BitStorm™ 1900 IP DSLAM

Installation and Maintenance Guide

Document No. 1900-A2-GN20-00

July 2002

PARADYNE®

Notice

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Trademarks

⚠ Important Safety Instructions

1. Read and follow all warning notices and instructions marked on the product or included in the manual.
2. All installation and service must be performed by qualified service personnel, as opening or removing covers may expose you to dangerous high voltage points or other risks.
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. 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 telecommunication cable.
5. 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.
6. 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.
7. When product is configured for DC output, connect the product to a 48 VDC SELV supply source that is electrically isolated from the ac source. The 48 VDC source is to be reliably connected to earth. Connect the earthing (grounding) wire to the protective earthing (grounding) lug connector, identified by the protective earth symbol.
8. Do NOT apply power to both AC and DC inputs simultaneously.
9. A readily accessible disconnect device as part of the building installation shall be incorporated in fixed wiring. The disconnect device (a 48 VDC, 10 amp circuit breaker or switch) must be included in the ungrounded supply conductor. Over current protection must be included with a 10 amp, 48 VDC fuse or circuit breaker.
10. This product is to be installed only in a Restricted Access Location (dedicated equipment rooms, equipment closets or the like) in accordance with articles 110-16, 110-17 and 110-18 of the National Electrical Code, ANSI/NFPA 70.
11. 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.
12. **CAUTION:** An energy hazard exists on the backplane. Do not touch or bridge pins on the connectors.

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.

⚠ 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.

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.

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About This Document

Focus and Audience

This document contains the complete installation and maintenance procedures for the BitStorm™ 1900 IP DSL Access Multiplexer (IP DSLAM) system. It is intended for installation technicians responsible for installing and maintaining the BitStorm 1900 IP DSLAM.

Related Documents

Documentation for BitStorm and EtherLoop products is available online at **www.paradyne.com**. Select *Library –> Technical Manuals –>BitStorm DSL Systems* or *GrandVIEW / StormTracker EMS.* Other supporting documentation for the BitStorm 1900 includes:

- 1900-A2-GK40, *BitStorm 1900 IP DSLAM Supported SNMP MIBs*

  This document lists supported SNMP MIBs.

- 1900-A2-GZ40, *BitStorm 1900 EMI Gasket Installation Procedures*

  This document shows how to install an EMI gasket on the BitStorm 1900 card slot divider.

- EMS-A2-GB20, *StormTracker EMS 2.3 User's Guide*

  This document explains how to use the StormTracker Element Management System with the BitStorm 1900.

- 08-01148-01, *StormTracker – Site Manager and Administration User's Guide*

  This document covers the applications used to provision and manage an EtherLoop system using the BitStorm Server.

- 08-01019-01, *StormTracker – Spectrum Manager User Guide*

  This document covers spectral compatibility and debug/monitor functionality.

Conventions

The following conventions have been used in preparing this documentation.

Safety Labels

Throughout this document the following labels will be displayed to indicate safety issues. Make sure to read the labels carefully to ensure your own personal safety as well as that of equipment and customer services.

CAUTION: POSSIBLE SERVICE INTERRUPTION! This label means there is a possibility of interruptions in service.

WARNING: POSSIBLE EQUIPMENT DAMAGE! This label means there is a possibility of damage to company equipment.

WARNING: ELECTROSTATIC DISCHARGE! This label means there is a possibility of damage to company equipment by electrostatic discharge (ESD).

DANGER: POSSIBLE PERSONAL INJURY! This label means there is a possibility of personal bodily injury.

Software Steps and Procedures

- Text you are required to type or enter will appear in the document as follows:

  <ENTER>, ***Name***, ***<Tab>***, ***programs\seven\aa1***

- Text displayed on a computer screen will appear as follows:

  "From the *HyperTerminal* window, select *File/ Properties*, then select the *Settings* tab."

1. BitStorm 1900 IP DSLAM

Introduction

The BitStorm 1900 utilizes patented EtherLoop™ Intelligent Ethernet technology to provide a robust platform that supports lifeline Plain Old Telephone Service (POTS) in addition to a variety of new revenue-generating services ranging from simple high-speed Internet access to advanced quality video conferencing, multi-stream Video On Demand (VOD), IP multicast video, and toll-quality Voice over IP (VolP).

The BitStorm 1900 functions as an Internet Protocol Digital Subscriber Line Access Multiplexer (IP DSLAM) that directs IP data traffic flow between StormPort™ CPE modems and a data network. The BitStorm 1900 is the backbone component of an EtherLoop, Intelligent Ethernet™-on-the-Loop, system. Supporting StormPort CPE modems in voice/data or data-only applications, the multiplexer is located in the communications room or telco.

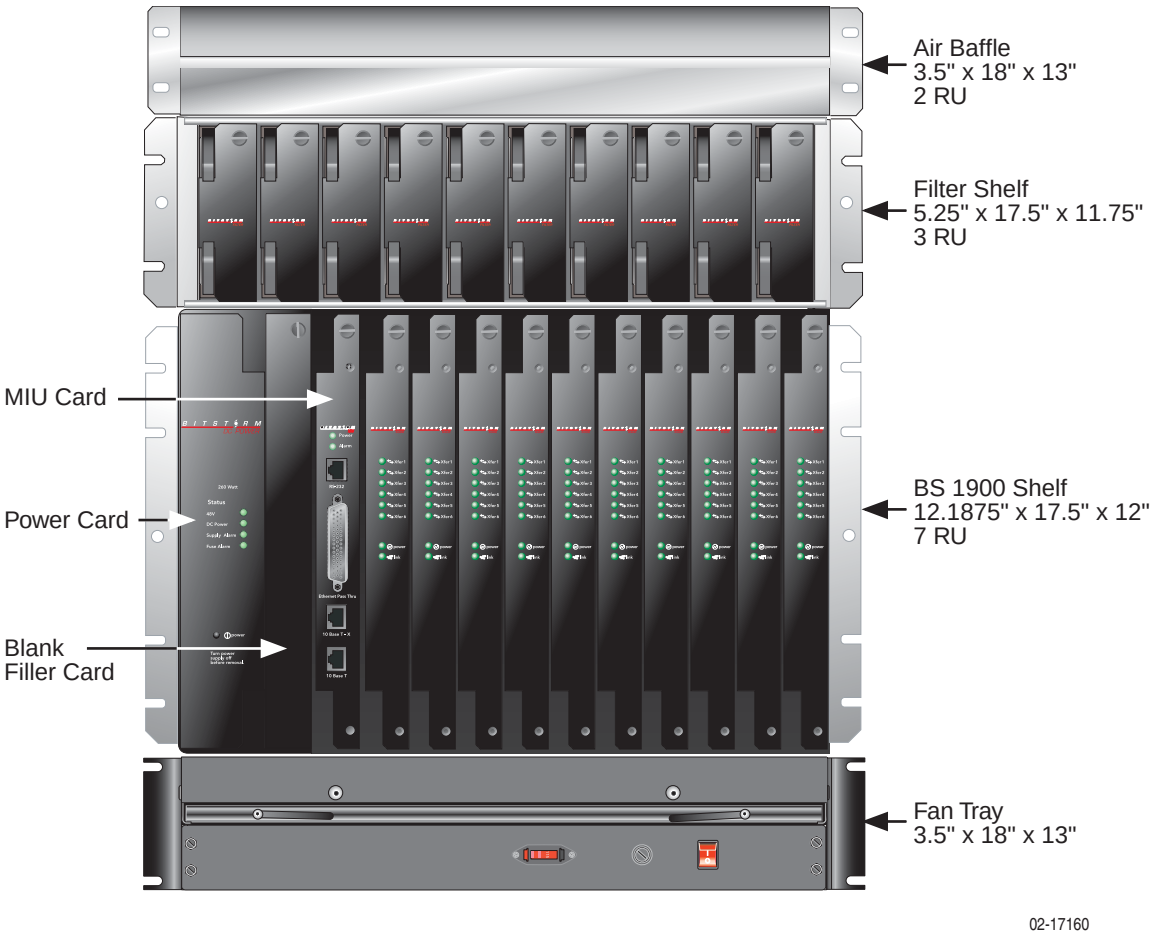
Product Overview

The BitStorm 1900 System Components

The basic BitStorm 1900 System includes the BS1900 Shelf (with circuit packs), Air Baffle, Filter Shelf (s), and a Fan Tray. Depending on the application, multiple components may be installed and/or omitted in each rack.

Figure 1-1,"BitStorm 1900 Shelf with Cards and Components," on page 2 shows the BitStorm 1900 shelf with the modem cards and basic components installed.

Figure 1-1: BitStorm 1900 Shelf with Cards and Components



BitStorm 1900 Shelf

The BitStorm 1900 Shelf supports 60 to 240 EtherLoop lines. Each BS1900 Shelf contains 13 card slots housing the following circuit packs:

- Ten (10) BitStorm Multiplexer Modem Cards
- Management Interface Unit (MIU)
- Power Card
- Blank Filler Card*

  * The blank filler card is used to keep the air flowing properly through the unit.

The BitStorm 1900 shelf and components are installed in a standard 19” rack and can be installed in 23” racks using optional 23” mounting ears. Up to five (5) BS1900 Systems can be installed into one rack depending on the application and the associated required components. Refer to *"Appendix B. Cabling Specifications," on page 115* for typical rack configurations.

Depending on the application/configuration, the following components are installed in the rack with the BitStorm 1900 Shelf to comprise the system:

Air Baffle

The Air Baffle, installed above the Filter Shelf (or the BitStorm 1900 Shelf), is used to deflect the exhaust air flow out the rear of the rack. When more than one BS1900 system is installed in a rack, the Air Baffle prevents the heated exhaust air of one BS1900 system from being drawn into the shelf of the BS1900 system installed above.

Fan Tray

The Fan Tray provides forced-air cooling throughout the BS1900 system. A Fan Tray is installed under each BS1900 Shelf and contains six forced-air cooling fans to ensure sufficient cooling for the entire system. The -48 V DC Fan Tray is ideal for the CO (Central Office) and the 110/220 V AC Fan Tray has been uniquely designed for enterprise applications.

Filter Shelf Option

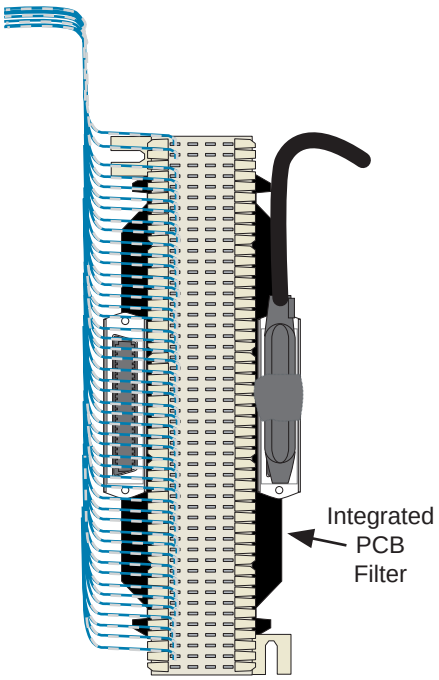
The Filter Shelf contains low-pass filter splitters to separate out-of voiceband signals from the voiceband traffic between the BitStorm modems and the external voice facility equipment. Each Filter Shelf contains up to 10 filter cards. One filter card supports 12 EtherLoop lines installed in the BS1900 shelf. Depending on the application, more than one Filter Shelf can be installed, one on top of another.

The following table provides information on some common configurations and the number of Filter Shelves required for each installation.

Configuration	Number of Filter Shelves
Ten 10224 CO Modem Cards (each 10224 card supports 24 lines)	2 Filter Shelves (one 10224 card requires two filter cards)
Ten 10306 CO Modem Cards (each 10306 card supports 6 lines)	1/2 Filter Shelf or 5 filter cards (two 10306 cards require one filter card)
Each Filter Shelf can filter up to 120 lines and requires 3RU of rack space.	

Filter 66-Block Option

The Filter 66-Block provides the same POTS splitter function as the Filter Shelf; however, it is a space saving and economical alternative to the Filter Shelf. Using the lastest technology from Excelsus Technologies, the Filter 66-Block integrates a 66-Block with a PCB (Printed Circuit Board) Filter, eliminating the need for a Filter Shelf, saving rack space and reducing the number of cables necessary for the installation. Each Filter 66-Block can filter up to 24 lines.



Filter 66-Block

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The following table compares the number of BS1900 systems that can be installed into a standard 7’ rack using the Filter Shelf or Filter 66-Block options:

Configuration	Number of BS1900 Systems Installed in a Rack with Optional Filter Shelf	Number of BS1900 Systems Installed in a Rack with Optional Filter 66-Block
10306 CO Modem Cards	3	4
10224 CO Modem Cards	3	4

The remainder of this chapter covers features of the BitStorm System and the CO modem card and component specifications. For further technical information on the BitStorm 1900 System, refer to *Appendix A* section *"BS1900 System Specifications," on page 108* for detailed information.

CO Modem Cards

One BitStorm 1900 shelf supports up to 10 modem cards. Each CO modem card controls the StormPort CPE modems, directing data traffic flow between the CPE modems and the data network.

WARNING: POSSIBLE EQUIPMENT DAMAGE! To comply with Telcordia GR-1089-CORE, Outside Plant Voltage/Current Limiting Protection is required for each Outside Plant Exposed line.

The following CO modem cards are available:

- **10306 CO modem card** – 6-port dedicated, 10 Mbps
- **10224 CO modem card** – 24-port statistically multiplexed, 10 Mbps

Table 1-1: CO Modem Card LEDs

LED	Color
Power	Green when power is on
Transfer	Green when data transfer is normal (blinks when training to find correct speed)
Link	Green when network is in normal operation (amber while training, or network is down)

Privacy Management

The Privacy Management (a.k.a. MAC Address Filtering) feature ensures the privacy of each user connected to a local layer 2 network. StormTracker EMS or the Site Manager is used to enter the MAC address of a gateway or router to connect to the internet or a local server in the StormPort CPE modem Privacy Management filter table. The Privacy Management ensures that downstream packets are discarded unless they are from one of the MAC addresses in the filter table and upstream packets are discarded unless they are going to one of the MAC addresses in the filter table. Thus, it is impossible for a user connected to one CPE modem to see another user on the same local L2 network connected to another CPE modem, unless the user's

computer's MAC address is entered into the Privacy Management filter table.

NOTE: Creating a filter table on a 10224 CO modem affects all EtherLoop ports on that card and one of its CPEs is redundant, but possible. However, the CO table should be the same or be a superset of the CPE table.

Same Card Broadcast

The Same Card Broadcast feature is an option on CO modems that should be used in conjunction with Privacy Management to provide secure communications (default is Disabled):

Refer to *Table 1-2, "Same Card Broadcast Feature Enabled/Disabled Function for CO Modems,"* for the feature function and security issues associated with each setting.

Table 1-2: Same Card Broadcast Feature Enabled/Disabled Function for CO Modems

CO Modem	Enabled/ Disabled	Feature Function	Security
10306	Enabled (Default)	Allows clients on circuits 1, 2, 3 or circuits 4, 5, 6 to communicate with each other without going out into the network first.	N/A
	Disabled	Blocks clients on the same group-of-three from seeing and communicating with each other, unless the traffic exits the DSLAM and returns from the network.	Clients on other groups-of-three or other cards can see each other unless Privacy Management is used.
10224	Enabled (Default)	Allows clients on circuits 1–12 or circuits 13–24 to communicate with each other without going out into the network first.	N/A
	Disabled	Blocks clients on the same group-of-12 from seeing and communicating with each other, unless the traffic exits the DSLAM and returns from the network.	Clients on other groups-of-12 or other cards can see each other unless Privacy Management is used.

The Same Card Broadcast feature is selected from StormTracker Site Manager and the modems are recognized as having the feature enabled or disabled.

Spectrum Manager ADSL Protect

The Spectrum Manager software makes EtherLoop spectrally compatible with asymmetrical services such as ADSL and G.Lite, detecting and protecting against interference within the same binder. In addition, EtherLoop in its native state is spectrally compatible with symmetrical digital services such as T1, HDSL, HDSL2, or SDSL.

Spectrum Manager operates under five modes of operation:

Mode	Description
Native	EtherLoop operates without the analysis of other service activity in the individual loops.
Monitor	Spectrum Manager analyzes other services in the loop that may limit EtherLoop performance.
Forced	EtherLoop provides optimum spectrally compatible performance with asymmetric services in the individual loop that may temporarily affect EtherLoop's upstream capability. In this mode, EtherLoop is forced to "mimic" asymmetric DSL.
Auto-Protect	EtherLoop operates in an Asymmetric Mode if asymmetric interferers are present. EtherLoop returns to normal upstream operations once the interference is gone.
Video Protect	EtherLoop operates in a forced Asymmetric Mode with guaranteed high downstream bandwidth for the delivery of streaming video applications.

Spectrum Manager-Video Protect

The Spectrum Manager-Video Protect activates the EtherLoop asymmetrical operation with all upstream traffic limited to a training speed of 25 (3 Mbps) on the BitStorm 10306 CO modems. Downstream traffic continues to run as fast as the loop conditions allow. When this feature is enabled, all nearby EtherLoop lines running high-speed video downstreams are protected. All CO modems at a site are required to have the feature enabled by StormTracker Site Manager or EMS via the MIU SNMP agent.

Passes VLAN Tagged Frames

The BitStorm 1900 is capable of passing 802.1Q tagged Ethernet frames of 1522 bytes. To implement a VLAN solution, a 802.1Q tagging switch must exist upstream. Also, an 802.1Q tagging switch or device must be present on the customer end of the CPE modem.

WAN Interface Cards

The BitStorm 1900 supports the following WAN interface:

- **MIU (Management Interface Card) –** supports 10306 and 10224 modem cards

MIU SNMP Functionality

The MIU provides remote monitoring and configuration functionality via SNMP (Simple Network Management Protocol). Through the SNMP agent, users can remotely manage and configure modem settings and monitor the performance statistics of all modems in the BitStorm 1900 system.

The MIU SNMP agent supports the SNMPv1/RFC 1157 protocol and supports RFC 1213 MIB II interface groups and the RFC 1493 Bridge MIB. The MIU SNMP agent also includes an EtherLoop private MIB. In order to manage the SNMP agent, the user must load our private MIB into the user's SNMP Network Manager using the procedure accompanying the specific Network Management Software (i.e., HP Openview, etc.).

A list of all supported MIBs and the private MIB can be found in document *1900-A2-GK40, BitStorm 1900 IP DSLAM Supported SNMP MIBs*. This document and private MIBs can be downloaded from the Paradyne website at **www.paradyne.com**.

Mixing CO Modem Cards

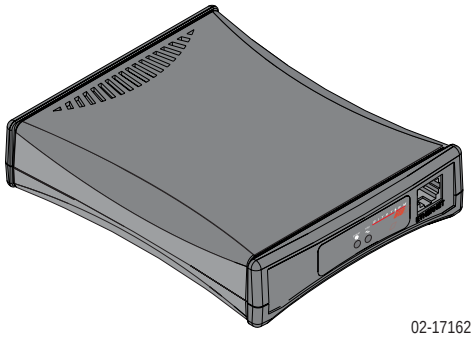
It is possible to fill a BitStorm 1900 shelf with different modem cards (i.e., five 10306 CO modem cards, and five 10224 CO modem cards).

For the 10306 CO modem cards, Spectrum Manager includes a Video Protect mode that protects EtherLoop heavy downstream traffic from disrupting upstream traffic on adjacent EtherLoop lines.

NOTE: The BitStorm 1900 CO modem card ports are provisioned in the CO & CPE Add/Search functions of the Database module in the StormTracker Site Manager application. The modem database is auto-provisioned, identifying the physical shelf slot location of each modem.

StormPort CPE Modems

The BitStorm 1900 system supports the StormPort 610, 620, and 1020 CPE (customer-premises equipment) modems.



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NOTE: The StormPort 1020 CPE modem works at full 10 Mbps capacity with the 10306 or 10224 CO modems.

10 Mbps CO Modem Card Specifications

10306 CO Modem Card

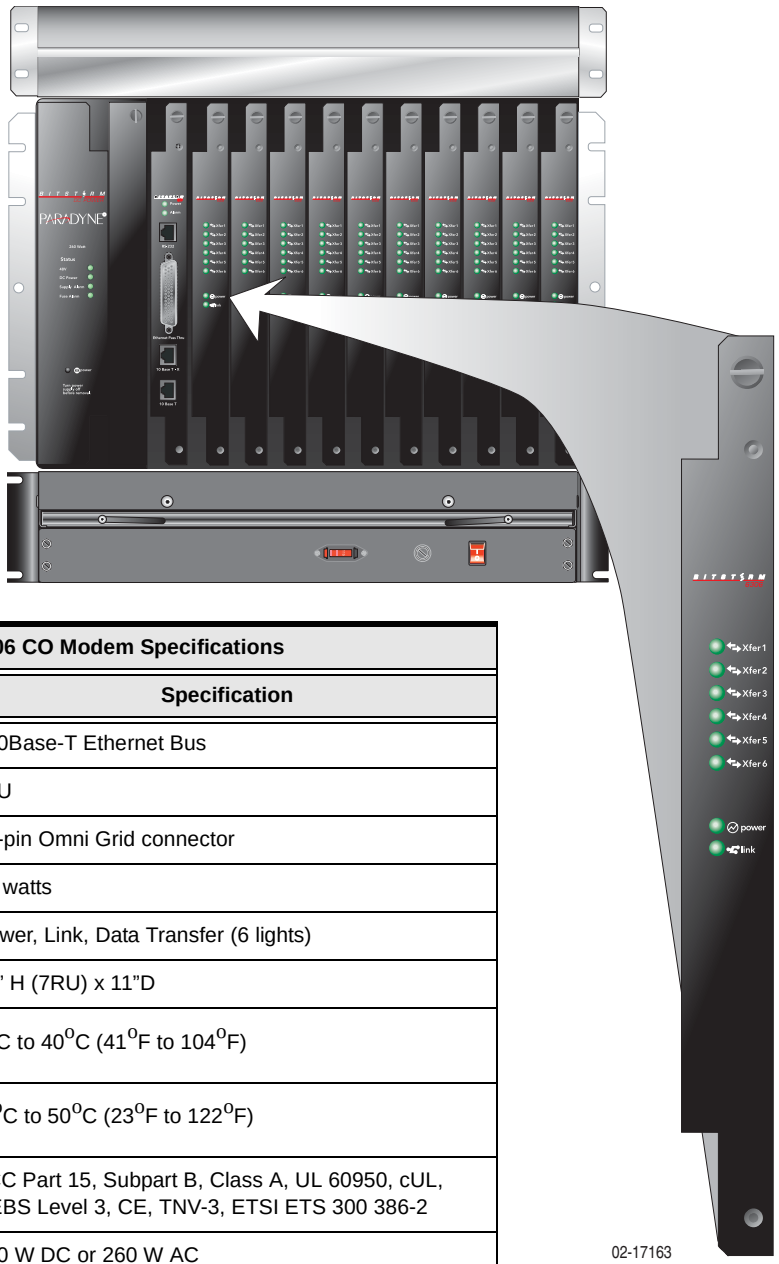
The 10306 CO modem card provides six EtherLoop lines, each with its own dedicated 10 Mbps modem.

WARNING: POSSIBLE EQUIPMENT DAMAGE! To comply with Telcordia GR-1089-CORE, Outside Plant Voltage/Current Limiting Protection is required for each Outside Plant Exposed line.

Special Features

- Same Card Broadcast
- Spectrum Manager – ADSL Protect
- Spectrum Manager – Video Protect
- Privacy Management
- IP Multicast Operation

Figure 1-2: BitStorm 1900 with 10306 Modem Cards (Part #: 01-00153-01)



10306 CO Modem Specifications	
Description	**Specification**
Shelf Interface	100Base-T Ethernet Bus
WAN Interface	MIU
Line Interface	35-pin Omni Grid connector
Heat Dissipation	22 watts
LEDs	Power, Link, Data Transfer (6 lights)
Card Dimensions	12” H (7RU) x 11”D
Operation Temperature	5^{O}C to 40^{O}C (41^{O}F to 104^{O}F)
Short-term Operating Temperature:	-5^{O}C to 50^{O}C (23^{O}F to 122^{O}F)
Certifications	FCC Part 15, Subpart B, Class A, UL 60950, cUL, NEBS Level 3, CE, TNV-3, ETSI ETS 300 386-2
Power Supply	260 W DC or 260 W AC
Fan Tray	**Mandatory, use -48 V DC with 260 W DC power supply; use 110 V AC with 260 W AC power supply** • An AC fan tray air filter frame must be installed **without** an air filter for AC configurations • A DC fan tray with an air filter installed is required for NEBs compliant DC configurations

Table 1-3: System Power Specifications with 10306 CO Modem

Power	Bit Storm 1900 Configuration	Modem Cards	# Lines	Power (Watts)	Watts Per Line	Watts w/Fan Tray	Max Current
DC	260 W DC power supply	10306*	60	260	4.4	305	6.4
AC	260 W AC power supply	10306*	60	230	3.8	335	3.1

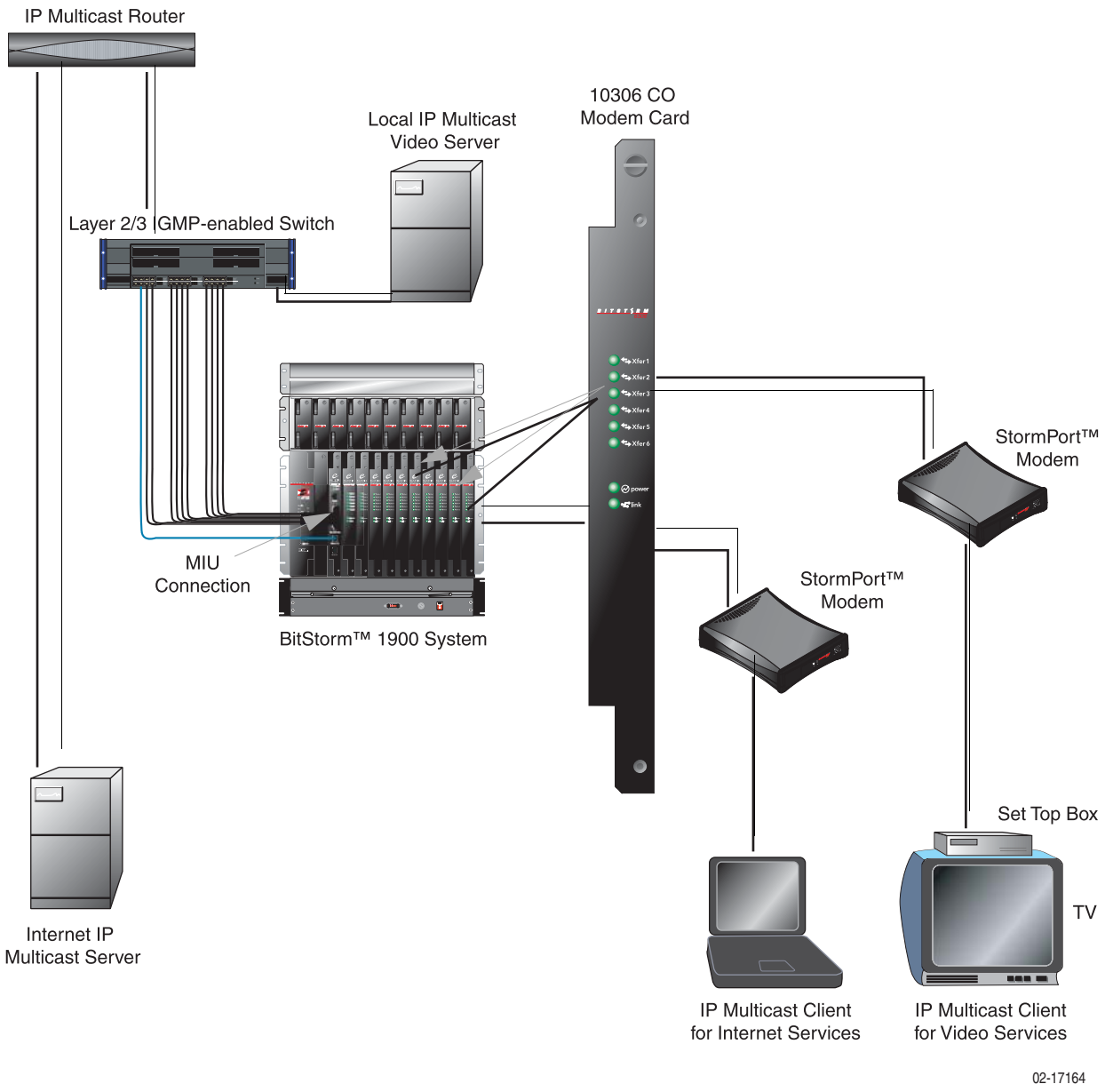
* Configuration assumes 10 modem cards are used.

WARNING: POSSIBLE EQUIPMENT DAMAGE! AC Fan Trays are shipped with an air filter frame. To ensure proper airflow, the frame must be installed. DO NOT install an air filter for the AC Fan Tray, only the frame.

10306 CO Modem IP Multicast Operation

An optional feature of the 10306 CO modem card is the ability to pass IP Multicast traffic only to the subscribing port. The 10306 modem card functions as a multi-layer switch and supports IGMP v1/v2 when connected to the MIU (Management Interface Unit) card via the 100 Base-T Ethernet backplane connection. The 10306 modem creates Port Table data when a client joins a multicast group and forwards the IGMP message upstream through the MIU to an IGMP-enabled Switch. When the IP Multicast data is streamed back to the 10306, it replicates and forwards the IP Multicast streams ONLY to the ports with subscribing clients.

Figure 1-3: 10306 IP Multicast Operation



The 10306 IP Multicast Operation works in the following manner:

1. The client issues an IGMP Join Request (Unsolicited report) Layer 2 broadcast.
2. The 10306 modem listens for any IGMP packets (IGMP snooping) and maintains a table mapping the IP Multicast stream to the port.
3. The 10306 forwards the IGMP Join Request upstream through the MIU to the IGMP-enabled switch.
4. The IGMP-enabled Switch “snoops” for the IGMP messages and builds a mapping of IP Multicast streams to its Ethernet port interfaces.
5. The Switch forwards the IGMP report on behalf of the IP Multicast client to the upstream Multicast Router.
6. The Multicast Router utilizes a multicast routing protocol (such as MOSPF, DVMRP, etc.) to route available multicast streams.
7. Once the IP Multicast stream is received at the IGMP-enabled Switch, it replicates and forwards the packets on all ports with active members of that IP Multicast group.
8. The 10306 replicates and forwards IP Multicast streams ONLY to the ports with subscribing clients.
9. When the member clients issues an IGMP Leave, the 10306 receives that message, forwards it to the upstream IGMP-enabled Switch, and then generates a series of “quick query” packets on the downstream port (default response time of 100 milliseconds, repeated 3 times.) This query will allow the 10306 modem to determine if there are any remaining client members of the IP Multicast group being left on that port, such as a second set-top box. If no IGMP Group Membership response is received, the 10306 modem will update the IP Multicast bridge table and no longer forward that IP Multicast stream to that port.
10. The query response time value and number of quick queries sent are provisionable parameters, and can be adjusted to better interoperate with a variety of client devices, such as IP television set-top boxes. Refer to the *StormTracker-Site Manager and Administration User Guide* for more information.
11. The 10306 modem relies on an upstream IGMP enabled router or switch to send Group Membership query messages.

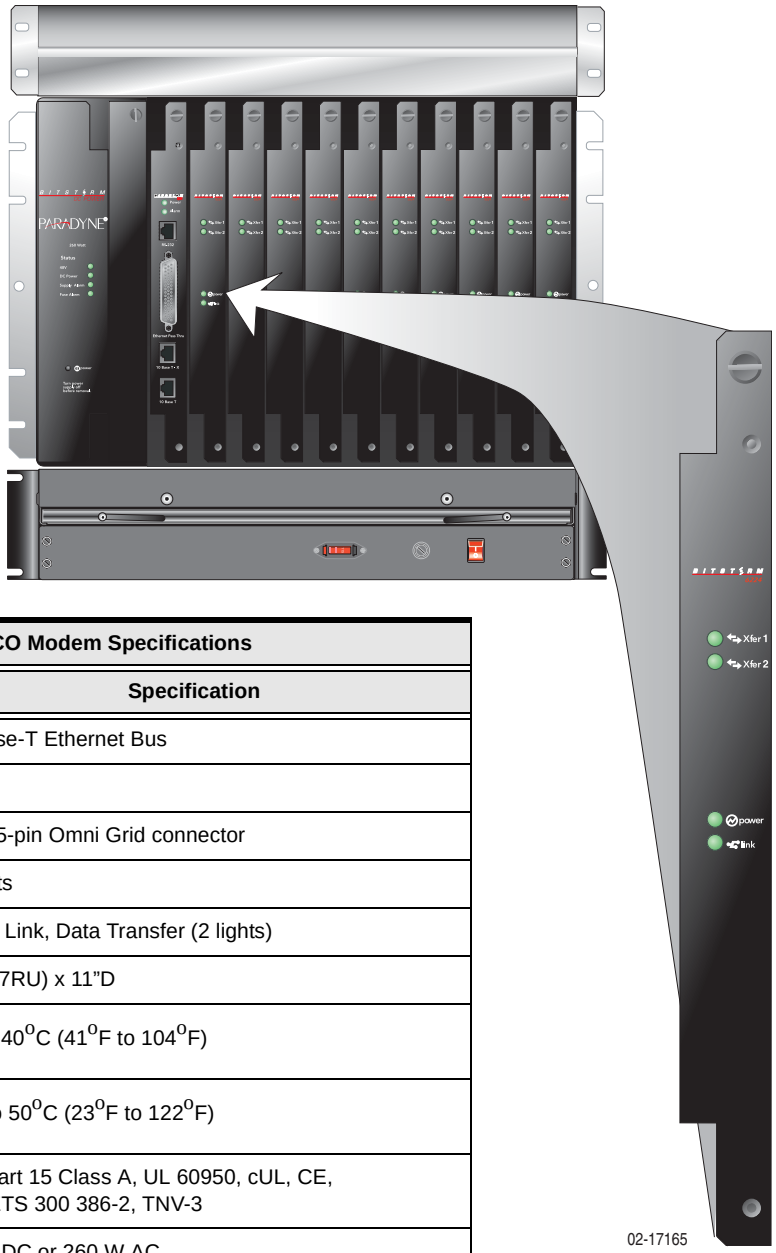
10224 CO Modem Card

The 10224 CO modem card provides 24 statistically multiplexed EtherLoop lines; 12 per single 10 Mbps modem.

