BitStorm® 2600 IP DSLAM

Installation Guide

Document No. 2600-A2-GN20-40

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PARADYNE®

Notice

Warranty, Sales, Service, and Training Information

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- **Telephone:** Call our automated system to receive current information by fax or to speak with a company representative.
  - Within the U.S.A., call 1-800-870-2221
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⚠ Important Safety Instructions

1. Read and follow all warning notices and instructions marked on the product or included in the manual.
2. This product is intended to be used with a 3-wire grounding type plug — a plug that has a grounding pin. This is a safety feature. Equipment grounding is vital to ensure safe operation. Do not defeat the purpose of the grounding type plug by modifying the plug or using an adapter. Prior to installation, use an outlet tester or a voltmeter to check the AC receptacle for the presence of earth ground. If the receptacle is not properly grounded, the installation must not continue until a qualified electrician has corrected the problem.

   If a 3-wire grounding type power source is not available, consult a qualified electrician to determine another method of grounding the equipment.
3. Slots and openings in the cabinet are provided for ventilation. To ensure reliable operation of the product and to protect it from overheating, these slots and openings must not be blocked or covered.
4. Do not allow anything to rest on the power cord and do not locate the product where persons will walk on the power cord.
5. Do not attempt to service this product yourself, as it will void the warranty. Opening or removing covers may expose you to dangerous high voltage points or other risks. Refer all servicing to qualified service personnel.
6. General purpose cables are described for use with this product. Special cables, which may be required by the regulatory inspection authority for the installation site, are the responsibility of the customer. To reduce the risk of fire, use a UL Listed or CSA Certified, minimum No. 26 AWG (0.128 mm^2) telecommunication cable, or comparable cables certified for use in the country of installation.
7. When installed in the final configuration, the product must comply with the applicable Safety Standards and regulatory requirements of the country in which it is installed. If necessary, consult with the appropriate regulatory agencies and inspection authorities to ensure compliance.
8. A rare phenomenon can create a voltage potential between the earth grounds of two or more buildings. If products installed in separate buildings are interconnected, the voltage potential may cause a hazardous condition. Consult a qualified electrical consultant to determine whether or not this phenomenon exists and, if necessary, implement corrective action prior to interconnecting the products.
9. In addition, if the equipment is to be used with telecommunications circuits, take the following precautions:
   - — Never install telephone wiring during a lightning storm.
   - — Never install telephone jacks in wet locations unless the jack is specifically designed for wet locations.
   - — Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.
   - — Use caution when installing or modifying telephone lines.
   - — Avoid using a telephone (other than a cordless type) during an electrical storm. There may be a remote risk of electric shock from lightning.
   - — Do not use the telephone to report a gas leak in the vicinity of the leak.
10. **CLASS 1 LASER PRODUCT**: This product has provisions for the customer to install a Class 1 laser transciever, which provides optical coupling to the telecommunication network. Once a Class 1 laser product is installed, the equipment is to be considered to be a Class 1 Laser Product (Appareil à Laser de Classe 1). The customer is responsible for selecting and installing the laser transciever and for insuring that the Class 1 AEL (Allowable Emission Limit) per EN/IEC 60825 is not exceeded after the laser transponders have been installed. Do not install laser products whose class rating is greater than 1. Refer to all important safety instructions that accompanied the transciever prior to installation. Only laser Class 1 devices, certified for use in the country of installation by the cognizant agency are to be utilized in this product.
11. Input power to the ALARM relay interface (located on the front panel of the enclosure) must not exceed 30V rms or 60 VDC.
12. The equipment is intended for installation in a max. 50° C ambient temperature, in an environment that is free of dust and dirt.

13. The power supply cord for countries other than North America is to be a minimum H05 V V-F type, min. 0.75 mm^2, 2-conductor and earth ground terminated in an IEC 320 connector on one end, and a plug which is certified for use in the country of installation at the other end.
14. Do not physically stack more than eight (8) 26x1 units high. Physical stability has not been evaluated for stacking higher than eight units, and any configuration greater than eight may result in an unstable (tip-over) condition. Ensure that the four (4) rubber feet supplied with the product have been installed on the bottom of each unit prior to stacking any 26x1 units on top of one another.

EMI Notices

⚠ UNITED STATES – EMI NOTICE:

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

The authority to operate this equipment is conditioned by the requirements that no modifications will be made to the equipment unless the changes or modifications are expressly approved by Paradyne Corporation.

If the equipment includes a ferrite choke or chokes, they must be installed per the installation instructions.

⚠ CANADA – EMI NOTICE:

This Class A digital apparatus meets all requirements of the Canadian interference-causing equipment regulations.

Cet appareil numérique de la classe A respecte toutes les exigences du réglement sur le matérial brouilleur du Canada.

Notices to Users of the Canadian Telephone Network

NOTICE: This equipment meets the applicable Industry Canada Terminal Equipment Technical Specifications. This is confirmed by the registration number. The abbreviation IC before the registration number signifies that registration was performed based on a Declaration of Conformity indicating that Industry Canada technical specifications were met. It does not imply that Industry Canada approved the equipment.

NOTICE: The Ringer Equivalence Number (REN) for this terminal equipment is labeled on the equipment and includes the effect of the POTS splitter. The REN assigned to each terminal equipment provides an indication of the maximum number of terminals allowed to be connected to a telephone interface. The termination on an interface may consist of any combination of devices subject only to the requirement that the sum of the Ringer Equivalence Numbers of all the devices does not exceed five.

When the equipment is used in a customer premises environment, a Model 6051 POTS Splitter must be used to ensure CS-03 compliance. Refer to the POTS splitter installation instructions for details.

CE Marking

When the product is marked with the CE mark on the equipment label, a supporting Declaration of Conformity may be downloaded from the Paradyne World Wide Web site at **www.paradyne.com**. Select *Library* → *Technical Manuals* → *CE Declarations of Conformity*.

Japan

Class A ITE

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This is a Class A product based on the standard of the Voluntary Control Council for interference by Information Technology Equipment (VCCI). If this equipment is used in a domestic environment, radio disturbance may arise. When such trouble occurs, the user may be required to take corrective actions.

Contents

About This Guide

1 Installation

2 Cabling

About This Guide

Document Purpose and Intended Audience

This document is written for technicians who install the BitStorm® 2600 IP DSLAM.

Document Summary

Section	Description
Chapter 1, *Installation*	Describes the physical installation of the BitStorm 2600 into a rack.
Chapter 2, *Cabling*	Describes how to install all cables for the BitStorm 2600.
Chapter 3, *LEDs*	Explains the meaning and usage of the front panel LEDs.
Chapter 4, *Configuration*	Describes the minimal configuration steps required to prepare the BitStorm 2600 for remote access, using the command line interface and web interface.
Appendix A, *Connectors and Pin Assignments*	Provides pinouts for connectors on the BitStorm 2600.
Appendix B, *Equipment List*	Provides part numbers for the BitStorm 2600 and related products.
Appendix C, *Technical Specifications*	Lists the technical characteristics of the BitStorm 2600.
Index	Lists key terms, acronyms, concepts, and sections in alphabetical order.

A master glossary of terms and acronyms used in Paradyne documents is available on the World Wide Web at **www.paradyne.com**. Select *Support* → *Technical Manuals* → *Technical Glossary*.

Related Product Documents

Documentation for the BitStorm 2600 IP DSLAM is available on the World Wide Web at **www.paradyne.com**. Select *Support* → *Technical Manuals.*

Document Number	Document Title
2600-A2-GB21	*BitStorm 2600 and GranDSLAM 4200 IP DSLAM Command Line Interface Reference* Describes the Command Line Interface (CLI) used to configure and monitor the BitStorm 2600 IP DSLAM.
2600-A2-GB22	*BitStorm 2600 and GranDSLAM 4200 IP DSLAM SNMP Reference* Contains the information necessary to use Simple Network Management Protocol (SNMP) to configure and monitor the BitStorm 2600 IP DSLAM.
2600-A2-GT20	*BitStorm 2600 and GranDSLAM 4200 Training Guide* Describes how to configure the BitStorm 2600 IP DSLAM for triple play (video, voice, and data).
6051-A2-GZ40	*BitStorm 6051 POTS Splitter Installation Instructions* Describes how to install the BitStorm 6051 POTS splitter.
6210-A2-GB20	*Hotwire 6210-A2, 6211-A2, and 6381-A2 User's Guide* Describes the installation and operation of the 6210 ADSL bridge, 6211 ADSL router, and 6381 ADSL/R router.
7890-A2-GB22	*GrandVIEW EMS User's Guide* Contains instructions for maintaining network services and resources using the GrandVIEW Element Management System (EMS).

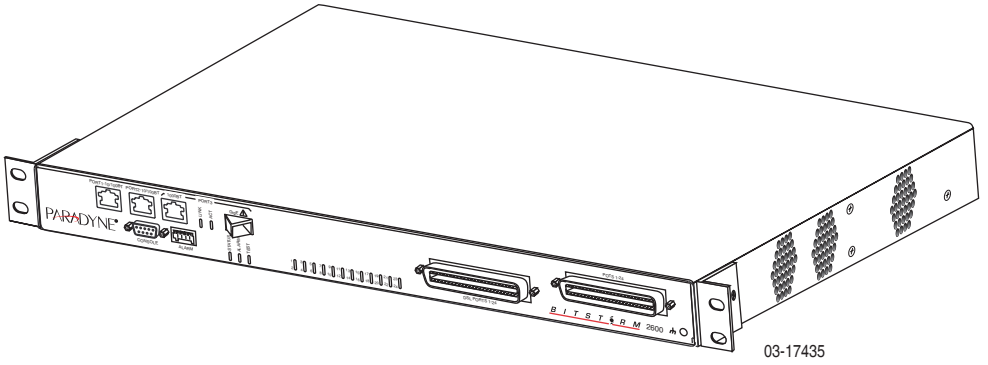
To order a paper copy of a Paradyne document, or to talk to a sales representative, please call 727-530-2000.

Installation

1

Overview

The BitStorm® 2600 is a family of stackable IP DSLAMs designed for installation in a Central Office (CO), multi-tenant unit (MTU), multi-dwelling unit (MDU), or remote terminal environment. The BitStorm 2600 is available with or without internal POTS splitters.



