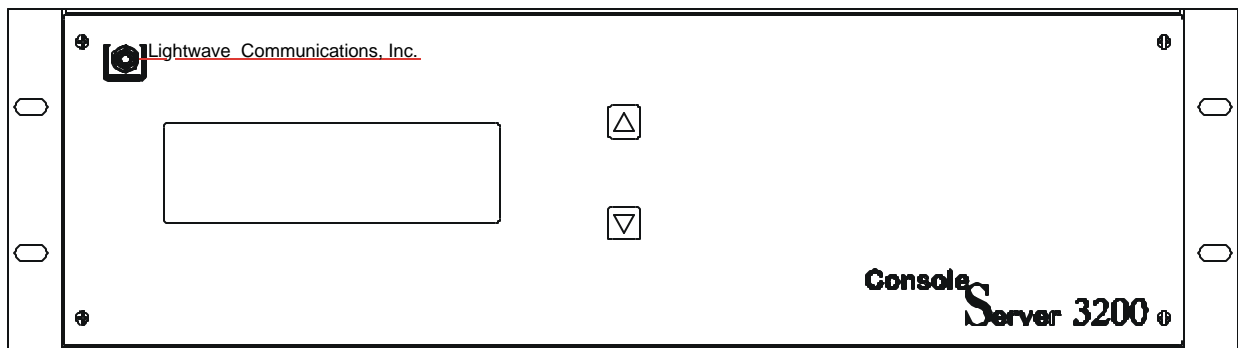


SCS3230

SSH Option for Console Server 3200 System Administrator's Guide



NOTE: Use this Guide and the ConsoleServer 3200 Manual, PN 15.00.017 for any new installation

Part Number 15.00.038
Revision A
May 2002



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Disclaimer & Revisions

Operation of this equipment in a residential area is likely to cause interference in which case the user, at his or her own expense, will be required to take whatever measures may be required to correct the interference.

Attention: *This product has been designed to comply with the limits for a Class A digital device pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against such interference when operating in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with this guide, may cause harmful interference to radio communications.*

Changes or modifications to this device not explicitly approved by Lantronix will void the user's authority to operate this device.

The information in this guide may change without notice. The manufacturer assumes no responsibility for any errors that may appear in this guide.

Date	Rev.	Part No.	Comments
April 2002	A (Preliminary)	15.00.038	System Administrator's Guide for SCS3230, an optional enhancement to the ConsoleServer 3200 system.
May 2002	A		Incorporated Addendum info on root-level password, and binary update file location (pp.9, 25, 39).

Declaration of Conformity

(according to ISO/IEC Guide 22 and EN 45014)

Manufacturer's Name & Address:

Lightwave Communications, a Lantronix Company
100 Washington Street, Milford, CT 06460 USA

Declares that the following product:

Product Name & Model: Lightwave Console Server 3200

Conforms to the following standards or other normative documents:

Safety:

EN60950: 1992+A1, A2, A3, A4, A11

Electromagnetic Emissions:

EN55022 Class A: 1998 (CISPR 22, Class A: 1993, A1: 1995, A2: 1996)

EN1000-3-2/A14: 2000

EN10003-3: 1994

Electromagnetic Immunity:

EN55024: 1998 Information Technology Equipment-Immunity Characteristics:

EN61000-4-2: 1995 Electro-Static Discharge Test

EN61000-4-3: 1996 Radiated Immunity Field Test

EN61000-4-4: 1995 Electrical Fast Transient Test

EN61000-4-5: 1995 Power Supply Surge Test

EN61000-4-6: 1996 Conducted Immunity Test

EN61000-4-8: 1993 Magnetic Field Test

EN61000-4-11: 1994 Voltage Dips & Interrupts Test

Supplementary Information:

This Class A digital apparatus complies with Canadian ICES-003 (CSA) and has been verified as being compliant within the Class A limits of the FCC Radio Frequency Device Rules (FCC Title 47, Part 15, Subpart B CLASS A), measured to CISPR 22: 1993 limits and methods of measurement of Radio Disturbance Characteristics of Information Technology Equipment. This product also complies with the requirements of the Low Voltage Directive 72/23/EEC and the EMC Directive 89/336/EEC.

The **Console Server 3200** carries the **CE** mark since it has been tested and found compliant with the following standards:

Safety: EN 60950

Emissions: EN 55022 Class A

Immunity: EN 55024

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For Your Notes

1: Product Description

The **SCS3230** is a **ConsoleServer 3200 (or CS3200)** that has been upgraded for enhanced security and control capabilities, including SSH capabilities required for today's secure server environment, and network features such as LDAP and NIS. The upgrade is available as a kit, or the individual parts (cards, cables, etc.) can be ordered separately.

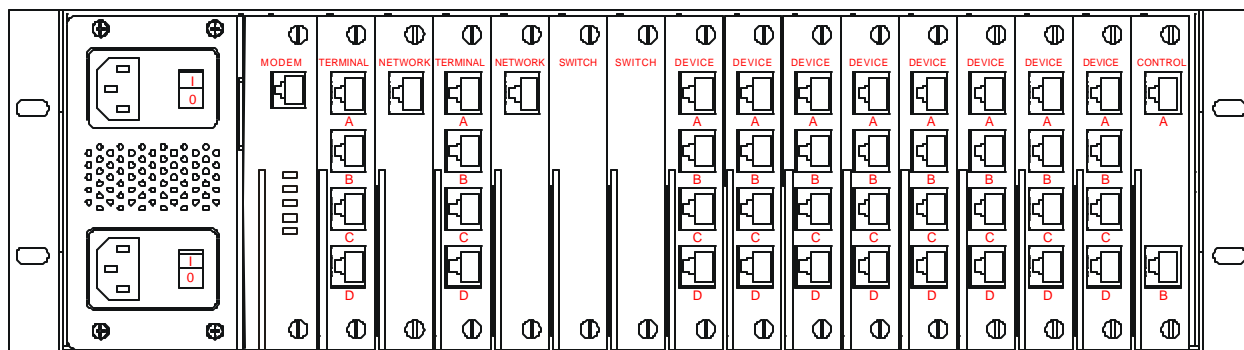


Fig. 1 Rear View of original **Console Server 3200** - notice **Control Card** to far right

The SCS3230 upgrade replaces the CONTROL card of the 3200 with a new 10/100 BaseT **NETWORK and CONTROL card** which includes a Linux-based operating system, and also replaces the NETWORK and TERMINAL cards of the 3200 with **CHANNEL EXTENDER cards**.

1.1 Quick Start

Overview of Upgrading from a CS3200 to a SCS3230 (all covered in this manual):

1. Backup the Database of your existing CS3200 System.
2. Obtain the SCS3230 Kit, which includes the cards, cables and this manual.
3. Locate the firmware updates for the DEVICE cards; they are stored in the `/lci/bin` directory on the NETWORK/CONTROL card. You may also download the update files from the Lightwave FTP site. DEVICE cards MUST be updates to Version 4.03 firmware.
4. Remove the CS3200 from service.
5. Remove the CONTROL card, the TERMINAL card(s) and the Network or 10/100 card(s)
6. Install the 3230's NETWORK/CONTROL card in place of the CONTROL card.
7. Install the four CHANNEL EXTENDERS in place of the TERMINAL or NETWORK cards.
8. Connect the four cables for the CHANNEL EXTENDERS.
9. Turn the System On, and administer the system using the TERM port. Set up your IP network connection information to get that operating.
10. RESTORE your CS3200's database into the SCS3230 system.

The SCS3230 system should be fully operational at this point.

1.2 Upgrade Description

The SCS3230 uses most of the same cards as the CS3200, and uses the CS3200 chassis. The SCS3230 is below. Notice the SCS3230's **NETWORK/CONTROL** card to the far right.

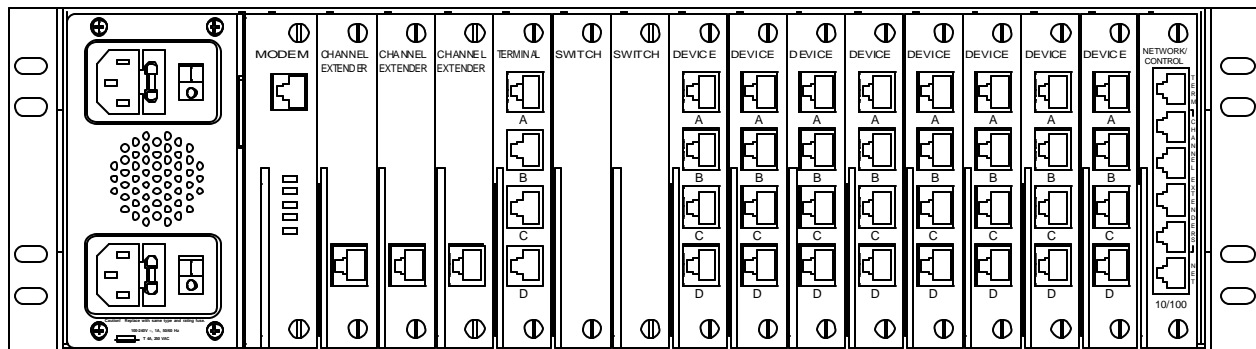


Fig. 2 Rear View of **SCS3230** - notice the **NETWORK / CONTROL** card in far right slot. Also note that this diagram shows three (3) Channel Extenders and one Terminal card in slots B through E, and 8 **DEVICE** cards.

1.3 System Features

The SCS3230 system is a Linux-based Console Server offering secure IP network-based connections to up to 32 connected devices via EIA-232 protocol. Linux administrators will find familiar commands and should need little guidance on administering the SCS3230 to co-operate in their server installation.

System users will not encounter any differences in operation. The commands and functions of the SCS3230 are designed to minimize any conversion issues.

The SCS3230 offers the following important features (many of which are also found in the CS3200 product):

- Hot-Swappable cards
- Dual Redundant Power Supplies
- 10/100 IP Network Interface
- Connect up to 32 RS-232 serial devices
- ID / Password Security, configurable access rights
- OpenSSH version 2 security
- Open LDAP
- NIS capable for remote database rights
- No unintentional break will ever be sent to attached servers
- Local access through TERM port (the 3230's Console port)
- Field upgradeable Flash memory
- User programming interface for simple administration and setup

1.4 Hardware Features

- 3RU tall (5-1/4 inches) rack-mountable Server
- One (1) 10/100 baseT Network Port for connection to your IP network
- Up to 32 serial DEVICE ports, RS232, connected via Category 5 (RJ45) wiring
- One (1) serial TERMINAL port, for VT100 console or PC with emulation
- 128KB-per-port Buffer Memory for DEVICE ports
- Front Panel multi-line backlit LCD display and pushbutton controls
- 128MB FLASH Memory, 128MB RAM
- * Redundant Power Inputs (chassis dependant)
- Optional Analog Modem for dial up access (non-secure)
- Power Options: Universal AC (100-240V) or -48VDC

* Some early CS3200 Chassis employ a single AC Power Input module. The Power Module is field-replaceable to provide redundant power capabilities, if required.

The SCS3230 is one of the most versatile network administration tools available today, allowing as many as 17 simultaneous users to access up to 32 connected devices via the RS-232C serial protocol. Pull-down menus help users navigate through all the functions of the SCS3230, creating an easy-to-use way to access system resources.

The SCS3230 consists of eight device card slots, two switch card slots, four access card slots, one modem slot and one Network/Control slot. The power supply slot contains two independent power supplies for redundant operation. The basic system consists of the power supply module, two switch cards, the Network / Control card, and in most cases, four Channel Extender Cards. The remaining card slots are populated according to the application requirements.

All system parameters are stored in non-volatile data flash memory. This data flash memory is organized such that there is always a complete copy of all data. Typical stored information includes the users' identities, user passwords, port parameters (such as baud rate, device name, etc.) and other system information. The data flash memory allow for a maximum of 200 user profiles to be stored, along with the parameters for all cards. System parameters may be backed up and restored from a local serial connection.

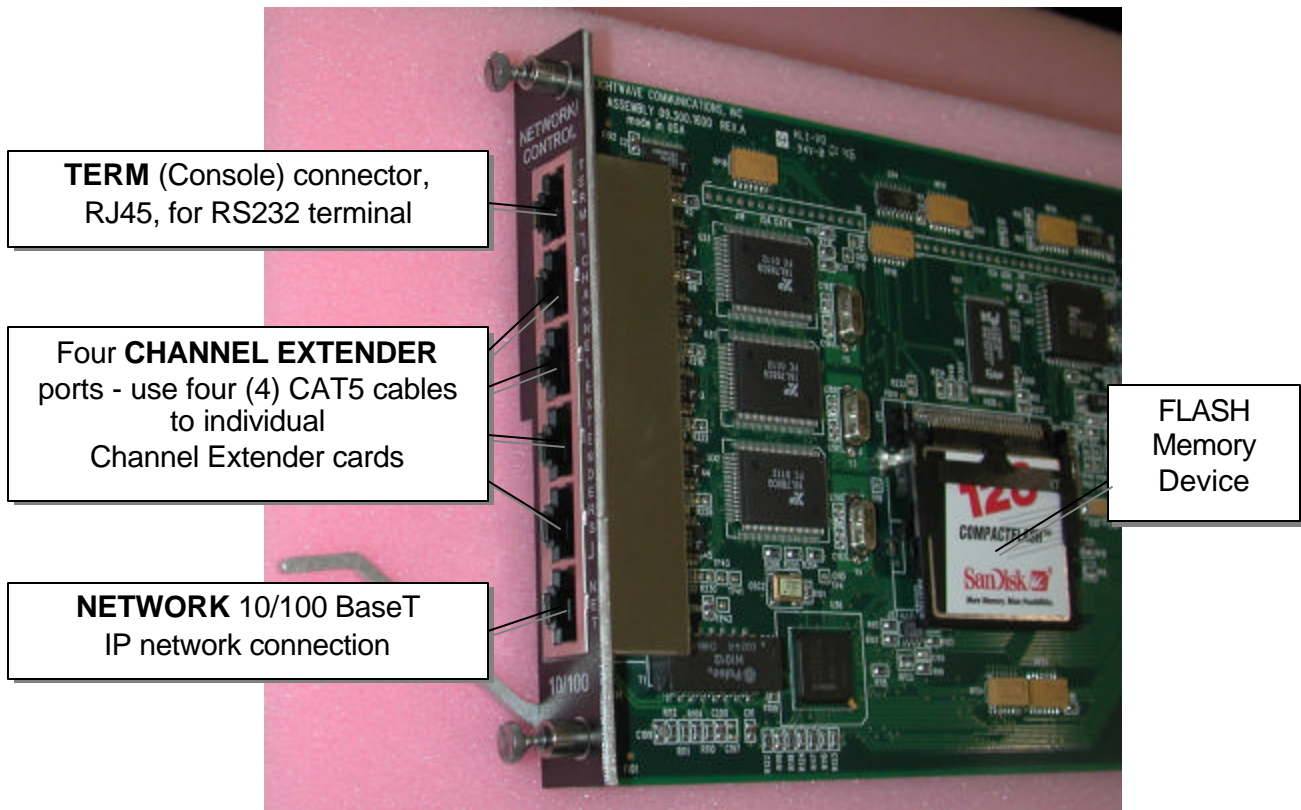
An important feature of the SCS3230 is the ability to re-configure the system hardware and software without turning off the power. The system boards have circuitry that allows them to be 'hot swapped' so the system may be expanded at any time while in use.

System updates can be accomplished via software upload to the system. For most updates, the system need not be restarted or taken out of service. Some operations or updates (e.g., Network update) may require the network ports be restarted.

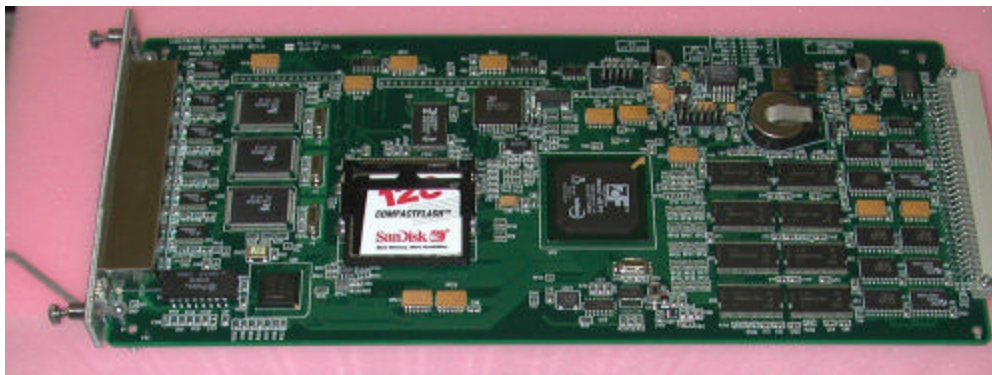
1.5 3230 Network/Control Card

The **SCS3230** offers the following benefits and features over the conventional CS3200 product:

- Linux-based Secure Console Server using OpenSSH v2
- ID / Password Security, configurable access rights
- One RS-232 Terminal port (for your local Console)
- 10/100 Network Port (TCP/IP) -- an option for the CS3200



The SCS3230 replaces the standard **CONTROL** card with the new combination **NETWORK / CONTROL** card, and fills the four Network / Terminal Card slots with "Channel Extender" cards.

