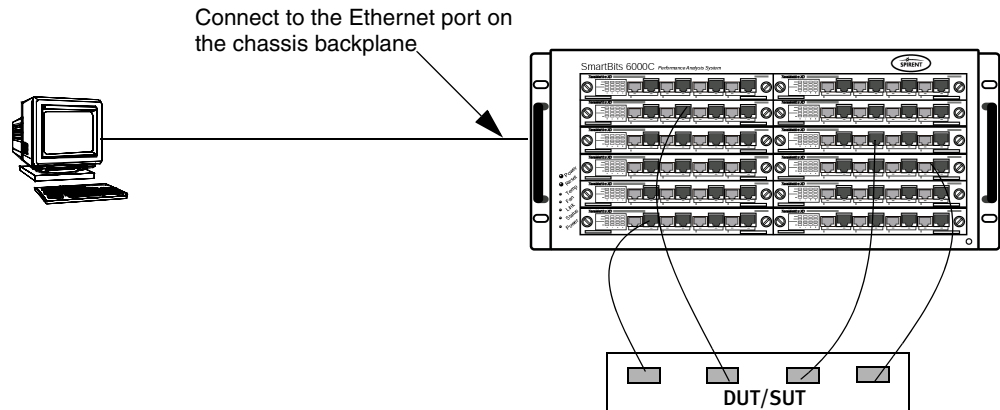


Figure 2-7. Connecting the PC Directly to the Chassis and to the DUT/SUT

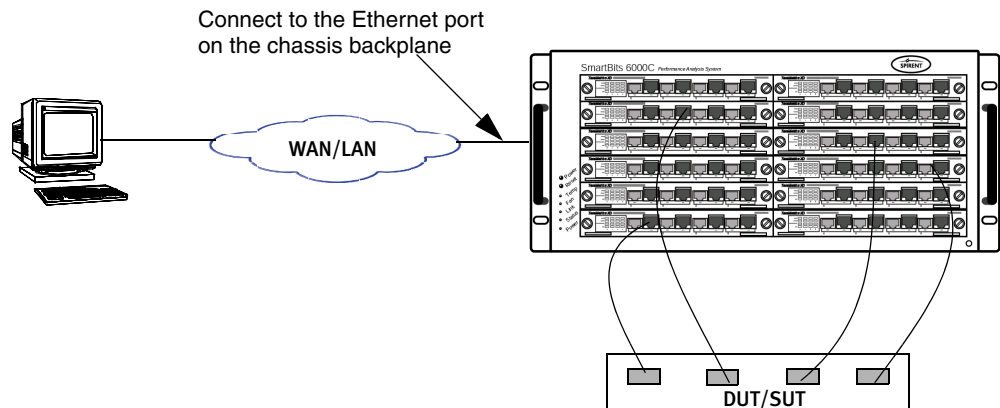


Figure 2-8. Connecting the PC via a WAN/LAN to the Chassis and to the DUT/SUT



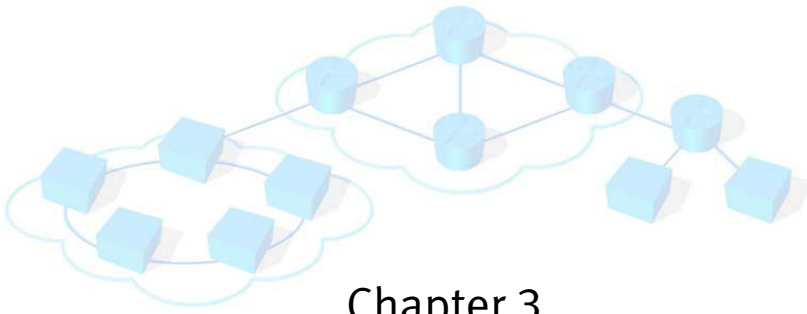
Important: • You must position and install the provided ferrite block onto the Ethernet cable (at the SmartBits end) that attaches the SmartBits chassis to your network. The ferrite block reduces potential EMI interference. Refer to *“Procedure 5: Install the Ferrite Block”* on page 36 for details on connecting the ferrite block.

- Before you begin testing, check your environment and make sure that you follow the EMI guidelines as described in the “[Safety Requirements](#)” on [page 23](#), and in the *ESD Requirements* on [page 131](#). Once the testing environment is properly prepared, you are ready to use the appropriate software for the tests you want to perform. Failure to comply with these guidelines may produce invalid test results.

Most test setups require a minimum of two module connections to the DUT – one module to transmit traffic, and one to receive traffic. Many tests are also set up as partial or full mesh, uni-directional or bi-directional, full or half duplex, single-to-many ports, or many-to-many ports.



- Notes:**
- For sample test scenarios, refer to the user guide for each software application.
 - For cable description and pinout information, refer to [Appendix B, “Cable Information.”](#)



Chapter 3

LED Indicators

Light-Emitting Diodes (LEDs) confirm the status of your installed SmartBits chassis, modules, and network link.

For module specifications, refer to the particular module type in the *SmartBits System Reference* manual and in the *SmartWindow* online help.

In this chapter . . .

This chapter contains the following topics:

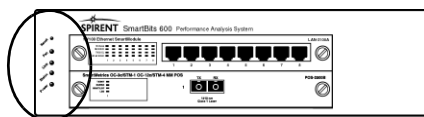
- **SmartBits 600x/6000x Chassis Front Panel LEDs 70**
- **Over-temperature Sequence Condition (SmartBits 6000C) 72**
- **SmartBits 600x/6000x Chassis Back Panel LEDs 73**
- **ATM TeraMetrics Module LEDs 74**
- **Ethernet Module LEDs 75**
- **LEDs on Ethernet SmartMetrics/TeraMetrics XD Modules 77**
- **Packet Over SONET (POS) Module LEDs 78**
- **Fibre Channel Module LEDs 79**
- **10 Gigabit Ethernet Module LEDs 80**

SmartBits 600x/6000x Chassis Front Panel LEDs

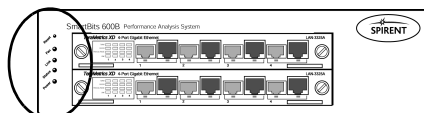
Every SmartBits 600x/6000x chassis has LEDs located on the front panel of the chassis (see [Figure 3-1](#)). On the SmartBits 600x chassis, the LEDs are located on the left side on the front panel; on the SmartBits 6000x chassis, they are located on the lower left side of the front panel.

The functions of the LEDs are the same for the SmartBits 600x/6000x chassis with the exception of the SmartBits 6000C chassis which has an additional TEMP LED.

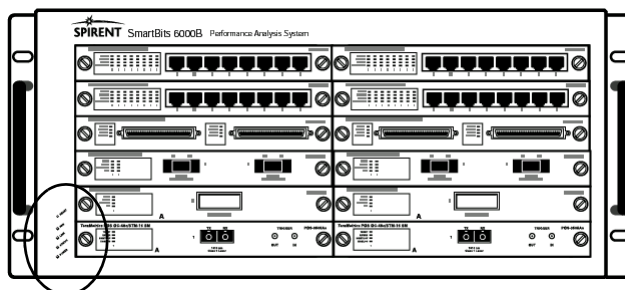
SmartBits 600



SmartBits 600B



SmartBits 6000B



SmartBits 6000C

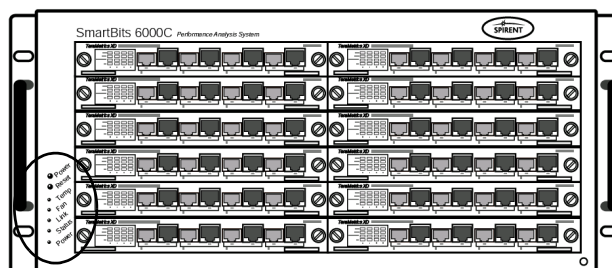


Figure 3-1. SmartBits 600x/6000x Chassis LED Locations (Front Panel)

Table 3-1. SmartBits 600x/6000x Chassis Front Panel LEDs

LED	Color/Status	Description
FAN	Green	Internal fans are operating properly.
	Red	One or more of the fans are not working properly.
LINK	Green	One or more users are connected to the SmartBits chassis.
	Off	No user or application is connected to the SmartBits chassis.
STATUS ¹	Green	Operationally ready to connect.
	Red	Not ready to connect.
	Yellow	Blinking – indicates an unrecoverable error. Power cycle the chassis to recover. If persistent, contact Spirent’s Customer Support department.
POWER	Green	The chassis is on.
	Off	The chassis is off.
TEMP ²	Green	Ambient temperature inside chassis is nominal (within upper limits).
	Yellow	Over-temperature condition detected, evasive procedures in process, temperature is being more closely monitored.
	Red	Temperature is consistently in excess of upper limit. Numerous chassis functions are disabled to attempt to reduce thermal load.

1 During bootup, the Status LED starts out red, turns to yellow while initializing, then turns to green when modules are initialized and Ethernet logins are enabled.

2 SmartBits 6000C chassis only. See “*Over-temperature Sequence Condition (SmartBits 6000C)*” on page 72.

Over-temperature Sequence Condition (SmartBits 6000C)

The TEMP LED on the SmartBits 6000C automatically goes through a sequence monitoring procedure when the chassis is operating. These functions are automated and prevent users from experiencing incorrect tests.

When the chassis is running properly, the LED will be *Green*.

When an “over-temperature” condition is sensed:

- 1** The LED will continue to be *Green*. The chassis will start to monitor the temperature for one minute.
- 2** If the “over-temperature” condition is still present after the (one minute) delay, the LED will turn *Yellow* and the chassis will attempt to suspend all test module operations (such as, SyncStart). It will also reserve all modules to the controller and stop all test traffic.
- 3** The chassis will continue to monitor the temperature for one additional minute.
- 4** If the chassis is still in “over-temperature” after the additional minute, the chassis will automatically reset all modules being used. The LED will turn red to further draw attention to the condition.
- 5** At any point during this sequence, the user could issue a RESET to the controller/chassis. This RESET will perform the normal initialization; but will also continue monitoring the thermal characteristics of the chassis.
- 6** If the chassis is still over the operational temperature, the above sequence will be re-initiated. If the thermal condition improves to be within the upper limit, then the chassis will once again be usable.
- 7** If a user logs onto the chassis using a TELNET session while the chassis is in an “over-temperature” condition, an additional message will be displayed to indicate the condition.

SmartBits 600x/6000x Chassis Back Panel LEDs

Every SmartBits 600x/6000x chassis has four LEDs located on the back panel of the chassis (see [Figure 3-2](#)). These LEDs indicate the status of the Ethernet control port to the chassis controller. The LED functions and descriptions for the chassis are the same and are described in [Table 3-2](#). [Figure 3-2](#) shows the back panel on a SmartBits 6000C chassis.

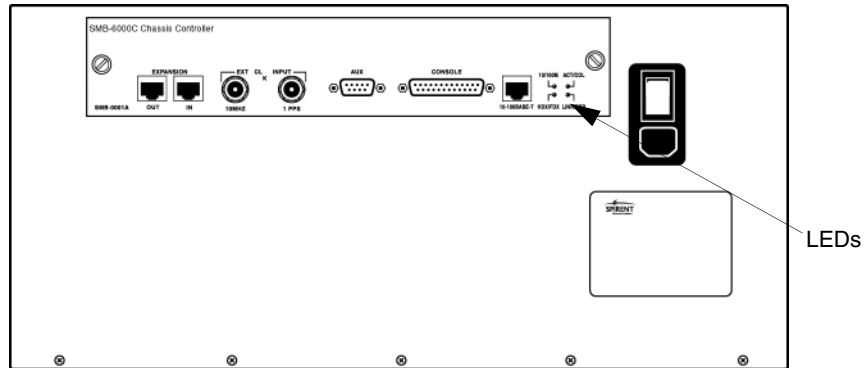


Figure 3-2. SmartBits 6000C LED Locations (Back Panel)

Table 3-2. SmartBits 600x/6000x Back Panel LEDs

LED	Color/Status	Description
10/100M (Transfer Rate)	Green Yellow	100 Mbps Ethernet rate. 10 Mbps Ethernet rate.
ACT/COL (Activity/Collision Status)	Green Yellow Off	Traffic is being sent or received. Collisions have occurred. No traffic activity is occurring.
HDX/FDX (Communications Protocol)	Green Yellow	Full duplex. Half duplex.
LINK/ERR (Link/Error Status)	Green Red Off	Physically connected to the network; confirmed with an Ethernet link pulse. Errors have occurred on the link. Not connected to the network.

ATM TeraMetrics Module LEDs

Every SmartBits ATM TeraMetrics module has its own LEDs, which are located on the left side of each module's front panel (see [Figure 3-3](#)). Although the LEDs are similar for all modules, some vary according to the features of each module. Ethernet module LEDs are described in [Table 3-3](#).

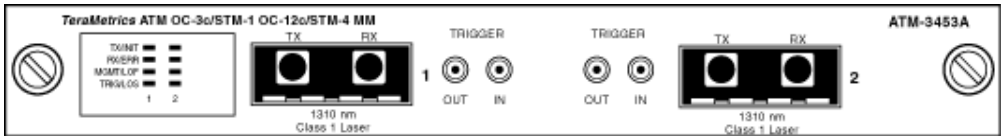


Figure 3-3. Example of LED Locations on an ATM TeraMetrics Module



Note: ATM TeraMetrics modules are listed in [Table 1-3 on page 18](#). For complete descriptions of the ATM TeraMetrics modules, refer to the *SmartBits System Reference* manual.

Table 3-3. LED Functions for ATM TeraMetrics Modules

LED	Color/Status	Description
TX/INIT	Green	Frame is transmitting. LED flashes briefly for each frame transmitted. If continuous transmission, light is in steady on condition.
	Red	Link is not ready.
RX/ERR	Green	Receiving frame.
	Red	SONET/SDH alarm active.
MGMT/LOF	Green	Receiving management frame.
	Red	Loss of Frame.
TRIG/LOS	Green	Trigger event.
	Red	Loss of signal.

Ethernet Module LEDs

Every SmartBits Ethernet module has its own LEDs, which are located on the left side of each module's front panel (see [Figure 3-4](#)). Although the LEDs are similar for all modules, some vary according to the features of each module. Ethernet module LEDs are described in [Table 3-4](#).

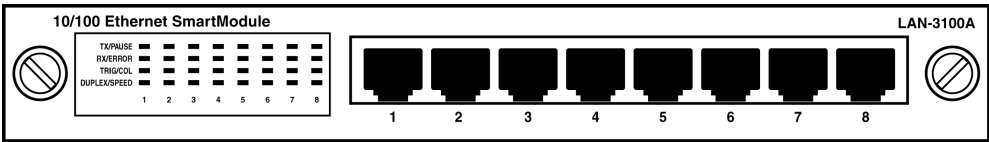


Figure 3-4. Example of LED Locations on an Ethernet Module



Note: Ethernet modules are listed in [Table 1-3 on page 18](#). For complete descriptions of the Ethernet modules, refer to the *SmartBits System Reference* manual.

