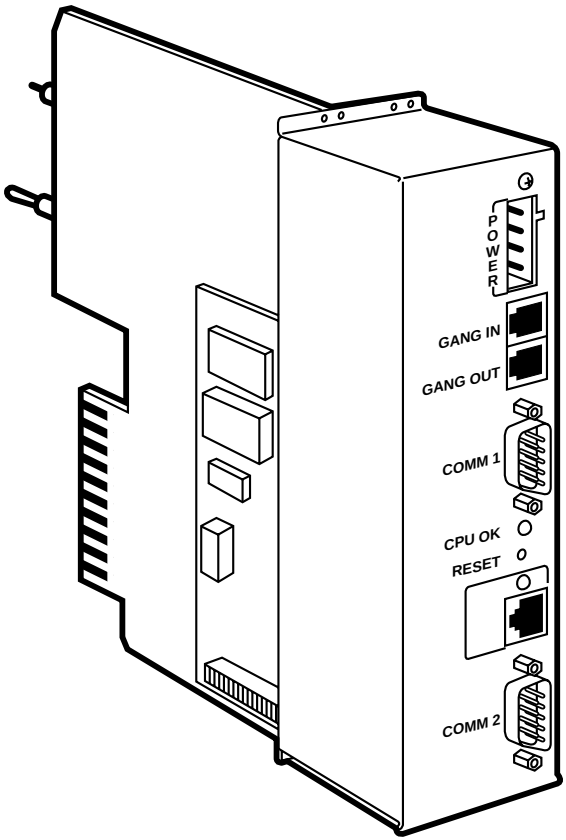



*1000 Park Drive • Lawrence, PA 15055-1018 • 724-746-5500 • Fax 724-746-0746*

BLACK BOX®
NETWORK SERVICES

JULY 2000
SM525C

# SNMP Card for Ganged Switching System




**CUSTOMER SUPPORT INFORMATION**

Order **toll-free** in the U.S. 24 hours, 7 A.M. Monday to midnight Friday: **877-877-BBOX**
FREE technical support, 24 hours a day, 7 days a week: Call **724-746-5500** or fax **724-746-0746**
Mail order: **Black Box Corporation**, 1000 Park Drive, Lawrence, PA 15055-1018
Web site: **www.blackbox.com** • E-mail: **info@blackbox.com**

# FEDERAL COMMUNICATIONS COMMISSION AND CANADIAN DEPARTMENT OF COMMUNICATIONS RADIO FREQUENCY INTERFERENCE STATEMENTS

This equipment generates, uses, and can radiate radio frequency energy and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio communication. It has been tested and found to comply with the limits for a Class A computing device in accordance with the specifications in Subpart J of Part 15 of FCC rules, which are designed to provide reasonable protection against such interference when the equipment is operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user at his own expense will be required to take whatever measures may be necessary to correct the interference.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

*This digital apparatus does not exceed the Class A limits for radio noise emission from digital apparatus set out in the Radio Interference Regulation of the Canadian Department of Communications.*

*Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la classe A prescrites dans le Règlement sur le brouillage radioélectrique publié par le ministère des Communications du Canada.*

## NORMAS OFICIALES MEXICANAS (NOM)
## ELECTRICAL SAFETY STATEMENT

## INSTRUCCIONES DE SEGURIDAD

1. Todas las instrucciones de seguridad y operación deberán ser leídas antes de que el aparato eléctrico sea operado.
2. Las instrucciones de seguridad y operación deberán ser guardadas para referencia futura.
3. Todas las advertencias en el aparato eléctrico y en sus instrucciones de operación deben ser respetadas.
4. Todas las instrucciones de operación y uso deben ser seguidas.
5. El aparato eléctrico no deberá ser usado cerca del agua—por ejemplo, cerca de la tina de baño, lavabo, sótano mojado o cerca de una alberca, etc..
6. El aparato eléctrico debe ser usado únicamente con carritos o pedestales que sean recomendados por el fabricante.
7. El aparato eléctrico debe ser montado a la pared o al techo sólo como sea recomendado por el fabricante.
8. Servicio—El usuario no debe intentar dar servicio al equipo eléctrico más allá a lo descrito en las instrucciones de operación. Todo otro servicio deberá ser referido a personal de servicio calificado.
9. El aparato eléctrico debe ser situado de tal manera que su posición no interfiera su uso. La colocación del aparato eléctrico sobre una cama, sofá, alfombra o superficie similar puede bloquea la ventilación, no se debe colocar en libreros o gabinetes que impidan el flujo de aire por los orificios de ventilación.
10. El equipo eléctrico deber ser situado fuera del alcance de fuentes de calor como radiadores, registros de calor, estufas u otros aparatos (incluyendo amplificadores) que producen calor.
11. El aparato eléctrico deberá ser connectado a una fuente de poder sólo del tipo descrito en el instructivo de operación, o como se indique en el aparato.

12. Precaución debe ser tomada de tal manera que la tierra fisica y la polarización del equipo no sea eliminada.

13. Los cables de la fuente de poder deben ser guiados de tal manera que no sean pisados ni pellizcados por objetos colocados sobre o contra ellos, poniendo particular atención a los contactos y receptáculos donde salen del aparato.

14. El equipo eléctrico debe ser limpiado únicamente de acuerdo a las recomendaciones del fabricante.

15. En caso de existir, una antena externa deberá ser localizada lejos de las lineas de energia.

16. El cable de corriente deberá ser desconectado del cuando el equipo no sea usado por un largo periodo de tiempo.

17. Cuidado debe ser tomado de tal manera que objectos liquidos no sean derramados sobre la cubierta u orificios de ventilación.

18. Servicio por personal calificado deberá ser provisto cuando:

    A: El cable de poder o el contacto ha sido dañado; u

    B: Objectos han caído o líquido ha sido derramado dentro del aparato; o

    C: El aparato ha sido expuesto a la lluvia; o

    D: El aparato parece no operar normalmente o muestra un cambio en su desempeño; o

    E: El aparato ha sido tirado o su cubierta ha sido dañada.

**TRADEMARKS**

The trademarks mentioned in this manual are the sole property of their owners.