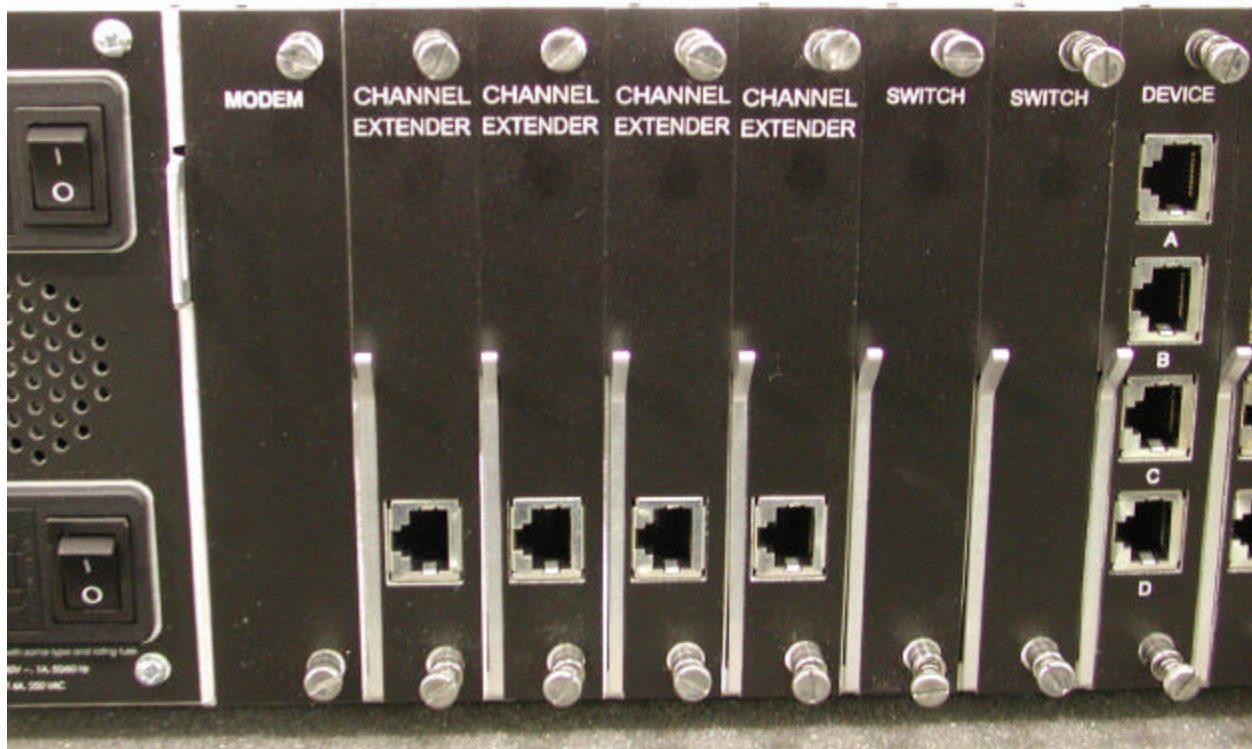


The Channel Extenders are used by the new Network / Control card to extend the number of

channels available to the 10/100 IP network connection. [The Channel Extender cards are the same as those used with the CS3200's 10/100 Network card.]

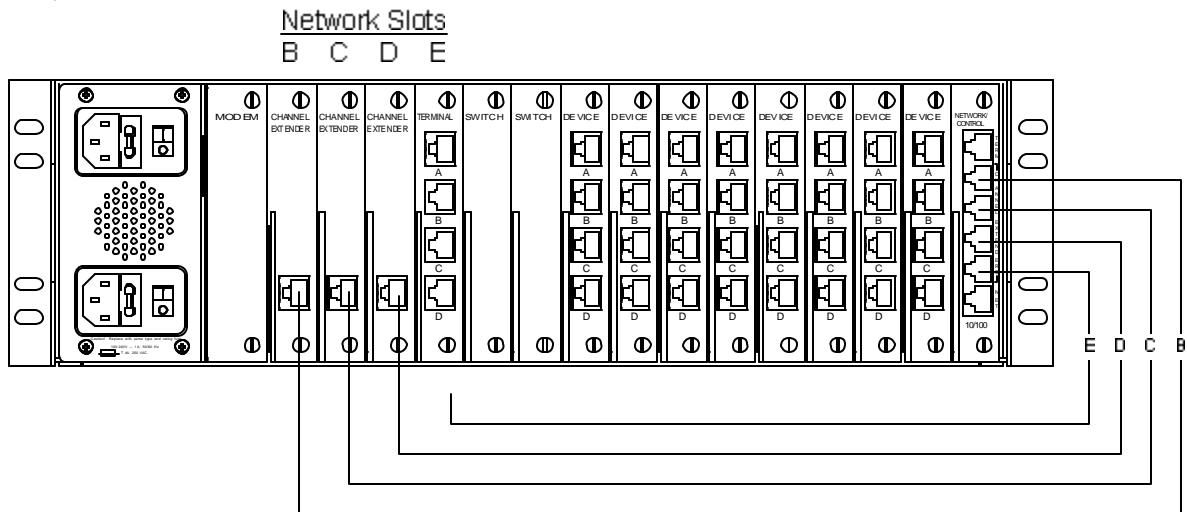


The **NETWORK / CONTROL** Card replaces the **CONTROL** card (far right slot) in 3200



The (4) **Channel Extenders** are used in place of the **NETWORK** or **TERMINAL** cards.

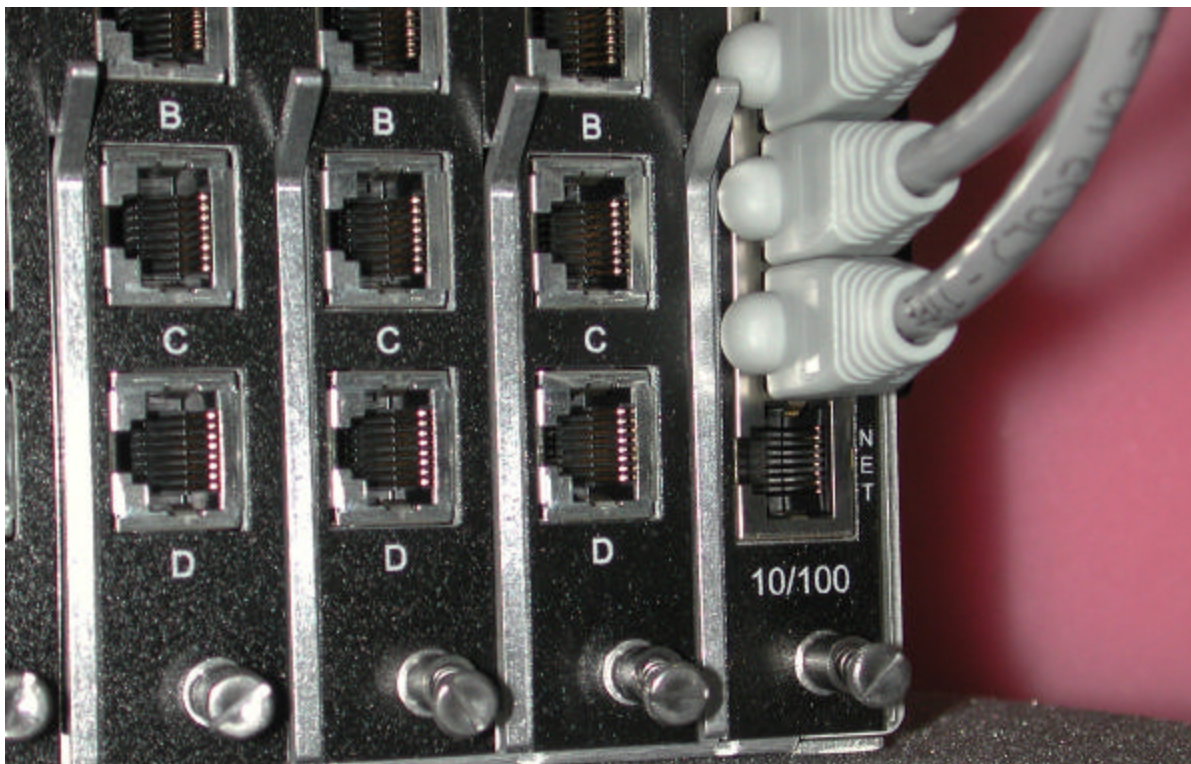
Four (4) 24-inch long CAT5 cables (PN 200.1061; straight-through, fully pinned) are used between the Channel Extenders and the NETWORK / CONTROL card. One cable is used to connect each of the Channel Extenders in **Slots B through E** to the corresponding port (see below) on the new Network/Control Card.



If a Terminal Card remains in the 3230 system, that Channel Extender port of the Network / Control Card is not used. Shown above, Network Slot E's Channel Extender position is "unused"; and this unnecessary cable would not be installed in that position.

1.5.1 10/100 Port (Network)

The 10/100 BaseT Network connection is accessible on the bottom RJ45 connector on the NETWORK / CONTROL card.



1.5.2 TERM Port (Console)

A Terminal port, or Console (labeled **TERM**) is available at the top RJ45 connector on the NETWORK / CONTROL Card. This is an EIA-232-compliant terminal position, typically used for System Administration purposes.



The **TERM** port on the NETWORK/CONTROL card is fixed at 9600 baud, 8 data bits, No Parity, and one Stop bit (**9600 / 8 / N / 1**) and is a **DCE** device. The TERM port has a higher Terminal priority than the 10/100 Network Port on this card, and can be used for forced logout of abandoned or other undesirable connections.

1.6 Backup and Restore Commands

The SCS3230 system is fully compatible with the "Backup and Restore" capabilities of the CS3200, so transferring your user database from your existing CS3200 into the new SCS3200 hardware is supported.

2: System Overview

For simplicity, we will discuss the features and capabilities of the SCS3230 as if it were a new and different system, not merely an upgrade to a ConsoleServer 3200. The SCS3230 is designed to operate as closely to the original ConsoleServer3200 as possible from a user's perspective, but still provide the capabilities needed for the secure server environment.

Existing 3200 customers maintain their investment and can offer enhanced security and control for their terminal server systems. Existing users will not require retraining since all commands and features of the SCS3230 option are the same as found in the CS3200. Even the upgrade process accepts the existing site database for rapid deployment of the SCS3230 equipment.

2.1 *Connect Up to Thirty-two RS-232C Compatible Ports*

The SCS3230 is plug-compatible with any RS-232C device, DTE or DCE. These include a variety of network servers, routers, or any other LAN/WAN computers on the network. Connections are made by routing the device signals through the switch cards to the appropriate user interface port.

2.2 *128K FIFO Audit Trail*

The SCS3230 stores the equivalent of approximately 200 screens worth of data (128K) per device port in a **true FIFO buffer** for each DEVICE port. This data may be viewed 'off-line' at any time by users accessing the device port buffer.

Should more than 128K of data be received in a buffer, the oldest data will be discarded, in the amount of the 'overflow'. By operating in this fashion, the most recent data is collected and the largest amount of data that can be saved will be maintained.

2.3 *Connections*

The system is capable of 17 simultaneous full-duplex connections to the connected devices. The administration functions may be accessed through a local serial connection or through a network connection. The **NETWORK / CONTROL** card (with a full complement of four **Channel Extender cards**) supports up to 16 users connections plus one connection to the administration functions. The NETWORK / CONTROL card also provides one TERM port (for a System Administrator's serial Console)

The **TERMINAL** cards (a 3200 access card) may be used for applications requiring additional local serial terminals. Each Terminal Card is installed in place of one of the Channel Extender

cards. By reducing the number of Channel Extender ports, the maximum number of available connections for 10/100 network access is reduced by four sessions for each Terminal Card installed. Illustrations showing a mixture of Channel Extender cards and Terminal Cards are found on pages 11 and 16 of this Guide.

An optional **MODEM** connection is also available, however its connections are not 'secure' and its use is not recommended except in those instances when security will not be compromised by dial-in access using the modem. The SCS3230's modem connection is not subject to the Linux security controls of the other access ports.

2.4 Security Passwords

The System Administrator may define up to 200 user profiles. Each user is assigned a unique password by the system administrator. The system forces the user to change the password the first time the user attempts to connect to any servers. After the users have changed their passwords, the system will not prompt for a change. The users change their passwords at whatever interval they feel is necessary.

The operating system is subject to Linux security constraints, including sysadmin and root level security. Users cannot access the sysadmin layer or the root layer of the system.

2.5 Interface

Interfaces to the **DEVICE** and **TERMINAL** cards are all RS-232C compliant. These ports are configured through the TERM port on the **NETWORK / CONTROL** card using a local Console, or via network connection through your TCP/IP network. All system access is password protected.

Each DEVICE port and TERMINAL has settings for baud rate, stop bits, parity, number of data bits, flow control, and port type (i.e., DTE or DCE). The TERM port (for your Console) on the NETWORK / CONTROL card has a fixed data format of 9600 / 8 / N / 1, and DCE.

The **NETWORK / CONTROL** card connects over a network using TCP/IP on 10- or 100-baseT at 10/100 Mbits (auto-negotiating). The **10/100** port on this card is assigned an IP address, a subnet mask, a default gateway, and an optional secondary destination path by Console configuration using the TERM port on this card during the initial setup of the system.

The optional **MODEM** card connects directly to a conventional modular phone jack (RJ11) to interface with a telephone network. The sys admin may designate a modem initialization string, or may use the default modem initialization string, which allows auto-answering on one ring. The modem provides card-edge visual status indicators.

Note: For 'secure' installations, **the Modem should not be used**. Modem access is not encrypted and/or secure and could allow unauthorized access to system information. However, if modem access is limited to internal administrative access, the modem may provide an additional means of system access in the event your network is down.

3: System Components

Each SCS3230 consists of three major components: the 3200 system chassis, 3200 DEVICE cards, and 3200 access cards. The 'access cards' include the new 3230 NETWORK/CONTROL card, which is the heart of the SCS3230 product, and makes it operate a bit differently.

Note: The 3200's **NETWORK** card and **10/100** Network card are NOT supported by the SCS3230 NETWORK / CONTROL card. The NETWORK/CONTROL card incorporates its own 10/100 Network port.

3.1 3200 Chassis

The chassis contains a front-panel LCD for quick system information that is available at all times. Two front panel buttons allow display selection and paging through displays (see **section 10.0** for more information).

The second major component of the chassis is the power supply module. This module contains two independent supplies, each capable of sustaining the system should one supply fail or lose its power input. The Power Supply module also incorporates the system fan. The AC power module has two front-panel switches (one for each supply) with replaceable fuses in their IEC-type connectors. The DC power module provides a single On/Off switch.

The third and last component of the chassis is the **SWITCH** card set. The switch cards connect the access cards to the device cards, with a maximum of **17** simultaneous connections using all available terminal, network, and modem ports.

3.1.1 Power Supply Module

The SCS3230 may be equipped with either an AC power module or a DC power module. The power module may be field-swapped (although is not hot-swappable) if the available power source requirements change.

The Power Module provides two discrete electrical inputs to the system. Either power input supports a fully-loaded chassis, and switching between power inputs is automatic if one source fails or is turned off.

3.1.2 3200 Switch Cards

Two 3200 **SWITCH** Cards are required, and are unchanged from the 3200 system.

3.2 Device Cards

The Device cards are fully compatible with the SCS3230 application. The SCS3230 requires version **4.03 Build 01** (or higher) of the Device Card binary firmware. Firmware updates are downloadable from the Lightwave FTP site (<ftp://ftp.lightwavecom.com>).

Note: DEVICE CARD firmware MUST be updated to 4.03 or higher

Each DEVICE card has four completely independent ports for attachment to servers or other devices with console ports. Eight device cards may be installed per system, for a maximum of 32 device ports. The device ports do not send an 'break' signal to the attached servers at any time unless specified by the user. There are no adjustments directly on the device cards. All parameters are set up through the **system administrator** port.

3.3 Access Cards

The card configuration is changed with the SCS3230, compared to CS3200.

3.3.1 NETWORK / CONTROL Card

The **NETWORK / CONTROL** card allows users to connect to the device cards from an SSH or telnet session over an IP network, and remote access to the administration functions.

The **NETWORK / CONTROL** card replaces the **CONTROL** card from the CS3200, and is located in the far right slot of the system chassis. Only one card is required in an SCS3230.

The **NETWORK / CONTROL** card includes one **TERM** connector for a local Console; one **10/100 NET** connector for a TCP/IP network interface, and four **CHANNEL EXTENDER** ports. The Channel Extender ports are connected by RJ45 cables to one to four **CHANNEL EXTENDER** cards, which are an extension of the **NETWORK** card's operation.

The **NETWORK / CONTROL** card supports up to sixteen simultaneous user telnet connections and one administrator connection to the same IP address. The network card must be connected to a network that uses TCP/IP.



3.3.2 CHANNEL EXTENDER Cards

CHANNEL EXTENDER cards are used to extend the NETWORK functionality of the NETWORK / CONTROL card, providing network access to the DEVICE ports in the system. The Channel Extenders provide additional circuits allowing more simultaneous network sessions, up to the system capacity of 16 device sessions. Channel Extenders are installed in slots B, C, D, and slot E, replacing the NETWORK cards and the TERMINAL cards in a 3200 system.

The SCS3230 is normally configured with four CHANNEL EXTENDERS, but may have any combination of CHANNEL EXTENDER cards and TERMINAL cards, as required for your application.

Note: At least one Channel Extender card is required if any DEVICE access is required using your IP Network.

CHANNEL EXTENDER cards connect to the NETWORK / CONTROL card using a short RJ45 cable. Each CHANNEL EXTENDER provides up to four (4) simultaneous sessions for DEVICE port access over the IP Network connection.

3.3.3 TERMINAL Cards

The **TERMINAL** card provides a point of connection for a conventional RS-232 terminal or a computer running a terminal emulation program. Users connected through a TERMINAL card may connect to any of the device cards in the system, provided that their user profile has access rights for the port. There are four ports per terminal card. Each port's parameters are set up independently from the other ports. All parameters are set up through the system administrator port. There is no access to the administration functions through the terminal card.

The SCS3230 may have up to 3 Terminal cards, depending on system requirements. In some applications, the existing Terminal Card may be required for local serial connection to one of the Device Ports. The existing Terminal Card is compatible and may be used, however **the use of each Terminal Card(s) reduces the number of simultaneous Network connections** (by 4 sessions) that may be made over the new 10/100 Network port on the Network Control Card. The 3200 Terminal cards offer **configurable** port parameters (baud rate, DTE/DCE, etc.), unlike the fixed parameters of the TERM (Console) port on the NETWORK / CONTROL card.

The SCS3230 requires version **4.00** (or higher) of the Terminal Card binary firmware (fterm.bin). This is not specific to 3230, and has been available for some time. Firmware updates are downloadable from the Lightwave FTP site (<ftp://ftp.lightwavecom.com>).