Table 3-4. Ethernet Module LEDs

LED	Color/Status	Description
100M PAUSE	Green	100 Base-TX operation.
	Yellow	Receiving PAUSE frames.
	Off	10 Base-T operation.
DUPLEX/ SPEED	Green	Solid green for 100 Mbps Full Duplex.
	Yellow	Solid yellow for 100 Mbps Half Duplex.
	Green	Flashes green for 10 Mbps Full Duplex.
	Yellow	Flashes yellow for 10 Mbps Half Duplex.
LINK	Green	Full-duplex with valid link.
	Yellow	No link detected.
LINK/DPLX	Green	Full-duplex with valid link.
	Yellow	Half duplex with valid link.
	Red	No link detected.
LINK SPEED	Green	Link up at 1 Gbps.
	Red	Link up at 2 Gbps.
	Off	No GBIC or loss of signal.
LINK 1000	Green	Autonegotiated at 1000 Mbps.
LINK 100	Yellow	Autonegotiated at 100 Mbps.

Table 3-4. Ethernet Module LEDs (continued)

LED	Color/Status	Description
LOS	Yellow	Loss of Signal (optical signal) condition exists.
MGMT/LOF	Yellow	Loss of Frame condition exists.
	Flashing Green	“Management” frame is received.
MGMT/PAUSE	Green	Flashes for management frames.
	Yellow	Flashes for pause frames.
RX/CRCERR	Red	Receiving CRC errors.
	Green	Receiving frame.
	Off	Not receiving.
RX/ERR	Green	Receive. Flashes Green once for each frame detected on the network.
	Red	CRC errors. Flashes Red once for each bad CRC detected in receive frames.
	Off	Not receiving.
TRIG/COL	Green	Receiving trigger frames.
	Red	Flashes for collisions.
	Off	No collision or trigger.
TX/INIT	Green	Transmitting.
	Red	Module not ready.
	Off	Not transmitting.
TRIG/LOS	Green	Triggered frame is received.
	Yellow	Loss of Signal (optical signal) condition exists.
TRIG/OSERR	Red	Receiving encoding errors.
	Green	Receive trigger.
	Off	No OS error or trigger.
TRIG/PAUSE	Green	Receiving trigger frames.
	Yellow	Receiving PAUSE frames.
	Off	No trigger or pause events.

LEDs on Ethernet SmartMetrics/TeraMetrics XD Modules

Every SmartBits Ethernet Dual-media XD module has its own LEDs, which are located on the left side of each module's front panel (see [Figure 3-5](#)). The LEDs for the Ethernet Dual-media modules have their own features and are described in [Table 3-5](#).



Figure 3-5. Example of LED locations on an Ethernet Dual-media XD Module



Note: SmartMetrics/TeraMetrics XD modules are listed in [Table 1-3 on page 18](#). For complete descriptions of the XD modules, refer to the *SmartBits System Reference* manual.

Table 3-5. LED Descriptions for Ethernet Dual-media Modules

LED	Color/Status	Description
TX/INIT	Red	Port not initialized.
	Green	Transmitting frame.
	Off	Ready.
RX/ERR	Red	Receiving CRC errors.
	Green	Receiving frame.
	Off	Collision.
TRIG/COLL-PAUSE	Yellow	Collision/paused.
	Green	Receiving trigger.
	Off	No pause condition or trigger.
LINK	Yellow	Autonegotiation in progress.
	Green	Link initialized.
	Off	No link.

Packet Over SONET (POS) Module LEDs

Every SmartBits POS module has its own LEDs, which are located on the left side of each module's front panel (*Figure 3-6*). Although the LEDs are similar for all modules, some vary according to the features of each module. POS module LEDs are described in *Table 3-6*.

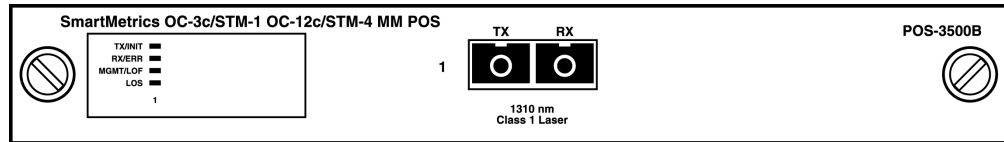


Figure 3-6. Example of LED Locations on a POS Module



Note: POS modules are listed in *Table 1-3 on page 18*. For complete descriptions of the POS modules, refer to the *SmartBits System Reference* manual.

Table 3-6. POS Module LEDs

LED	Color/Status	Description
TX/INIT	Red	Link is not ready.
	Flashing Green	Frame is transmitting.
RX/ERR	Flashing Red	Rx frame is received with a CRC error.
	Flashing Green	Rx frame is received.
	Off	Not receiving.
MGMT/LOF	Yellow	Loss of Frame condition exists.
	Flashing Green	“Management” frame is received.
TRIG/LOS	Green	Triggered frame is received.
	Yellow	Loss of Signal (optical signal) condition exists.
LOS	Yellow	Loss of Signal (optical signal) condition exists.

Fibre Channel Module LEDs

Every SmartBits Fibre Channel module has its own LEDs, which are located on the left side of each module's front panel (*Figure 3-7*). Although the LEDs are similar for all modules, some vary according to the features of each module. Fibre Channel module LEDs are described in *Table 3-7*.

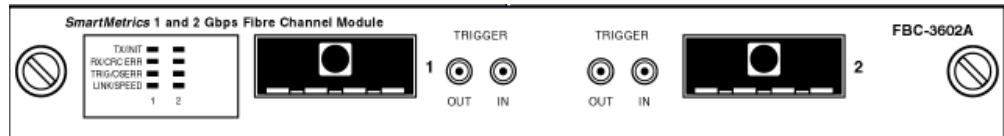


Figure 3-7. Example of LED Location on a Fibre Channel Module



Note: Fibre Channel modules are listed in *Table 1-3 on page 18*. For complete descriptions of the Fibre Channel modules, refer to the *SmartBits System Reference* manual.

Table 3-7. Fibre Channel Module LEDs

LED	Color/Status	Description
TX/INIT	Red	Port not initialized.
	Green	Frame is transmitting.
	Off	Ready.
RX/CRCERR	Red	Receiving CRC errors.
	Green	Receiving frame.
	Off	Not receiving.
TRIG/OSERR	Red	Receiving encoding errors.
	Green	Receive trigger.
	Off	No OS error or trigger.
LINK SPEED	Green	Link up at 1 Gbps.
	Red	Link up at 2 Gbps.
	Off	No GBIC or loss of signal.

10 Gigabit Ethernet Module LEDs

Every SmartBits 10 Gigabit module has its own LEDs, which are located on the left side of each module's front panel (*Figure 3-8*). Although the LEDs are similar for all modules, some vary according to the features of each module. The module LEDs are described in *Table 3-8*.



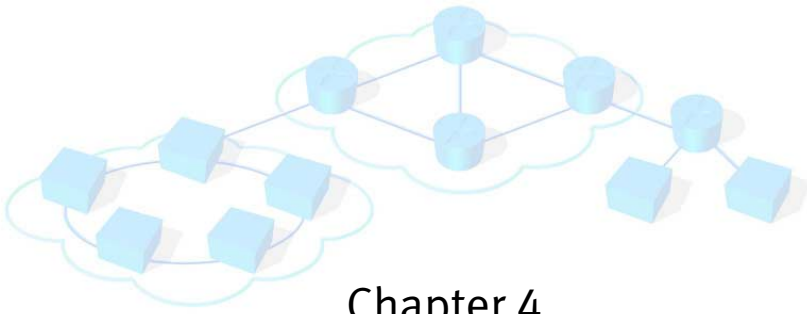
Figure 3-8. Example of LED Location on 10 Gigabit Modules



Note: 10 Gigabit modules are listed in *Table 1-3 on page 18*. For complete descriptions of the various 10 Gigabit modules, refer to the *SmartBits System Reference* manual.

Table 3-8. 10 Gigabit Module LEDs

LED	Color/Status	Description
TX/INIT	Red	Port not initialized.
	Green	Frame is transmitting.
	Off	Ready.
RX ERR	Flashing Red	Rx frame is received with a CRC error.
	Flashing Green	Rx frame is received.
	Off	Not receiving.
TRIG/PAUSE	Green	Receiving trigger frames.
	Yellow or Green	Receiving PAUSE frames.
	Off	No trigger or pause events.
LINK	Green	Link up.
	Yellow	Loss of signal.
	Off	Empty XENPAK slot.



Chapter 4

Troubleshooting and Maintenance

This chapter provides solutions for common serial and Ethernet connection problems, as well as HyperTerminal problems.

In this chapter . . .

This chapter contains the following topics:

- **Ethernet Connection Problems 82**
- **Replacing Fuses in SmartBits 600x/6000B Chassis 83**
- **SmartBits 6000C Circuit Breaker 83**

Ethernet Connection Problems

LINK LED on SmartBits Chassis Does Not Light

Ensure that the cable is good. If it is a straight-through cable, switch it with a crossover cable and connect it directly to the controlling PC.

SmartBits Chassis Does Not Respond To Ping

Check that you can ping to other nodes on the local network.

If you cannot ping to a SmartBits chassis on another subnet, try pinging the gateway to be sure it is alive and at the IP address you have configured. Try pinging other nodes on the other subnet.

Unable to Reach the Remote Host

If you receive this message when you start SmartWindow, try pinging the SmartBits chassis. Check that the IP address you have entered in SmartWindow is the same IP address you set on the SmartBits chassis. Check that cables are connected properly and are the correct cable type.

Replacing Fuses in SmartBits 600x/6000B Chassis

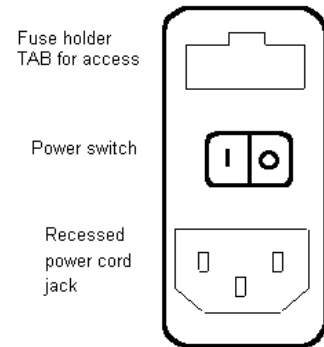
The power supply in the SmartBits 600x/6000B chassis has a universal input that accepts 120/240 VAC requiring no selection or adjustment. The Power Supply Inlet is the main disconnect device and is located on the rear of the chassis. It houses the power switch, fuse holder, and a universal 3-wire instrument power cord jack. Replacement fuses are metric.



Note: The SmartBits 6000C chassis is controlled by a 15 Amp, 250V circuit breaker and does not use fuses.

The fuse requirements for each SmartBits chassis is as follows:

- Smartbits 600x chassis: 2.0 Amp, 250V, fast action
- SmartBits 6000B chassis: 10.0 Amp, 250V, fast action



Important: When cycling power to a SmartBits chassis, be sure to let the power stay off for a few seconds to allow the capacitors to discharge before restoring power to the unit.



To remove the fuse holder:

- 1 Remove the power cord from the jack.
- 2 Lever out the fuse holder by prying outward on the tab using a small flat-head screwdriver or other thin-edged tool.

SmartBits 6000C Circuit Breaker

The SmartBits 6000C chassis is controlled by a 15 Amp, 250V circuit breaker located in the rear rocker panel and does not use fuses. This is built into the switch.



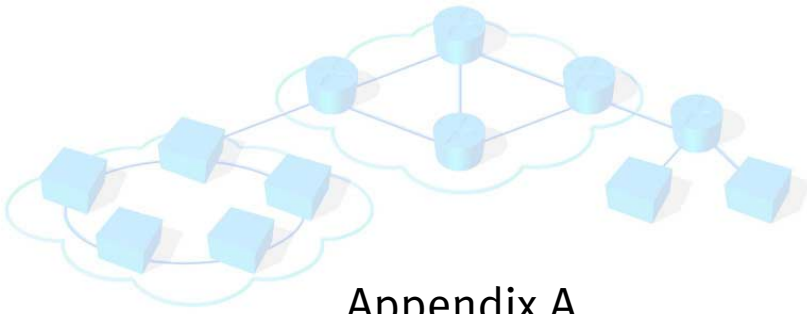
If you have a power failure:

- 1 Turn off the chassis (power switch at the rear of the chassis).
- 2 Wait 10 seconds.
- 3 Turn the chassis back on (power switch at the rear of the chassis).



Note: After the chassis is powered back on, make sure that the power inhibit switch button, located on the front panel, is pressed in (see [Figure 1-6 on page 16](#)).





Appendix A

Multiple Chassis Local Connect

In this appendix . . .

This appendix contains the following topics:

- **Multiple Chassis Connections 86**
- **Setting Up and Powering Up Multiple Chassis 90**
- **Multi-chassis Extension Unit 97**

Multiple Chassis Connections

If you are connecting multiple SmartBits chassis locally with CAT-5 UTP cables for use with any SmartBits application, you **MUST** synchronize all chassis with the procedure presented in this document.

Many SmartBits applications are designed to perform tests with hundreds of SmartBits ports by connecting multiple chassis together as defined in this document. Multiple chassis environments may include any mixed combination of SmartBits 10, SmartBits 200/2000, or SmartBits 600x/6000x chassis. This document references all of these chassis types.



Important: The following rules **must** be followed to ensure proper multiple chassis connections, synchronization, and correct test results. Failure to comply with these procedures will result in faulty tests results such as frame loss and out of order frames:

- When using a multiple chassis configuration that contains SmartBits 600x/6000x chassis, you **must** use a synchronous CAT-5 straight-through (not crossover) cable to connect the chassis together. (Refer to *“Cable Information” on page 86.*) The use of the synchronous cable **is required** in order for overall test results to be accurate (not just the latency test results, but all test results). Maximum distance between chassis is 3 feet (.9144m).
- All of the chassis in the arrangement **must** be booted in the proper order. (Refer to *“Power Up the Multiple Chassis In Sequential Order” on page 94.*)
- The synchronized clock and pulse signals passing through the connected chassis **require** careful sequential powering up. Failure to do so will cause random errors and incorrect test results. (Refer to *“Power Up the Multiple Chassis In Sequential Order” on page 94.*)

Failure to comply with these connection and synchronization procedures will result in faulty tests results, including frame loss and out-of-order frames.

Cable Information

Spirent Communications provides the following cable kit (Spirent part number 620-5000-003) which is described in *“Checking the SmartBits Package” on page 30.*

In addition, when using a SmartBits 2000 chassis, you will receive the following:

- One Cable Assembly Terminator (Spirent part number 620-0032-001)
- One CPU-Card Cage Cable Assembly (Spirent part number 620-0017-001)
- One Expansion Cable (Spirent part number 620-0019-001) for each chassis used, if you are using multi-chassis stacking.

Multiple Chassis Connection Terminology

Use [Figure A-1](#) and the descriptions listed below to help you understand multiple chassis connection terminology.

- **Controller** – A chassis that can be connected via IP (#4, #5, #8, #10). A controller can be a SmartBits 200/2000 chassis or a SmartBits 600x/6000x chassis.
- **Primary Controller** – The controller that supplies the synchronization in an expansion configuration (#4). A primary controller can be a SmartBits 200/2000 chassis or a SmartBits 600x/6000x chassis.
- **Dependent Controller** – Any controller that is connected side-by-side, through the RJ-45 expansion connectors, and relies on the primary controller for synchronization (#5, #8, #10).
- **Master Controller** – If a controller is a SmartBits 2000 chassis, it can also be the master controller (top) chassis in a stacking configuration (#4, #8, #10).
- **Slave Unit** – In a stacking configuration, a unit (SmartBits 10 or SmartBits 2000) that relies on the master controller for its source (#1, #2, #3, #6, #7, #9).