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- The ReachDSL™ Models 2611 and 2614 are interoperable with the Hotwire® 6381 ADSL/R modem, as well as with all other Customer Premises Equipment (CPE) containing Asymmetric Digital Subscriber Line/ReachDSL (ADSL/R™) chipsets. The 2614 models support E1 or T1 MLPPP.
- The ADSL Models 2621 and 2624 are interoperable with the Hotwire 6381 ADSL/R modem, as well as any standard ADSL CPE. They support ADSL Annex A, including ADSL2 and ADSL2+. The 2624 models support E1 or T1 MLPPP.
- The ADSL Model 2631 supports ADSL Annex B, including ADSL2 and ADSL2+.
- The SHDSL Model 2671 and 2674 are interoperable with any standard SHDSL CPE. They support SHDSL (G.991.2). The 2674 models support E1 or T1 MLPPP.

See Appendix B, *Equipment List* for a description of all available models.

User interfaces include a Command Line Interface (CLI) and a web browser interface. The unit also may be managed using a network manager such as the Paradyne GrandVIEW® Element Management System (EMS).

Up to eight BitStorm 2600 units can be logically stacked, with aggregation for up to 192 ports of DSL traffic. ReachDSL, ADSL, and SHDSL units can be included in the same stack.

Preparation

Consider the following before installing the BitStorm 2600 IP DSLAM:

- **Installation Site**

  Your installation site should be well ventilated, clean, and free of environmental extremes.

- **Installation Options**

  The BitStorm 2600 may be:

  — Mounted with the included mounting brackets in a standard 19-inch (483 mm) or 23-inch (584 mm) rack (including both Bay Networks and Nortel 23-inch racks), or, with separately purchased mounting brackets, in a 21-inch (535 mm) ETSI rack. ETSI brackets are available from Paradyne. See Appendix B, *Equipment List*.

  As many BitStorm 2600 units may be mounted in a standard rack as there are 1.75-inch (44.45 mm) spaces in the rack, so long as adequate cooling is provided.

  — Mounted vertically against a wall.

  The standard mounting brackets provided can be fastened to the base of the unit for wall mounting.

  — Set on a shelf or desktop.

  Up to five BitStorm 2600 units may be stacked on a shelf or desktop. Different models can be mixed in a stack.

- **Power**

  The BitStorm 2600 operates from a 90 to 265 VAC, 47 to 63 Hz power source.

- **Other Cabling**

  No cables are provided with the BitStorm 2600. See Table 1-1, Cable Descriptions, to determine what cables you need to obtain before installation.

Cables Required

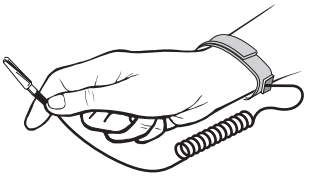
Table 1-1 shows all the cables that may be required for your installation.

Table 1-1. Cable Descriptions

Connector Name	Connector and Cable	For Connecting . . .
DSL PORTS 1–24 POTS 1–24	50-pin RJ21X Telco-type straight connector and 50-wire cable. Two cables required, one for DSL and one for POTS (if used).	Up to 24 DSL ports to Main Distribution Frame, punchdown block, or splitters. Up to 24 POTS splitter ports to Main Distribution Frame or punchdown block.
Port 3 GigE	SFP Transceiver	An upstream BitStorm 2600 to a downstream BitStorm 2600, or a downstream BitStorm 2600 to an upstream BitStorm 2600 or network.
Port 3 1000BT	8-position modular plug and 8-wire Category 5 or better unshielded twisted pair (UTP) cable.	
Port 2 10/100BT	8-position modular plug and 8-wire Category 5 or better unshielded twisted pair (UTP) cable.	
Port 1 10/100BT	8-position modular plug and 8-wire Category 5 or better unshielded twisted pair (UTP) cable.	A Network Management System (NMS) over a Local Area Network (LAN) employing 10BaseT or 100BaseT.
T1/E1 Ports 1–8	From one to eight 8-position modular plug and 8-wire Category 5 or better unshielded twisted pair (UTP) cables.	A BitStorm 2600 to a T1/E1 bridged PPP or MLPPP uplink interface.
CONSOLE	DB9 plug connector and shielded cable. ■ The other connector depends on the serial port on your terminal or PC, but normally is a DB9 socket. ■ The other connector depends on the serial port on your modem, but normally is a DB25 plug. A null modem (crossover) cable is required.	The BitStorm 2600 to one of the following: ■ A terminal or a PC with a terminal emulation program, or ■ A modem.
ALARM	5-position terminal block and shielded, twisted-pair cable.	The BitStorm 2600 to an alarm system.

Unpacking the Hardware

HANDLING PRECAUTIONS FOR STATIC-SENSITIVE DEVICES



This product is designed to protect sensitive components from damage due to electrostatic discharge (ESD) during normal operation. When performing installation procedures, however, take proper static control precautions to prevent damage to equipment. If you are not sure of the proper static control precautions, contact your nearest sales or service representative.

The BitStorm 2600 is shipped in a cardboard shipping container. Carefully remove the unit from its shipping container and check for physical damage. If the unit shows signs of shipping damage, notify your sales representative.

Package Contents

In addition to this installation guide, the BitStorm 2600 shipping carton should contain:

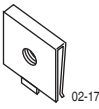
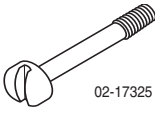
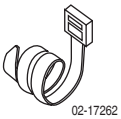
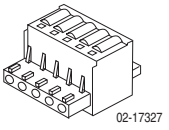
- BitStorm 2600 DSLAM
- AC Power Cable
- Two sets of mounting brackets: one set suitable for a 19-inch (483 mm) rack and one set suitable for a 23-inch (584 mm) rack (including Bay Networks and Nortel)
- Hardware kit (see Table 1-2, Contents of Hardware Kit Shipped with the BitStorm 2600)

If anything is missing, notify your sales representative.

Before installing the BitStorm 2600, read the *Important Safety Instructions* in the beginning of this document.

Be sure to register your warranty at **www.paradyne.com/warranty**.

Table 1-2. Contents of Hardware Kit Shipped with the BitStorm 2600

Appearance	Description	Quantity
 02-17259	Flat-head screw for attaching 19" mounting brackets to unit	6
 02-17326	Machine screw with captive starwasher (6-32 x 1/4″) for attaching 23" mounting brackets to unit	6
 02-17256	Self-retaining nut for racks without threaded holes	4
 02-17257	Dress screw (12-24 x 1/2″) for use with self-retaining nuts	4
 02-17258	Machine screw with captive starwasher (10-32 x 1/2″) for use with racks with threaded holes	4
 02-17325	Captive pan-head screw for replacing long Telco screw	2
 02-17261	Rubber foot for desk-mount and stacking of units	4
 02-17262	Cable tie (8″) for strain relief and cable management	2
 02-17327	5-position plug for ALARM connection	1

Mounting Configurations

Three basic installation configurations are available:

- Rack mount – see *Installing the Brackets for Rack Mounting* on page 1-6 and *Installing the BitStorm 2600 Into a Rack* on page 1-8.
- Wall mount – see *Installing the BitStorm 2600 on a Wall* on page 1-10.
- Shelf or desktop – see *Installing the BitStorm 2600 on a Shelf or Desktop* on page 1-12.

Mounting Brackets

Your BitStorm 2600 can be installed in a rack or on the wall using mounting brackets. Two brackets suitable for a 19-inch (483 mm) rack (marked EIA-19) and two brackets suitable for a 23-inch (584 mm) Bay Networks or Nortel rack (marked with Paradyne Part Number 868-6282-0020) are shipped with the unit. Two brackets suitable for a 21-inch (535 mm) rack (marked ETSI) are available from Paradyne as a separate feature (see Appendix B, *Equipment List*).

Rack-mounting brackets may also be used to attach the unit to a wall.

NOTE:

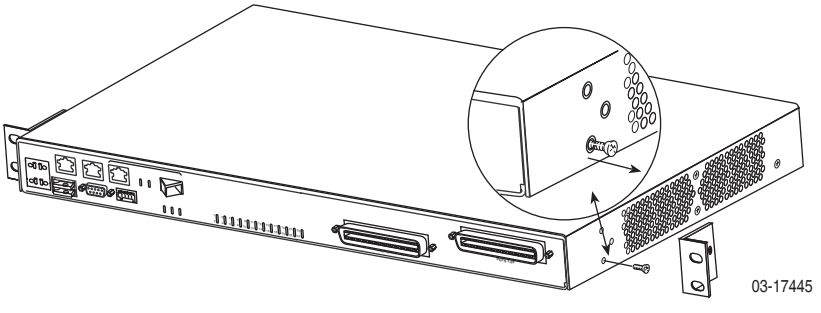
In this guide, the term *rack* refers to any rack, cabinet, frame, or bay suitable for mounting telecommunications equipment.