3.3.4 3200 Network Cards

The earlier 3200 **Network** card (10baseT) is not supported by the 3230 Network / Control Card. It will not function if installed.

3.3.5 3200 10/100 Network Cards

The earlier 3200 **10/100 Network** card is not supported by the 3230 Network / Control Card. It will not function if installed.

3.3.6 Modem Card

The Modem Card is used primarily in the Console Server 3200 systems, however, it does not provide or support any of the "secure" features of the SCS3230 system. It is not secure in the sense that the modem circuitry is not subject to the encryption used for secure SSH transactions, a primary reason for updating to the SCS3230. For this reason, the use of the modem may be limited, or the modem may simply be disabled or removed, depending on your site's application.

The modem card allows non-secure dial-in access to the SCS3230 and the servers attached to its device ports. The modem card supports baud rates up to 38.4 kbps, and will auto-detect the actual connection speed. Only one user at a time may access through the modem card, and only one modem card may be installed per unit. The system administration functions may not be accessed from the modem card.

4: Installation Instructions

Two options for your installation exist:

- you are either UPGRADING a CS3200 system to be an SCS3230 system, or
- you are installing a NEW SCS3230 system.

For simplicity, we will refer to a **ConsoleServer 3200** system with the **NETWORK/CONTROL** card installed as a SCS3220 system. In either case above, you will use THIS GUIDE for administering the SCS3230 features and options, while referring to the ConsoleServer 3200 manual for a majority of the hardware installation instructions.

- When you purchase a CS3200 chassis, you will get the CS3200 manual (PN 15.00.017).
- When you purchase a SCS3230 NETWORK/CONTROL card, you will get the SCS3230 System Administrator's Guide (this manual, PN 15.00.038).

NOTE: The majority of this System Administrator's Guide is intended for the administration and setup of the system, when using the SCS3230 kit. The hardware of the ConsoleServer 3200 may have been previously installed and is being upgraded at this time, or the system may be installed as brand new installation.

Many hardware installation details are discussed in the ConsoleServer 3200 System Manual. Not all are repeated in this manual.

4.1 Items in a SCS3230 Kit

The SCS3230 'kit' includes all of the cards and cables required to upgrade a CS3200 to the SCS3230.

PN 500.000.0010 - 10/100 BT SECURE 3230 CARD KIT

includes:

- (1) 500.000.0014 -- 10/100 BT CNTL/NTWK Card
- (4) 500.000.0012 -- 3200 CHANNEL EXTENDER Card
- (4) 200.0161 -- CAT5 Cable, 24 inch long

This **SCS3230 guide, PN 15.00.038** is included with each **PN 500.000.0014 card**.

Additional adapters and cables may also be included in the shipping container if ordered. Orders with a large number of cables and adapters are usually shipped in separate containers.

If you are updating a CS3200 system, you may want to save your existing database from the CS3200 and copy it into the SCS3230. To do so, you will use **Backup** to save the database, and then **Restore** to copy it into the SCS3230's memory.

4.2 Move Database from your CS3200 to SCS3230

The SCS3230 is designed to work with the **Backup and Restore** options found in the CS3200 product. You can transfer your database from the CS3200 to the SCS3230. To accomplish this, you must save the Backup the system database to a local PC, and then after upgrading the hardware, you can then upload the saved information.

If you do not use Backup and Restore, you will have to re-program the system with port and user information.

This section assumes some existing familiarity with the administration methods (logging in, using the TERM port, etc.) of the CS3200 system, much of which will be similar with the SCS3230 system.

4.2.1 Backup Procedure of your CS3200 System

Before shutting down the CS3200 System, you should **backup** the existing user database. This is a normal CS3200 operation, as described in the 3200 documentation.

1. Log in as the sys admin on **Control card port A** on the **CS3200's CONTROL card**.
2. Make sure that there are no users logged in to the ConsoleServer 3200. If there are any, have them log out or force them off the system using the **FORCELOGOUT** command.
3. In the communications program, begin the text file capture. Name the text file as something that will indicate that it is the ConsoleServer 3200 parameters backup file, not just a plain text file (i.e., **3200. bak** and not **3200. txt**).
4. Type the command **BACKUP** at the **sys admin>** prompt and press **<ENTER>**. Text will be outputted to the screen; this text is equivalent to the binary data stored in the ConsoleServer 3200's non-volatile memory. Wait several minutes while the ConsoleServer searches memory for all non-zero records (unused records are skipped in the backup).
5. After the **sys admin>** prompt returns, end the text file capture in the communications program.
6. Open the text file with a text editor (such as Window's Notepad text editor, or StarOffice, etc.).
7. Remove any text after but not including the line **\$BACKUP COMPLETE**. **DO NOT EDIT ANY OF THE TEXT ABOVE THIS LINE!** It is not necessary to remove the text after **\$BACKUP COMPLETE**, but it reduces the download time for the file during the **RESTORE** process.

4.2.2 Restore Procedure

After the SCS3230 system is operational, you can transfer your CS3200 database into the system using the **RESTORE** option. After your database is saved in the SCS3230 system, you can backup and restore the SCS3230's user database using Backup and Restore.

1. Log in as the sys admin on TERM port on the NETWORK / CONTROL card.
2. Make sure that there are no users logged in to the SCS3230. If any users are currently logged on, have them log out or force them off the system by using the **FORCELOGOUT** command.

3. At the sys admin> prompt, type RESTORE and press <ENTER>. The SCS3230 will prompt for confirmation to proceed with the parameter restore process. Type YES and press <ENTER> to proceed. The system will ask for a second confirmation to proceed. Type YES and <ENTER> to start the parameter restore process. After the second confirmation, there is no text echoed to the screen indicating that the restore process is proceeding.
4. Using the communications program, send the text file containing the backup records to the SCS3230. Be sure to use text mode when transferring the file. The file download should not take too much time; less than a minute is typical at 38.4K baud. After the download is complete, the SCS3230 will re-zero all unused records. If a problem is encountered during the text file transfer, the SCS3230 will abort the restore process and return to the sys admin> prompt.
5. Once all unused records have been re-zeroed, the SCS3230 will reboot. Allow the complete memory check to proceed; after it is done, log in as the sys admin at the LCI3200> prompt.
6. The ConsoleServer is restored to its previous settings and is ready for use. Check that all user, terminal, device, and other parameters are correct and acceptable.

4.2.3 To RESTORE from a 3200 to a 3230

Use a terminal emulation software on a PC connected to the sysadmin port of a 3200. Ensure that software flow control (XON/XOFF) is turned on for the software.

1. Implement a capture to file.
2. type "backup".
3. Wait until you see "\$BACKUP COMPLETE"
4. edit the backup file and remove any information before the line which starts 0,... This is probably the first line. Also remove the couple of lines that say \$BACKUP COMPLETE. After the backup there will be some extraneous information, this needs to be removed.

Copy the file to the 3230. This can be accomplished using pscp or scp

Log in to the 3230 and establish yourself as root.

Cd to /lci/bin

Step 1) Type 'restore "file name" yes'

"file name" is the name of the file you just copied.

The last yes is needed if you want to be told what passwords the system is inserting for this user. If you do not want to see the passwords, do not type anything.

Unless there is an issue, you will observe users being added to the system and any changes that take place to the user name or password. If you receive a message about record number being incorrect, the file is either corrupt from flow control or you have not edited out the extraneous information that is in the file from doing the backup.

If the service multidrop is running you will be asked to stop it and told how to do so 'type "service multidrop stop"'. Goto step 1.

4.2.4 LCI Update

There are four binary (.bin) files in the **/lci/bin** directory of the Network/Control card that may be needed to update existing 3200 cards for use with the new Network/Control card's firmware:

- fterm.bin
- rterm.bin
- fdevice.bin
- rdevice.bin

These files are stored on the Network/Control Card in the **/lci/bin** directory on the card. The files may also be downloaded from the Lightwave FTP site (<ftp://ftp.lightwavecom.com>). The customer will use the **lciupdate** program to install these updates, however, they do not need to transfer the binary files from an external computer to the 3200 - they should just direct `lciupdate` to use the `/lci/bin` path.

It is not necessary to update the Device or Terminal cards before assembling the system, however, before the system is put into service, the cards should be updated.

To Update a Card or Cards

From the 3230 bash shell, type the following.

[If you are in the sysadmin shell on a 3230, type 'exit' to get to the 3230 bash shell.]

- Establish yourself as super user
- Type 'service multidrop stop'
- Type 'ps -ax' and look for any processes that contain the title multidrop.
- If any multidrop processes exist, type 'killall multidrop'. Type ps-ax and again look for any multidrop processes. If there are any, type 'kill -9 "the number in the farthest left column on the same line as the process"', do this for all multidrop processes.
- Type lsmod and look for mdser. If mdser is not present type insmod mdser.
- If you wish to change the card binary file (*.bin) stored on the SCS3230, copy the update file (filename.bin) to the 3230 and place in the "/lci/bin" directory.
- Type '/lci/bin/lci_update "[card letter][processor number]" file'. Where file is the name of the file you for the slot you are updating. For instance you would probably type
- /lci/bin/lci_update b1 fterm.bin for terminal cards (the file name may be different and b could be b,c,d,e)
- /lci/bin/lci_update h1 fdevice.bin for device cards (the file name may be different and h could be h,i,j,k,l,m,n,o)
- The processor number is relevant to multiprocessor cards. You will be informed if it is anything other than one.

4.3 Connecting to the TERM Port

The cable kit **P/N 200.0135** contains the necessary adapters to interface the system TERM port on the NETWORK / CONTROL card to a laptop or a terminal. Using the adapters in the kit, follow the steps outlined below.

The communications settings for the system administrator port (**TERM**) are fixed at 9600 baud, one stop bit, no parity, eight data bits, and DCE (9600 8N1 DCE).

NOTE: The administration functions may also be reached via telnet. However, it is first necessary to configure the network ports through the direct serial connection.

1. Turn on power to the terminal or computer. If using a computer, start the desired communication program. The terminal or communications program used must be in VT100 emulation mode. Note that the VT100 functions keys are not always mapped to the terminal or computer function keys; consult the appropriate documentation for further information.
2. Ensure that the communications settings of your Terminal are correct.
3. Locate the serial port on the terminal or computer and determine what type of connector is used. The cable kit included with the SCS3230 contains each of the following: one RJ45 serial cable, an RJ45 to male DB9 adapter, an RJ45 to female DB9 adapter, an RJ45 to male DB25 adapter, and an RJ45 to female DB25 adapter. Select the appropriate adapter for the serial port on the terminal or computer.
4. Firmly seat the adapter in the serial port. Screw down the adapter to secure it to the serial port.
5. Insert one end of the serial cable into the adapter until a click is heard. Insert the other end of the serial cable into TERM port of the NETWORK / CONTROL card, again until a click is heard.
6. Press <ENTER> on the keyboard. The `l o g i n >` (using Telnet) or `l o g i n a s : >` (using SSH) prompt should appear. If not, check that the SCS3230 is connected to the appropriate power outlet, the power switch is on, the cards are firmly seated, and that all cable connections are secure. If "garbage" characters appear on the screen, check that the communications settings are correct.
7. The system administrator may now login to the system.

5: Connecting Equipment to the SCS3230

When connecting devices to the SCS3230, be sure to use Lightwave Communications cables and adapters to ensure the proper transmission of data signals. If a device has an RJ45 serial port, use the manufacturer's cable included with the equipment to convert the RJ45 serial connector to a DB9 or DB25 connector, and then use a Lightwave Communications adapter to convert back to RJ45 to attach to the device port. Directly connecting the RJ45 port on the SCS3230 to the RJ45 port on a third-party device may not allow for the proper transmission of data signals.

SCS3230 serial port default settings

Port Type	Baud Rate	Data Bits	Parity	Stop Bits	Port Configuration
TERM	9600 (fixed)	8	None	1	DCE
Terminal	38400	8	None	1	DCE
Device	9600	8	None	1	DCE

5.1 Terminal Card

Terminal Card typical adapters and port configuration:

System Type	Adapter Part Number	Port Configuration
Wyse 50 / 60	200.0066	DCE
DEC VT330, PC (25pin)	200.0067	DCE
PC (9pin)	200.0070	DCE

Materials:

- SCS3230 terminal port
 - terminal or computer with RS-232 serial port
 - RJ45-terminated Cat 5 cable (standard LAN cable)
 - Lightwave adapter for terminal serial port
1. Attach the Lightwave adapter to the terminal or computer serial port.
 2. Connect the Cat 5 cable to the adapter. Connect the other end to the SCS3230 terminal port.
 3. Turn on the terminal or start the computer's communication program. Make sure that the communication parameters of the terminal or computer match those of the terminal port.

5.2 NETWORK / CONTROL Card

The network port of the NETWORK / CONTROL card runs at 10/100 Mbits, half-duplex, with auto-negotiation. The device used to connect the ConsoleServer to the network (i.e., a hub or switch) must support this configuration.

Materials:

- SCS3230 network port
- network point-of-connection (i.e., a switch or hub)
- RJ45-terminated Cat 5 cable (standard LAN cable)

1. Configure the ConsoleServer network parameters to the desired values as outlined in section 6.5.
2. Configure the network point-of-connection. It must be manually set to 10 Mbits, half-duplex, with no auto-negotiation.
3. Connect the ConsoleServer network port to the network using a standard LAN cable.
4. Check the status lights at the network end of the connection. It should indicate a good link. Try reaching the IP address assigned to the ConsoleServer by using **PING** or **TELNET**. If there is a problem, check the network configuration on both ends.

5.3 Modem Card

Materials:

- SCS3230 modem port
- Analog telephone line (POTS)
- RJ11 modular telephone cable

1. Locate the modular jack for the telephone line to be used. Select a telephone cable with sufficient length to reach between the jack and the ConsoleServer.
2. Connect one end of the telephone cable to the jack. Connect the other end to the ConsoleServer modem port.
3. Make sure the ConsoleServer is powered. Dial the telephone number of the line connected to the ConsoleServer. The modem should automatically answer. If not, check the telephone line and connections.

5.4 Device Card

NOTE: DEVICE Cards MUST be updated to Version 4.03 (or higher) firmware for SCS3230

The SCS3230 is designed so that the default device port communications settings will match the communications settings of most Sun® server and workstation console ports (9600 baud, 8 data bits, no parity, one stop bit). Other equipment types (i.e., Cisco®) frequently use similar communications settings; check the manuals included with the equipment for the correct settings. The table below lists the default serial port communications settings for the SCS3230. Sections 6.3 and 6.4 outline the commands for changing the terminal and device port communications settings.

The following tables list the adapter part number and port configuration for some common equipment types that may be connected to the SCS3230. Note that in some cases, an additional cable or adapter is included with the equipment to convert a proprietary pinout to an EIA-standard pinout. Also, note that **it is not possible to connect the RJ45 serial port of the ConsoleServer directly to the RJ45 serial port of any third-party equipment.** Sun Netra servers, Cisco switches, and other similar devices require a special adapter or cable to connect to the ConsoleServer. The adapter or cable is usually provided by the manufacturer of the equipment (e.g., Sun), or may need to be created by the user. The adapters and cables from the equipment manufacturer are usually designed to interface directly to a terminal, so the ConsoleServer device port must be configured as DTE rather than its default value of DCE. Lightwave Communications has pre-made adapters and kits for some common equipment types; contact Lightwave for information regarding your specific application.

Note: Some adapters are also available in quantity packs, and may be shipped under a different part number. Quantity packs are "299.xxxx" compared to "200.xxxx".

Device Card typical adapters and 3200 port configuration:

System Type	Adapter Part Number	Port Configuration
SUN	200.0066	DCE
HP, SGI, PC (9pin)	200.0070	DCE
PC (25pin)	200.0067	DCE
Sun Netra t1/Cisco	200.0225	DCE

RJ45 to RJ45 Cables:

Part Number	Length
200.0062	2m
200.0063	5m
200.0064	10m
200.0065	15m

Standard DB9 or DB25 installation:

Materials:

- SCS3230 device port
- device with RS-232-C serial console port
- RJ45-terminated Cat 5 cable (standard LAN cable)
- Lightwave adapter for serial console port

1. Attach the Lightwave adapter to the serial console port.
2. Connect the Cat 5 cable to the adapter. Connect the other end to the SCS3230 device port.
3. Check that the device port and serial console port communications parameters match, and synchronize them if they do not match.