Note: Each controller that is connected via expansion needs a separate IP connection to the application. This cable should have a maximum distance of 3 feet in length. Using cables longer than 3 feet in length will cause faulty test results. Use the supplied purple 3 foot (.9144 m.) straight-through Ethernet LAN cable for this connection.

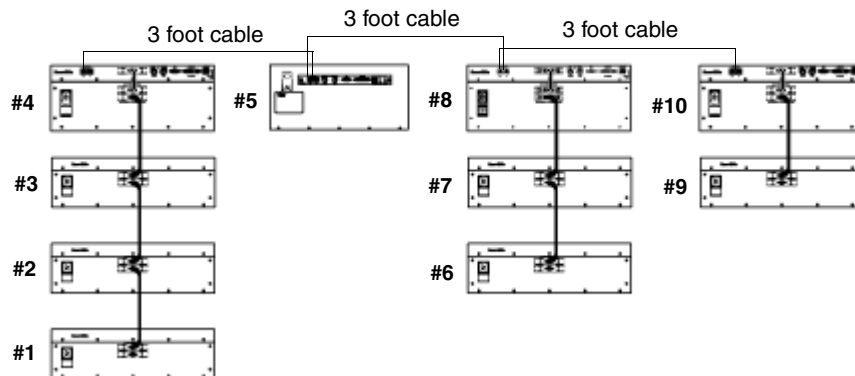


Figure A-1. Multiple Chassis Connection Terminology

Stacking Connections (SmartBits 2000 chassis only)

A *stacking* connection involves a SmartBits 2000 chassis (*master controller*) and up to three units (*slave units*) connected vertically via DB37 connectors (see [Figure A-2](#)). A SmartBits 2000 chassis must serve as the *master controller* chassis. The three slave units in the stack can be any combination of SmartBits 10 or SmartBits 2000 chassis.

See [Figure A-2](#) for an example of using the maximum number of units in a single stack.

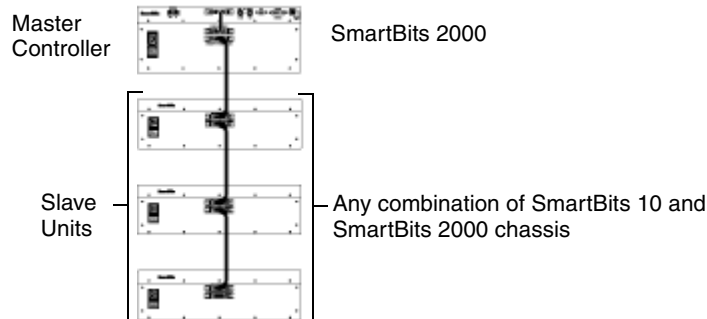


Figure A-2. Example of the Multiple Chassis Stacking Order

Connect a SmartBits Stack of 80 Ports via DB37 Connectors



Note: Refer to “[Procedure 4: Connect SmartBits to PC, Power, and LAN](#)” on page 34 when making any SmartBits chassis connection.



To connect a SmartBits via DB37 connectors:

- 1 With the power turned off on all chassis, remove the terminator from the top chassis (which must be a SmartBits 2000 chassis). This will be the *master controller* chassis in the stack.
- 2 Remove all cables from the lower (*slave*) units in the stack.
- 3 Install the long SmartBits cable from the lower port (where you removed the terminator) of the *master controller* chassis to the middle port on the lower (*slave*) unit. Install the terminator in the bottom port of the *slave* unit.
- 4 The hub of the *slave* unit will be empty. Note that the SmartBits 10 chassis has no hub port and can only be used as a *slave*.



Note: Only the *master controller* chassis is connected to the PC or LAN, and has a cable on the HUB port. Only the last unit in the stack has a terminator on the bottom port.

- 5 Connect third and fourth SmartBits *slave* units if needed.
- 6 When you power up the SmartBits stack (see “[Setting Up and Powering Up Multiple Chassis](#)” on page 90, turn on the slave chassis first, then turn on the SmartBits 2000 chassis (*master controller*) last.



Important: If you fail to follow the power up sequential order, the *master controller* (SmartBits 2000) chassis will not recognize the *slave* unit/s.

- 7 To power off multiple units in a stack, you must turn off the SmartBits 2000 (*master controller*) chassis first and then turn off the *slaves*.

Expansion Connections (all chassis)

An *expansion* connection involves any combination of SmartBits chassis connected horizontally, via the RJ-45 expansion connectors using a straight-through Ethernet LAN cable. You may connect up to eight chassis (one *primary controller* and seven *dependent controller* chassis). This allows for multiple chassis test synchronization with one clock source (*primary controller*), which supplies the synchronization in the system. [Figure A-3](#) shows an example of an *expansion* connection.



Note: Each controller that is connected via expansion needs a separate IP connection to the application. This cable should have a maximum distance of 3 feet in length. Using cables longer than 3 feet in length will cause faulty test results. Use the supplied purple 3 foot (.9144 m.) straight-through Ethernet LAN cable for this connection.

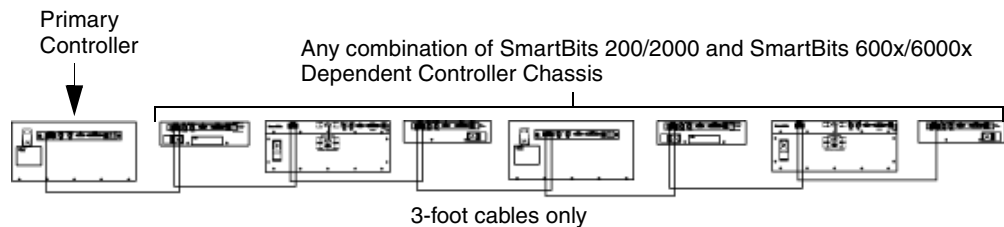


Figure A-3. Example of a Multiple Chassis Expansion Connection

If you are using a SmartBits 2000 chassis as the *primary controller* or one of the *dependent controller* chassis, you can also *stack* and connect up to three additional units below it via the DB37 ports. In this configuration, the chassis would then become a *master controller* chassis as described in “[Stacking Connections \(SmartBits 2000 chassis only\)](#)” on page 88.

Setting Up and Powering Up Multiple Chassis



Important: Prior to powering up your system, make sure that the following tasks have been performed:

- All chassis in the expansion connection are properly connected using the RJ-45 expansion cables as described in *“Expansion Connections (all chassis)” on page 89.*
- All chassis in the stacking connection are properly connected using the DB37 cables supplied as described in *“Stacking Connections (SmartBits 2000 chassis only)” on page 88.*
- If you are connecting remotely via GPS or CDMA, make sure that the GPS/CDMA receiver to the *primary controller* chassis is connected and synchronized using the coaxial cables supplied. Refer to the *Using GPS/CDMA with SmartBits Chassis* manual for more information.
- You have read and understand the following safety information:
 - *“Specifications” on page 21*
 - *Appendix E, “ESD Requirements”*
 - *Appendix F, “Fiber Optic Cleaning Guidelines.”*

Check Applications to be Used with Multiple Chassis

To use multiple chassis connections correctly, first check that you have the appropriate version of the application to be used with the chassis. If you have an appropriate application, proceed to *“Assign an IP Address to Each Smartbits Chassis” on page 92.*

The SmartBits applications that support multiple chassis connections are listed in *Table A-1:*

Table A-1. Multiple Chassis Application Support

Application	SmartBits Chassis		
	200/2000	600x/6000x	Combined
AST II	X	X	X
Avalanche SmartBits		X	
Block Storage Tester		X	
Fabric Services Tester		X	
SAN Routing Tester		X	
SmartCableModem Test	X	X	X

Table A-1. Multiple Chassis Application Support (continued)

Application	SmartBits Chassis		
	200/2000	600x/6000x	Combined
SmartApplications	X	X	X
SmartFabric		X	
SmartFlow	X	X	X
SmartLibrary	X	X	X
SmartMulticastIP	X	X	X
SmartSignaling	X		
SmartTCP	X	X	X
SmartVoIPQoS	X	X	X
SmartWindow	X	X	
SmartxDSL	X	X	X
Spirent Connect	X	X	X
TeraRouting Tester		X	
TeraVPN Tester		X	
Turn Up Connect	X	X	X
WebSuite		X	



Note: Check with your Spirent Communications sales representative for the latest required version levels for all products.

Assign an IP Address to Each Smartbits Chassis

Each chassis must have its own IP address and be connected to a LAN or WAN (see “[Procedure 8: Set the IP Address](#)” on page 41, and [Figure A-4](#) on page 93).

Connect Multiple Synchronized Chassis

The connected *primary controller* and *dependent controller* chassis may be any combination of SmartBits chassis, totaling up to eight chassis. The maximum number of ports to configure is 768 ports (eight SmartBits 6000x chassis x 12 slots x 8-port LAN-3100A modules).

For information regarding the configuration of more than eight SmartBits chassis, refer to “[Multi-chassis Extension Unit](#)” on page 97.

A *dependent controller* may also be a *master controller* if it is a SmartBits 2000 chassis and is also used in a stacking configuration as shown in [Figure A-5](#) on page 95.



Important: The following rules **must** be followed to ensure proper multiple chassis connections, synchronization, and correct test results. Failure to comply with these procedures will result in faulty test results such as frame loss and out of sequence frames.

- When using a multiple chassis configuration that contains SmartBits 600x/6000x chassis, you **must** use a synchronous CAT-5 straight-through (not crossover) cable to connect the chassis together. (Refer to [Table 2-1](#) on page 35.) The use of the synchronous cable **is required** in order for overall test results to be accurate (not just the latency test results, but all test results).
- If you are connecting multiple SmartBits chassis locally with CAT-5 UTP cables for use with any SmartBits application, you **must** synchronize all chassis with the procedure presented in this document.
- The synchronized clock and pulse signals passing through the connected chassis require careful sequential powering up. Failure to do so **will cause** random errors and incorrect test results.
- To maintain synchronization, the *dependent controller* you are using **must always** be connected to the *primary controller* chassis through one or more *dependent controllers* as needed, even if you are not using ports in the primary chassis.



To connect multiple synchronized chassis:

- 1 With power **off** to all chassis, use a standard Category 5 UTP straight-through cable and connect the Expansion Out RJ-45 port of the *primary controller* chassis to the Expansion In RJ-45 port of a *dependent controller* chassis. The cable should not exceed 39 inches or 1 meter in length.



Note: The *primary controller* chassis uses only the RJ-45 Expansion Out port. It **does not** use the RJ-45 Expansion In port. The *primary controller* chassis is viewed as the first chassis (Chassis #1) in the series of connected synchronized chassis. See [Figure A-4](#).

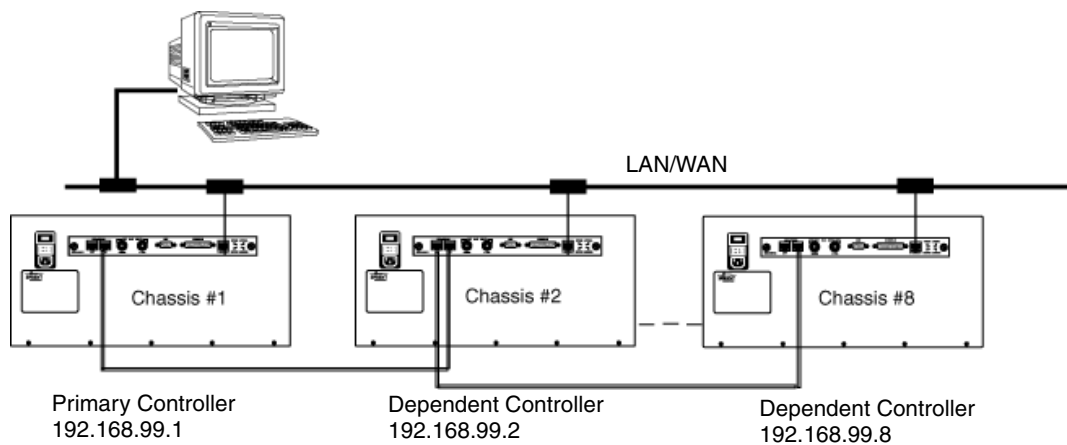


Figure A-4. Example of a Synchronized Multiple Chassis Connection using SmartBits 6000x Chassis

- 2 Connect the remaining chassis in your system, (Category 5 UTP cables) not to exceed a total of eight chassis (one *primary controller* and seven *dependent controllers*). For an example, refer to [Figure A-3 on page 89](#).
- 3 After all the chassis have been connected and the IP addresses have been set, proceed with “[Power Up the Multiple Chassis In Sequential Order](#)” on page 94 for power up instructions.



Caution: To prevent false test results, make sure that the Expansion In and Expansion Out cables are attached to the proper connectors at each end. Any cables left disconnected may cause problems.

Power Up the Multiple Chassis In Sequential Order



Important: Follow the power up sequence procedures as shown below. Failure to do so **will cause** random errors and incorrect test results.

When powering up your multiple chassis configuration:

- SmartBits 200/2000 – Allow the LINK LED on the chassis to stop flashing before powering up the next chassis in sequence. (Time varies between 30 and 60 seconds.)
- SmartBits 600x/6000x – Allow the STATUS LED on the chassis to turn green before powering up the next chassis in sequence. (Time varies between 30 and 200 seconds.)
- Stacking configuration – Turn on all the *slave* units (any sequential order). Wait at least 30 seconds and then power up the *master controller* of the stack. If this sequence is not followed, the *master controller* may not recognize the *slaves*.

For an example of powering up multiple chassis in sequential order, we will use the example shown in [Figure A-5 on page 95](#).



To power up multiple chassis:

- 1 Turn on the *slave* units #1, #2, #3, #6, #7, #9.
- 2 Allow the LINK LEDs on the chassis' to stop flashing (at least 30 seconds) and then power on the *primary controller* (chassis #4).
- 3 When the LINK LED has stabilized on the *primary controller*, power on the *dependent controllers* in sequential order, (chassis #5, #8, 10). Wait for the LINK LED or the STATUS LED to stabilize in between powering up each chassis, until you have completely powered up all the chassis in a given series.



Important: If any of the *dependent controllers* get power-cycled or disconnected, repeat the power-up sequence to ensure the system clock connection.