Installing the Brackets for Rack Mounting

▶ Procedure

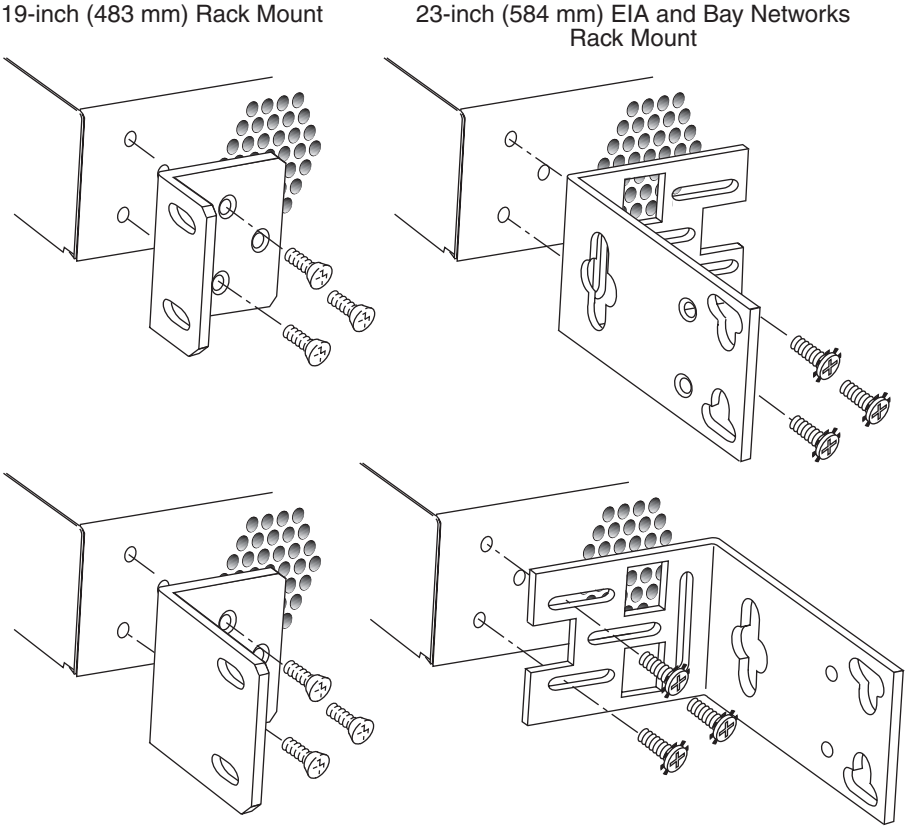
To install the mounting brackets for rack mounting:

1. Locate the black screw nearest the front panel on each side of the unit, as shown.



2. Remove these two black screws (one from each side) before attempting to install the mounting brackets.

3. Identify six flat-head screws (for 19-inch racks) or six machine screws (for 23-inch racks) provided with the mounting brackets in the hardware kit.
4. Attach the brackets appropriate to your rack size. Tighten all screws firmly.



Installing the BitStorm 2600 Into a Rack

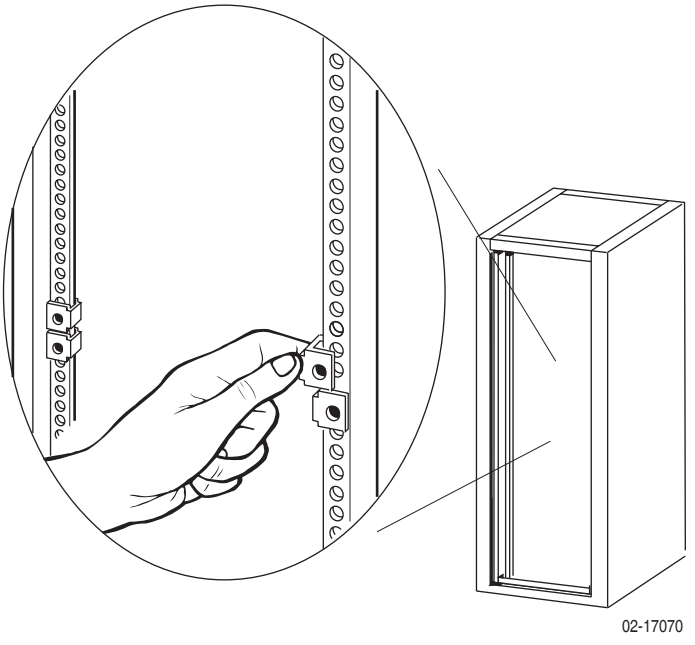
Two types of mounting screws are provided. Use:

- #10-32 mounting screws for rails with threaded screw holes
- #12-24 mounting screws and self-retaining nuts for rails with unthreaded screw holes

▶ Procedure

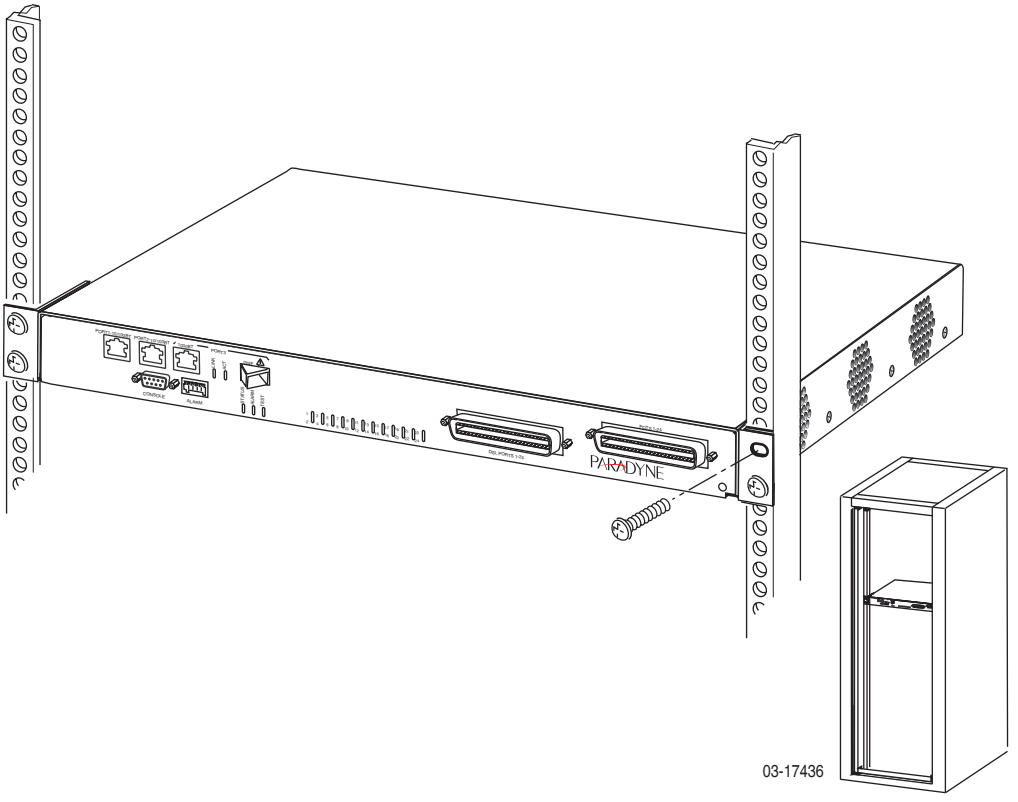
To install the BitStorm 2600 into a rack:

1. Determine where in the rack you will mount the BitStorm 2600. If your rack does not have threaded screw holes, slip self-retaining nuts onto the rails where the BitStorm 2600 will be fastened.



2. Place the unit so that the brackets rest against the front of the rails. Insert screws in the bottom screw positions and hand-tighten them.

3. Insert and tighten the screws in the top screw positions, then tighten the bottom screws.



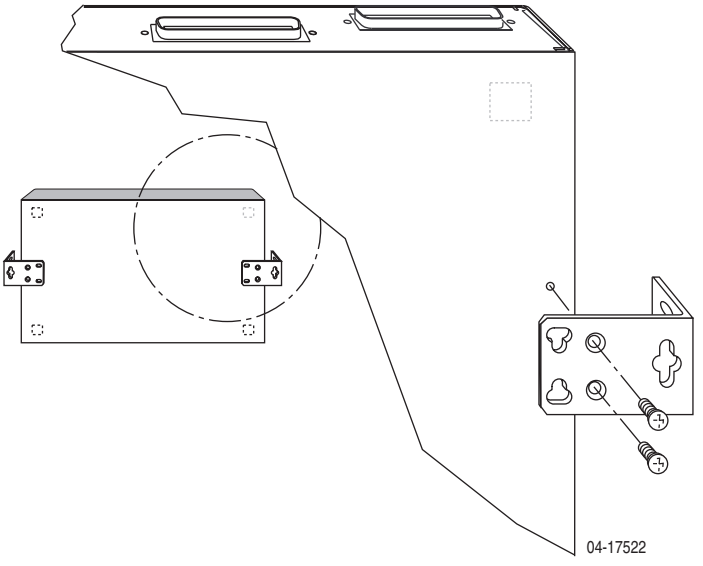
Installing the BitStorm 2600 on a Wall

Wall mounting requires two wood screws suitable for the weight of the fully cabled unit. These are not included. Use at a minimum 1/4-inch (6 mm) diameter screws in 3/4-inch (19 mm) plywood (not drywall).

▶ Procedure

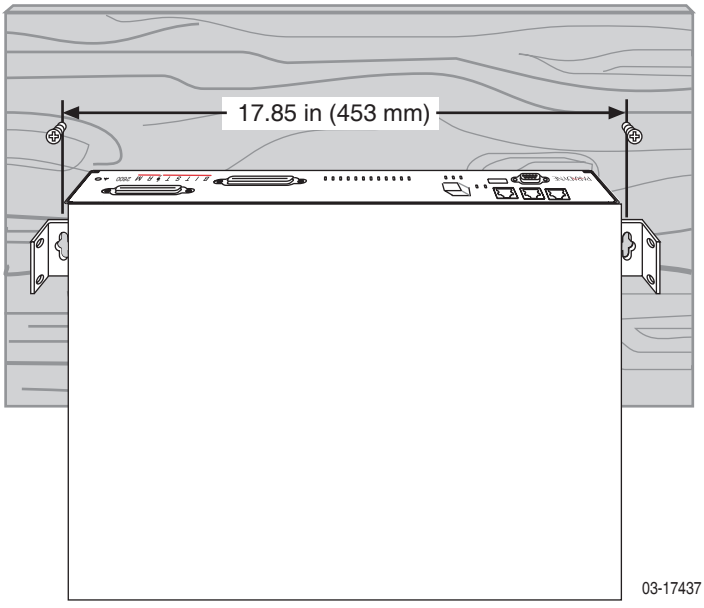
To install the BitStorm 2600 on a wall:

1. Identify the flat-head screws provided in the hardware kit and the brackets suitable for a 23-inch rack. Two screws are required for each bracket.
2. Orient the unit so that the bottom is facing you and the faceplate is at the top.
3. Locate the supplied Right Side mounting bracket and fasten it to the right side of the unit.



4. Locate the supplied Left Side mounting bracket and fasten it to the left side of the unit.
5. Tighten all screws firmly.

6. Install two wood screws (not provided) at the same height above the floor and 18.75 inches (476.25 mm) apart. Do not completely tighten the screws. Leave them so their heads are about 1/4 inch (6 mm) from the wall.



