SmartBits

Performance Analysis System

SmartBits 600/6000B Installation Guide

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SPIRENT Communications

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Contents

About This Guide

In About this Guide . . .

This section of the installation guide contains the following topics:

Purpose

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

Audience

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

User Guide Content

This guide contains the following sections:

Chapter 1, "About SmartBits 600/ 6000B"	Introduces the SmartBits 600 and SmartBits 6000B chassis.
Chapter 2, "Installation and Setup"	Describes the installation and set up of the SmartBits chassis.
Chapter 3, "LED Indicators"	Describes the LED status indicators of the chassis and different module types.
Chapter 4, "Troubleshooting"	Describes error messages and various troubleshooting conditions.
Appendix A, "Connecting Multiple Chassis Locally"	Provides details for setup, connecting, and powering up multiple chassis used in stacking and expansion configurations. Also provides details for various Multi-chassis Extension Unit connections and configurations.
Appendix B, "Downloading and Installing Applications"	Provides the general steps for downloading and updating Spirent Communications software applications.
Appendix C, "Debug Console"	Describes how to access SmartWindow Debug console and outlines procedures for debugging specific SmartCards/modules.
Appendix D, "ESD Requirements"	Provides ESD guidelines and procedures.
Appendix E, "Fiber Optic Cleaning Guidelines"	Provides cleaning guidelines for fiber optic equipment.
Index	Provides a comprehensive index listing.

Conventions

This guide uses the following typographical conventions:

- *Italics* is used for parameter and field names, chapter names, document titles, areas within windows, and words of emphasis.
- **Bold** is used in procedures to indicate the menu, option, button, key, or tab being selected, as well as any parameter values.
- The terms *DUT* and *device under test* as well as *SUT* and *system under test* are used interchangeably in this guide.
- Text you enter or input is shown in `Courier`.
- Directory and file names are shown in Helvetica.
- The terms *packet* and *frame* are used interchangeably.
- The term "SmartCard" refers to a printed circuit board used in an SMB-200/2000 chassis. The term "module" generally refers to a printed circuit board used in an SMB-600/6000B chassis. The term "card" is often used in SmartBits software applications and in this manual to refer to either type of circuit board.

Notes, cautions, and other important user information are shown as follows:

Note: Includes related information and tips.

Caution: Includes related precautions.

Important: Includes related important details.

Warning: Includes related warnings to prevent damage to equipment and or injury.

Related Manuals

Additional manuals related to the Product Name*SmartBits 600/6000B User Guide* include:

- *SmartBits System Reference*: Explains SmartBits system architecture and hardware, basic concepts for using SmartBits systems, and additional 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 SmartCards/modules 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 D, "ESD Requirements"*of this document for further information.

Some SmartBits equipment contains fibre 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 E, "Fiber Optic Cleaning Guidelines"* for proper cleaning practices for these components.

How to Contact Us

Technical support is available Monday through Friday between 07:00 and 18:00 Pacific Standard Time.

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

Phone: +1 800.886.8842 (available in the U.S. and Canada)

+1 818.676.2589

Fax: +1 818.880.9154

E-mail: smartbits.support@spirentcom.com

In addition, the latest versions of application Help files, application notes, and software and firmware updates are available on our website at:

http://www.spirentcom.com

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1 About SmartBits 600/6000B

In this chapter . . .

This chapter contains the following topics:

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 SmartBits 600 and SmartBits 6000B (referred to as SMB-600/6000B in this guide) are the next generation of test platforms that meet these growing requirements.

The SMB-600 and SMB-6000B chassis are high-density network performance analysis test systems. Both chassis support 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 SMB-600/6000B after a brief introduction to the systems' features. For more information about the SmartBits chassis and for 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, refer to each applications specific user guide and online help file.

What is SmartBits?

SMB-600/6000B 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)
- Fibre Channel

The following network types are supported:

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

What are the SmartBits Models?

SmartBits systems are comprised of five different chassis models. This user guide describes the following two models:

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

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

- SmartBits 200 chassis (SMB-200), 4 slots.
- SmartBits 2000 chassis (SMB-2000), 20 slots.

SMB-600

The SMB-600 (see *Figure 1-1*) is a portable and compact high-density-for-its-size network performance analysis test system. Compatible with the SMB-6000B system, the SMB-600 holds up to two modules that can support up to:

- 16 10/100 Mbps Ethernet ports
- 4 Gigabit Ethernet ports
- 1 10 Gigabit Ethernet port
- 2 POS (Packet over SONET) ports
- 4 Fibre Channel ports

or a mixture of these port types.

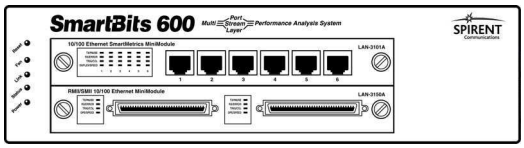


Figure 1-1. SmartBits 600 Chassis

SMB-6000B

The SMB-6000B is an ultra high-port density network performance analysis test system. Each chassis holds up to 12 modules that can support up to:

- 96 10/100/1000 Mbps Ethernet ports
- 24 Gigabit Ethernet ports
- 6 10 Gigabit Ethernet ports
- 12 POS (Packet over SONET) ports
- 12 Fibre Channel ports

or a mixture of these port types.

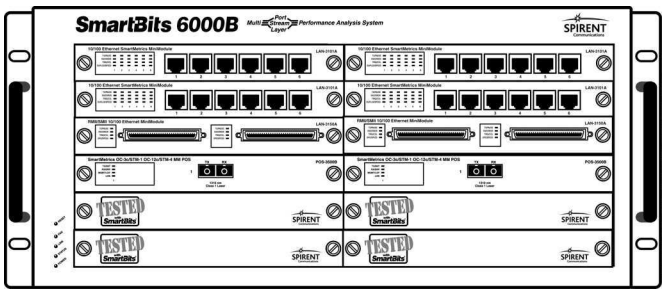


Figure 1-2. SmartBits 6000B Chassis

SMB-600/6000B Features and Benefits

The SMB-600/6000B provides the following features and capabilities:

- Control via an Ethernet port.
  - Default IP Address allows quick and easy connection of your chassis without the need of a serial cable connection.
  - The 10/100/1000 Mbps Ethernet port allows you to test a remote device by connecting it to the SmartBits chassis over a local Ethernet network. A serial port only permits a short point-to-point connection.
  - 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 SMB-2000.
  - Faster downloads of test configurations.
  - Faster statistics data and captured traffic transfers to a PC or UNIX workstation.
- 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. Refer to *Appendix A, "Connecting Multiple Chassis Locally,"*for details.

Reset Button

The Reset Button is located above the LEDs on the front of the SMB-600/6000B 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. If the chassis and module LEDs do not flicker uniformly during the reset, power cycle the chassis with the ON/OFF power switch.

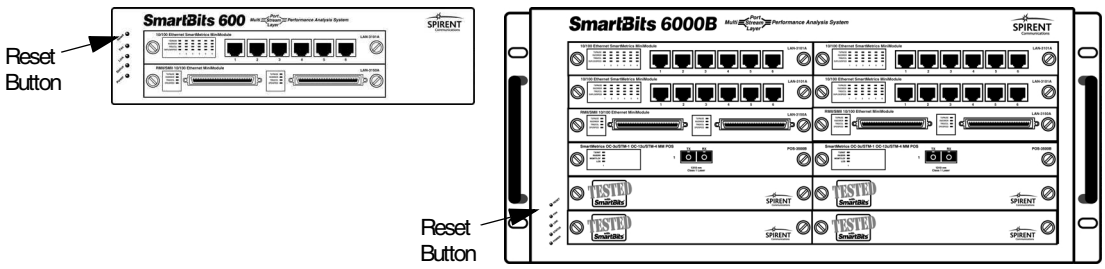


Figure 1-3. Location of the Reset Button on the SMB-600/6000B Chassis

SmartBits Applications

SmartBits software applications that are available for use on the SMB-600/6000B include:

- SmartWindow
- SmartLib Programming Library
- ScriptCenter
- SmartApplications
- SmartMulticastIP
- SmartFlow
- SmartVoIPQoS
- SmartFabric
- AST II (Advanced Switch Tests)
- SmartxDSL
- SmartCableModemTest
- SmartTCP
- WebSuite
- TeraRouting Tester
- TeraVPN

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

Supported Modules

Table 1-1 shows a list of SMB-600/6000B supported modules and their connector types. For a complete description of each module, plus cabling information, refer to the *SmartBits System Reference* manual.

Table 1-1. SMB-600/6000B Supported Modules

Module	Description	Connector
LAN-3100A	10/100Base-TX Ethernet, 8 port module	RJ-45
LAN-3101A	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	SC Fiber
LAN-3150A	10/100Base Ethernet, 8-port, RMII/SMII module	80-pin
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-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-3310A	1000Base-X Ethernet, GBIC, 2-port, SmartMetrics module	GBIC
LAN-3311A	1000Base-X Ethernet, GBIC, 2-port, TeraMetrics module	GBIC
LAN-3710AS	10GBase-SR Ethernet, 1-port, 2-slot, multi-mode, 850nm module	GBIC
LAN-3710AL	10GBase-LR Ethernet, 1-port, 2-slot, single mode, 1310nm module	GBIC
LAN-3710AE	10GBase-ER Ethernet, 1-port, 2-slot, single mode, 1550nm module	GBIC
POS-3500B	POS OC-3c/OC-12c, 1-port, multi-mode, SmartMetrics module	SC Fiber
POS-3500Bs	POS OC-3c/OC-12c, 1-port, single mode, SmartMetrics module	SC Fiber
POS-3502A	POS OC-3c, 1-port, multi-mode, SmartMetrics module	SC Fiber
POS-3502As	POS OC-3c, 1-port, single mode, SmartMetrics module	SC Fiber
POS-3504As	POS OC-48c, 1-port, single mode, 1310nm, SmartMetrics module	SC Fiber

Table 1-1. SMB-600/6000B Supported Modules

Module	Description	Connector
POS-3504AR	POS OC-48c, 1-port, single mode, 1550nm, SmartMetrics module	SC Fiber
POS-3505As	POS OC-48c, 1-port, single mode, 1310nm, TeraMetrics module	SC Fiber
POS-3505AR	POS OC-48c, 1-port, single mode, 1550nm, TeraMetrics module	SC Fiber
POS-3510A	POS OC-3c/OC-12c, 1-port, multi-mode, SmartMetrics module	SC Fiber
POS-3510As	POS OC-3c/OC-12c, 1-port, single mode, SmartMetrics module	SC Fiber
POS-3511A	POS OC-3c/OC-12c, 1-port, multi-mode, TeraMetrics module	SC Fiber
POS-3511As	POS OC-3c/OC-12c, 1-port, single mode, TeraMetrics module	SC Fiber
POS-3518As	POS OC-192c, 1-port, single mode, 1310nm, SmartMetrics module	SC Fiber
POS-3518AR	POS OC-192c, 1-port, 2-slot, single mode, 1550nm, SmartMetrics module	SC Fiber
POS-3519As	POS OC-192c, 1-port, 2-slot, single mode, 1310nm, TeraMetrics module	SC Fiber
POS-3519AR	POS OC-192c, 1-port, 2-slot, single mode, 1550nm, TeraMetrics module	SC Fiber
FBC-3601A	Fibre Channel 1G, 2-port, SmartMetrics module	GBIC (20-pin)
FBC-3602A	Fibre Channel 1G and 2G, 2-port, SmartMetrics module	GBIC (20-pin)

Specifications and Safety Requirements

Specifications

- Input Power: 100-240 VAC Nominal 115 or 230 VAC, 50-60 Hz.
- Controllable over the Internet or from a PC with Windows 98/2000/NT.
- Maximum number of ports: SMB-600 – 16; SMB-6000B – 96.
- Dimensions:
  - SMB-600: Width: 12 in. (30.5 cm.)
    Height: 3.5 in. (8.9 cm.)
    Depth: 12.5 in. (31.8 cm.)
    Weight: 5.25 lbs. (2.4 kg.) fully loaded.
    Shipping weight, approximately 8.5 lbs. (3.8 kg.)
  - SMB-6000B: Width: 19 in. (48.26 cm.)
    Height: 8.5 in. (21.59 cm.)
    Depth: 16.5 in. (41.91 cm.)
    Weight: 45 lbs. (20.4 kg.) fully loaded.
    Shipping weight, approximately 48 lbs. (21.8 kg.)
- Operating Environment: 59-104^{o}F (15-40^{o}C), 20-80% relative humidity. Must have unimpeded airflow into the fans at the side of the chassis.

Emissions

- FCC Part 15 Compliant
- EMI Class A Standard

Safety

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

The SMB-600/6000B 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-located 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 EC Requirements

All SmartBits products, including chassis, SmartCards/modules, are designed and manufactured in compliance with EC 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 our 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 EC 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 EC 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:

1. 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.
2. Use only certified cable in any SmartBits Ethernet port (both control port and test ports).
3. Use only yellow optical cable with SmartBits ports that support single-mode optics.
4. Use only orange or gray optical cable with SmartBits ports that support multi-mode optics.
5. All SmartBits cards and modules should be fully inserted into the chassis, and all thumb screws should be tightened.
6. 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.
7. 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.
8. 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.

2 Installation and Setup

In this chapter . . .

This chapter contains the following topics:

Summary of Installation Procedures

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

Check SmartBits Requirements and Package Contents

1 Check the system requirements (see *page 21*).

2 Check the SmartBits chassis and package (see *page 22*).

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 23*).

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 (*page 25*).

5 Install the ferrite block onto the Ethernet cable (see *page 27*).

6 Start SmartWindow (see *page 29*).

7 Set up the SmartBits IP address (see *page 30*).

8 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 and gateway if needed (see *page 39*).

9 Update firmware if needed (optional) (see *page 43*).

Connect SmartBits to an Application

10 Configure the SmartWindow-to-SmartBits Ethernet connection (see *page 51*).

Connect SmartBits to the DUT

11 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 53*).

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 an SMB-600/6000B. Review these requirements carefully to ensure successful installation.

PC Workstation Requirements

- IBM compatible PC (400 MHz Pentium II recommended) 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 (optional).
  - Minimum of 128 MB RAM (Windows 98/2000 or NT SP4.0); 256 MB RAM is recommended.
  - Minimum 40 MB space on the hard drive; a 4 GB 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.
  - RS-232 straight-through cable with DB-25 female connector for attachment to the chassis and either a DB-9 or DB-25 female connector for the PC end.
- CD-ROM drive.
- Microsoft Windows 98/2000 or Windows NT.
- Microsoft Terminal or HyperTerminal or another communications application.
- Acrobat Reader 4.0 or later (to print user documentation).

SmartBits Minimum Requirements

- An SMB-600/6000B chassis (with one or more ordered modules, card panels, and firmware installed).
- Chassis Firmware Version 1.10 or higher.
- SmartWindow, SmartLib, or SmartApplications (supplied and to be installed on the PC that is connected to SmartBits chassis). Use these applications to configure SmartBits to test your device.

Note: SmartBits systems can also be controlled using the UNIX version of SmartLib for custom application programming. For UNIX workstation requirements, please refer to the SmartLib documentation or Release Notes.