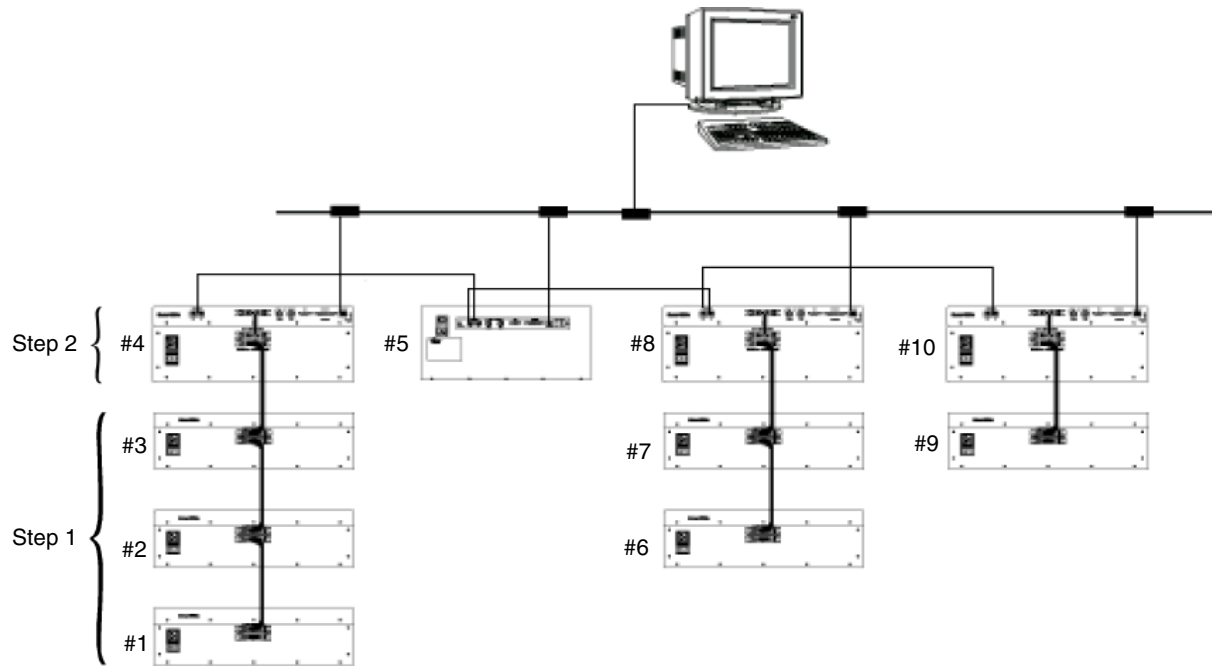


Figure A-5. Multiple Chassis Power Up Sequence



Important: While your system is operating, the following connect/disconnect rules apply:

- If powering up too quickly or out of sequence, the PC or workstation may report “ethernet connection timeout” and “socket timeout” errors.
- If you disconnect the *primary master controller* chassis, you break the synchronization of the entire series of connected (RJ-45 Expansion In and Out connected) chassis.
- If you disconnect a *dependent* chassis within a synchronized series, it breaks the connection for itself and for all chassis following it (downstream) in the series.
- If you disconnect a *master controller* chassis in a stack, you automatically disconnect all *slave* units connected (DB37) to it.
- If you disconnect a *slave* unit within a stack, the entire stack is disabled.

Power Down and Disconnect the Chassis

For powering down and disconnecting the chassis, we will use the example shown in *Figure A-5 on page 95*.



To power down and disconnect the chassis:

- 1 Power down the *expansion* chassis in the reverse order of the powering up sequence, starting with the last *dependent controller* chassis (#10) that has an RJ-45 Expansion In connection only, and no Expansion Out connection.
- 2 Power down the *dependent controller* chassis #8 and #5.
- 3 Power down the *master controller* chassis #4.
- 4 You may power down the *slave* units (#1, #2, #3, #6, #7, and #9) any time **after** the *master controller* chassis that they are connected to has been powered down.

Multi-chassis Extension Unit

The Multi-chassis Extension Unit (see [Figure A-6](#) and [Figure A-7](#) below) enables the connection of up to 512 synchronized SmartBits chassis. Each extension unit supports up to eight chassis; each of these chassis can connect to another extension unit that supports up to eight additional chassis, and so on, until reaching the 512 quantity limit. This extension unit also provides flexibility in cable length and cable distribution, and supports the regeneration of signals and timing at each extension unit.

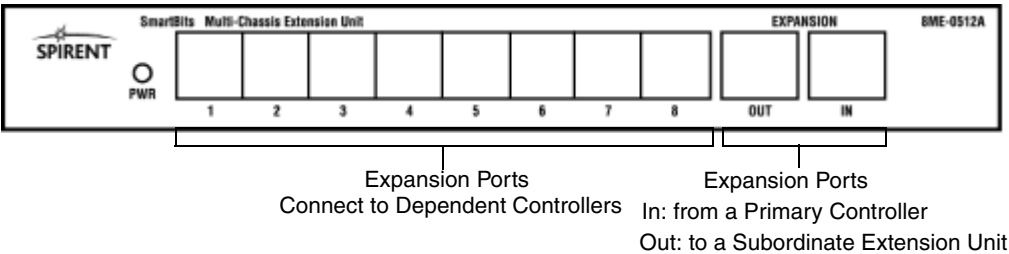


Figure A-6. Multi-chassis Extension Unit – Front View

An AC/DC power converter is included with the Multi-chassis Extension Unit. This converter connects to the back of the unit and into any 120V outlet (see [Figure A-7](#)).

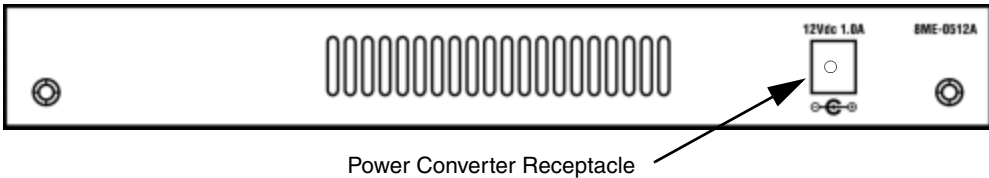


Figure A-7. Multi-chassis Extension Unit – Back View

Multi-chassis Extension Unit Terminology

The terminology used with Multi-chassis Extension Unit connections is defined as follows and is shown in *Figure A-8*:

- **Primary Controller** – The main chassis which controls the synchronization for all the chassis and extension units in the configuration.
- **Principle Extension Unit** – The extension unit that is connected to the primary chassis.
- **Dependent Controller** – Any chassis that relies on another chassis or an extension unit for its synchronization.
- **Subordinate Extension Unit** – An extension unit that relies on a dependent chassis or another extension unit for its synchronization.
- **Flat Connection** – An extension unit that is connected to, and relies on, another extension unit for its synchronization.
- **Hierarchical Connection** – A series of connections from extension units to SmartBits chassis in multiple layers.

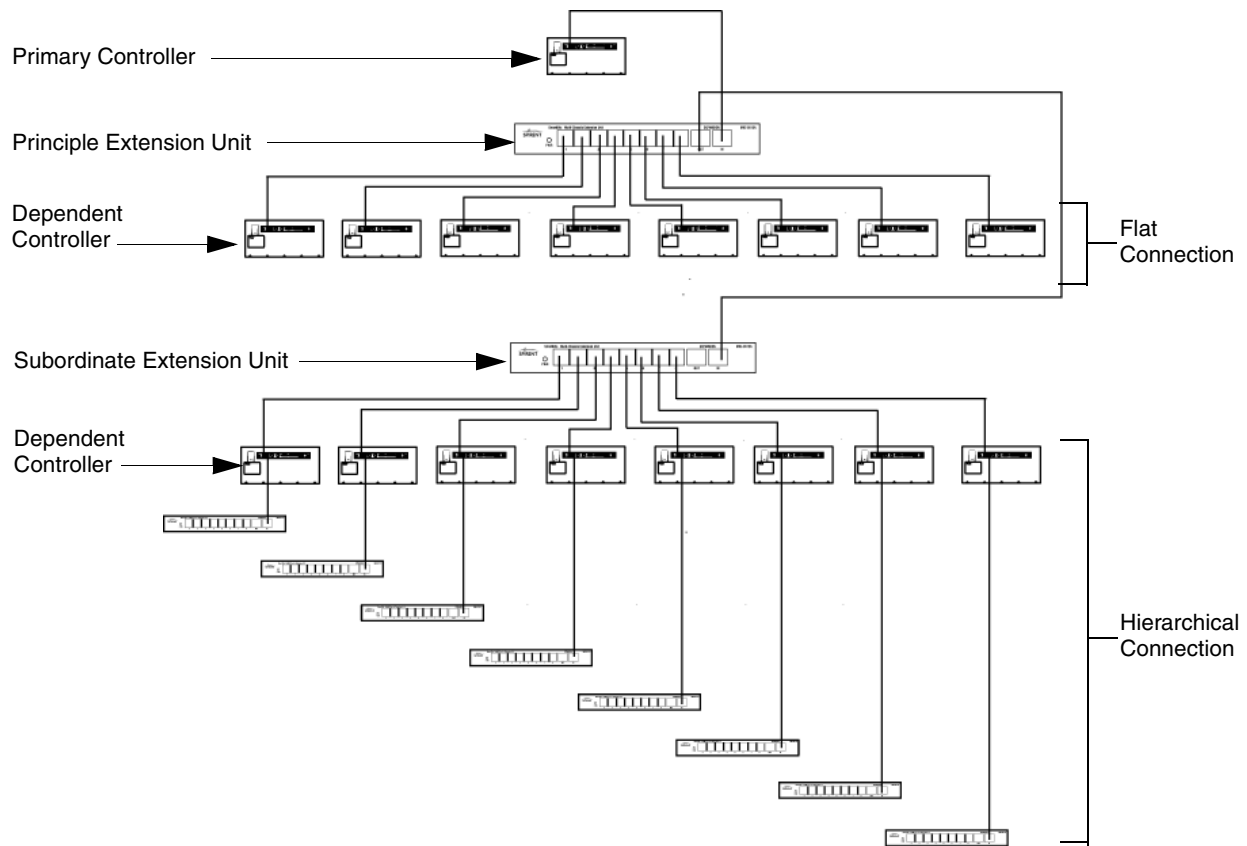


Figure A-8. Multi-chassis Extension Unit Terminology

Multi-chassis Extension Unit Cable Connections



Important: The total accumulative length of the Category 5 UTP cable (RJ-45) used for all connections between a layer of SmartBits chassis and another SmartBits chassis must not exceed 50 feet in length (15.24 meters).

The primary SmartBits chassis connection that measures from the *Primary Controller* (or #1 chassis) to the *Principle Extension Unit* (see [Figure A-9](#)) determines the maximum cable length of subsequent cables used between a SmartBits chassis connected to the Multi-chassis Extension Unit.

To determine the cable length limitation for these connections, subtract the length of the *Primary Controller/Principle Extension Unit* cable from 50 feet (15.24 meters). In the example shown in [Figure A-9](#), the cable used to connect the master chassis to the *Principle Extension Unit* is 3 feet in length. Therefore, the maximum accumulative cable length from the extension unit to all directly connected chassis can be any variable under 47 feet ($50 - 3 = 47$) in length (see [Figure A-10 on page 100](#)).

Multi-chassis Extension Unit Configurations

The Multi-chassis Extension Unit may be configured in various ways. For this connection example, we will discuss using the OUT port of the Extension Unit exclusively.



Note: Refer to “*Multi-chassis Extension Unit Terminology*” on [page 98](#) for terminology descriptions.

Flat Connection



To set a flat connection:

- 1 Connect a cable from the expansion OUT port of the *Primary Controller* to the IN port on the *Principle Expansion Unit* as shown in [Figure A-9](#).

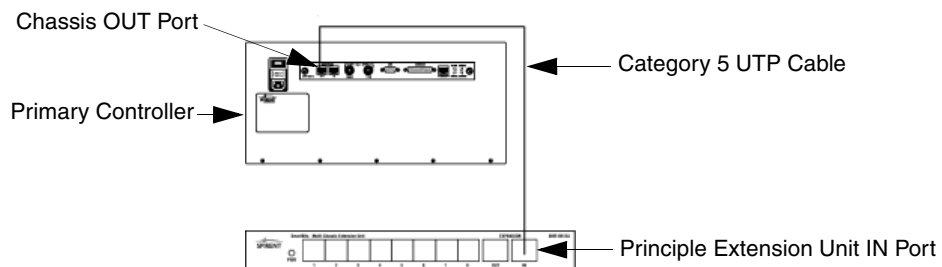


Figure A-9. Initial Connection of a SmartBits Chassis to an Extension Unit

- 2 From each of the *Principle Extension Unit's* eight ports, connect up to eight *dependent controllers* IN ports as shown in [Figure A-10](#).

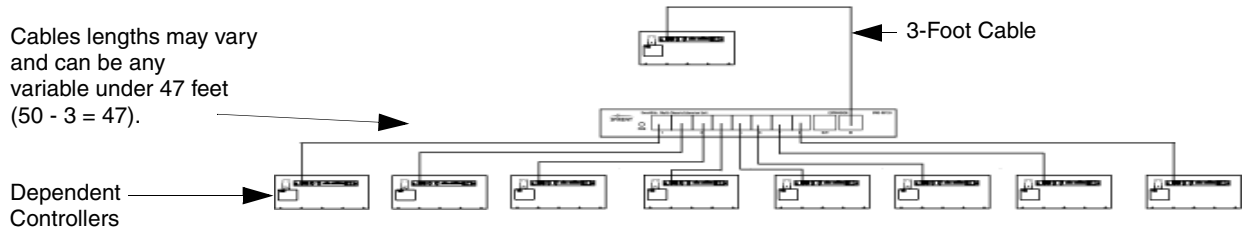


Figure A-10. Connecting SmartBits Chassis to an Extension Unit



Note: In this example, we are using a 3-foot cable to connect the *Primary Controller* to the *Principle Extension Unit*. Each cable that connects the extension unit to the next SmartBits chassis may vary in length and can be any variable under 47 feet ($50 - 3 = 47$) in length (14.33 meters).

- 3 You can connect another extension unit to the *Principle Extension Unit* by connecting a cable from the OUT expansion port of the *Principle Extension Unit* to the IN port of the *Subordinate Extension Unit* as shown in [Figure A-11](#). You may continue adding extension units and chassis until you reach 512 chassis.

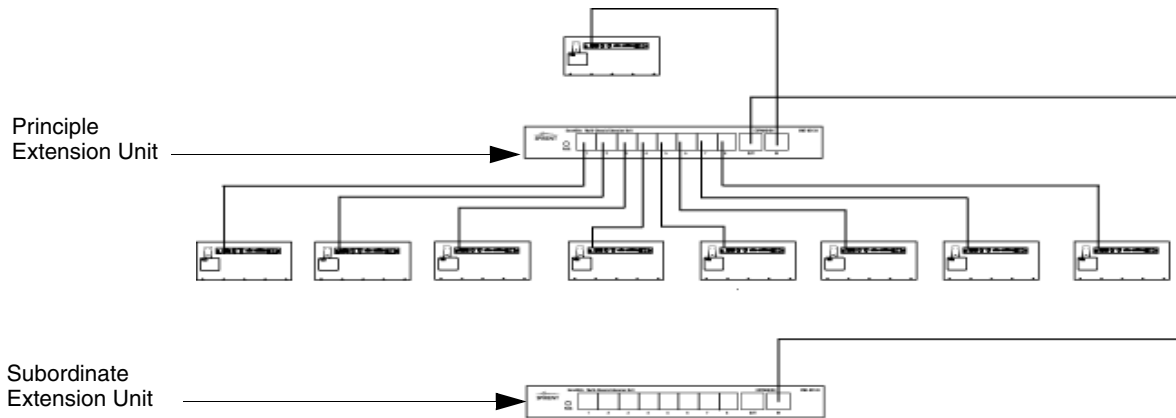


Figure A-11. Connecting an Extension Unit to Another Extension Unit

You can connect up to an additional eight chassis to the *Subordinate Extension Unit* as shown in *Figure A-12*.



Important: The example shown in *Figure A-12* uses a 5-foot cable to connect the *Principle Extension Unit* to the *Subordinate Extension Unit*. Subtract the length of this cable from 50 to determine the maximum cable length allowed between chassis. In this example, each cable connected from the *Subordinate Extension Unit* to the next chassis can be any variable under 45 feet in length ($50 - 5 = 45$).