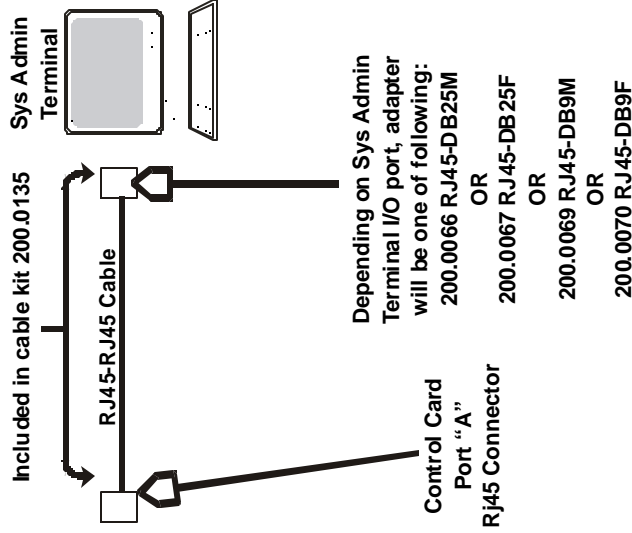
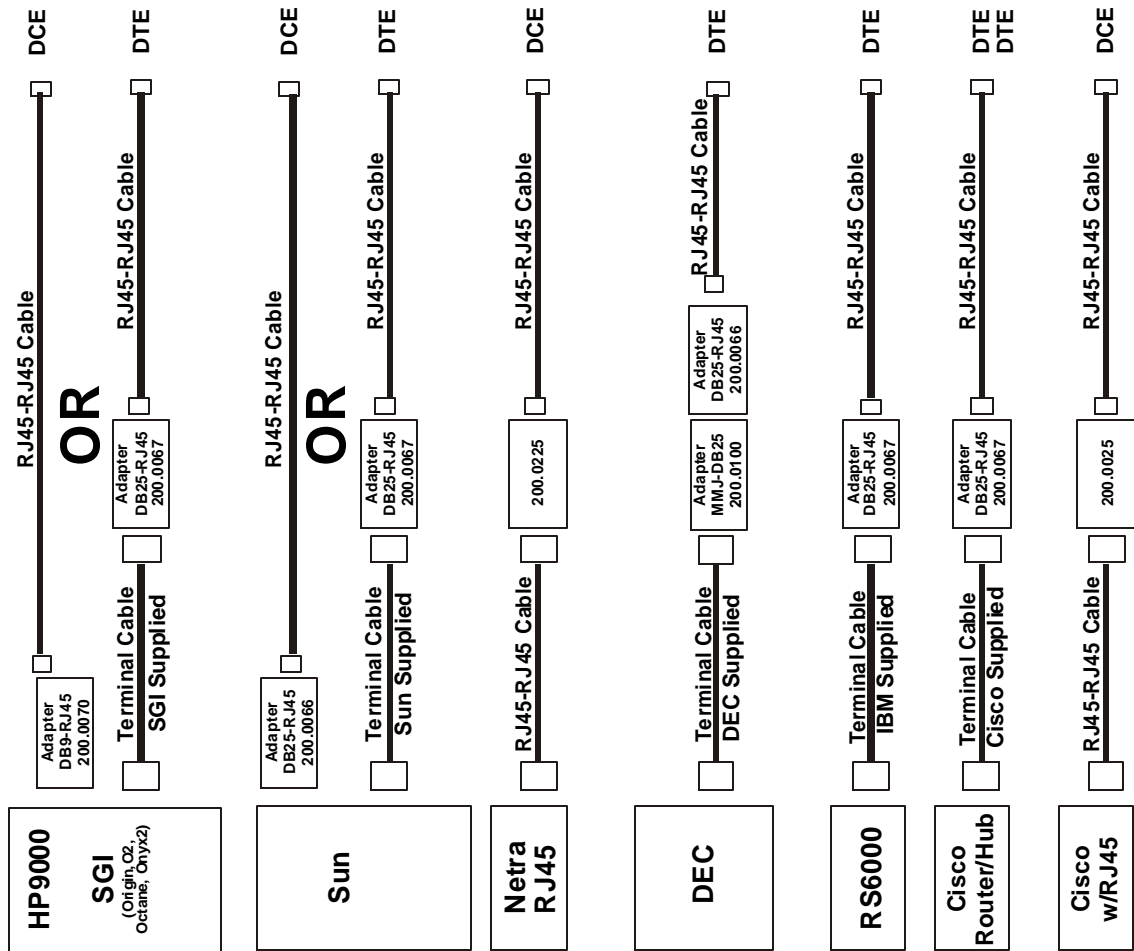
Sun® Netra t1 installation:

Materials:

1. Connect a Cat 5 cable to the console port of the Netra. Connect the other end to the end of the ConsoleServer/Netra adapter (P/N 200.0225) marked "to Netra".
2. Connect another Cat 5 cable between the adapter end marked "ConsoleServer" and the ConsoleServer device port.
3. Check that the device port and serial console port communications parameters match, and synchronize them if they do not match.

ConsoleServer 3200 Adapter Quick Checklist

PORT CONFIG.



Note: Other adapters are available from Lightwave. Call for information and availability.

4
RJ45 Connection to Switch

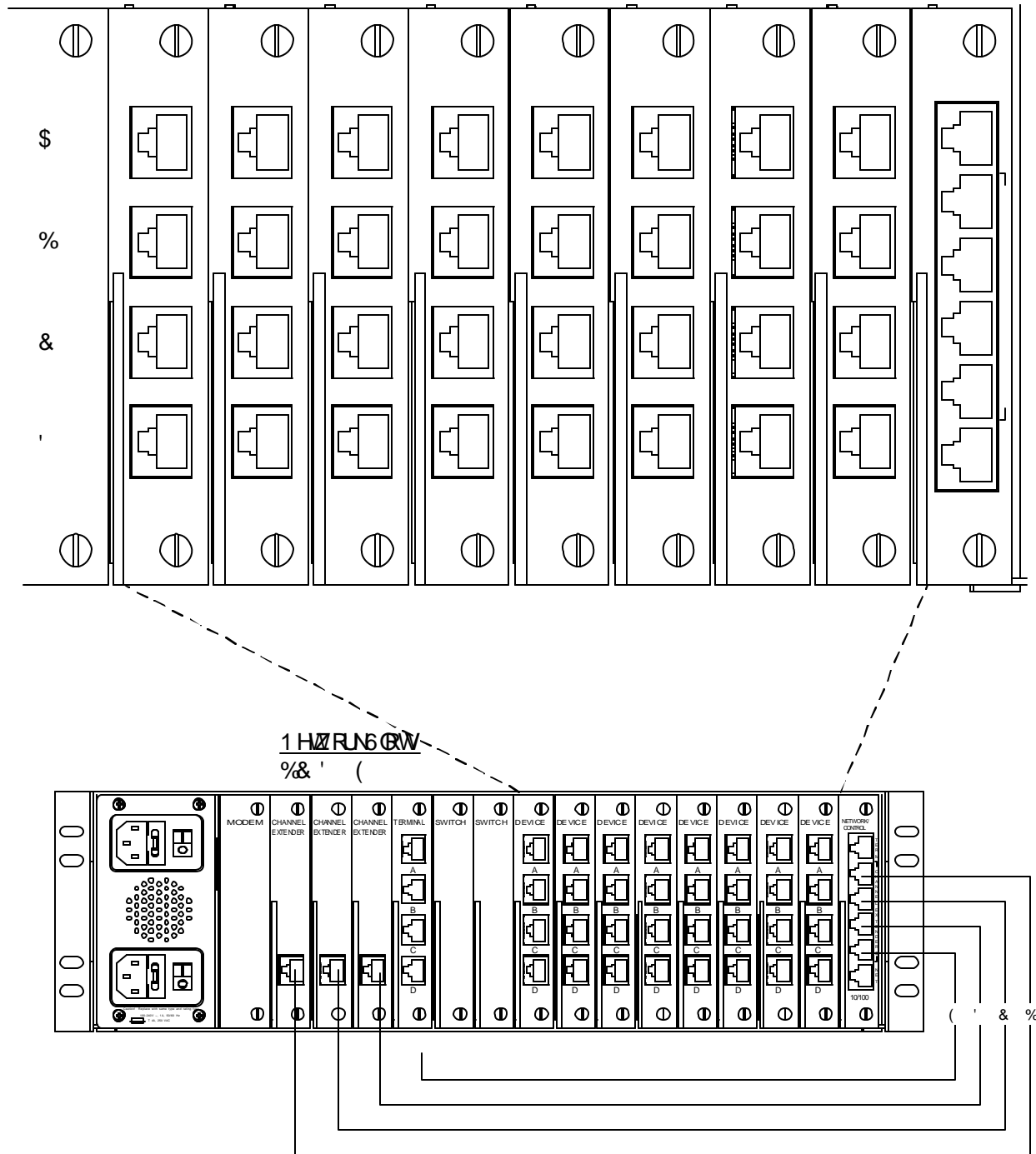
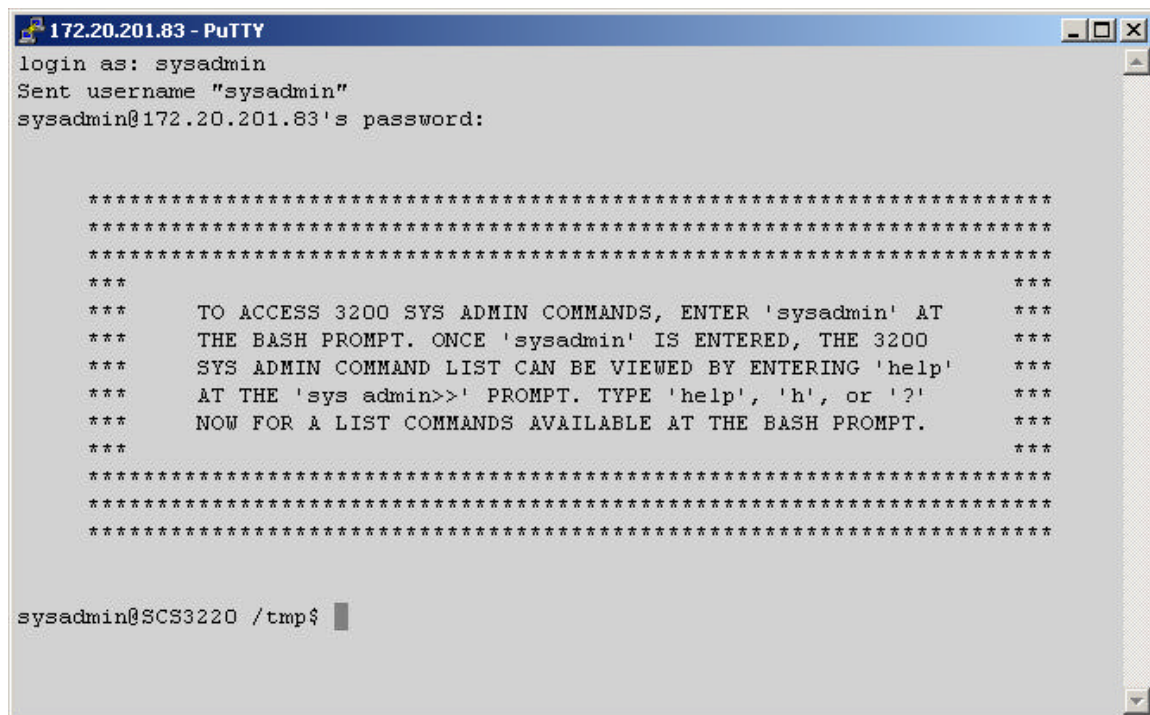


Fig. 3 General layout showing DEVICE port numbering.

6: SCS3230 Setup Script and System Administration

The SCS3230 uses a script file to assist in the initial setup and configuration of the 3230 system. The script is intended for the first time the unit is turned on, in order to get the system 'up and running' as quickly as possible.

Note: In some of the following screens, the term "3220" may be found in place of the "3230" which is found in the actual screens of the SCS3230 system.



```
172.20.201.83 - PuTTY
login as: sysadmin
Sent username "sysadmin"
sysadmin@172.20.201.83's password:

*****
*****
*****
***
***      TO ACCESS 3200 SYS ADMIN COMMANDS, ENTER 'sysadmin' AT      ***
***      THE BASH PROMPT. ONCE 'sysadmin' IS ENTERED, THE 3200      ***
***      SYS ADMIN COMMAND LIST CAN BE VIEWED BY ENTERING 'help'    ***
***      AT THE 'sys admin>>' PROMPT. TYPE 'help', 'h', or '?'      ***
***      NOW FOR A LIST COMMANDS AVAILABLE AT THE BASH PROMPT.      ***
***
*****
*****
*****

sysadmin@SCS3220 /tmp$
```

The following section outlines the administration functions and commands.

The administration functions and commands are designed to enable the administrator to configure the SCS3230 to fit the needs of the system application. User IDs, devices, terminals and access rights may be configured using the administration commands.

Many commands may be abbreviated to one extent or another, but some may not be abbreviated at all. For example, the command **VERSION** may be abbreviated to **VER**, but **LCIUPDATE** may not be abbreviated. See Appendix E for more information regarding abbreviations.

NOTE: <ESC> <ESC> or <CTRL>+C will cancel an operation and return to the administrator prompt. Pressing <CTRL>+R at the **LCI 3200>** or **sys admin>** prompt will discard the characters on the current command line, and retype the last command used; <ENTER> must still be pressed to execute the command. Pressing <CTRL>+U at either prompt erases the current command line back to the prompt.

6.1 Power-up Sequence and Basic Use of the Administrator Functions

NOTE: When the system is first turned on, it may take as long as 90 seconds before the front panel display will show any activity, and before the system will 'wake up'. Total boot-up time is generally about 3 minutes.

When the SCS3230 is first installed and powered up, it must be configured through the serial terminal port. Connect the terminal port to a terminal device or computer using a terminal emulation program. After the network interface has been configured, the administration login may also be reached via telnet. All the functions available from a local serial connection (with the exception of **BACKUP** and **RESTORE**) are also available through telnet by connecting to port 5000 of a ConsoleServer's network IP address.

The serial terminal will display the following text at power-up:

```
ConsoleServer3200 Boot V1.76
Copyright 2000 by Lightwave Communications, Inc. All rights reserved.
Identify Flash
Flash ID OK
Verifying Flash Image
Starting system
Lightwave Communications, Inc. ConsoleServer3200
Please wait... system initializing
Checking non-volatile memory...
2048
Start checking and reading stored data
Reading User Start up .....

LCI3200>>
```

The power-on self-test may be skipped by pressing <ESC> <ESC> or <CTRL>+C, but the SCS3230 should be allowed to complete the POST if possible (this check usually takes about three minutes). This information is not available on a network connection, as it is not possible to connect to the ConsoleServer via telnet until the power-on self-test is complete. At the completion of the power-up sequence, the administrator is logged out, as indicated by the **LCI 3200>>** prompt. Some commands may be used from this prompt, but most are available only when logged in.

NOTE: The administrator may define the system prompt using the **PROMPT** command (see section 6.11), but the system default prompt (**LCI 3200>>**) is used in this guide for clarity.

6.1.1 Logging In, Serial Connection

```
LCI3200>>login
Please enter password: ****
sys admin>>
```

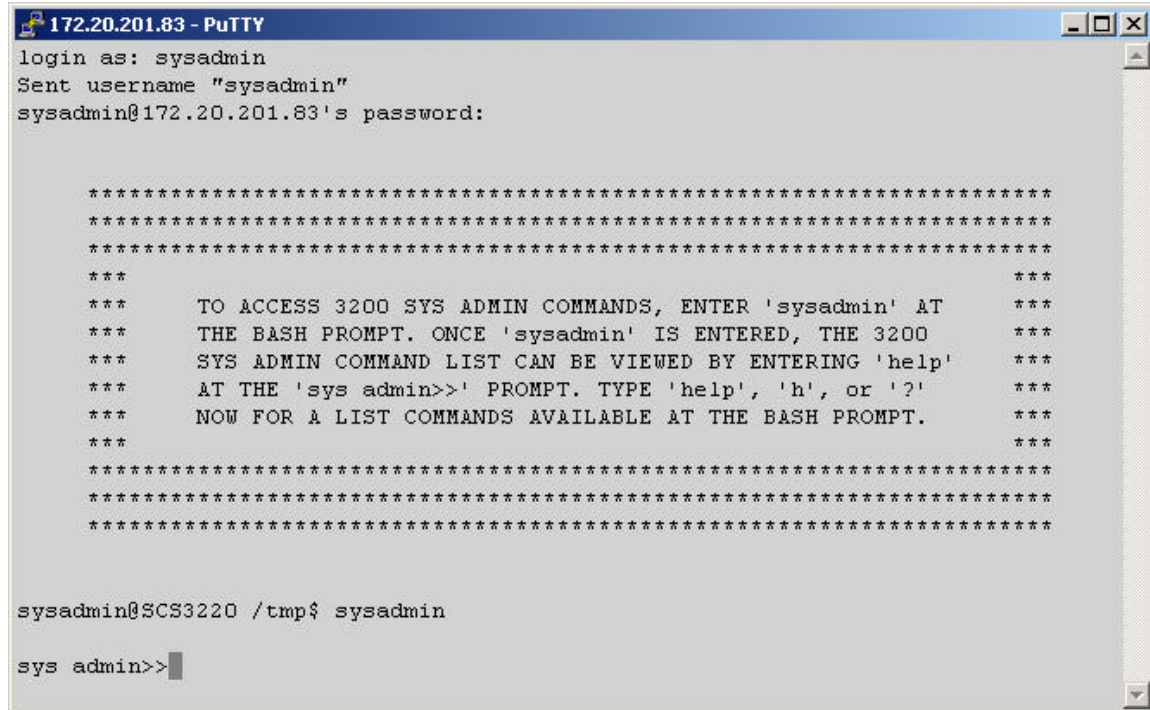
To log in on the ConsoleServer through a local serial connection, type **LOGIN** at the **LCI 3200>>** prompt. The system returns the prompt **Please enter password:** . The default administrator password is **PASS**. The ConsoleServer will only echo stars when the password is entered. If the password is correct, the prompt will change to **sys admin>>**.

6.1.2 Logging In, Network Connection

```
UNIX_MACHINE# telnet 172.16.1.200 5000
Connecting to 172.16.1.200 port 5000...
Escape sequence is ^]
Welcome to the ConsoleServer3200 SysAdmin
LCI3200>>login
Please enter password: ****
sys admin>>
```

To log in on the ConsoleServer through a network connection, the network interface for the ConsoleServer first must be configured through the serial terminal. Once the network interface is configured and functioning, telnet to port 5000 of the IP address assigned to the ConsoleServer. The ConsoleServer will display a welcome message and the **LCI 3200>>** prompt. At the prompt, type **LOGIN**. The system will only prompt for the password. At the **Please enter password:** prompt, enter the administration password. The default administrator password is **PASS**.

If the password is correct, the prompt will change to **sys admin>>**.



```
172.20.201.83 - PuTTY
login as: sysadmin
Sent username "sysadmin"
sysadmin@172.20.201.83's password:

*****
*****
*****
***
***   TO ACCESS 3200 SYS ADMIN COMMANDS, ENTER 'sysadmin' AT   ***
***   THE BASH PROMPT. ONCE 'sysadmin' IS ENTERED, THE 3200   ***
***   SYS ADMIN COMMAND LIST CAN BE VIEWED BY ENTERING 'help' ***
***   AT THE 'sys admin>>' PROMPT. TYPE 'help', 'h', or '?'   ***
***   NOW FOR A LIST COMMANDS AVAILABLE AT THE BASH PROMPT.   ***
***
*****
*****
*****

sysadmin@SCS3220 /tmp$ sysadmin

sys admin>>
```

6.1.3 Logging Out

To log out from an administration session, enter the command **LOGOUT** or **LOGOFF**. If logging out from a network session, the ConsoleServer will disconnect the telnet session. If logging out from a direct serial session, the ConsoleServer will return to the **LCI 3200>>** prompt.