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 insure you have received all of the items listed here:

- An SMB-600/6000B chassis (with two or more ordered modules, card panels, and firmware installed).
- Four cables, an adapter, and one ferrite block.
  - One power cord.
  - White 10 ft. (3.048 m.) crossover Ethernet LAN cable (RJ-45); used to connect the SmartBits chassis directly to a PC.
  - Blue 10 ft. (3.048 m.) straight-through Ethernet LAN cable (RJ-45); used to connect SmartBits chassis to a LAN.
  - Purple 3 ft. (.9144 m.) straight-through Ethernet LAN cable (RJ-45); used to connect one SmartBits chassis to another SmartBits chassis.
  - DB-25-Female to DB-25-Female cable; used to connect the SmartBits console serial port to a PC serial port when setting the first-time IP address of the SmartBits chassis.
  - DB-9-to-DB-25 adapter; used for the serial port cable if needed.
  - 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, SmartLib, or SmartApplications).
- SmartBits Documentation CD (for SmartWindow, SmartLib, and SmartApplications manuals).
- *SmartBits 600/6000B Installation Guide* (this document).

Adding or Rearranging Modules

Each SMB-600 can hold up to two modules; each SMB-6000B 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 SMB-600 or SMB-6000B module slot. (Note that some SmartBits modules require two SMB-600/6000B slots.)

Warning: If you are adding or rearranging modules in your SmartBits chassis, you must follow these precautions.

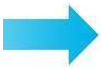
- Always turn the power off to the SmartBits chassis before inserting or removing modules.
- If fewer than the maximum modules are installed, all unused slots MUST BE COVERED with the provided blank face-plates to maximize airflow inside the chassis.

Procedure 3: Install SmartBits Applications & Print

Before proceeding with the chassis setup and installation, it is valuable to:

- 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 user guide.
- Print user documentation now or later, as needed.

Installing the SmartBits Applications



To install SmartBits applications, perform the following steps:

1 To install the core applications (SmartWindow, SmartLib, and SmartApplications), insert each SmartBits CD into the CD-ROM drive of your PC. 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 SmartLib programming library, please follow the instructions in the SmartLib documentation or Release Notes.

Note: Documentation for the SmartBits chassis, as well as for SmartWindow, SmartLib, 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.

If you require hard copies of any SmartBits user manuals, please contact your sales representative, fax the request form supplied with the SmartBits products, or call us at Spirent Communications Technical Support.

2 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.

3 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 85*.)

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 your Release Notes

It can be crucial to check the Release Notes for your SmartBits products and highlight key items that may affect your installation, test configuration, or test results. We have increased our product testing dramatically and want to alert you to important last-minute requirements or changes in each product.

Please 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 website located at http://www.spirentcom.com/support/softwareupdates.

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

Printing User Guides 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, SmartLib, and SmartApplications). The user guide for each optional application resides on the CD for each application.

If you require hard copies of any SmartBits user manuals, please contact your sales representative, fax the request form supplied with the SmartBits products, or call us at Spirent Communications Technical Support.

Important: To print the user documentation pdf files, Acrobat Reader 4.0 must be installed on your PC. This software is located on the SmartBits Documentation CD and is 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 Adobe at www.adobe.com.

Procedure 4: Connect SmartBits to PC, Power, & 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 your device or system under test (Procedure 11).

The back panel connectors of the SMB-600 and SMB-6000B chassis are identical. The chassis differ only in the location of the power supply connector and the ON/OFF switch. *Figure 2-1* shows an SMB-600.

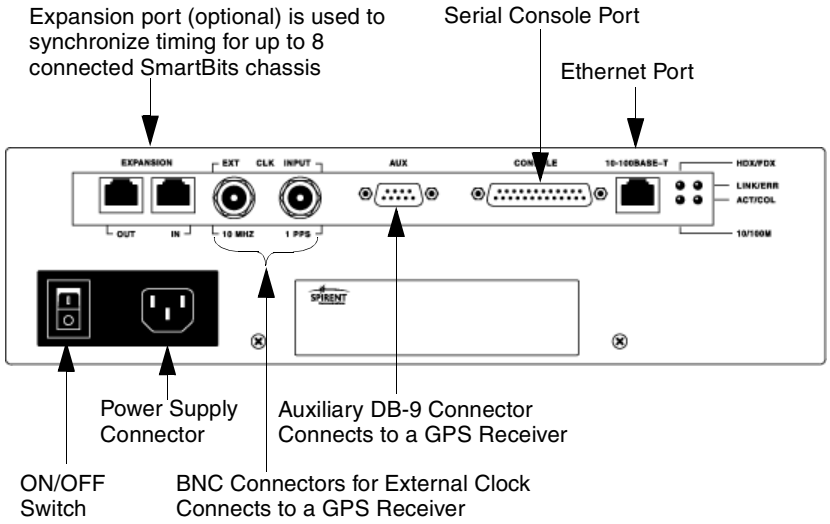


Figure 2-1. SMB-600/6000B Chassis Back Panel Connectors

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 (DB-25) – for IP address assignment ONLY	PC Serial port (RS-232)	DB-25-to-DB-25 cable (plus a DB-25-to-DB-9 adapter 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 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	An external timing device	RG58 coaxial cable (BNC)
AUX	A GPS receiver	DB-25 to DB-25 male-to-male with DB-9 adapter

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, "Connecting Multiple Chassis Locally"* for details. To connect multiple chassis remotely via GPS or a modem, refer to the *Using GPS with SmartBits* manual.

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* below) is packaged as part of the Base Unit Cable Kit that is sent with your SmartBits chassis.

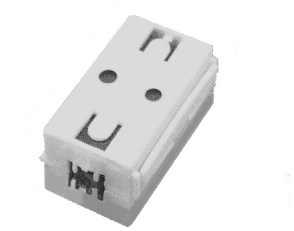


Figure 2-2. Ferrite Block

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, follow the steps below:

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*, #1).
3. Clamp the ferrite block around the Ethernet cable making sure the built-in clip snaps together (see *Figure 2-3*, #2).
4. Connect the Ethernet cable to the chassis (see *Figure 2-3*, #3).

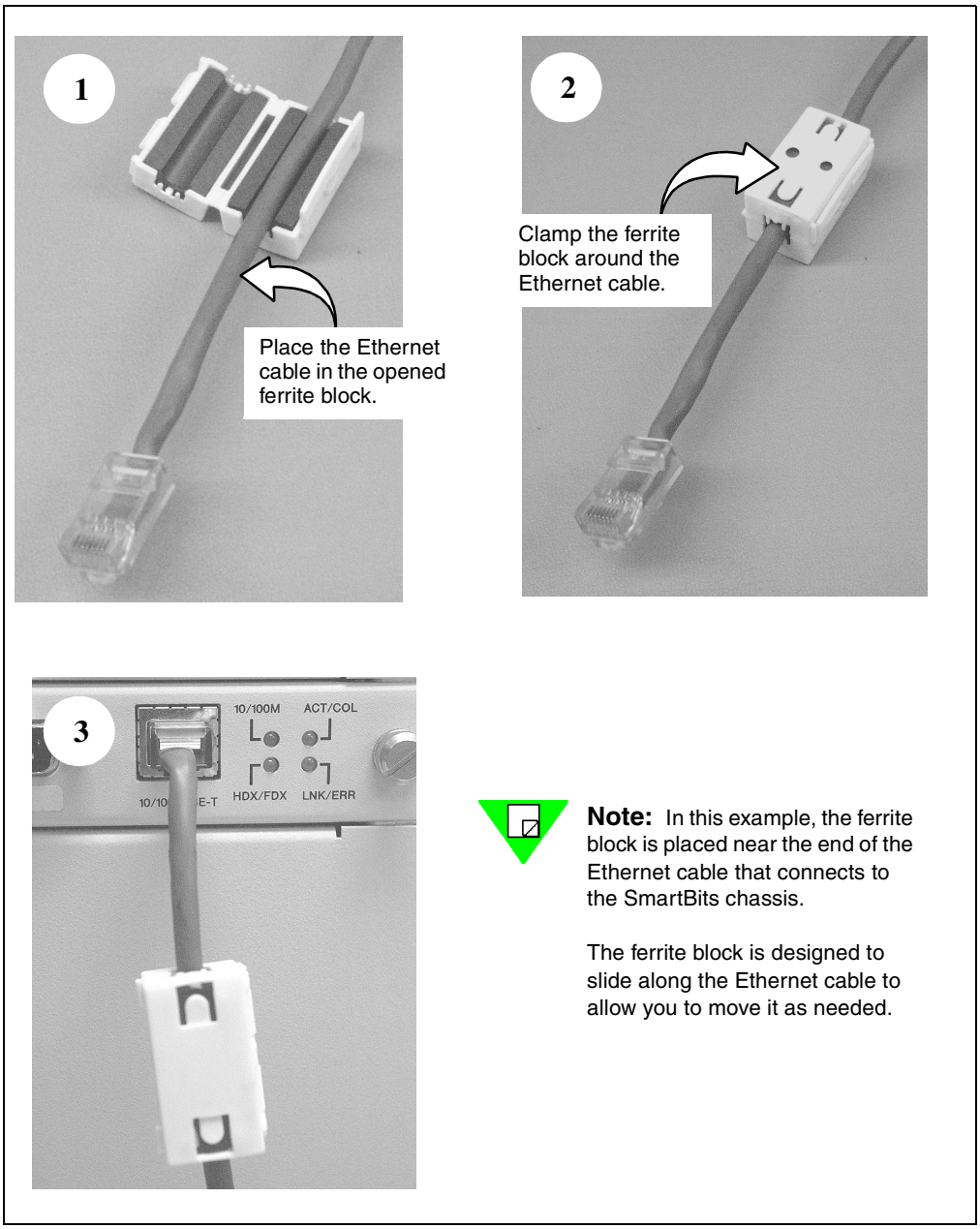


Figure 2-3. Ferrite Block Installation

Procedure 6: Start SmartWindow

Once *SmartWindow* is installed (see *"Procedure 3: Install SmartBits Applications & Print" on page 23*), 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.

SmartBits Tab

The Shortcuts tab displays icons for each type of SmartBits chassis: SMB-200, SMB-2000, SMB-600,and SMB-6000B (*Figure 2-4*). When you select one of these, the Launcher displays the GUI for that chassis type and it opens a default configuration file.

This tab is useful when you want to set up a configuration offline, before you connect to the SmartBits chassis.

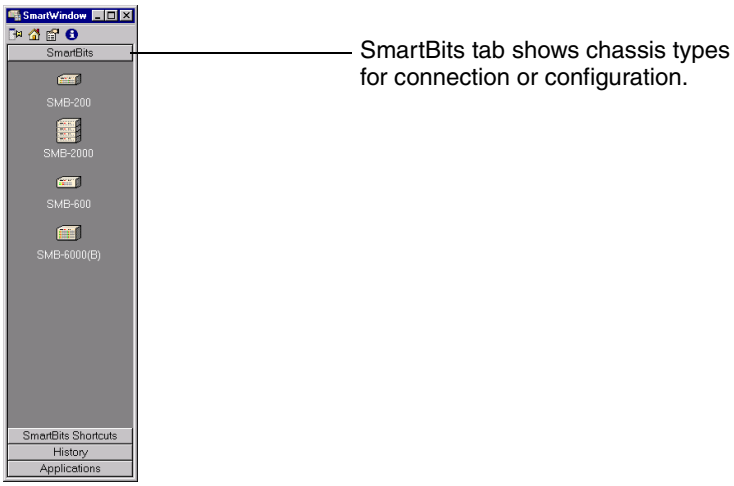


Figure 2-4. SmartBits Tab (SmartWindow Launcher)

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 2-5*). If it cannot find a chassis, you may need to check the setup connections shown in *"Procedure 4: Connect SmartBits to PC, Power, & LAN" on page 25*.

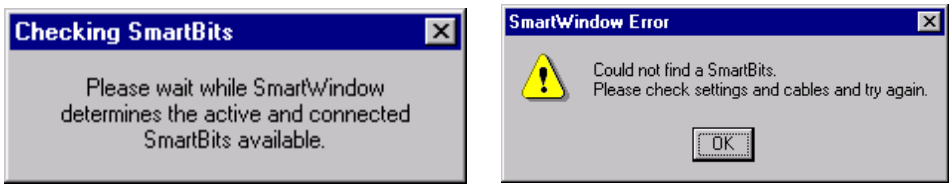


Figure 2-5. Connection Status Messages (SmartBits Tab)

Procedure 7: 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 31*.

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 32*)
- Telnet (Ethernet) (see *page 36*)
- SmartWindow (Ethernet) (see *page 37*)

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 long (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 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.
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 255.255.0.0).
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 *"SMB-600/6000B Chassis Front Panel LEDs" on page 56*).
8. When the PC is ready, use the DOS prompt and ping the SmartBits chassis (see *"Pinging the SmartBits IP Address" on page 40*). 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, & LAN" on page 25*.
- *"Checking the TCP/IP Stack/Address/Gateway on Your PC" on page 40*.
- *"Procedure 8: Confirm the Ethernet Link" on page 39*.
- *Chapter 4, "Troubleshooting."*

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

Setting the IP Address via HyperTerminal

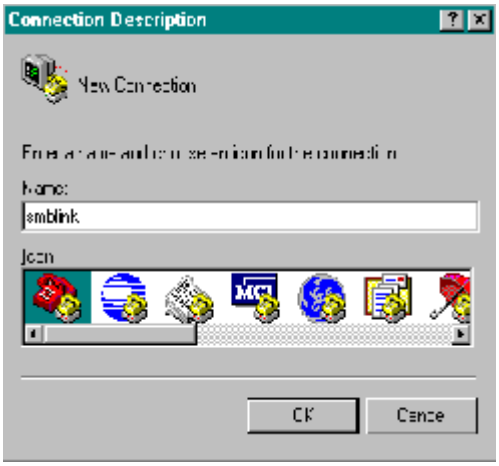
These steps illustrate the HyperTerminal application which comes with Microsoft Windows. However, you can use any serial port console application.

To set the IP Address via HyperTerminal:

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

2 Double-click on **Hypertrm.exe** to see the *Connection Description* window.

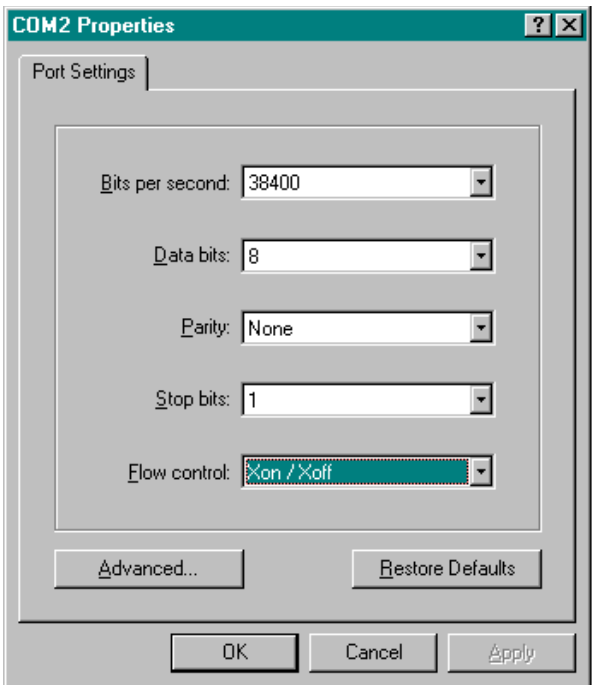
3 In the *Connection Description* window, enter a name for the new connection. Select the link you are making. In this example we are using **smblink**. Click **OK**



The Phone Number dialog box appears as shown in step 4 on *page 33*.