NOTE: The 10224 is recommended for use on loops up to 6000' long.

WARNING: POSSIBLE EQUIPMENT DAMAGE! To comply with Telcordia GR-1089-CORE, Outside Plant Voltage/Current Limiting Protection is required for each Outside Plant Exposed line.

Figure 1-4: BitStorm 1900 with 10224 Modem Cards (Part #: 01-00164-01)



10224 CO Modem Specifications	
Description	**Specification**
Shelf Interface	100Base-T Ethernet Bus
WAN Interface	MIU
Line Interface	Dual 35-pin Omni Grid connector
Heat Dissipation	12 watts
LEDs	Power, Link, Data Transfer (2 lights)
Card Dimensions	12” H (7RU) x 11”D
Operation Temperature	5^{o}C to 40^{o}C (41^{o}F to 104^{o}F)
Short-term Operating Temperature:	-5^{o}C to 50^{o}C (23^{o}F to 122^{o}F)
Certifications	FCC Part 15 Class A, UL 60950, cUL, CE, ETSI ETS 300 386-2, TNV-3
Power Supply	260 W DC or 260 W AC
Fan Tray	**Mandatory**, use -48 V DC with 260 W DC power supply; use 110 V AC with 260 W AC power supply • An AC fan tray air filter frame must be installed **without** an air filter for AC configurations • A DC fan tray with an air filter installed is required for DC configurations

Table 1-4: System Power Specifications with 10224 CO Modem

Power	Bit Storm 1900 Configuration	Modem Cards	# Lines	Power (Watts)	Watts Per Line	Watts w/Fan Tray	Max Current
DC	260 W DC power supply	10224*	240	160	0.7	205	4.3
AC	260 W AC power supply	10224*	240	150	0.6	255	2.3

* Configuration assumes 10 modems cards are used.

WAN Interface Card Specifications

The BitStorm 1900 system supports the MIU (Management Interface Unit) WAN interface.

MIU (Management Interface Unit)

The MIU is the recommended WAN interface for the BitStorm 1900. Seated next to the modem cards, the MIU processes Ethernet traffic and manages modems. The MIU provides powerful management capabilities including SNMP and the flexiblity of mixing and matching modem cards for varied configurations.

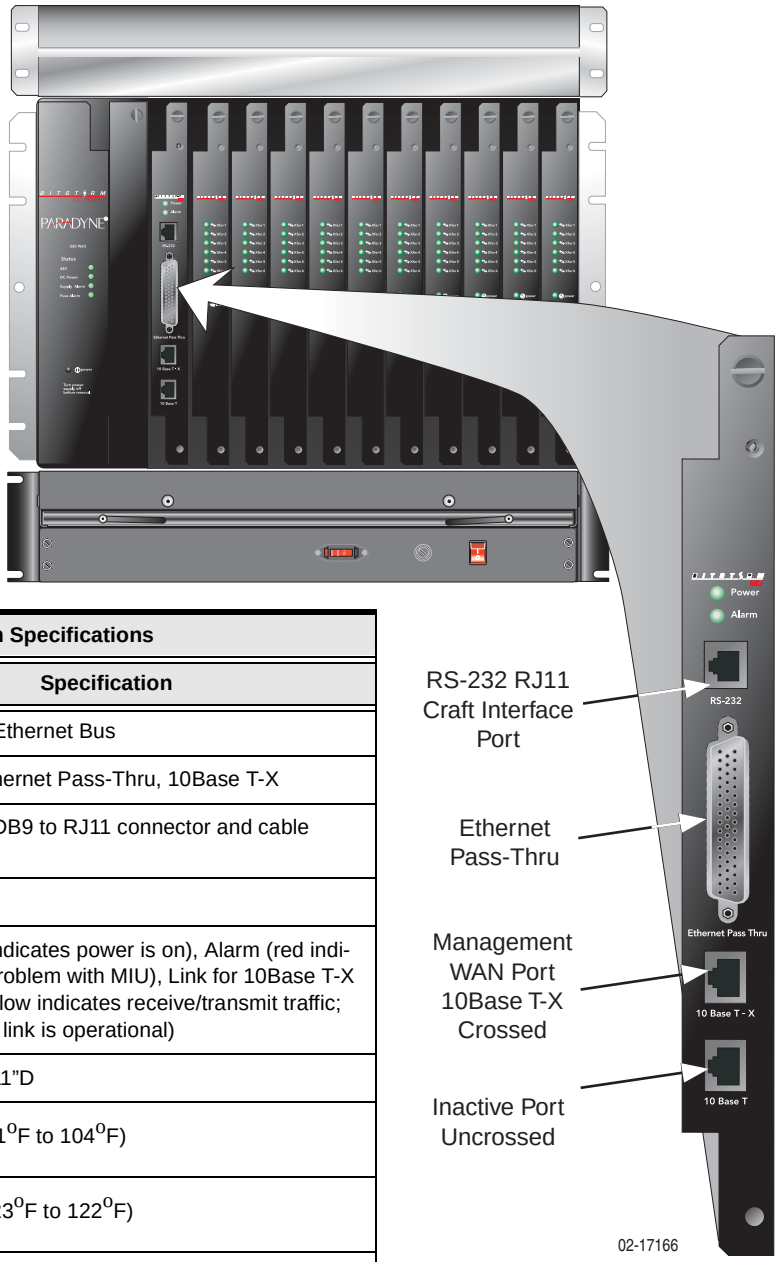
The primary functions of the MIU are Ethernet Pass-Thru and Modem Management/Auto-Discovery/Auto-Provisioning. When initialized, the MIU automatically discovers and auto-provisions modems, on its shelf, by writing a Shelf ID for each modem card in the shelf via an out-of-band I²C configuration channel. Thereafter, the assigned modems will only respond to commands from the associated MIU via the in-band Ethernet connection.

Modem parameters can also be set in the *Add/Search* modem links of the *Database* module in Site Manager.

The MIU communicates with the Site Manager or EMS, via TCP/IP, which extends the flexibility of remote equipment location(s) and network management. Each MIU requires only one IP address (the MIU IP address) to manage all modems within a shelf. The MIU uses the Modex Daemon protocol to communicate directly with EtherLoop CO and CPE modems.

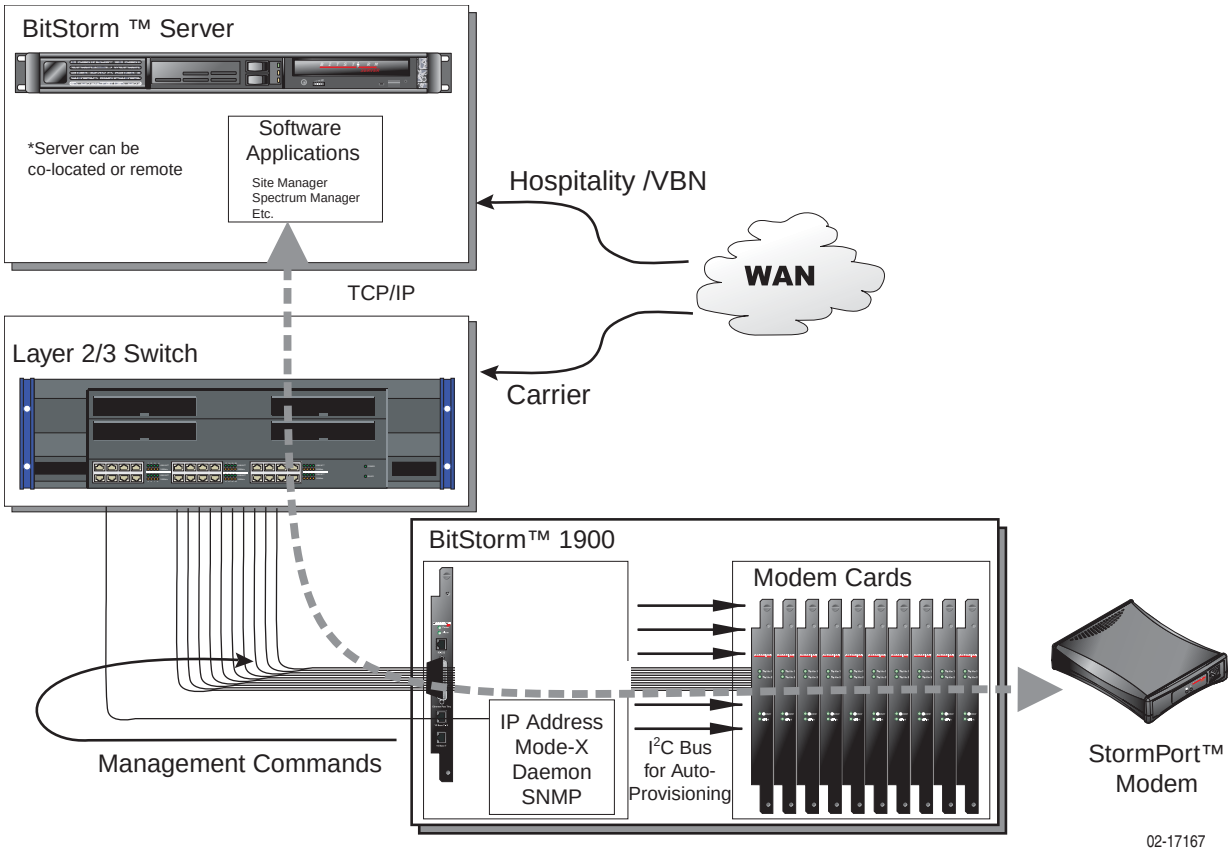
An SNMP agent has been incorporated into the MIU which allows SNMP PC programs such as the StormTracker EMS 2.x or Castle Rock's SNMPc to manage the MIU and EtherLoop modems. The SNMP MIBs, including MIB II RFC 1213 and the EtherLoop MIB, are listed in document *1900-A2-GK40, BitStorm 1900 IP DSLAM Supported SNMP MIBs.* MIBs are available from the Paradyne website at **www.paradyne.com**.

Figure 1-5: BitStorm 1900 with MIU (Part #: 01-00075-01) and 10306 CO Modems



MIU CO Modem Specifications	
Description	**Specification**
Shelf Interface	10/100Base-T Ethernet Bus
WAN Interface	50 Pin AMP Ethernet Pass-Thru, 10Base T-X
Craft Interface	RS-232 RJ11 (DB9 to RJ11 connector and cable included)
Heat Dissipation	4 watts
LEDs	Power (green indicates power is on), Alarm (red indicates internal problem with MIU), Link for 10Base T-X (two lights – yellow indicates receive/transmit traffic; green indicates link is operational)
Card Dimensions	12” H (7RU) x 11”D
Operation Temperature	5^{o}C to 40^{o}C (41^{o}F to 104^{o}F)
Short-term Operating Temperature	-5^{o}C to 50^{o}C (23^{o}F to 122^{o}F)
Certifications	FCC Part 15, Subpart B, Class A, UL 60950, cUL, CE, NEBs Level 3, ETSI ETS 300 386-2
Power Supply	260W AC or DC
Fan Tray	**Mandatory**, use -48 V DC with 260 W DC power supply; use 110 V AC with 260 W AC power supply
Cables	“Decapus” Pass-Thru Cable w/10 RJ-45 (included)

Figure 1-6: MIU Data Connection



Power Card Specifications

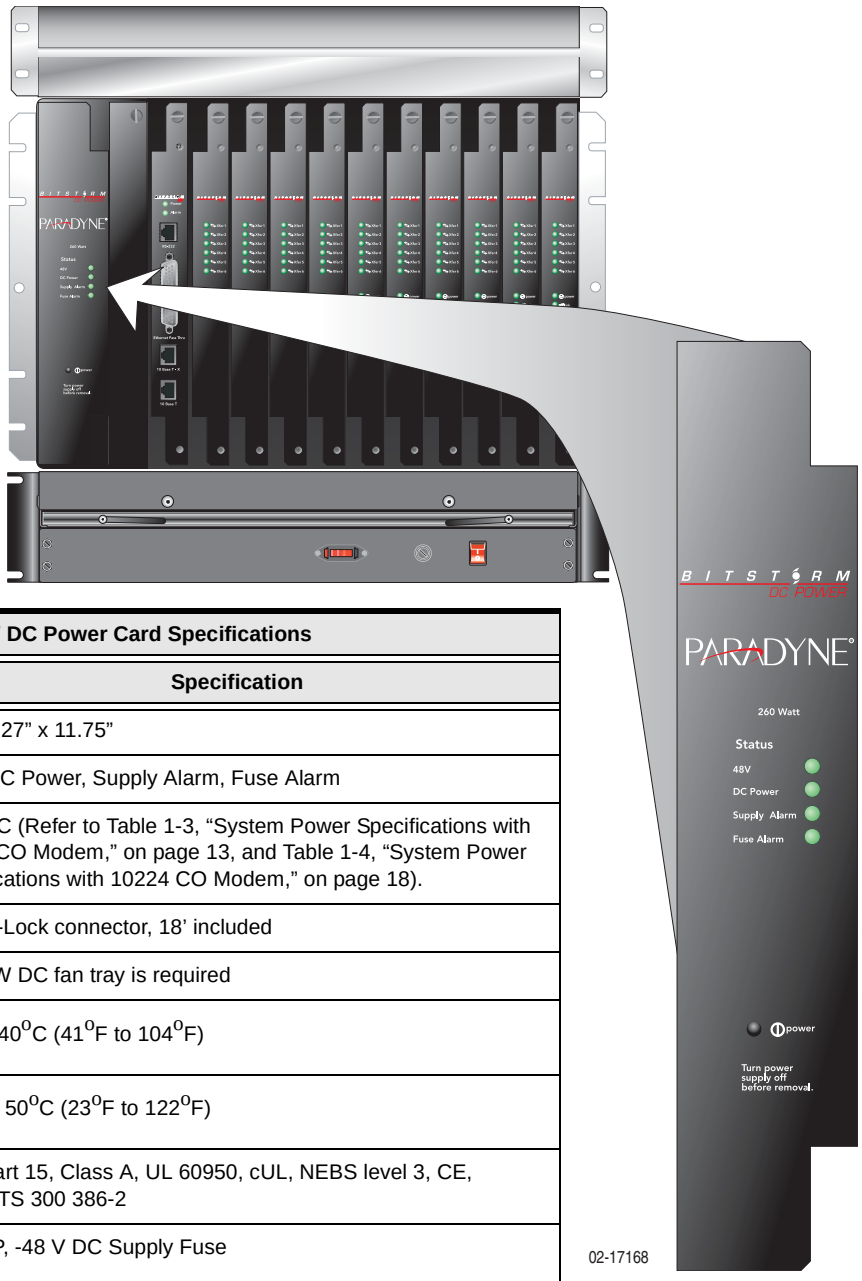
The power cards convert the power feeds to the +12, +5, +3.3, -5 and +2.5 V DC power levels used by the BitStorm 1900 components.

260 W DC

The 260 W DC power card converts the -48 V DC power feed to the power levels used by the 10306 and 10224 CO modem cards.

Application: The 260 W DC power card is required for the 10306 and 10224 CO modem cards and MIU.

Figure 1-7: 260 W DC Power Card (Part #: 01-00080-01)



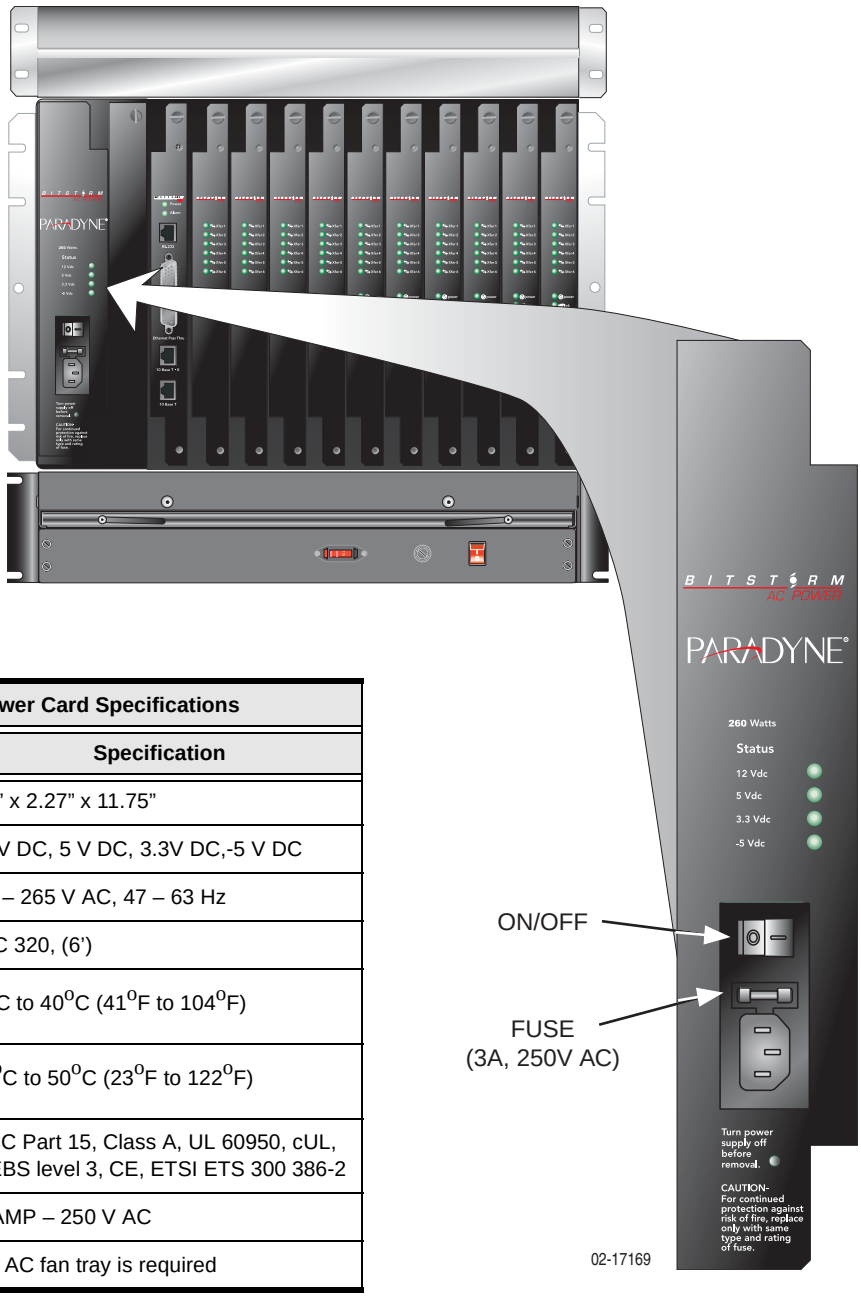
260 W DC Power Card Specifications	
Description	**Specification**
Card Dimensions	12” x 2.27” x 11.75”
LEDs	-48V, DC Power, Supply Alarm, Fuse Alarm
Input	-48V DC (Refer to Table 1-3, “System Power Specifications with 10306 CO Modem,” on page 13, and Table 1-4, “System Power Specifications with 10224 CO Modem,” on page 18).
Cord	Mate-n-Lock connector, 18’ included
Fan Tray	A 260 W DC fan tray is required
Operating Temperature	5^{O}C to 40^{O}C (41^{O}F to 104^{O}F)
Short-term Operating Temperature	-5^{O}C to 50^{O}C (23^{O}F to 122^{O}F)
Certifications	FCC Part 15, Class A, UL 60950, cUL, NEBS level 3, CE, ETSI ETS 300 386-2
-48 V DC Supply Fuse	10 AMP, -48 V DC Supply Fuse

260 W AC

The 260 W AC power card converts the 110/220 V AC power feed to the power levels used by the 10603 and 10224 CO modem cards and the MIU.

Application: Required with 10306 and 10224 CO modem cards with AC power supply.

Figure 1-8: 260 W AC Power Card (Part #: 01-00079-01)



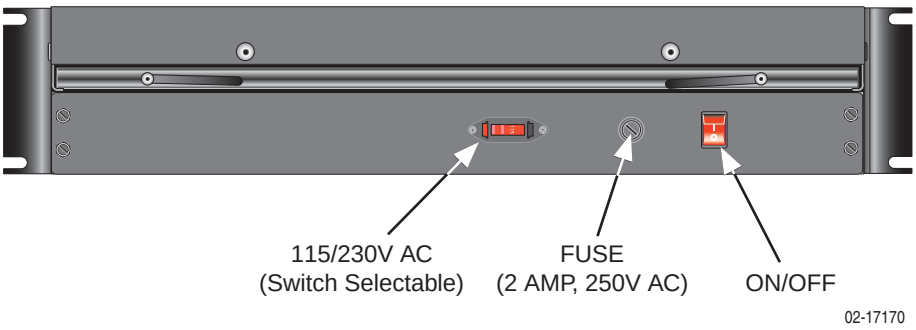
260 W AC Power Card Specifications	
Description	**Specification**
Card Dimensions	12” x 2.27” x 11.75”
LEDs	12V DC, 5 V DC, 3.3V DC,-5 V DC
Input	85 – 265 V AC, 47 – 63 Hz
Cord	IEC 320, (6’)
Operating Temperature	5^{O}C to 40^{O}C (41^{O}F to 104^{O}F)
Short-term Operating Temperature	-5^{O}C to 50^{O}C (23^{O}F to 122^{O}F)
Certifications	FCC Part 15, Class A, UL 60950, cUL, NEBS level 3, CE, ETSI ETS 300 386-2
AC Supply Fuse	3 AMP – 250 V AC
Fan Tray	An AC fan tray is required

Fan Tray Specifications

The -48V DC fan tray and the 110/220V AC (switch selectable) fan tray are used with the BitStorm 1900 in EtherLoop applications to provide forced-air cooling in each chassis. A fan tray is *required* under each chassis that houses one or more 10306 or 10224 CO modem cards.

Fan Tray 110/220 V AC

Figure 1-9: Fan Tray 110/220 V AC (Part #: 01-00084-02)



Fan Tray 110/220 V AC Specifications	
Operating Temperature	0^{o}C to 40^{o}C (0^{o}F to 104^{o}F)
Storage Temperature	-40^{o}C to 70^{o}C (-40^{o}F to 158^{o}F)
Certifications	UL 60950, cUL, CE
Power Consumption	105 W
Dimensions	3.5” x 18” x 13”
Filter (See Warning below)	For proper air flow, install the air filter frame only. **DO NOT** install an air filter with the frame.
Cord	IEC 320, 6’
AC Supply Fuse	2 AMP, 250 V AC

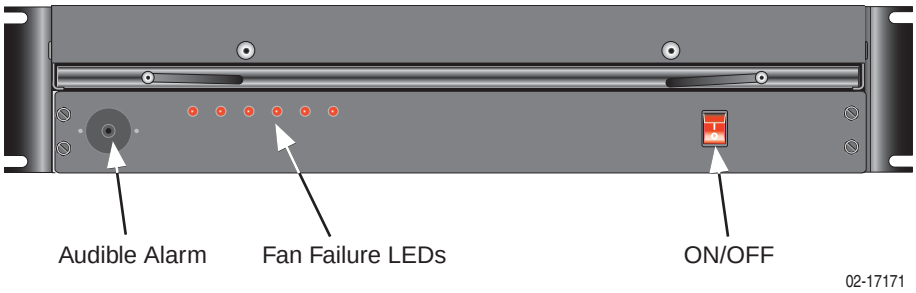
WARNING: POSSIBLE EQUIPMENT DAMAGE! AC Fan Trays are shipped with an air filter frame. To ensure proper airflow, the frame must be installed. DO NOT install an air filter for the AC Fan Tray, only the frame.

Table 1-5: Power Specifications for the AC Fan Tray

Power	Bit Storm 1900 Configuration	Modem Cards	# Lines	Power (Watts)	Watts per line	Watts w/fan tray	Max current
AC	AC Fan Tray	n/a	n/a	105	n/a	n/a	.9

Fan Tray -48 V DC

Figure 1-10: Fan Tray -48 V DC (Part #: 01-00084-01)



Fan Tray -48 V DC Specifications	
Operating Temperature	0^{o}C to 40^{o}C (0^{o}F to 104^{o}F)
Storage Temperature	-40^{o}C to 70^{o}C (-40^{o}F to 158^{o}F)
Certifications	UL 60950, cUL, NEBS Level 3 CE
Power Consumption	45W
Dimensions	3.5” x 18” x 13”
NEBS Air Filter	Change every 6 months
Cord	14-gauge stranded cable (not included)
-48 V DC Supply Fuse	2 AMP, -48 V DC Supply Fuse

Table 1-6: Power Specifications for the DC Fan Tray

Power	Bit Storm 1900 Configuration	Modem Cards	# Lines	Power (Watts)	Watts per line	Watts w/fan tray	Max current
DC	DC Fan Tray	n/a	n/a	45	n/a	n/a	.9

Low-Pass Filter Specifications

Filter Shelf

Low-Pass filters are used with the BitStorm 1900 in EtherLoop applications where voice service is required. The low-pass filter cards separate out-of-voiceband signals from the voiceband traffic between the BitStorm modems and the external voice facility equipment. The Low-Pass Filter Shelf contains one filter card for every two 10306 modem cards, or two filter cards for every 10224 modem card.

The filter shelf connects to the distribution frame, designed to minimize signal interference and facilitate broadband connectivity by isolating Digital Service Units (DSUs) from the Private Branch Exchange (PBX). Refer to *Figure 1-11 on page 30* for Filter Shelf Specifications.

Filter 66-Block

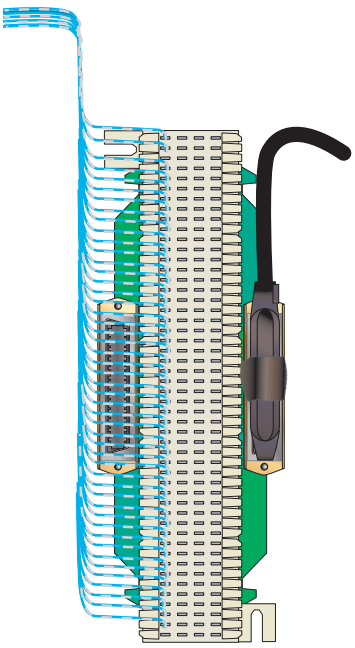
The Filter 66-Block provides the same function as the filter shelf, however, it is a space saving and economical alternative to the filter shelf for large enterprise installations. Refer to *Figure 1-11 on page 30* for Filter 66-Block Specifications.

Figure 1-11: Filter Shelf (Filter Shelf Part #: 01-20029-01, Filter Card Part #: 01-20029-01, and Filter 66-Block Part #: 05-00021-01)

Front Panel

*Back Panel

02-17172



Filter
66-Block

Filter Shelf Specifications	
Shelf Dimensions	5.25” x 17.5” x 11.75”
Card Dimensions	4.75” x 1.5” x 11.25”
Third-Order Low-Pass Filters	insertions loss < .5 dB to 12 kHz 60 kHz stop-band loss>30 dB 100 Ohm return loss> 20 dB to 12 kHz
Certifications	UL 60950, cUL, NEBs Level 3, CE, ETSI ETS 300 386-2
Connectors	10 Omni-Grid Connectors
Cables	Refer to *Appendix B: Cabling Specifications.*

Filter 66-Block Specifications*	
Dimensions	10” x 4.5” x 2.75”
Connectors	Amp Champ

* For more detailed specifications on the Filter 66-Block, refer to the *Excelsus Technologies Spec Sheet* located on their website at **excesus-tech.com**.

BitStorm 1900 Component Requirements

Table 1-7, "BitStorm 1900 Component Requirements," provides the basic requirements for each component within the shelf.

Table 1-7: BitStorm 1900 Component Requirements

Part Number	Shelf Components	10306 CO Modem Card	10224 CO Modem Card	Special Instructions
01-00080-01	260 W DC power	Yes	Yes	Must use fan tray* *Air filter is required for NEBs compliance
01-00079-01	260 W AC power	Yes	Yes	Must use fan tray without an air filter
01-00075-01	MIU	Yes	Yes	
01-00084-01	Fan Tray, DC	Yes	Yes	
01-00084-02	Fan Tray, AC	Yes	Yes	

WARNING: POSSIBLE EQUIPMENT DAMAGE! To comply with Telcordia GR-1089-CORE, Outside Plant Voltage/Current Limiting Protection is required for each Outside Plant Exposed line.

WARNING: POSSIBLE EQUIPMENT DAMAGE! AC Fan Trays are shipped with an air filter frame. To ensure proper airflow, the frame must be installed. DO NOT install an air filter for the AC Fan Tray, only the frame.

2. BitStorm 1900 Installation and Testing

The BitStorm 1900 provides EtherLoop CO modems, which communicate with the remote StormPort CPE modems installed at the customer premises. Installing the BitStorm 1900 consists of the following:

- Installing the BitStorm shelf and accessories into an equipment rack
- Connecting the BitStorm 1900 to the telephone line
- Installing the StormPort CPE modems
- Connecting the Ethernet data network

NOTE: In voice/data applications, the BitStorm 1900 shelf installation includes an auxiliary voiceband Filter Shelf or Filter 66-Block.

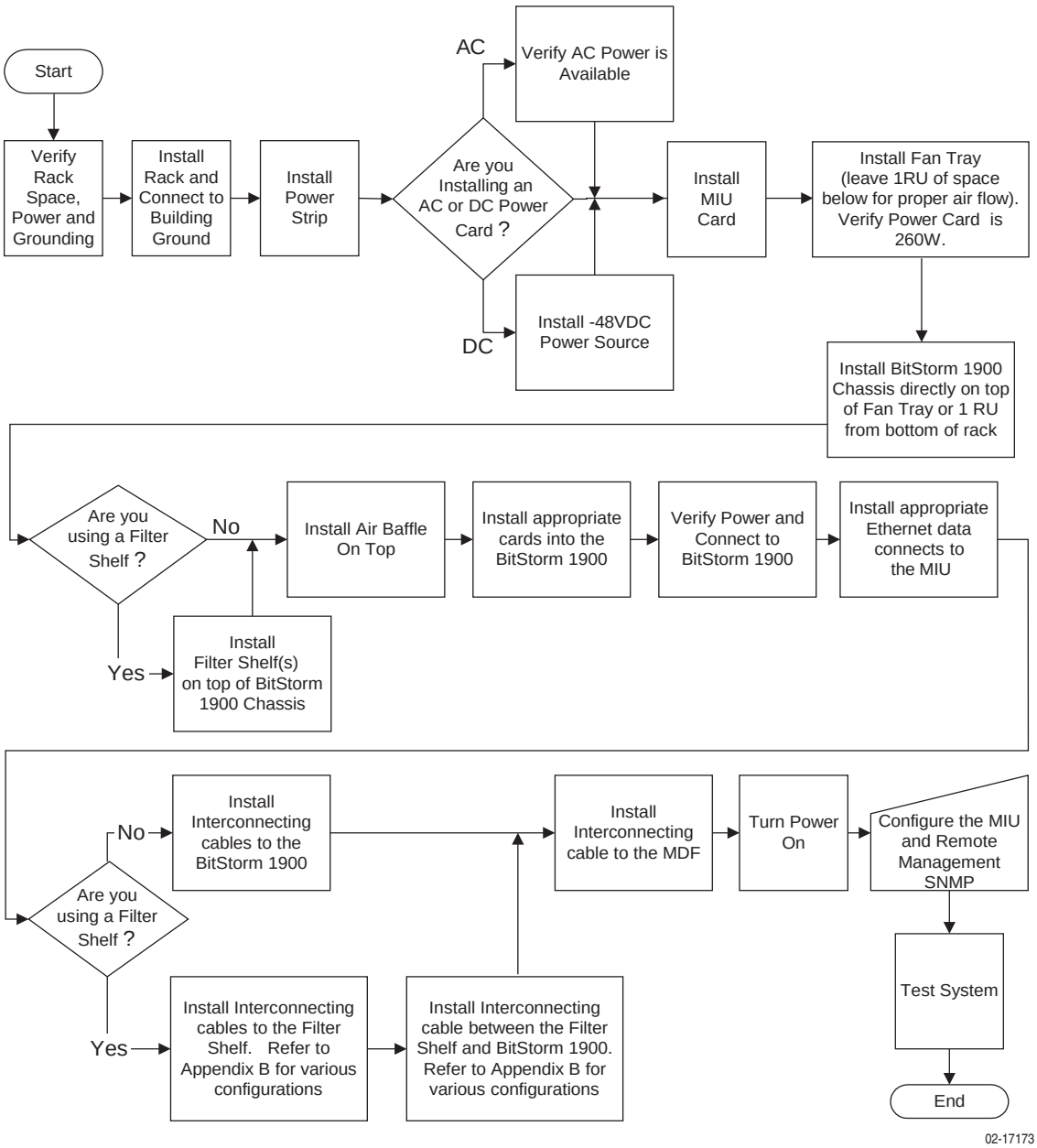
This chapter contains the procedures for installing and testing the mid-mount and flush-mount components of the BitStorm 1900.