**CONTENTS**

# 1. Specifications

**Connectors—**Power: 4-Pin Molex; (2) RJ-11; (2) DB9 male; 10BASE-T: RJ-45

**Power—**External AC transformer

**Size—**6.5"H x 2"W x 8"D (16.5 x 5 x 20.3 cm)

**Weight—**1 lb. (0.5 kg)

# 2. Introduction

## 2.1 Description

The SNMP Card (SM525C) for Ganged Switching System enables you to manage the switching system from a remote PC connected to the system either through the RS-232 port or a LAN. This manual shows you how to install, configure, and control your Ganged Switching System using the features of the SNMP control card.

Installed into the Automatic Rack Chassis (SM500A), the SNMP Card contains a 10BASE-T connector to provide remote switching through a LAN or other connection. From a PC, VT100 terminal, or other controlling device, users can issue either SNMP or ASCII Telnet commands to perform single or group line switching.

The SNMP Card also has a DB9 connector to provide local switching (as well as configuration of the system) from controlling devices connected directly to the Ganged Switching System.

The SNMP Card supports daisychaining among all types of Ganged Switching Systems to provide gang switching across several racks.

## 2.2 Card Components

The SNMP Card (SM525C) has the following components on the rear panel:

- 10BT—10BASE-T connector—connects with a 10BASE-T network for remote access to the Ganged Switching System.
- COMM1—DB9 male connector—connects with a VT100 terminal or equivalent to allow configuration of the Ganged Switching System as well as local switching.
- COMM2—DB9 male connector—not used.
- CPU OK—LED (green)—indicates the status of the CPU on the SNMP Card of the Ganged Switching System; When it's lit, the CPU is OK; when it's not lit, the CPU requires service.
- GANG IN, GANG OUT—Two RJ-11 connectors—used to daisychain racks together to perform system gang switching; uses with RJ-11 cables (EL04M)

- POWER—Power connector (4-pin male)—used for input power to the rack
- RESET—Reset pushbutton—reinitializes the Ganged Switching System; press to allow changes in the system configuration to take effect or if the rack does not properly respond to switching commands.

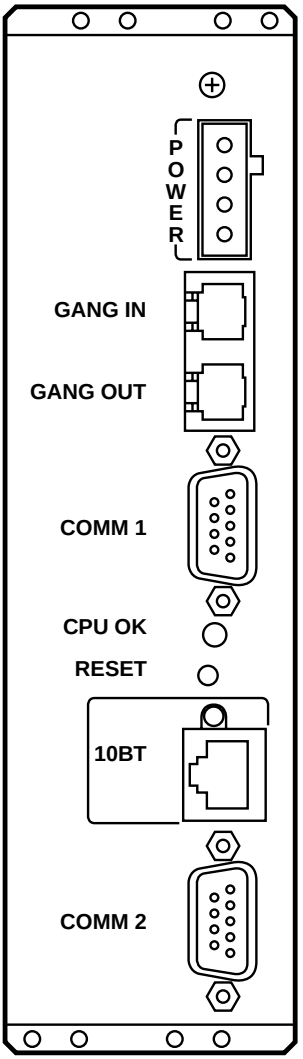



**Figure 2-1. Rear panel of the SNMP Card (SM525C).**

# 3. Installation

## CAUTION

**Electrostatic Discharge (ESD): Cards are ESD-sensitive. To prevent ESD damage, always wear grounding wrist straps when touching, removing, or inserting cards. Store and transport cards in sealed, static-shielding bags.**

The following sections show how to properly install and configure your SNMP Card.

## 3.1 Installing the SNMP Card

To install the SNMP Card, insert and secure the control card into slot 16 of the Automatic Rack Chassis (SM500A). For daisy-chained racks, install the SNMP Card in the first rack.

The SNMP Card occupies the width of the last two slots (slots 16 and 17). You may need to remove any blank panel occupying slot 17.

## 3.2 Connecting the 10BASE-T Cable

For remote switching or configuration of your Ganged Switching System via SNMP/Telnet sessions, you must connect your rack to your network using the 10BASE-T connector on the SNMP Card.

Connect a 10BASE-T cable from the 10BASE-T connector on the rear of the rack to your network.

## 3.3 Daisychaining Racks (optional)

Optionally, you can interconnect (daisychain) Automatic Rack Chassis to perform system gang switching. The racks connect via the GANG IN and GANG OUT connector on the rear panel of the SNMP Card.

## NOTE

**To perform gang switching across several daisychained racks, you must install the SNMP Card in the first rack of the daisychain.**

To daisychain racks, follow these steps:

1. Connect an RJ-11 cable (part number EL04M) from the GANG OUT connector of one rack to the GANG IN connector of the next rack.

2. Repeat Step 1 for all racks you wish to daisychain.

# 4. System Configuration

To perform remote switching or configuration of your Ganged Switching System rack via SNMP/Telnet sessions, you must configure your system with the proper settings.

This section describes how to configure your system and describes the SNMP/Telnet ASCII commands. The commands are available through a VT100 terminal or equivalent connected to the serial COMM1 port, or through a Telnet session into the 10BASE-T port of the rack.

## 4.1 Configuring Your System

Generally, there are two options for configuring your system:

1. Configure only the IP address from a local VT100 terminal connection, and then continue configuring the system remotely via Telnet sessions.

2. Configure all system settings from a local VT100 terminal connection.

Whichever option you choose, it is essential that the IP address be entered into order to access your Ganged Switching System rack remotely.

**COMM 1 Port Pin Assignments (DCE).**

| Pin # | Signal | Direction |
|---|---|---|
| 1 | NOT USED | — |
| 2 | RXD | Output |
| 3 | TXD | Input |
| 4 | DTR | Input |
| 5 | Signal GND | — |
| 6 | DSR | Output |
| 7 | NOT USED | — |
| 8 | NOT USED | — |
| 9 | NOT USED | — |

**VT100 Terminal Communication Settings.**

| | |
|---|---|
| Bits per second | 9600 |
| Data bits | 8 |
| Parity | None |
| Stop bits | 1 |

To configure your system...

1. Connect a VT100 terminal—Connect a VT100 terminal or equivalent to the COMM1 port, located on the SNMP control card. Refer to the table on **page 11** for a pinout of the COMM1 port.

2. Set communication settings—Set the communication settings of the VT100 terminal: 9600 bps, 8 data bits, no parity, 1 stop bit.

3. Enter the IP address—Assign the IP address of the Ganged Switching System rack by entering the following into the terminal:

   ```
   SET RACK 1 IP ADDRESS a.b.c.d
   ```

   where: a.b.c.d is the IP address.