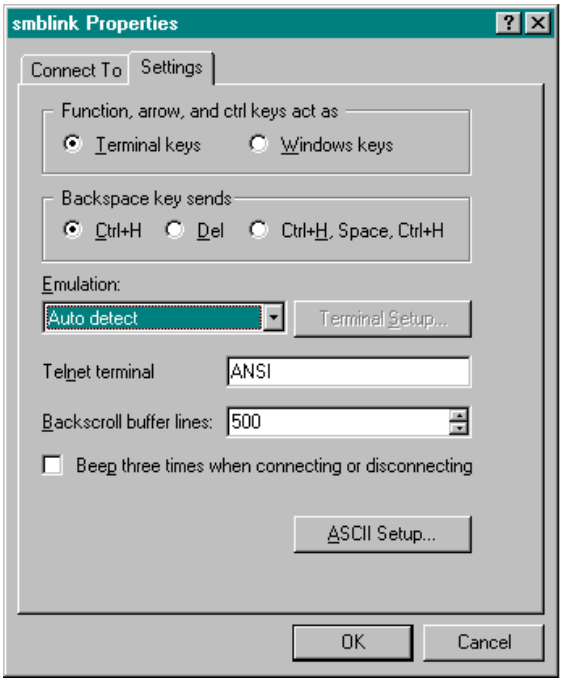
4 In the Phone Number window beside the *Connect using* field, select **COM** (1, 2, 3, or 4). The example below shows **Direct to COM2** selected. Click **OK** to access the COM port Properties window.

5 Set the port settings (38400, 8, Xon/Xoff) as shown in the Properties window below, and then click **OK**.

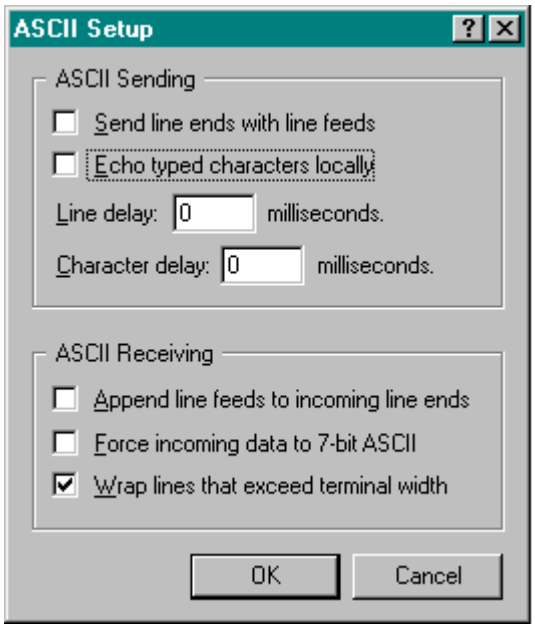


6 In the *HyperTerminal Console Command* window which then appears, click the **Properties** button as shown below (or choose **File > Properties**).

7 In the *Properties* window *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), uncheck the *Echo typed characters locally* box. 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 instead of the message below, see the *"Garbled Data on HyperTerminal" on page 66*.

Important: If the chassis has already completed its startup before HyperTerminal is open, simply 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**.

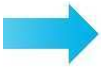
13 When you have finished, check to be sure the IP address was entered correctly by entering **ipaddr** and then press **Return**.

14 Power off the SMB-600/6000B chassis and then power it back on.

Important: You must reset the SMB-600/6000B chassis before the IP address change is implemented.

Setting the IP Address via Telnet

Telnet uses the same commands that are available on the console port (refer to the *System Reference Manual*) and provides a means for the Customer Support group to access a customer's SMB-600/6000B chassis for troubleshooting. In the following example we are using an SMB-600.



To set the IP Address via Telnet:

1 Start a telnet session in your PC or workstation using your preferred Telnet Interface software.

2 Connect to the SMB-600 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 @ 2000, 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 36*.

6 To disconnect from the chassis, type:
quit <enter>

Setting the IP Address via SmartWindow

To set the IP Address using SmartWindow, use the Serial CONSOLE port for a point-to-point connection from your SMB-600/6000B chassis to your PC. This port is used to set up the SmartBits IP address for the first time, and can be used to run applications as well.

Note: You must have SmartWindow 6.53 Build 19 or later to use this feature, and you must be *Offline* to access *Connection Setup*.

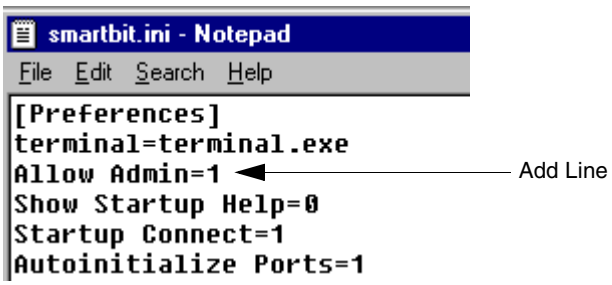
Make sure the SMB-600/6000B chassis is connected to the PC with the white Ethernet (RJ-45) crossover cable.

Setting or Changing the IP Address via SmartWindow

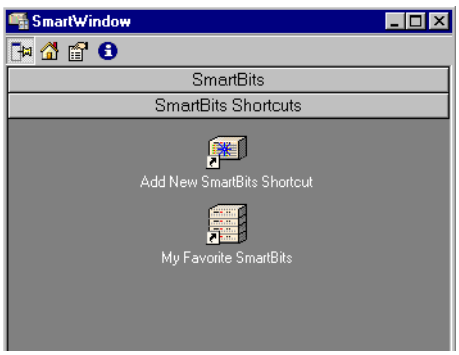
You can launch the program in two ways:

- 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:

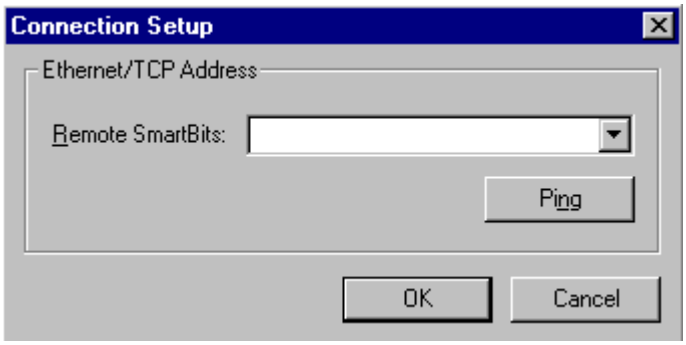


1 After launching SmartWindow, you will see the following window.



2 Click **SmartBits** and then select the type chassis you are using. (For this example we will use the **SMB-600**.)

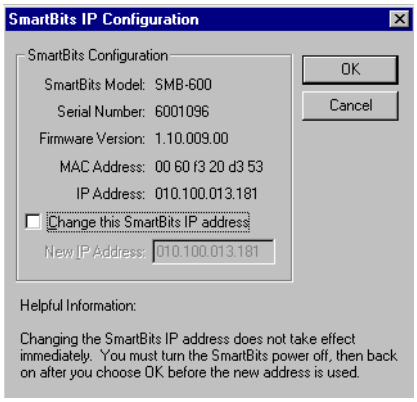
3 Select **Options > Connection Setup**. You will see the following window.



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.

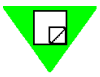


7 Click the box labeled *Change the SmartBits IP address*. Type in the IP address that you want to assign and click **OK**.

8 Choose **Actions > Disconnect**.

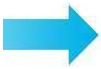
9 For the changes to take effect, reset the SmartBits chassis.

Procedure 8: 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, perform the following steps:

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 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, & LAN" on page 25*, or connect the cables now, as needed.

PC on Same Subnet as SMB-600/6000B

To connect a PC on the same local subnet as the SMB-600/6000B 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 SMB-600/6000B 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 on the back SMB-600/6000B chassis.

   The LINK LED next to the 10/100BASE-T connector on the SMB-600/6000B chassis should light. If the LINK LED does not light, refer to *Chapter 4, "Troubleshooting."*

Local Connection through a Hub. If you are connecting the controlling PC to an SMB-600/6000B 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 SMB-600/6000B chassis. If the LINK LED does not light, refer to *Chapter 4, "Troubleshooting."*

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."*

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

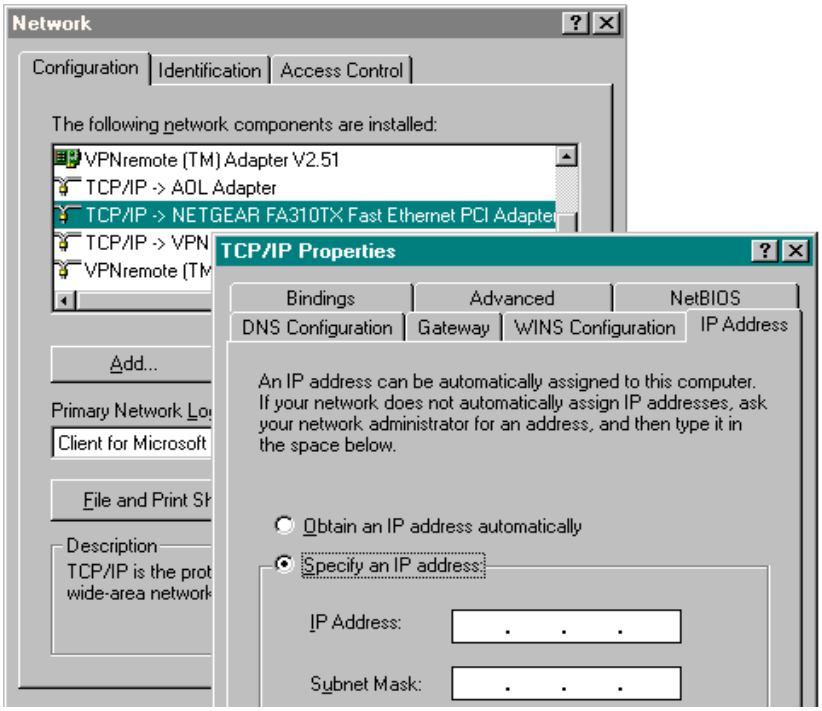
The PC must be configured for TCP/IP to be able to connect to the SMB-600/6000B chassis via Ethernet. If you are uncertain about how to configure TCP/IP on the controlling PC and how to specify the correct IP address, contact your local System Administrator.

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, follow these steps:

1 Select **Start > Settings > Control Panel > Network icon**.

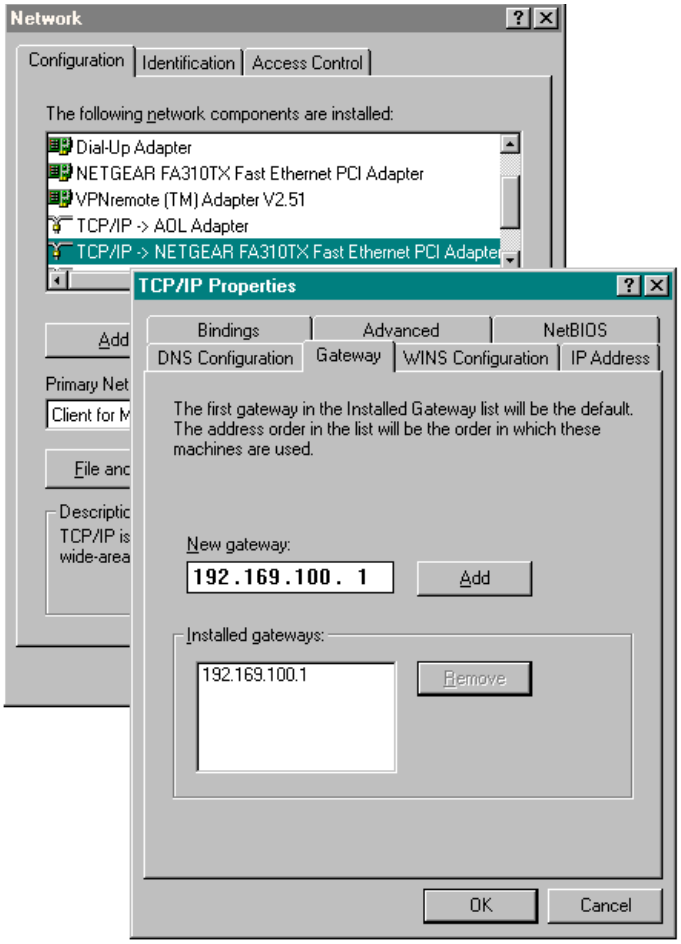
2 In the PC Configuration tab window, view the PC's IP address and netmask, click on your **TCP/IP** adapter card (which will connect to the LAN or directly to the SmartBits chassis), and then click on the **IP Address** tab, shown in the following window.



3 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.

4 If your PC is on the same subnet as the subnet of your SmartBits chassis, proceed to step 9.

5 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 **Gateway** tab in the TCP/IP Properties window. The following window appears.



6 Enter the IP address of the router port for the subnet where the SMB-600/6000B chassis is located. In this example, we connect to an chassis with an IP address of 192.169.100.19. The address of the router port is 192.169.100.1.

7 Click the **Add** button to add the new gateway address.

8 Click **OK** to close the TCP/IP Properties window.

9 Click **OK** to close the Network window.

10 Shut down and restart Windows 98/2000 for the change to take effect.

11 Ping the SmartBits IP address again, as shown on page 40. If you are unable to ping the SMB-600/6000B chassis, refer to *Chapter 4, "Troubleshooting."*

Procedure 9: 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.

You can obtain the firmware from these sources:

- Spirent Communications website at www.spirentcom.com.
- An E-mail message from Technical Support (no password required).

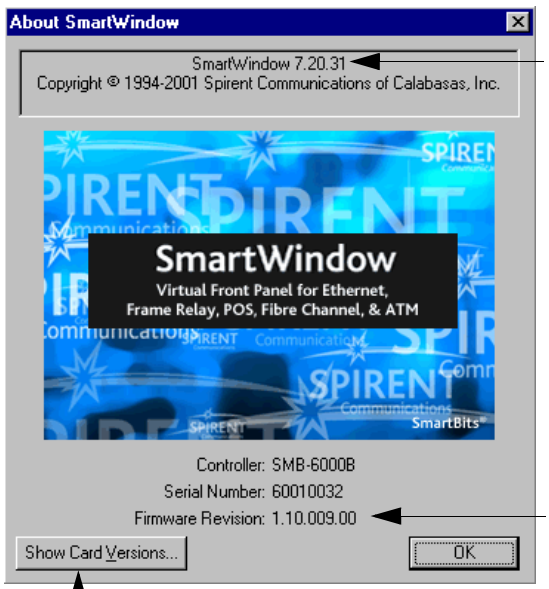
Checking the Current Firmware Version

To determine the version level of the software you are using, you may look on the CD label, or follow the procedures listed below:

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.

2 You will see the following window. This window will identify the SmartWindow Version number, and the Controller, Serial Number, and Firmware Revision number.