6.1.4 System Help (Command List)

To access the help screens, type <F1> H, ?, or **HELP** to display the help page, once logged in. The HELP screens offer a Sys Admin Command List.

HELP SCREEN

```

sys admin>>?

ConsoleServer 3230 Sys Admin Command List
  [] - optional <> - parameter must be specified | - OR
abbreviations                - Display list of command abbreviations
adduser [new user id]        - Add a new user
break <terminal channel>    - Break connection
connections [/monitor]      - Display list of current connections
                             (/MONITOR will auto-refresh)
deleteuser [user id|/n]     - Delete a user by user id or number
devices                      - Display device settings
devices [n|device name]    - Change settings (n can be 1 to 32)
edituser [user id]          - Edit a user's settings
forcelogout <terminal channel> - Force a user off the system
forcelogout sysadmin        - Logout sys admin on a network connection
info <slot letter>          - Report miscellaneous information
linesperpage [n]            - Display/set number of lines before pause
                             (n can be 0 to 99, 0 disables)
listcards                   - Display list of installed cards
listdevices                 - Display list of device names
listusers [user id|/all]   - Display list of users
exit                        - Exit sysadmin shell
modem [/default]           - Display/set modem init string
                             /DEFAULT will set init string to default

Press <CR> to continue

modemtimeout [t]           - Display/set timeout for modem calls
                             (t can be 0 to 30 minutes, 0 disables)
powerstatus                 - Display status of power supplies
prompt [/clear|/default]   - Set/clear system prompt for logged-out state
                             or set prompt to factory default
telnettimeout [t]          - Display/set timeout for telnet sessions
                             (t can be 0 to 30 minutes, 0 disables)
terminals                  - Display terminal settings
terminals [n]              - Change settings (n can be 1 to 17)
timeout [t]                - Display/set timeout on sys admin login
                             (t can be 0 to 30 minutes, 0 disables)
version [/all|slot letter] - Report software version information
                             (/ALL will return versions for all cards)

sys admin>>

```

6.1.5 Abbreviations

A listing of abbreviations for the administrator commands is also available when connected to the administrator port.

```

sys admin>>abbreviations

  ConsoleServer 3230 Sys Admin Command Abreviations List
abbreviations      - a
adduser            - addu
                   au
break              - (no abbreviation)
connections        - c
deleteuser         - deleteu
devices            - dev
edituser           - editu
                   eu
forcelogout        - (no abbreviation)
help               - h, ?
info               - (no abbreviation)
linesperpage       - linespp
                   lines
                   lpp
listcards           - listc
                   lc
listdevices         - listd
                   ld
listusers           - listu
                   lu

Press <CR> to continue
exit               - (no abbreviation)
modem              - (no abbreviation)
modemtimeout       - modemt
                   mt
powerstatus        - po
                   ps
prompt             - pr
telnettimeout      - telnett
                   tt
terminals          - term
timeout            - time
version            - ver

sys admin>>

```

You must use the <CR> to go to the second page of the Abbreviations list. You cannot interrupt it in the middle, only let it play out. THEN, you return to sys admin>.

```

sysadmin@SCS3230 /tmp$ h

Command      User      Description
-----
SAVE         root     Save changes in RAM to Flash
changes      root     List changed files from factory settings
lciupdate    root     Download flash updates to terminal or device cards
poweroff     root     Power off the SCS3230
reboot       root     Reboot the SCS3230
restore      root     Restore parameters from a previous save
setup        root     Run the System Configuration script
sysadmin    sysadmin/root  Run the Sys Admin shell
timeout      root     Display/set timeouts for console or telnet logins
unsaved      root     List files changed since last SAVE

sysadmin@SCS3230 /tmp$ sysadmin

sys admin>>

```

6.2 Sys Admin vs. root access

The System Administrator (sys admin) has the ability to run the sysadmin functions of the system. In order to run the Setup command, the System Administrator must change to the root user. Below is a list of commands accessible by the different admin levels:

```

172.20.201.83 - PuTTY
*****
*****
*****

sysadmin@SCS3220 /tmp$ help

Command      User          Description
-----      -
SAVE         root          Save changes in RAM to Flash
changes      root          List changed files from factory settings
lciupdate    root          Download flash updates to terminal or device cards
poweroff     root          Power off the SCS3220
reboot       root          Reboot the SCS3220
restore      root          Restore parameters from a previous save
setup        root          Run the System Configuration script
sysadmin     sysadmin/root Run the Sys Admin shell
timeout      root          Display/set timeouts for console or telnet logins
unsaved      root          List files changed since last SAVE

sysadmin@SCS3220 /tmp$ su
Password:
root@SCS3220 /var/tmp# setup

```

The Sys Admin must sign on, and then switch to root level (requires root password) so that they may run the Setup command. The default root password is 'root'. This root password should be changed as soon as the System Administrator has gained access to the system.

To Change the root-level password of the SCS3230, follow the steps below.

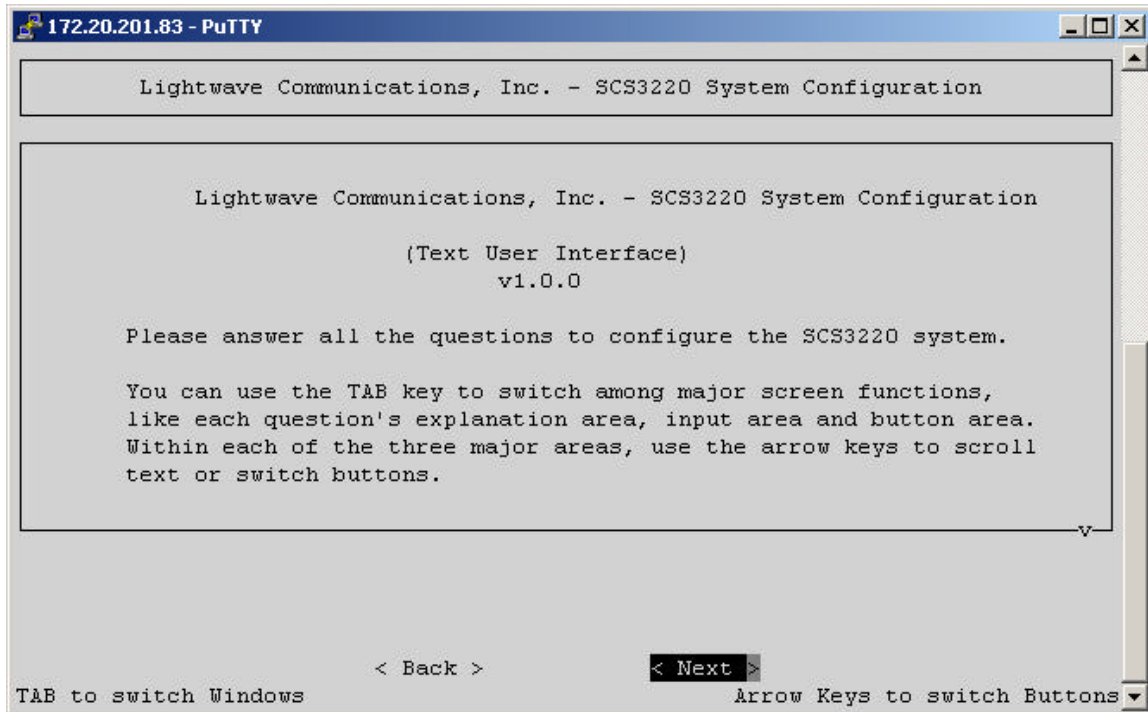
1. Log in as sysadmin (you see the bash prompt) = sysadmin@SCS3230 /tmp\$
2. su to root level; you must enter the existing root password (default = root)
3. After password is accepted, notice root level = root@SCS3230 /var/tmp#
4. Use passwd to change root level password
5. After successful, '**authentication tokens updated**' message is displayed. You are returned to the root level prompt = root@SCS3230 /var/tmp#
6. Use exit to leave root level (sysadmin@SCS3230 /tmp\$)
7. Use logout to log out of the system

If you lose the root password, there is no 'back door' password or higher-level access. The Flash memory device would have to be replaced in order to regain access to the system. Your existing data on that Flash device would be inaccessible.

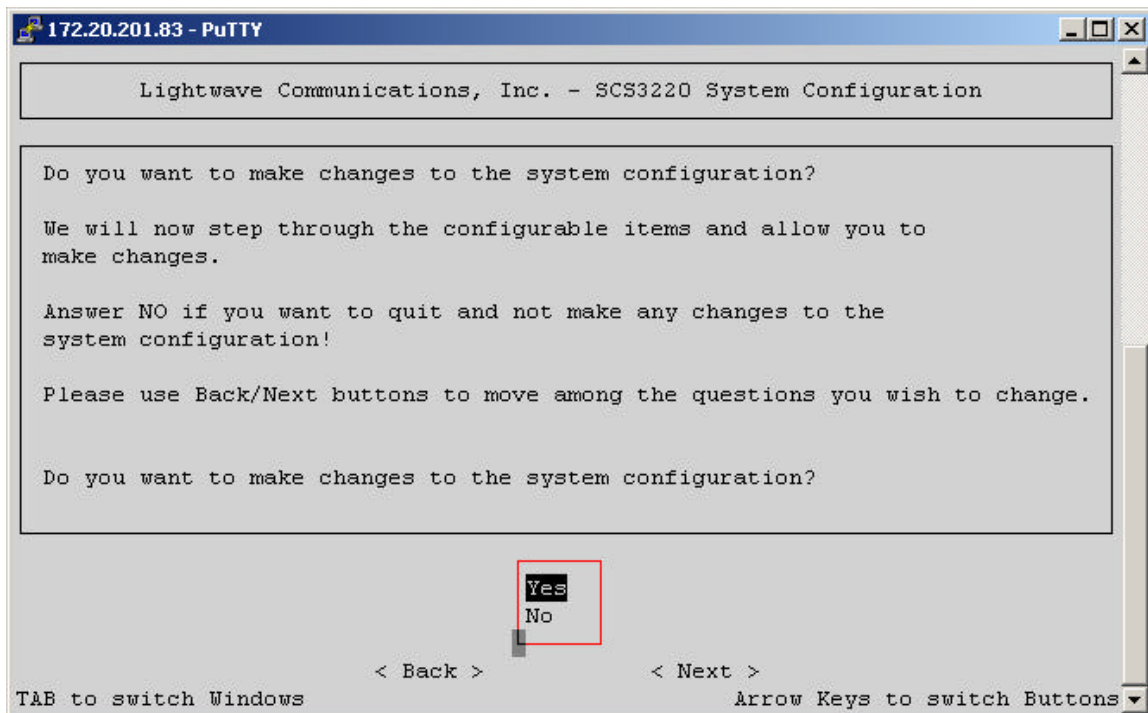
Only the root level password has access to the SAVE feature which can invoke permanent changes to the system's memory and features. Turn the system power off without using SAVE will cause any system changes to be lost.

6.3 Setup Script

The System Administrator must switch to root level in order to access the Setup Script. From the root command prompt, type set up to begin the setup script:

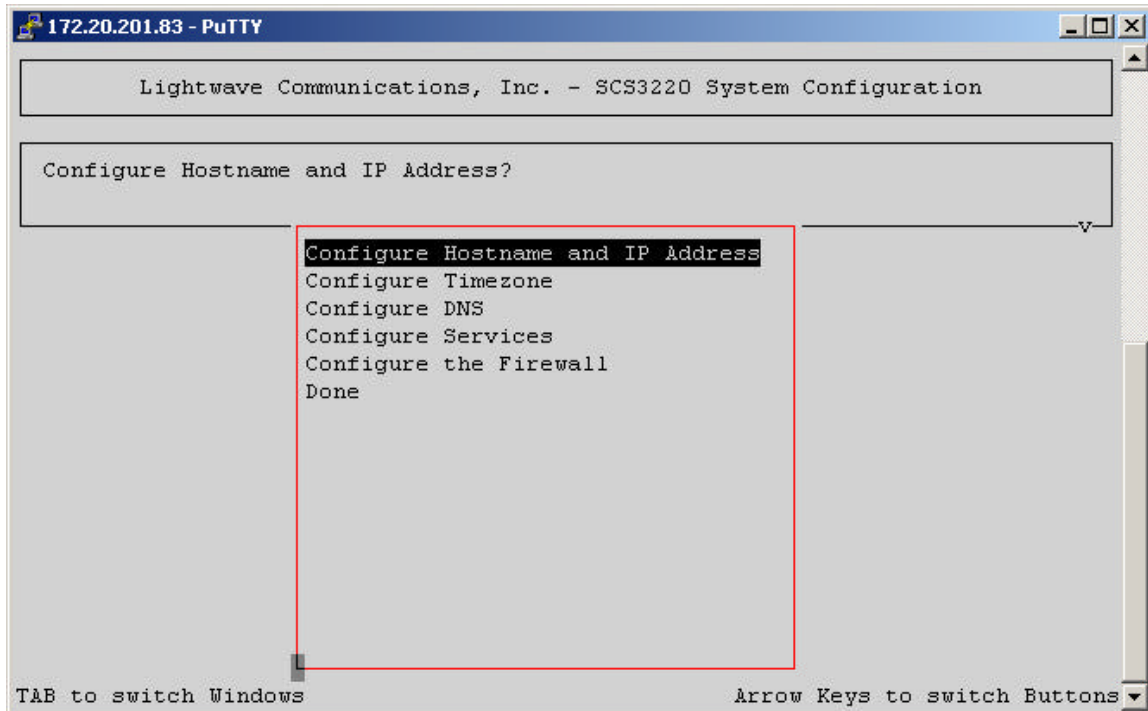


Follow the script prompts; use the arrows or 'Enter' to advance unless otherwise indicated.

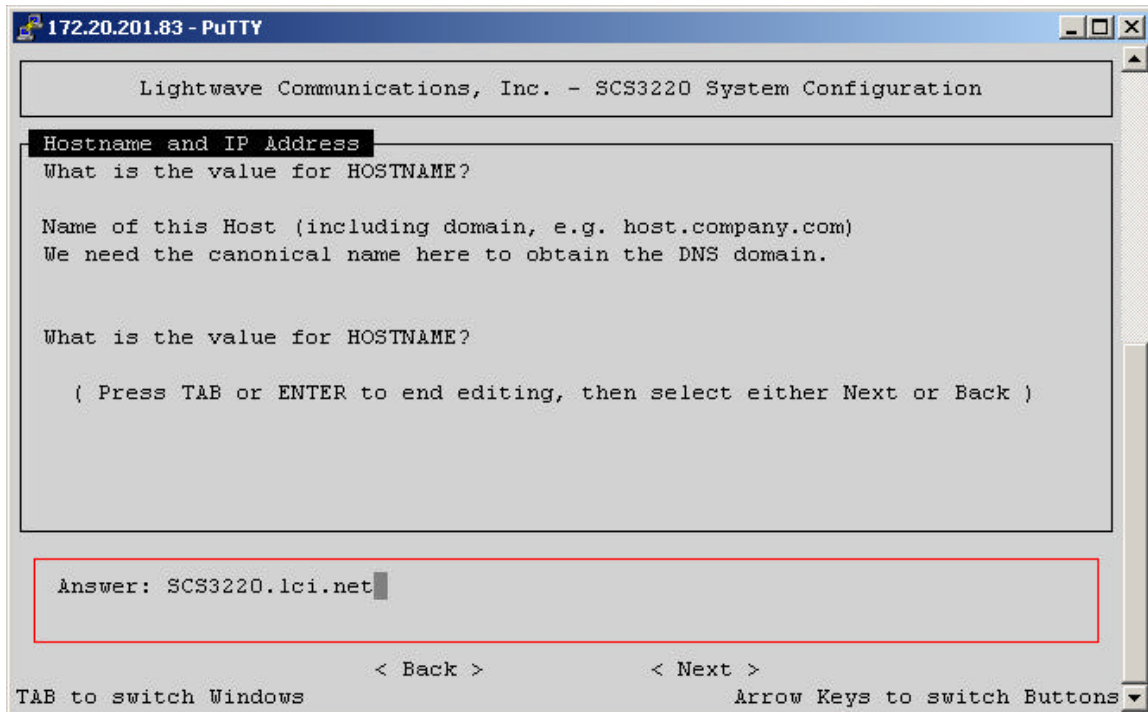


Using the arrow keys, you may select from any of the following attributed to administer. The script also provides 'hints' along the way. You may also 'exit' using the Done command. Using the 'enter' key to advance, you will step through a majority of the Setup script.

6.3.1 Hostname and IP Address

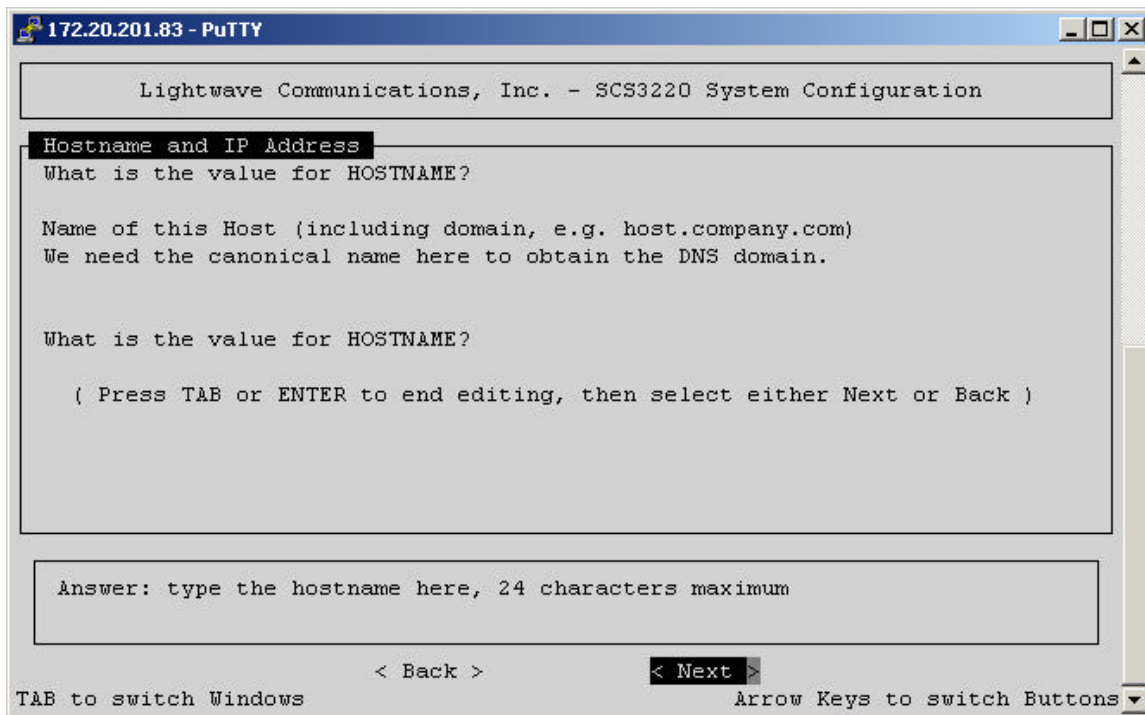


Use the arrow keys to advance; or in some cases, simply press 'enter'.