7. Hang the unit from the wood screws to verify that the screws are properly placed. The screws should freely slide into the top of the key slots in the brackets.

   Do not fasten the unit to the wall until after it is completely cabled and tested.

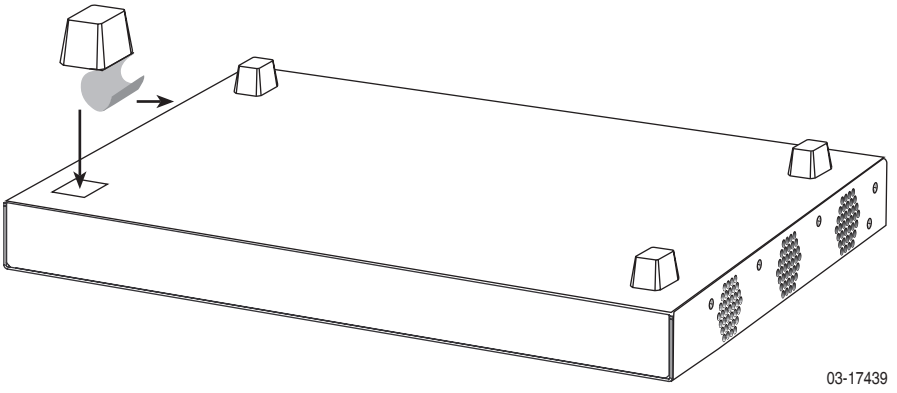
Installing the BitStorm 2600 on a Shelf or Desktop

If the BitStorm 2600 will be placed on a shelf or desktop, install the provided rubber feet before putting the unit in position.

▶ Procedure

To install the BitStorm 2600 on a shelf or desktop, as a standalone unit or in a stack:

1. Locate the rubber feet in the hardware kit provided with the unit.
2. Turn the unit upside down on a work surface. Squares stamped into the bottom of the unit show the proper positions for the feet.
3. Remove the protective sheet from the bottom of each foot, then press the foot onto a corner of the bottom of the unit.



4. Turn the unit right side up and place it in position on a shelf or desktop.

   If the installation includes more than one unit, one can be stacked atop another. Up to five units can be stacked together.

Cabling

2

Cabling Overview

The BitStorm 2600 has a large variety of possible cabling configurations. This chapter describes all possible connections, not all of which are required:

DSL Ports

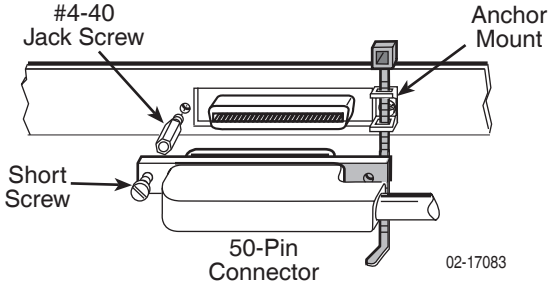
The BitStorm 2600 DSL connector supports the tip and ring connections of up to 24 DSL ports over a 50-position cable.

A POTS (plain old telephone service) splitter connector is also provided, for CO applications only. The internal splitter includes an ANSI T1.413-compliant Maintenance Test Signature (MTS) circuit. If your model does not contain the integrated POTS splitter, you must connect the unit to a separate POTS splitter. The Model 6051 POTS Splitter must be used for customer premises applications in Canada.

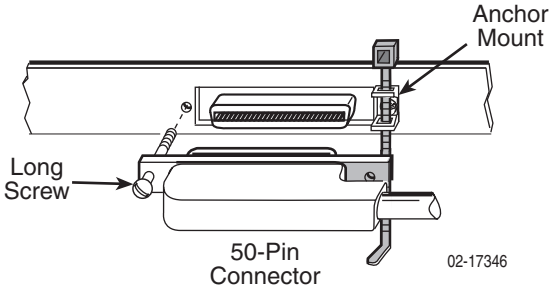
▶ Procedure

To cable the DSL Ports:

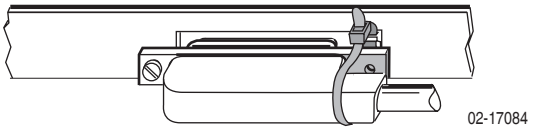
1. Insert a cable tie (provided) through the top of the anchor mount next to the DSL PORTS 1–24 connector.
2. If the connector for your cable has a short captive screw, attach the cable to the DSL PORTS 1–24 connector and fasten it to the jack screw with its short captive screw.



3. If the connector for your cable has a long captive screw, remove the provided jack screw from the threaded hole next to the DSL PORTS 1–24 connector. Attach the DSL PORTS 1–24 connector to the unit using the long, captive pan-head screw (provided).



4. Tighten the cable tie around the connector and trim the excess.



5. If you use an internal POTS splitter, repeat Step 1 through Step 4, substituting POTS 1–24 for DSL PORTS 1–24.
6. Secure the cables as required for strain relief.

GigE Uplink (Port 3)

Port 3 comprises two interfaces, only one of which may be used at a time:

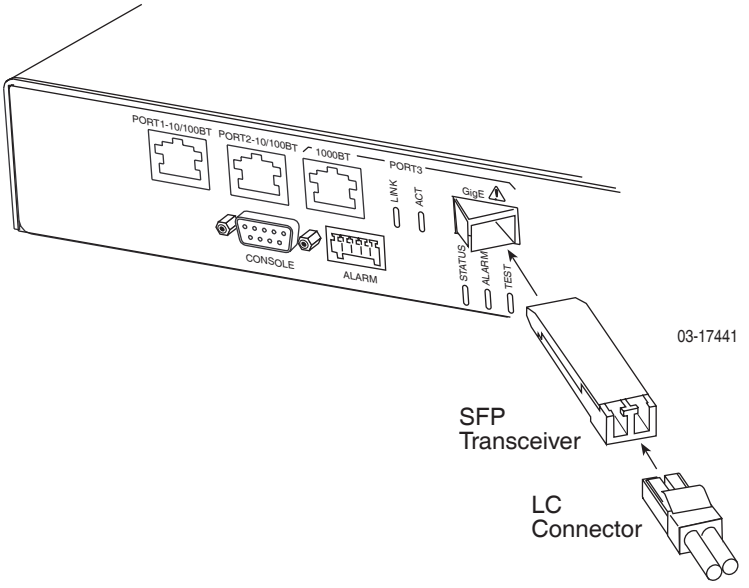
- An 8-position modular jack providing support for 1000BaseT
- A Small Form-Factor Pluggable (SFP) socket providing, with the appropriate transceiver installed, support for 1000BaseX. A single-mode 1000BaseLX transceiver is available from Paradyne. See Appendix B, *Equipment List*.

Either interface can be used as the uplink for a single BitStorm 2600, or for the terminating unit in a stack of BitStorm 2600s.

▶ Procedure

To use Port 3 as the uplink:

1. Connect the uplink cable to the BitStorm 2600:
   - **For a wire connection**, plug the 8-position modular plug of your uplink cable into the Port 3 1000BT modular jack. A straight-through cable can be used regardless of the destination interface, since the port automatically distinguishes between a Medium-Dependent Interface (MDI) and an MDI Crossover (MDIX).
   - **For a fiber connection**, plug your transceiver into the Port 3 GigE SFP socket. Plug the LC connector of your fiber optic uplink cable into the cable socket of the transceiver. Observing the minimum bend radius for your cable, fasten it with cable ties in such a way that it will not be kinked or snagged in the course of other cabling. If you do not know the specifications for your cable, maintain a radius of at least ten times the cable diameter.



2. Connect the other end of the uplink cable to the uplink interface, such as an Ethernet switch.
3. Port 3 (eth3) is the default uplink. If you have changed the default, use the **configure uplink** CLI command or the Configuration / Uplink screen of the web interface to specify eth3 as the uplink port.

10/100BaseT Uplink (Port 2)

Port 2 can be configured as the uplink for a single BitStorm 2600, or for the terminating unit in a stack of BitStorm 2600s. A straight-through cable can be used regardless of the destination interface, since the port automatically distinguishes between an MDI and an MDIX.

▶ Procedure

To use Port 2 as the uplink:

1. Connect an 8-position modular cable to Port 2.
2. Connect the other end of the cable to the uplink interface, such as an Ethernet switch.
3. Using the **configure uplink** CLI command or the Configuration / Uplink screen of the web interface, specify eth2 as the uplink port.

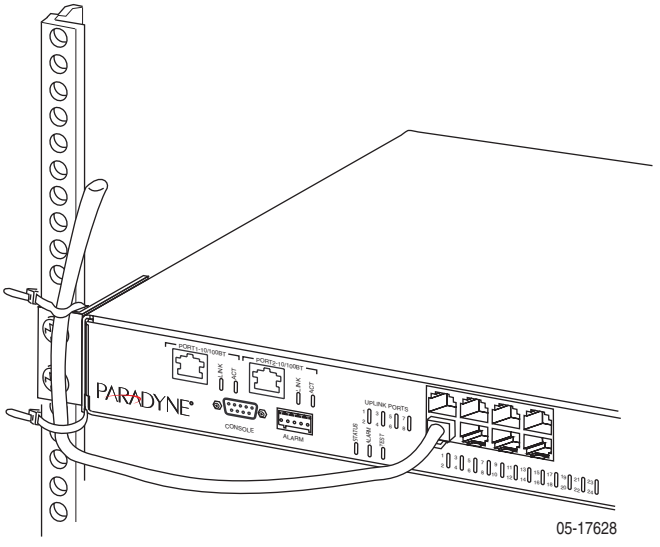
T1 or E1 Uplink

Models that support T1 or E1 have eight ports that can be used in any combination to provide PPP or MLPPP uplinks.

▶ Procedure

To use T1 or E1 uplinks:

1. Use the CLI or web interface to configure PPP or MLPPP paths.
2. Connect an 8-position modular cable to one of the eight T1 or E1 ports on the faceplate of the DSLAM. Connect the other end of the cable to the uplink interface.
3. Connect up to seven other T1 or E1 cables as in Step 2.
4. Fix the cable or cables to the rail as required for strain relief.