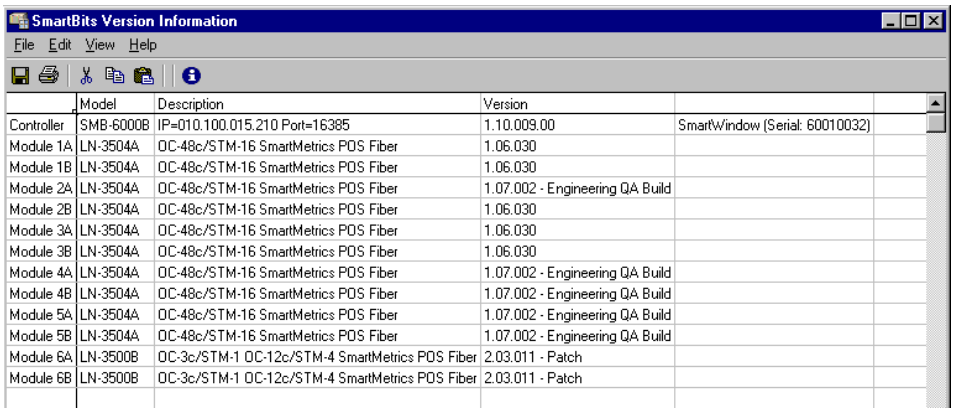


SmartWindow Version

Firmware Revision Number

Displays slot number, card description, and firmware version for each card.

3 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	
Controller	SMB-6000B	IP=010.100.015.210 Port=16385	1.10.009.00	SmartWindow (Serial: 60010032)
Module 1A	LN-3504A	OC-48c/STM-16 SmartMetrics POS Fiber	1.06.030	
Module 1B	LN-3504A	OC-48c/STM-16 SmartMetrics POS Fiber	1.06.030	
Module 2A	LN-3504A	OC-48c/STM-16 SmartMetrics POS Fiber	1.07.002 - Engineering QA Build	
Module 2B	LN-3504A	OC-48c/STM-16 SmartMetrics POS Fiber	1.06.030	
Module 3A	LN-3504A	OC-48c/STM-16 SmartMetrics POS Fiber	1.06.030	
Module 3B	LN-3504A	OC-48c/STM-16 SmartMetrics POS Fiber	1.06.030	
Module 4A	LN-3504A	OC-48c/STM-16 SmartMetrics POS Fiber	1.07.002 - Engineering QA Build	
Module 4B	LN-3504A	OC-48c/STM-16 SmartMetrics POS Fiber	1.07.002 - Engineering QA Build	
Module 5A	LN-3504A	OC-48c/STM-16 SmartMetrics POS Fiber	1.07.002 - Engineering QA Build	
Module 5B	LN-3504A	OC-48c/STM-16 SmartMetrics POS Fiber	1.07.002 - Engineering QA Build	
Module 6A	LN-3500B	OC-3c/STM-1 OC-12c/STM-4 SmartMetrics POS Fiber	2.03.011 - Patch	
Module 6B	LN-3500B	OC-3c/STM-1 OC-12c/STM-4 SmartMetrics POS Fiber	2.03.011 - Patch	

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 SmartWindow Help About, not the overall firmware release number. For information on reserving SmartCards/modules, refer to the documentation for the application you are using.

Updating Firmware from the Spirent Website or E-mail

To download firmware updates from the Spirent website or an e-mail 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.

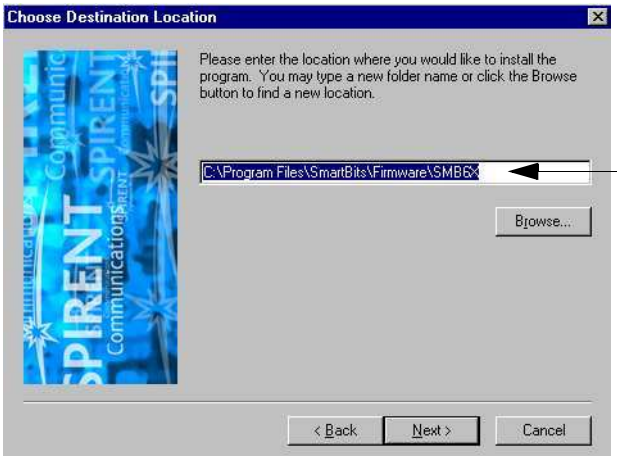
1 Contact Spirent Communications for one or more firmware passwords, by phone, fax, or email smartbits.support@spirentcom.com

2 Download the desired firmware **.exe** file(s) from the website Support page at http://www.spirentcom.com into the desired directory on your PC. Allow up to 12 MB of free space on your local hard drive.

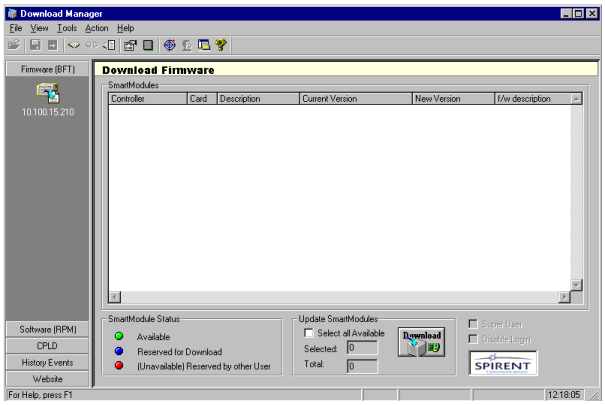
3 Select **Start > Run**. The Browse window appears.

4 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.

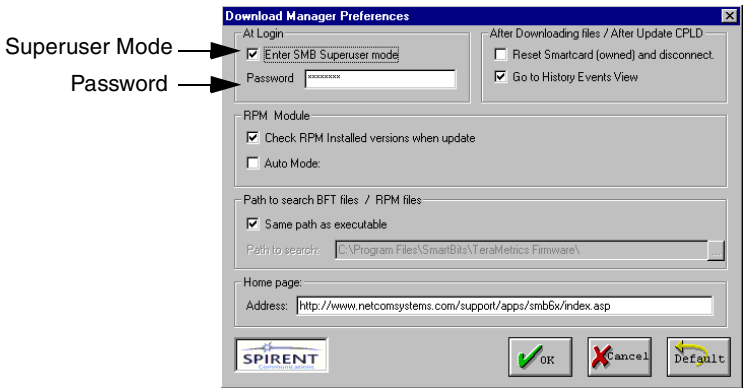


6 Once the firmware files are copied, locate the directory where the files were copied (see preceding screen), and click on **fdlmgr.exe**. This launches the Download Manager application, which you use to download the firmware. You will see the Download Firmware screen shown below.



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 screen shown below.

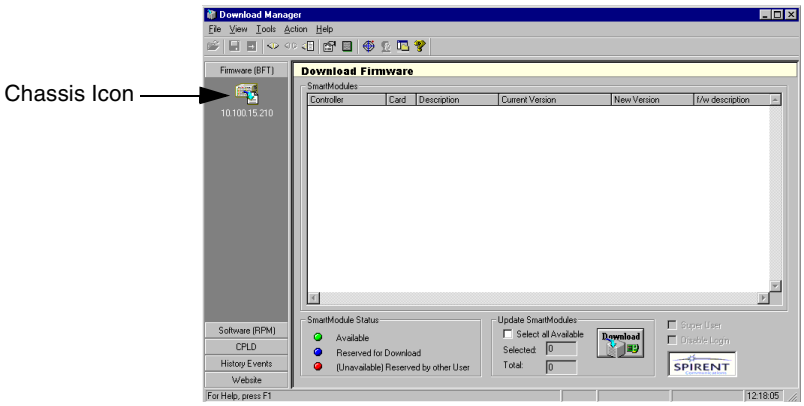


b Select **Superuser mode** and enter the Superuser password (default is **SMB-6000**). If you only plan to download module firmware, you do not need to activate the Superuser mode.

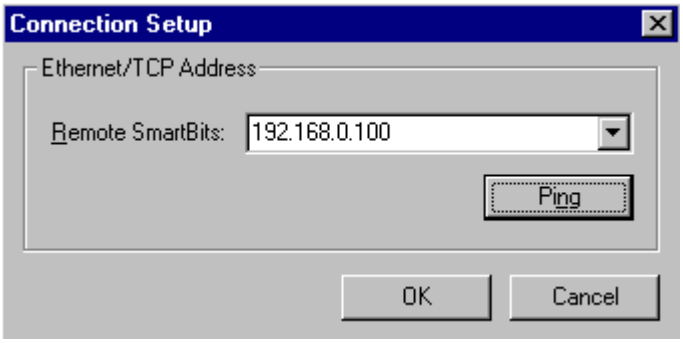
c Click **OK**. This takes you back to the Download Firmware menu shown in Step 6 above.

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 must return the chassis to the factory to reset the firmware.

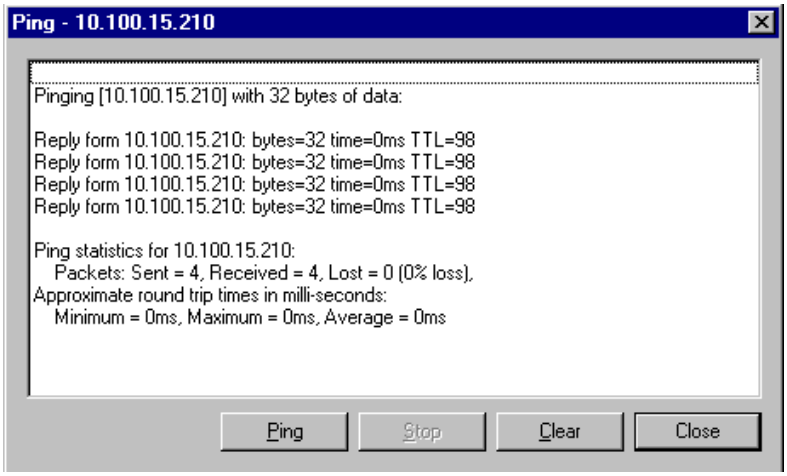
8 Double click on the chassis icon.



The Connection Setup window appears.



9 Enter the IP address of your SMB-600/6000B chassis (refer to *"Procedure 7: Set the IP Address" on page 30*). Click on the **Ping** tab to make sure the connection is working properly. You will see the following screen.

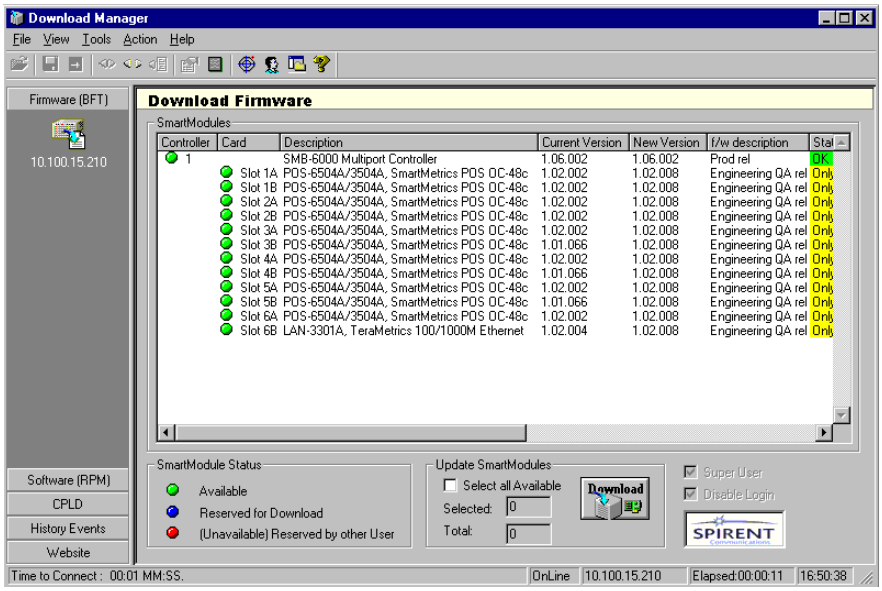


Check to see if the system is "pinging"; click on **Close** and then click **OK** on the Connection Setup window.

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.

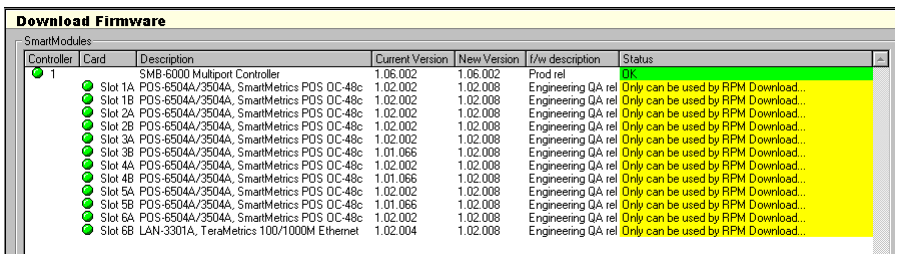
11 Continue the firmware download procedure by following the steps in one of the following three sections:

- 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).



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.

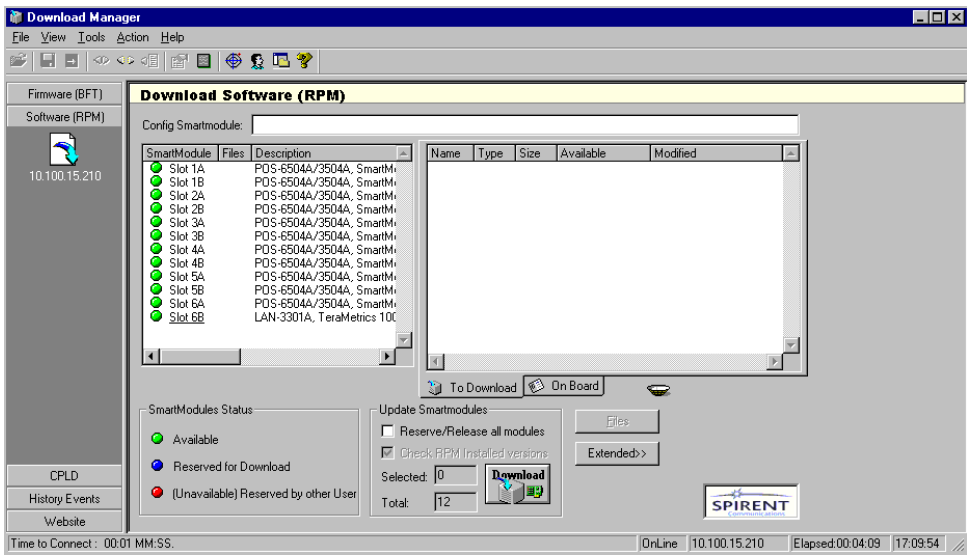
3 Click the **Download** button to load the firmware to the selected chassis/modules.