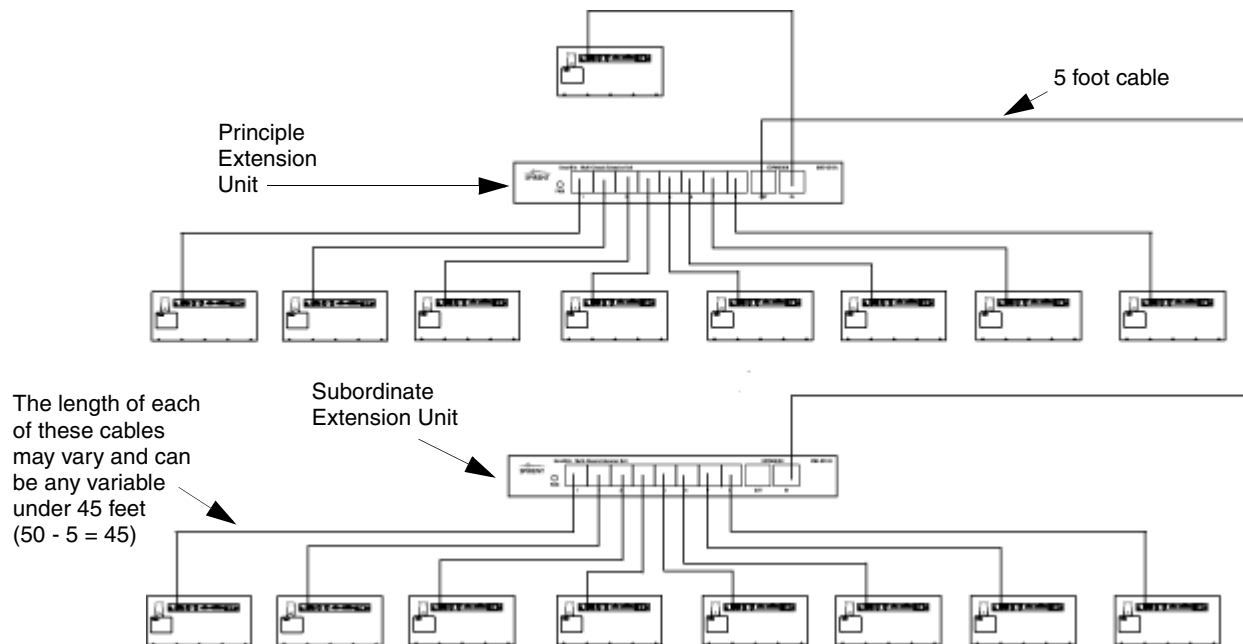


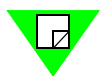
Figure A-12. Connecting Additional SmartBits Chassis to a Second Extension Unit

Continue adding extension units and chassis until you reach the desired number of chassis that you want to synchronize (up to 512).

Hierarchical Connection



To set up a hierarchical connection:



Note: Refer to “*Multi-chassis Extension Unit Terminology*” on page 98 for terminology descriptions.

- 1 Connect the *Primary Controller* chassis to the *Principle Extension Unit* (see *Figure A-13*).
- 2 Connect the *Principle Extension Unit* to eight *Dependent Controller* chassis.
- 3 Connect each *Dependent Controller* chassis to another *Multi-chassis Extension Unit*.

You may repeat this procedure to obtain the required ports.



Important: Once the cable connections pass through another SmartBits chassis, the cable measuring process starts over again.

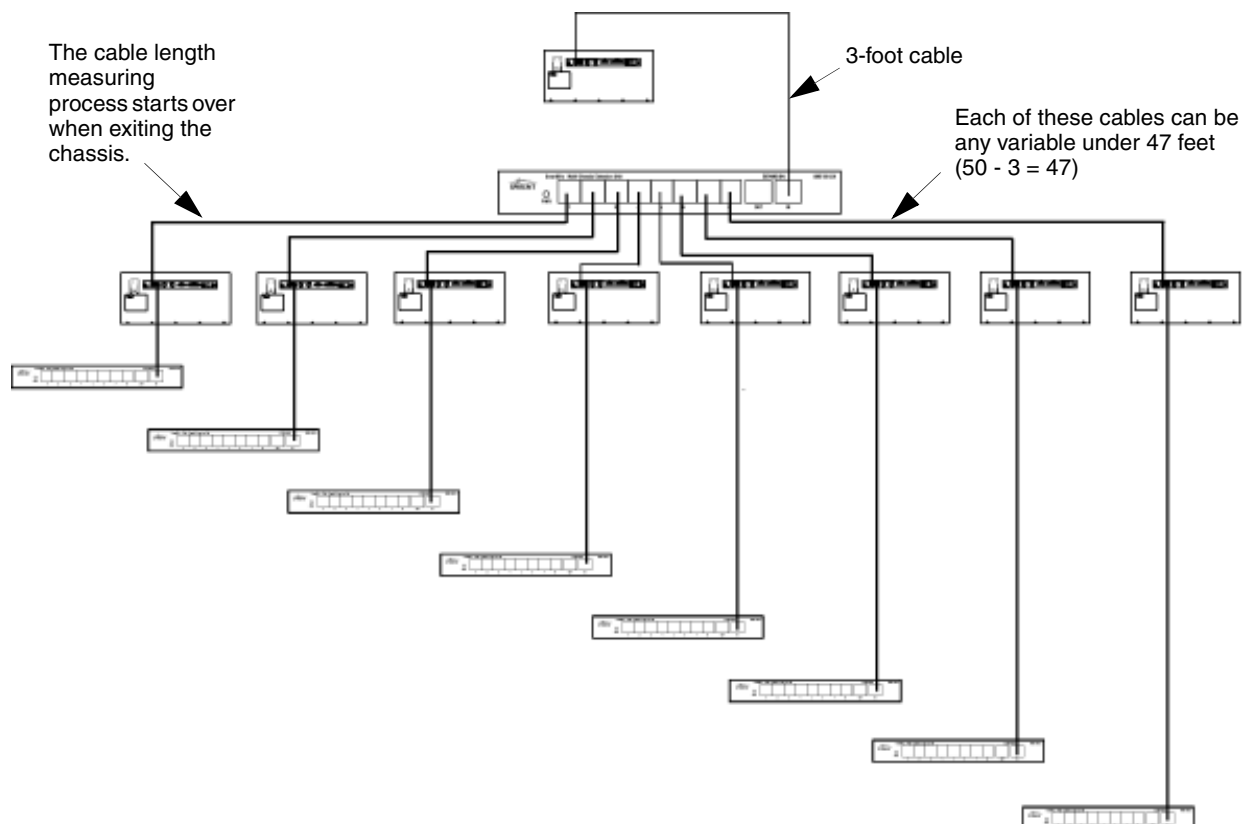


Figure A-13. Example of Hierarchical Connection Configuration

Beginning with the configuration shown in *Figure A-13 on page 102*, you can add eight more chassis to each extension unit (*Figure A-14*). You may repeat this procedure until you reach 512 chassis.



Important: When measuring cable length from a SmartBits chassis to an extension unit, and to another SmartBits chassis, remember that the total cable length can be any variable under 50 feet.

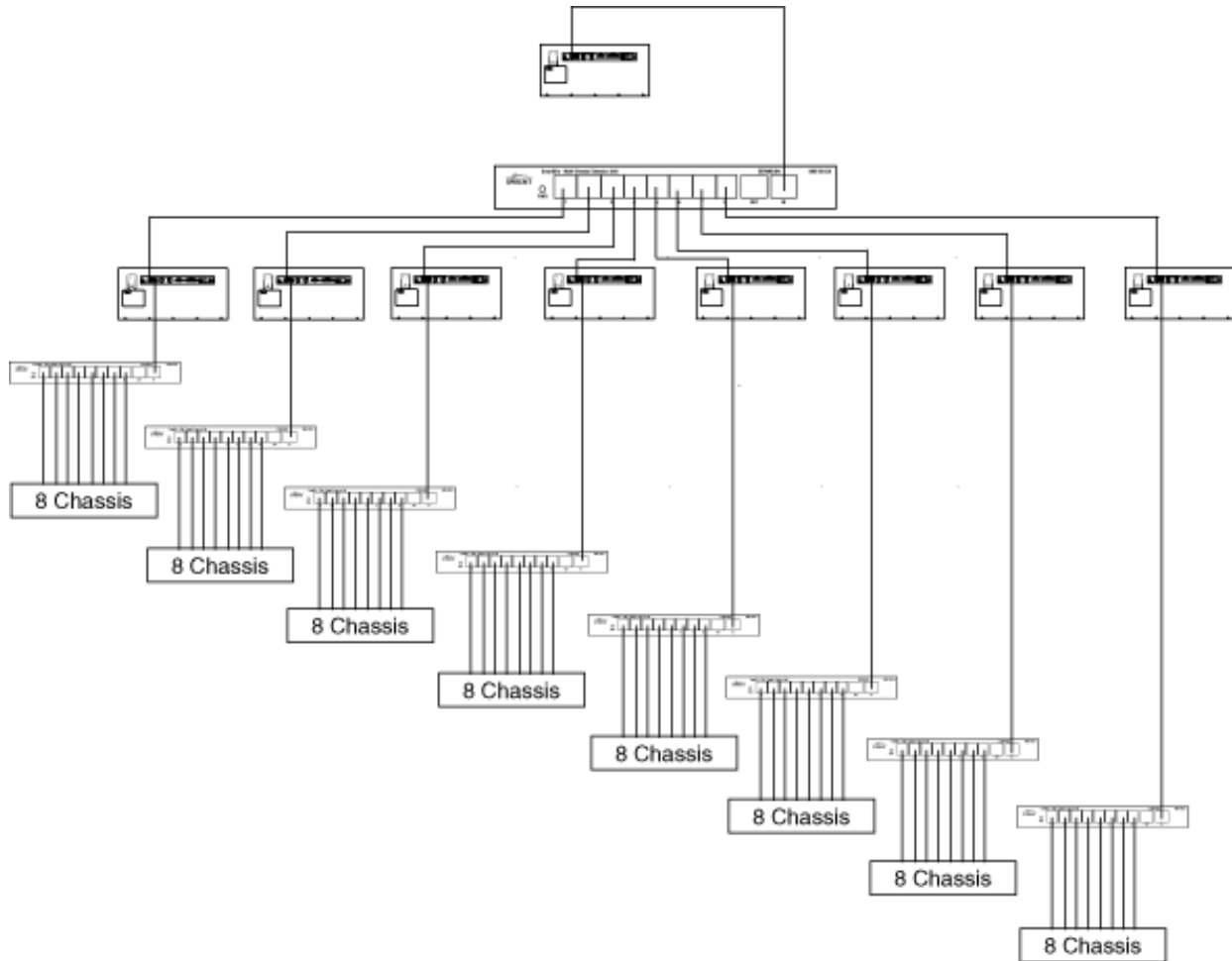
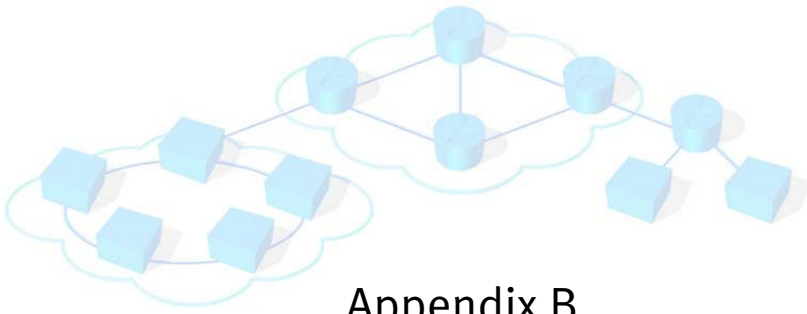


Figure A-14. Connecting Chassis Through an Extension Unit in a Hierarchical Connection Configuration





Appendix B

Cable Information

In this appendix . . .

- Ethernet Cables 106
- Ethernet Connectors 107
- XAUI Extender Module RJ-45 Pinouts 112
- SmartBits-to-GPS/CDMA Control Interface 112
- Fiber Connectors 113

Ethernet Cables

Each interface requires a different pin out depending on the type of interface and if the connection is a DCE-to-DTE or DCE-to-DCE.

Unless otherwise specified, the Ethernet cables specified below use 4-pair Category 5 unshielded twisted pair (UTP) cables with a patch length of one meter used between the RJ-45 connectors.

Straight-through Cable for 10/100/1000 Base

Pin	Color	Color	Pin
1	BLUE	BLUE	1
2	BLUE-WHITE	BLUE-WHITE	2
3	ORANGE	ORANGE	3
4	GREEN	GREEN	4
5	GREEN-WHITE	GREEN-WHITE	5
6	ORANGE-WHITE	ORANGE-WHITE	6
7	BROWN	BROWN	7
8	BROWN-WHITE	BROWN-WHITE	8

Crossover Cable for 10/100/1000 Base

Pin	Color	Color	Pin
1	BLUE	ORANGE	1
2	BLUE-WHITE	ORANGE-WHITE	2
3	ORANGE	BLUE	3
4	GREEN	BROWN	4
5	GREEN-WHITE	BROWN-WHITE	5
6	ORANGE-WHITE	BLUE-WHITE	6
7	BROWN	GREEN	7
8	BROWN-WHITE	GREEN-WHITE	8

Ethernet Connectors

RJ-45 Connector

LAN-3100A, LAN-3101B, LAN-3102A, LAN-3300A, LAN-3301A, LAN-3302A, LAN-3306A, LAN-3320A, LAN-3321A, LAN-3324A, LAN-3325A, LAN-3327A modules

Table B-1. RJ-45 Connector Pin Assignments

Pin	Signal
1	TRD 0 +
2	TRD 0 -
3	TRD 1 +
4	TRD 2 +
5	TRD 2 -
6	TRD 1 -
7	TRD 3 +
8	TRD 3 -

80-pin Connector

The LAN-3150A has two female 80-pin connectors, J1 and J2. The J1 connector is for the first four ports. The J2 connector is for the second four ports.

The DUT should have the corresponding 80-pin female connector, and can be connected to the LAN-3150A by using the two 12-inch cables that are supplied and recommended by Spirent Communications.

The J1 and J2 connectors both carry one set of MII management signals. These signals can be configured independently for each four-port DUT. However, for a single eight-port DUT, the MII management signal from the J2 connector should be used and the corresponding signal at the J1 connector should be ignored.

Table B-2 on page 108 shows the LAN-3150A 80-pin connector assignment for SMII and RMII. Input and output are identified in the left column as I and O respectively.

The J1 and J2 pin structures are exactly the same except for the port numbers (0, 1, 2, 3 for J1; and 4, 5, 6, 7 for J2).