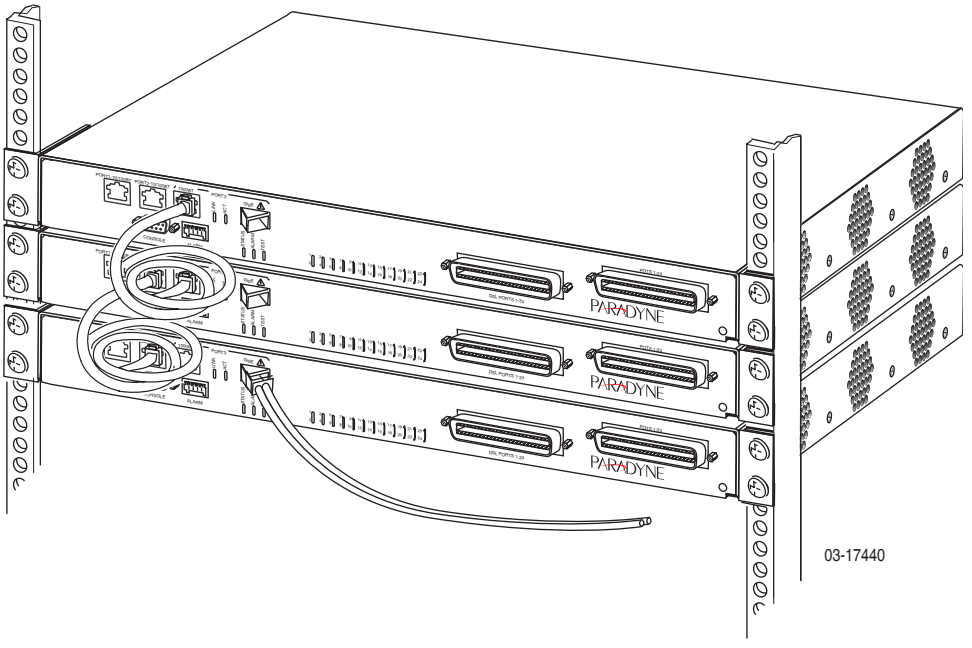
CAUTION:

It is possible to create bridging loops by connecting cables improperly relative to the configuration defined on the SCP card.

Chaining BitStorm 2600s

Up to eight BitStorm 2600s can be chained together to use a single uplink. The same port (eth2 or eth3) used as the uplink for one unit must be used as the downlink for the next. For example, in this illustration:

- The top unit has Port 3 (eth3) defined as its uplink and is connected to Port 3 of the next unit in the chain using a straight-through 8-position modular cable.
- The middle unit has Port 2 (eth2) defined as its uplink and is connected to Port 2 of the next unit.
- The bottom unit has Port 3 (eth3) defined as its uplink, which is the uplink for the stack. That unit is using the fiber interface.



Copper cables connecting:

- Port 2 to Port 2 must be at least 3 feet (0.9 m) long
- Port 3 to Port 3 must be at least 6 feet (1.8 m) long

Shorter cables may cause data errors.

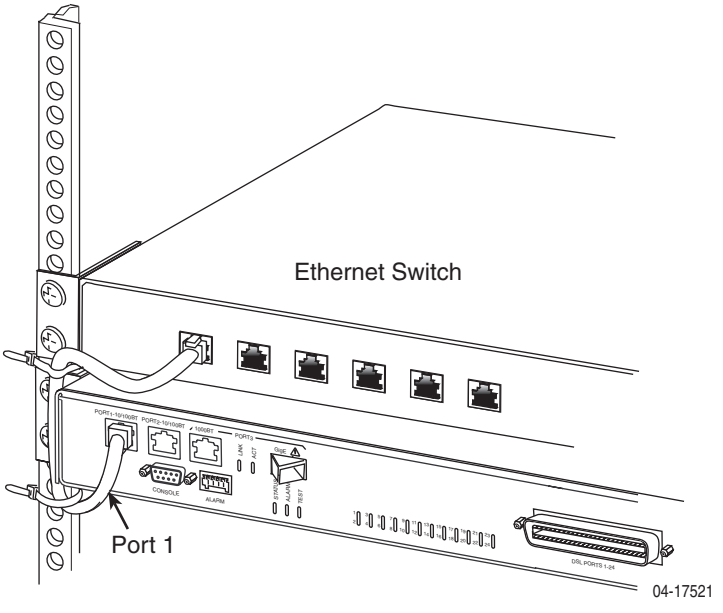
Management Port

Port 1 can be used to connect the BitStorm 2600 to a network management system using a 10BaseT or 100BaseT LAN. A straight-through cable can be used regardless of the destination interface, since the port automatically distinguishes between an MDI and an MDIX.

▶ Procedure

To use Port 1 as the out-of-band management port:

1. Connect an 8-position modular cable to Port 1.
2. If the BitStorm 2600 is in a rack, fasten the cable to a rail with a cable tie.
3. Connect the other end of the cable to your Ethernet switch or a network interface card in a PC.



Console Port

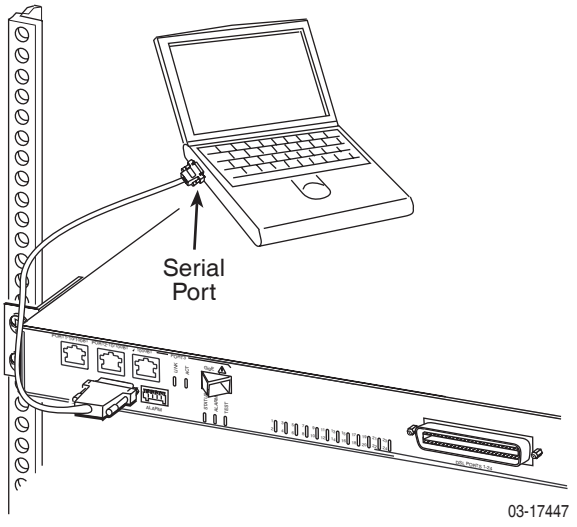
The CONSOLE port normally serves as the primary user interface with the BitStorm 2600 during installation. You can connect a terminal or PC directly to the CONSOLE port using a DTE cable (see procedure below). You can also use the CONSOLE port to attach a modem to the BitStorm 2600 for remote dial-in management of the unit using a DCE cable (see *Connecting a Modem to the Console Port* on page 2-9).

Connecting a Terminal or PC to the Console Port

▶ Procedure

To connect a terminal or PC to the CONSOLE port:

1. Configure the terminal or terminal emulation program to use the following parameters:
   - — Maximum speed: 9600 bps
   - — Data bits: 8
   - — Parity: None
   - — Flow Control: None
   - — Stop bits: 1
2. Determine and procure the proper Data Terminal Equipment (DTE) cable type. The CONSOLE port requires a DB9 plug connector. The other connector depends on the serial port on your terminal or PC.
3. Connect the DB9 plug connector to the CONSOLE port socket. The CONSOLE port is ordinarily used only during installation, so do not fasten the connector.
4. Connect the other end of the cable to the serial port of your terminal or PC.

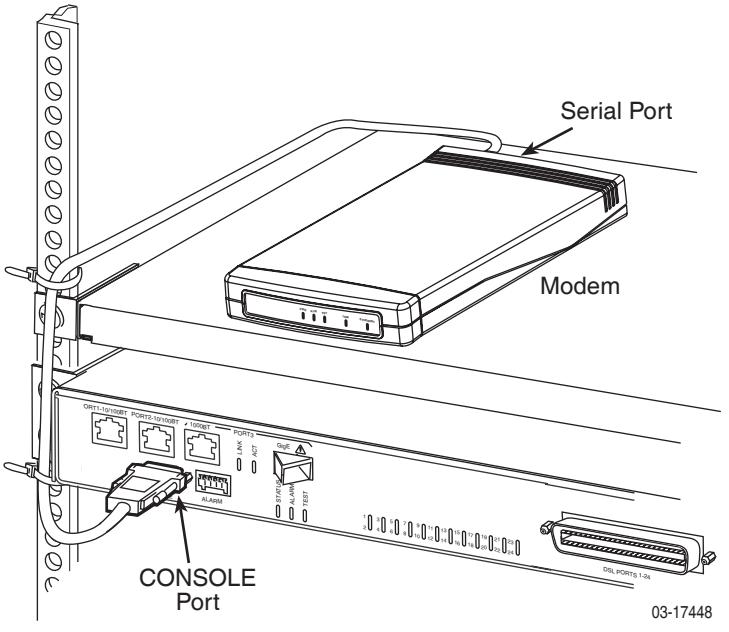


Connecting a Modem to the Console Port

▶ Procedure

To connect a modem to the CONSOLE port:

1. Determine and procure the proper DCE cable type for your modem. The CONSOLE port requires a DB9 plug connector. The other connector depends on the serial port on your modem, but normally a DB25 plug is required. The cable must be an EIA-232-E crossover (null modem) cable.
2. Connect the DB9 plug connector to the CONSOLE port socket.
3. If the modem will be permanently connected, fasten the connector to the Management Module with its captive screws. If the BitStorm 2600 is in a rack, dress the cable to the left and attach it to the rail with a cable tie.
4. Connect the other end of the cable to the serial port of your modem.



Alarm Interface

The ALARM interface consists of five contacts. Three of the contacts provide access to alarm relays that that can be used to set off Major and Minor physical alarms. The other two contacts provide access to a sense circuit that can be used to detect the open or closed condition of an external alarm relay.

A 5-position plug provided in the hardware kit is used to connect 20–28 AWG wire to the ALARM terminal block (see Table 1-2, Contents of Hardware Kit Shipped with the BitStorm 2600, in Chapter 1, *Installation*).

The contacts are closed during normal operation. They open in response to loss of power, hardware failure, or other alarm conditions. See *ALARM Connector* in Appendix A, *Connectors and Pin Assignments* for more information.