   Example:

   ```
   SET RACK 1 IP ADDRESS 192.19.211.10
   ```

4. Enter the subnet mask—Assign the rack subnet mask by entering the following:

   ```
   SET RACK 1 SUBNET MASK a.b.c.d
   ```

   where: a.b.c.d is the subnet mask.

   Example:

   ```
   SET RACK 1 SUBNET MASK 255.255.255.0
   ```

You can perform the remaining steps via your present local terminal session or via Telnet. Reset the rack if connecting via Telnet by pressing the RESET pushbutton on the SNMP control card or by entering:

```
RESET RACK 1
```

5. Establish Telnet session (optional)—For each installed rack in your system, establish a Telnet session. The Telnet session will simulate a terminal screen.

   When connected to the rack, press the Enter key. The rack responds with 1:OK. Communication with the rack is now possible.

6. Set remaining configuration settings—Using the command tables listed in the following Configuration Commands section, configure each rack with the proper settings.

7. Reset rack—To enable the configuration changes, reset the rack by entering:

   ```
   RESET RACK 1
   ```

   All settings take effect when the rack is reset.

**NOTE**

**You MUST enter an IP address into the rack in order to access it remotely.**

Once you enter the IP address into the rack, it's stored in battery-backed-up memory in the rack and will not be lost when you disconnect the power cord.

## 4.2 Configuration Commands

This section describes SET commands that allow you to configure your system for SNMP and Telnet operation. The section also includes HELP commands and GET commands to display rack information and configuration settings. Almost all SET commands have a GET counterpart, which returns the configured value.

Commands are not case-sensitive, although some command parameters such as community names and passwords might be case-sensitive. All changed settings take effect upon a rack reset only.

### 4.2.1 Universal Settings

Use the following SET commands to configure your system for either SNMP or Telnet operation. (Enter `RESET RACK 1` to allow configuration changes to take effect.)

| Enter… | In order to… |
|---|---|
| SET RACK 1 FACTORY DEFAULTS | Clear the battery-backed-up configuration and set all SNMP/Telnet parameters and MIB variables to their default values:<br>DEFAULT ROUTER set to 0.0.0.0<br>IP ADDRESS set to 0.0.0.0<br>SNMP MANAGER values are all cleared<br>SNMP READ COMMUNITY NAME set to “public”<br>SNMP SECURITY TRAPS set to 10<br>SNMP TRAPS set to ON<br>SNMP WRITE COMMUNITY NAME set to “private”<br>SUBNET MASK set to 0.0.0.0<br>TELNET IDLE TIMEOUT set to 60 minutes<br>TELNET PASSWORD set to NONE<br>TELNET SECURITY TRAPS set to 3 |
| SET RACK 1 DEFAULT ROUTER a.b.c.d<br>where a.b.c.d is the IP address of the default router. | Set the default router to where packets will be sent if their destination IP address is not on the same network. If the default router is not set, a proxy ARP server is required for these packets to reach their destination. Default value: 0.0.0.0 |
| SET RACK 1 ECHO ON/OFF | Set echo on or echo off for the rack. Choose either ON or OFF. |
| SET RACK 1 IP ADDRESS a.b.c.d<br>where a.b.c.d is the IP address of the rack. | Define the rack IP address. Default value: 0.0.0.0 |

`SET RACK 1 SUBNET MASK a.b.c.d`

where a.b.c.d is the subnet mask.

Define the rack subnet mask. Default value: 0.0.0.0

`SET RACK 1 TIME mm/dd/yy ddd hh:`

where mm/dd/yy is the numeric month, day, and year; ddd is the day (MON, TUE, WED, THU, FRI, SAT, SUN); hh:mm is the time in 24-hour format.

Set the time and date for the rack.

#### 4.2.2 SNMP SETTINGS

Use the following SET commands (in addition to the commands listed in the Universal Settings section) to configure your system for SNMP operation. (Enter `RESET RACK 1` to allow configuration changes to take effect.)

**Enter…** **In order to…**

`SET RACK 1 SNMP DEFAULTS`

Set all MIB variables to their default values.

`SET RACK 1 SNMP MANAGER m IP ADDRESS a.b.c.d`

where m is the SNMP manager (1 to 16).
a.b.c.d is the IP address of the SNMP manager.

Define an SNMP manager to where traps will be sent. Managers #1 through #16 are supported. Manager #1 I will be defined for trap transmission to be enabled. Default value: [all values are cleared]

`SET RACK 1 SNMP READ COMMUNITY NAME name`

where name is the SNMP read community name.

Define the SNMP community name to be accepted for SNMP GET requests and to be used for traps sent out to managers. Default value: public

**Enter…** **In order to…**

`SET RACK 1 SNMP SECURITY TRAPS x`

where x is the number of consecutive erroneous community names received.

Define the number of consecutive erroneous community names received after which an "snmpBadCommunity" trap will be sent. Default value: 10

`SET RACK 1 SNMP TRAPS ON/OFF`

Enable/disable traps transmission. Choose either ON or OFF. Default value: ON

`SET RACK 1 SNMP WRITE COMMUNITY NAME name`

where: name is the SNMP write community name.

Define the SNMP community name to be accepted for SNMP SET requests. Default value: private

#### 4.2.3 Telnet Settings

Use the following SET commands (in addition to the commands listed in the Universal Settings section) to configure your system for Telnet operation. (Enter `RESET RACK 1` to allow configuration changes to take effect.)

**Enter…** **In order to…**

`SET RACK 1 TELNET IDLE TIMEOUT x`

where x is the number of idle minutes.