Table B-2. 80-Pin Connector Assignments

I/O	Pin	Signal Name		Pin	Signal Name	
		RMII	SMII		RMII	SMII
O	1	3VCC	3VCC	41	3VCC	3VCC
O	2	5VCC	5VCC	42	5VCC	5VCC
O	3	REF_CLK+	REF_CLK+	43	REF_CLK–	REF_CLK–
O	4	GND	GND	44	GND	GND
O	5	DNC (Note 5)	SYNC+	45	DNC (Note 5)	SYNC–
O	6	/SMII (Note 1)	/SMII (Note 1)	46	/BRDCON (Note 2)	/BRDCON (Note 2)
O	7	TXD1_0+	TXD1+	47	TXD1_0–	TXD1–
O	8	TXD1_1+	DNC (Note 5)	48	TXD1_1–	DNC (Note 5)
O	9	TXEN1+	DNC (Note 5)	49	TXEN1–	DNC (Note 5)
I	10	RXD1_0+	RXD1+	50	RXD1_0–	RXD1–
I	11	RXD1_1+	DNC (Note 5)	51	RXD1_1–	DNC (Note 5)
I	12	CRS_DV1+	DNC (Note 5)	52	CRS_DV1–	DNC (Note 5)
I	13	R_CLK+ (Note 3)	R_CLK+ (Note 3)	53	R_CLK– (Note 3)	R_CLK– (Note 3)
O	14	GND	GND	54	GND	GND
O	15	TXD2_0+	TXD2+	55	TXD2_0–	TXD2–
O	16	TXD2_1+	DNC (Note 5)	56	TXD2_1–	DNC (Note 5)
O	17	TXEN2+	DNC (Note 5)	57	TXEN2–	DNC (Note 5)
I	18	RXD2_0+	RXD2+	58	RXD2_0–	RXD2–
I	19	RXD2_1+	DNC (Note 5)	59	RXD2_1–	DNC (Note 5)
I	20	CRS_DV2+	DNC (Note 5)	60	CRS_DV2–	DNC (Note 5)
I	21	DNC (Note 5)	R_SYNC+ (Note 3)	61	DNC (Note 5)	R_SYNC– (Note 3)
O	22	GND	GND	62	GND	GND

Table B-2. 80-Pin Connector Assignments (continued)

I/O	Pin	Signal Name		Pin	Signal Name	
		RMII	SMII		RMII	SMII
O	23	TXD3_0+	TXD3+	63	TXD3_0–	TXD3–
O	24	TXD3_1+	DNC (Note 5)	64	TXD3_1–	DNC (Note 5)
O	25	TXEN3+	DNC (Note 5)	65	TXEN3–	DNC (Note 5)
I	26	RXD3_0+	RXD3+	66	RXD3_0–	RXD3–
I	27	RXD3_1+	DNC (Note 5)	67	RXD3_1–	DNC (Note 5)
I	28	CRS_DV3+	DNC (Note 5)	68	CRS_DV3–	DNC (Note 5)
I	29	/RESET (Note 4)	DNC (Note 5)	69	DNC (Note 5)	DNC (Note 5)
O	30	GND	GND	70	GND	GND
O	31	TXD4_0+	TXD4+	71	TXD4_0–	TXD4–
O	32	TXD4_1+	DNC (Note 5)	72	TXD4_1–	DNC (Note 5)
O	33	TXEN4+	DNC (Note 5)	73	TXEN4–	DNC (Note 5)
I	34	RXD4_0+	RXD4+	74	RXD4_0–	RXD4–
I	35	RXD4_1+	DNC (Note 5)	75	RXD4_1–	DNC (Note 5)
I	36	CRS_DV4+	DNC (Note 5)	76	CRS_DV4–	DNC (Note 5)
n/a	37	DNC (Note 5)	DNC (Note 5)	77	DNC (Note 5)	DNC (Note 5)
O	38	GND	GND	78	GND	GND
Note 6	39	MDIO (Note 6)	MDIO (Note 6)	79	MDC (Note 6)	MDC (Note 6)
O	40	3VCC	3VCC	80	3VCC	3VCC

1 **SMII** Output. Low for SMII, high for RMII. Disregard this signal for single mode DUTs.

2 **BRDCON** Input. Active low, DUT connected flag. It should be tied to ground at the DUT.

3 **R_CLK+/-** and **R_SYNC+/-**. These two LVDS input pairs should be the output of 65LVDS31 drivers on the DUT. These signals must be supplied to LAN-3150A through J2.

4 **RESET** This low active output can be used as PHY hardware reset signal.

5 **DNC** Do not connect.

6 **MDIO** This signal is bi-directional.

MDC This is an output signal.

SFP MSA Connectors

LAN-3320A, LAN-3321A, LAN-3324A, LAN-3325A, LAN-3327A, XD modules

Table B-3. SFP MSA Connector Pin Assignments

Pin	Signal	Pin	Signal
20	TX GND	1	TX GND
19	TD- (TX DATA IN-)	2	TX FAULT
18	TD+ (TX DATA IN+)	3	TX DISABLE
17	TX GND	4	MOD-DEF2
16	VccTX	5	MOD-DEF1
15	VccRX	6	MOD-DEF0
14	RX GND	7	N/C
13	RD+ (RX DATA OUT-)	8	LOS
12	RD- (RX DATA OUT-)	9	RX GND
11	RX GND	10	RX GND

GBIC (9-pin) Connector

LAN-3201B, LAN-3310A, LAN-3311A, LAN-3710AL, LAN-3710AE modules

Table B-4. GBIC (9-pin) Connector Pin Assignments

Pin	Signal
1	Rx Gnd
2	RD+ (Rx Data Out +)
3	RD- (Rx Data Out -)
4	Rx Signal Detect)
5	V _{cc} Rx
6	V _{cc} Tx
7	TD- (Tx Data In -)
8	TD + (Tx Data In +)
9	Tx Gnd

GBIC (20-pin) Connector

FBC-3601A, FBC-3602A modules

Table B-5. GBIC (20-pin) Connector Pin Assignments

Pin Name	Pin Number	Sequence
RX_LOS	1	2
GND	2	2
GND	3	2
MOD_DEF(0)	4	2
MOD_DEF(1)	5	2
MOD_DEF(2)	6	2
TX_DISABLE	7	2
GND	8	2
GND	9	2
TX_FAULT	10	2
GND	11	1
-RX_DAT	12	1
+RX+DAT	13	1
GND	14	1
V _{cc}	15	2
V _{cc}	16	2
GND	17	1
+TX_DAT	18	1
-TX_DAT	19	1
GND	20	1

XAUI Extender Module RJ-45 Pinouts

XLW-3720A and XLW-3721A modules

Table B-6. XAUI RJ-45 Connector Pin Assignments

Pin	Signal	Input/Output	Voltage
1	LASI	Output	Active High
2	MDIO	Input/Output	1.2v
3	MDC	Output	1.2v
4	XENPAK reset	Output	Active Low
5, 6, 7, 8	Tied together	N/A	Ground

SmartBits-to-GPS/CDMA Control Interface

The serial (AUX) port on the rear panel of the SmartBits is used to configure the ETR receiver and to read the clock (yy:mm:dd:hh:mm:ss). The serial port on the SmartBits is DCE, with pinouts as described below.



Note: Refer to the appropriate user manual for the Interface Kit you are using for the cable information pertaining to that kit.

SmartBits (DCE
RS-232 (9-pin))

TXD	2
RXD	3
GND	5

DB9P DB9S
Male Female
Chassis Cable



Fiber Connectors

SC Fiber, Multi- and Single Mode, LC Fiber Connector

LAN-3111A, LAN-3111As

SC Fiber, Multi-Mode, 850nm Connector

LAN-3200A module

SC Fiber, Multi-Mode, 1300nm Connector

ATM-3451A, ATM-3453A, POS-3500B, POS-3502A, POS-3510A, POS-3511A modules

SC Fiber, Single Mode, 1310nm Connector

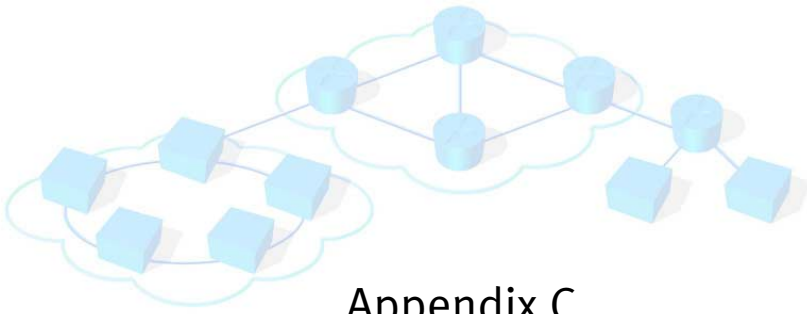
ATM-3451As, ATM-3453As, LAN-3200As, LAN-3710AL, POS-3500Bs, POS-3502As, POS-3504As, POS-3505As, POS-3510As, POS-3511As, POS-3518As, POS-3519As modules

Fiber, SC duplex, single mode, 1550nm

LAN-3710AE, POS-3504AR, POS-3505AR, POS-3518AR, POS-3519AR modules

Table B-7. Wavelength and Speed Definitions per SmartBits Fiber Optics Modules

Module	Multi-Mode		Single Mode	
	850nm	1300nm	1310nm	1550nm
ATM-3451A		OC-3c (STM-1c)		
ATM-3451As			OC-3c (STM-1c)	
ATM-3453A		OC-3c/OC-12c (STM-1c/STM-4c)		
ATM-3453As			OC-3c/OC-12c (STM-1c/STM-4c)	
LAN-3200A	1000Base-SX			
LAN-3200As			100Base-LX	
POS-3500B		OC-3c/OC-12c (STM-1c/STM-4c)		
POS-3502A		OC-3c (STM-1c)		
POS-3504As			OC-48c (STM-16c)	
POS-3504AR				OC-48c (STM-16c)
POS-3505As			OC-48c (STM-16c)	
POS-3505AR				OC-48c (STM-16c)
POS-3510A		OC-3c/OC-12c (STM-1c/STM-4c)		
POS-3510As			OC-3c/OC-12c (STM-1c/STM-4c)	
POS-3511A		OC-3c/OC-12c (STM-1c/STM-4c)		
POS-3511As			OC-3c/OC-12c (STM-1c/STM-4c)	
POS-3518As			OC-192c (STM-64c)	
POS-3518AR				OC-192c (STM-64c)
POS-3519As			OC-192c (STM-64c)	
POS-3519AR				OC-192c (STM-64c)



Appendix C

Download and Install Applications

In this appendix . .

This appendix contains the following topics:

- **Downloading SmartBits Applications 116**
- **Running the Application 117**
- **Key Files 117**

Downloading SmartBits Applications

The latest SmartBits software applications are available from the Spirent Communications' Customer Service Center website at <http://support.spirentcom.com>.

In order to enter this website, you need to register with Spirent Communications. Once registered, you can use the Customer Service Center to download new versions of software applications, scripts, and firmware. You will also have access to Spirent product FAQs, service tracking information, and Spirent news issues.

Example Download



To download SmartBits software from the web:

- 1 Call Spirent Communications Technical Support for a password or a set of passwords for the applications you are authorized to download via your current Software Upgrade Support (SUS) contract. Be ready to give the representative the serial number of your SmartBits chassis when you call.
- 2 Go to Spirent's Customer Service Center website (<http://support.spirentcom.com>) and login in the upper left *Members* area of the website's main page.



Note: To register your email address and password for login, click the **SignUp** button in the *Members* area of the website's main page and then follow the instructional screens.

- 3 In the *Self Service Tools* area, click on **Download Software Updates**.
- 4 In the *Software Downloads* product tree that appears, locate the product line and product category that contains the product you want to download (e.g., SmartBits/ Applications).
- 5 Click the + sign next to the appropriate product category (APIs, Applications, etc.) to display the list of products available for download.
- 6 Locate the desired product listing and click on the product name.
- 7 If you want to download a software version that is different from the one that appears in the default listing, then select the alternative version from the **Other Versions Available** pull-down menu.
- 8 Click the **Download** button on the *Software Downloads* page to launch the File Download window.
- 9 Select **Save** to download the **setup.exe** file to your PC. Specify the preferred download directory.
- 10 Follow the installation instructions provided by the software installer. The software files will be copied to the directory that you specify.



Note: It is recommended that you install upgrades in a new directory and that you only install one application per directory (do not install all of the SmartBits applications in a single directory).

- 11** Once installation is complete, you need to install a key file that allows you to use the product with your particular SmartBits chassis. This key file is contained on a 3.5-inch diskette that is shipped with the product CD or is emailed to you from Spirent Communications Technical Support. Download the key file, which appears in the format **<application>key.txt**, into the directory where the product is installed. (See below for more information on key files.)

Running the Application

The applications icon will be installed by default in the SmartBits Applications directory. You also have the option to install a shortcut on your desktop. To run the application, select **Start > Programs > SmartBits Applications > DesiredApplication** or click twice on the applications icon.



Note: Some SmartBits applications may use the directory: **Start > Programs > Netcom Systems Applications > DesiredApplication**.

Key Files

When you start a SmartBits application, you may get the *No Authorization* message. This indicates that the application cannot find the key file for the application.

All SmartBits applications, except the core applications (SmartWindow, SmartApplications, and SmartLibrary), require a key file. Look for the 3.5 in. (8.9 cm.) disk supplied with your application; it will contain your key file, which you can copy into the directory where your application resides.

If the key file is not found, the application will run in demo mode; that is, it will run for a limited time and then timeout and close.

If you had a previous installation of the application, copy the **<application>key.txt** file from that directory to the new installation directory.

If you have lost your **<application>key.txt** file, you will need to call Spirent Communications Technical Support to have another file created for you. You will need to have the chassis serial number associated with the key file, as well as an email address to receive the key file. When you receive the file, copy it to the directory where the SmartBits application is installed.

Key files are keyed to a specific SmartBits chassis. If you want to move your application to another PC, you simply move the key file to the new PC with the application. If you want to run the application on a different SmartBits chassis, you will need another key file.



Note: Spirent Communications Technical Support can generate special keys with more than one chassis number. See *“How to Contact Us” on page 6*.





Appendix D

Serial Port and Telnet Commands

In this appendix . . .

- Overview of the Serial Command Set 120
- Serial Command Interface Updates 121
- Serial Port Command Set 121
- Superuser Commands 122
- Netmask Commands 124
- Gateway Commands 125
- External Time Reference Commands 126

Overview of the Serial Command Set

This appendix contains the serial port commands, shown in [Figure D-1](#) and [Figure D-2](#). You can send these commands from your PC directly over a serial port connection to a SmartBits 600x/6000x chassis using HyperTerminal or an equivalent terminal emulation program.

The following SmartBits firmware commands are available when you connect your PC HyperTerminal program using a serial port to a SmartBits 600x/6000x chassis. To view each help window and the chassis firmware version level, enter the **HELP** command and press **Return**, in the HyperTerminal window.