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 screens:

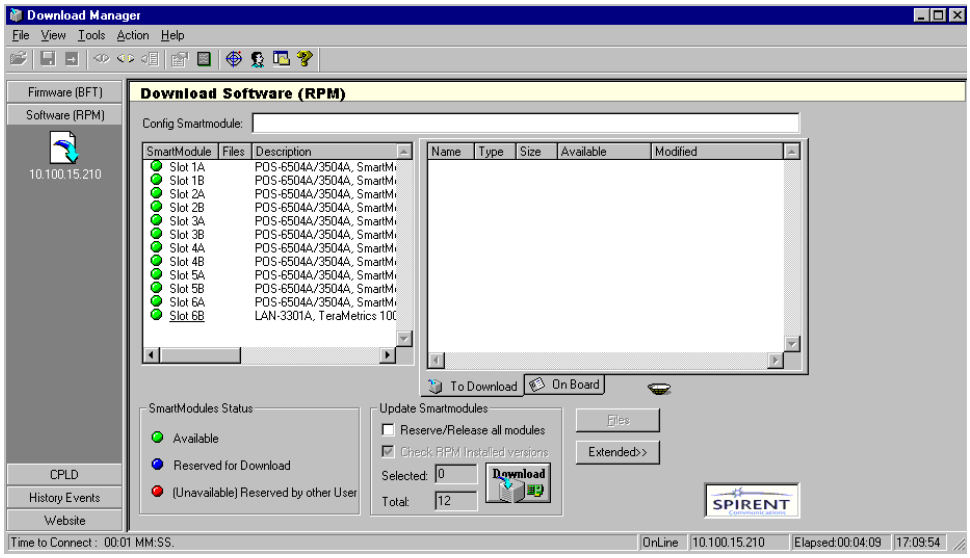
5 Click the **Download** button to download the .rpm file(s).

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 screens:

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 10: 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 8: Confirm the Ethernet Link" on page 39*). 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 for details.
- The serial cable **cannot** be used to connect any of the SmartBits software applications on the SMB-600/6000B chassis. This feature is only available in the SMB-200/2000 chassis.

To connect a SmartBits application to a specific SmartBits chassis for the first time, perform the steps listed below:

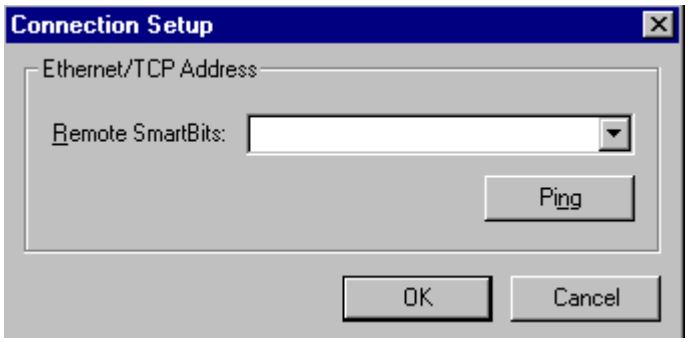
1 Check that you have:
- Installed the application on your PC.
- Connected the PC to SmartBits with the serial cable or Ethernet cable.
- Set the IP address for the SmartBits chassis.
- Powered up the SmartBits chassis.

2 Enter the application by selecting **Start > Programs > SmartBits (or Netcom Systems) Applications > APPLICATIONname**.

3 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 3, on *page 23*.

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."*

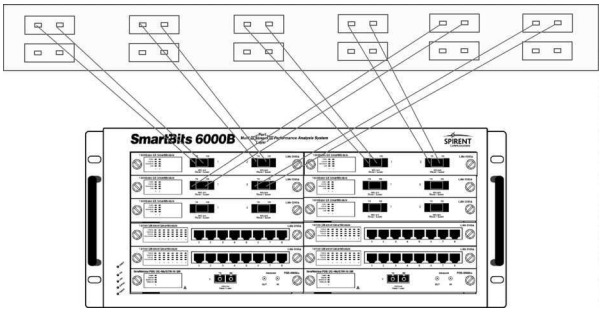
Note: If you close SmartWindow, and then re-open it, the application will try to connect to the IP address last specified in the Connection Setup window.

Procedure 11: Connect to the DUT and Check Cabling

Connect the SmartBits chassis to the desired device(s) or network to be tested via one of the following methods (see *Figure 2-6* for an example):

- Connect each module port directly to the device (DUT) or system under test (SUT).
- Connect each module port to the devices/systems over a LAN or WAN, depending on the configuration needed.

Important: You must clip and position 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 27* for details on connecting the ferrite block.



Note: It is recommended that you connect cables from left to right, starting with the top row and progressing down.

Figure 2-6. Example of Connecting a SmartBits Chassis to a Switch.

For cable description and pinouts of each module type, refer to the *SmartBits System Reference* manual.

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. For sample test scenarios, refer to the user guide for each application.

Important: Before you begin testing, check your environment and make sure that you follow the EMI guidelines as described on *page 15* and in *Appendix D, "ESD Requirements."* 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.

Maintenance and Advanced Procedures

For maintenance or upgrade information, please refer to the *SmartBits System Reference* manual.

Procedures include but are not limited to the following topics:

- Changing Chassis Timeout
- Replacing Chassis Fuses
- GPS and Other Remote Access Methods

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:

SMB-600/6000B Chassis Front Panel LEDs

Every SMB-600/6000B chassis has four LEDs located on the front panel of the chassis (see *Figure 3-1*). On the SMB-600 chassis, the LEDs are located on the left side on the front panel; on the SMB-6000B chassis, they are located on the lower left side of the front panel.

The functions of the LEDs are the same for both the SMB-600 and the SMB-6000B (see *Table 3-1*).

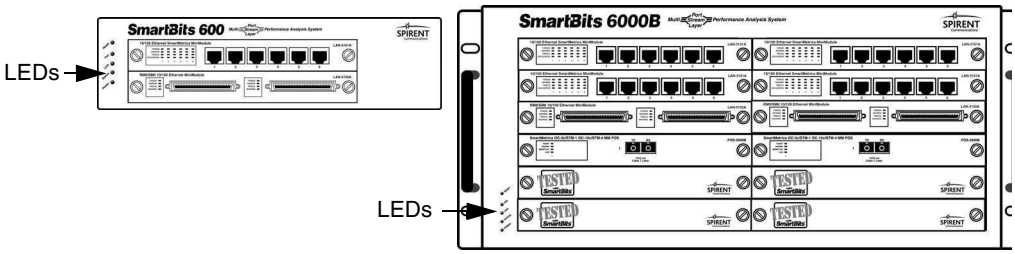


Figure 3-1. SMB-600/6000B Chassis LED Locations (Front Panel)

Table 3-1 SMB-600/6000B 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.
POWER	Green	The chassis is on.
	Off	The chassis is off.

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.

SMB-600/6000B Chassis Back Panel LEDs

Every SMB-600/6000B chassis has four LEDs located on the back panel of the chassis (see *Figure 3-2*). The LED functions and descriptions are the same for both the SMB-600 or the SMB-6000B (see *Table 3-2*).

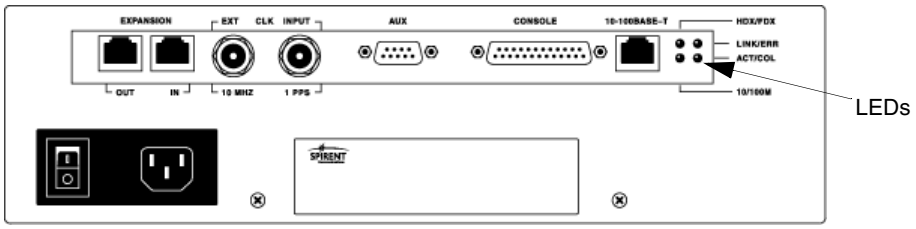


Figure 3-2. SMB-600/6000B LED Locations (Back Panel)

Table 3-2 SMB-600/6000B Back Panel LEDs

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

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 3-3*). Though the LEDs are similar for all modules, some vary according to the features of each module.

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

Note: Ethernet modules are listed in *Table 1-1 on page 13*. For complete descriptions of the Ethernet modules, refer to the *SmartBits System Reference* manual.

Table 3-3 Ethernet Module LEDs

LED	Color/Status	Description
TX/INIT	Green	Transmitting.
	Red	Module not ready.
	Off	Not transmitting.
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/ PAUSE	Green	Receiving trigger frames.
	Yellow	Receiving PAUSE frames.
	Off	No trigger or pause events.
MGMT/ PAUSE	Green	Flashes for management frames.
	Yellow	Flashes for pause frames.
TRIG/COL	Green	Receiving trigger frames.
	Red	Flashes for collisions.
	Off	No collision or trigger.
LINK	Green	Full duplex with valid link.
	Yellow	No link detected.

Table 3-3 Ethernet Module LEDs

LED	Color/Status	Description
LINK SPEED	Green	Link up at 1 Gbps.
	Red	Link up at 2 Gbps.
	Off	No GBIC or loss of signal.

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 3-4*). Although the LEDs are similar for all modules, some vary according to the features of each module.

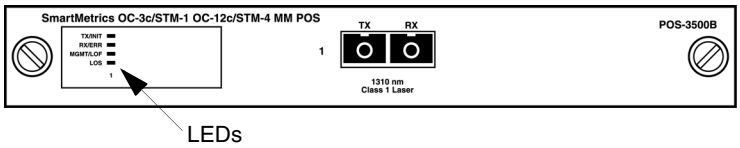


Figure 3-4. Example of LED Locations on a POS Module

Note: POS modules are listed in *Table 1-1 on page 13*. For complete descriptions of the POS modules, refer to the *SmartBits System Reference* manual.

Table 3-4. 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 3-4*). Although the LEDs are similar for all modules, some vary according to the features of each module.

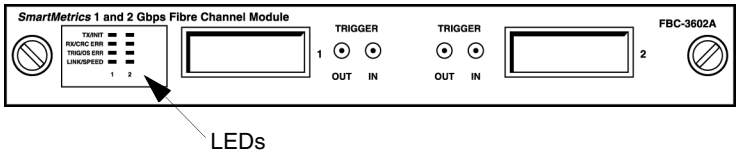


Figure 3-5. Example of LED Location on a Fibre Channel Module

Note: Fibre Channel modules are listed in *Table 1-1 on page 13*. For complete descriptions of the Fibre Channel modules, refer to the *SmartBits System Reference* manual.

Table 3-5 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	Red	No GBIC or Loss of Signal.
	Green	Link up at 2 Gbps.
	Off	Link up at 1 Gbps.

4 Troubleshooting

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

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.

Serial Connection Problems

If SmartWindow cannot establish the communication link automatically, then the link must be established manually and some troubleshooting may be required. Most likely, another PC COM port should be selected. This can be done through SmartWindow by operating with the graphic display in the *Offline* mode.

To further troubleshoot a communications link problem, check the cables that connect the PC and the SmartBits chassis. Review the sections in *Chapter 2, "Installation and Setup"* to confirm that the RS-232 cables connecting the PC serial port to the SmartBits chassis (as well as any additional SmartBits chassis) are properly connected and terminated. The bottom DB-37 connector of the last SmartBits chassis must be terminated with the termination plug provided.

When trying to connect to SmartBits, the following conditions may cause communication errors:

- The wrong type of cable is being used. Ensure that the cable is NOT a null modem cable.
- The port is configured incorrectly. Ensure that the information in the Connection Setup dialog box is consistent with the baud rate indicated on the chassis' front panel. SmartWindow operates successfully at 2400, 4800, 9600, 19,200 and 38,400 bps. Generally, baud rates of 9600 and above are preferred for better system performance.

- Check that the SmartBits chassis you are using is communicating with SmartWindow and not trying to use the RS-232 port to print test results.
- An invalid COM Port was selected from the drop-down Port Setup menu. The COM Port may already be in use by another Windows application, or there may not be hardware available to support it. In this case, try another COM Port.

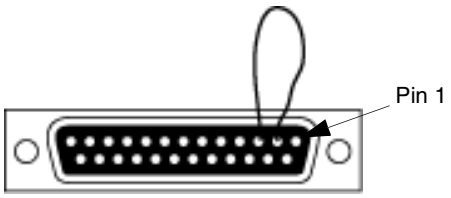
No data displayed

This condition can be caused by connecting to the wrong serial port, or a non-functioning port, or by using a null modem instead of a straight-through RS-232 cable.

To correct this condition, test your serial connection:

1 Disconnect the cable from the back of the SMB-600/6000B chassis.

2 Connect a paper clip or jumper wire from pin 2 to pin 3 of the cable connector as shown below.



3 Type some characters in the HyperTerminal window. If you are connected to the correct serial port and the serial port is working correctly, the characters will be echoed in the window as shown.

If this does not work, check that you have connected to the correct port, and that the port is functioning properly.

4 Ensure that **Hardware Flow Control** is NOT selected.

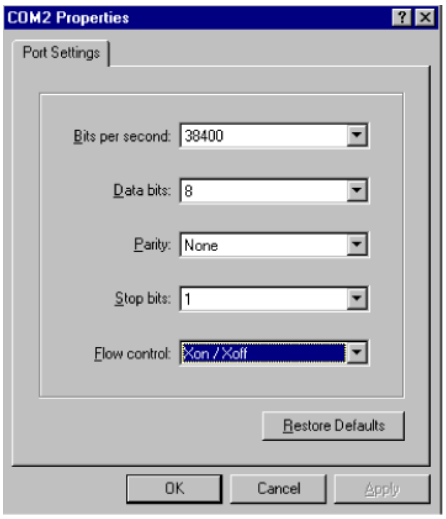
Using HyperTerminal to Check Serial Link

HyperTerminal can be used when checking a serial link.

To use HyperTerminal to check the serial communications link:

1. Power off the SmartBits chassis.
2. Open HyperTerminal (choose **Start > Programs >Accessories > HyperTerminal**).
3. Choose **Hypertrm.exe**.
4. Enter a name for the new connection. Select **Direct to Com** in the *Connect Using* combo box. The example below shows **Direct to Com2** selected.

5. Set the communications parameters to **38400 8N1 XON/XOFF**, as shown below.



6 Click the **OK** button to start the session.

7 Power the SmartBits chassis **ON**. The HyperTerminal window should show data coming back from the SmartBits chassis. If the speed of your HyperTerminal session does not match the current setting of the SmartBits chassis, you will run garbled data as shown below.

This is not important unless you want to send commands to the SmartBits chassis from HyperTerminal. If you do, you will have to set the speeds to match (for details, see section on *"Garbled Data on HyperTerminal" on page 66*.

If the speeds do match, you will receive completion messages.

Another good test of the communication link is to turn the SmartBits RS-232 LED on and off from HyperTerminal as follows:

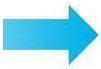
1 To turn the RS-232 LED **ON**, enter **`sr`** at the >> prompt and press the **Enter** key.

2 To turn the RS-232 LED **OFF**, enter **`sm`** at the >> prompt and press the **Enter** key.

HyperTerminal Problems

Garbled Data on HyperTerminal

If your HyperTerminal session showed garbled data when you powered up the SmartBits chassis, you have a speed mismatch between the SMB-600/6000B chassis and HyperTerminal.



To correct this condition:

1. Choose **File > Properties** on the HyperTerminal window.
2. Click the **Configure** button on the Properties window. Check that the speed is set to **38400** and **8N1**.
3. Click **OK** to close the Properties window. Close HyperTerminal.
4. Start **SmartWindow**. Select **Actions > Disconnect** from the SmartWindow menu.
5. When you have disconnected, select **Options > Connection Setup** from the SmartWindow menu.
6. Check the connection speed in the SmartWindow Connection Setup window. Ensure that it is set to **38400**.
7. Start **HyperTerminal** with the same settings as before to confirm that the serial connection is working correctly. Power the SmartBits chassis off and on again. Wait approximately 30 seconds for the “Loaded from device 1” message.

A Connecting Multiple Chassis Locally

In this appendix . . .