Define the the number of consecutive idle minutes (minutes during which no character is received) after which a Telnet session will be disconnected. Default value: 60

`SET RACK 1 TELNET PASSWORD password/NONE`

where password is the login password.

| Enter… | In order to… |
|---|---|
| | Define the login password for incoming Telnet sessions. The user will not be prompted for a password if TELNET PASSWORD is set to NONE. Choose to enter a password or NONE. Default value: NONE |

`SET RACK 1 TELNET SECURITY TRAPS x`

where x is the number of consecutive erroneous login passwords received.

| | |
|---|---|
| | Define the number of consecutive erroneous login passwords received after which a “telnetBadPassword” trap will be sent. Default value: 3 |

#### 4.2.4 To Display Settings

Use the following GET commands to display rack and configuration information.

| Enter… | In order to… |
|---|---|
| `GET RACK 1 CARDS` | Display information about the line cards in the rack. |
| `GET RACK 1 DEFAULT ROUTER` | Display the IP address of the default router for the rack |
| `GET RACK 1 IP ADDRESS` | Display the IP address of the rack. |
| `GET RACK 1 MAC ADDRESS` | Display the MAC address of the rack. |
| `GET RACK 1 SNMP MANAGERS` | Display the assigned SNMP managers for the rack. |

| Enter… | In order to… |
|---|---|
| GET RACK 1 SNMP READ COMMUNITY NAME | Display the SNMP READ COMMUNITY NAME for the rack. |
| GET RACK 1 SNMP SECURITY TRAPS | Display the SNMP security traps for the rack. |
| GET RACK 1 SNMP STATUS x<br><br>where x is the snmp status number 1. 2. 3. 4.<br>1 displays SNMP statistics<br>2 displays Ethernet statistics<br>3 displays IP/ICMP statistics<br>4 displays SNMP auditing information<br>5 displays system information<br>6 displays CPU information | Display the SNMP status x for the rack. |
| GET RACK 1 SNMP TRAPS | Display the SNMP traps for the rack. |
| GET RACK 1 SNMP WRITE COMMUNITY NAME | Display the SNMP WRITE COMMUNITY NAME for the rack. |
| GET RACK 1 SUBNET MASK | Display the subnet mask for the rack. |
| GET RACK 1 TELNET IDLE TIMEOUT | Display the Telnet idle timeout setting for the rack. |
| GET RACK 1 TELNET SECURITY TRAPS | Display the Telnet security traps for the rack. |

| Enter… | In order to… |
|---|---|
| GET RACK 1 TELNET STATUS x<br><br>where x is the status number 1, 3, or 4: 1 displays Telnet session information; 3 displays TCP statistics; 4 displays Telnet auditing information | Display the Telnet status x for the rack. |
| GET RACK 1 TIME | Display the time of the rack. |
| GET RACK 1 VERSION | Display the firmware version of the rack. |

#### 4.2.5 To Reset Rack

Use the following RESET command to reset your rack and to allow configuration changes to take effect.

| Enter… | In order to… |
|---|---|
| RESET RACK 1 | Reset the specified the rack and apply any changed settings. |

#### 4.2.6 Help

Use the following HELP commands to display all available commands and their syntax.

| Enter… | In order to… |
|---|---|
| HELP | List the available commands. |
| HELP SET | List the available SET commands |

| Enter… | In order to… |
|---|---|
| HELP GET | List the available GET commands. |
| HELP RESET | List the available RESET commands. |

#### 4.2.7 Example Configuration

A typical SNMP/Telnet setup sequence would look like the following:

Basic IP settings—

SET RACK 1 FACTORY DEFAULTS
1 : OK

SET RACK 1 IP ADDRESS 231.98.4.204
1 : OK

SET RACK 1 SUBNET MASK 255.255.255.0
1 : OK

SET RACK 1 DEFAULT ROUTER 231.98.4.53
1 : OK

Specific SNMP settings—

SET RACK 1 SNMP WRITE COMMUNITY NAME NETMAN
1 : OK

SET RACK 1 SNMP MANAGER 1 IP ADDRESS 231.98.4.29
1 : OK

SET RACK 1 SNMP MANAGER 2 IP ADDRESS 231.98.4.47
1 : OK

Rack reset in order for settings to take effect—

RESET RACK 1
1: VERSION

AUTOMATIC SWITCHING SYSTEM
1: SNMP UP!

Connectivity test—

SET RACK 1 PING 231.98.4.49
PING STARTED. PRESS ANY KEY TO STOP.
11:07:44 REPLY FROM 231.98.4.49
11 :07:45 REPLY FROM 231.98.4.49
11:07:46 REPLY FROM 231.98.4.49
11:07:47 REPLY FROM 231.98.4.49
11:07:48 REPLY FROM 231.98.4.49
11:07:49 REPLY FROM 231.98.4.49
1: OK

Health Check—

GET RACK 1 SNMP STATUS 2
1:STATUS #2
IP ADDRESS: 231.098.004.204 SUBNET MASK: 255.255.255.000
DEFAULT ROUTER: 231.098.004.053 MAC ADDRESS: 0X004016011E
TRAPS:ON
SECURITY TRAPS: 10
READ COMMUNITY:
WRITE COMMUNITY: NETMAN
ETHERNET STATISTICS
NIC INTERRUPTS: 0000008769
DMA FAILURES: 0000000000
MEMORY SHORTAGES:0000000000
MAX. QUEUE DEPTH:0000000020
AVAILABLE HEAP: 0000004963
OCTETS TRANSMITTED: 0000133659
OCTETS RECEIVED: 0001100528
FRAME ALIGNMENT ERRORS: 0000000000
CRC ERRORS: 0000000000
FRAMES LOST: 0000000000
COLLISIONS: 0000000000

# 5. Operation

This section describes two ways for performing operations on your Ganged Switching System rack—ASCII Telnet commands and SNMP.

## 5.1 Telnet Commands

To issue ASCII Telnet commands…

1. Establish a Telnet session with your Ganged Switching System rack. The Telnet session will simulate a terminal screen.

   When connected to the rack, press the Enter key. The rack responds with 1:OK. Communication with the rack is now possible.

2. Issue ASCII Telnet commands—Use the commands listed in the following ASCII Telnet Command tables to perform operations on your Ganged Switching System rack.

### 5.1.1 Switching

| Enter… | In order to… |
|---|---|
| `SET RACK 1 LINE x\|ALL\|SYS PORT p` | |

where x is the line to be switched (0 to 15) for single-line switching; p is the port to switch to: A or B

Perform switching operations. Entering this command switches one line in a rack (x), all lines in a rack (ALL), or all lines in all daisy-chained racks (SYS) to a specified port. Choose only one among selections separated by vertical lines—x, ALL, or SYS. For example,

SET RACK 1 LINE 12 PORT A switches line 12 to port A
SET RACK 1 LINE ALL PORT B switches all lines in the rack to port B
SET RACK 1 SYS PORT A switches all lines in all daisy-chained racks to port A.

#### 5.1.2 Sending a Ping

| Enter… | In order to… |
|---|---|
| `SET RACK 1 PING a.b.c.d` | |

where a.b.c.d is the target IP address.

Start a ping to the specified destination. An ICMP ECHO request is sent every second until a key is pressed. Only one ping can be active at a time.