Note: [Figure D-1](#) and [Figure D-2](#) are examples of the Help menu. Some release versions may vary and the actual content may change in presentation and content with respect to the version you are using.

```
SmartBits SMB-600 Command Summary: (F/W ver: 2.00.010.00)

HELP          Display (this) help text.
USER          Display version string.
HISTORY       Displays last 16 commands.
!! [N]        Executes command number N, see HISTORY
IPADDR [xxx.xxx.xxx.xxx] Display/modify chassis IP address.
NETMASK [xxx.xxx.xxx.xxx] Display/modify netmask.
GATEWAY [xxx.xxx.xxx.xxx] Display/modify default gateway IP address.
PORTNO [xxxxx] Display/modify TCP listen port number.
IDLEMAX [60..604800] Display/modify idle logout time (seconds).
MACADDR       Display MAC address.
SERIAL        Display serial number.
SAVE          Writes the current settings to NVRAM.
ECHO ON       Allow serial input to be echoed when entered.
ECHO OFF      Disallow serial input to be echoed when entered.
CARDS SHOW    Displays use/status of all cards.
SU            Enter SuperUser mode, enables SuperUser commands.
```

Figure D-1. SmartBits 600x/6000x Firmware Commands Available Using HyperTerminal

The SmartBits 600x/6000x chassis offers a superuser mode with additional commands as shown in [Figure D-2](#).

```
--- additional SuperUser (SU) mode commands:
USER SHOW    Displays all logged-in users.
STATUS       Displays all users with special privilege.
RESERVE [ipadd][cardlist] Reserves listed cards for user.
RELEASE [ipadd][cardlist] Releases listed cards for user.
ALLOW [ipaddress]    Allows login privilege to this user.
DISALLOW [ipaddress] Disallows login privilege to this user.
MAXIMUM [1..15]      Sets the max number of logged-in users.
CLOSE [1..15 | ALL]  Closes selected or all logged-in users.
CARDS SHOW    Displays use/status of all cards.
EN/DISABLE [cardlist] Enables/Disables cards in the list for/from use.
RESET [cardlist] Resets all the cards in the CARDLIST.
SECURITY SHOW Displays security check status.
ENABLE | DISABLE Enables/disables security check.
PW           Sets security password for security check.
SAVE         Saves security setting across power cycle.
IPFW SET [ip][card][port][user] Setup IP forwarding, for IP
CLEAR [ip]   Clear IP forwarding, for IP
SHOW        Show IP forwarding configuration
SVNC STATUS  Displays status of SyncOp
ABORT        Aborts any pending SyncOp
GPS MODE     Displays Mode of pseudo-GPS interface
STATUS       Displays status of pseudo-GPS interface
TIME         Displays NTP time of day (as if from GPS)
DATE         Displays NTP date (as if from GPS)
FREQ [value] Displays/changes GPS Freq. Figure of Merit
TFM [value]  Displays/changes GPS Time Figure of Merit
REBOOT       Reboots the SMB chassis
INITFLASH    Resets the NVRAM to default settings.
SUPASS       Modifies SuperUser password.
EXITSU       Exits SuperUser mode, disables SuperUser commands.
```

Figure D-2. SmartBits 600x/6000x Firmware Commands Using Superuser Mode

Serial Command Interface Updates

Starting with firmware version 2.00, the SmartBits 600x/6000x chassis serial command interface has been enhanced to improve the basic user/card management command structures and by adding Netmask and Gateway commands. The Netmask and Gateway commands listed in this appendix are for 2.00 or later firmware releases.

Most of the command structure changes will define and support commands in more of a hierarchical fashion. In most commands, the order of the command name and first argument can be swapped; in some cases, this may make the alternate command form more intuitive command and easier to remember.

The *Help* command has been updated to reflect the new commands and hierarchical command structure.

Serial Port Command Set

The following commands apply to all chassis unless otherwise specified.

HELP – Displays the available commands.

VER – Displays the chassis firmware version.

HISTORY – Displays the previous 16 commands.

!! [#] – Recalls any of the previous 16 commands displayed and executes them again.

IPADDR [xxx.xxx.xxx.xxx] – Displays [or modifies] IP address. This command allows you to change the SmartBits IP address. The change takes effect following a power cycle or reset. If a new IP address is not entered, the SmartBits will display the current IP address. If the IP address or the syntax is bad, it will display the following error message: Invalid IP address entered.

NETMASK – See “*Netmask Commands*” on page 124.

GATEWAY – See “*Gateway Commands*” on page 125.

PORTNO [xxxxx] – Displays or modifies the TCP port number for the SmartBits chassis.

IDLEMAX [x] – Displays [or modifies] idle logout time, in seconds (60 seconds to a maximum of 604800 seconds). This command sets a time limit for the SmartBits controller to close any inactive open connection. The SmartBits controller has been designed to be a high-performance multi-user system. Any user who connects to the controller but does not use it (i.e., does not send any command) will be disconnected and all resources freed after the set idle time limit expires.

If a new idle time limit value is not entered, the SmartBits controller will display the current idle time limit value. The largest value for the idle_time_limit_value that is accepted is 604800.

MACADDR – Displays the SmartBits MAC address. For information only.

SERNUM – Displays the SmartBits serial number. For information only.

ECHO ON – Allows text entries through the serial port to be echoed while entered. ECHO ON allows the user to see their keystrokes as they occur. It is the default echo setting.

ECHO OFF – Does not allow text entries through the serial port to be displayed while being entered. The ECHO state is temporarily forced to ECHO OFF during all password entry sessions.

CARDS SHOW – Displays the use and status of all cards being used.

ETH SHOW – Displays the current operational configuration of the chassis controller's (host) Ethernet port. This information includes the current speed and duplex settings.

SU – Enter *super-user* mode, enables the *super-user* command set. This command provides entry into the super-user mode, where the current logged-on Ethernet connections on the unit can be examined, and if desired, closed. The super-user mode is password protected and prompts you for an 8-character password. The factory default password is **SMB-6000**.

Superuser Commands

These commands are available under the superuser mode of the SmartBits 6000x controller chassis using either the serial port or Telnet interface.

USERS – Sets the way log-in and card reservation permissions are handled. These command parameters can be combined into groups to better understand their functionality.

USERS SHOW|STATUS – (A command for information purposes only.) Lists those users currently logged in to the chassis, and which cards those users have reserved. A single character will designate if the user has (S) super-user or (A) administrative privileges, or if the user is on a (T) Telnet connection. The status command is used only for displaying user information regarding cards reserved with the USER RESERVE command. If no users have cards reserved for them in this manner, an empty table will be displayed.

USERS RESERVE/RELEASE [ipaddress][cardlist] – Reserves the cardlist for exclusive access by the host at ipaddress. Card reservation is terminated with the release command.

USERS ALLOW|DISALLOW [ipaddress] – Removes the ability of any host matching ipaddress to log in to the chassis. The allow switch removes this limitation, but does not grant any special privileges.

USERS MAXIMUM [1...15] – Displays the current setting for the maximum number of users allowed to concurrently log in to the chassis (when entered without a number). The maximum number of users must be a number between 1 and 15.

USERS CLOSE [1...15/ALL] – Closes the connection(s) for either the indicated usernum or for ALL users. A console (serial port) connection does not have a user number and cannot be closed.

CARDS SHOW – Displays the status of each slot in the system as well as the user information for any cards currently shared or reserved.

CARDS ENABLE/DISABLE [cardlist] – Enables or disables all access to the card(s) in cardlist. Users currently reserving or sharing these cards will not have their access affected until they unreserve or stop sharing the card, after which they will be affected as any other user.

CARDS RESET [cardlist] – Issues a warm boot command to each card in the cardlist.

Note: IPFW commands only work with TeraMetrics modules.

IPFW SET [ip][card][port][user] – Assigns the IP Address to the card.

IPFW CLEAR [ip] – Removes the address definitions.

IPFW SHOW – Returns to the list of current IP Addresses.

SYNC STATUS/ABORT – (SyncOps are multi-chassis tests.) Allows for the inquiry of the status of the SyncOps or to abort the operation.

ETR MODE/STATUS/TIME/DATE/FFOM/TFOM – See “*ETR Commands*” on page 126.

ETH SET – Allows the user to set the speed and duplex of the chassis controller’s (host) Ethernet port. The value for speed can be 10, 100, or Auto; indicating 10 Mbps, 100 Mbps, or autonegotiable. The value for duplex can be half, full or Auto; indicating half duplex, full duplex, or autonegotiate.

REBOOT – Issues a warm boot command to each card in the cardlist.

INITFLASH – Resets the chassis to its default settings.

SUPASS – Provides a mechanism to alter the Super User password. First, the current password must be correctly entered at the prompt *Please enter Super-user password:*. If not correctly entered, an error string “Incorrect Super-user password” is displayed. Then the prompt *Please enter new Super-user password:* for the new password is displayed. This password must be entered twice and must be exactly eight characters. Once a new password is entered, it will be encrypted and stored in a non-volatile Flash RAM. The user is prompted again *Please re-enter new Super-user password:* to confirm the new password. If a mismatch is detected, the error string “The new passwords are not same. Existing Super-user password will not be changed.” is displayed, and the change is rejected.

EXITSU – Exits superuser mode and exits access to the superuser command set.



Netmask Commands

In administering Internet sites, a netmask is a string of 0's and 1's that mask or screen out the network part of an IP address (IP) so that only the host computer part of the address remains. The binary 1's at the beginning of the mask turn the network ID part of the IP address into 0's. The binary 0's that follow allow the host ID to remain. The default netmask is 255.255.255.0 (255 is the decimal equivalent of a binary string of eight ones). Used for a Class C subnet (one with up to 255 host computers), the ".0" in the "255.255.255.0" netmask allows the specific host computer address to be visible.



- Important:**
- The following Netmask commands were initially released with the 1.10 firmware. You must have firmware version 1.10 or later installed to be able to access these commands.
 - Resetting the netmask values while other users are connected may cause those TCP sessions to be disrupted or terminated.
 - Netmask definitions are not persistent through a reset until the user invokes the *save* command. Typing *save* at the command prompt will update the Flash RAM, including the current netmask and gateway settings.

NETMASK [MASK] – Sets the netmask for the subnet. The *NETMASK* value uses the same type of format as an IP address, except that restrictions exist upon its value. For example, the default value 255.255.255.0 represents a valid netmask, while the value 255.0.255.0 does not. The user-defined gateway will be used to access any IP address that is not on the chassis' subnet, where the subnet's bounds are defined by this netmask. This command is similar to the one used to display the netmask, except that it includes the defined mask (which is in the same type format as an IP address).

When issued with no parameters, this command reports the current netmask assignment defining the chassis subnet. The user-defined gateway(s) will be used when accessing any IP addresses that are not on the chassis' subnet (as determined by this netmask).

For the firmware versions prior to 2.00, the netmask could not be directly changed once it was defined. A specific *NETMASK RESET* command needed to be issued (see below). Starting with the 2.00 release, the netmask can be changed at any time.



Note: If the user has not defined a gateway (see "[Gateway Commands](#)" on page 125) prior to the initial definition of the netmask, the firmware will automatically define a default gateway which is consistent with the chassis' IP address and netmask. Therefore, the user needs to define the gateway **only** if it is different from the default. For example, if the chassis' IP address is 192.169.100.24, a netmask of 255.255.255.0 will default to a gateway of 192.169.100.1.

NETMASK RESET – (Only used for firmware versions prior to 2.00.) Resets the netmask to 0.0.0.0, allowing a new netmask to be defined by the user.

Gateway Commands

A gateway is a network point that acts as an entrance to another network. On the Internet, a node or stopping point can be either a gateway node or a host (end-point) node. Both the computers of Internet users and the computers that serve pages to users are host nodes. The computers that control traffic within your company's network or at your local Internet service provider (ISP) are gateway nodes.

In the network for an enterprise, a computer server acting as a gateway node is often also acting as a proxy server and a firewall server. A gateway is often associated with both a router, which knows where to direct a given packet of data that arrives at the gateway, and a switch, which furnishes the actual path in and out of the gateway for a given packet.



- Important:**
- The following Gateway commands were initially released with the 1.10 firmware. You must have firmware version 1.10 or later installed to be able to access these commands.
 - Gateway definitions are not persistent through a reset until the user invokes the *save* command. Typing *save* at the command prompt will update the Flash RAM, including the current netmask and gateway settings.

GATEWAY [IPADDRESS] – Allows the user to set or query the default gateway address (192.168.0.1) used by the chassis controller. When the command is issued without an address, the current default gateway is returned. Supplying an IP address will set the default gateway to that address.

Gateway commands evolved over several firmware releases. Differences between versions are summarized in [Table D-1](#).

Table D-1. Summary of Version Releases

Firmware Version	Behavior Notes
1.10	Every time the GATEWAY command was issued with an IP address, the address was added to a list of used gateways. These were only cleared from the list on reset.
1.2x	Gateways are added and removed by typing GATEWAY ADD <ADDRESS> or GATEWAY DEL <ADDRESS>. These are still tracked as a list of gateways.
2.00 or later	Only one gateway is user-definable, and this is used by default. Subsequent gateway definitions will replace the default gateway. Other gateways are tracked automatically in response to received ICMP redirect messages.



Note: The netmask **must** be defined prior to defining the gateway(s) (see “[Netmask Commands](#)” on page 124), and all gateways must reside on the chassis’ subnet (as defined by the netmask). If the user has not defined a gateway prior to the initial definitions of the netmask, the firmware will automatically define a default gateway during the execution of the netmask command. In this case, the automatically defined gateway is created consistent with the chassis’ IP address and user-defined netmask. Therefore, the user needs to explicitly define the gateway *only* if it is different from the default.



Important: The following information is subject to change in subsequent releases:

- The netmask should not be changed once the gateway is defined. A warning will be printed for every gateway that becomes part of a different subnet if the chassis netmask is changed.
- The netmask and gateway definitions are not persistent through chassis reset operations, and must either be explicitly saved or manually redefined as needed.

External Time Reference Commands

External Time Reference (ETR) is a Spirent Communications generic term for providing a way to offer either GPS or CDMA protocols within a network. These commands are used to confirm your system is operational. Refer to *Using GPS/CDMA with SmartBits Chassis User Guide* for complete information about these commands and the receivers available.

ETR Commands



Important: Although these commands are prefixed with “ETR”, they apply equally to both GPS and CDMA, since they all mimic the same interface. Also, these commands will accept “GPS” or “CDMA” as equivalent aliases for “ETR.” These commands may also return “GPS” as part of a command response. This is for backwards compatibility and applies equally to a CDMA receiver.

ETR TIME – Queries the GPS/CDMA receiver for the current time of day, and displays it to the user. A binary version of this command also exists, and is indirectly supported by SmartLibrary.

ETR DATE – Queries the GPS/CDMA receiver for the current date, and displays it to the user. A binary version of this command also exists, and is indirectly supported by SmartLibrary.

ETR MODE – Determines the mode of operation of the chassis, with respect to its connection to other SmartBits chassis and/or a GPS/CDMA receiver. A binary version of this command also exists, and is indirectly supported by SmartLibrary.

ETR MODE command responses:

- **MASTER** – No GPS/CDMA is detected, no other chassis are detected on the chassis' Expansion IN connection.
- **SLAVE** – No GPS/CDMA is detected, another SmartBits chassis is detected on the chassis Expansion IN connection.
- **GPS MASTER** – GPS/CDMA is detected, no other chassis are detected on the chassis' Expansion IN connection.
- **INVALID GPS SLAVE** – GPS/CDMA is detected, and another SmartBits chassis is detected on the chassis' Expansion IN connection. This is an invalid configuration.

ETR STATUS – Returns a summary of the operational status of the GPS/CDMA receiver. A binary version of this command exists, and is indirectly supported by SmartLibrary.

ETR STATUS command responses:

- **“GPS OK”** – GPS/CDMA is detected, and appears to be operational (ready for use).
- **“GPS NOT READY”** – GPS/CDMA is either not detected or appears to not be operational (not ready for use).
- **“GPS NOT CONNECTED”** – GPS/CDMA is not connected or not connected correctly.