WARNING: POSSIBLE EQUIPMENT DAMAGE! To comply with Telcordia GR-1089-CORE, Outside Plant Voltage/Current Limiting Protection is required for each Outside Plant Exposed line.

Installation Flowchart

Figure 2-1, "BitStorm 1900 Installation Flowchart." provides a visual flowchart of the BitStorm 1900 installation process as a reference tool.

Figure 2-1: BitStorm 1900 Installation Flowchart



Installation Task List

The following is a complete list of all tasks to perform. To install the BitStorm 1900 complete each task in the order given.

Installing the BitStorm 1900

The following tasks and procedures have been provided to properly install the BitStorm 1900 components. The installation is organized into numbered tasks with each task containing all of the procedural steps for completion. Complete each task in the order given and complete each step for a task procedure in the order given before continuing on to the next task.

Task 001: Pre-Installation Checklist

Before installing the BitStorm 1900 system, verify that the following steps have been completed:

Step Procedure

1.) Perform site survey and verify equipment bays are installed correctly.

2.) Verify that the amount of rack space is adequate for the required installed application.

3.) Verify the racks are secured and electrically grounded according to standard industry practice. Refer to *"Appendix A. Installation Requirements," on page 107* for specifications.

4.) Verify you have all necessary tools, equipment, and materials for the installation. Use the following table as a guide

Table 2-8: Installation Tools, Equipment, and Materials

Tools, Equipment, and Materials
Installation hardware kit supplied with shelf
Phillips-head screwdriver (#1 or #2)
Anti-static protection such as a grounded wrist strap
Volt-ohm meter
PC with serial port to configure MIU
Cross-connect punch-down tool
14-gauge stranded cable
Cable ties
5 BitStorm 1900 cable harnesses
5 intermediate cables
Cross-connect block(s) of the same type used in the existing main distribution frame (MDF)
24 AWG Jumper Wires (24 wires per modem card)

Step Procedure (continued)

5.) Verify all necessary BS 1900 system components, hardware, circuit packs, and cables are at the installation site and that they are in good condition. If a Materials List is provided, verify the packing list with it.

6.) Determine if an AC or DC power card is to be used in the configuration.

a.) If installing a DC power card, install the -48 V DC power source.

7.) Complete all remaining tasks in the order given unless otherwise directed.

You have completed this task.

Task 002: Installing the 19” Fan Tray

The 19" fan tray is necessary for a chassis housing one or more 10306 or 10224 CO modem cards. The fan tray is installed under each BS1900 shelf and contains six forced-air cooling fans to ensure sufficient cooling for operation. Use this procedure *only* to connect fan trays for use with the 10306 or 10224 CO modem cards. The following instructions are for installation of the -48 V DC and 110/220 V AC (switch selectable) fan trays.

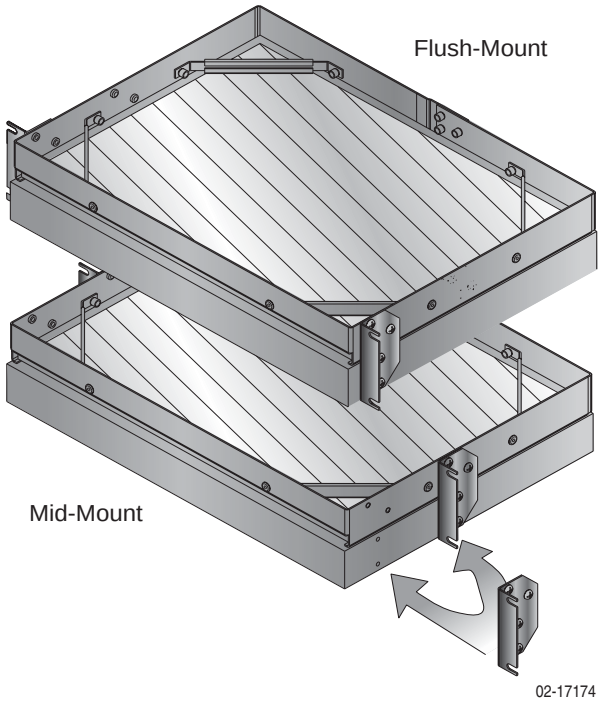
Step Procedure

1.) Seat the fan tray at the bottom of the rack, leave room for at least 1 RU (Rack Unit) of air entry, then mount the two (2) side brackets (19” mounting ears) to secure the tray in the shelf. (For 23” racks, use 23” adapter ears.) Brackets are adjustable for flush and mid-mounting. Refer to *Figure 2-2, "Fan Tray Mounting," on page 39*.

WARNING: POSSIBLE EQUIPMENT DAMAGE! AC Fan Trays are shipped with an air filter frame. To ensure proper airflow, the frame must be installed. DO NOT install an air filter for the AC Fan Tray, only the frame.

Step Procedure (continued)

Figure 2-2: Fan Tray Mounting



2.) Connect power for -48 V DC. (If you are installing an AC fan tray, proceed to step 3 to connect power for the 110 V AC fan tray.)

a.) The -48 V DC connection requires a 14-gauge stranded cable (not included).

b.) Connect the black power feed to the positive terminal and the red power feed to the negative terminal.

NOTE: This is the opposite of how non-telecommunications electronics are connected.

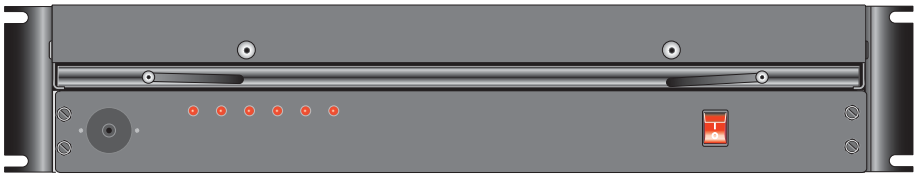
c.) Route the other end to the matching connector on the BitStorm 1900 backplane.

d.) LEDs indicate fan failure.

NOTE: The power supply for the multiplexer must also be -48 V DC.

Step Procedure (continued)

Figure 2-3: -48 V DC Fan Tray



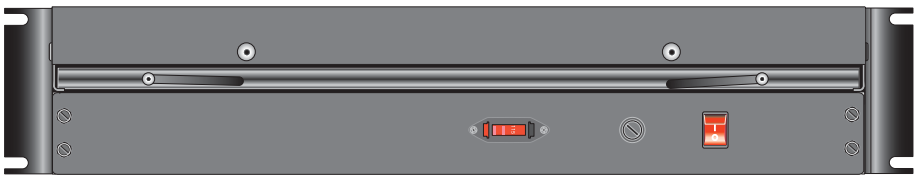
3.) Connect power for the 110/220 V AC fan tray.

a.) Connect the power cord to the IEC terminal connection on the front panel.

b.) Route the other end to a grounded outlet.

NOTE: The power supply for the multiplexer must also be 110/220 V AC.

Figure 2-4: 110 V AC Fan Tray



WARNING: POSSIBLE EQUIPMENT DAMAGE! Be sure to set the switch on the back panel of the 110/220 V AC fan tray to 115 V for a 110 V AC connection, and 230 V for a 220 V AC connection. Failure to do so will blow the fuse on the front panel.

Step Procedure (continued)

4.) Install the air filter frame.

a.) The filter must be removed.

b.) Slide the frame into place.

5.) Install the air filter for the DC fan tray. (DO NOT install a filter in the AC fan tray).

NOTE: An air filter must be installed and maintained in the DC Fan Tray for NEBs compliance.

WARNING: POSSIBLE EQUIPMENT DAMAGE! AC Fan Trays are shipped with an air filter frame. To ensure proper airflow, the frame must be installed. DO NOT install an air filter for the AC Fan Tray, only the frame.

a.) Verify filter is installed in the frame.

b.) Slide the unit into the fan tray.

NOTE: Installed air filters must be changed every 6 months. Bulk packs of 5 NEBs Air Filters (Part # 0100085-01) are available.

You have completed this task.

Task 003: Installing the BS1900 and Filter Shelves

Use this procedure to install the BitStorm 1900 modem shelf and filter shelf.

NOTE: The filter shelf is not required in data-only applications.

Requirements

This procedure requires the following:

- Equipment bay with enough space available installed, secured, and electrically grounded according to standard industry practice (specifications for a suitable bay are described in the *Appendix A* section *"Bay Requirements and Specifications," on page 107*).
- Installation hardware kit supplied with shelf
- Phillips-head screwdriver (#1 or #2)

WARNING: POSSIBLE EQUIPMENT DAMAGE! DO NOT rest objects such as tools or anyhting else on top of the BitStorm 1900 shelves. The mounting fasteners can only support the weight of the shelf. Additional weight may weaken the fasteners.

Step Procedure

1.) Select and apply grounded anti-static protection.

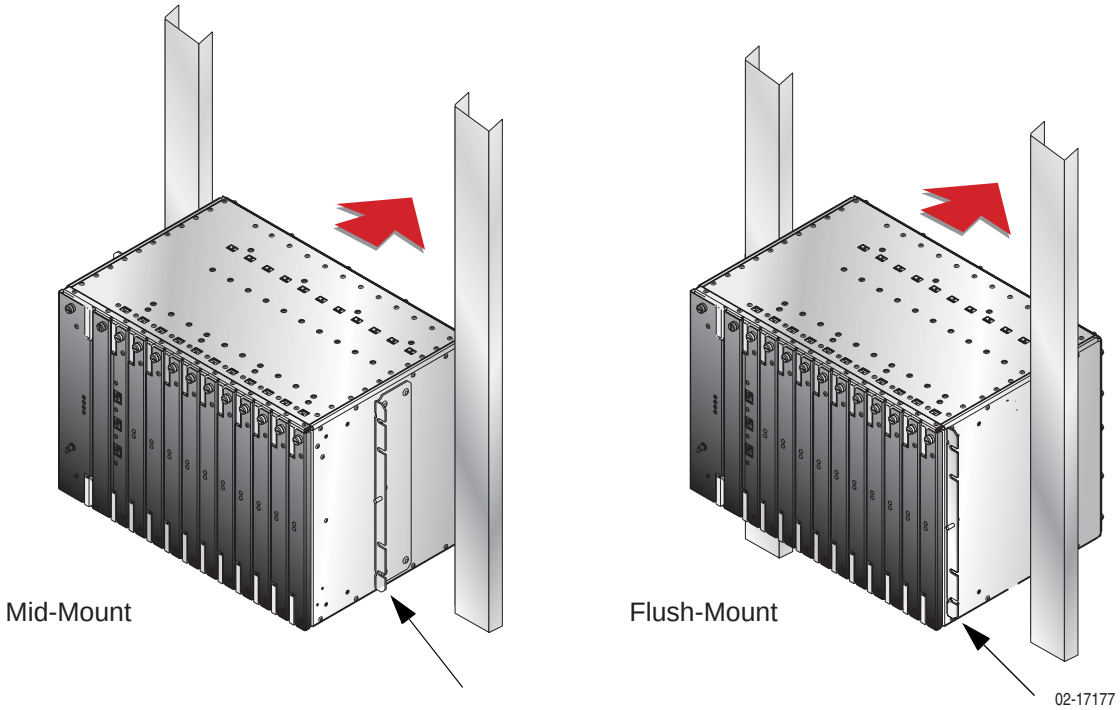
WARNING: ELECTROSTATIC DISCHARGE! Anti-static protection required! The BitStorm 1900 shelves are shipped with the circuit packs installed. When handling any circuit pack, you must wear grounded anti-static protection. The discharge of static electricity can damage the circuit packs.

2.) Select the mounting point in the bay where the top holes of the shelf mounting flanges will be attached.

WARNING: POSSIBLE EQUIPMENT DAMAGE! Installation Requirement! For a single-shelf application without a Fan Tray, be sure to leave at least three inches of space above and below the BitStorm 1900 shelves to dissipate heat.

3.) Align the holes of the shelf mounting flanges with the mounting holes in the bay as shown in *Figure 2-5, "BitStorm 1900 Modem Shelves Mounted in Bay."*

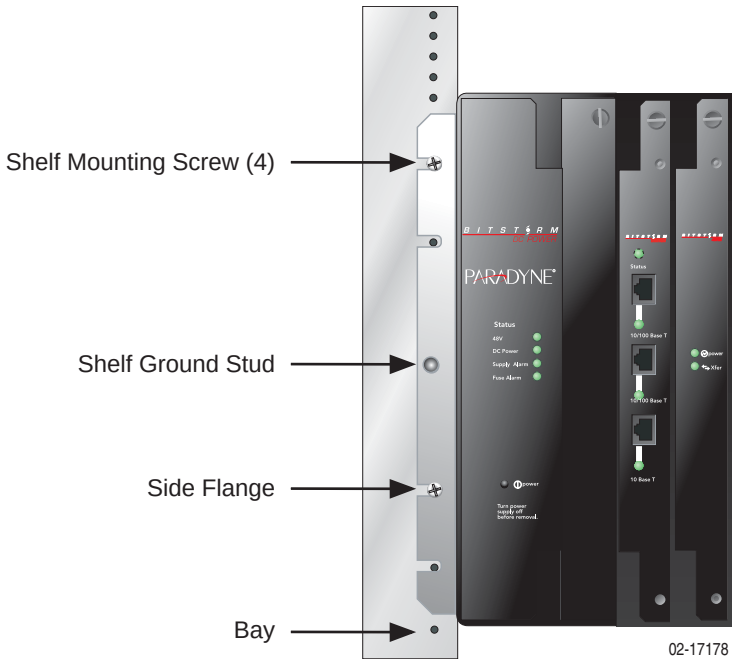
Figure 2-5: BitStorm 1900 Modem Shelves Mounted in Bay



4.) Using the shelf mounting screws provided in the shelf hardware kit, fasten the left and right flanges to the bay as shown in *Figure 2-6, "BitStorm 1900 Shelf Fastened to Bay," on page 45*.

Step Procedure (continued)

Figure 2-6: BitStorm 1900 Shelf Fastened to Bay

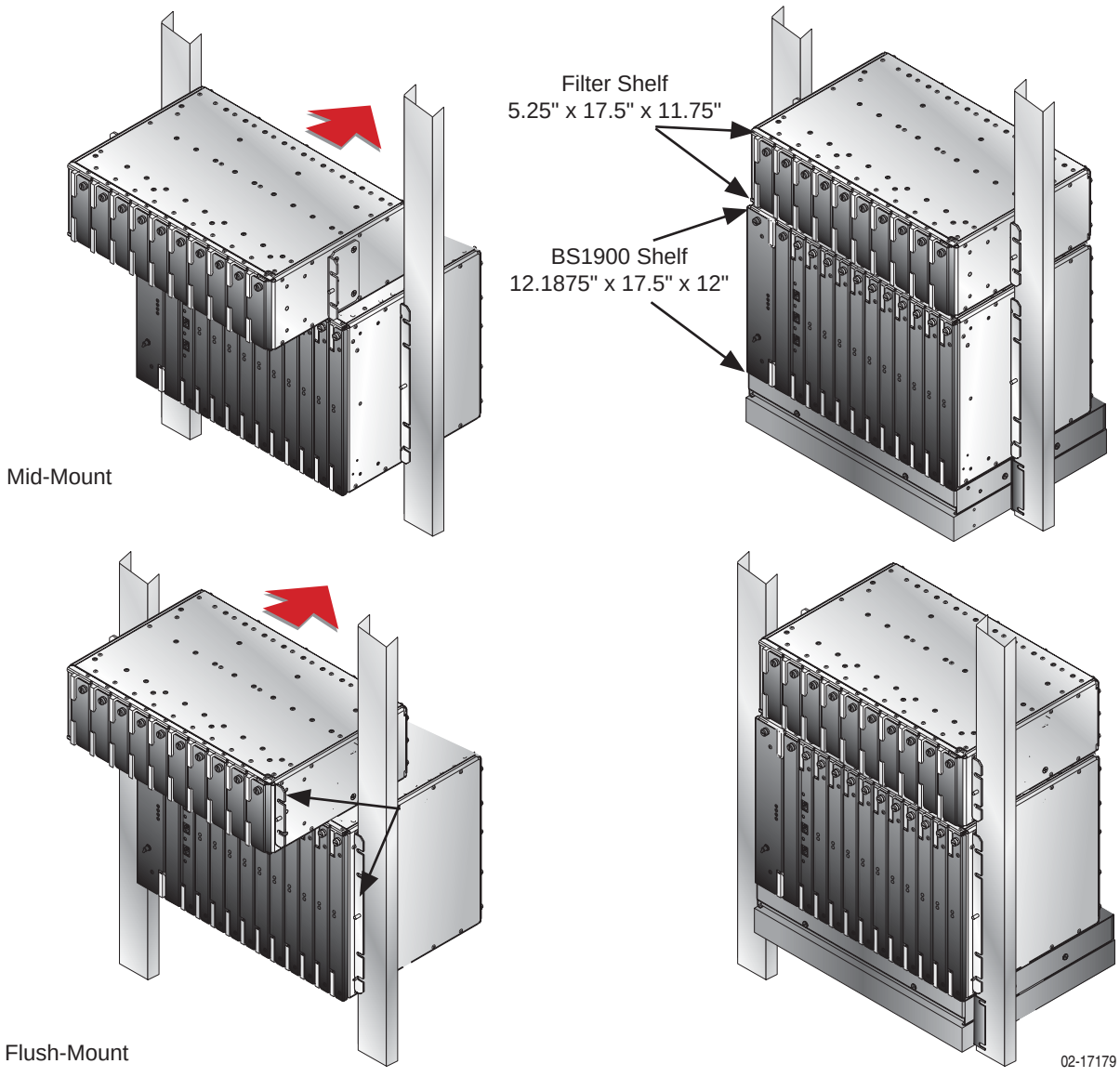


5.) Proceed according to the following table:

If the application is	Then
Voice/data	Align and mount a filter shelf directly above the BitStorm 1900 shelf as shown in *Figure 2-7, "Filter Shelf Mounting in Bay," on page 46*.
Data-only	Do not install the filter shelf. **NOTE: For a Data-only application: Stop here. You have completed the task.**

Step Procedure (continued)

Figure 2-7: Filter Shelf Mounting in Bay



STOP

You have completed this task.

Task 004: Installing the Air Baffle

Use this procedure to install the BitStorm 1900 Air Baffle.

Requirements

This procedure requires the following:

- Phillips-head screwdriver (#1 or #2)

Step Procedure

1.) Verify that the mounting adapters are in the same position as the BS 1900 and the Filter Shelf (i.e., mid-mount or flush-mount).

2.) Place directly above the BS 1900 or Filter Shelf.

3.) Secure with mounting screws.

You have completed this task.

Task 005: Installing the Circuit Packs

Use this procedure to install the BitStorm 1900 circuit packs.

Requirements

This procedure requires the following:

- Grounded anti-static protection

WARNING: ESD (ELECTROSTATIC DISCHARGE) ! Anti-static protection required! When handling any circuit pack, you must wear grounded anti-static protection. The discharge of static electricity can damage the circuit packs.

Step Procedure

1.) Place anti-static strip on wrist and attach to the grounded rack.

2.) Remove the circuit pack from the anti-static packaging.

3.) Align the card in the appropriate slot.

4.) Seat the card by pressing firmly into place.

You have completed this task.

Task 006: Connecting Power to the Shelf

Use this procedure to install the power feeds from a -48 V DC or 110 V AC power source to the BitStorm 1900 modem shelf.

NOTE: The filter shelf does not require a power feed.

Requirements

This procedure requires the following:

- Volt-ohm meter
- BitStorm 1900 DC power harness
- -48 V DC power fuse bay or AC-to-DC rectifier or 110 V AC power

Power supply and wiring specifications are described in *"Appendix A. Installation Requirements," on page 107*.

Step Procedure

1.) Eject all cards (Power, MIU Shelf Processor and Modems) from the backplane of the shelf. Ensure that the cards completely dislodge from their backplane connectors.

WARNING: POSSIBLE EQUIPMENT DAMAGE! Never connect untested power to the BitStorm 1900 with any circuit packs installed. The BitStorm 1900 shelf and rectifier could be seriously damaged if the power feed polarities on a -48 V DC power supply are reversed.

2.) Route and connect a ground wire from the building's grounding facility to the ground stud on the side flange of the shelf. Refer to the *Appendix A* section *"Grounding Environment Specifications," on page 109* for the BitStorm 1900 grounding requirements.

Step Procedure (continued)

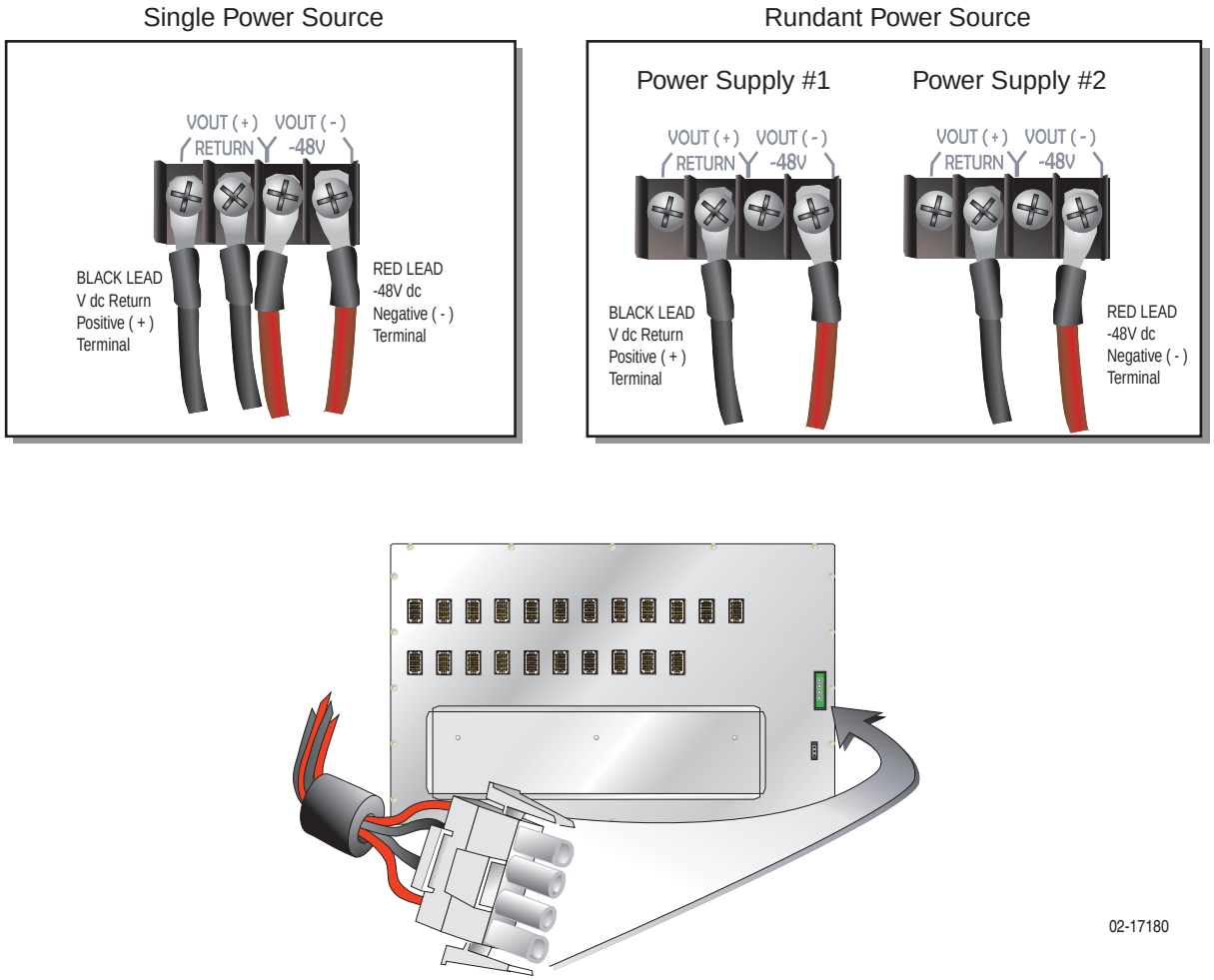
3.) With the power supply turned OFF, connect the -48 V DC (260W) or 110 V AC (260W) power source according to the following table and *Figure 2-8, "Typical DC Power Harness Connection to -48 V DC (260W) Power Source," on page 51*.

WARNING: POSSIBLE EQUIPMENT DAMAGE! With the -48 V DC power supply, reversed polarities on the power feed can irreparably damage the BitStorm 1900 shelf components. Be certain that power feeds are connected properly to the power source, with the red lead connected to the -48 V DC supply (negative terminal) as shown in the table below. Note that this is the opposite of other (non-telecommunications) applications, in which the red lead is usually connected to the positive (+) terminal.

Power Lead	Power Source	Terminal Connection	Line Fuse
Red	-48 V DC supply	Negative (-)	10 AMP, 260W
Black	-48 V DC return	Positive (+)	
N/A	110 V AC supply	IEC	6 AMP, 260W

Step Procedure (continued)

Figure 2-8: Typical DC Power Harness Connection to -48 V DC (260W) Power Source



4.) For a -48 V DC power source, connect the red power lead to the Negative (-) terminal connection and the black power lead to the Positive (+) terminal connection as seen in *Figure 2-8, "Typical DC Power Harness Connection to -48 V DC (260W) Power Source," on page 51*.

NOTE: If using a -48 V DC power supply, use an appropriate volt-ohm meter to test and verify that the red power feed at the shelf is the -48 V DC supply. The meter should read between -46 and -56 V DC.

Step Procedure (continued)

NOTE: The redundant power supply sources connect to two pairs of wires on the BitStorm 1900's power harness and are electrically the same.

5.) Route the other end of the DC power harness to the DC power connector on the backplane of the BitStorm 1900 modem shelf. The connector only fits one way.

6.) For an AC power supply, connect the power cord to the IEC terminal connection on the front panel.

Figure 2-9: Typical Power Connection to 260W AC Power Source

7.) Route the other end of the cord to a grounded socket.

8.) Re-seat the power, modem, and MIU Shelf processor into their shelf backplane connectors.

Step Procedure (continued)

9.) Secure the power harness in accordance with local office procedures.

10.) Turn ON the power to the shelf from the power supply.

You have completed this task.

Task 007: Installing the Data Network Connection with an MIU

Use this procedure to connect the BitStorm 1900 to the Ethernet data network using an MIU.

Requirements

This procedure requires the following:

- Ethernet data network installed
- Serial cable and DB9S to RJ-11 serial adapter (included)
- PC with serial port to configure system
- Two Category 5 crossover or straight cables terminated with RJ-45 connectors according to *Table 2-1*.

Table 2-1: Data Cable Selection for MIU Shelf Processor

MIU	Cable Requirements	Application
RS-232	RJ-11 cable (a DB9S to RJ-11 serial adapter is included)	To a PC (for configuration only)
Ethernet Pass Thru	50-pin connector decapus cable (DB50F) part # 04-00017-01, with 10 RJ-45 cables (included)	To Ethernet switch
10 Base-T X (top port) (Management ports must be connected)	RJ-45 straight cable, 6' (included)	To a port on an intermediate switch or hub **NOTE: Switch or hub must have connection to EtherLoop network router.**
10 Base-T (bottom port)	Not used in this release	Not used in this release

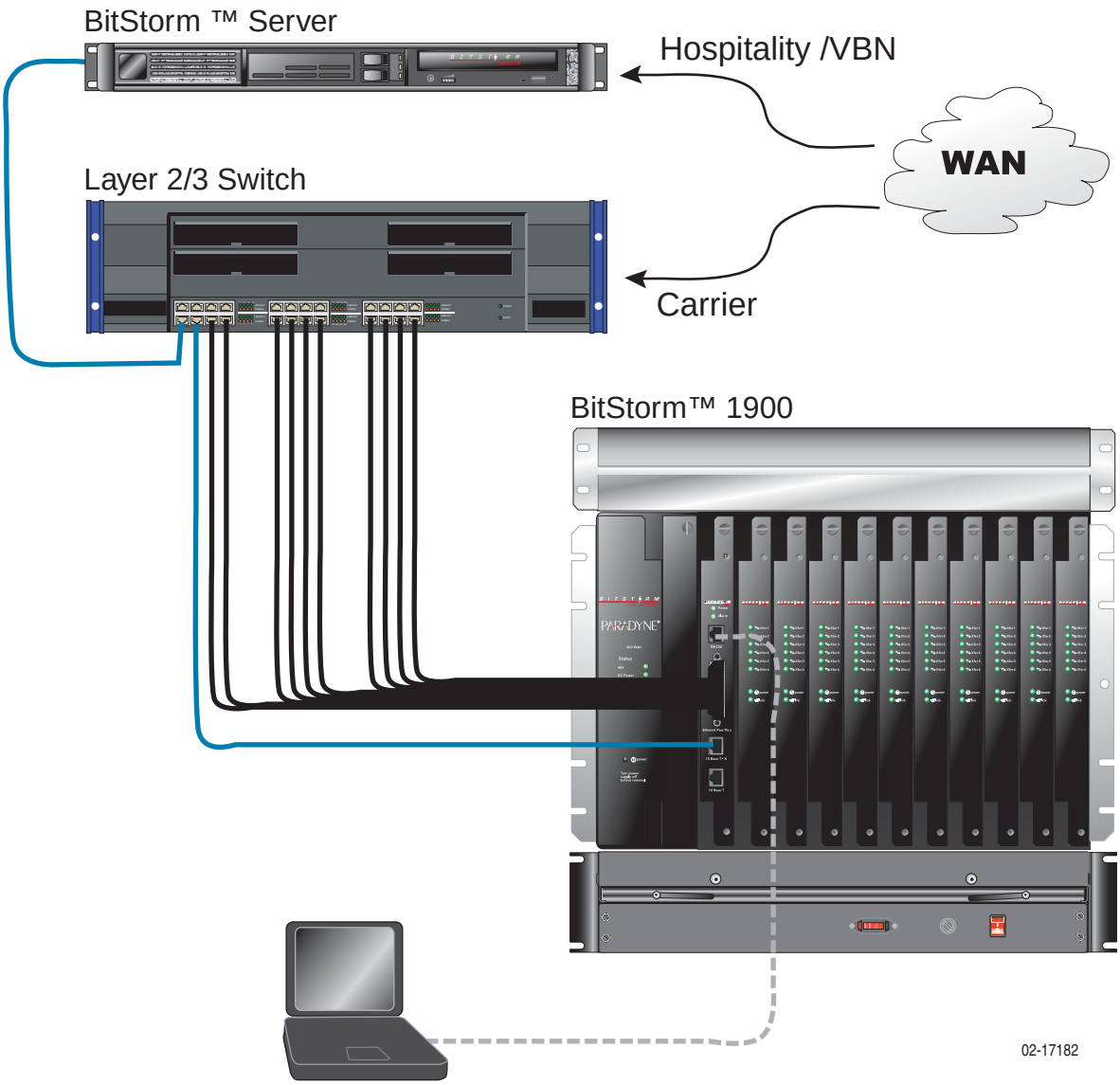
Step Procedure

1.) Connect one end of the RJ-45 (crossed) cable to the switch/router, then route the other end to the 10 Base T-X port of MIU.

Step Procedure (continued)

Figure 2-10 shows a typical EtherLoop data network connection with the BitStorm 1900 using an MIU.

Figure 2-10: BitStorm 1900 Data Connection via MIU



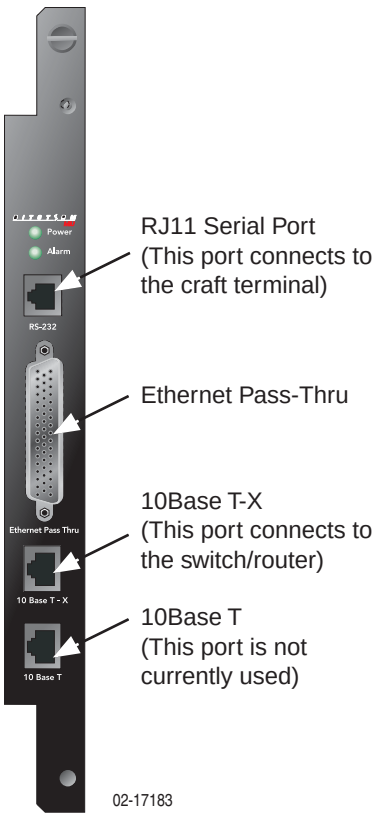
Step Procedure (continued)

2.) Connect the 50-pin connector to the Ethernet Pass-Thru port, then connect the cables at the other end to the corresponding switch(es). Refer to *Figure 2-11* (shown below).

3.) Connect the RJ-11 cable with the adapter (DB9S to RJ-11) to the local craft terminal (PC/laptop). Then connect the other end to the RS-232 port on the MIU. Refer to *Figure 2-11* (shown below).

4.) Verify that the green LED at the EtherLoop hub/router port illuminates, indicating connectivity is established from the BitStorm 1900 Access Multiplexer shelf to the switch/router.