#### 5.1.3 Help

| Enter... | In order to... |
|---|---|
| `HELP` | List the available commands. |
| `HELP SET` | List the available SET commands. |
| `HELP GET` | List the available GET commands. |
| `HELP RESET` | List the available RESET commands. |

#### 5.1.4 Other Commands

For a description of all other ASCII 10BASE-T commands, refer to **Section 4.2**, which includes SET, GET, and HELP commands.

## 5.2 SNMP—Black Box MIB

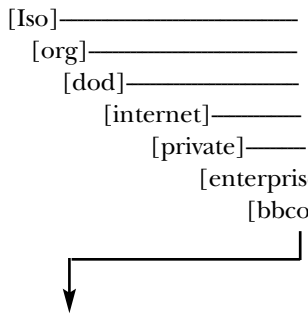
To use SNMP control…

1. Compile MIB—Compile (load) the BBSM500.MIB file using your SNMP manager.

2. Issue SNMP commands—Use the MIB tables in this section as a guide to managing your Ganged Switching System rack. The tables provide general descriptions on SNMP operation. Refer to your SNMP manager manual for more specific information on using your SNMP manager software.

### 5.2.1 MIB Path Summary

The following flowchart shows the MIB paths of the variables in the BBSM500.MIB file. The variables—without brackets [ ]—are located at the end of each branched path. The variables and their usage are explained in the remainder of the chapter.




[bbcorp] — 1.3.6.1.4.1.509
- [autoSwitch500] — 1.3.6.1.4.1.509.2
  - [rack500Entry] — 1.3.6.1.4.1.509.2.1
    - rackRealTimeClock — 1.3.6.1.4.1.509.2.1.1.0
    - rackKeyLocked — 1.3.6.1.4.1.509.2.1.2.0
    - rackGangSwitch — 1.3.6.1.4.1.509.2.1.3.0
    - rackSystemGangSwitch — 1.3.6.1.4.1.509.2.1.4.0
    - rackSwitchErrs — 1.3.6.1.4.1.509.2.1.5.0
    - rackIpRequester– — 1.3.6.1.4.1.509.2.1.6.0
  - [lineCardTable] — 1.3.6.1.4.1.509.2.2
    - [lineCardEntry] — 1.3.6.1.4.1.509.2.2.1
      - lineSwitchedPort — 1.3.6.1.4.1.509.2.2.1.2.1lineCardlndex
      - lineComment — 1.3.6.1.4.1.509.2.2.1.3.1lineCardlndex
  - [timeTrigOpTable] — 1.3.6.1.4.1.509.2.3
    - [timeTrigOpEntry] — 1.3.6.1.4.1.509.2.3.1
    - timeTrigOpTime — 1.3.6.1.4.1.509.2.3.1.2.timeTrigOplndex
    - timeTrigOpFreq — 1.3.6.1.4.1.509.2.3.1.3.timeTrigOplndex
    - timeTrigOpStart — 1.3.6.1.4.1.509.2.3.1.4.timeTrigOplndex
    - timeTrigOpStop — 1.3.6.1.4.1.509.2.3.1.5.timeTrigOplndex
    - timeTrigOpSwitchToPort — 1.3.6.1.4.1.509.2.3.1.6.timeTrigOplndex
    - timeTrigOpTarget — 1.3.6.1.4.1.509.2.3.1.7.b'meTrigOplndex
    - timeTrigOpCardsList — 1.3.6.1.4.1.509.2.3.1.8.bmeTrigOplndex
    - timeTrigOpComment — 1.3.6.1.4.1.509.2.3.1.9.timeTrigOplndex
    - timeTrigOpRowStatus — 1.3.6.1.4.1.509.2.3.1.10.bmeTrigOplndex

Traps generated by the rack:

- rackKeyLockedChange
- rackGangSwitchChange
- lineCardChange
- lineSwitchedPortChange
- timeTrigOpSwitch
- lineSwitchError
- snmpBadCommunity
- telnetLogin
- telnetBadPassword

#### 5.2.2 Global Rack Variables

The following variables allow you to set the time and get global status information of your Ganged Switching System rack.

rackRealTimeClock

Description: Current time for the rack. The format is DDD HH:MM. You can SET and GET the value of this variable.

Parameters: Day (DDD): MON, TUE, WED, THU, FRI, SAT, SUN; Time (HH:MM): 00:00 to 23:59

MIB Path: 1.3.6.1.4.1.509.2.1.1
iso(1).org(3).dod(6).internet(1).private(4).
enterprises (1).bbcorp(509).
autoSwitch5000(2).rack5000Entry(1).rackRealTime Clock(1)

Variable: 1.3.6.1.4.1.509.2.1.1.0 where 0 indicates that the variable is not part of a table.

Example: Set the current time to TUE 1:15 pm (13:15) for the rack.

| | |
|---|---|
| Operation: | Set |
| Variable: | 1.3.6.1.4.1.509.2.1.1.0 |
| Set Value: | TUE 13:15 |

rackKeyLocked

Description: Key switch position. When the key is in the locked position, the manual switch buttons on the front of the rack are disabled. When the key is in the unlocked position, the switch buttons are enabled. You can only GET the value of this variable.

Parameters: no (0) indicates that the key position on the front of the rack is set to “unlocked”; the manual switch buttons on the rack are enabled.
yes (1) indicates that the key position on the front of the rack is set to “locked”; the manual switch buttons on the rack are disabled.

MIB Path: 1.3.6.1.4.1.509.2.1.2
iso(1).org(3).dod(6).internet(1).private(4).
enterprises (1).
bbcorp(509).autoSwitch5000(2).rack5000Entry(1).
rackKeyLocked(2)

Variable: 1.3.6.1.4.1.5

09.2.1.2.0 where 0 indicates that the variable is not part of a table.

Example: Determine the key switch position on the rack.
Operation: Get
Variable: 1.3.6.1.4.1.509.2.1.2.0

rackGangSwitch

Description: Forces all line cards for the rack to switch to the selected port. You can SET and GET the value of this variable.

Parameters: A(1), B(2)

MIB Path: 1.3.6.1.4.1.509.2.1.3
iso(1).org(3).dod(6).internet(1).private(4).
enterprises
(1).bbcorp(509).
autoSwitch5000(2).rack5000Entry(1).
rackGangSwitch(3)

Variable: 1.3.6.1.4.1.509.2.1.3.0

Example: Switch all line cards to port B.
Operation: Set
Variable: 1.3.6.1.4.1.509.2.1.3.0
Set Value: B(2)

rackSystemGangSwitch

Description: Forces all line cards for all daisy-chained racks to switch to the selected port. You can SET and GET the value of this variable.