ETR FFOM [FFOM] – Allows the user to display or change the threshold for the Frequency Figure of Merit (FFOM), by which the firmware determines the GPS/CDMA's readiness. This command was added to allow specialized testing even while the GPS/CDMA is operating in a degraded state, such as *holdover mode*.

More specifically, this command sets the maximum acceptable FFOM. As described in [Figure D-2 on page 120](#), this value indicates the accuracy of the UTC time reference and related 1 Hz (i.e., 1 PPS) and 10 MHz output signals. A value of **0** indicates a stable output synchronized to the GPS satellites or CDMA cell site transmitter, and is the normal requirement for the chassis SYNC operation. A value of **2** indicates that the GPS/CDMA receiver is not currently receiving sufficient satellite information to provide an accurate time reference; but is providing a secondary time reference utilizing its internal oscillator and the last known synchronization. A value of **3** indicates that the receiver is not synchronized and should not be used. The value of **1** indicates that the ETR is receiving some timing information, and is in the process of synchronizing its internal phase-locked loop (PLL) to the time reference. For more details refer to the specific manual for the time reference being used.

The SmartBits chassis checks the reported value for the FFOM against the limiting value set by this command when determining if the GPS's time is usable. The default value on reset is **0**.

Table D-2. Frequency Figure of Merit Value Descriptions

FFOM Value	Definition	SmartBits Chassis Notes
0	PLL stabilized, 1 PPS and 10 MHz output within specification.	Default requirement for GPS Sync operations.
1	PLL stabilizing	(transient state)
2	PLL unlocked (in holdover mode)	Allowable state, for a short period after antenna signal is disrupted. Both the 1 PPS and 10 MHz signals are generated, but may not be as accurate.
3	PLL unlocked (not in holdover mode). The 1 PPS and 10 MHz output should not be considered stable or usable.	Should not be used for SmartBits chassis.

ETR TFOM [TFOM] – Allows the user to change the threshold for the Time Figure of Merit (TFOM), by which the firmware determines the GPS/CDMA's readiness. This command was added to allow specialized testing even while the ETR is operating in a degraded state, such as holdover mode.

More specifically, the TFOM command sets the maximum acceptable TFOM; the largest range by which the reported time differs from GPS/CDMA time. Valid entries for **x** for the GPS (NanoSync and HP/Symmetricon 58503) are **3** through **9**; although values of **0** through **2** are also allowed for other compatible GPS/CDMA receivers (available on HP/Symmetricon 59551 GPS; but not available on HP/Symmetricon 58503 (GPS), NanoSync (GPS), or Praecis Cf (CDMA). Valid entries for **x** using the CDMA (Praecis Cf) are **6** through **9**. As illustrated in [Table D-3 on page 129](#), the value of **x** is a power of 10, in nanoseconds. For example, **x = 5** indicates an accuracy of no less than 10^5 , or 100000 nanoseconds.

The SmartBits chassis checks the reported value for the TFOM against the limiting value set by this command when determining if the time is usable. In order to run a GPS- or CDMA-based SmartBits SYNC operation without a sufficient antenna signal, this value should be set to the lowest value possible. In most cases, the default value is recommended. The default value on reset is **3** for GPS and **6** for CDMA.



Note: When a GPS receiver is not actively tracking a GPS satellite, its Time Figure of Merit is an estimate only, based on measured performance of the internal crystal oscillator. Similarly, if a CDMA loses reception of the cellular signal, its TFOM is also estimated.

Table D-3. Time Figure of Merit Value Descriptions

TFOM Value	Time Error	Notes
0	Less than 1 ns	Not available for 58503, NanoSync, or CDMA.
1	1-10 ns	Not available for 58503, NanoSync, or CDMA.
2	10-100 ns	Not available for 58503, NanoSync, or CDMA.
3	100-1000 ns	Default requirement for GPS Sync operation. Not available for CDMA.
4	1-10 μ s	GPS Sync operation only. Not available for CDMA.
5	10-100 μ s	GPS Sync operation only. Not available for CDMA.
6	100-1000 μ s	Available for both GPS and CDMA.
7	1-10 ms	Available for both GPS and CDMA.
8	10-100 ms	Available for both GPS and CDMA.
9	Greater than 100 ms	Available for both GPS and CDMA.

AUX Commands

The following AUX commands support the auxiliary serial interface path to and from the External Time Reference (GPS/CDMA).

AUX TYPE – Allows the user to display and change the type of External Time Reference connected to the chassis. This change is not persistent until/unless the user issues a SAVE command.

The following **AUX TYPE #** are for the internal storage definition (and value):

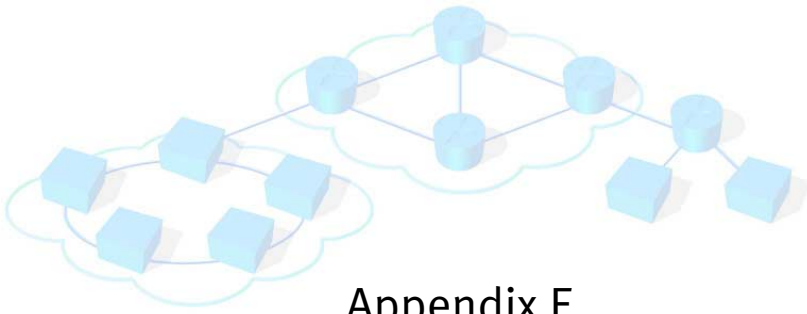
- 0 – UNKNOWN
- 1 – HP/Symmetricon 58503 (GPS)
- 2 – HP/Symmetricon 59551 (GPS)
- 3 – Zyfer NanoSync or NanoSync II (GPS)
- 4 – EndRun Technologies Cf or Cfr (CDMA)

AUX BAUD – Allows the user to display or change the BAUD rate of the chassis' auxiliary serial interface. This change is not persistent; since generally the BAUD rate is preset based on the TYPE of External Time Reference connected. This command is provided as a means of manually configuring the serial port to temporarily allow access external devices that do not match the standard settings. Supported BAUD rates are currently limited to 9600, 19200, and 38400.

AUX LEARN – Causes the chassis to execute a test to try to determine what type of External Time Reference is connected to the chassis. This does not automatically change the value defined by the AUX TYPE command. This is most useful for determining the type of time reference connected to a remotely configured chassis using a TELNET session.

AUX ID – Queries and displays the identification string associated with an External Time Reference. Commonly these identification strings include such information as the type and version of the time reference. The AUX TYPE must be correctly set before executing this command.

AUX CMD – Supports a pass-through path to and from the External Time Reference's serial interface. This allows access to any of the External Time Reference's native commands. Refer to the vendor specific documentation for a description of the available commands.



Appendix E

ESD Requirements

In this appendix . . .

This appendix contains the following topics:

- **General Equipment Handling 132**
- **Workstation Preparation 133**

Spirent Communications manufactures and sells products that require industry standard precautions to protect against damage from electrostatic discharge (ESD). This document explains the proper process for handling and storing electrostatic discharge sensitive (ESDS) devices, assemblies, and equipment.

The requirements presented in this document comply with the EIA Standard, *ANSI/ESD S20.20-1999: Development of an Electrostatic Discharge Control Program*, and apply to anyone who handles equipment that is sensitive to electrostatic discharge. Such equipment includes, but it not limited to:

- All electronic assemblies manufactured by Spirent Communications
- Discrete and integrated circuit semiconductors
- Hybrid microcircuits
- Thin film passive devices
- Memory modules



Caution: Failure to comply with the requirements explained in this document poses risks to the performance of ESDS devices, as well as to your investment in the equipment.

General Equipment Handling

Whenever you handle a piece of ESDS equipment, you must be properly grounded to avoid harming the equipment. Also, when transporting the equipment, it must be packaged properly. Follow the requirements below to help ensure equipment protection.

- Wrist straps must be worn by any person handling the equipment to provide normal grounding.
- The use of foot straps is encouraged to supplement normal grounding. If foot straps are used exclusively, two straps (one on each foot) should be used. Note that foot straps are only applicable in environments that use ESD flooring and/or floor mats.
- Hold ESDS equipment by the edges only; do not touch the electronic components or gold connectors.
- When transporting equipment between ESD protected work areas, the equipment must be contained in ESD protective packaging. Equipment that is received in ESD protective packaging must be opened either by a person who is properly grounded or at an ESD protected workstation.
- Any racks or carts used for the temporary storage or transport of ESDS equipment must be grounded either by drag chains or through direct connection to earth ground. Loose parts that are not protected by ESD-safe packaging must not be transported on carts.

Workstation Preparation

The ideal setup for working with ESDS equipment is a workstation designed specifically for that purpose. *Figure E-1* illustrates an ESD protected workstation. Please follow the requirements listed below to prepare a proper ESD protected workstation.

- The ESD Ground must be the equipment earth ground. Equipment earth ground is the electrical ground (green) wire at the receptacles.
- An ESD protected workstation consists of a table or workbench with a static dissipative surface or mat that is connected to earth ground. A resistor in the grounding wire is optional, providing that surface resistance to ground is $\geq 10^5$ to $\leq 10^9 \Omega$.
- The workstation must provide for the connection of a wrist strap. The wrist strap must contain a current limiting resistor with a value from $\geq 250K \Omega$ to $\leq 10M \Omega$.
- ESD protective flooring or floor mats are required when floor-grounding devices (foot straps/footwear) are used or when it is necessary to move in between ESD protected workstations when handling ESDS equipment.

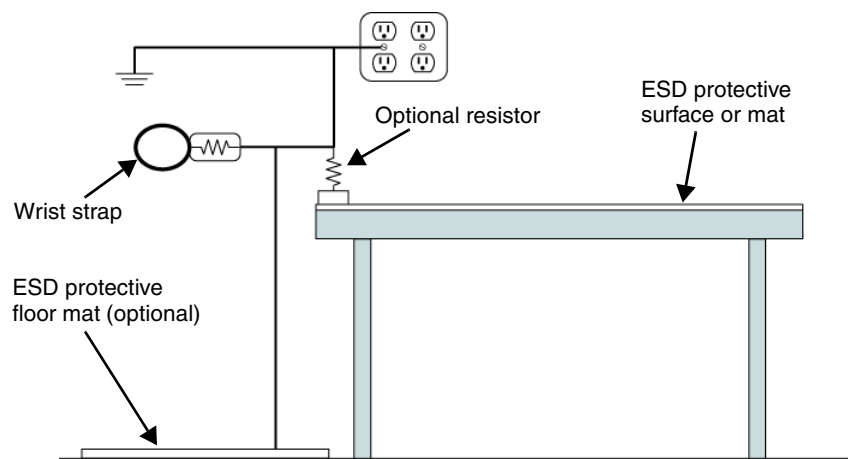
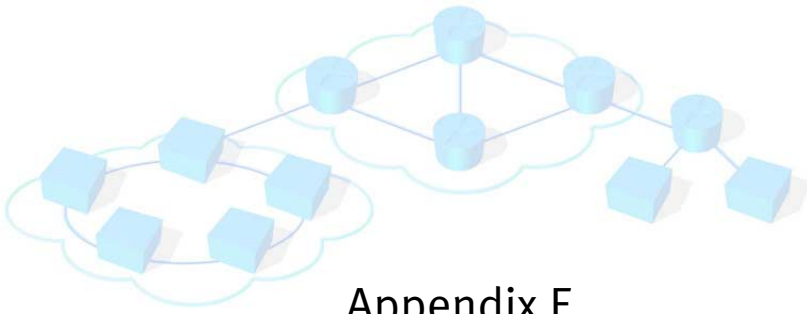


Figure E-1. ESD Protected Workstation



Note: The equipment needed for proper grounding is available in ESD service kits, such as the ESD Field Service Kit available from Spirent Communications (P/N 170-1800). Additional information on ESD can be found on the following website:
<http://www.esda.org/aboutesd.html>.





Appendix F

Fiber Optic Cleaning Guidelines

In this appendix . . .

This appendix contains the following topics:

- **Cleaning Guidelines 136**

Spirent Communications manufactures and sells products that contain fiber optic components, including fiber optic transmitters and receivers. These components are extremely susceptible to contamination by particles of dirt or dust, which can obstruct the optic path and cause performance degradation. To ensure optimum product performance, it is important that all optics and connector ferrules be kept clean.

This appendix presents guidelines for maintaining clean fiber optic components. Spirent Communications recommends that these guidelines be followed very closely.



- Caution:**
- Failure to comply with the guidelines explained in this appendix poses risks to the performance of fiber optic-based devices, as well as to your investment in the equipment.
 - Whenever you handle a piece of equipment that contains fiber optic components, you must be properly grounded to avoid harming the equipment. Refer to [Appendix E, “ESD Requirements”](#) for more details on ESD.

Cleaning Guidelines

To ensure the cleanliness of fiber optic components, follow the guidelines below:

- Use fiber patch cords (or connectors if you terminate your own fiber) only from a reputable supplier. Low-quality components can cause many hard-to-diagnose problems during an installation.
- Dust caps are typically installed on fiber optic components to ensure factory-clean optical devices. These protective caps should not be removed until the moment of connecting the fiber cable to the device. Ensure that the fiber is properly terminated, polished, and free of any dust or dirt. Also make sure that the location of installation is as free of dust and dirt as possible.
- Should it be necessary to disconnect the fiber device, reinstall the protective dust caps.
- If you suspect that the optics have been contaminated, alternate between blasting with clean, dry, compressed air and flushing with methanol to remove particles of dirt.



Appendix G

Revision History

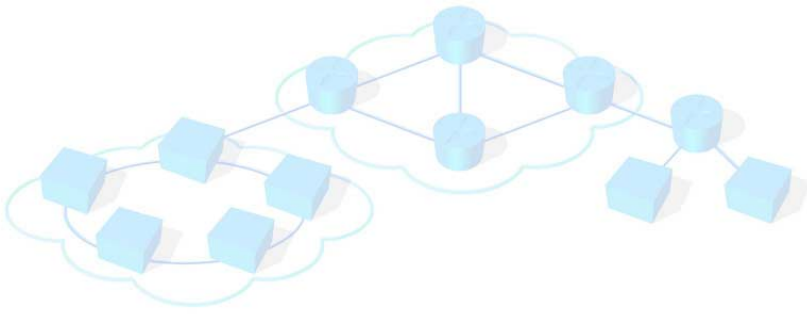
Spirent Communications increments the revision letter in a manual's part number when the technical content changes. When minor non-technical changes (cosmetic or editorial) are made, the revision letter does not increment, but remains the same.

Revision A: (March 2004) First release of this manual.

Revision B: (October 2004) Updated manual to include the following changes:

- Added the following modules to *Table 1-3 on page 18*:
 - XFP-3730A 10GBase Ethernet XFP MSA, 1-port, 1-slot, SmartMetrics module
 - XFP-3731A 10GBase Ethernet XFP MSA, 1-port, 1-slot, TeraMetrics module
- Fixed ON/OFF switch information to read **I** for ON and **O** for OFF (see *“Procedure 6: Connect the SmartBits Power Cord” on page 38*).
- Corrected dimension specifications (see *Table 1-4 on page 21*).
- Corrected PC/UNIX workstation requirements (see *page 29*).
- Updated cabling kit information (see *“Checking the SmartBits Package” on page 30* and *Table 2-1 on page 35*).
- Added graphics to *“Procedure 12: Connect to the DUT and Check Cabling” on page 67*.





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