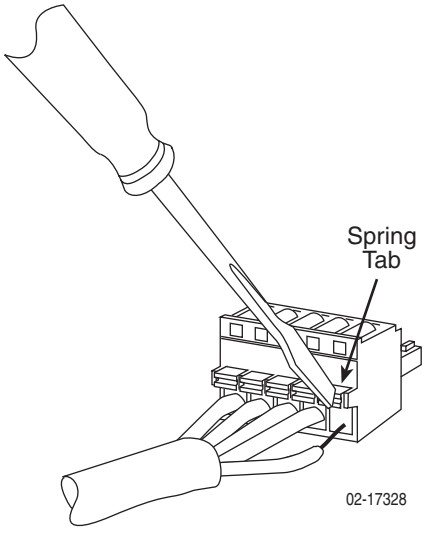
CAUTION:

The ALARM Sense + and Sense – contacts are intended to be connected to an external alarm relay. Do not apply power to these contacts; doing so will result in damage to the unit.

▶ Procedure

To connect the ALARM interface:

1. Strip the tips of the alarm source wires about 1/2 inch (13 mm).
2. Use a screwdriver to press the orange spring tab in while inserting the wire into the hole below it. The insulation should be fully within the plug and no bare wire should be exposed outside of the plug.



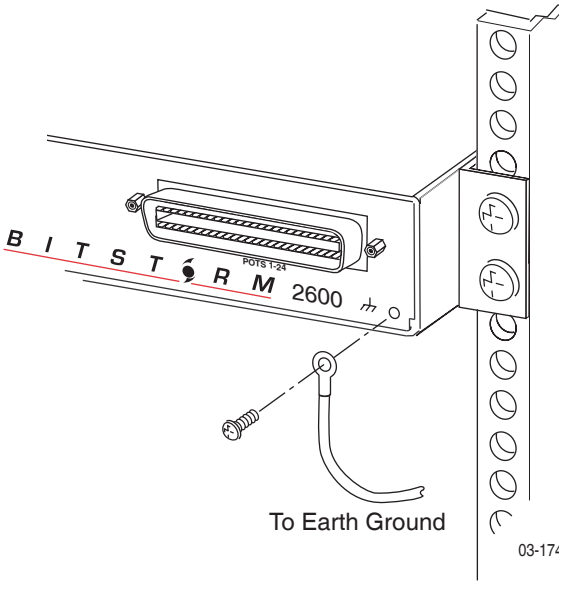
3. Insert the plug into the ALARM interface on the front panel of the BitStorm 2600.
4. If the BitStorm 2600 is in a rack, dress the cable to the left and secure it to the rail with a cable tie.
5. Connect the other end of the cable to your alarm monitoring system.

Ground

▶ Procedure

To connect the unit to a ground:

1. Crimp a ring terminal onto the stripped end of 14 AWG or heavier copper ground wire.
2. Remove the screw marked by the ground symbol (⏚) at the right side of the front panel.
3. Fasten the ring terminal to the front panel using the same screw.
4. Attach the ground wire to an earth ground.



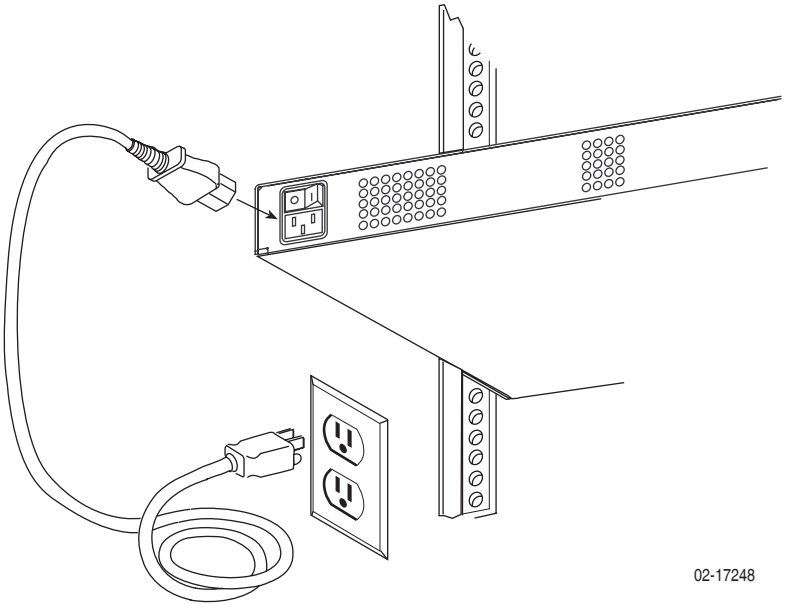
Connecting to Power

The BitStorm 2600 can be powered by any AC power source supplying 90–265 VAC at 47–63 Hz.

▶ Procedure

To connect the BitStorm 2600 to a power source:

1. Insert the supplied power cord into the power socket on the back of the unit.



2. If the BitStorm 2600 is in a rack, dress the power cord to the left and fasten it to the rail with a cable tie.
3. Connect the other end of the power cord to a grounded AC power source.
4. Make sure the STATUS LED on the front panel is ON (green). See Chapter 3, *LEDs*.

LEDs

3

LED Locations

The locations of the System and DSL Port LEDs on the front panel of the BitStorm 2600 are shown in Figure 3-1, Front Panel LEDs (GigE Uplink).

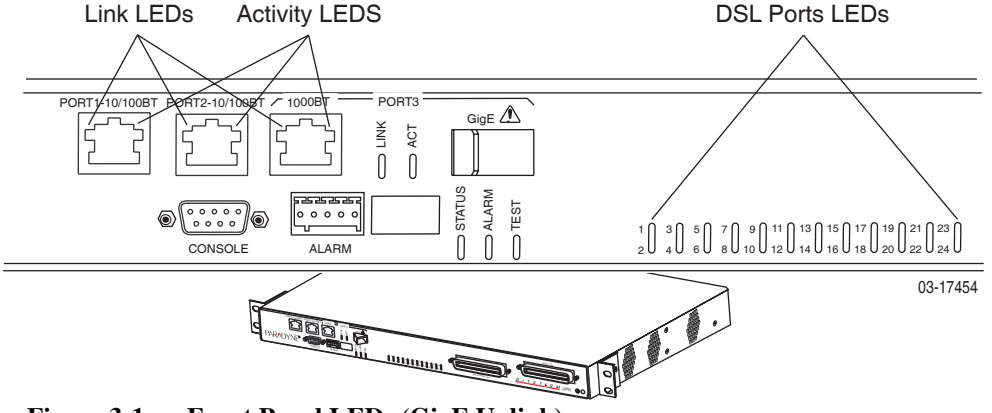


Figure 3-1. Front Panel LEDs (GigE Uplink)

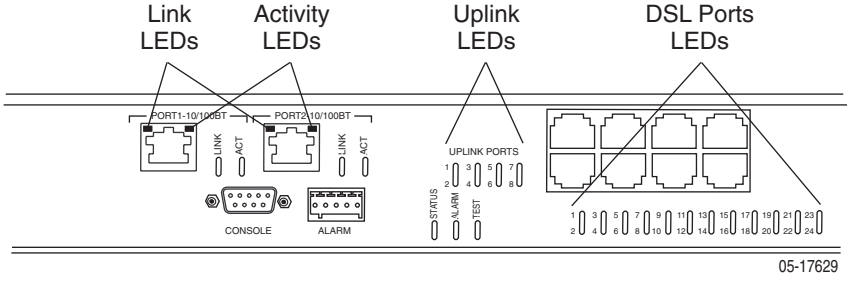


Figure 3-2. Front Panel LEDs (T1/E1 Uplink)

LED Meanings

When power is first applied to the unit, it performs a power-on self-test. When this test is successfully completed, the Status LED blinks. The meaning of all the LEDs is shown in Table 3-1, Front Panel LEDs.

Table 3-1. Front Panel LEDs

LED	Color	State	Meaning
Link*	Green	Off	No Ethernet link present.
		On	Ethernet Link present.
		Flashing	Ethernet link is present, but port is administratively disabled.
Activity*	Green	Off	No data is being transferred.
		On	Data is being transferred.
Uplink Ports 1–8 (T1/E1 models)	Green	On	Good signal; unit is trained.
	Yellow	On	Link is in an alarm state.
		Off	Link is disabled.
STATUS	Green	Off	No power, or the unit has not completed initialization.
		On	Unit has power and has completed initialization.
ALARM	Amber	Off	No Alarms.
		On	An alarm is reported: the unit failed self-test, or the unit has exceeded a safe temperature, or a fan has failed, or a port is in an alarm state.
TEST	Amber	Off	Normal operating mode.
		On	At least one port is in test mode.
DSL Ports (LEDs numbered 1–24 correspond to DSL ports 1–24)	Green	Off	The port is disabled or no signal is detected on the line.
		On	Port has successfully trained with the remote and is active.

* The RJ45-type connectors for Port 1, Port 2, and (if present) Port 3 bear two LEDs: the left one is the Link LED and the right one is the Activity LED. The SFP socket for Port 3 has two adjacent LEDs marked LINK and ACT.

Configuration

4

Overview

The BitStorm 2600 is designed to require minimal configuration before it can be accessed by a Network Operations Center (NOC). When the BitStorm 2600 is first powered up it is a fully functional bridge, and all DSL ports are set to their maximum speed.

Initial configuration is performed using the Command Line Interface (CLI). The CLI is available from a terminal or PC connected to the CONSOLE port.

Additional configuration may be necessary, depending on the mode used to manage the BitStorm 2600:

- Inband
- Out of band through Port 1

This can be performed using the CLI, SNMP, or the web interface.

For more configuration information, see the *BitStorm 2600 and GranDSLAM 4200 IP DSLAM Command Line Interface Reference* (for the CLI) and the online Help (for the web interface).

Using the CLI

A command line interface (CLI) can be used to configure and monitor the unit. The CLI is available from a PC or terminal connected to the Console port, or from a Telnet session with the device.

The following commands are available:

Table 4-1. CLI Commands

Command	Function
clear	Clear the system log.
configure	Enter Configuration mode.
copy	Copy from one file to another.
date	Set the time zone and date format.
end	If user is in Administrator mode, shifts to User mode; if user is in User mode, positions interface at top of menu tree.
exit	Terminate current session.
firmware	Download or apply new firmware.
paging	Enable or disable paging (*more* prompt) for this session.
privilege	Enable administrator mode.
restart	Restart a unit.
show	Display configuration, statistics, and status.
technical-support	Display information for contacting technical support.
test	Test the system.