Figure 2-11: MIU Card with Cable Connections



Step Procedure (continued)

5.) Proceed according to the following table:

If the application is	Then
Voice/data	GO TO: *"Task 008: Installing Voice/Data & Filter Shelf Connections, on page 58."* OR *"Task 009: Installing Voice/Data w/Filter 66-Block Connections, on page 64."*
Data-only	GO TO: *"Task 010: Installing the Data-only Connections, on page 67."*

You have completed this task.

Task 008: Installing Voice/Data & Filter Shelf Connections

Use this procedure to connect the BitStorm 1900 to the EtherLoop cross-connect in voice/data applications.

Requirements

This procedure requires the following tools and materials:

- 10 BitStorm 1900 cable harnesses
- 10 intermediate cables
- 10 BitStorm 1900 data cables

"Appendix B. Cabling Specifications," on page 115 contains the specifications for the cables and wiring required in this procedure.

Step Procedure

1.) Place and secure the dedicated EtherLoop cross-connect on the facility main distribution frame.

2.) Designate and label one side of each block as "Line/CPE," and the other side as "Voice."

3.) Review pin and pair assignments in *Figure 2-2, "Pin and Pair Assignments for the Champ to Omni Grid Cable (Part #: 04-00007-10)," on page 59*.

Step Procedure (continued)

Table 2-2: Pin and Pair Assignments for the Champ to Omni Grid Cable (Part #: 04-00007-10)

From Conn	From Pin #	With Pair #	Color Code	To	To Pin #
J1	B2	R1	BLU/WHT	P1	1
	E2	R2	OR/WHT		2
	B3	R3	GR/WHT		3
	E3	R4	BR/WHT		4
	B4	R5	SLT/WHT		5
	E4	R6	BLU/RED		6
	B6	R7	OR/RED		7
	E6	R8	GR/RED		8
	B7	R9	BR/RED		9
	E7	R10	SLT/RED		10
	B8	R11	BLU/BLK		11
	E8	R12	OR/BLK		12
J2	B2	R13	GR/BLK		13
	E2	R14	BR/BLK		14
	B3	R15	SLT/BLK		15
	E3	R16	BLU/YEL		16
	B4	R17	OR/YEL		17
	E4	R18	GR/YEL		18
	B6	R19	BR/YEL		19
	E6	R20	SLT/YEL		20
	B7	R21	BLU/VIO		21
	E7	R22	OR/VIO		22
	B8	R23	GR/VIO		23
	E8	R24	BR/VIO		24
	N/A		SLT/VIO		25

From Conn	From Pin #	With Pair #	Color Code	To	To Pin #
J1	A2	T1	WHT/BLU	P1	26
	D2	T2	WHT/OR		27
	A3	T3	WHT/GR		28
	D3	T4	WHT/BR		29
	A4	T5	WHT/SLT		30
	D4	T6	RED/BLU		31
	A6	T7	RED/OR		32
	D6	T8	RED/GR		33
	A7	T9	RED/BR		34
	D7	T10	RED/SLT		35
	A8	T11	BLK/BLU		36
	D8	T12	BLK/OR		37
J2	A2	T13	BLK/GR		38
	D2	T14	BLK/BR		39
	A3	T15	BLK/SLT		40
	D3	T16	YEL/BLU		41
	A4	T17	YEL/OR		42
	D4	T18	YEL/GR		43
	A6	T19	YEL/BR		44
	D6	T20	YEL/SLT		45
	A7	T21	VIO/BLU		46
	D7	T22	VIO/OR		47
	A8	T23	VIO/GR		48
	D8	T24	VIO/BR		49
	N/A		VIO/SLT		50

Step Procedure (continued)

4.) Connect one Amp-Champ connector of an intermediate cable to the "Line/CPE" side of the EtherLoop cross-connect block, then connect the other end to an Amp-Champ to Dual Omni Grid cable.

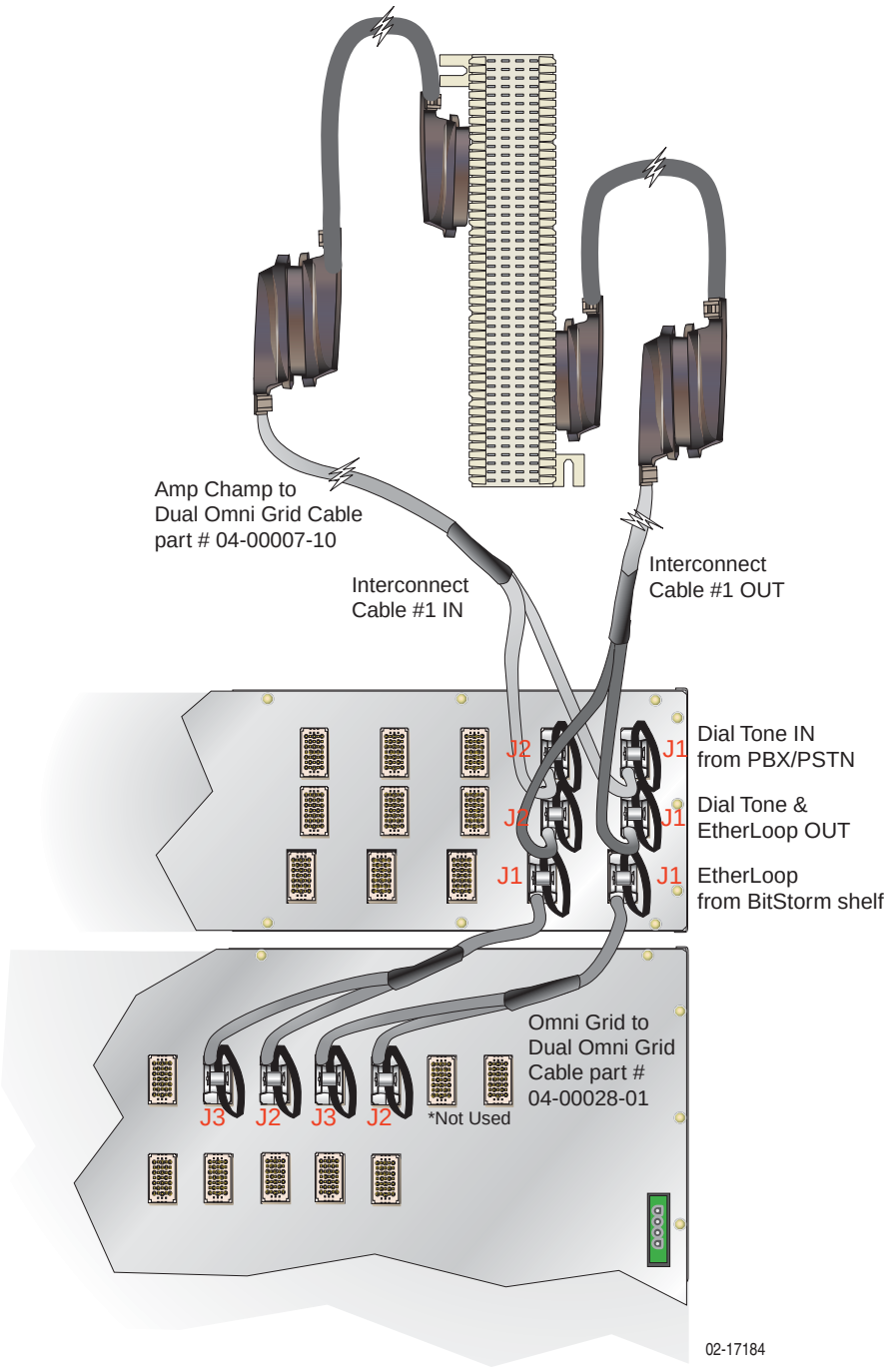
5.) Connect the Amp-Champ connector of the second intermediate cable to the "Voice" side of the EtherLoop cross-connect block, then connect the other end to an Amp-Champ to Dual Omni Grid cable.

6.) Connect the two Omni-Grid connectors from the EtherLoop "Line/CPE" side to the "Dial Tone & EtherLoop OUT" ports of the filter shelf as shown in *Figure 2-12, "Line/CPE and Voice Connections on the Filter Shelf for 10306 Modem Cards," on page 61*.

7.) Connect the two Omni-Grid connectors from the "Voice" side to the "Dial Tone IN from PBX/PSTN" ports of the filter shelf as shown in *Figure 2-12, "Line/CPE and Voice Connections on the Filter Shelf for 10306 Modem Cards," on page 61*, and *Figure 2-13, "Line/CPE and Voice Connections on the Filter Shelf for 10224 Modem Cards," on page 62*. Record EtherLoop assignments.

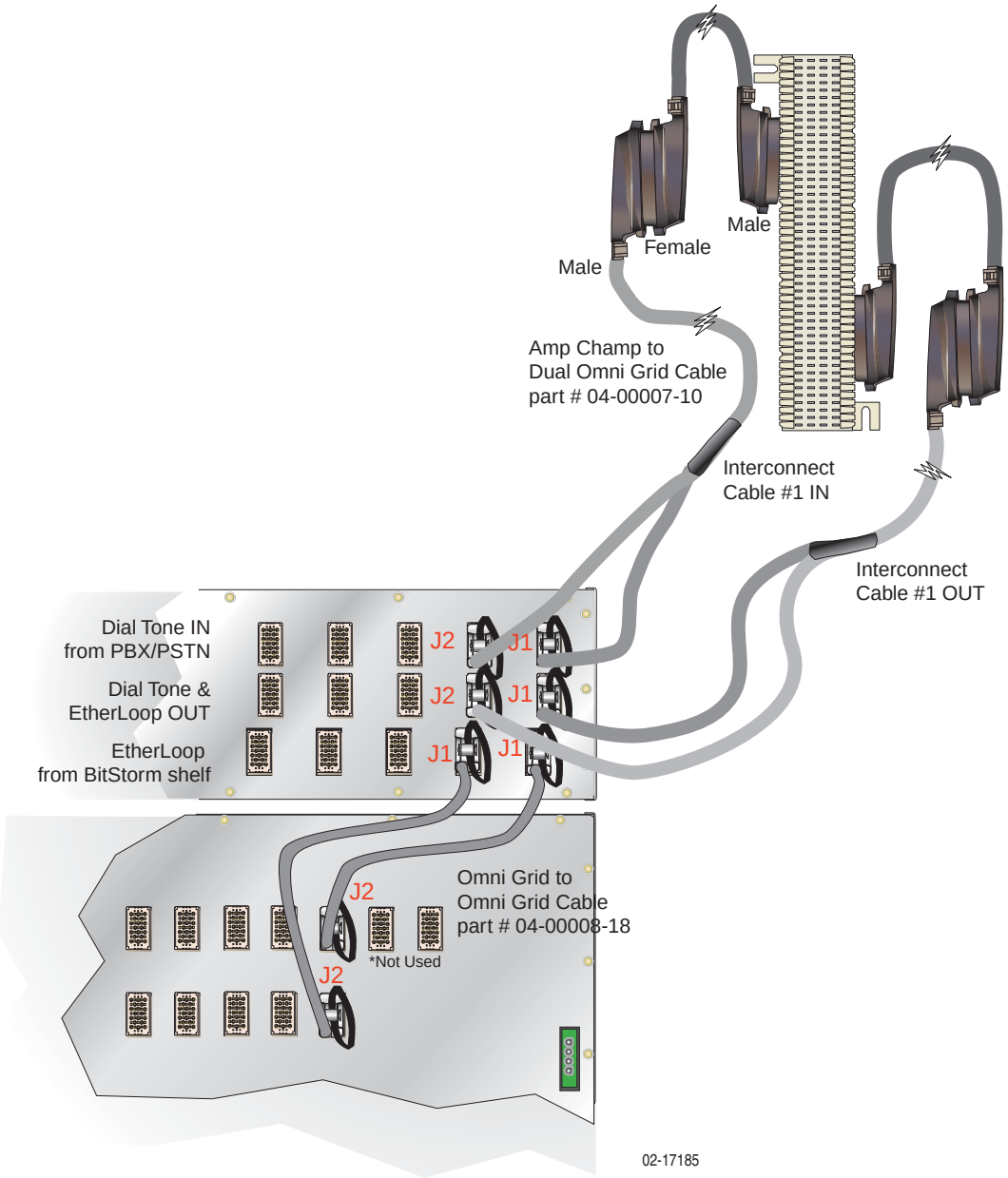
Step Procedure (continued)

Figure 2-12: Line/CPE and Voice Connections on the Filter Shelf for 10306 Modem Cards



Step Procedure (continued)

Figure 2-13: Line/CPE and Voice Connections on the Filter Shelf for 10224 Modem Cards



Step Procedure (continued)

8.) Go to *"Task 011: Installing External Voice Switch Connections, on page 70."*

You have completed this task.

Task 009: Installing Voice/Data w/Filter 66-Block Connections

Use this procedure to connect the BitStorm 1900 to the EtherLoop cross-connect in applications where voice/data service is required with a Filter 66-Block.

Requirements

This procedure requires the following tools and materials:

- 5 BitStorm 1900 cable harnesses
- 5 intermediate cables
- Cross-connect block(s) of the same type used in the existing main distribution frame (MDF)
- Cross-connect punch-down tool
- Jumper Wire (24 AWG)

"Appendix B. Cabling Specifications," on page 115 contains the complete specifications for the cables and wiring required in this procedure.

Step Procedure

1.) Mount 66-blocks on wall in an appropriate area for running jumpers.

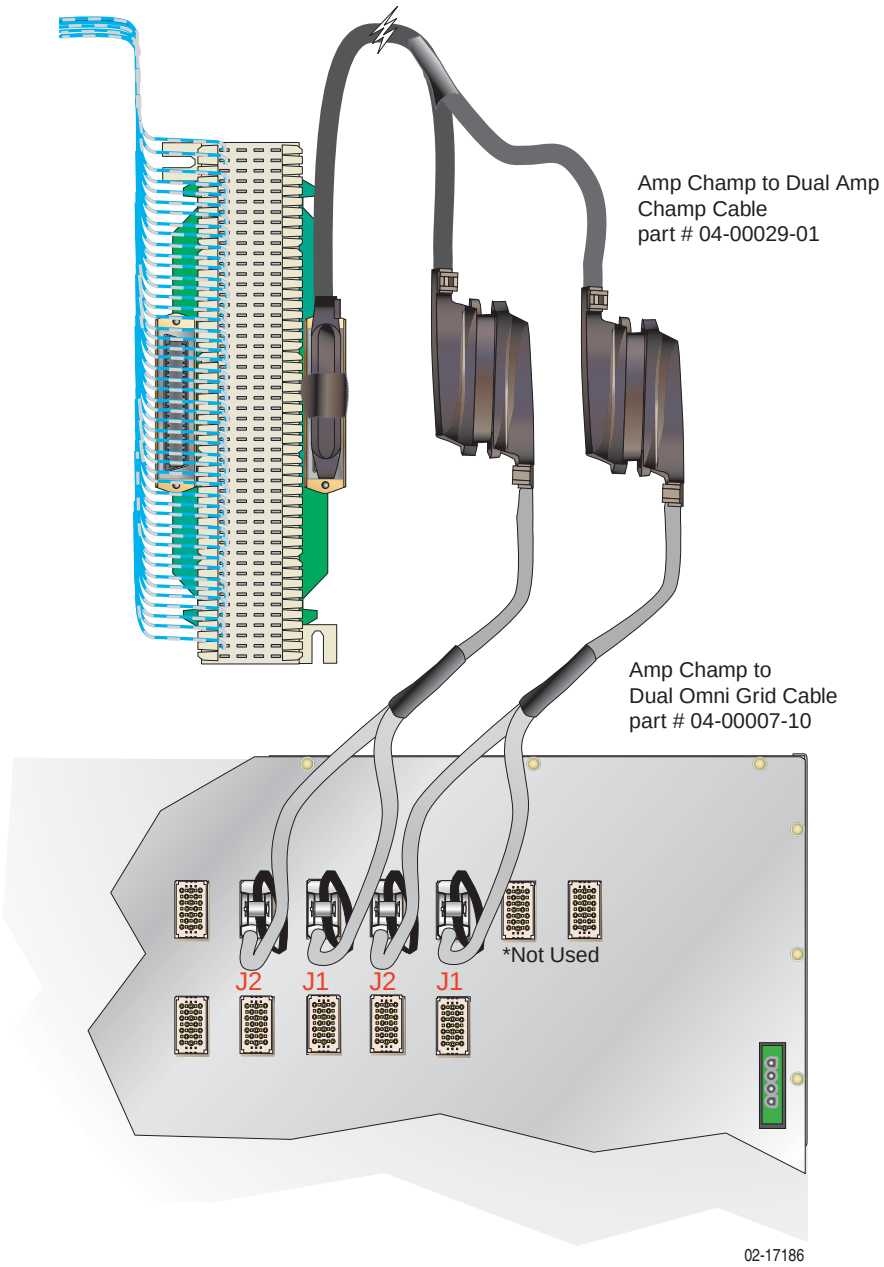
2.) Verify the room position on frame blocks.

3.) Replace jumpers to 66-Filter Block and retest phone lines.

4.) Refer to *Figure 2-14, "Voice/Data Filter 66-Block Connections for 10306 CO Modems," on page 65*, and *Figure 2-15, "Voice/Data Filter 66-Block Connections for 10224 CO Modems," on page 66*.

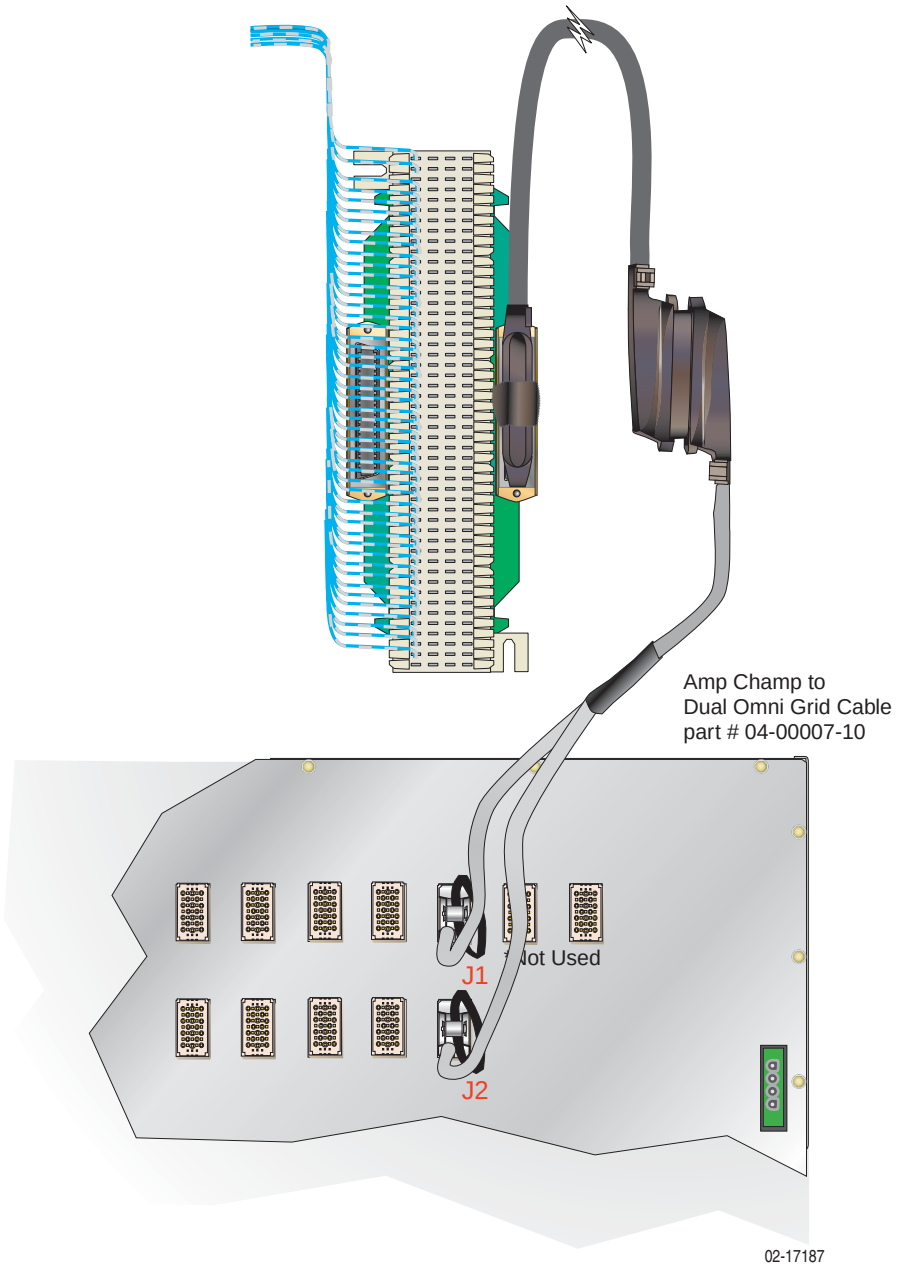
Step Procedure (continued)

Figure 2-14: Voice/Data Filter 66-Block Connections for 10306 CO Modems



Step Procedure (continued)

Figure 2-15: Voice/Data Filter 66-Block Connections for 10224 CO Modems



STOP

You have completed this task.

Task 010: Installing the Data-only Connections

Use this procedure to connect the BitStorm 1900 to the EtherLoop cross-connect in applications where no voice service is required.

Requirements

This procedure requires the following tools and materials:

- 5 BitStorm 1900 cable harnesses
- 5 intermediate cables
- Cross-connect block(s) of the same type used in the existing main distribution frame (MDF)
- Cross-connect punch-down tool

"Appendix B. Cabling Specifications," on page 115 contains the complete specifications for the cables and wiring required in this procedure.

Step Procedure

1.) Place and secure the dedicated EtherLoop cross-connect on the facility main distribution frame.

2.) Route the Tip/Ring pairs originating from the StormPort/CPE lines to the EtherLoop cross-connect.

3.) Terminate the StormPort /CPE Tip/Ring connections to the EtherLoop cross-connect block. Record the StormPort/CPE Tip/Ring assignments of the EtherLoop cross-connect according to local office procedures.

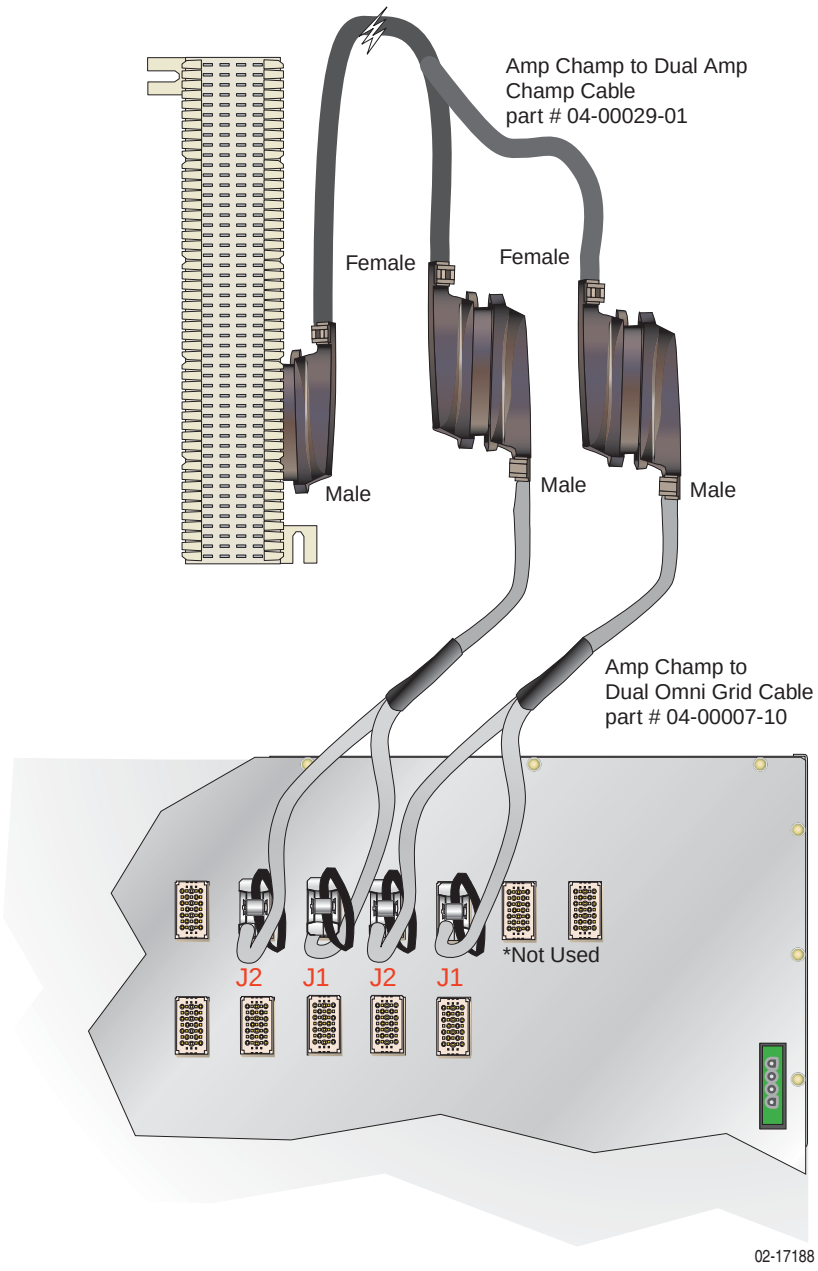
4.) Connect one Amp-Champ connector of an intermediate cable to the matching connector on the EtherLoop cross-connect block, then route the other connector to the equipment bay containing the BitStorm 1900.

5.) Connect the J1/J2 split connectors on the cable harness to the matching J1/J2 modem connectors of two adjacent modem cards in the BitStorm 1900 shelf. Refer to *Figure 2-16, "Data-only Connections on the 66-Block for 10306 CO Modem Cards," on page 68*, and/or

Step Procedure (continued)

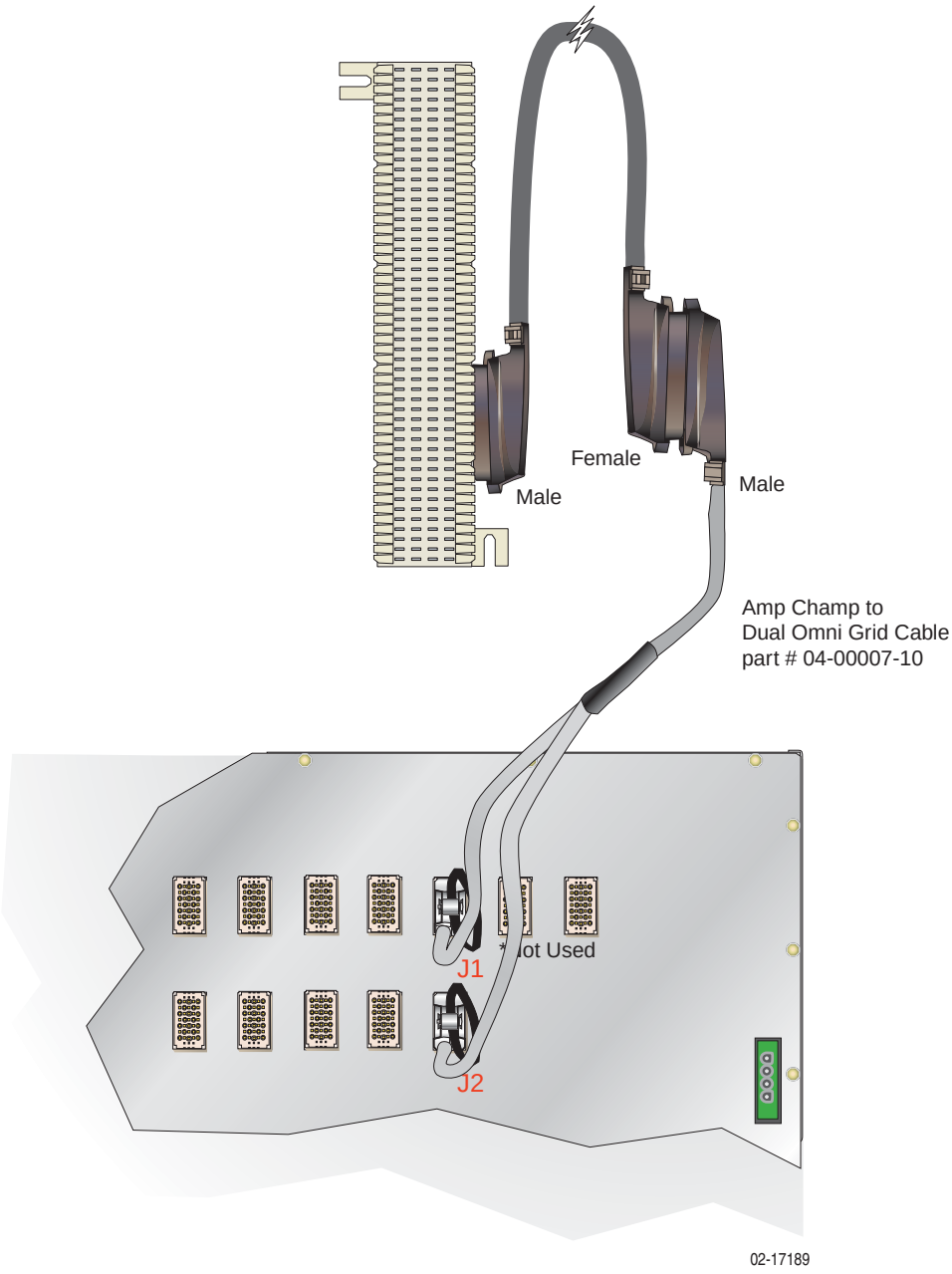
Figure 2-17, "Data-only Connections on the 66-Block for 10224 CO Modem Cards," on page 69. Record the EtherLoop assignments.

Figure 2-16: Data-only Connections on the 66-Block for 10306 CO Modem Cards



Step Procedure (continued)

Figure 2-17: Data-only Connections on the 66-Block for 10224 CO Modem Cards



STOP

You have completed this task.

Task 011: Installing External Voice Switch Connections

Use this procedure to connect the BitStorm 1900 lines to an external voice facility.

Requirements

This procedure requires the following tools and materials:

- 24 jumper wires (24-AWG) for each BitStorm 1900 modem card installed (240 wires for a full shelf)
- Cross-connect punch-down tool

"Appendix B. Cabling Specifications," on page 115 contains the specifications for the cables and wiring required in this procedure.

Step Procedure

1.) Identify the existing Tip and Ring jumper connections from the external voice facility cross-connect block to the customer-premises equipment (CPE) cross-connect block.

2.) Verify dial tone on the existing voice facility at the CPE cross-connect block for the line being rerouted.

3.) Remove the Tip and Ring jumper connections from the line.

4.) Terminate the Tip/Ring jumper wires from the cross-connect of the external voice facility to the "Voice" side of the EtherLoop cross-connect.

5.) Terminate the jumper wires from the CPE Tip/Ring connections to the "EtherLoop" side of the cross-connect block.

6.) Verify the new connection by testing dial tone again at the CPE cross-connect block.

7.) Secure all cabling in accordance with local office procedures.

Step Procedure (continued)

8.) Record the EtherLoop cross-connect Tip/Ring assignments for the voice facility according to local office procedures.

You have completed this task.

Task 012: Configuring the MIU

Complete the following steps to configure the MIU.

Step	Procedure

1.) Ensure that the BitStorm 1900 is powered on.

2.) Verify the PC has an ASCII terminal emulator loaded (i.e., Hyperterminal software, etc.).

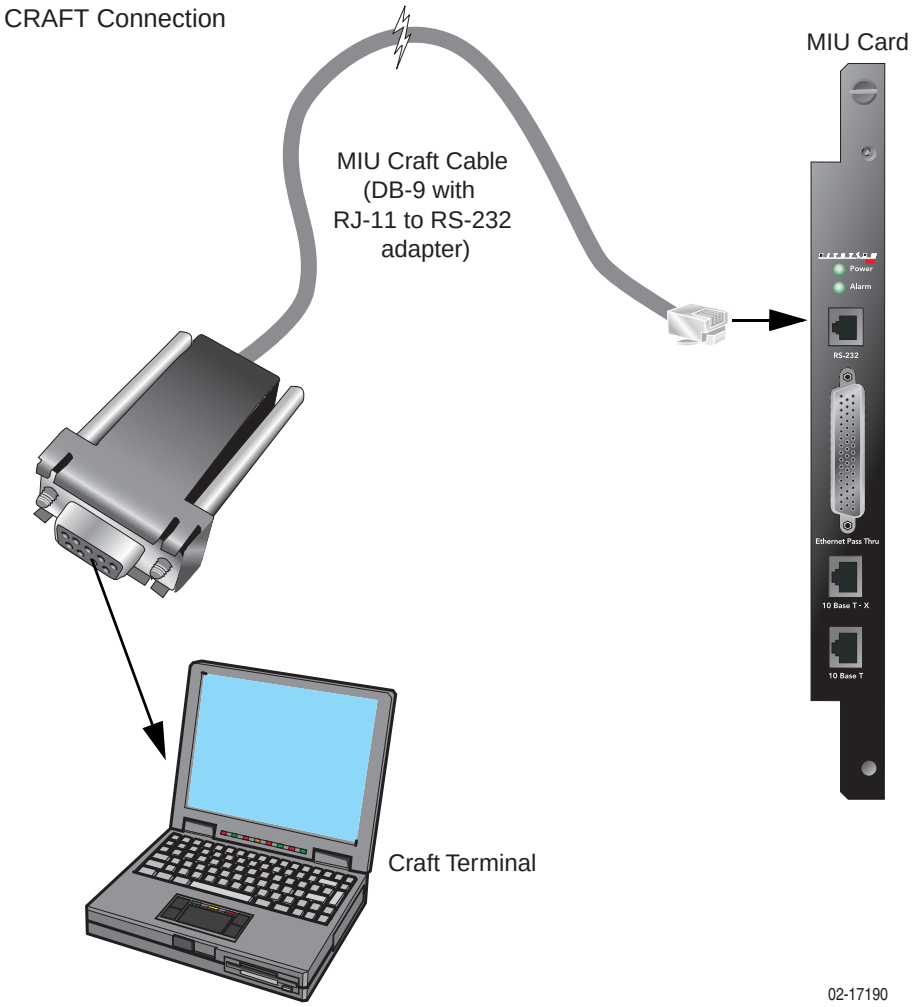
3.) Connect the PC to the MIU card using the MIU Craft Cable (RS-232 to RJ-11 adapter and telephone cable) as shown in *Figure 2-18, "Craft Connection with the MIU Craft Cable," on page 73*.

a.) Connect the DB-9 end of the cable to the serial COM port on the PC.

b.) Connect the RJ-11 connector to the RS-232 jack on the MIU card.