Parameters: A(1), B(2)

MIB Path: 1.3.6.1.4.1.509.2.1.4
iso(1).org(3).dod(6).internet(1).private(4).
enterprises
(1),bbcorp(509).
autoSwitch500(2).rack500Entry(1).rackSystemGang
Switch(4)

Variable: 1.3.6.1.4.1.509.2.1.4.0

Example: Switch all line cards in all daisy-chained racks to port B.

Operation: Set
Variable: 1.3.6.1.4.1.509.2.1.4.0
Set Value: B(2)

rackSwitchErrs

Description: Total number of switching errors since the rack was last re-initialized. You can only GET the value of this variable.

Parameters: Counter

MIB Path: 1.3.6.1.4.1.509.2.1.5
iso(1).org(3).dod(6).internet(1).private(4).
enterprises(1).bbcorp(509).
autoSwitch500(2).rack500Entry(1).rackSwitchErrs(5)

Variable: 1.3.6.1.4.1.509.2.1.5.0
where 0 indicates that the variable is not part of a table

Example: Display the total number of switching errors since the rack was last re-initialized.

Operation: Get Variable: 1.3.6.1.4.1.509.2.1.5.0

rackIpRequester

Description: The IP address of the remote entity that last requested a switch. The null value is returned if this is a local manual switch. You can only GET the value of this variable.

Parameters: IP address

MIB Path: 1.3.6.1.4.1.509.2.1.6
iso(1).org(3).dod(6).internet(1).private(4).enterprises
(1).bbcorp(509).
autoSwitch500(2).rack500Entry(1).rackIpRequester(6)

Variable: 1.3.6.1.4.1.509.2.1.6.0
where 0 indicates that the variable is not part of a table

Example: Display the IP address of the remote entity that last requested a switch.

Operation: Get Variable: 1.3.6.1.4.1.509.2.1.6.0

### 5.2.3 Line Card Variables

The following variables allow you to view the line-card status or perform line-card operations for your rack.

lineSwitchedPort

Description: The port switched to (for example, port A). You can SET and GET the value of this variable.

Parameters: A(1), B(2)

MIB Path: 1.3.6.1.4.1.509.2.2.1.2
iso(1).org(3).dod(6).internet(1).private(4).enterprises (1).
bbcorp(509).autoSwitch5000(2).lineCardTable(2).
lineCardEntry(1).lineSwitchedPort(2)

Variable: 1.3.6.1.4.509.2.2.1.2[lineCardIndex]
where [lineCardIndex] is the slot number (0 through 15) occupied by the line card.

Example: Switch line card 7 to port B.
Operation: Set
Variable: 1.3.6.1.4.1.509.2.2.1.2.7
Set Value: B(2)

lineComment

Description: A user comment for each line card. You can SET and GET the value of this variable.

Parameters: Up to 31 characters

MIB Path: 1.3.6.1.4.1.509.2.2.1.2
iso(1).org(3).dod(6).internet(1).private(4).
enterprises(1).
bbcorp(509).autoSwitch5000(2).lineCardTable(2).
lineCardEntry(1).lineComment(3)

Variable: 1.3.6.1.4.1.509.2.2.1.2[lineCardIndex] where [lineCardIndex] is the slot number (0 through 15) occupied by the line card.

Example: Enter a user comment for line card 12.
Operation: Set Variable: 1.3.6.1.4.1.509.2.2.1.2.12
Set Value: “Denver backup line”

#### 5.2.4 Time-Triggered Operations Variables

The following variables allow you to perform time-triggered switching operations for your Ganged Switching System rack. In general, all variables that have a common "timeTrigOpIndex" (for which you enter a value) are part of the same time-triggered operation.

timeTrigOpTime

Description: Time of the switching operation. The format is: DDD HH:MM. You can SET and GET the value of this variable.

Parameters: Day: MON, TUE, WED, THU, FRI, SAT, SUN
Time: 00:00 to 23:59

MIB Path: 1.3.6.1.4.1.509.2.3.1.2
iso(1).org(3).dod(6).internet(1).private(4).
enterprises(1).bbcorp(509).
autoSwitch500(2).timeTrigOpTable(3).
timeTrigOpEntry(1).timeTrigOpTime(2)

Variable: 1.3.6.1.4.1.509.2.3.1.2[timeTrigOpIndex]
where [timeTrigOpIndex] is a number (from 1 to n) of a time-triggered switching operation to which the time entry is assigned.

Example: Set the switching time of time-triggered operation 4 to Tuesday at 5 pm (17:00).

Operation: Set
Variable: 1.3.6.1.4.1.509.2.3.1.2.4
Set Value: TUE 17:00

timeTrigOpFreq

Description: Indicates how often the switching operation will be performed. Note that operations set to "once(1)"—one time switching—are automatically cleared when they have been executed. You can SET and GET the value of this variable.

Parameters: never(0), once(1),
every_week(2),every_day(3)

MIB Path: 1.3.6.1.4.1.509.2.3.1.3
iso(1).org(3).dod(6).internet(1).private(4).
enterprises(1).bbcorp(509).

autoSwitch500(2).timeTrigOpTable(3).
timeTrigOpEntry(1).timeTrigOpFreq(3)

Variable: 1.3.6.1.4.1.509.2.3.1.3[timeTrigOpIndex] where [timeTrigOpIndex] is a number (from 1 to n) of a time-triggered switching operation to which the switching frequency is assigned.

Example: Set the switching frequency to daily for time-triggered switching operation 5.

Operation: Set
Variable: 1.3.6.1.4.1.509.2.3.1.3.5
Set Value: every_day(3)

timeTrigOpStart

Description: Time when an "every_day" operation is activated. The format is: DDD HH:MM. (The "every_day" operation is set in the "timeTrigOpFreq" variable.) You can SET and GET the value of this variable.

Parameters: Day: MON, TUE, WED, THU, FRI, SAT, SUN—all days are ignored; Time: 00:00 to 23:59

MIB Path: 1.3.6.1.4.1.509.2.3.1.4
iso(1).org(3).dod(6).internet(1).private(4).
enterprises(1).bbcorp(509).
autoSwitch5000(2).timeTrigOpTable(3).timeTrigOpEntry(1).timeTrigOpStart(4)

Variable: 1.3.6.1.4.1.509.2.3.1.4[timeTrigOpIndex] where [timeTrigOpIndex] is a number (from 1 to n) of a time-triggered switching operation to which the start time is assigned.