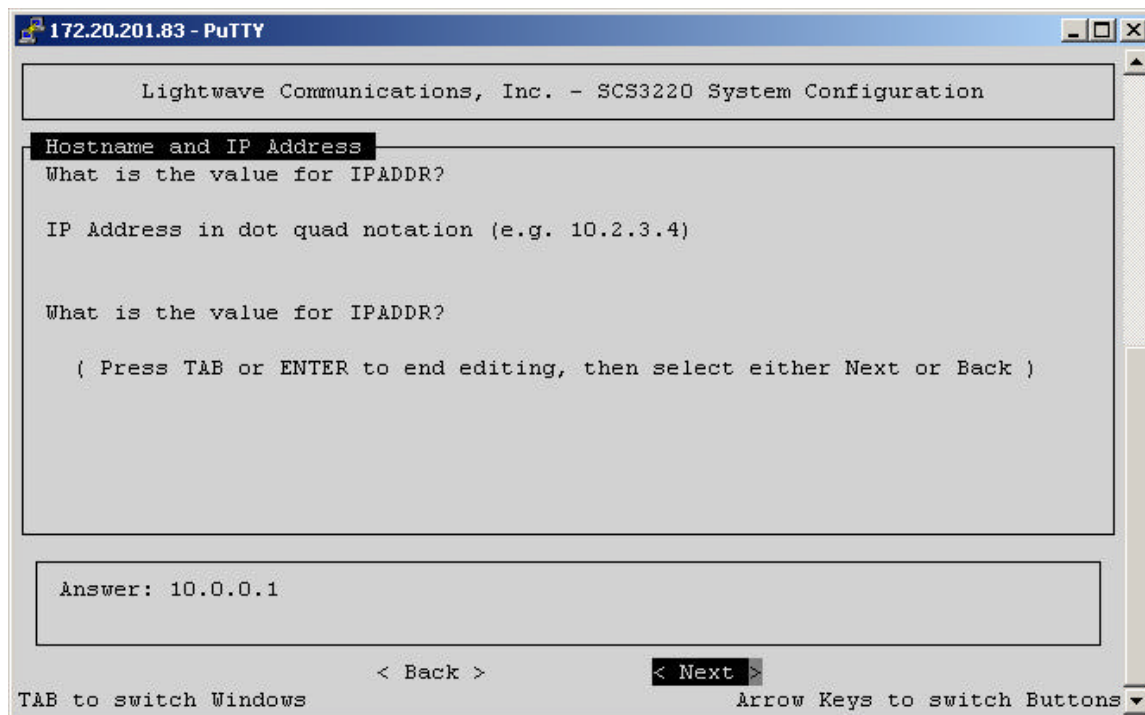


The existing HOSTNAME information is displayed in the 'Answer' field.

Type in your HOSTNAME information in the Answer field. It may be up to 24 characters long; it i

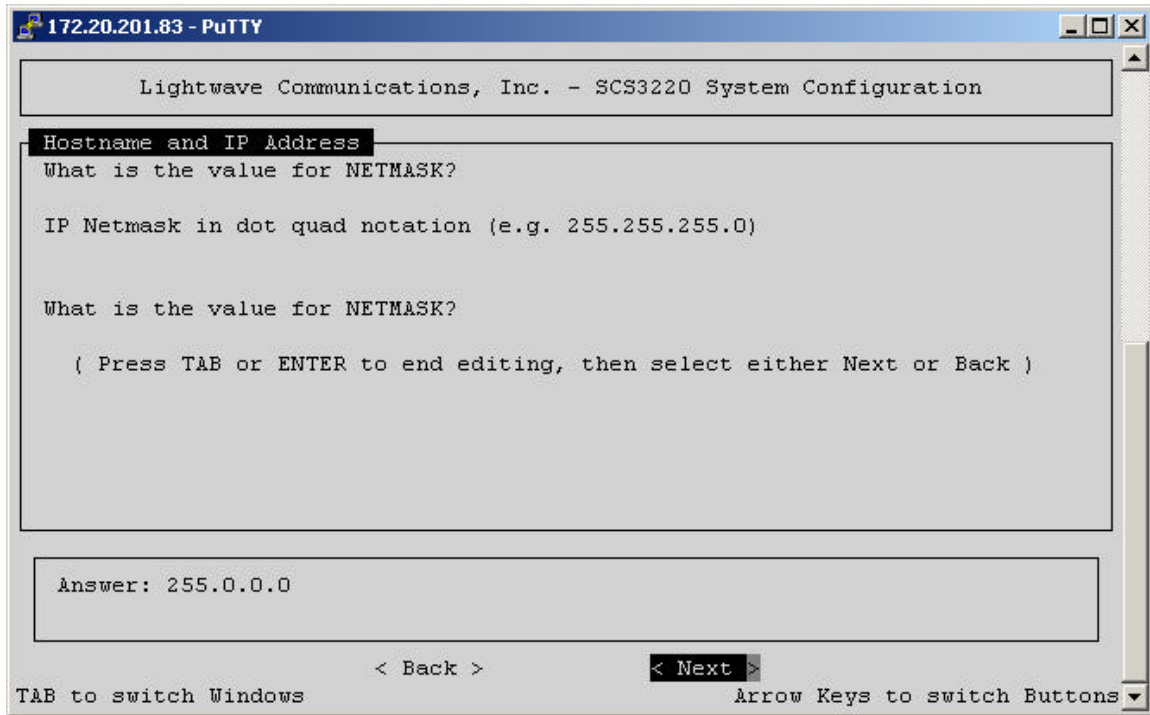


After entering your Hostname, the system advances to the IP Address setting.

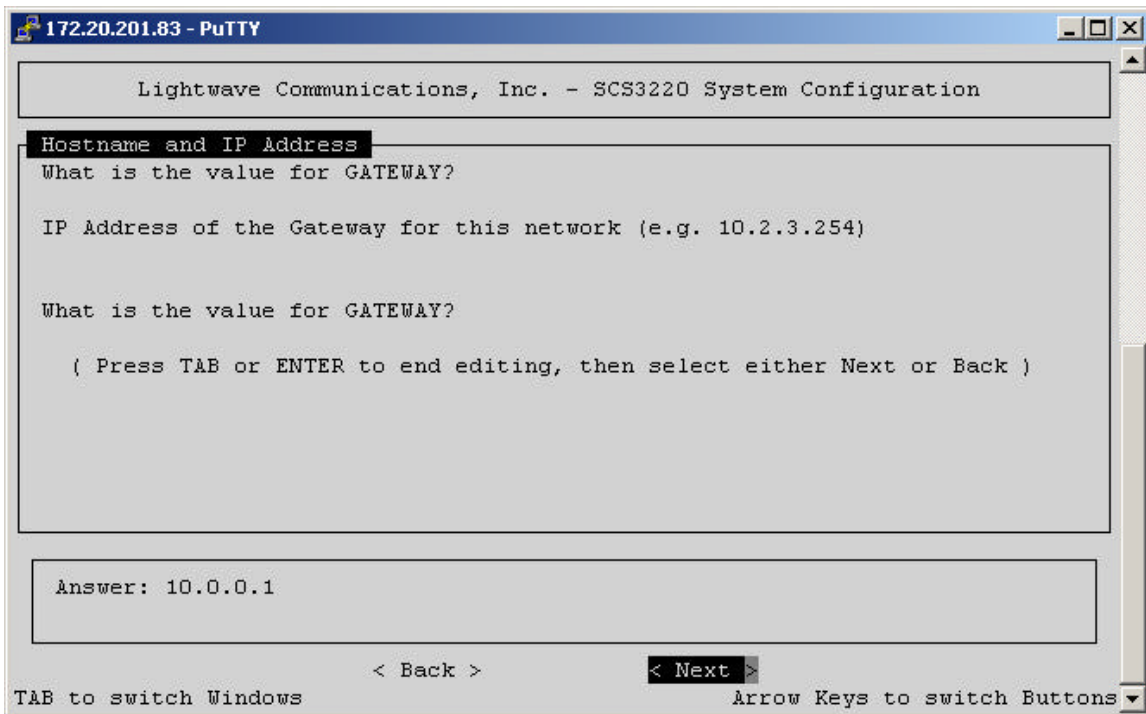


Enter your IP information, in dot-quad format. Select Next to proceed.

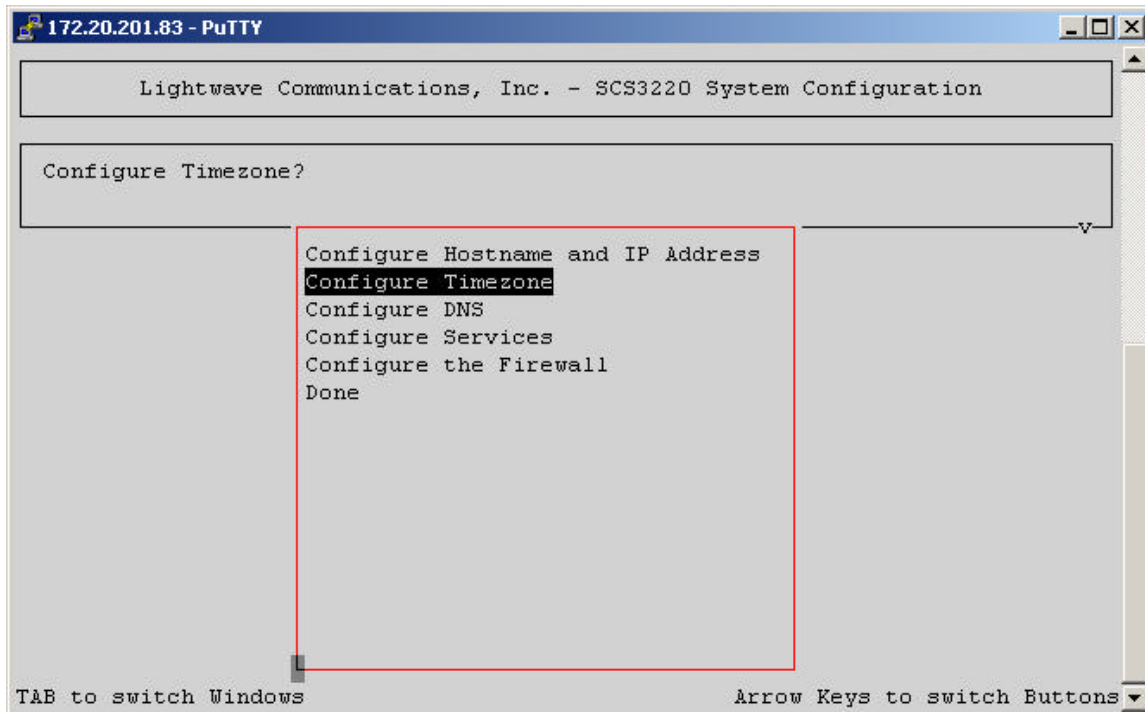
Next, enter your Network Mask information, in dot-quad format. Select Next to proceed.



Then, enter your gateway information. Select Next to proceed.

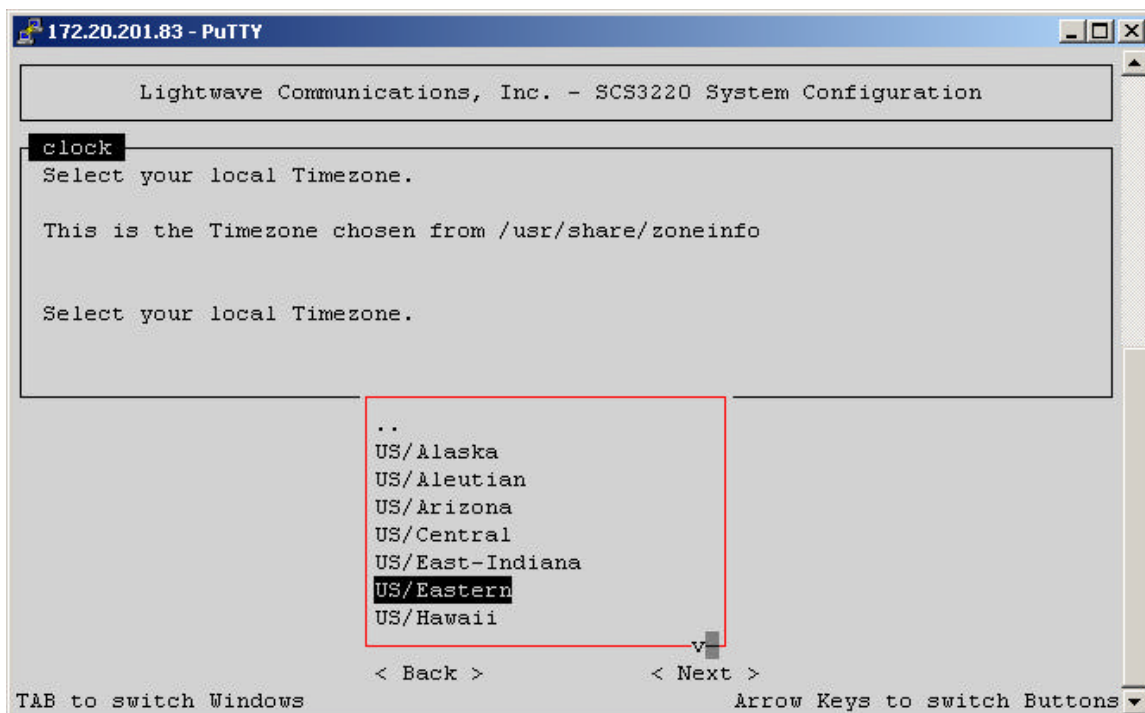


You are then returned to the Script's menu. You may continue the script by pressing 'enter' to advance, or select another option.

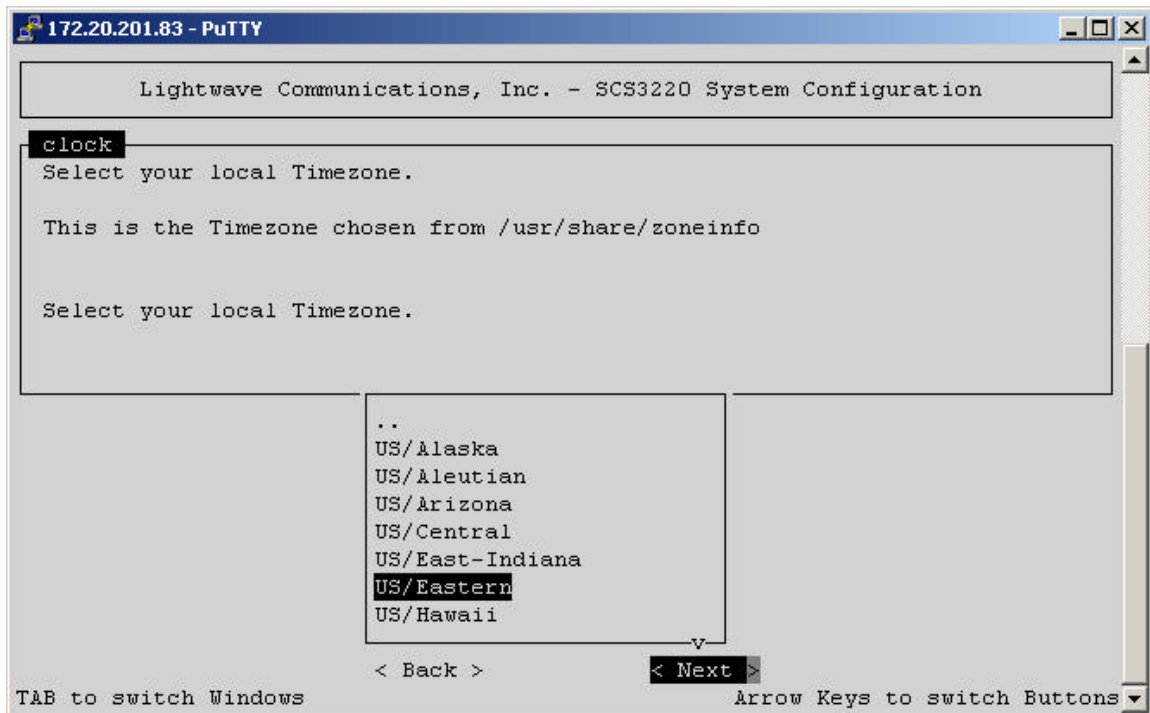


6.3.2 Timezone (Clock)

You must select a Timezone value for the SCS3230's clock. The SCS3230 uses the universal time system

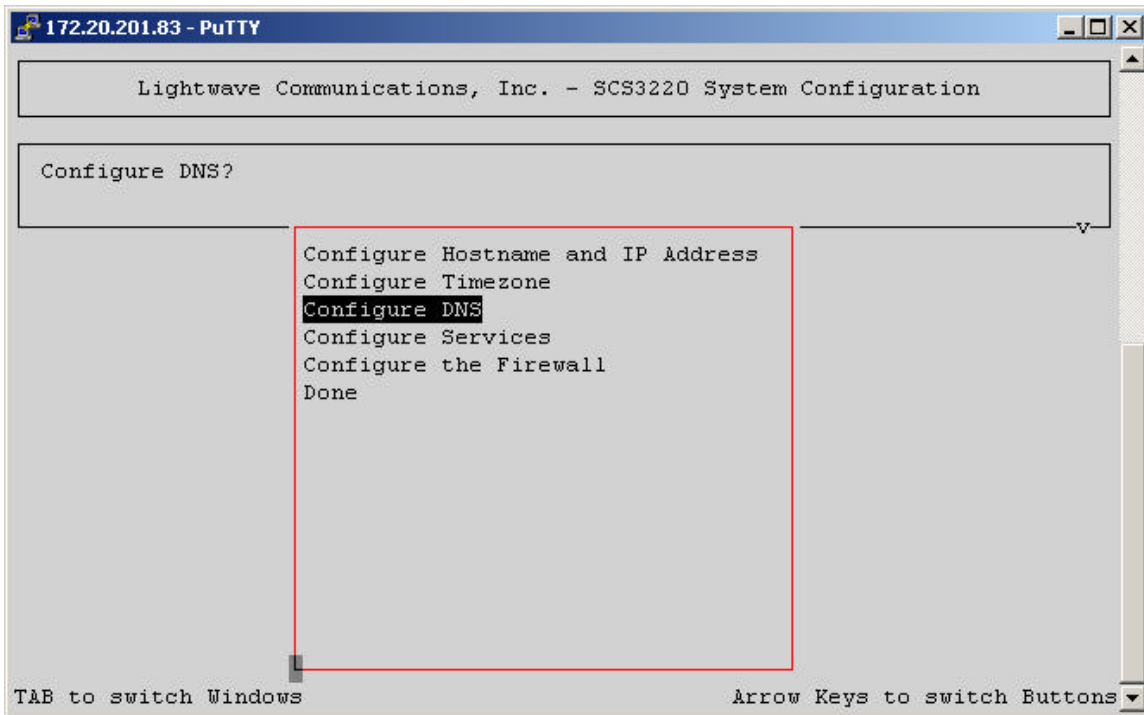


Using the up and down arrows, select an appropriate Time Zone parameter. To go up one level in the Time Zone menu, move to the ". . ." prompt at the top of the list. Press 'enter' to select your value.