This appendix contains the following topics:

Multiple Chassis Connections

Many SmartBits applications are designed to perform tests with hundreds of SmartBits ports by connecting multiple chassis together as defined in this section. Because multiple chassis environments may include any mixed combination of SMB-200/2000/600/6000B chassis, and SMB-10 units, this section will reference all of these chassis/units.

Important: For a list of cables to use in your chassis connections, refer to *"Procedure 2: Check the Chassis and Package" on page 22*, and *"Procedure 4: Connect SmartBits to PC, Power, & LAN" on page 25*.

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 an SMB-200/2000/600/6000B.
- **Primary Controller** – The controller that supplies the synchronization in an expansion configuration (#4). A primary controller can be an SMB-200/2000/600/6000B.
- **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 an SMB-2000, it can also be the master controller (top) chassis in a stacking configuration (#4, #8, #10).
- **Slave Unit** – In a stacking configuration, a unit (SMB-2000 or SMB-10) 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.

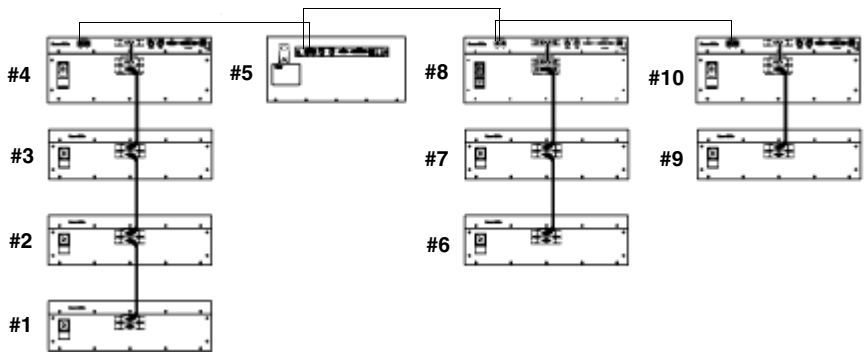


Figure A-1. Multiple Chassis Terminology

Stacking Connections (SMB-2000 only)

A *stacking* connection involves an SMB-2000 chassis (*master controller*) and up to three units (*slave units*) connected vertically via DB-37 connectors (see *Figure A-2*). An SMB-2000 must serve as the *master controller* chassis. The three slave units in the stack can be any combination of SMB-2000s or SMB-10s.

Refer to *Figure A-2* for an example of using the maximum number of units in a single stack.

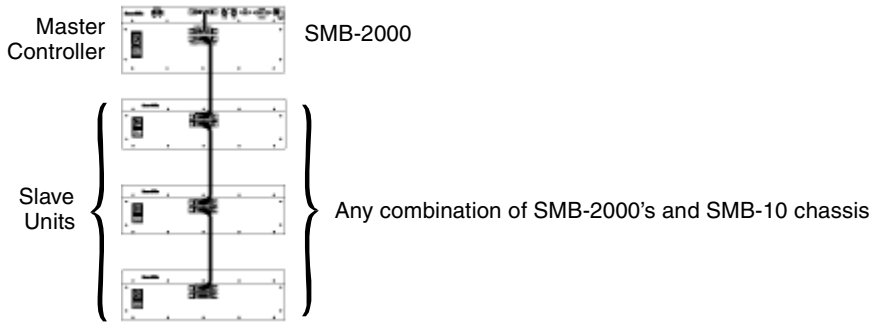


Figure A-2. Sample Multiple Chassis Stacking Order

Connect a SmartBits Stack of 80 Ports via DB-37 Connectors

Note: Refer to *"Procedure 4: Connect SmartBits to PC, Power, & LAN" on page 25* when making any SmartBits chassis connection.

To connect a SmartBits via DB-37 connectors, follow these steps:

1. With the power turned off to all chassis, remove the terminator from the top chassis (which must be an SMB-2000). 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 SMB-10 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 *"Power up the multiple chassis in sequential order" on page 73*, turn on the slaves first, then turn on the SMB-2000 (*master controller*) last.

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

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

Expansion Connections (all chassis)

An *expansion* connection involves any combination of SMB-200/2000/600/6000B chassis connected horizontally, via the RJ-45 expansion connectors. 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.

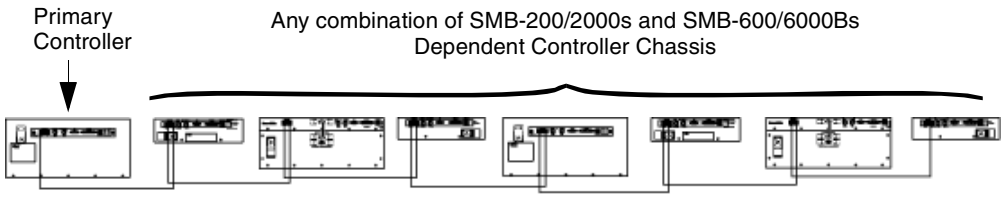


Figure A-3. Example of Multiple Chassis Expansion Connection

If you are using an SMB-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 DB-37 ports. In this configuration, the chassis would then become a *master controller* chassis.

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.
- All chassis in the stacking connection are properly connected using the DB-37 cables supplied (see *page 69*).
- If you are connecting remotely via GPS, make sure that the GPS receiver to the *primary controller* chassis is connected and synchronized using the coaxial cables supplied. Refer to the *Using GPS with SmartBits* manual for more information.
- You have read and understand the following safety information:
  - *"Specifications and Safety Requirements" on page 15*
  - *Appendix D, "ESD Requirements"*
  - *Appendix E, "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, please proceed to *"Assign an IP Address to each SmartBits chassis" on page 72*.

The SmartBits applications that support multiple chassis connections are:

- SmartWindow 7.00 and higher[1]
- SmartLib 3.06 and higher
- SmartApplications 2.22 and higher
- SmartSignaling 3.00
- SmartMulticastIP 1.10 and higher
- SmartFlow 1.00 and higher
- SmartVoIPQoS 1.00 and higher
- AST II 1.00 and higher
- SmartTCP 1.10 and higher
- SmartxDSL 1.00 and higher
- SCMT 1.10 and higher
- VAST 2.10 and higher
- ScriptCenter 1.00 and higher

1 Multiple chassis support is provided only through the multi-instance capability of SmartWindow. SmartWindow does not recognize *Expansion* or *GPS*.

Note: Please confirm 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 7: Set the IP Address" on page 30*, and *Figure A-4 on page 73*).

Connect multiple synchronized chassis

The connected *primary controller* and *dependent controller* chassis may be any combination of SMB-200/2000 or SMB-600/6000B chassis, totaling up to eight chassis. The maximum number of ports to configure is 768 ports (eight chassis x 12 slots x 8-port LAN-3100A modules).

Notes:

- A *dependent controller* may also be a *master controller* if it is an SMB-2000 and is also used in a stacking configuration as shown in *Figure A-5 on page 74*.
- The synchronized clock and pulse signals passing through the connected chassis require careful sequential powering up to avoid random errors and distorted test results (see *Power up the multiple chassis in sequential order* below).
- 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.

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. 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 on page 73*.

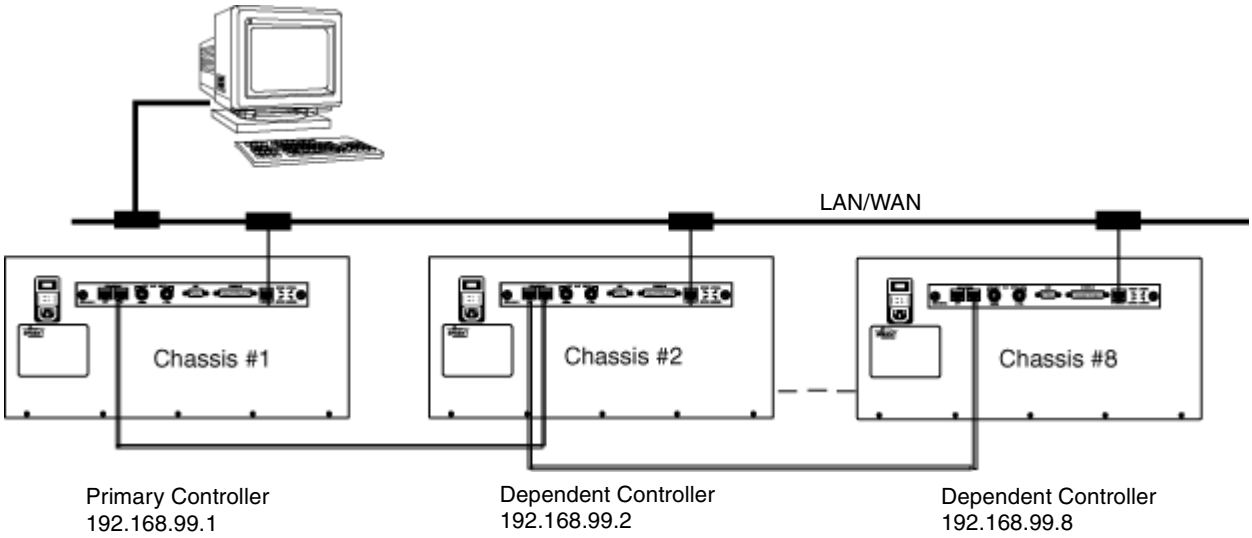


Figure A-4. Example of a Synchronized Multiple Chassis Connection using SMB-6000Bs

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 70*.

3 After all the chassis have been connected and the IP addresses have been set, proceed with Step 4 below 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 unconnected may cause problems.

Power up the multiple chassis in sequential order

When powering up your multiple chassis configuration:

- SMB-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.)
- SMB-600/6000B – Allow the STATUS LED on the chassis to turn green before powering up the next chassis in sequence. (Time varies between 30 and 60 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* below.

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 LINK LED or 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.

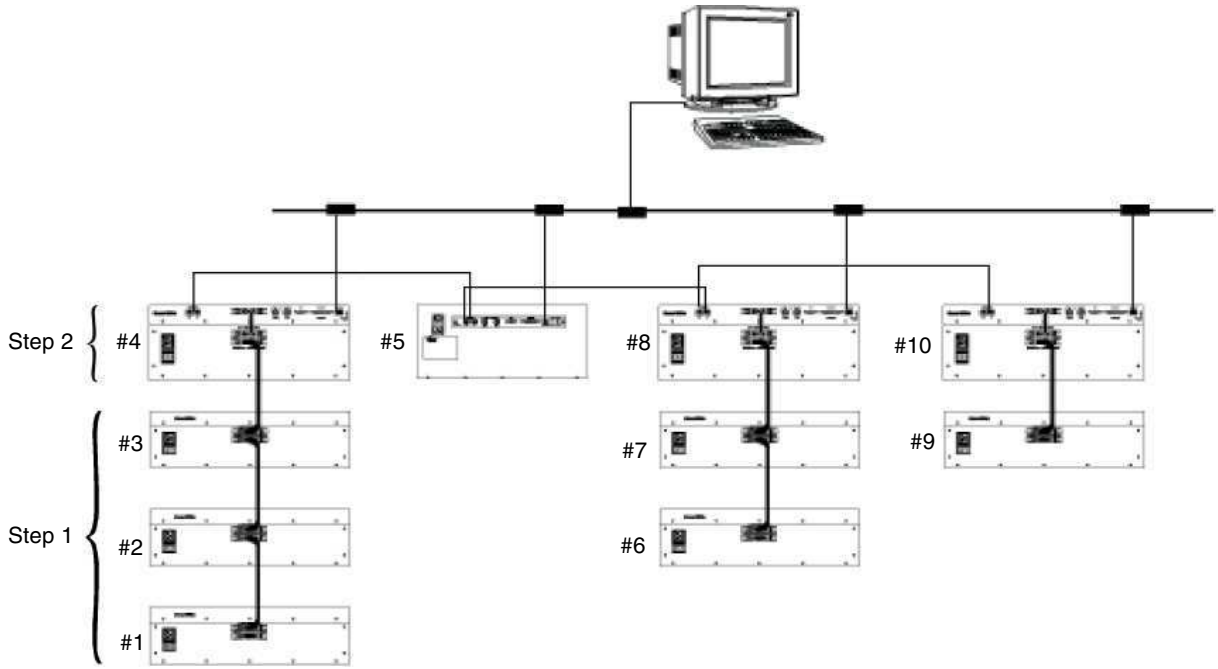


Figure A-5. Multiple Chassis Power Up Sequence

Note: If powering up too quickly or out of sequence, the PC or workstation may report "ethernet connection timeout" and "socket timeout" errors.

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

- 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 (DB-37) 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 74*.

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) which 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 any time **after** the *master controller* chassis that they are connected to have 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.

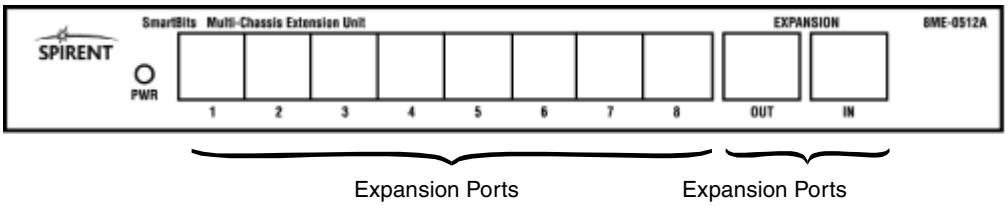


Figure A-6. Multi-chassis Extension Unit – Front View

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*).

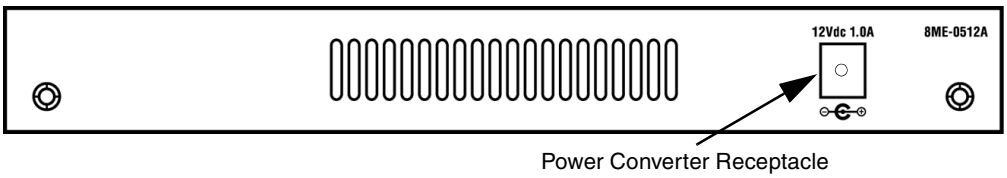


Figure A-7. Multi-chassis Extension Unit – Back View

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* below:

- **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 a 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.
- **Hierarchal Connection** – A series of connections from extension units to SmartBits chassis in multiple layers.