Step Procedure (continued)

Figure 2-18: Craft Connection with the MIU Craft Cable



Step Procedure (continued)

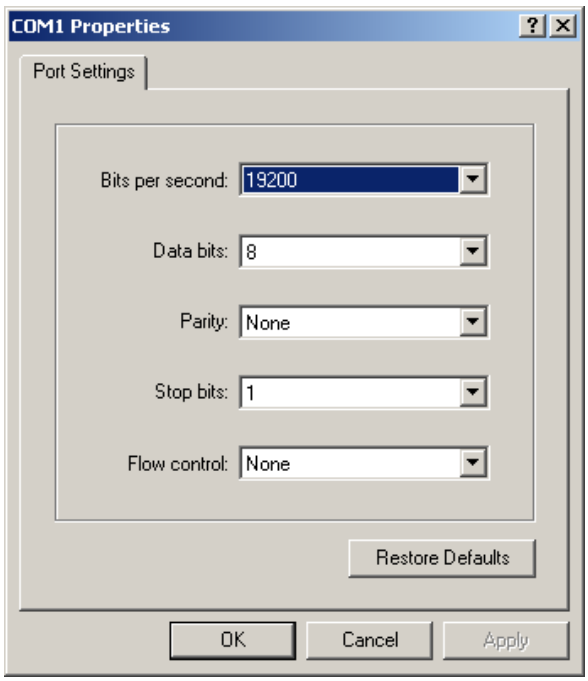
4.) Set the serial COM1 port terminal communication settings.

a.) Initiate a Terminal Session using terminal emulation software (i.e., Hyperterminal).

b.) Select the appropriate serial *COM* port from the pull down menu (i.e., COM1, COM2, etc).

c.) Verify the port settings are the same as shown in Figure 2-19, "COM Port Settings." and click **OK**.

Figure 2-19: COM Port Settings

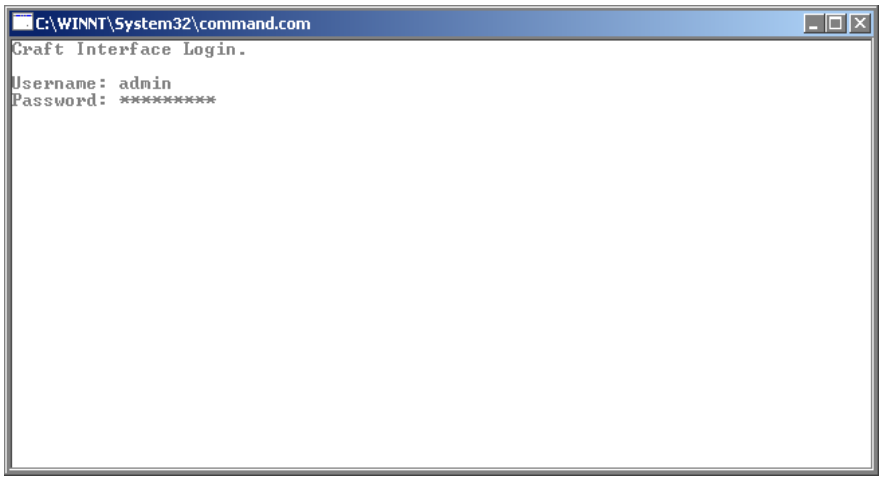


Step Procedure (continued)

5.) The *Craft Interface Login* screen displays. Type **admin** for the default *Username* and press **<Enter>**.

NOTE: The Craft Interface is case-sensitive. Make sure to type all entries in lowercase.

The following screen displays requiring a *Password* to continue:

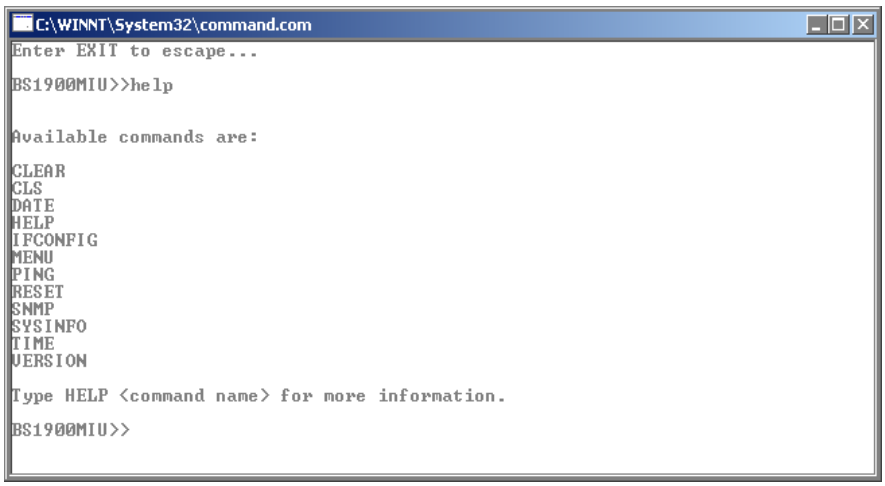


6.) Type **etherloop** and press **<Enter>.** (The user name and password can be changed after the initial login).

Step Procedure (continued)

The *BS1900MIU>>* prompt displays:

7.) For list of all available CLI commands, type **help** at the *BS1900MIU>>* prompt and press **<Enter>**.



This screen provides a list of the available commands to configure the MIU. Refer to the following table for a description of each command.

Table 2-3: CLI (Command Line Interface) Commands

CLI Commands	
Command	**Description**
CLEAR	Enter to clear the screen of data leaving only the BS1900MIU>> prompt. 
CLS	This command is the same as CLEAR.

Table 2-3: CLI (Command Line Interface) Commands

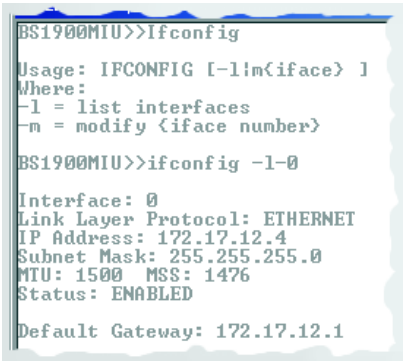
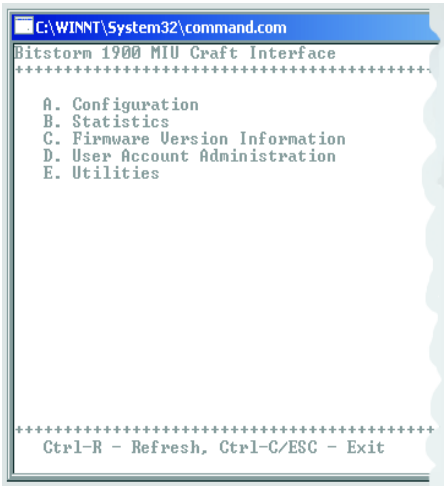
CLI Commands	
Command	**Description**
DATE	Enter to change the date. 
HELP	Enter to obtain additional help
IFCONFIG	Use to configure the MIU I.P. Address, Subnet Mask, Status, Default Gateway etc. 
MENU	Enter to view the Main Menu for the interface. 

Table 2-3: CLI (Command Line Interface) Commands

CLI Commands	
Command	**Description**

PING	Enter to verify if an I.P. Address is valid.
	`BS1900MIU>>ping`
	`Usage: PING [-n count] [-s size] [-t timeout] [-i TTL] [-v TOS] [-f] [-d] destination`
	`Where:`
	`count = number of ping attempts`
	`size = data packet size (32 bytes is the default)`
	`timeout = time to wait on each PING before giving up.`
	`TTL = time to live.`
	`TOS = type of service.`
	`The -f option specifies to set the 'Don't Fragment' (DF) flag in the packet.`
	`The -d option specifies to continue pinging until stopped by CTRL-C`
	`-Destination specifies a valid IP address.`

RESET	Use to Reset or Reboot the system.
	`BS1900MIU>>reset`
	`This will completely RESET the system. Are you sure? (y/n): _`
	(It is not advised to power down the system in order to perform a reset of the system.)

SNMP	Enter to review and/or modify the current SNMP configuration.
	`BS1900MIU>>snmp`
	`Usage: SNMP [-l!m]`
	`Where:`
	`-l = list current configuration`
	`-m = modify configuration`

SYSINFO	Enter to access and review system information.
	`BS1900MIU>>sysinfo`
	`Usage: SYSINFO [-t!m!o]`
	`Where:`
	`-t = list current tasks.`
	`-m = list memory.`
	`-l = list loading information.`
	`-r = list reset/alert/uptime information.`

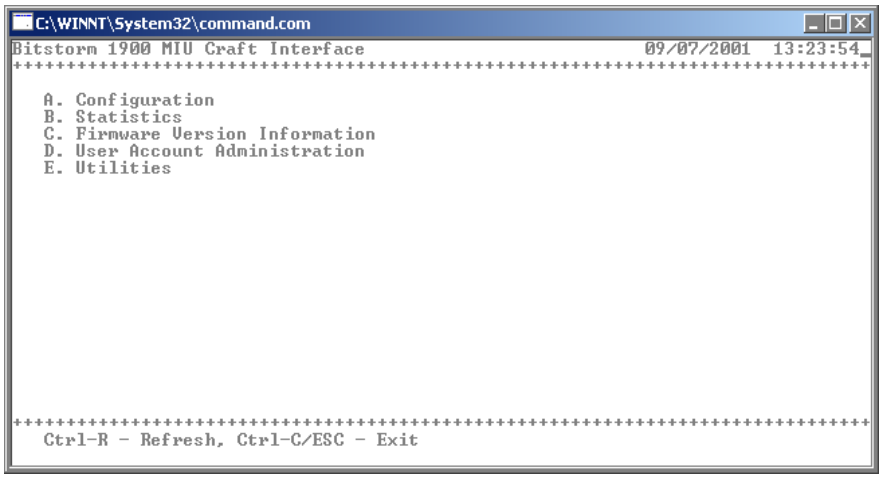
TIME	Enter to set the time.
	`BS1900MIU>>time`
	`Use -s to set the system time. Current System Time is: 15:17:36`

VERSION	Enter to view the version of firmware currently loaded on the MIU.
	`BS1900MIU>>version`
	`Software version: ELASHELF_MIU1900_FW___02_00_04 -- BitStorm MIU`

Step Procedure (continued)

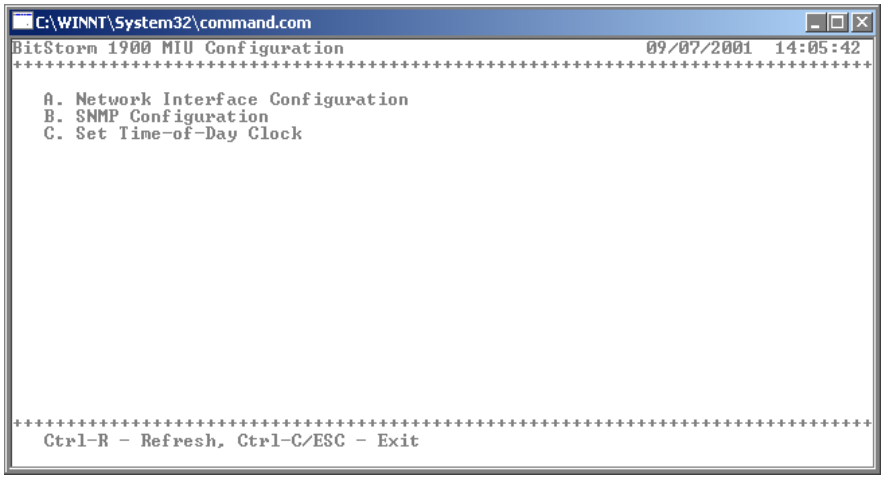
8.) Type **`menu`** at the BS1900MIU>> prompt.

The *`BitStorm 1900 MIU Craft Interface Main Menu`* displays.

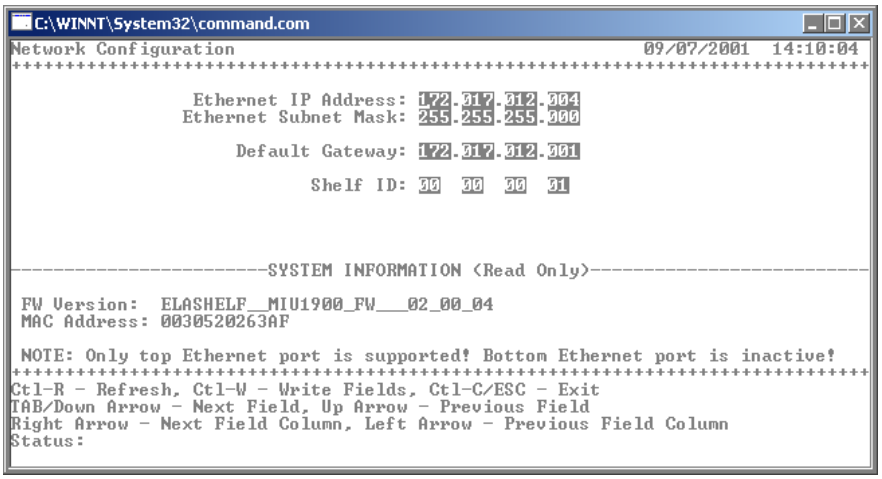


9.) Type ***a*** to select *`Configuration`*.

Step Procedure (continued)

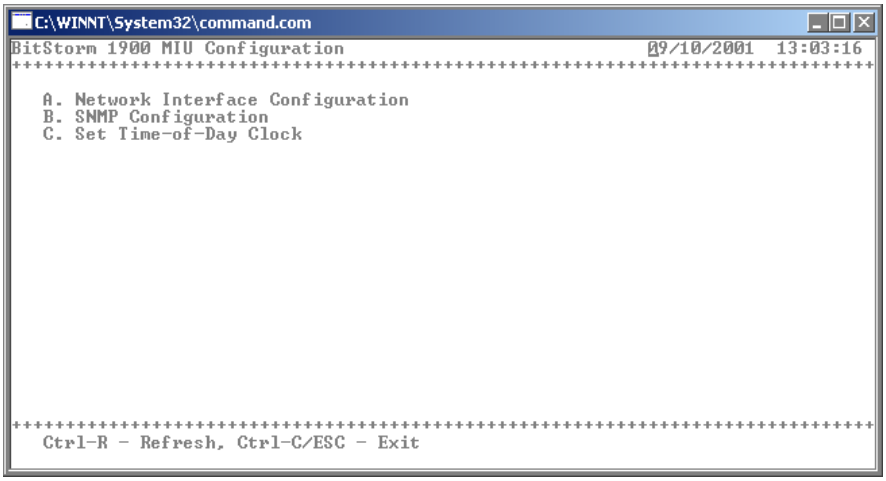


10.) From the *Configuration Menu*, type ***a*** to access the *Network Interface Configuration* screen.

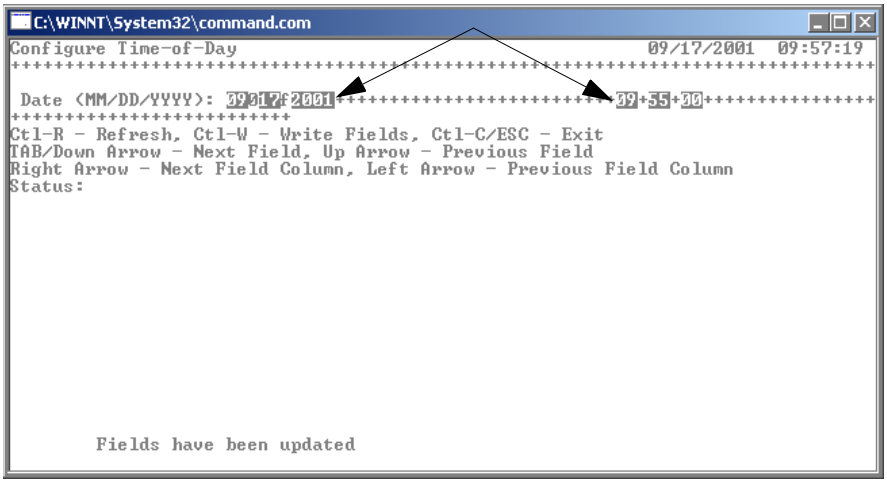


11.) Type in the **MIU Ethernet IP Address, MIU Ethernet Subnet Mask, MIU Default Gateway,** and the **MIU Shelf ID**.Press **<CTRL>+W** to save the settings, then press **<Esc>** . The *Configuration Menu* will display.

Step Procedure (continued)



12.) Type **c** to select *Set Time-of-Day Clock*. The following screen appears:



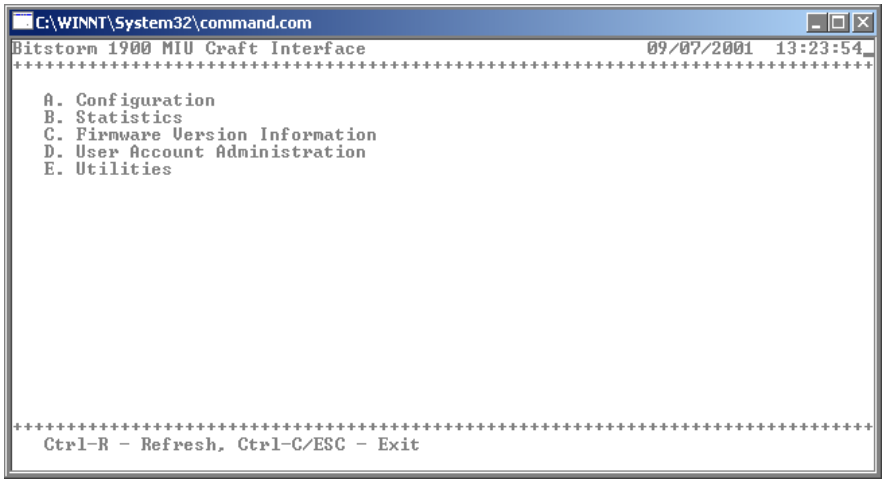
13.) Enter the current date and time.

a.) Enter the current date in the format MMDDYYYY. [Enter only the numbers not the slashes (/). This screen is currently under construction. There will be a 0 and an f in place of the slash (/) between the numbers.]

Step Procedure (continued)

b.) After entering the 4-digit year, the cursor will automatically jump to the Time field. (This field is not marked in this version.) Enter the time as HHMMSS (Do not type the colon (:) between the numbers, plus signs (+) will separate the numbers.

c.) Press **<CTRL>+W** to save the changes. Press **<Esc>** or **<CTRL>+C** to return to the *Configuration* screen, then press **<Esc>** or **<CTRL>+C** again to return to the *Main Menu* screen.



14.) To change user name and password settings, type **d** to select *User Account Administration*.

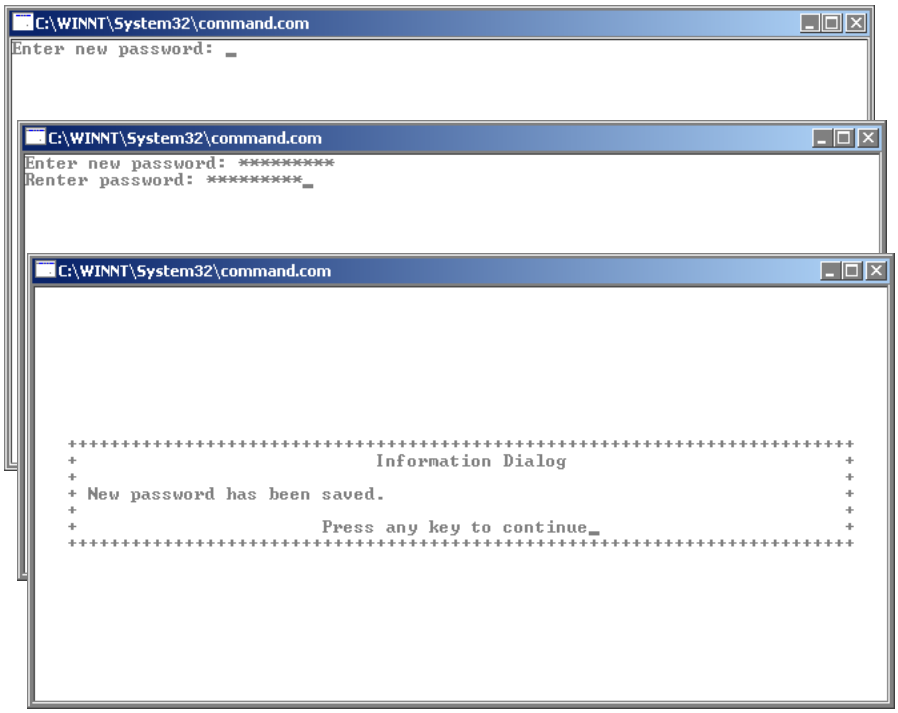
Step Procedure (continued)

15.) Type ***a*** to select *Change Username* to modify the user name. The following screens display:

Step Procedure (continued)

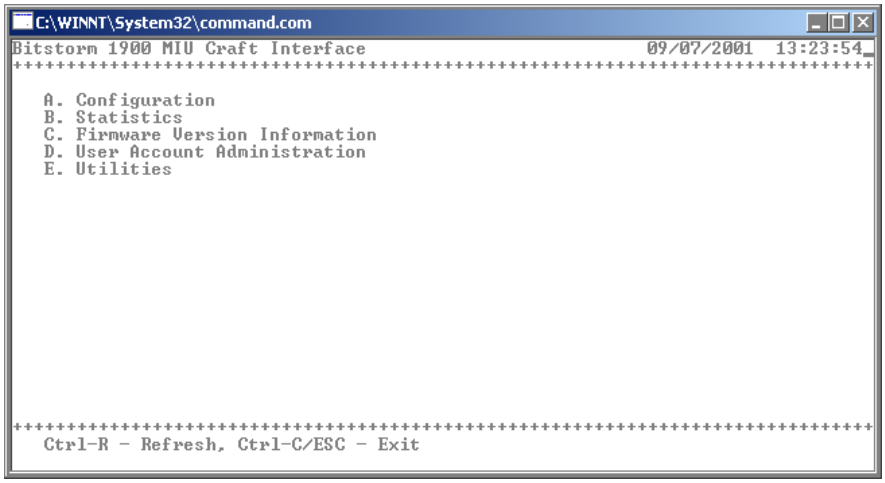
16.) Type a new user name, then press **<Enter>** (a confirmation will follow indicating that the user name has been saved). Press any key to return to the *User Account Administration* screen.

17.) Select *Change Password* to modify the password. The following screens display:



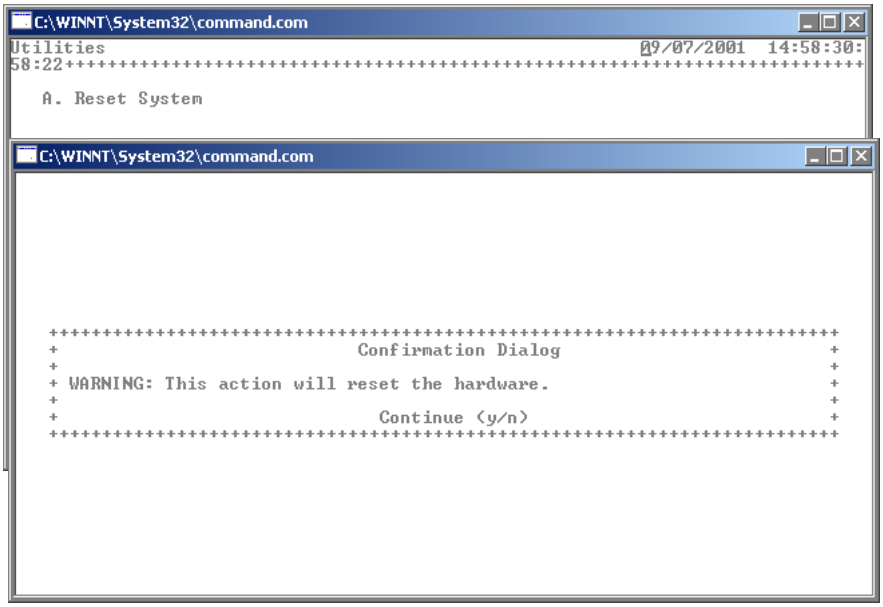
18.) Type a new password, then press **<Enter>**. Re-enter the password when prompted. A confirmation will follow indicating that the password has been saved. Press any key to return to the Main Menu screen.

Step Procedure (continued)



19.) Once all of the configuration parameters are entered, the system must be reset for the changes to take effect. To reset the system, type ***e*** to select *Utilities* from the *Main Menu* screen.

Step Procedure (continued)



20.) Type **a** to select *Reset System*, and then **y** to confirm.

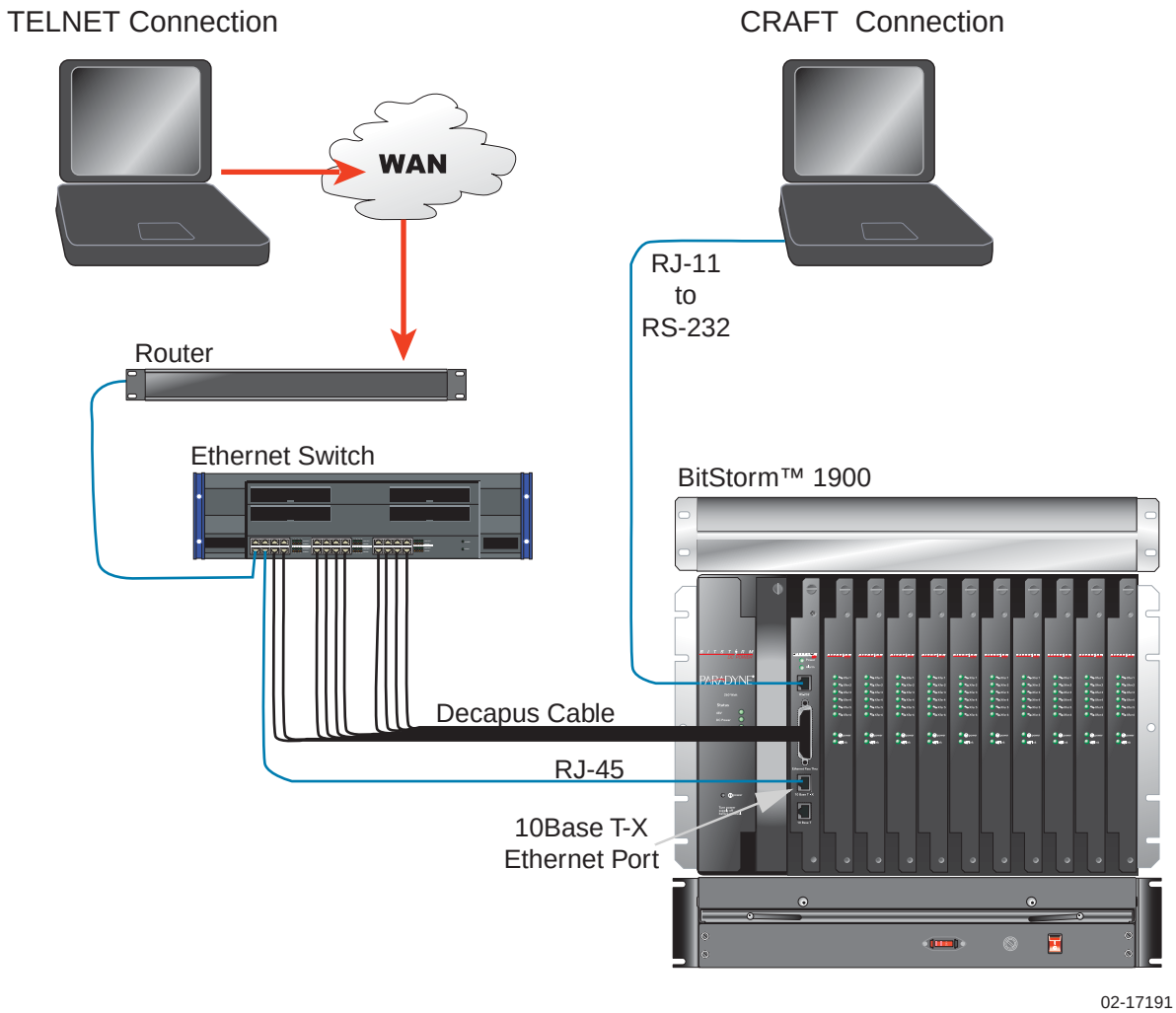
STOP

You have completed this task.

Task 013: Configuring Remote Management

The MIU can be remotely managed via the management 10Base T-X Ethernet port as shown in *Figure 2-20, "Telnet Connection for the BitStorm 1900."*

Figure 2-20: Telnet Connection for the BitStorm 1900



To access and configure the MIU SNMP function, clients will either use an SNMP Network Management Software solution (i.e., EMS 2.x, HP OpenView, CastleRock's SNMPc, etc.) or Telenet into the MIU and use the CLI (Command Line Interface).

Using SNMP Network Management Software

If the client is using SNMP Network Management Software, our private MIB must be loaded into the user's SNMP Network Manager using the procedure accompanying the specific Network Management Software.

A list of all supported MIBs and the private MIB can be found in document *1900-A2-GK40, BitStorm 1900 IP DSLAM Supported SNMP MIBs*. This document and private MIBs can be downloaded from the Paradyne website at **www.paradyne.com**.

Using Telnet for Remote Provisioning and Management

NOTE: Before using the Telnet option for remote management, the MIU must first be configured using the craft interface. This procedure is mandatory as an MIU I.P. address is required when accessing the MIU remotely.

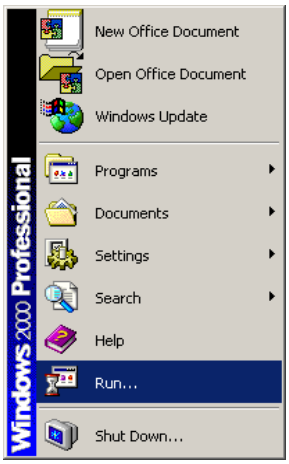
The following steps and procedures are provided to aide in configuring the MIU and setting the traps. (This is intended as a brief overview. Refer to document *1900-A2-GK40, BitStorm 1900 IP DSLAM Supported SNMP MIBs,* for more detailed information.)

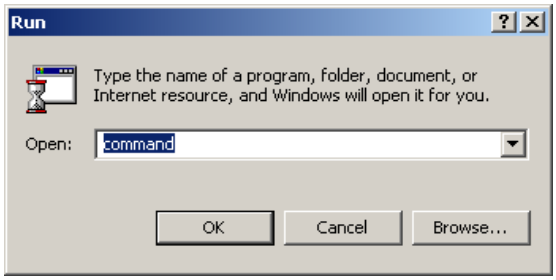
Step Procedure

1.) Initiate a Telnet session:

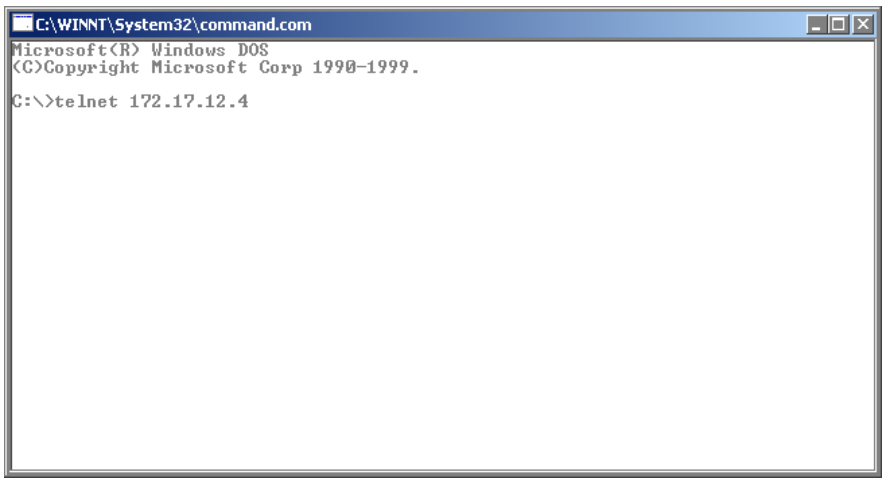
a.) From Windows, click on the **Start** button, then select **Run**.