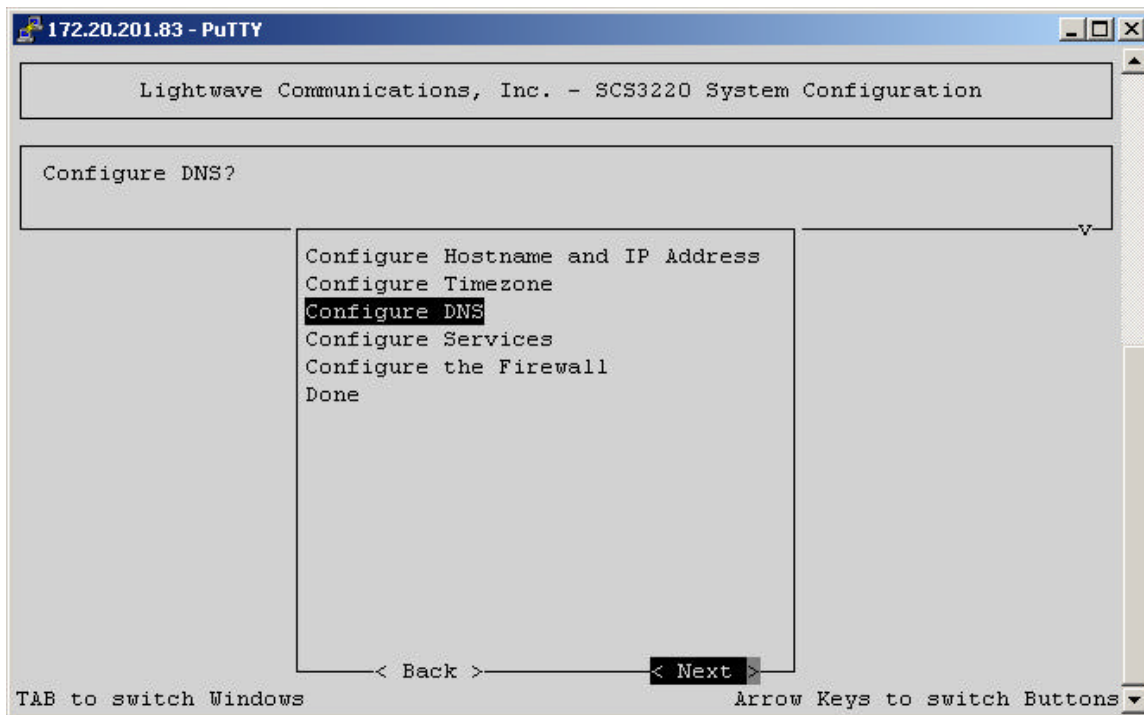


Once completing the Timezone field, you are returned to the Script's menu.

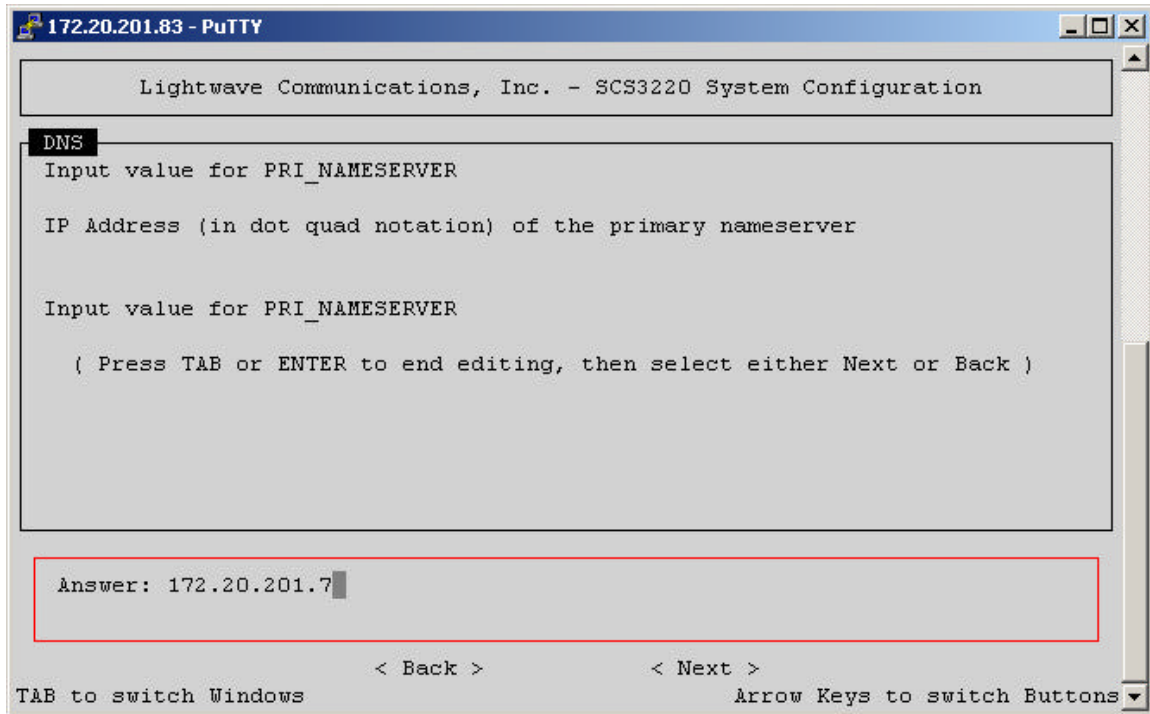
6.3.3 Configure DNS



Select 'Next' to advance in the DNS (Directory Name Server) menu.

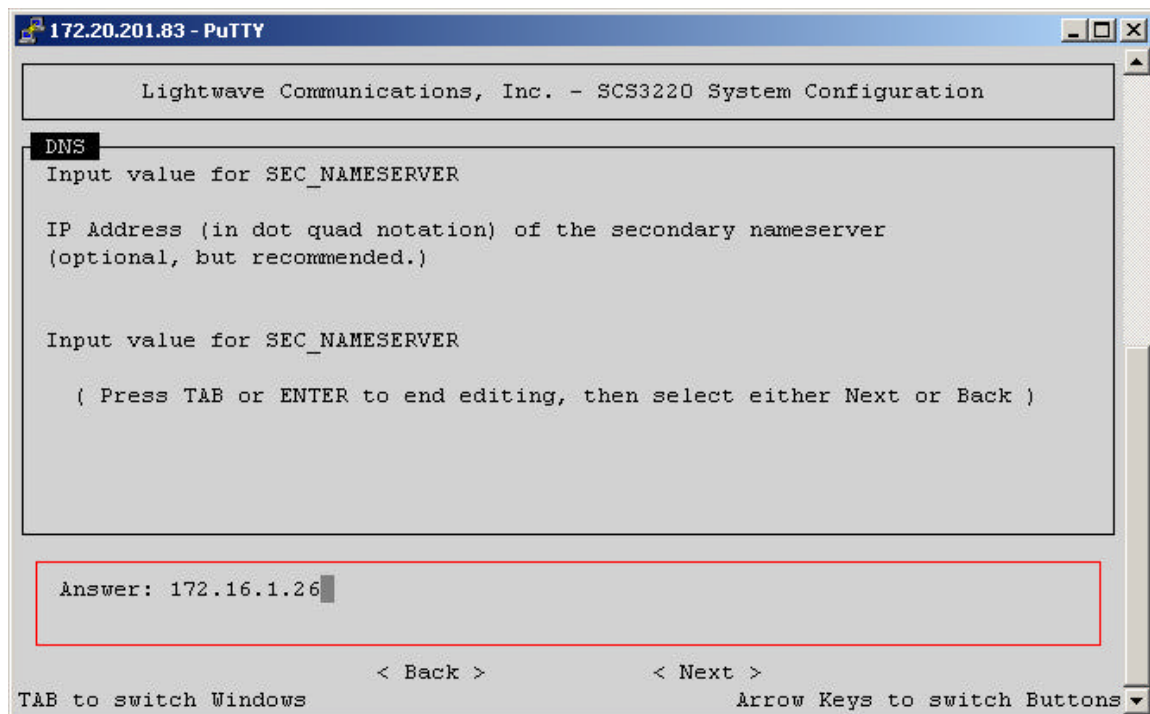


Fill in the IP address information for your Primary Nameserver.



The screenshot shows a PuTTY terminal window titled "172.20.201.83 - PuTTY". The window displays the "Lightwave Communications, Inc. - SCS3220 System Configuration" menu. The "DNS" option is selected. The prompt asks for the "Input value for PRI_NAMESERVER" and provides the instruction: "IP Address (in dot quad notation) of the primary nameserver". Below this, it says "Input value for PRI_NAMESERVER" and "(Press TAB or ENTER to end editing, then select either Next or Back)". A red box highlights the input field containing "Answer: 172.20.201.7". At the bottom, there are navigation options: "< Back >" and "< Next >". A footer note says "TAB to switch Windows" and "Arrow Keys to switch Buttons".

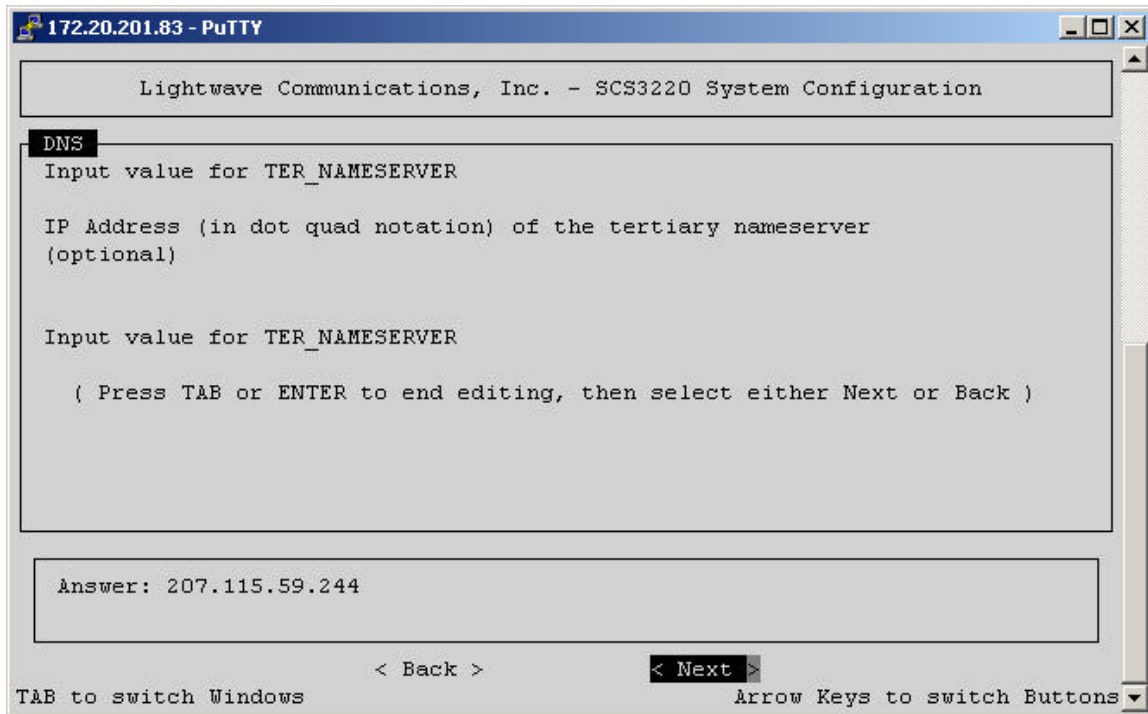
Note: If you start to fill in this parameter, but cannot complete the value at this time, you must enter some dot-quad address in order to leave this prompt. A value of '10.0.0.1' may be suitable in this instance.



The screenshot shows a PuTTY terminal window titled "172.20.201.83 - PuTTY". The window displays the "Lightwave Communications, Inc. - SCS3220 System Configuration" menu. The "DNS" option is selected. The prompt asks for the "Input value for SEC_NAMESERVER" and provides the instruction: "IP Address (in dot quad notation) of the secondary nameserver (optional, but recommended.)". Below this, it says "Input value for SEC_NAMESERVER" and "(Press TAB or ENTER to end editing, then select either Next or Back)". A red box highlights the input field containing "Answer: 172.16.1.26". At the bottom, there are navigation options: "< Back >" and "< Next >". A footer note says "TAB to switch Windows" and "Arrow Keys to switch Buttons".

Enter your Secondary Nameserver information, if applicable. Press Next to advance.

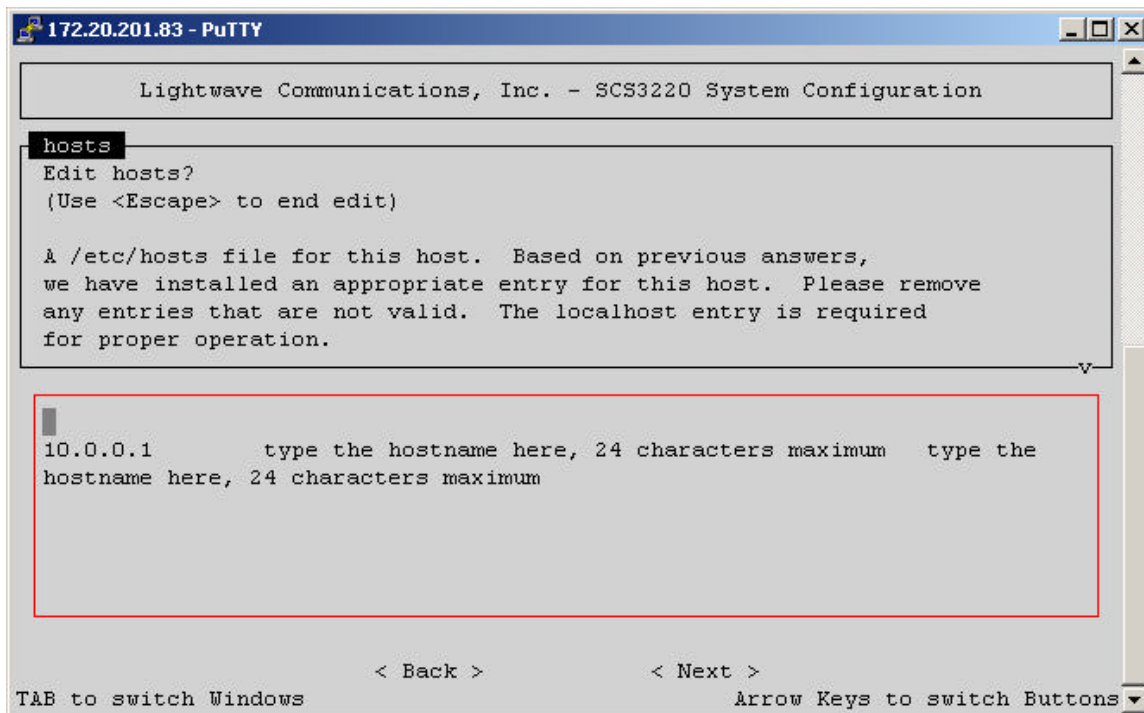
Enter your Tertiary Nameserver information, if applicable.



Press Next to advance to the configuration for Hosts.