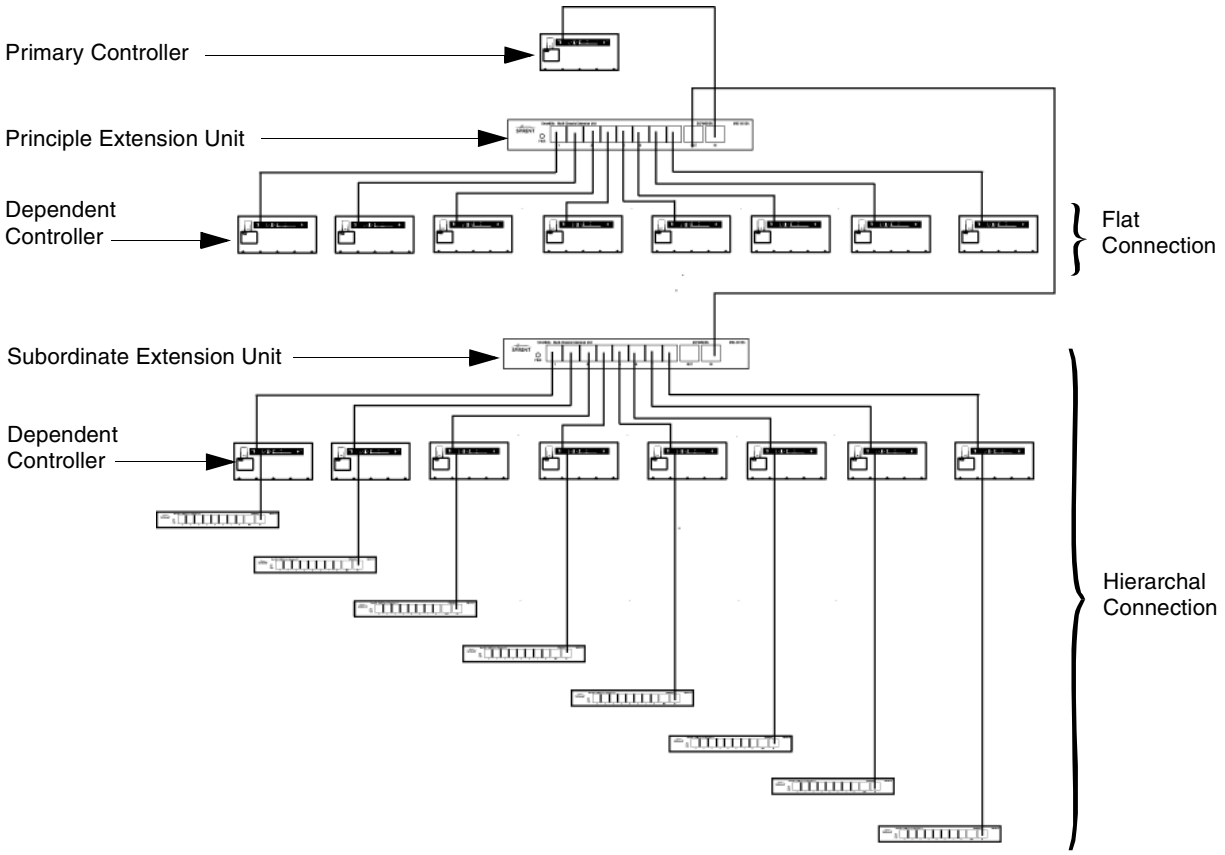


Figure A-8. Multi-chassis Extension Unit Terminology

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 (see *Figure A-10 on page 79*) can be any variable under 47 feet (50 - 3 = 47) in length.

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 *Figure A-8 on page 77* for terminology explanations.

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*.

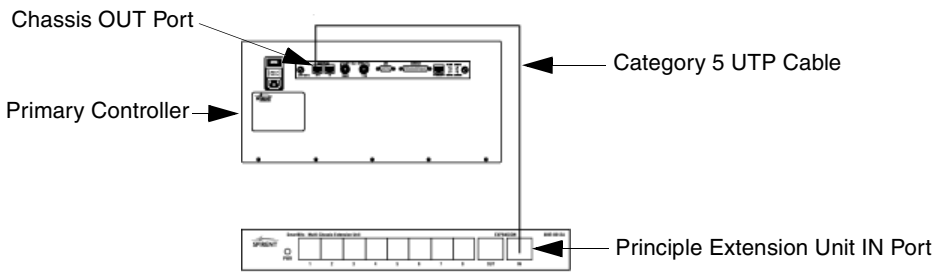


Figure A-9. Initial Connection of a SmartBits Chassis to an Extension Unit

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* below.

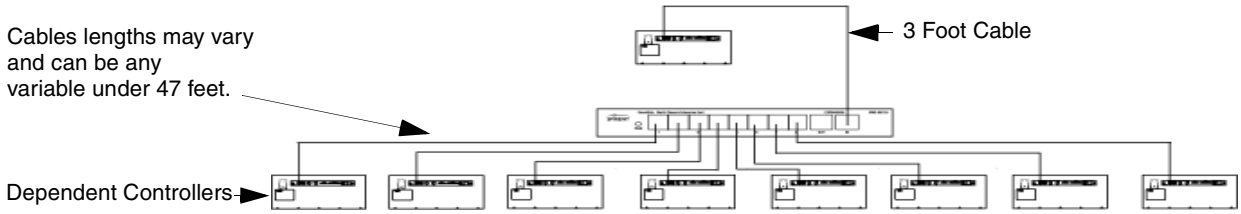


Figure A-10. Connecting SmartBits Chassis to an Extension Unit

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 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* below. You may continue adding extension units and chassis until you reach 512 chassis.

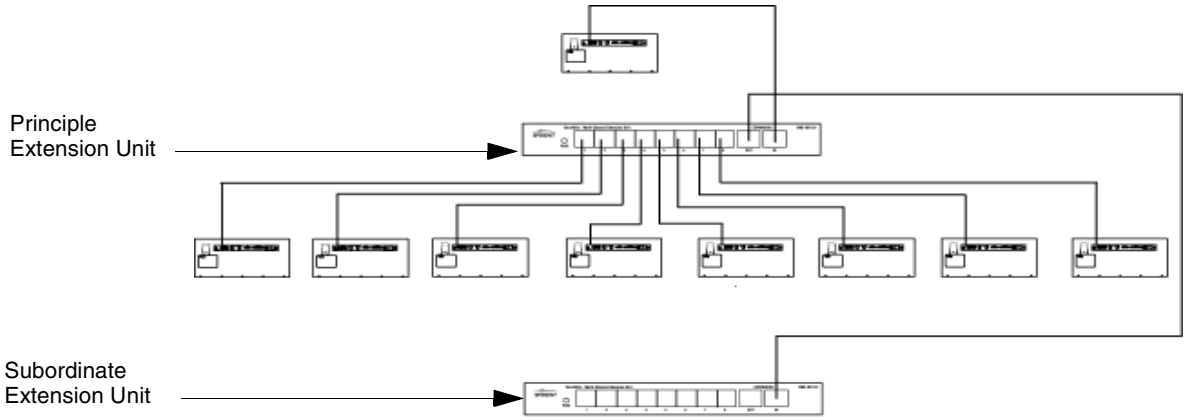


Figure A-11. Connecting an Extension Unit to Another Extension Unit

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

Important: To determine the maximum cable length allowed between chassis, we are using a 5 foot cable, in the example shown in *Figure A-12*, which connects the *principle extension unit* to the *subordinate extension unit*. That means that each cable connected from the *subordinate extension unit* to the next chassis can be any variable under 45 feet in length.

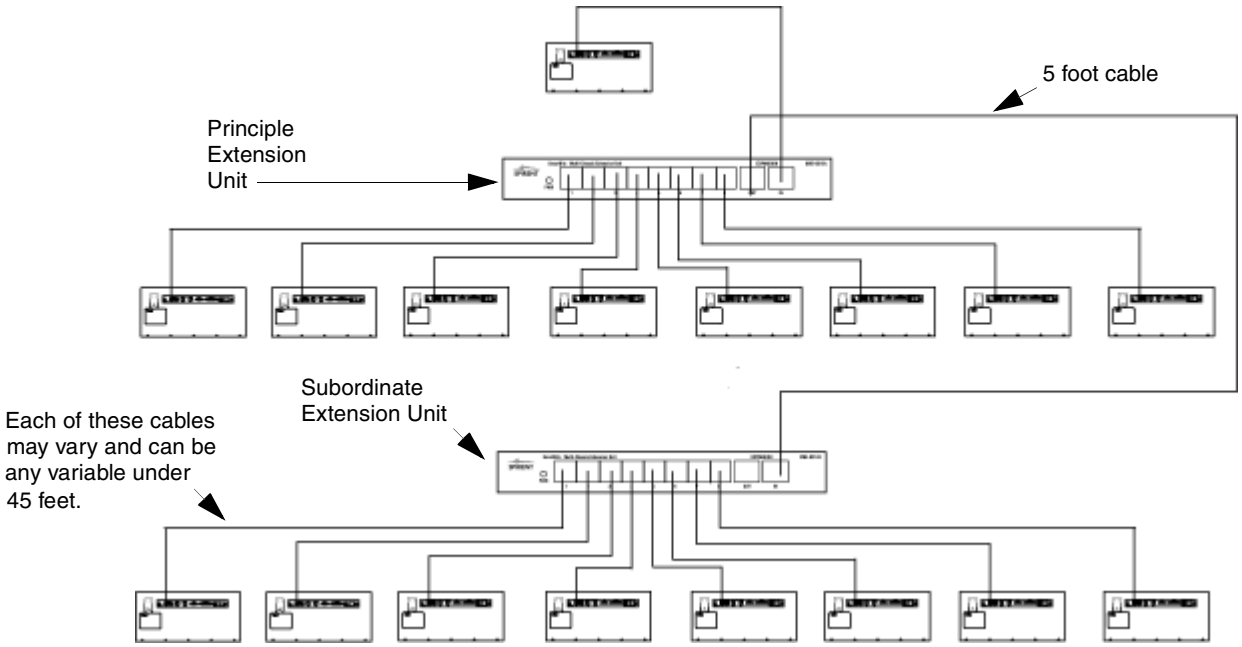


Figure A-12. Connecting Additional SmartBits Chassis to a Second Extension Unit

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

Hierarchal connection

To set up a hierarchal connection:

Note: Refer to *Figure A-8 on page 77* for terminology explanations.

1. Connect the *Primary Controller* chassis to the *Principle Extension Unit*.
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.

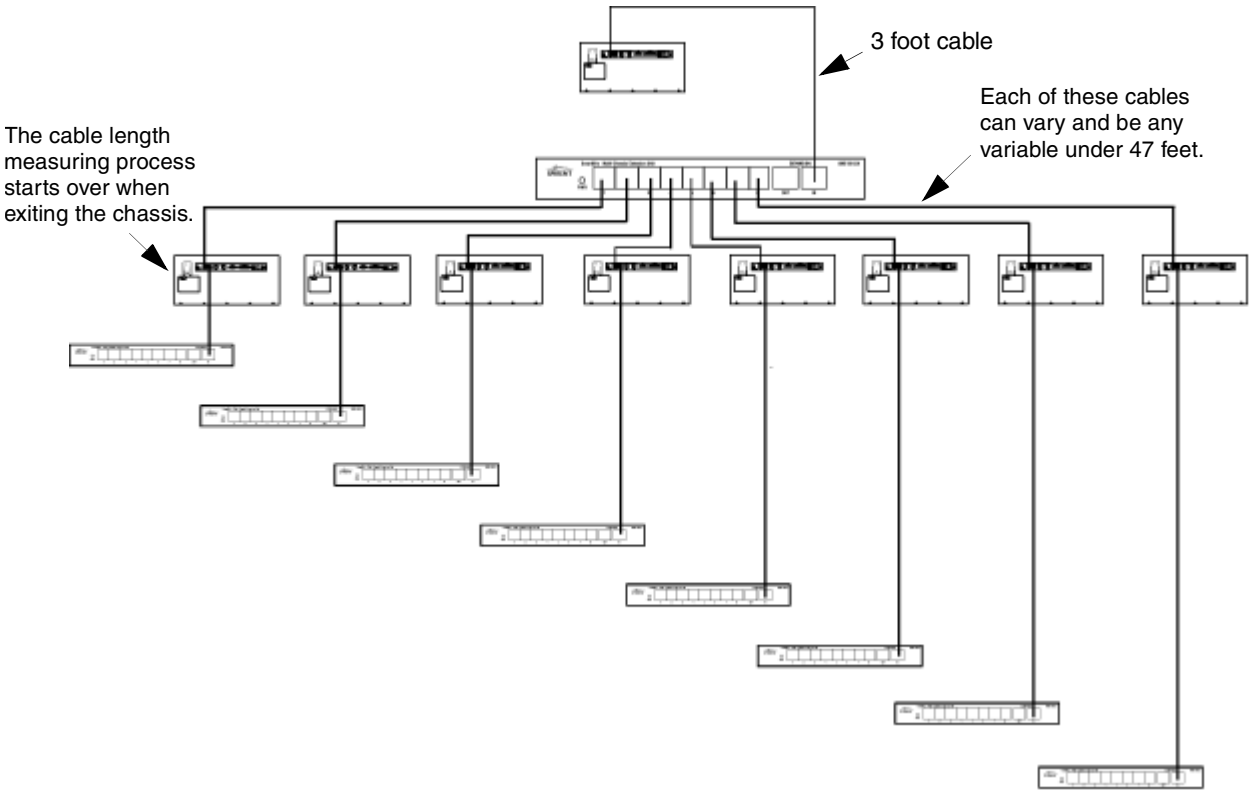


Figure A-13. Example of Hierarchal Connection Configuration

Beginning with the configuration shown in *Figure A-13 on page 81*, you can add eight more chassis to each extension unit (*Figure A-14* below). 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.

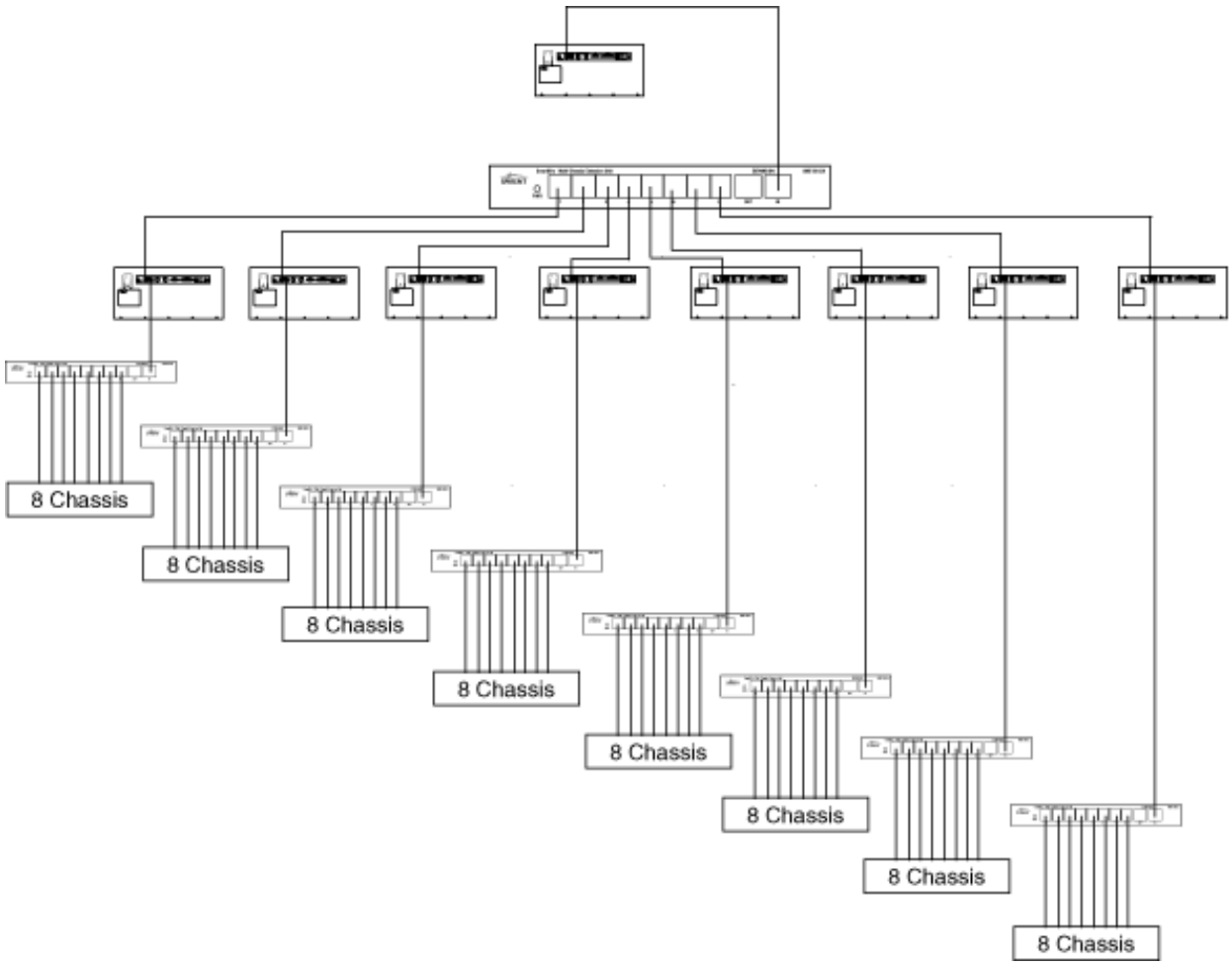


Figure A-14. Connecting Chassis Through an Extension Unit in a Hierarchal Connection Configuration

B Downloading and Installing Applications

In this appendix . .