Descriptions of some essential configuration commands follow.

Configure Management Default Gateway Address

The **configure management default gateway** command specifies the IP address of the next hop router for the management traffic.

configure management default-gateway {ip_address}
Minimum Access Level: **Administrator**
ip_address – Specifies the IP address of the default gateway for the management ports. **Example:** `PDYN# configure management default-gateway 137.90.127.1`

Configure Management Inband Address

The **configure management inband address** command specifies the IP address of the unit.

configure management inband address {ip_address} { subnet_mask}
Minimum Access Level: **Administrator**
ip_address – Specifies the management IP address. Default is 0.0.0.0 (disabled). Do not configure inband and out-of-band management on the same subnet. **subnet_mask –** Specifies the subnet mask to be applied to the IP address. The default mask is 255.255.255.0. Example: PDYN# **configure management inband address 137.90.127.3 255.255.255.0**

Configure Management Out-of-Band Address

The **configure management out-of-band address** command specifies the IP address of the unit that will accept management traffic on the out-of-band management port.

configure management out-of-band address {bootp | {{ip_address} { subnet_mask} }
Minimum Access Level: **Administrator**
bootp – Specifies that a BOOTP server will determine the management IP address. **ip_address –** Specifies the management IP address. The default address is 10.10.10.10. Do not configure inband and out-of-band management on the same subnet. **subnet_mask –** Specifies the subnet mask to be applied to the IP address. The default mask is 255.255.255.0. Example: PDYN# **configure management out-of-band address bootp** PDYN# **configure management out-of-band address 137.90.127.3 255.255.255.0**

BitStorm 2600 Startup Procedure

You can initialize your BitStorm 2600 via a PC or terminal connected to the unit's CONSOLE port. Then, using a series of CLI commands, GrandVIEW EMS or another Element Management System, or the web interface, you can configure the unit according to your requirements.

Login

▶ Procedure

To log in to the BitStorm 2600:

1. Connect a PC or terminal to the CONSOLE port. (See *Console Port* in Chapter 2, *Cabling*.)
2. At the *login>* prompt, type **admin** and press Enter.
3. At the *password>* prompt, press Enter. The default login password is blank.
4. At the *PDYN>* prompt, type **privilege** and press Enter.
5. At the *password#* prompt, press Enter. The default privileged password is blank.

You are now logged on and in privileged mode, which allows you to configure the unit.

Management Modes

The startup procedure for the BitStorm 2600 system differs depending on the type of management used:

- Inband Management – Operates over the uplink.
- Out-of-Band Management – Operates over Port 1.

Startup Procedure for Inband Management

With inband management, the BitStorm 2600 is managed using the uplink port.

▶ Procedure

To start up the BitStorm 2600 using inband management:

1. Specify the uplink port using the **configure uplink** command. It must be either **eth2** (Port 2) or **eth3** (Port 3). For example:

   ```
   PDYN# configure uplink eth3
   ```

2. Assign an IP address, netmask, and next-hop router using the **configure management** command. For example:

   ```
   PDYN# configure management inband address 137.90.127.3
   255.255.255.0

   PDYN# configure management default-gateway
   137.90.127.1
   ```

   Do not configure inband and out-of-band management on the same subnet.

Startup Procedure for Out-of-Band Management

In out-of-band management, you manage the unit through Port 1.

▶ Procedure

To start up the BitStorm 2600 using out-of-band management:

1. Assign an IP address, netmask, and next-hop router using the **configure management** command. For example:

   ```
   PDYN# configure management out-of-band address
   137.90.80.3 255.255.255.0

   PDYN# configure management default-gateway 137.90.80.1
   ```

   You can now access the web interface by typing into the Location field of your web browser the IP address assigned to the Port 1. See *Using the Web Interface* on page 4-6.

   Do not configure inband and out-of-band management on the same subnet.

2. Configure routers as necessary to route data from the NOC to the BitStorm 2600.

Using the Web Interface

To access the web interface:

▶ Procedure

1. Open your web browser. (Internet Explorer Version 6 or above is recommended.)
2. Type http:// and the IP address of the BitStorm 2600 into the Address field of your browser window. For example:

3. A login window appears. Enter the default User ID (**admin**) and leave Password blank. Click on OK. The web interface screen appears.
4. Click on the menu tab appropriate to what you would like to do:
   - — Configuration – To configure the system and interfaces
   - — Status – To display statistics, status, and contents of memory
   - — System – To display system information, download firmware, back up configurations, and modify users
   - — Diagnostics – To start and stop tests

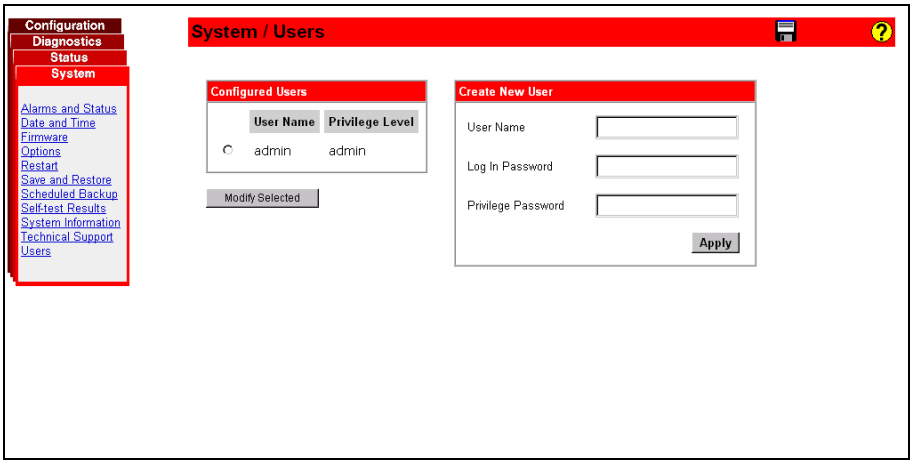
System / Users

For security reasons, it is a good idea to change the default password the first time you use the system.

▶ Procedure

To change the default password for user **admin**:

1. Click on the System menu tab, then click on Users. The folllowing screen appears.



2. In the Configured Users box, select **admin** by clicking in the circle next to it.
3. Click on Modify Selected. The System / Users / admin screen appears.
4. Type in a new Login Password and a new Privilege Password, then click on Apply. Keep a record of the new password.

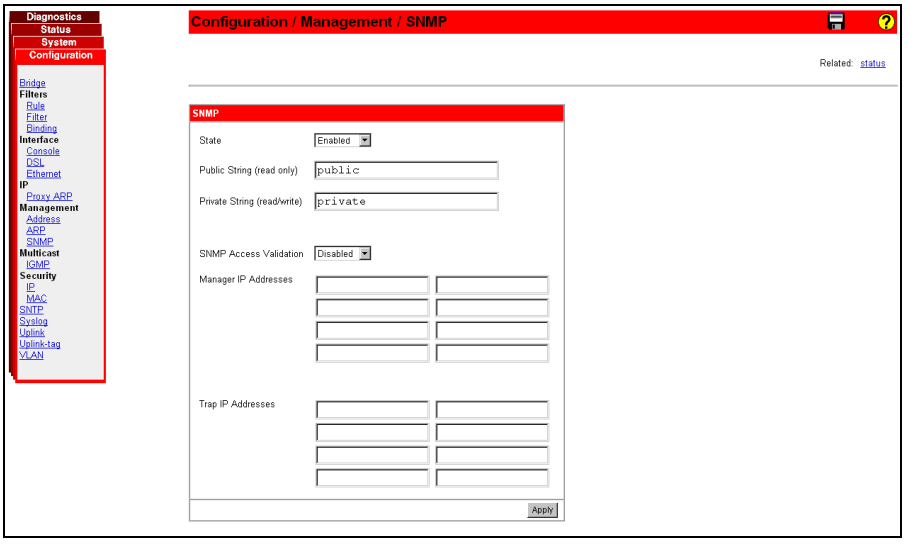
Configuration / Management / SNMP

SNMP access to the unit is disabled by default. The read-only community string is **public**, and the read-write string is **private**. Community strings, network management system addresses, and trap manager addresses can be set using the System/Management/SNMP screen.

▶ Procedure

To set SNMP parameters:

1. Click on the Configuration menu tab, then click on SNMP. The System/Management/SNMP screen appears.



2. Enter new SNMP parameters as desired. Click on Apply.

Connectors and Pin Assignments

A

Overview

The following sections provide pin assignments for:

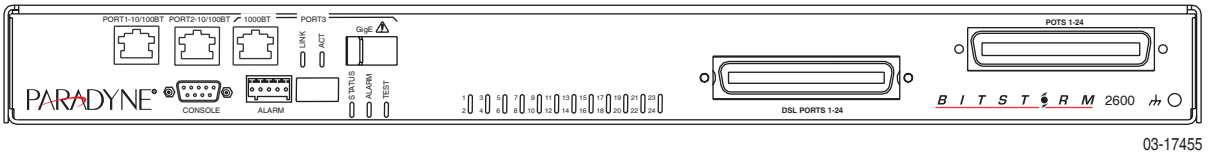


Figure A-1. BitStorm 2600 IP Front Panel

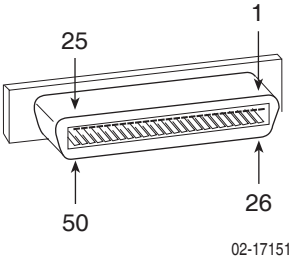
DSL Ports and POTS Splitter Connectors

The 50-pin RJ21X Telco connector labeled DSL Ports 1–24 provides the 2-wire loop interface from each DSL port to the MDF for CO applications, or the in-building wiring for customer premises applications. (The Canadian designation for this connector is CA21A.) The 50-pin RJ21X (CA21A) Telco connector labeled POTS 1–24 (if installed) provides the 2-wire loop interface with the internal POTS splitters.

Table A-1 lists the pin assignments for these interfaces. Note that Pins 25 and 50 are not used.