Example: Set the start time of the "every_day" operation to 8 am for time-triggered switching operation 2.
Operation: Set
Variable: 1.3.6.1.4.1.509.2.3.1.4.2
Set Value: MON 08:00 [the day-of-the-week value is ignored]

timeTrigOpStop

Description: Time when an "every_day" operation is deactivated. (The "every_day" operation is set in the

"timeTrigOpFreq" variable.) You can SET and GET the value of this variable.

Parameters: Day: MON, TUE, WED, THU, FRI, SAT, SUN—all days are ignored; Time: 00:00 to 23:59

MIB Path: 1.3.6.1.4.1.509.2.3.1.5
iso(1).org(3).dod(6).internet(1).private(4).enterprises (1).bbcorp(509).autoSwitch5000(2).timeTrigOpTable (3).timeTrigOpEntry(1).timeTrigOpStop(5)

Variable: 1.3.6.1.4.1.509.2.3.1.5
where [timeTrigOpIndex] is a number (from 1 to n) of a time-triggered switching operation to which the stop time is assigned.

Example: Set the stop time of the "every_day" operation to 6 pm (18:00) for time-triggered switching operation 2.
Operation: Set
Variable: 1.3.6.1.4.1.509.2.3.1.5.2
Set Value: MON 18:00 [the day-of-the-week value is ignored]

timeTrigOpSwitchToPort

Description: Port switched to at the time of the switching operation. You can SET and GET the value of this variable.

Parameters: A(1), B(2)

MIB Path: 1.3.6.1.4.1.509.2.3.1.6
iso(1).org(3).dod(6),internet(1).private(4).
enterprises(1).bbcorp(509).
autoSwitch5000(2).timeTrigOpTable(3).
timeTrigOpEntry(1).timeTrigOpSwitchToPort(6)

Variable:
1.3.6.1.4.1.509.2.3.1.6[timeTrigOpIndex] where [timeTrigOpIndex] is a number (from 1 to n) of a time-triggered switching operation to which the port entry (A,B) is assigned.

Example: Set port A as the port switched to for time-triggered switching operation 3.

| | |
|---|---|
| Operation: | Set |
| Variable: | 1.3.6.1.4.1.509.2.3.1.6.3 |
| Set Value: | A(1) |

timeTrigOpTarget

Description: Indicates the type of switching for the scheduled switch operation. You can choose to switch a list of line cards in a rack, all line cards in a rack, or all line cards in all daisy-chained racks. You can SET and GET the value of this variable.

Parameters: Card(1) indicates that a list of line cards in a rack will switch. You must specify the list in the TimeTrigOpCardsList variable.
GS(2) indicates a Gang Switch for all line cards in a single rack. Setting this parameter will void the values in the TimeTrigOpCardsList variable.
SGS(3) indicates a System Gang Switch for all line cards in all daisy-chained racks. Setting this parameter will void the values in the TimeTrigOpCardsList variable.

MIB Path: 1.3.6.1.4.1.509.2.3.1.7
iso(1).org(3).dod(6).internet(1).private(4).
enterprises(1).bbcorp(509).
autoSwitch500(2).timeTrigOpTable(3).timeTrigOp
Entry(1).
timeTrigOpTarget(7)

Variable: 1.3.6.1.4.1.509.2.3.1.7[timeTrigOpIndex] where [timeTrigOpIndex] is a number (from 1 to n) of a time-triggered switching operation to which the target switch is assigned.

Example: Set the switch to perform a gang switch for time-triggered switching operation 2.

| | |
|---|---|
| Operation: | Set |
| Variable: | 1.3.6.1.4.1.509.2.3.1.7.2 |
| Set Value: | GS(2) |

timeTrigOpCardsList

Description: List of line cards to switch. This is a list of line cards separated by white spaces. For example, to switch the first, third, and tenth line cards,

timeTrigOpCardsList would be 1 3 10. You can SET and GET the value of this variable.

Parameters: Line cards 0 to 15

MIB Path: 1.3.6.1.4.1.509.2.3.1.8
iso(1).org(3).dod(6).internet(1).private(4).
enterprises(1).bbcorp(509).
autoSwitch500(2).timeTrigOpTable(3).
timeTrigOpEntry(1).
timeTrigOpCardsList(7)

Variable: 1.3.6.1.4.1.509.2.3.1.8[timeTrigOpIndex] where [timeTrigOpIndex] is a number (from 1 to n) of a time-triggered switching operation to which the list is assigned.

Example: Create a list from line cards 1, 4, 8, 13, and 15 that will switch for time-triggered operation 3.

Operation: Set
Variable: 1.3.6.1.4.1.509.2.3.1.8.3
Set Value: 1 4 8 13 15

timeTrigOpComment

Description: User comment for each time-triggered switching operation. You can SET and GET the value of this variable.

Parameters: Up to 31 characters

MIB Path: 1.3.6.1.4.1.509.2.3.1.9
iso(1).org(3).dod(6).internet(1).private(4).
enterprises(1).bbcorp(509).
autoSwitch5000(2).timeTrigOpTable(3).
timeTrigOpEntry(1).timeTrigOpComment(9)

Variable: 1.3.6.1.4.1.509.2.3.1.0[timeTrigOpIndex] where [timeTrigOpIndex] is a number (from 1 to n) of a time-triggered switching operation to which the user comment is assigned.

Example: Enter a user comment for time-triggered switching operation 3.

Operation: Set
Variable: 1.3.6.1.4.509.2.3.1.9.3
Set Value: “Back up Detroit if CSU fails”

timeTrigOpRowStatus

Description: Selections for managing rows in the time-triggered operations table. A row is an entry or group of variables. Each row is identified by its index—timeTripOpIndex—and contains entries for determining switching operations. You can activate or inactivate your time-triggered switching operations using this variable. You can SET and GET the value of this variable.

| | |
|---|---|
| Parameters: active(1) | activate the row |
| notInService(2) | inactivate the row |
| notReady(3) | inactivate the row |
| createAndGo(4) | process the row, and activate |
| createAndWait(5) | process the row, but remain inactive |
| destroy(6) | delete the row |

MIB Path: 1.3.6.1.4.1.509.2.3.1.10
iso(1).org(3).dod(6).internet(1).private(4).
enterprises(1).bbcorp(509).
autoSwitch5000(2).timeTrigOpTable(3).
timeTrigOpEntry(1).timeTrigOpRowStatus(10)

Variable:
1.3.6.1.4.1.509.2.3.1.10[timeTrigOpIndex] where [timeTrigOpIndex] is a number (from 1 to n) of a time-triggered switching operation to which the row status is assigned.