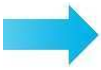
This appendix contains the following topics:

Downloading SmartBits Applications

SmartBits applications are available from the Spirent Communications website at http://www.spirentcom.com.

To reach the download area, select the **SmartBits** option on the Spirent Communications home page. This displays the home page for Spirent Communications, SmartBits Division. From there, select **Support > Software Updates**. Both released and beta software and firmware versions are listed.

Example Download



To downloaded SmartWindow 7.30.

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 www.spirentcom.com. Select **Support > Software Upgrades** menu option. The list of current released and beta software and firmware appears.
3. Click the SmartWindow hyperlink. The SmartWindow download area appears.

   A more detailed explanation of the SmartWindow 7.30 release is displayed, listing the new features that are included in this update release. Note the hyperlink for the Release Notes at the top of the page. The Release Notes indicate the hardware items that are supported by the software.
4. Click the **Download** button to download the desired file.

   Use the download procedures appropriate for the web browser you are using.

   You are prompted for the download location on your local system. In this example, we will save the SmartWindow file *smartwindow730.exe*, to the temp directory on our local hard drive. The SmartBits software is then placed on your local hard drive.

Note: You did not need any keys or passwords to perform these steps. These are required later in the process.

5. After you download a SmartBits application file, run it by double-clicking the **.exe** file on the Windows Explorer window. The file will prompt you for a password.

   When you have entered the password, the downloaded files will start the installation and walk you through the installation process.
6. During the install, you will be prompted for the application directory. 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).
7. To complete the installation of any optional application, copy the **<application-Key.txt>** file from the 3.5 in. (8.9 cm.) disk supplied with the application, into the

directory where you installed the application. This applies to all applications except SmartWindow, SmartLib, and SmartApplications. (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 applications may use the directory: **Start > Programs > Netcom Systems Applications > DesiredApplication**.

Key Files

When you start the 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, SmartApps, and SmartLib), require a key file. Look for the 3.5 in. (8.9 cm.) disk supplied with your applications; 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 `<program>KEY.TXT` file from that directory to the new installation directory.

If you have lost your `<program>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 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.

C Debug Console

In this appendix . . .

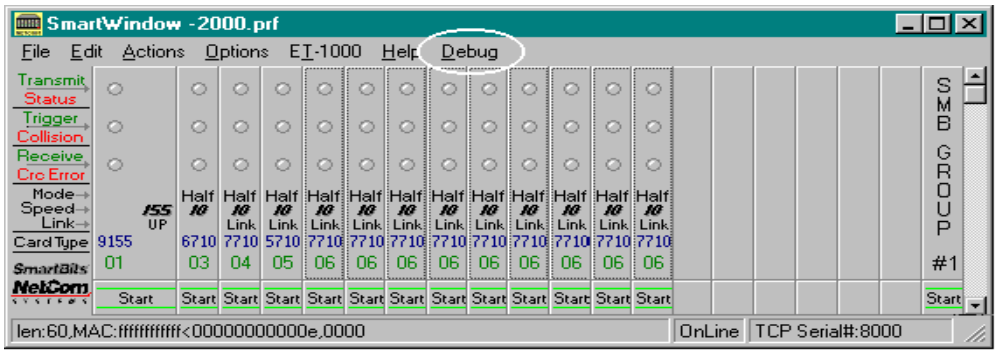
This appendix contains the following topics:

Enabling the Debug Console

To enable the Debug console in SmartWindow, you need to add the line `terminal=terminal.exe` to the top or first [Preferences] section of the `C:\windows\smartbit.ini` file, as shown below.

```
[Preferences]
terminal=terminal.exe
```

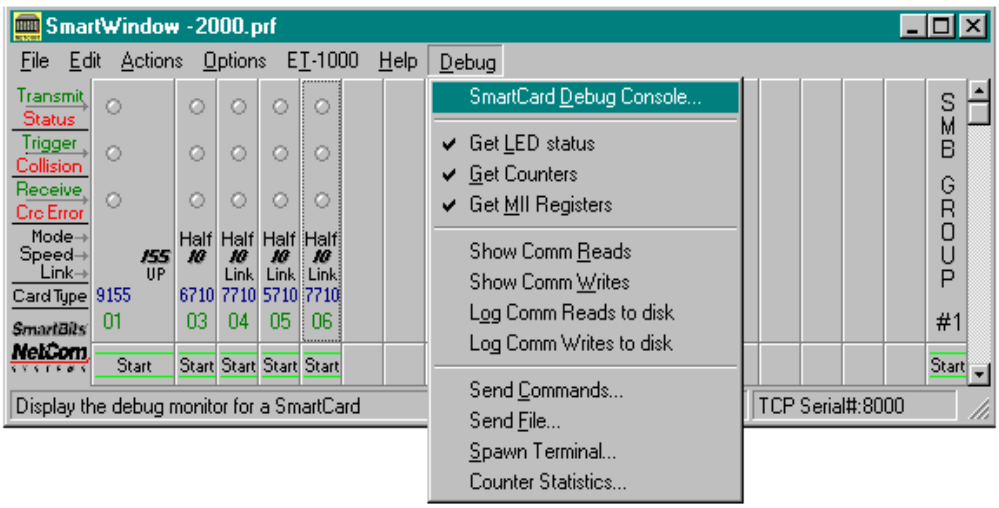
After you add the line, save the `smartbit.ini` file, and reboot SmartWindow. The Debug menu appears in the menu bar beside the Help menu.



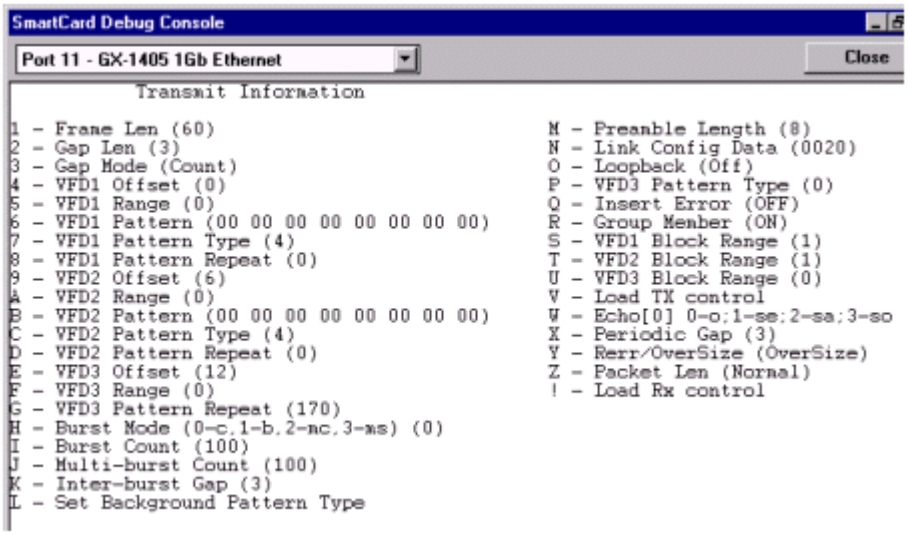
Using the Debug Console

To use the Debug console (example):

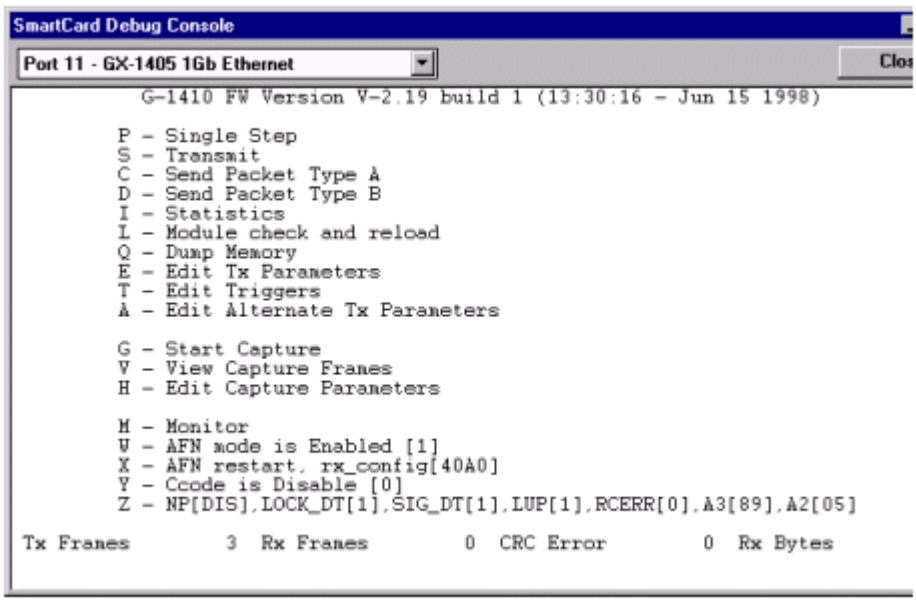
1 Choose **Debug > SmartCard Debug Console** as shown here.



The debug console will be displayed. The combo box on the upper left-hand side shows the currently selected module. In the following example, the debug console shows the GX-1405 Gb Ethernet module in Port 11.



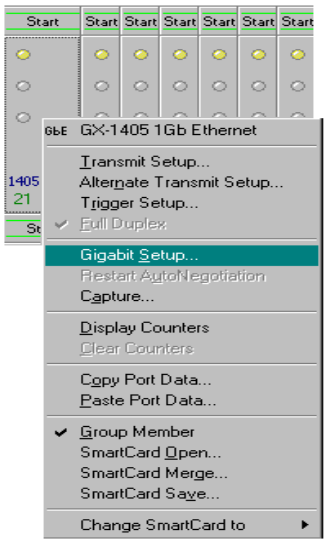
2 To check the Configuration Data register, enter **E** for *Edit Tx*.



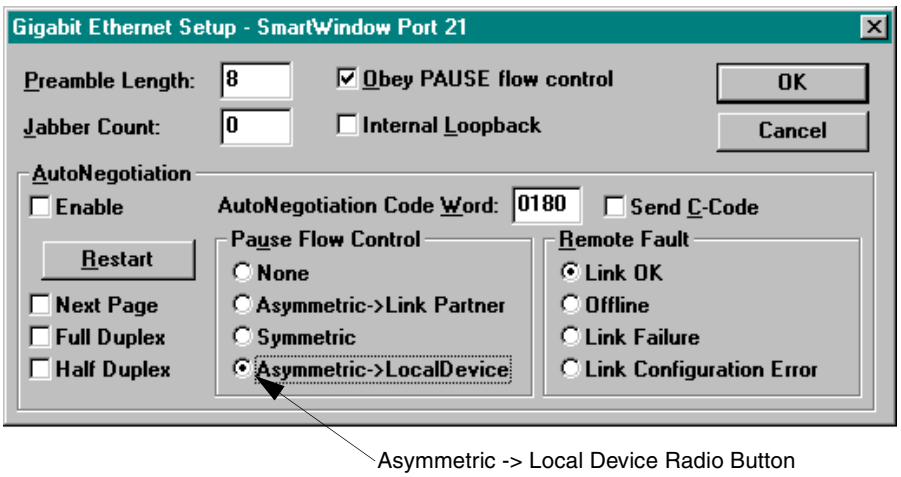
The current status of the Link Config Data register is shown as 0020.

3 Click **Esc** to return to the main menu.

4 Leaving the debug console window open, choose **Gigabit Setup** from the SmartWindow drop-down menu, shown below. The *Gigabit Ethernet Setup* menu will be displayed.



5 Check the Autonegotiation Enable checkbox and select the Pause Flow Control **Asymmetric > LocalDevice** radio button as shown below.



6 Click the **Restart** button.

7 Return to the Debug Console (you will have to click in the window to make the Window active before it will accept commands).

8 Select **E** again to display the Tx setup data. The Link Config Data is now shown as 01A0.

D ESD Requirements

In this appendix . . .

This appendix contains the following topics:

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

The requirements presented in this appendix 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 appendix 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 D-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 $\leq 10^9$□Ω.
- The workstation must provide for the connection of a wrist strap. The wrist strap must contain a current limiting resistor with a value from ≥ 250K Ω to ≤ 10M Ω.
- 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.

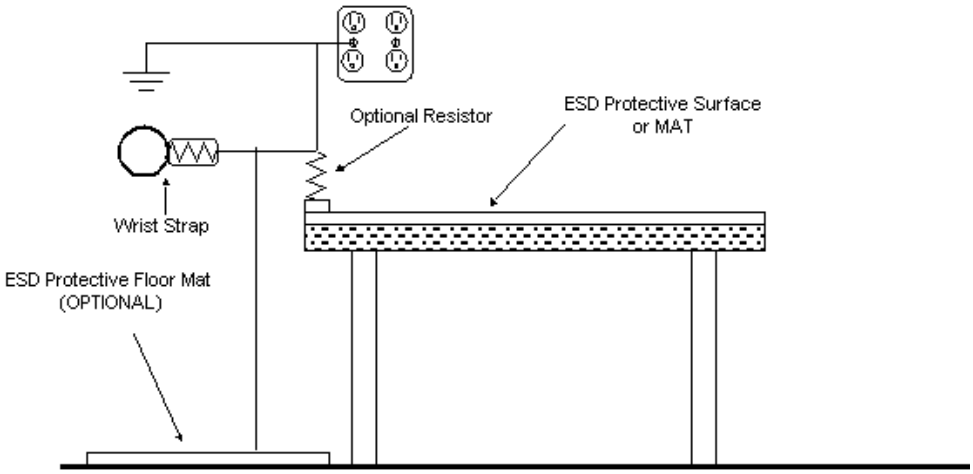


Figure D-1. ESD Protected Workstation

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 170-8505). For additional information regarding Spirent Communications ESD standards and procedures, please refer to the ESD Control Procedure document (P/N 900-0211-001).

E Fiber Optic Cleaning Guidelines

In this appendix . . .

This appendix contains the following topics:

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 D, "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.

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