Step Procedure (continued)



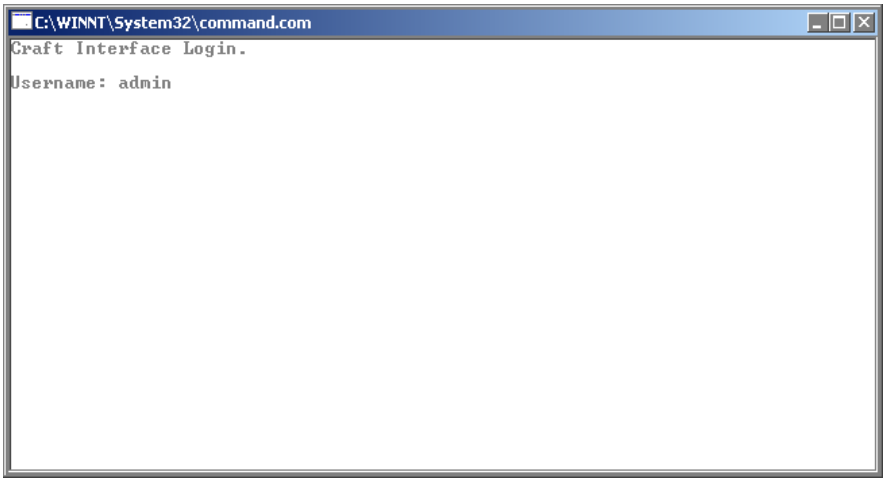


2.) Type **`command`** in the *`Open:`* field and click **`OK`**. The DOS prompt displays:



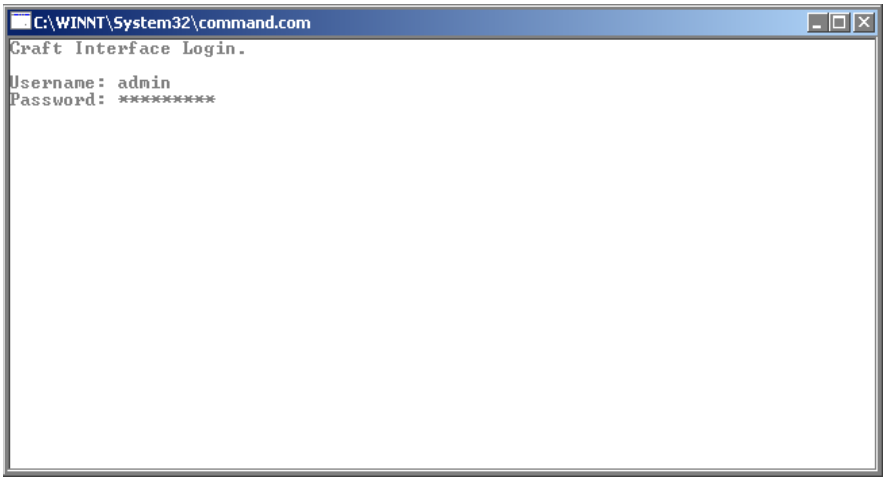
3.) At the DOS prompt type **`telnet`** and the **`I.P. Address`** for the MIU, then press **`<Enter>`**. The *`Craft Interface Login`* screen displays:

Step Procedure (continued)



4.) Type **admin** for the default *Username* and press **<Enter>**.

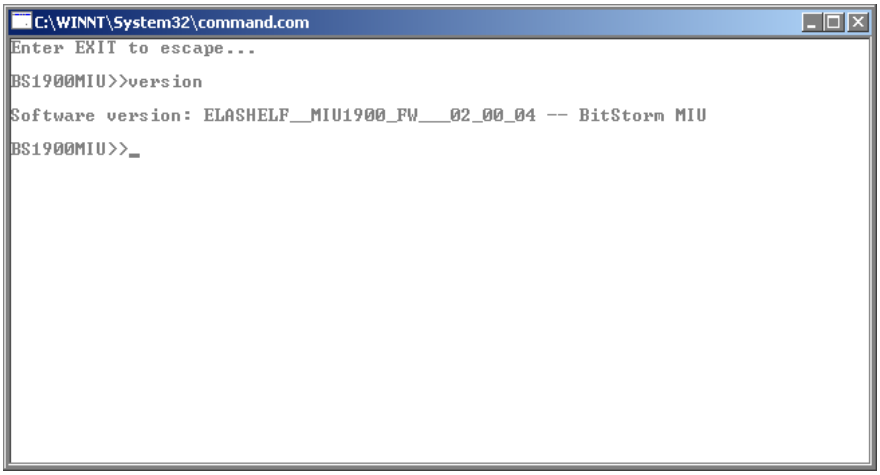
NOTE: The Craft Interface is case-sensitive. Make sure to type all entries in lowercase.



5.) Type **etherloop** for the default *Password* and press **<Enter>**.

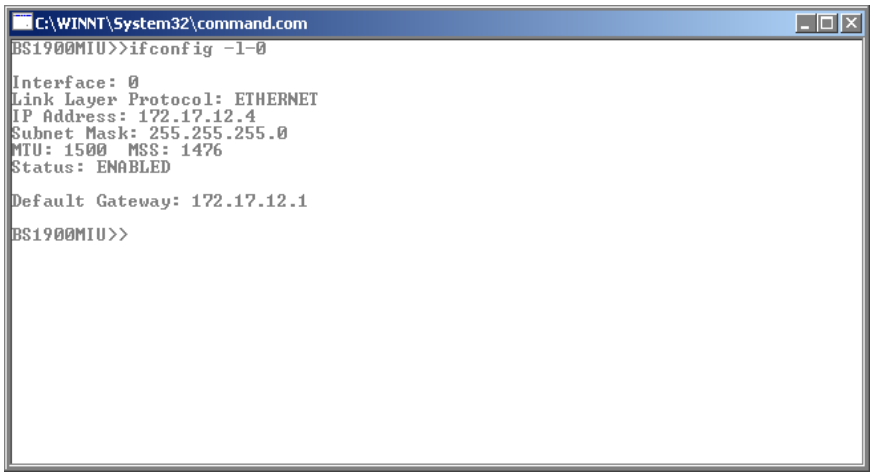
Step Procedure (continued)

The *BS1900MIU>>* prompt displays:



6.) Type **`version`** to check the current firmware version. To verify this is the latest version, contact our Technical Support organization at **www.paradyne.com**.

7.) Type **`ifconfig -L-0`** and press **<Enter>** and verify the current MIU configuration information.

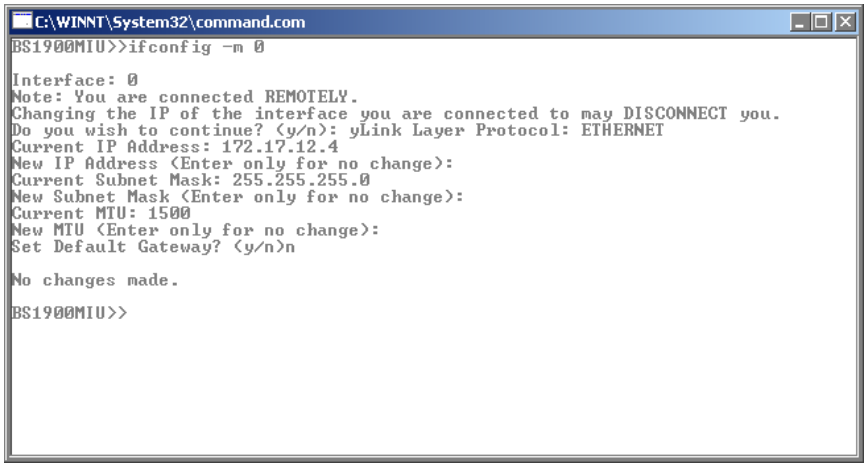


Step Procedure (continued)

8.) If any of the information needs to be modified, type:

`ifconfig -m 0` and press **`<Enter>`**.

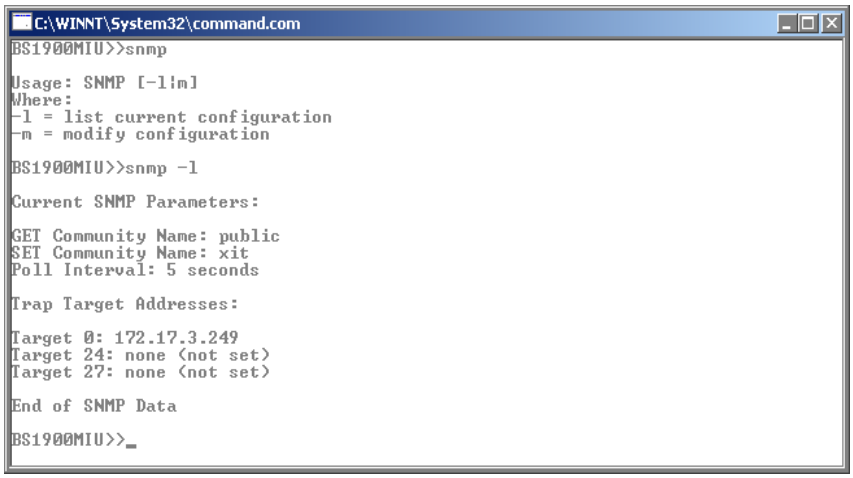
9.) The screen above displays indicating you are connected remotely to the MIU and asks if you would like to change the *IP* address of the MIU. Press ***y*** .



10.) From this screen changes to the I.P. Address, Current Subnet Mask, MTU, and Set Default Gateway can be made. If there is no change, press **`<Enter>`** to continue to the next item. Do not change the MTU or MSS settings.

Step Procedure (continued)

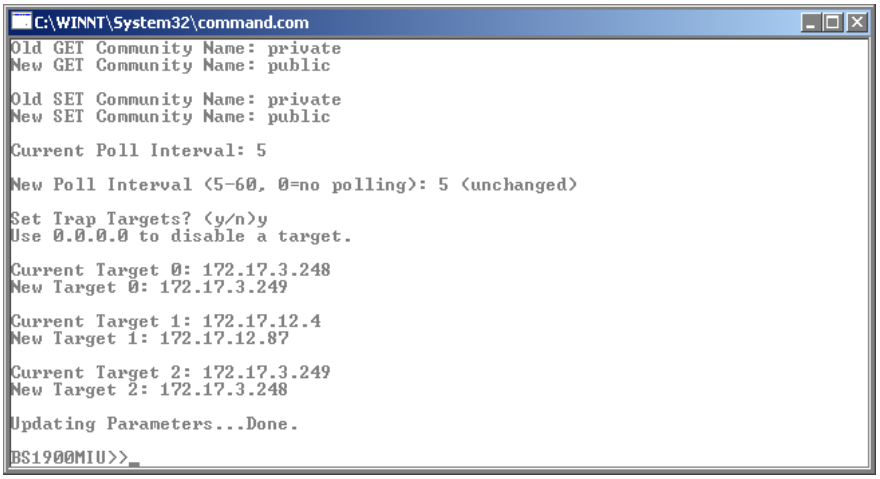
11.) To view the current SNMP parameters, type **`snmp -L`** and press **`<Enter>`**.



12.) Verify the correct *`Community Name`*, *`Poll Intervals`*, and *`Trap Target Addresses`*.

13.) To edit the SNMP configuration information type **`snmp -m 0`**.

Step Procedure (continued)

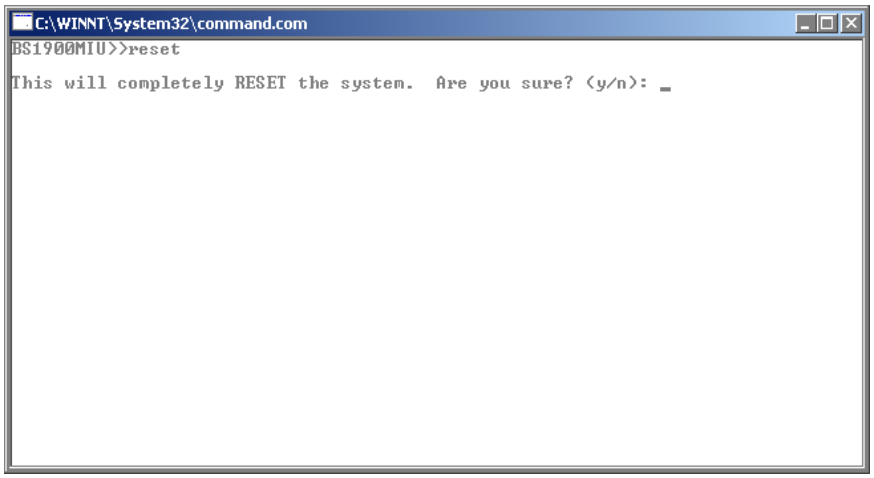


14.) From this screen changes to the *Community Name*, *Current Poll Interval*, and *Set Trap Targets* can be made. Refer to the following table as a guide for these settings. If there are no changes, press **<Enter>** to continue to the next item.

Setting	Description
Community Name	The *Community Name* is used by SNMP V1 as a minimum security control tool much like a user ID and/or password. • For this field, enter an identifier of up to 15 alpha characters.
Current Poll Interval	The *Current Polling Interval* provides the ability to set the poll interval in number of seconds. The SNMP Agent polls the modems every n seconds for trap conditions (alarms). (n=how often the equipment is polled.) • The acceptable range is 5 to 60 seconds (inclusive). • To disable the polling, set the poll interval to 0.
Set Trap Targets	*Set Trap Targets* is used to set the IP Address of the Network Management Stations where the SNMP Traps are designated to. • Up to 3 Trap Targets can be set.

Step Procedure (continued)

15.) If changes to the configuration have been made, the system must be reset. Type **`reset`** and press **`<Enter>`**, then **`y`** to confirm.



NOTE: When logging back into the MIU, the new IP Address must be entered.

Refer to *Table 2-3, "CLI (Command Line Interface) Commands," on page 76*, for additional CLI commands for remote management. Also, refer to document *1900-A2-GK40, BitStorm 1900 IP DSLAM Supported SNMP MIBs*, for additional information.

STOP

You have completed this task.

Task 014: Testing the BitStorm 1900 Installation

Testing a BitStorm 1900 installation includes the following tasks:

- Testing voice connectivity
- Testing data connectivity
- End-to-end connectivity

The following sections contain testing-related information followed by the BitStorm 1900 testing tasks. Testing tasks for network support equipment such as LAN/WAN routers are not included in this document.

BitStorm 1900 Testing Locations

Primary test points for installation include the following:

- Customer premises cross-connect containing the connections for the BitStorm 1900 and customer premises equipment
- Modem user locations

If the system is having trouble, other test points may be required.

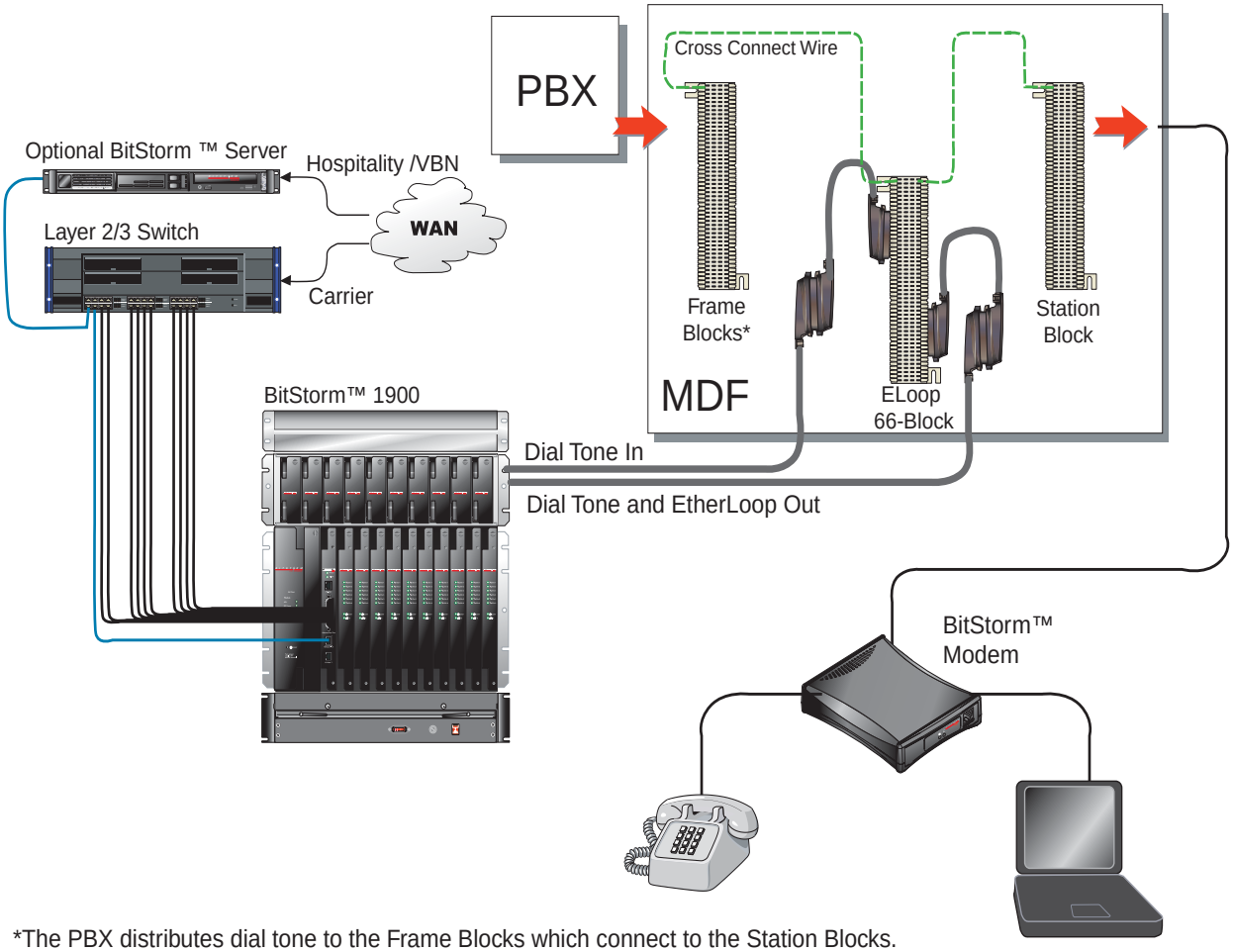
Step Procedure

1.) Review the BitStorm 1900 Test Point Diagrams as follows:

- *Figure 2-21, "Voice/Data System Test Points," on page 97* shows the schematic layout and primary test points of a BitStorm 1900 voice/data system.
- *Figure 2-22, "Data-only System Test Points," on page 98* shows the schematic layout and primary test points of a BitStorm 1900 data-only system.

Step Procedure (continued)

Figure 2-21: Voice/Data System Test Points

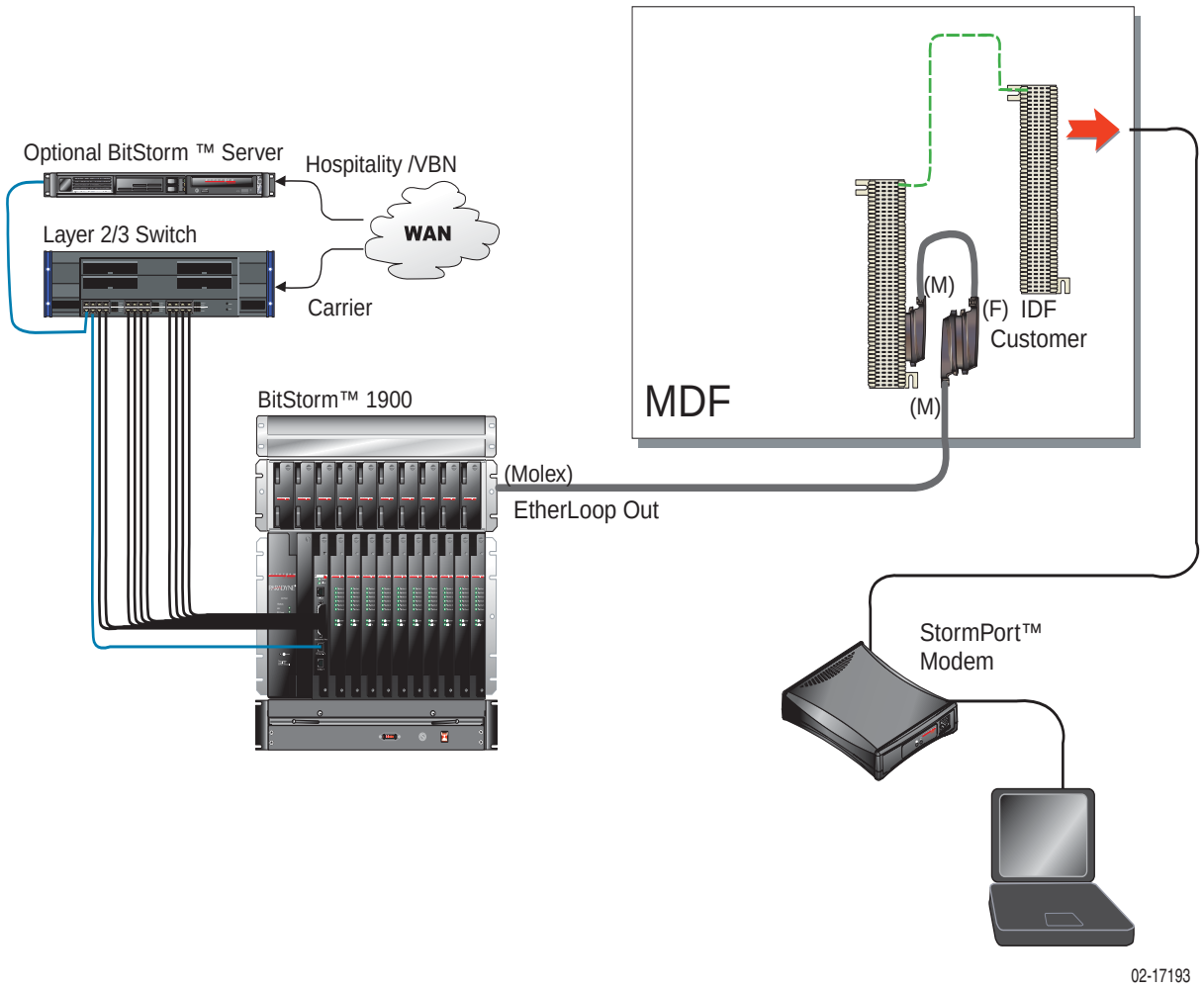


*The PBX distributes dial tone to the Frame Blocks which connect to the Station Blocks.

02-17192

Step Procedure (continued)

Figure 2-22: Data-only System Test Points



STOP

You have completed this task.

Task 015: Testing Voice Connectivity

This procedure checks the voice connectivity in BitStorm 1900 voice/ data applications.

Requirements

The following is required to do this procedure:

- External voice facility point-of-presence equipment installed
- Tip/Ring assignments
- Standard telecommunications hand-test telephone set

Step Procedure

1.) Identify the voice line being tested. Turn on the BitStorm 1900.

2.) Connect the hand test set Tip and Ring testers to the Tip/Ring pair at the customer premise cross-connect.

3.) Test for dial tone. A successful test indicates that voice service is passing through the filter shelf.

4.) If no dial tone is present, refer to *"Chapter 3. BitStorm 1900 Maintenance" on page 103*, for troubleshooting information.

You have completed this task.

Task 016: Testing Data Connectivity

This procedure checks data connectivity from the customer premise distribution frame and the BitStorm 1900 shelf.

Requirements

A StormPort Modem with power adapter and extension cord (if necessary) is required for this procedure.

Step Procedure

1.) Identify the data connections being tested at the EtherLoop cross-connect block and the Modem card on the BitStorm 1900 shelf.

2.) Install and connect the modems on the corresponding lines at the customer premises locations.

3.) Connect power to the modem.

4.) Turn on the BitStorm 1900.

5.) Observe the modem and BitStorm 1900 Modem card LEDs. After about 4-5 minutes, all LEDs at both the BitStorm 1900 and CPE locations should be green, with the transfer LEDs flickering.

You have completed this task.

Task 017: EtherLoop End-to-End Testing

This procedure checks the EtherLoop system installation, including simultaneous voice and data EtherLoop tests from the modem to the voice and data networks.

Requirements

The EtherLoop end-to-end system testing requires the following:

- Modem installed and powered
- Data network equipment installed and configured, including connection from EtherLoop to Internet, Intranet or LAN
- User room telephone or telephone test set with RJ-11 connection to the StormPort modem
- Ethernet 10Base-T cable with RJ-45 terminations
- Laptop personal computer equipped with the following:
  - Ethernet PC card configured for TCP/IP
  - Ethernet PC card RJ-45 adapter cable
  - Internet browser application, either *Internet Explorer* 4.0 (or higher) or *Netscape Navigator* 3.0/4.0 (or higher)

Step Procedure

1.) Identify the modem pair being tested.

2.) Verify dial tone on the room phone.

3.) If the laptop is running, shut it down.

4.) Connect the Ethernet PC card RJ-45 adapter cable to the Ethernet PC card.

5.) Connect one RJ-45 plug of the Ethernet cable to the PC card RJ-45 adapter, and the other end to the "To PC" RJ-45 port on the StormPort modem.

6.) Start the laptop, and launch the browser application.

Step Procedure (continued)

NOTE: The browser application must be configured for "no proxies." Refer to "Chapter 3. BitStorm 1900 Maintenance" on page 103 for more information."

7.) In the browser application, enter the IP address of a known, working site on your network or on the Internet. Repeat this step for several sites.

8.) Once data connectivity has been established in step 7, verify dial tone again on the room phone.

9.) If the voice or data connectivity fails, refer to *"Chapter 3. BitStorm 1900 Maintenance" on page 103*.

You have completed this task.

3. BitStorm 1900 Maintenance

This chapter contains guidelines and checklists for the maintenance of the BitStorm 1900 system.

Maintenance Guidelines

The following factors can cause service problems in an EtherLoop system installation:

- Poor wiring conditions
- Incomplete cable connections
- Improper BitStorm 1900 equipment installation
- Improper data network equipment configuration
- Equipment failure

The following sections briefly describe each of these potential problem causes.

Wiring Conditions

In general, EtherLoop systems can function well on standard, twisted pair phone lines (Category 3 or better). However, in older facilities, extremely poor wiring conditions may exist that can adversely impact EtherLoop performance, Also, RJ-11 wall jack connectors can become corroded, which may not impact voice service other than generating some static on the line, but can interfere with EtherLoop data service.

Cable Connections

It is important to ensure that all connections to the EtherLoop system are firmly seated and secured. An incomplete connection at any one point could cause the EtherLoop system to malfunction.

BitStorm 1900 Equipment Installation

BitStorm 1900 equipment is relatively simple to install. However, if an equipment card is installed in the wrong slot, or if the cards are not firmly seated in their backplane connectors, the EtherLoop system will not function.

Data Network Equipment Configuration

For an EtherLoop system to function, the data network supporting the system must be properly configured. For example, IP addresses must be correct, and the network router must be configured properly.

Equipment Failure

LEDs on the BitStorm 1900 shelf and on the modem indicate if any equipment failures have occurred in the EtherLoop system.

Maintenance Checklists

Voice/Data Connectivity Troubleshooting Checklist

Table 3-1: Voice/Data Connectivity Maintenance in Facility Room

Problem	Maintenance Check
No voice or data service	• Verify that the correct Tip/Ring pairs are being tested for both voice and data • Verify power at all points in the system • Check jumper connections at all cross-connects • Verify connections and wiring conditions at all points
Voice but no data service	• Verify that the correct Tip/Ring pairs are being tested for both voice and data • Check jumper connections • Check LEDs at intermediate hub or InterProxy/router connections • Check for 10Base-T cable damage • Verify that Modem card is present in correct slot and fully seated in BitStorm 1900 backplane connection • Replace Modem card to check for bad card • Verify that the MIU Shelf Processor is in correct slot and fully seated in the BitStorm 1900 backplane connection • Replace Hub card to check for bad card
Data but no voice service	• Verify that the correct Tip/Ring pairs are being tested for both voice and data • Check jumper connections at PSTN/PBX cross-connect • Check dialtone at the PSTN/PBX cross-connect to verify that there is not an external voice network problem • Verify that Filter card is present in correct slot and fully seated in the Filter Shelf • Replace Filter card to check for bad card

End-to-End Maintenance Checklist

Table 3-2: End-to-End Maintenance Checklist

Problem	Check
No voice or data service	• Verify power at all points in the system • Verify connections and wiring conditions at all points
Voice but no data service	• Verify that there is not an external network problem such as a server being down • Verify that the Ethernet card on the PC connected to the modem has been configured • Verify that the correct type of Ethernet cable (“straight” or “crossover”) is being used for the application. • Verify that the green LEDs at the various Ethernet connection points are lit • Check for 10Base-T cable damage • Verify router configuration and installation • See the checklist in *Table 3-1, “Voice/Data Connectivity Maintenance in Facility Room,” on page 105*.
Data but no voice service	• Check dialtone at the PSTN/PBX cross-connect to verify that there is not an external voice network problem • Check/replace filter card in filter shelf

Appendix A. Installation Requirements

This appendix describes the facility requirements for the BitStorm 1900 shelf and filter shelf.

BitStorm 1900 Support Equipment

Equipment and materials that must be installed to support the BitStorm 1900 shelf include the following:

- Telecommunications bay/rack to support the BitStorm 1900 shelf and the filter shelf (if applicable)
- -48 V DC or 110 V AC power supply
- -48 Vdc or 110/220 V AC Fan Shelf (if applicable)
- Grounding facility
- Network support equipment

The following sections list the specifications and requirements for each of these components.

Bay Requirements and Specifications

The bay containing the BitStorm 1900 shelf must meet the following requirements:

- The equipment bay must be capable of supporting the BitStorm 1900 weight and dimensions. We recommend a standard 19-inch wide x 7-foot tall bay intended for use with telecommunications equipment. A 23-inch wide telecommunications bay can be used with the appropriate 19-inch flange adapters.

- The bay must be installed and secured in accordance with standard telecommunications industry practices
- Use an Isolation Kit to isolate the bay from building structures and outside elements for "in-building" installations (i.e., enterprise, MDU, and MTU).
- The bay must be electrically grounded according to standard telecommunications industry practices

BS1900 System Specifications

Table A-1, "BitStorm 1900 System Specifications" shows the power specifications for the BitStorm 1900 shelf.

Table A-1: BitStorm 1900 System Specifications

BitStorm 1900 System Specifications		
Description	**Front Mount 10306 Full[1]**	**Front Mount 10224 Full[2]**
Lines Per Chassis	60 Lines, 10 Megabit	240 Lines, 10 Megabit
Weight	50 lbs.	46 lbs.
Height	12.1875”	12.1875”
Width	12”	12”
Required Rack Units	13	13
Depth	12”	12”
Cabled Depth	17.5”	17.5”
Cabled Ear to Front (Front Mount)	4”	4”
Cabled Ear to Front (Mid Mount)	7.75”	7.75”
Cabled Ear to Back (Mid Mount)	13.5”	13.5”
Cabled Ear to Back (Mid Mount)	9.75”	9.75”
Humidity (Non-Condensing)	1% to 90%	1% to 90%
Ambient Temp. Rating	5^{o}C to 40^{o}C	5^{o}C to 40^{o}C
Altitude	-200 to 13,123’	-200 to 13,123’

Table A-1: BitStorm 1900 System Specifications (continued)

BitStorm 1900 System Specifications		
Description	**Front Mount 10306 Full[1]**	**Front Mount 10224 Full[2]**
Connectors	• 2 Rows of Omni-Grid Connectors for Data Out • Rear Top Row- Left to Right: Cards 10-1, Lines 1-12 on each card • Rear Bottom Row- Left to Right: Cards 10-1, Lines 13-24 each card (10224 Cards Only) • Rear Top Two right most connecotrs are not used in current configurations. • Mate-n-Lock Power Connector for DC Power Cards (Not used with AC) • Alarm Connector (Not Currently Used) • WAN Interface (WAN Card Specific- See Individual WAN Card Details)	
Dependencies	Air Baffle, Fan Tray	Air Baffle, Fan Tray
Cable List	See Individual Cards	See Individual Cards
Certifications	FCC Part 15, Subpart B, Class A, UL 60950, cUL, NEBS Level 3, CE, TNV-3, ETSI ETS 300 386-2	FCC Part 15, Subpart B, Class A, UL 60950, cUL, NEBS Level 3, CE, TNV-3, ETSI ETS 300 386-2

1 10306 configuration assumes a full chassis consisting of a 260 Watt AC Power Card, MIU and 10-10306 CO Cards.

2 10224 configuration assumes a full chassis consisting of a 260 Watt AC Power Card, MIU and 10-10224 CO Cards.

Fan Trays

The fan shelf provides forced-air cooling in the 7RU modem chassis and 3RU filter chassis. The -48 V DC fan tray is ideal for the Central Office (CO) and the 110/220 V AC fan tray is geared toward the enterprise. Fan shelves are **required** for any chassis housing one or more 10 Mbps CO modem cards.

Grounding Environment Specifications

The grounding environnment for the bay containing the BitStorm 1900 shelf must meet local electrical codes and Integrated Building Distribution Network (IBDN) standards. The grounding environment for the BitStorm 1900 shelf and its supporting bay can be either a Common Bonding Network (CBN) or an Isolated Bonding Network

(IBN) environment. Either of these environments may use a 1/0 AWG ground collector.