Example: Process all variables for time-triggered operation 1 and make this row active. You can SET and GET the value of this variable.
Operation: Set
Variable: 1.3.6.1.4.1.509.2.3.1.10.1
Set Value: createAndGo(4)

### 5.2.5 TRAPS

The following traps (messages) are generated by the rack when certain conditions occur, as listed in each description below. All traps carry the "mibSystem.sysObjectId" whose value is 1.3.6.1.4.1.509.2.

The generic traps are predefined standard traps that are applicable to most devices. The specific traps listed below are only particular to the Ganged Switching System rack.

## NOTE

**You must configure the rack with an IP address to where the traps will be sent, using the command SET RACK SNMP MANAGER. Refer to Chapter 4 for more information on configuring the rack.**

*Generic Traps*

| | | |
|---|---|---|
| coldStart | 0 | The "Generic trap=0" statement is a standard trap that is sent when the rack reinitializes. It carries the "mibSystem.sysDescr" whose MIB path is 1.3.6.1.2.1.1.1. |

*Specific Traps*

| | | |
|---|---|---|
| rackKeyLockedChange | | |
| | 1 | This trap is generated when the key switch position is changed. The trap returns information to the "rackKeyLocked" variable as listed below.<br><br>rackKeyLocked—<br>Description: Key switch position. When the key is in the locked position, the manual switch buttons on the front of the rack are disabled. When the key is in the unlocked position, the switch buttons are enabled.<br><br>Parameters: no(0) indicates that the key position on the front of the rack is set to "unlocked"; the manual switch buttons on the rack are enabled.<br>yes(1) indicates that the key position on the front of the rack is set to "locked"; the manual switch buttons on the rack are disabled.<br><br>Variable: 1.3.6.1.4.1.509.2.1.2.0, where 0 indicates that the variable is not part of a table. |

rackGangSwitchChange

2 This trap is generated when a gang switch is executed. The trap returns information on the "rackGangSwitch" variable as listed below.

rackGangSwitch—

Description: Forces all line cards for the rack to switch to the selected port. You can SET and GET the value of this variable.

Parameters: A(1), B(2)

Variable: 1.3.6.1.4.1.509.2.1.3.0, where 0 indicates that the variable is not part of a table

lineCardChange

3 This trap is generated when a line card is inserted or removed. The trap returns information on the "lineCardIndex" variable as listed below.

lineCardIndex—

Description: The slot number (0 through 15) occupied by the line card.

Parameters: 0 to 15

Variable: 1.3.6.1.4.1.509.2.5.1.2[lineCardIndex], where [lineCardIndex] is the slot number (0 through 15) occupied by the line card.

lineSwitchedPortChange

4 This trap is generated when the switch position for a line card is changed. The trap returns information on the "lineSwitchedPort" and "racklpRequester" variables as listed below.

lineSwitchedPort—

Description: The port switched to (for example, port A).

Parameters: A(1), B(2)

Variable: 1.3.6.1.4.1.509.2.2.1.2[lineCardIndex], where [lineCardIndex] is the slot number (0 through 15) occupied by the line card.

rackIpRequester—

Description: The IP address of the remote entity that last requested a switch. The null value is returned if this is a local manual switch.

Parameters: IP address

Variable: 1.3.6.1.4.1.509.2.1.6.0, where 0 indicates that the variable is not part of a table

timeTrigOpSwitch

5 This trap is generated when an alarm-triggered switch is executed. The trap returns information on the "lineSwitchedPort" and "timeTrigOpComment" variables as listed below.

lineSwitchedPort—

Description: The port switched to (for example, port A).

Parameters: A(1), B(2)

Variable: 1.3.6.1.4.1.509.2.2.1.2[lineCardIndex], where [lineCardIndex] is the slot number (0 through 15) occupied by the line card.

timeTrigOpComment—

Description: User comment for each time-triggered switching operation.

Parameters: Up to 31 characters

Variable: 1.3.6.1.4.1.509.2.3.1.9[timeTrigOpIndex], where [timeTrigOpIndex] is a number (from 1 to n) of a time-

| | | |
|---|---|---|
| | | triggered switching operation to which the user comment is assigned. |
| lineSwitchError | | |
| | 6 | This trap is generated when a card was unable to switch to the port value in the "lineSwitchedPort" variable. The trap returns information on the "lineSwitchedPort" variable as listed below.<br><br>lineSwitchedPort—<br><br>Description: The port switched to (for example, port A).<br><br>Parameters: A(1), B(2)<br><br>Variable: 1.3.6.1.4.1.509.2.2.1.2[lineCardIndex], where [lineCardIndex] is the slot number (0 through 15) occupied by the line card. |
| snmpBadCommunity | | |
| | 7 | This trap is generated when an excessive number of incorrect SNMP community names are received from the "rackIpRequester" variable as listed below.<br><br>rackIpRequester—<br><br>Description: The IP address of the remote entity that last requested a switch. The null value is returned if this is a local manual switch.<br><br>Parameters: IP address<br><br>Variable: 1.3.6.1.4.1.509.2.1.6.0, where 0 indicates that the variable is not part of a table |
| telnetLogin | 8 | This trap is generated when a Telnet session is successfully opened by the "rackIpRequester" variable. The trap returns information on the "rackIpRequester" variable as listed below.<br><br>rackIpRequester— |

Description: The IP address of the remote entity that last requested a switch. The null value is returned if this is a local manual switch.

Parameters: IP address

Variable: 1.3.6.1.4.1.509.2.1.6.0, where 0 indicates that the variable is not part of a table.

telnetBadPassword

9

This trap is generated when an excessive number of incorrect Telnet passwords are received from the "rackIpRequester" variable. The trap returns information on the "rackIpRequester" variable as listed below.

rackIpRequester—

Description: The IP address of the remote entity that last requested a switch. The null value is returned if this is a local manual switch.

Parameters: IP address

Variable: 1.3.6.1.4.1.509.2.1.6.0, where 0 indicates that the variable is not part of a table