Table A-1. DSL Connector Pinouts

DSL Port	Connector Pins (Ring, Tip)
1	1, 26
2	2, 27
3	3, 28
4	4, 29
5	5, 30
6	6, 31
7	7, 32
8	8, 33
9	9, 34
10	10, 35
11	11, 36
12	12, 37
13	13, 38
14	14, 39
15	15, 40
16	16, 41
17	17, 42
18	18, 43
19	19, 44
20	20, 45
21	21, 46
22	22, 47
23	23, 48
24	24, 49

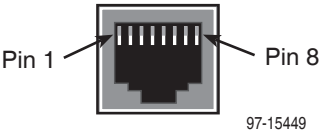


Port 1 and Port 2 10/100BaseT Connectors

Port 1 and Port 2 are 8-pin unkeyed modular jacks for a 10/100Base interface.

Table A-2. Port 1 and Port 2 Pinouts

Signal	Pin
Transmitted Data +	1
Transmitted Data –	2
Received Data +	3
Unused	4
Unused	5
Received Data –	6
Unused	7
Unused	8

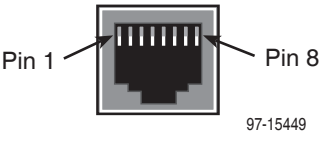


Port 3 1000BaseT Connector

Port 3's 1000BaseT interface is an 8-pin unkeyed modular jack.

Table A-3. Port 3 1000BaseT Connector

Signal	Pin
Tip 1	1
Ring 1	2
Tip 2	3
Ring 3	4
Tip 3	5
Ring 2	6
Tip 4	7
Ring 4	8



Port 3 GigE SFP Connector

Port 3's GigE interface is a standard SFP socket.

Table A-4. Port 3 GigE Connector

Signal	Pin
VeeT	1
TXFault	2
TXDisable	3
MOD-DEF(2) – I2C_DATA	4
MOD-DEF(1) – I2C_CLK	5
MOD-DEF(0) – SFP_PRESENT_L	6
Rate Select	7
LOS	8
VeeR	9
VeeR	10
VeeR	11
RD-	12
RD+	13
VeeR	14
VccR	15
VccT	16
VeeT	17
TD+	18
TD-	19
VeeT	20

E1 and T1 Uplink Connectors

The E1 and T1 connectors on T1/E1 MLPPP models are single, RJ48C, unkeyed, shielded, 8-pin modular jacks. The shield is connected to ground via the module.

Table A-5. E1 Uplink Connectors

Signal	Direction	Pin
Receive Ring	In	1
Receive Tip	In	2
NC	—	3
Transmit Ring	Out	4
Transmit Tip	Out	5
NC	In	6
NC	—	7
NC	—	8

Console Port Connector

The CONSOLE port connector is a DB9 socket connector that supports an EIA-232-E circuit as shown in Table A-6.

Table A-6. Console Port Connector

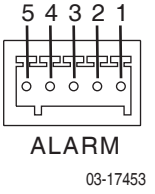
RS-232 Signal	Direction	Pin
Data Carrier Detect	Out	1
Receive Data	Out	2
Send Data	In	3
Data Terminal Ready	In	4
Ground	—	5
Data Set Ready	Out	6
Request to Send	In	7
Clear to Send	In	8
Ring Indicator	—	9

ALARM Connector

The alarm relay reports major alarms through the ALARM connector.

Table A-7. ALARM Connections

Signal	Direction	Contact
Major Alarm	Out	1
Common	Out	2
Minor Alarm	Out	3
Alarm Sense +	In	4
Alarm Sense –	In	5



The alarm contacts are closed during normal operation. They open in response to loss of power, hardware failure, or other alarm conditions. The maximum rated load for the alarm relays is:

- 30 VDC: 1.0 Amp
- 60 VDC: 0.6 Amp
- 60 VAC: 0.6 Amp

Equipment List

B

All BitStorm 2600 models include the BitStorm 2600, 19- and 23-inch mounting brackets and hardware, and an Installation Guide.

Table B-1. BitStorm 2600 Model List (1 of 2)

Model Number	DSL Ports	DSL Type	Splitters	Power Cord Compatibility	Other Features
2611-A1-420	24	ReachDSL	None	North America	–
2611-A1-424	24	ReachDSL	None	UK	–
2611-A1-425	24	ReachDSL	None	Europe	–
2611-A1-430	24	ReachDSL	900 Ohm	North America	–
2611-A1-434	24	ReachDSL	600 Ohm	UK	–
2611-A1-435	24	ReachDSL	600 Ohm	Europe	–
2611-A1-436	24	ReachDSL	600 Ohm	India	–
2614-A1-420	24	ReachDSL	None	North America	T1 MLPPP (8 ports)
2614-A1-422	24	ReachDSL	None	North America	E1 MLPPP (8 ports)
2621-A2-420	24	ADSL2+	None	North America	–
2621-A2-424	24	ADSL2+	None	UK	–
2621-A2-425	24	ADSL2+	None	Europe	–
2621-A2-430	24	ADSL2+	900 Ohm	North America	–
2621-A2-434	24	ADSL2+	600 Ohm	UK	–
2621-A2-435	24	ADSL2+	600 Ohm	Europe	–
2621-A2-436	24	ADSL2+	600 Ohm	India	–
2624-A1-420	24	ADSL2+	None	North America	T1 MLPPP (8 ports)
2624-A1-422	24	ADSL2+	None	North America	E1 MLPPP (8 ports)
2631-A2-425	24	ADSL2+	None	Europe	Annex B
2671-A1-420	24	SHDSL	None	North America	–
2674-A1-420	24	SHDSL	None	North America	T1 MLPPP (8 ports)

Table B-1. BitStorm 2600 Model List (2 of 2)

Model Number	DSL Ports	DSL Type	Splitters	Power Cord Compatibility	Other Features
2674-A1-422	24	SHDSL	None	North America	E1 MLPPP (8 ports)

Table B-2. BitStorm 2600 Related Equipment List

Model Number	Description
2600-A2-GB21	*BitStorm 2600 and GranDSLAM 4200 IP Command Line Interface Reference* (paper copy)
2600-A2-GB22	*BitStorm 2600 and GranDSLAM 4200 IP SNMP Reference* (paper copy)
4200-F1-001	Mounting Brackets for ETSI 21-inch (535 mm) Rack
4200-F3-000	Single-Mode 1000BaseLX SFP Transceiver (10 km, 1310 nm FP-LD)
4200-F3-001	Single-Mode 1000BaseLX SFP Transceiver (40 km, 1310 nm DFB-LD)
4200-F3-002	Single-Mode 1000BaseZX SFP Transceiver (80 km, 1550 nm DFB-LD)
4200-F3-003	Multimode 1000BaseSX SFP Transceiver (0.55 km, 850 nm VCSEL)
5011-A1-000	1-Slot POTS Splitter Chassis
5016-A1-000	6-Slot POTS Splitter Chassis
6051-B1-001	BitStorm 6051 Universal Line Sharing POTS Splitter
8400-F1-001	LC to SC Multimode Conversion Cable
8400-F1-002	LC to SC Single-Mode Conversion Cable

Technical Specifications

C

Technical specifications are subject to change without notice.

Table C-1. BitStorm 2600 Technical Specifications (1 of 2)

Specifications	Criteria
Alarm Contacts Maximum Rated Load	■ 30 VDC: 1.0 Amp ■ 60 VDC: 0.6 Amp ■ 60 VAC: 0.6 Amp
Cooling and Air Handling	Each BitStorm 2600 is independently cooled with integral fans and does not rely on vertical air flow.
DSL Compatibility	Models 2611 and 2614: ■ ReachDSL 2.2 Models 2621 and 2624: ■ G.dmt (G.992.1) ■ G.lite (G.992.2) ■ ANSI T1.413-1998 ■ ADSL2 (G.992.3) ■ ADSL2+ (G.992.5) Model 2631: ■ G.dmt (G.992.1) Annex B ■ ADSL2 (G.992.3) Annex B ■ ADSL2+ (G.992.5) Annex B Model 2671: ■ G.SHDSL (G.991.2)
Electromagnetic Compatibility (EMC)	Meets the following standards: ■ EN 300 386-2 ■ EN 55024 ■ EN 55022, Class A ■ FCC Part 15, Class A ■ VCCI, Class A

Table C-1. BitStorm 2600 Technical Specifications (2 of 2)

Specifications	Criteria
Interfaces	■ **DSL PORTS:** 50-pin RJ21X Telco-type connector ■ **POTS:** 50-pin RJ21X Telco-type connector ■ **CONSOLE:** DB9 (EIA-232-E) ■ **Port 1 and Port 2:** 8-pin modular jack (10/100BaseT) ■ **Port 3 copper interface:** 8-pin modular jack (1000BaseT) ■ **Port 3 fiber interface:** SFP socket ■ **T1/E1 MLPPP interface:** eight RJ48C modular jacks
Operating Environment	Ambient Temperature: 0° to 50° C (32° to 122° F) Relative Humidity: 5% to 95% noncondensing Storage Temperature: –40° to 85° C (–40° to 185° F) Shock and vibration tolerance sufficient to withstand normal shipping
Physical Dimensions	Height: 1.75″ (44.5 mm, or 1U as defined in EIA-310-C) without feet Width: 17.2″ (437 mm) without mounting brackets Depth: 16.0″ (406 mm) with cables
Power	90–265 VAC, 47–63 Hz
Power Consumption	Model 2611: 45 Watts Maximum Model 2614: 43 Watts maximum Model 2621: 57 Watts Maximum Model 2624: 55 Watts Maximum Model 2631: 57 Watts Maximum Model 2671: 46 Watts Maximum Model 2674: 44 Watts Maximum
Weight	2611 without splitters: 15.1 lb (6.8 kg) 2611 with splitters: 17.0 lb (7.7 kg) 2614: 13.1 lb (5.9 kg) 2621 without splitters: 14.7 lb (6.7 kg) 2621 with splitters: 16.3 lb (7.4 kg) 2624: 12.2 lb (5.5 kg) 2631 without splitters: 14.7 lb (6.7 kg) 2631 with splitters: 16.3 lb (7.4 kg) 2671: 15.5 lb (7.0 kg) 2674: 13.1 lb (5.9 kg)

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