The following sections offer guidelines for each of these environments, with and without ground collectors. See local electrical codes or the appropriate IBDN standards for more information.

CBN Grounding Environment

In most facilities using the CBN environment, the bay containing the BitStorm 1900 shelf should be grounded to a frame ground bar (FGB) as the common ground point using a 6 AWG, stranded, ground conductor. In smaller facilities where no FGB exists, the building principal ground (BPG) must be used.

If the facility has a ground collector, the bay must be grounded to the connector using a 6 AWG (stranded) ground conductor to the collector. The collector must then be grounded to the common ground point (FGB or BPG) using a 2 AWG (stranded) ground conductor.

If the distance from the FGB, BPG or ground collector is greater than 53 ft (16 m), a 2 AWG (stranded) ground conductor must be used to ground the bay.

IBN Grounding Environment

In most facilities using the IBN environment, the bay containing the BitStorm 1900 shelf should be grounded using a 6 AWG, stranded, ground conductor to the building single-point ground (SPG) as the common ground point. In smaller facilities where no SPG exists, the building principal ground (BPG) must be used.

If the facility has a ground collector, the bay must be grounded to the connector using a 6 AWG (stranded) ground conductor to the collector. The collector must then be grounded to the common ground point (SPG or BPG) using a 2 AWG (stranded) ground conductor.

If the distance from the SPG, BPG or ground collector is greater than 53 ft (16 m), a 2 AWG (stranded) ground conductor must be used to ground the bay.

Network Support Equipment

The network support equipment that may need to be installed includes the following:

- Ethernet 10 Base-T hub port for BitStorm 1900 Hub card connection (one per BitStorm 1900 shelf)
- Ethernet 10 Base-T hub ports for StormTracker/InterProxy (two per StormTracker)
- LAN router connections
- WAN gateway connection

Network support requirements will vary according to the existing facility resources. We suggest using a site survey questionaire to ensure all requirements are identified. Paradyne Partners will find surveys on our Partners site at **www.paradyne.com**.

BS1900 Component Installation Requirements

Table A-2, "BitStorm 1900 Components" lists the component requirements for the BitStorm 1900.

Table A-2: BitStorm 1900 Components

Part#	BitStorm Component	Rules/Capacity
01-00039-10	BitStorm 1900 Shelf (empty)	10 CO Modem Cards 1 Power Card 1 MIU Card
06-00010-01	Blank Filler Card	1 included; 1 per empty modem slot Required w/Fan Tray
01-00080-01	DC, 260W Power Card	Powers 10306 w/MIU
01-00079-01	AC, 260W Power Card	Powers 10306 w/MIU
01-00075-01	MIU Card w/Cable	1 per shelf
01-00153-01	10306 CO Modem Card	6 Dedicated 10 Mbps EtherLoop Lines,
01-00164-01	10224 CO Modem Card	24 EtherLoop Lines: 10 Mbps 24 Stat-Mux; 12 ports per 10 Mbps modem
01-20029-01	Filter Shelf, 3RU (empty)	10 filter cards; 120 filters 1 per two BitStorm 1900 w/10306 2 per BitStorm 1900 w/10224

Table A-2: BitStorm 1900 Components (continued)

Part#	BitStorm Component	Rules/Capacity
01-30036-01	Filter Card, 3RU	12 filters; 1 filter card per two 10306 cards 2 filter cards per 10224
04-00007-10	Champ to Dual Omni Grid	2 per four 10306 cards 2 per 10224
04-00008-18	Omni Grid to Dual Omni Grid	2 per 10224 w/filter shelf
04-00028-01	Omni Grid to Dual Omni Grid	1 per two 10306 cards with filter shelf
03-00003-01	Air Baffle	1 per BitStorm 1900
01-00085-01	Bulk Pack 5 Fan Tray Filters	Replace every 6 months (Required DC fan tray for NEBs compliance) DO NOT install a filter in an AC fan tray – only the filter frame.
01-00084-01	DC Fan Tray	1 per BitStorm 1900 w/MIU (An air filter must be installed to meet NEBs)
01-00084-02	AC Fan Tray	1 per BitStorm 1900 w/MIU (DO NOT install an air filter – only the air filter frame.)

Installation Tools and Materials

The tools and materials required to install the BitStorm 1900 shelf include the following:

- 4 bay mounting screws
- 1 medium Phillips-head screwdriver
- 1 cross-connect block matching the existing blocks used in the facility MDF, such as Siemon R66, BIX, or AT&T 110 cross-connect blocks
- 1 wiring punch-down tool intended for use with the cross-connect block
- Cross-connect jumper wires (24 AWG, quantity varies) for tip/ring connections

BitStorm 1900 Physical Characteristics

This section specifies the physical dimensions and weight of the BitStorm 1900 and filter shelves

Table A-3, "BitStorm 1900 Weight and Dimensions" includes the shelf weight and dimensions.

Table A-3: BitStorm 1900 Weight and Dimensions

Specification	Weight (metric)
Weight (without cards)	19 lbs.
Weight (with cards)	43.4 lbs.
Height	12.1875 in.
Width	17.5 in.
Depth	12 in.

Installation Site Requirements

Equipment Location

The BitStorm 1900 should be isolated from other machinery and should have a minimum distance of 30 inches from UV lighting to prevent Electrostatic Discharge (ESD).

The BitStorm 1900 should not be installed in laundry rooms, workshops, janitorial closets, chemical storage sites, carpeted areas, or any other locations where potentially harmful airborne particles may be present.

Table A-4, "BitStorm Operational Requirements" includes the installation site requirements for the BitStorm 1900 shelf.

Table A-4: BitStorm Operational Requirements

Specification	Requirement
Local area network environment	Layer 2 Ethernet
Power supply	-48 V DC nominal -46 to -56 V DC acceptable range or 110 V AC
Environmental	Operating temperature: 5°C (41°F) to 40°C (104°F) Relative Humidity: 1% to 90% Air quality should be good to excellent Electromagnetic emissions: Per FCC Part 15 Class A and EN 55022

WARNING: POSSIBLE EQUIPMENT DAMAGE! For compliance with Telcordia GR-1089-CORE, Outside Plant Voltage/Current Limiting Protection is required for each Outside Plant Exposed line.

Appendix B. Cabling Specifications

This appendix contains the specifications for the cabling used with the 10306 and 10224 modem cards in the BitStorm 1900 shelf. The illustrations associated with each of the modem card cabling sections show typical rack layouts. (These configurations change according to the particular implementation needs of the customer.)

Cable Connections and Specifications

This section includes cable connections and specifications for the 10306 and 10224 modem cards using the Filter Shelf and Filter Blocks.

10306 Modem Card Cabling

Refer to *Figure B-1,"Cabling – Filter Shelf with 10306 Modem Cards," on page 116*, for the 10306 cable connections using a filter shelf and 66-Block. *Figure B-2,"Cabling – Filter 66-Block with 10306 Modem Cards," on page 117*, illustrates the connections for the 10306 modem card using a Filter 66-Block.

Figure B-1: Cabling – Filter Shelf with 10306 Modem Cards

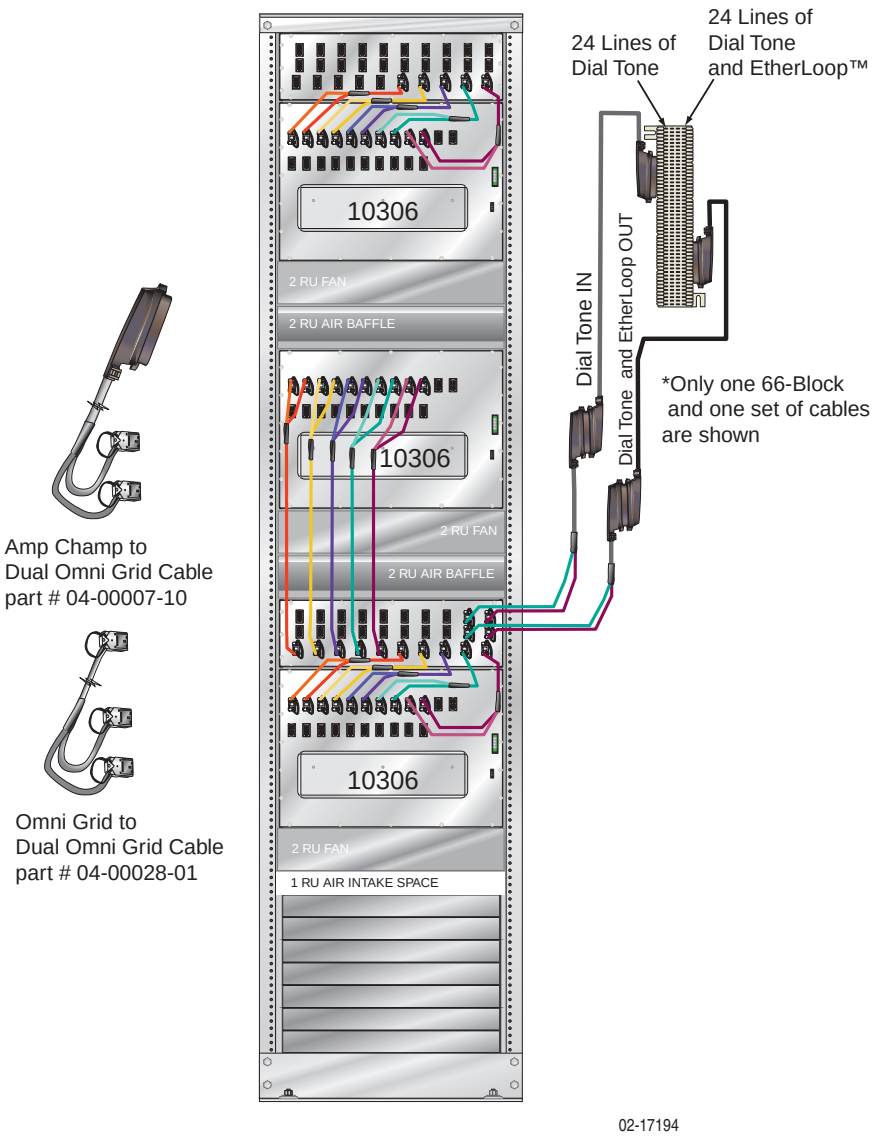
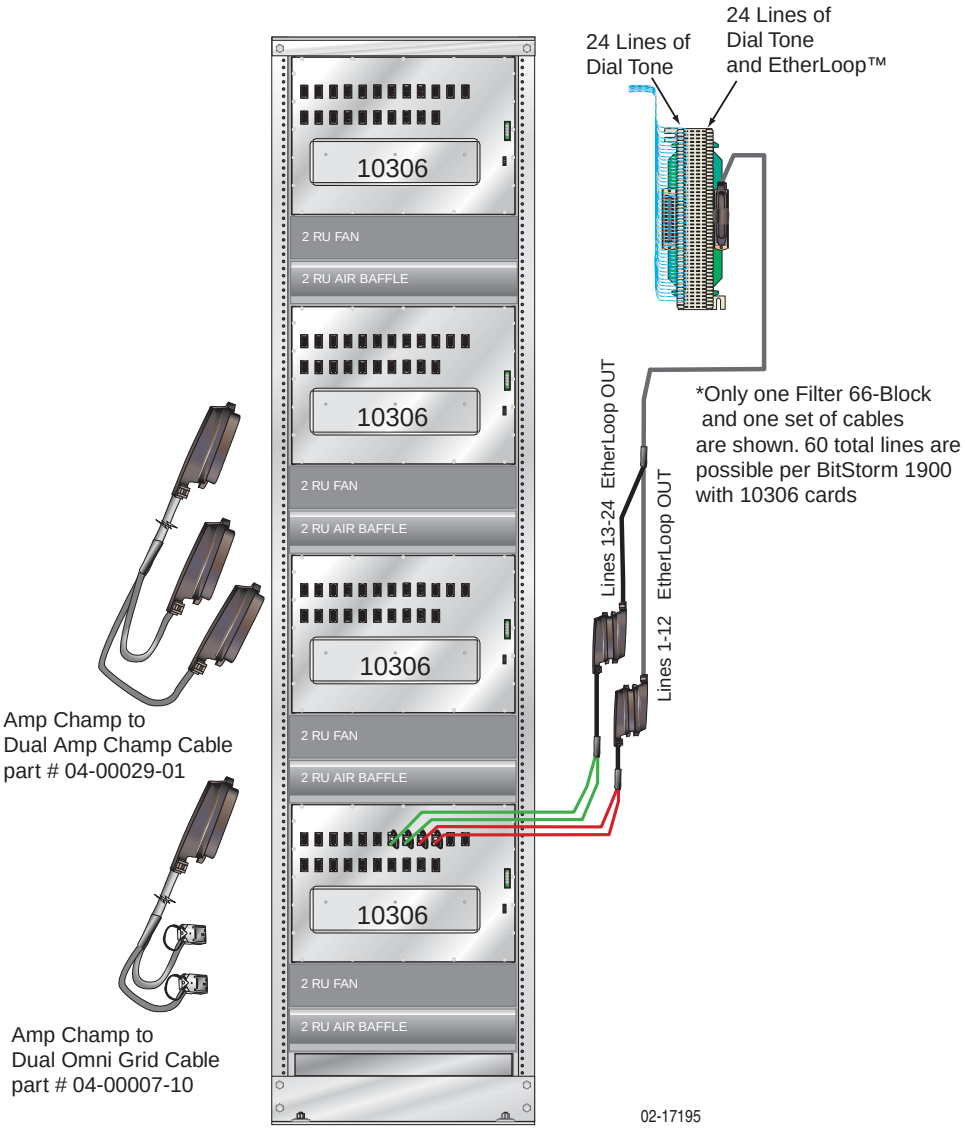


Figure B-2: Cabling – Filter 66-Block with 10306 Modem Cards



10224 Modem Card Cabling

Figure B-3,"Cabling – Filter Shelf with 10224 Modem Cards," on page 118, for 10224 cable connections using a filter shelf and 66-Block. *Figure B-4,"Cabling – Filter 66-Block with 10224 Modem Cards," on page 119*, illustrates the connections for the 10224 modem cards using a Filter 66-Block.

Figure B-3: Cabling – Filter Shelf with 10224 Modem Cards

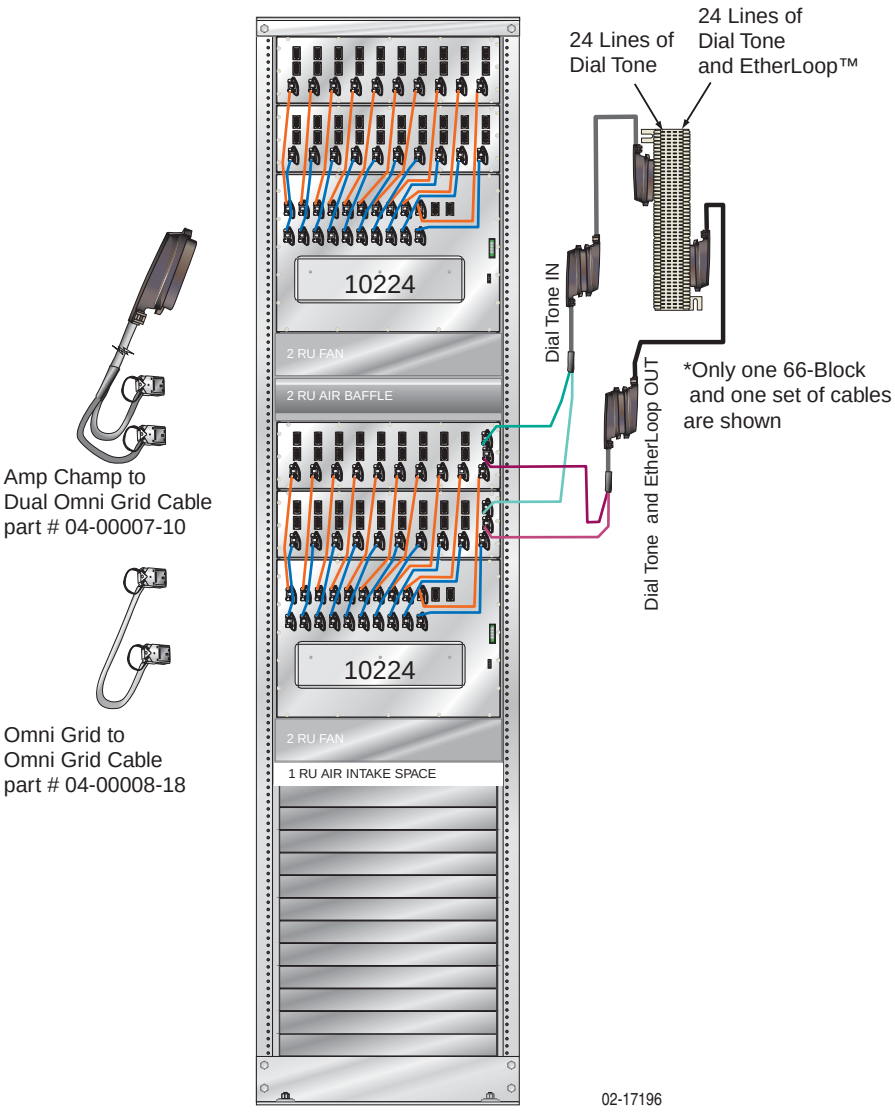
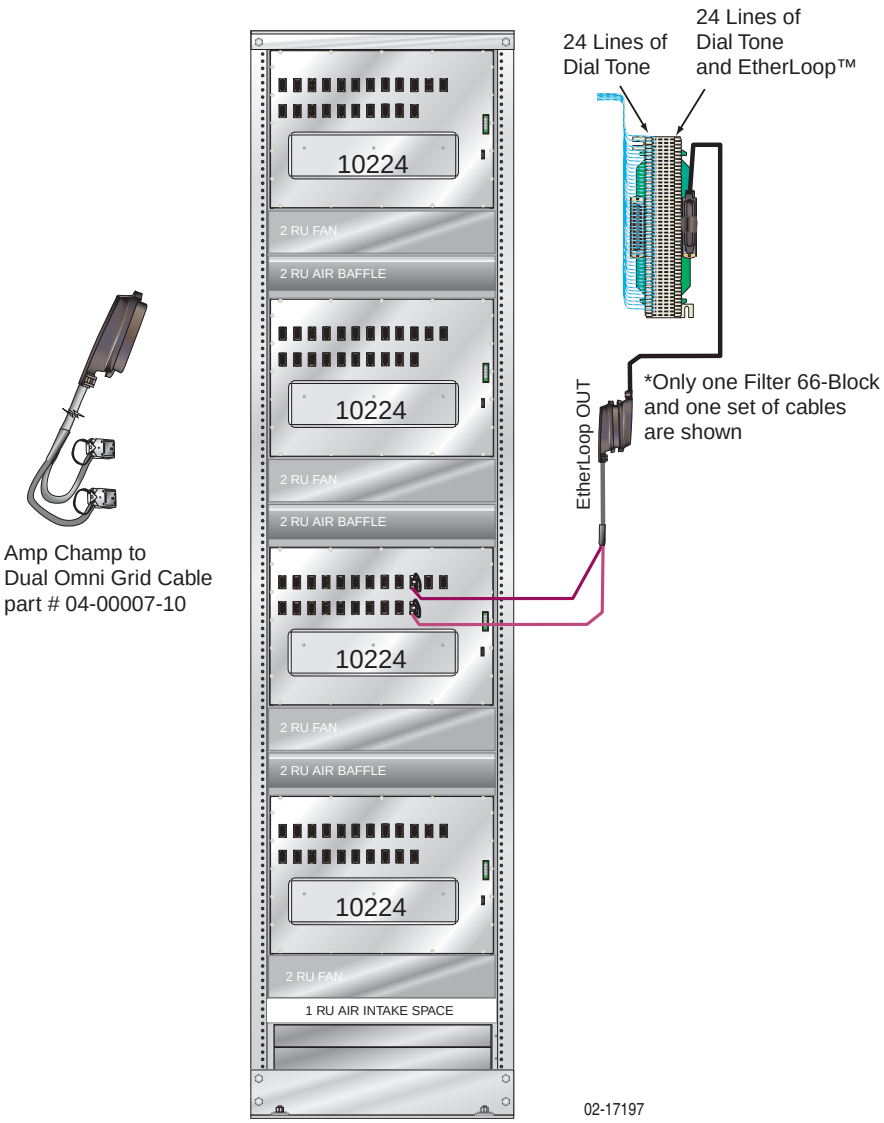


Figure B-4: Cabling – Filter 66-Block with 10224 Modem Cards

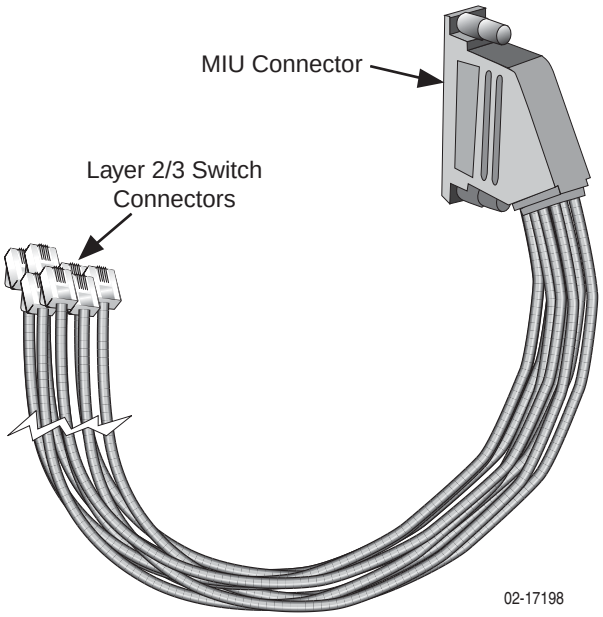


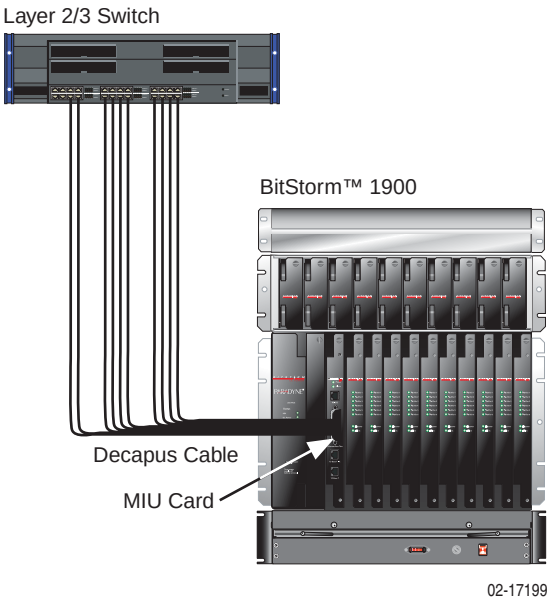
BitStorm 1900 Cable Harness

Figure B-5 (on next page) illustrates the BitStorm 1900 cable assembly (DSUB50P to 10x RJ45). This cable connects the MIU card to the layer 2/3 switch.

Decapus Cable

Figure B-5: Decapus Cable Connections





AMP-Champ to Dual AMP Champ Cable

The AMP Champ to Dual AMP Champ cable connects from the Filter 66-Block to an AMP Champ Omni Grid cable, which connects to the 10306 cards. Refer to *Figure B-6* (shown below) and to *Table B-1, "AMP-Champ to Dual AMP-Champ Cable Specifications," on page 122* for cable specifications.

Figure B-6: AMP Champ to Dual AMP Champ Cable (Part #: 04-00029-01)

Table B-1: AMP-Champ to Dual AMP-Champ Cable Specifications

Conn1	Color Code of Cable 1	Conn2
1	BL/W	1
26	W/BL	26
2	O/W	2
27	W/O	27
3	G/W	3
28	W/G	28
4	BR/W	4
29	W/BR	29
5	S/W	5
30	W/S	30
6	BL/R	6
31	R/BL	31
7	O/R	13
32	R/O	38
8	G/R	14
33	R/G	39
9	BR/R	15
34	R/BR	40
10	S/R	16
35	R/S	41
11	BL/BK	17
36	BK/BL	42
12	O/BK	18
37	BK/O	43

Conn1	Color Code of Cable 2	Conn3
13	G/BK	1
38	BK/G	26
14	BR/BK	2
39	BK/BR	27
15	S/BK	3
40	BK/S	28
16	BL/Y	4
41	Y/BL	29
17	O/Y	5
42	Y/O	30
18	G/Y	6
43	Y/G	31
19	BR/Y	13
44	Y/BR	38
20	S/Y	14
45	Y/S	39
21	BL/V	15
46	V/BL	40
22	O/V	16
47	V/O	41
23	G/V	17
48	V/G	42
24	BR/V	18
49	V/BR	43

AMP Champ to Dual Omni Grid Cable

The AMP Champ to Dual Omni Grid cable is used to connect the Filter Shelf or Filter 66-Block with 10306 and 10224 CO modem cards to the AMP Champ to AMP Champ cable the cross connect. For 10306 and 10224 CO modem cards connecting to a Filter 66-Block, this cable connects to the AMP Champ to Dual AMP Champ cable. Refer to *Figure B-7* (shown below) and *Table B-2, "AMP Champ to Dual Omni Grid Cable Specifications," on page 124* for cable specifications.

Figure B-7: AMP Champ to Dual Omni Grid Cable (Part #: 04-00007-10)

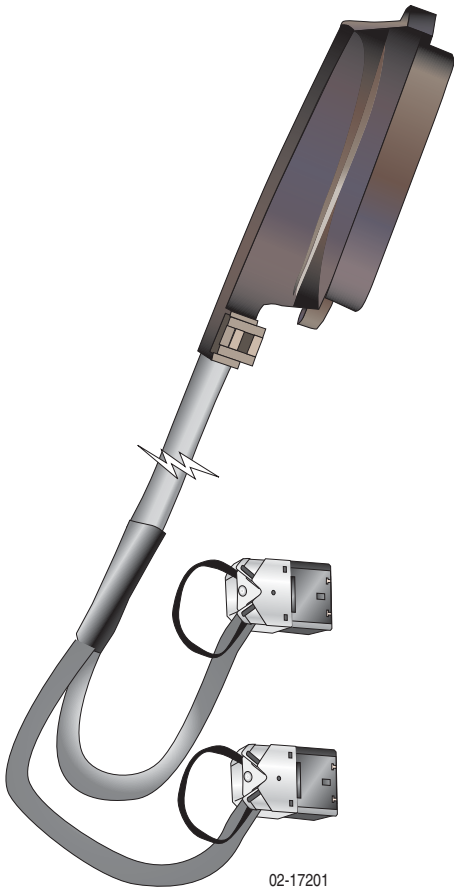


Table B-2: AMP Champ to Dual Omni Grid Cable Specifications

From Conn	From Pin #	With Pair #	Color Code	To	To Pin #
J1	B2	R1	BLU/WHT	P1	1
	E2	R2	OR/WHT		2
	B3	R3	GR/WHT		3
	E3	R4	BR/WHT		4
	B4	R5	SLT/WHT		5
	E4	R6	BLU/RED		6
	B6	R7	OR/RED		7
	E6	R8	GR/RED		8
	B7	R9	BR/RED		9
	E7	R10	SLT/RED		10
	B8	R11	BLU/BLK		11
	E8	R12	OR/BLK		12
J2	B2	R13	GR/BLK		13
	E2	R14	BR/BLK		14
	B3	R15	SLT/BLK		15
	E3	R16	BLU/YEL		16
	B4	R17	OR/YEL		17
	E4	R18	GR/YEL		18
	B6	R19	BR/YEL		19
	E6	R20	SLT/YEL		20
	B7	R21	BLU/VIO		21
	E7	R22	OR/VIO		22
	B8	R23	GR/VIO		23
	E8	R24	BR/VIO		24
	N/A		SLT/VIO		25

From Conn	From Pin #	With Pair #	Color Code	To	To Pin #
J1	A2	T1	WHT/BLU	P1	26
	D2	T2	WHT/OR		27
	A3	T3	WHT/GR		28
	D3	T4	WHT/BR		29
	A4	T5	WHT/SLT		30
	D4	T6	RED/BLU		31
	A6	T7	RED/OR		32
	D6	T8	RED/GR		33
	A7	T9	RED/BR		34
	D7	T10	RED/SLT		35
	A8	T11	BLK/BLU		36
	D8	T12	BLK/OR		37
J2	A2	T13	BLK/GR		38
	D2	T14	BLK/BR		39
	A3	T15	BLK/SLT		40
	D3	T16	YEL/BLU		41
	A4	T17	YEL/OR		42
	D4	T18	YEL/GR		43
	A6	T19	YEL/BR		44
	D6	T20	YEL/SLT		45
	A7	T21	VIO/BLU		46
	D7	T22	VIO/OR		47
	A8	T23	VIO/GR		48
	D8	T24	VIO/BR		49
	N/A		VIO/SLT		50

Omni Grid to Dual Omni Grid

The Omni Grid to Dual Omni Grid cable is used to connect the Filter Shelf to 10306 CO modem cards. Refer to *Figure B-8* (shown below) and *Table B-3, "Omni Grid to Dual Omni Grid Cable Specifications," on page 126* for cable specifications.

Figure B-8: Omni Grid to Dual Omni Grid Cable (Part #: 04-00028-01)

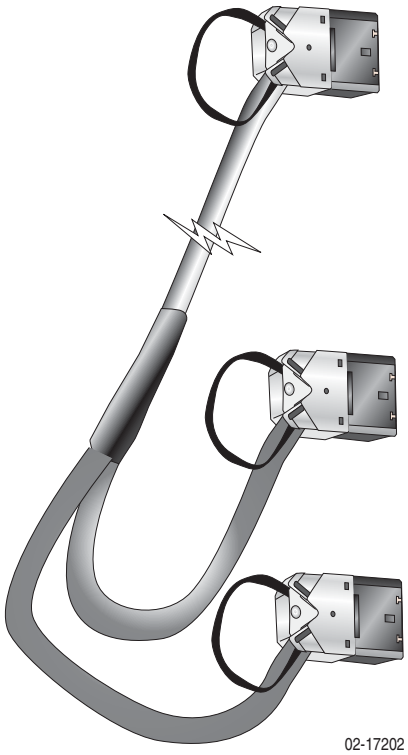


Table B-3: Omni Grid to Dual Omni Grid Cable Specifications

J3	J2	Color	J1
	B2	BLU/WHT	B2
	A2	WHT/BLU	A2
	E2	OR/WHT	E2
	D2	WHT/OR	D2
	B3	GR/WHT	B3
	A3	WHT/GR	A3
	E3	BR/WHT	E3
	D3	WHT/BR	D3
	B4	GRY/WHT	B4
	A4	WHT/GRY	A4
	E4	BLU/RED	E4
	D4	RED/BLU	D4
B2		OR/RED	B6
A2		RED/OR	A6
E2		GR/RED	E6
D2		RED/GR	D6
B3		BR/RED	B7
A3		RED/BR	A7
E3		GRY/RED	E7
D3		RED/GRY	D7
B4		BLU/BLK	B8
A4		BLK/BLU	A8
E4		OR/BLK	E8
D4		BLK/OR	D8

Omni Grid to Omni Grid Cable

The omni grid to omni grid cable connects the Filter Shelf to the 10224 CO modem cards. Refer to *Figure B-9* (shown below) and *Table B-4, "Omni Grid to Omni Grid Cable Specifications," on page 128* for cable specifications.

Figure B-9: Omni Grid to Omni Grid Cable (Part #: 04-00008-18)

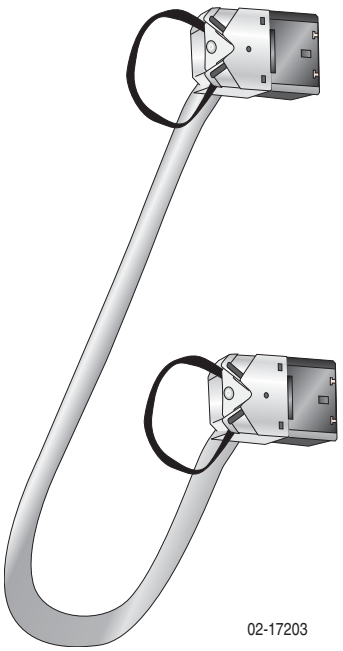


Table B-4: Omni Grid to Omni Grid Cable Specifications

From Conn	From Pin #	With Pair #	Color Code	To Conn	To Pin #
J1	A2	T1	WHT/ BLU	J2	A2
	D2	T2	WHT/ OR		D2
	A3	T3	WHT/ GR		A3
	D3	T4	WHT/BR		D3
	A4	T5	WHT/ SLT		A4
	D4	T6	RED/ BLU		D4
	A6	T7	RED/OR		A6
	D6	T8	RED/GR		D6
	A7	T9	RED/BR		A7
	D7	T10	RED/ SLT		D7
	A8	T11	BLK/ BLU		A8
	D8	T12	BLK/OR		D8

From Conn	From Pin #	With Pair #	Color Code	To Conn	To Pin #
J1	B2	R1	BLU/ WHT	J2	B2
	E2	R2	OR/ WHT		E2
	B3	R3	GR/ WHT		B3
	E3	R4	BR/WHT		E3
	B4	R5	SLT/ WHT		B4
	E4	R6	BLU/ RED		E4
	B6	R7	OR/RED		B6
	E6	R8	GR/RED		E6
	B7	R9	BR/RED		B7
	E7	R10	SLT/ RED		E7
	B8	R11	BLU/ BLK		B8
	E8	R12	OR/BLK		E8

Intermediate Cable Specifications

BitStorm 1900 intermediate (loop extension) cables can be obtained "off-the-shelf" from a variety of vendors, as long as cables chosen meet the following specifications:

- Category 5 bundled 25-pair cable made of 24-AWG wires
- Unshielded, 25-pair female connector (Amp-Champ or equivalent) on the end connecting to the BitStorm 1900 cable harness

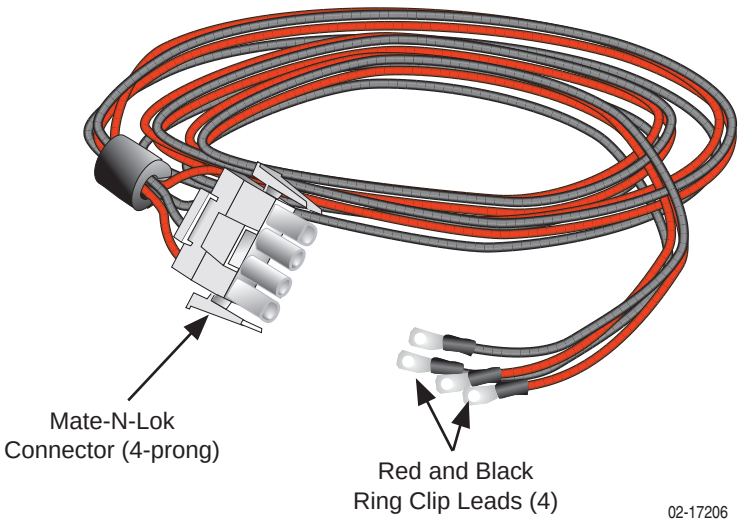
Figure B-10 (shown below) illustrates an example of intermediate cabling suitable for use with the BitStorm 1900.

Figure B-10: Intermediate Cable

Power Cable Harness

Figure B-11 (shown below) illustrates the BitStorm 1900 cable harness. The BitStorm 1900 power cable assembly connects the DC power source to the BitStorm 1900 shelf. One BitStorm 1900 power cable harness contains connectors to support three BitStorm 1900 shelves.

Figure B-11: Power Cable Harness



Power Connector Terminations

The end of the BitStorm 1900 power cable assembly that connects to the power source has two red and two black leads. Each lead is terminated with 24-4 ring clips. If using a DC power supply, the BitStorm 1900 power cable assembly must terminate at the DC power source as shown in *Table B-5*. Refer to the WARNING label on the next page.

Table B-5: Terminal Connection for DC Power Source

Power Cable Connector	Power Source	Terminal Connection
Red (2)	DC supply	Negative (-)
Black (2)	DC return	Positive (+)

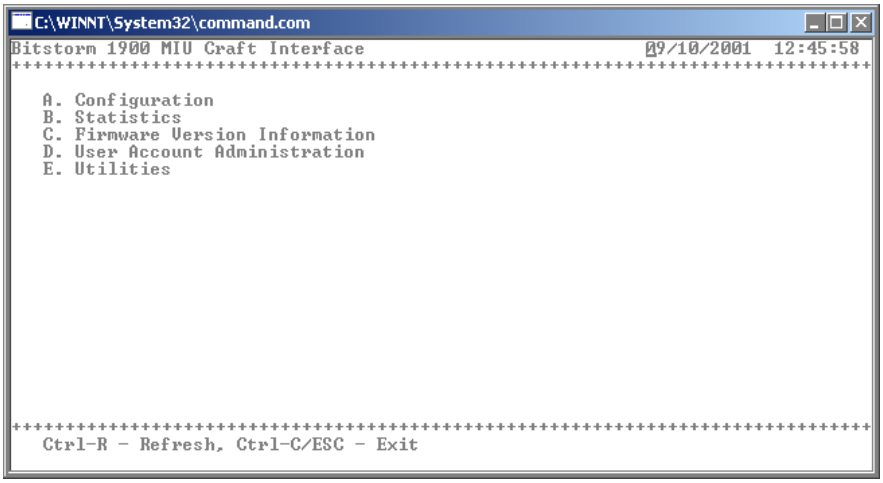
WARNING: POSSIBLE EQUIPMENT DAMAGE! Reversed polarities on the DC power feed can irreparably damage the BitStorm 1900 shelf components. Be certain power feeds are connected properly to the power source, with the red leads connected to the DC supply as shown in the table above. Note that this is the opposite of other (non-telecommunications) applications, in which red leads are usually connected to the "+" terminal.

Appendix C. Craft Interface Screens

This appendix includes all of the Craft Interface screens available from the Main Menu.

Main Menu

Figure C-1: Main Menu



Configuration

Figure C-2: (A. Configuration) Configuration Menu

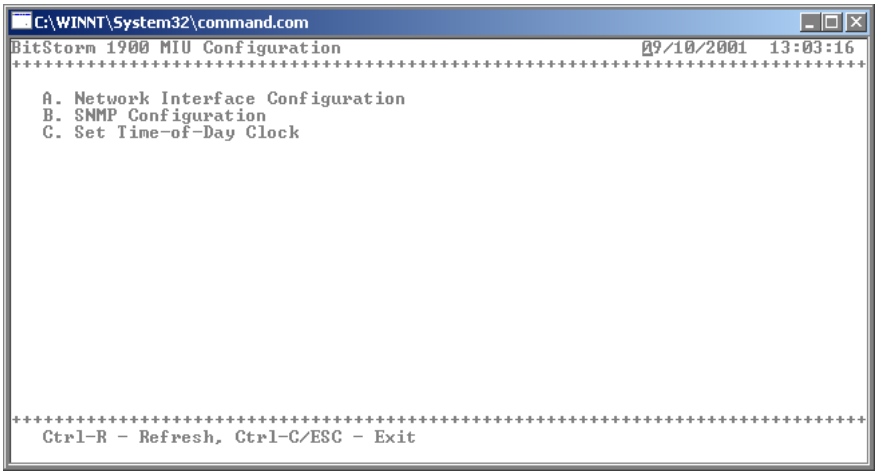


Figure C-3: (A. Configuration) A. Network Interface Configuration

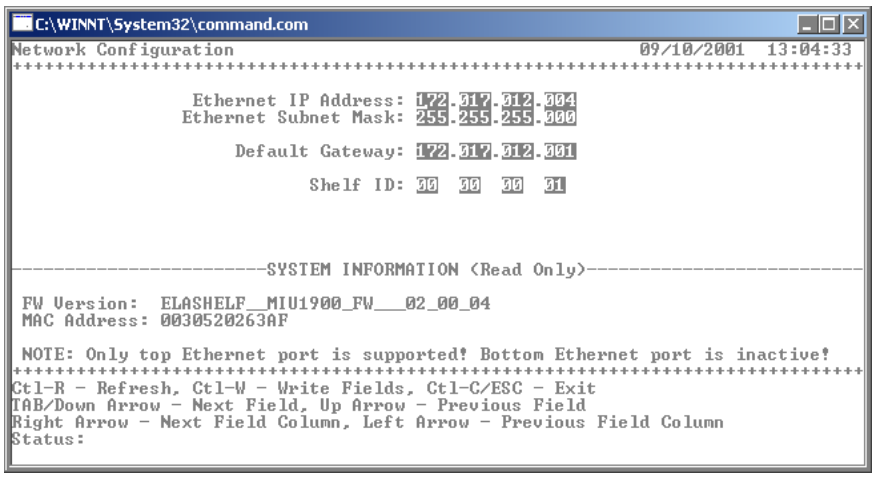


Figure C-4: (A. Configuration) B. SNMP Configuration Menu

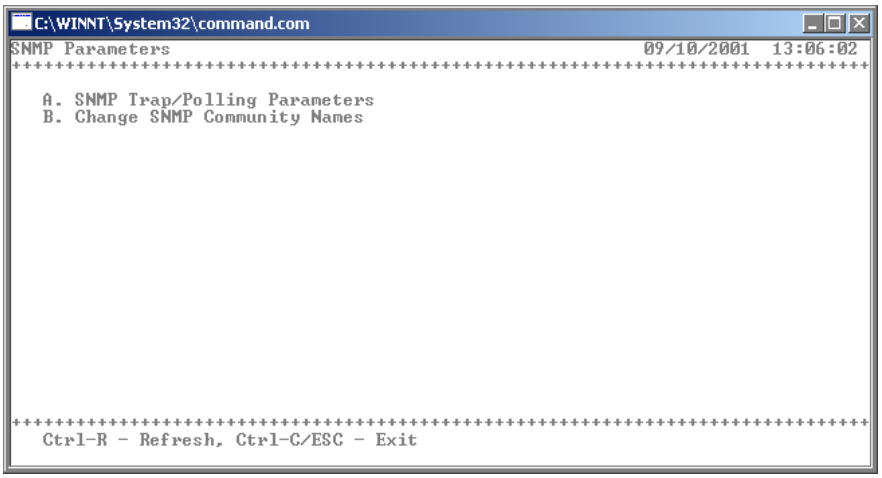


Figure C-5: (A. Configuration, B. SNMP Configuration Menu) A. SNMP Trap/Polling Parameters

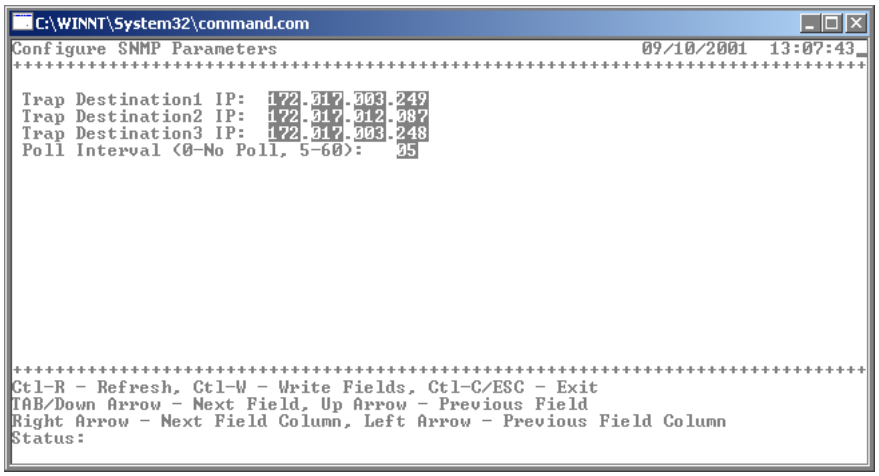


Figure C-6: (A. Configuration, B. SNMP Configuration Menu) B. Change SNMP Community Names

Figure C-7: (A. Configuration) C. Set Time-of-Day Clock

Statistics

Figure C-8: B. Statistics Menu

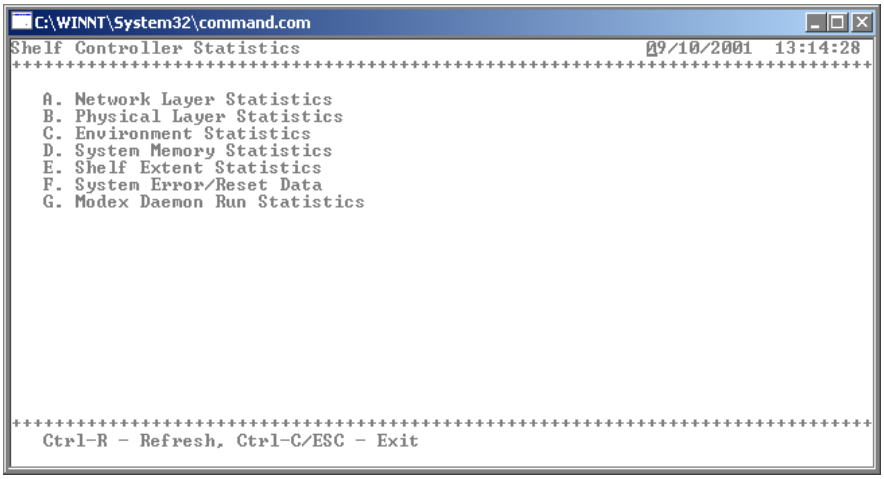


Figure C-9: (B. Statistics) A. Network Layer Statistics

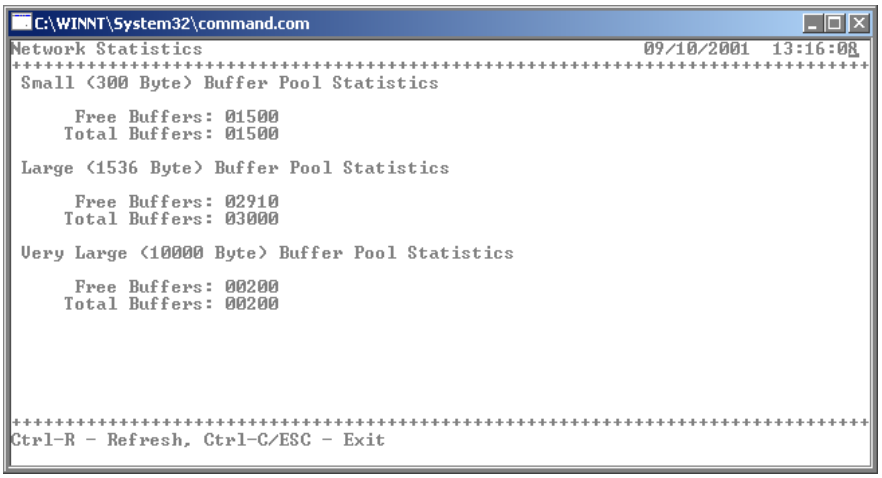


Figure C-10: (B. Statistics) B. Physical Layer Statistics Menu

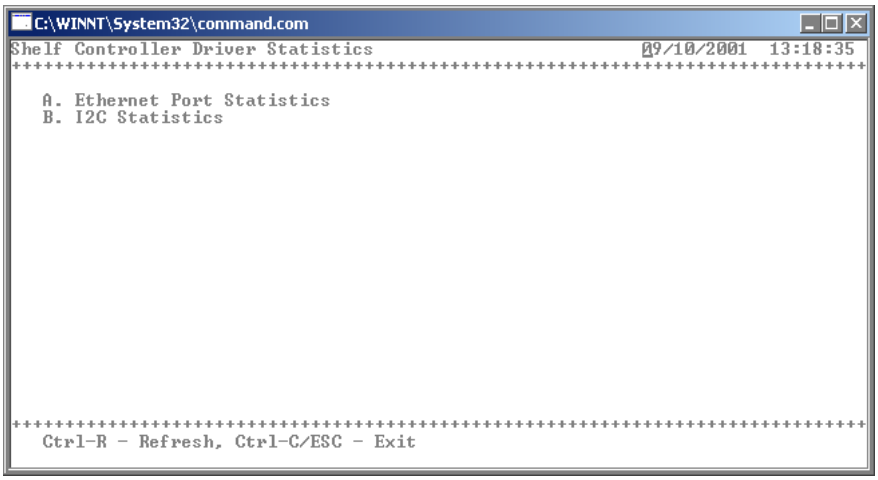


Figure C-11: (B. Statistics, B. Physical Layer Statistics) A. Ethernet Port Statistics

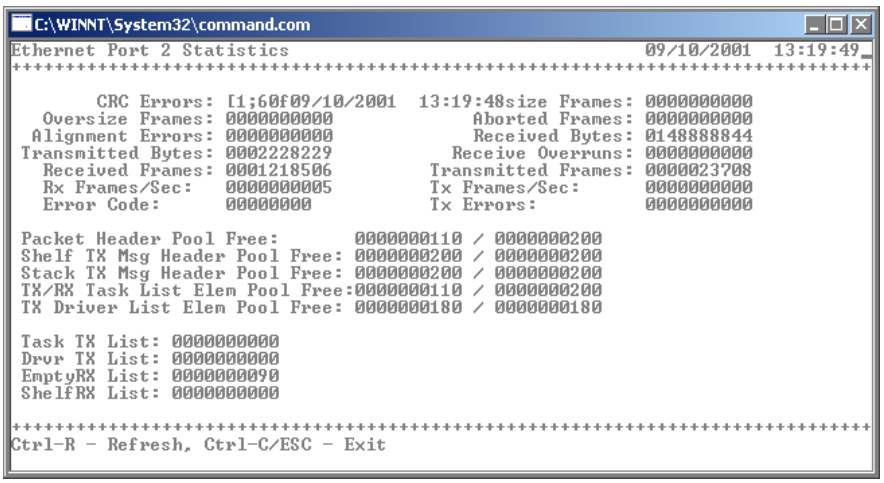


Figure C-12: (B. Statistics, B. Physical Layer Statistics) B. I2C Statistics

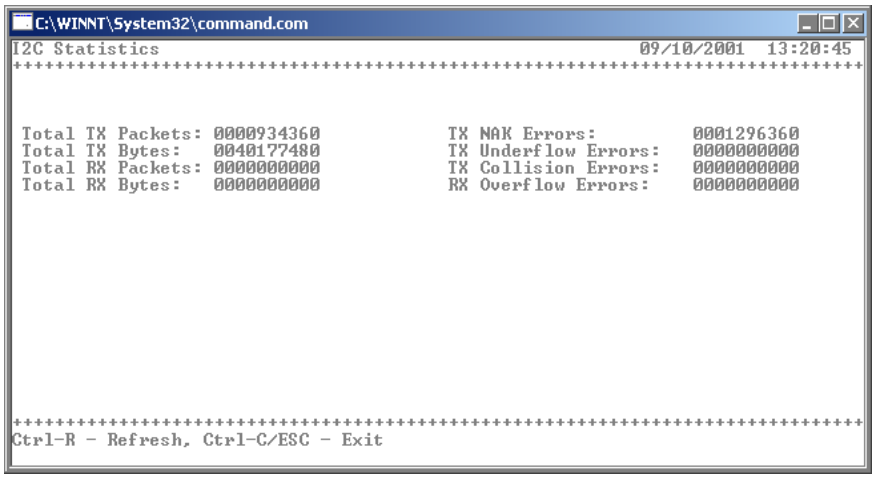


Figure C-13: (B. Statistics) C. Environment Statistics

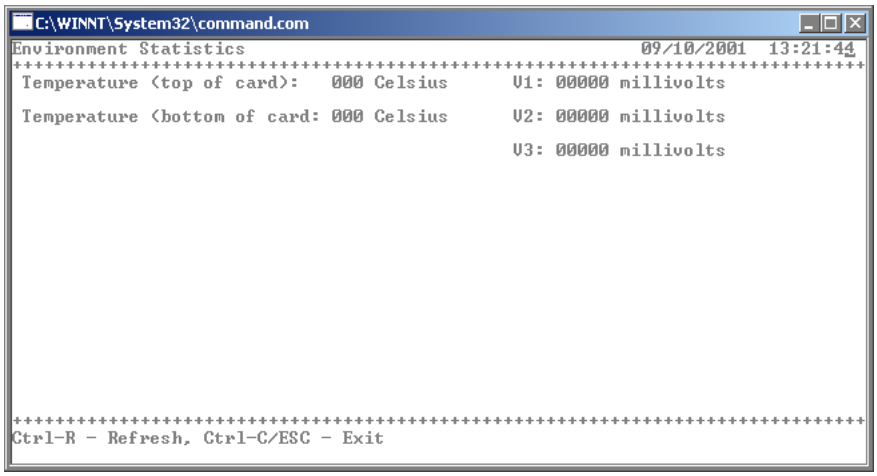


Figure C-14: (B. Statistics) D. System Memory Statistics

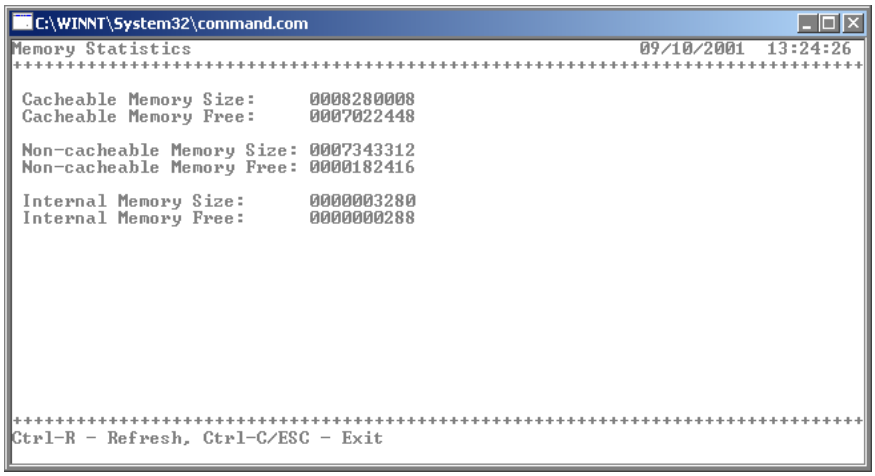


Figure C-15: (B. Statistics) E. Shelf Extent Statistics

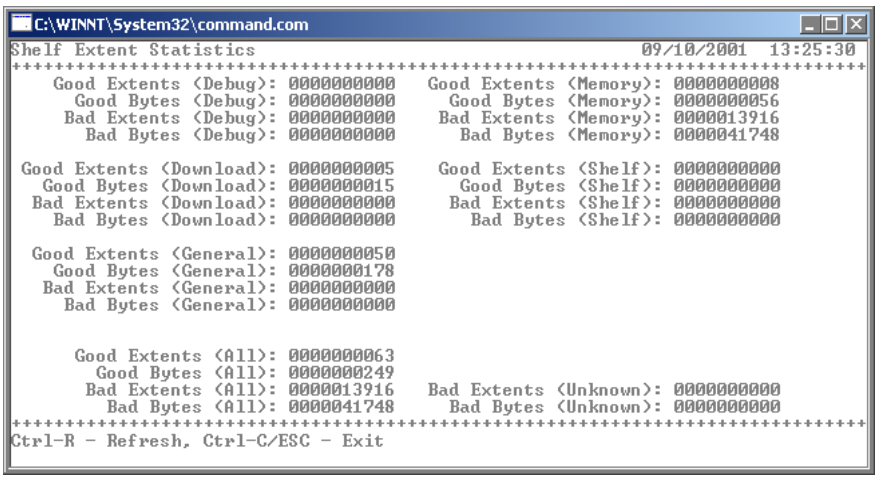


Figure C-16: (B. Statistics) F. System Error-Reset Data

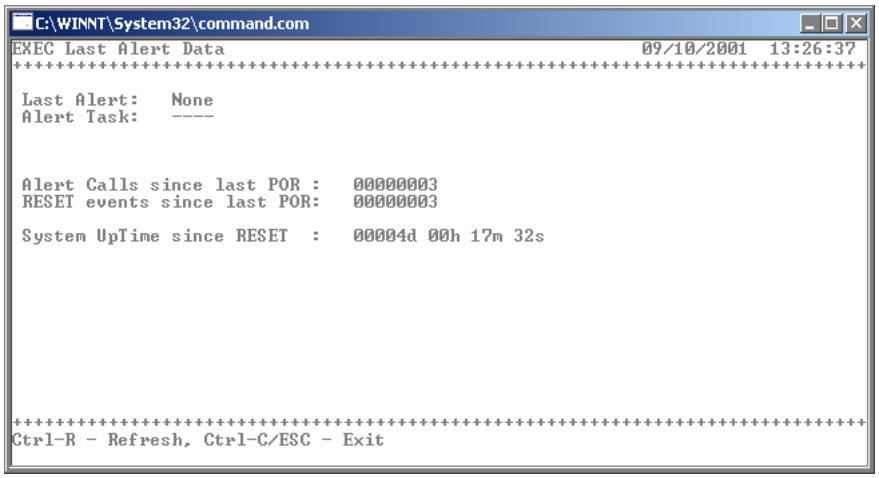
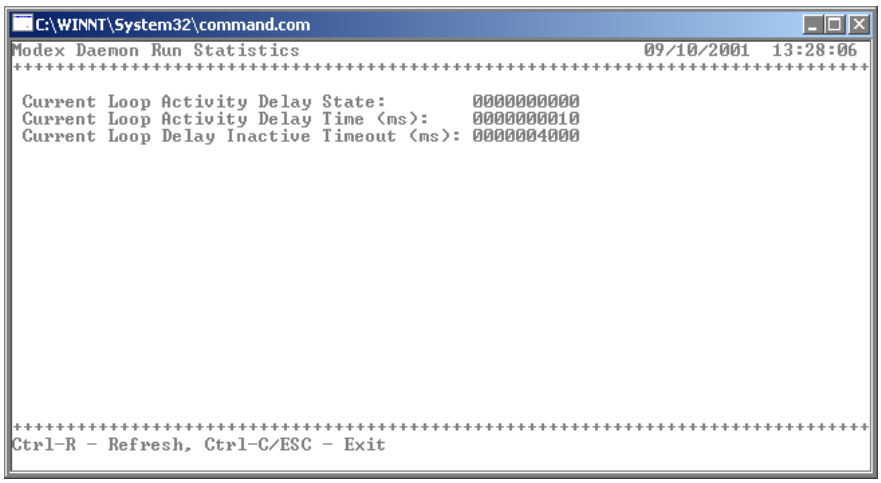
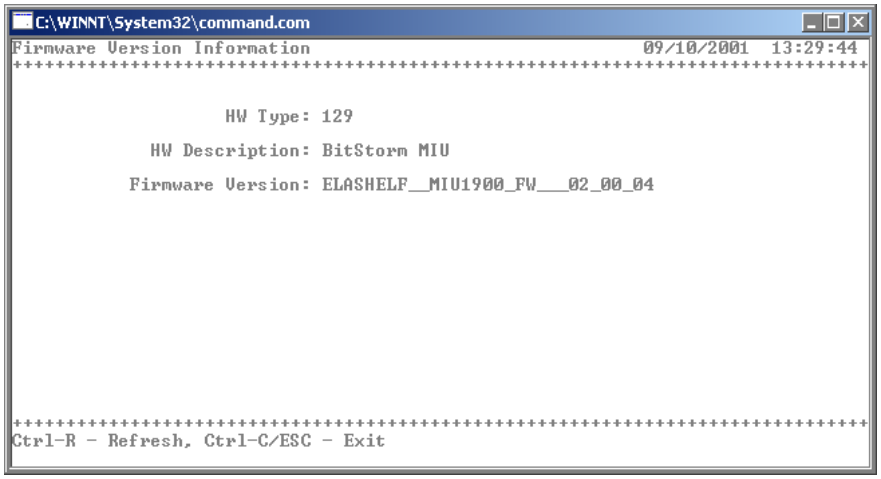


Figure C-17: (B. Statistics) G. Modex Daemon Run Statistics



Firmware Version Information

Figure C-18: C. Firmware Version Information



User Account Administration

Figure C-19: D. User Account Administration Menu

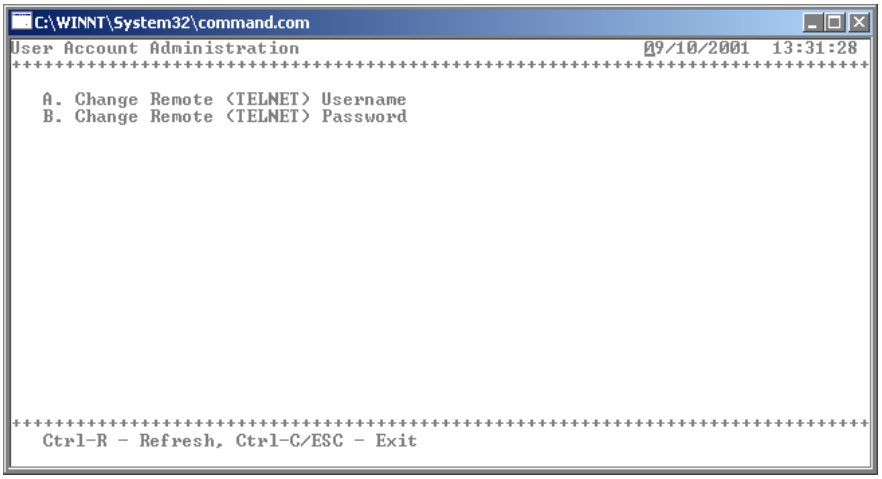


Figure C-20: (D. User Account Administration) A. Change Remote <TELENET> Username

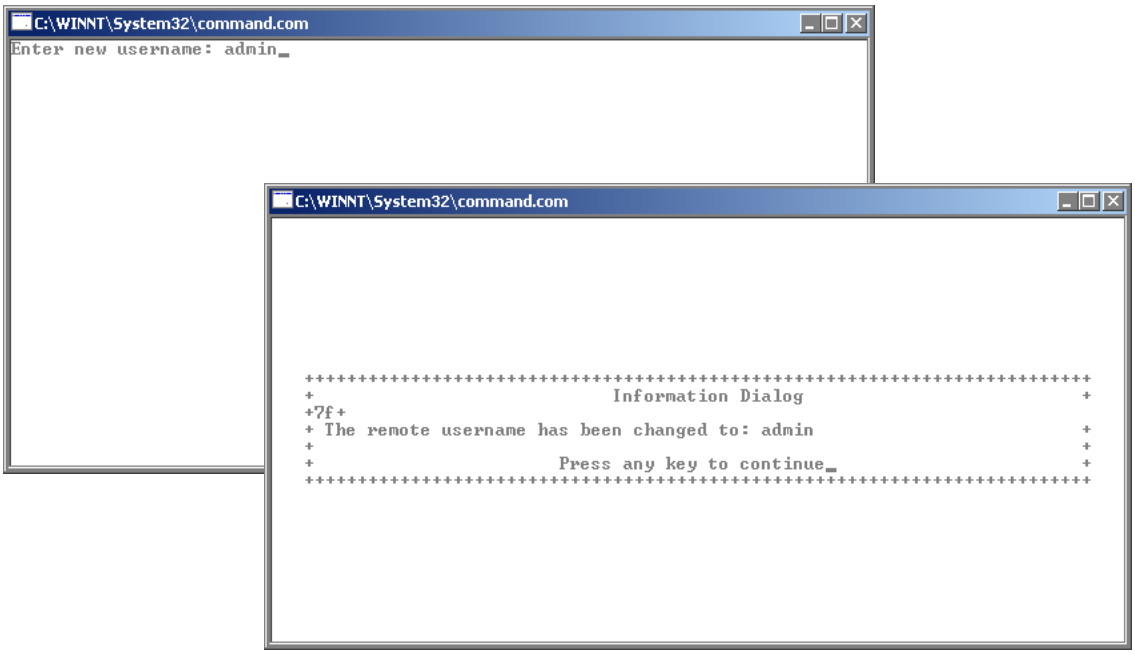
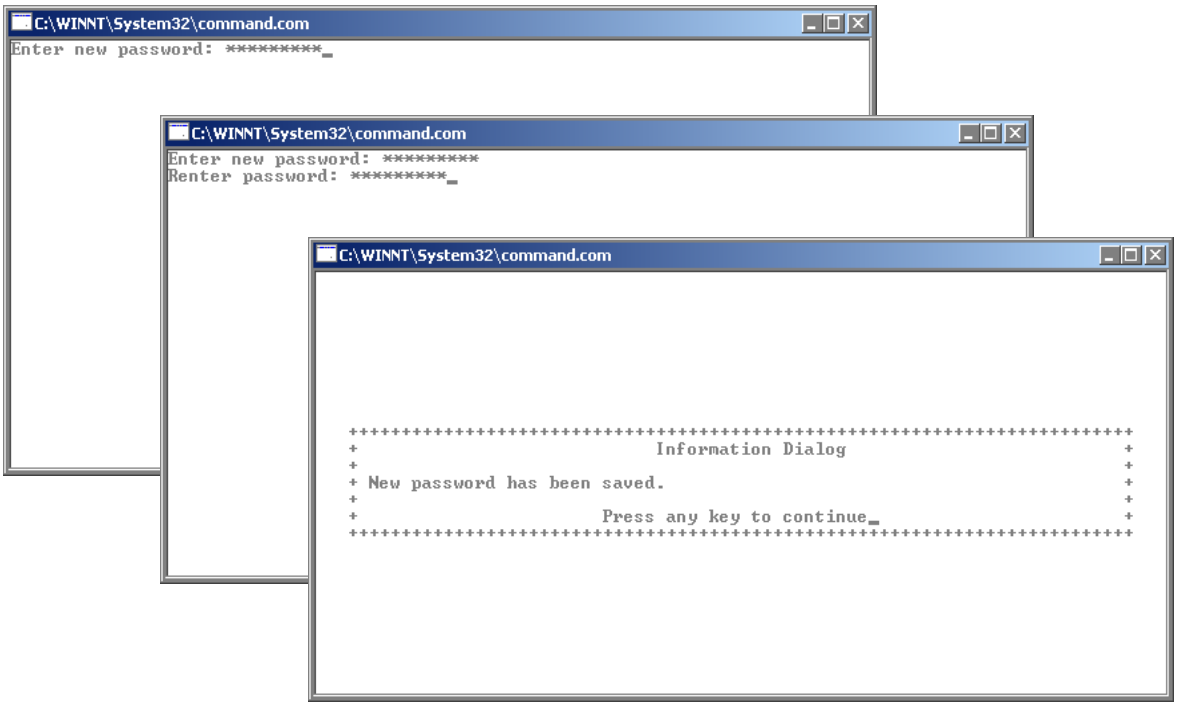


Figure C-21: (D. User Account Administration) B. Change Remote <TELENET> Password



Utilities

Figure C-22: E. Utilities Menu

Figure C-23: (E. Utilities) A. Reset Confirmation