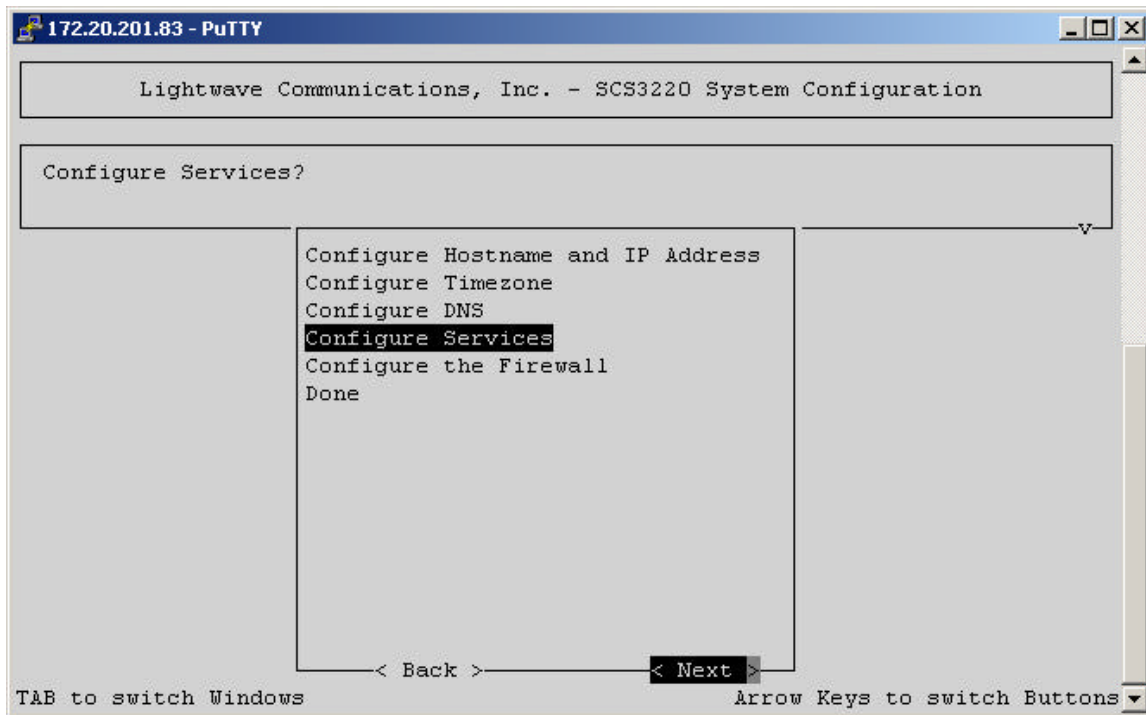
6.3.4 Hosts

The parameters for HOSTS is a bit different than other screens. Here, you will edit the data.



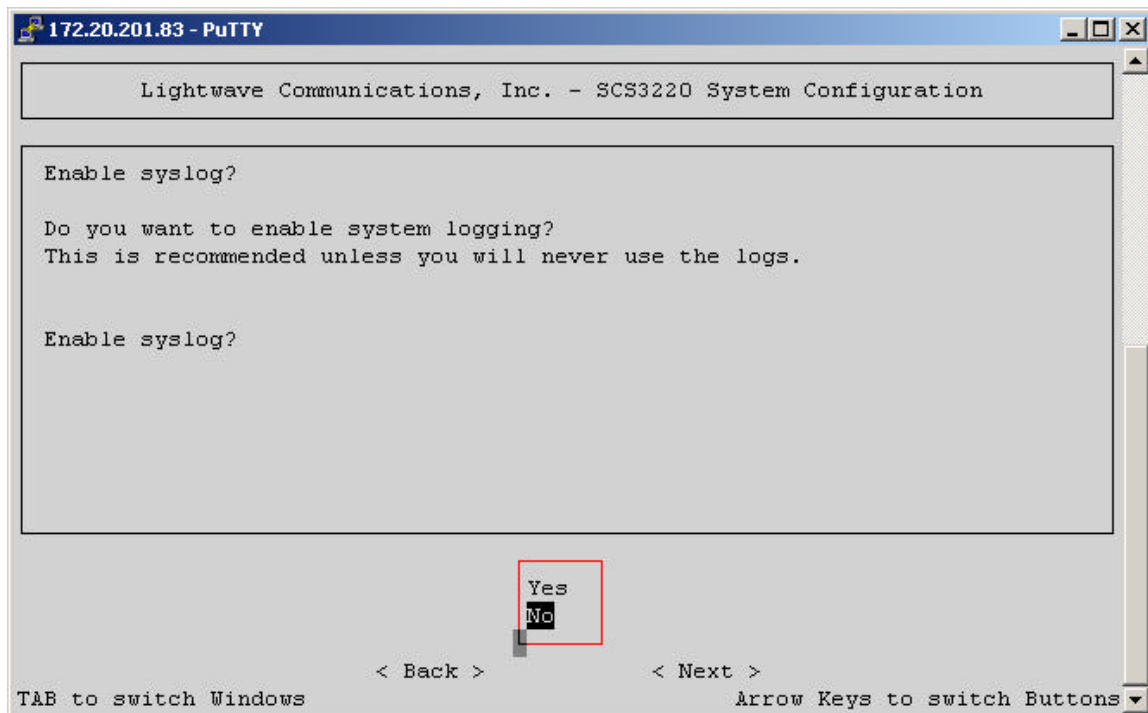
The system has started an 'edit' routine which you must 'exit' by using the ESC key to end the edit mode, and get to the 'Next' prompt

You are then returned to the Script menu.

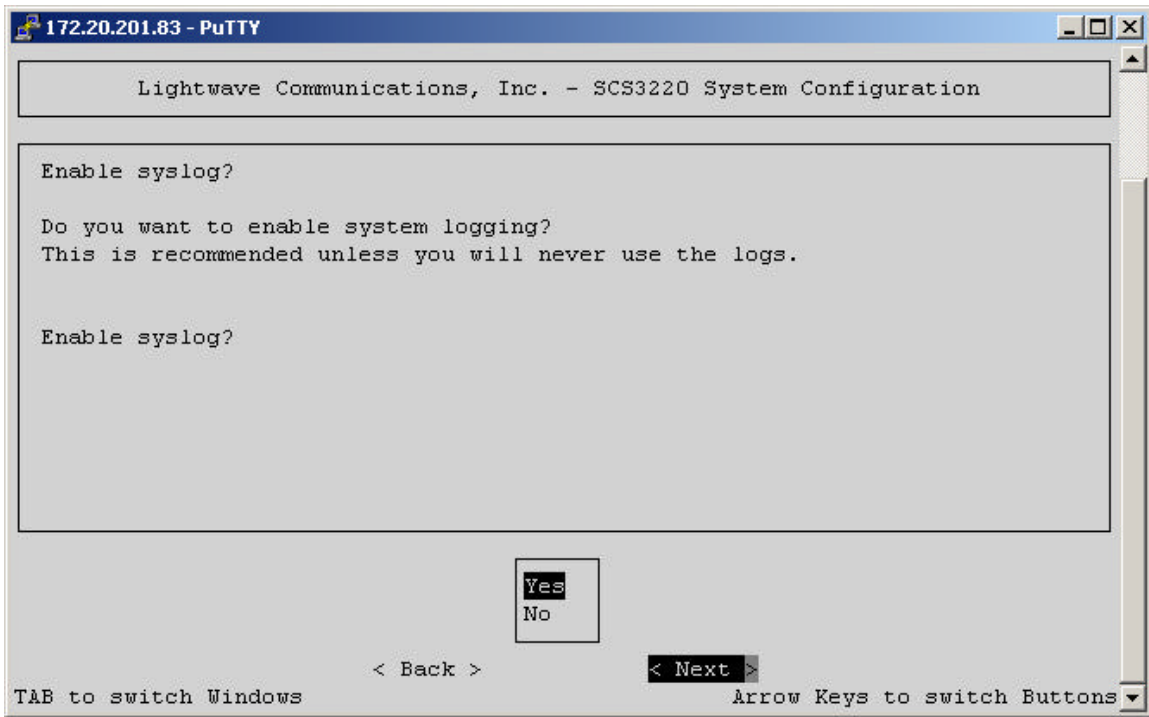


6.3.5 Services

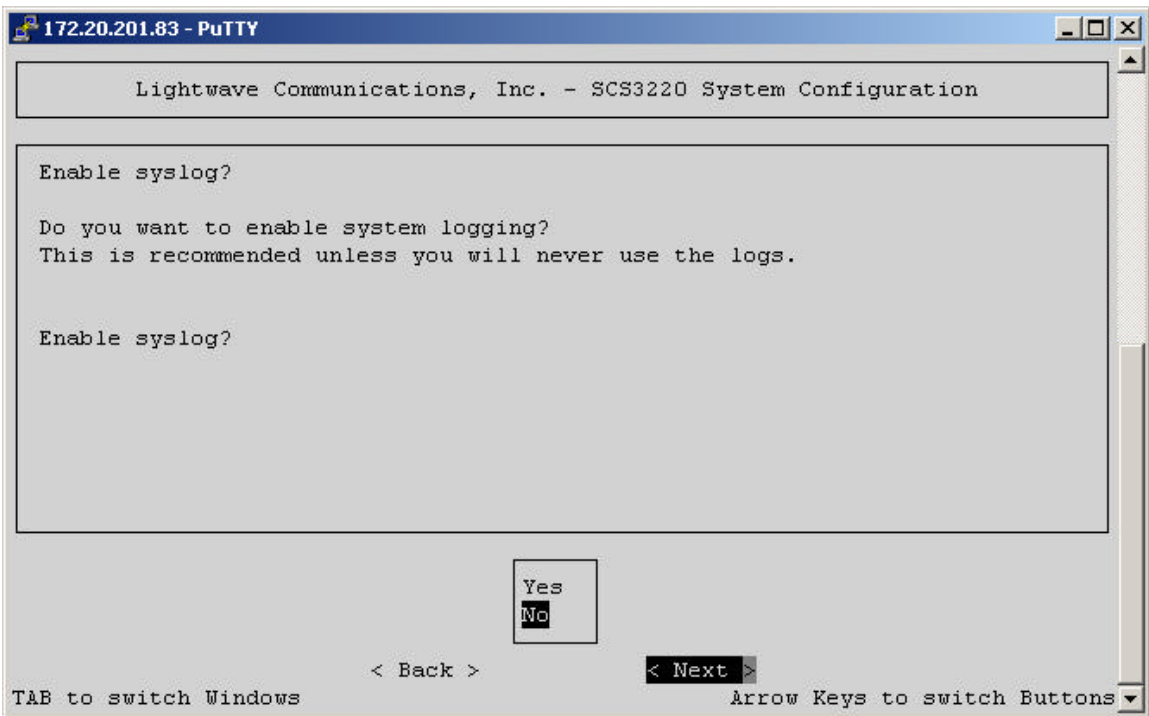
You can now enable or disable several Services of the SCS3230.



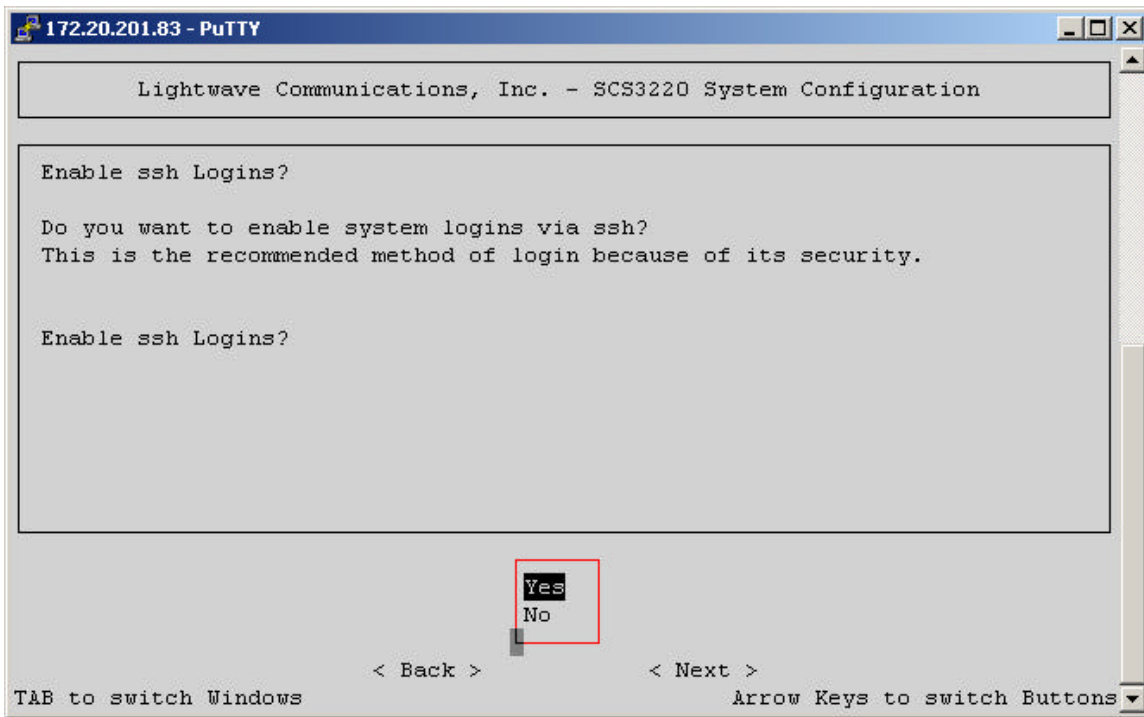
Choose Yes or No, by using your arrow keys. Press Next to advance.



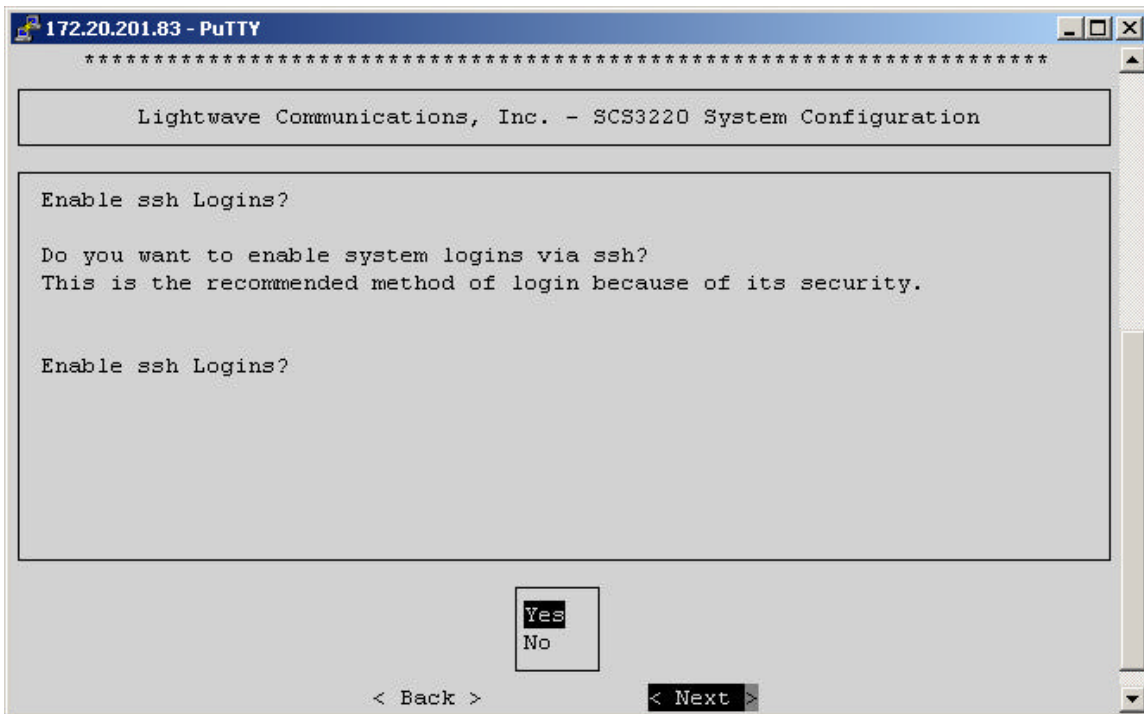
6.3.6 Syslog



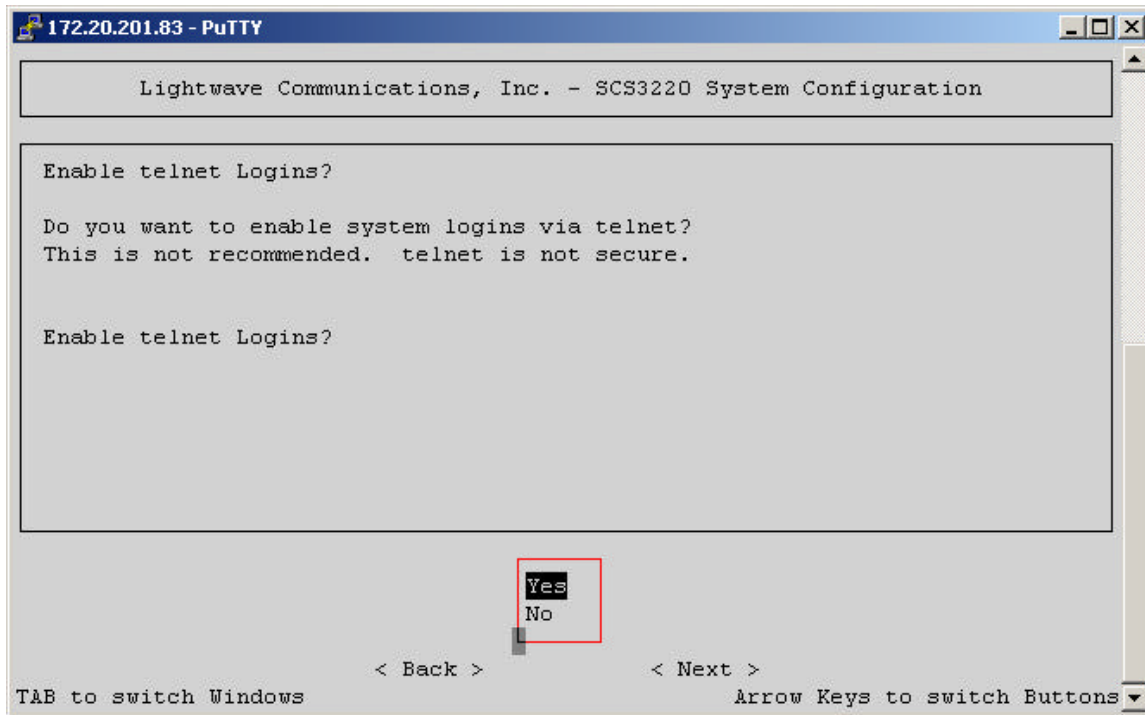
6.3.7 SSH Logins



SSH is the secure, and preferred method of accessing the system.

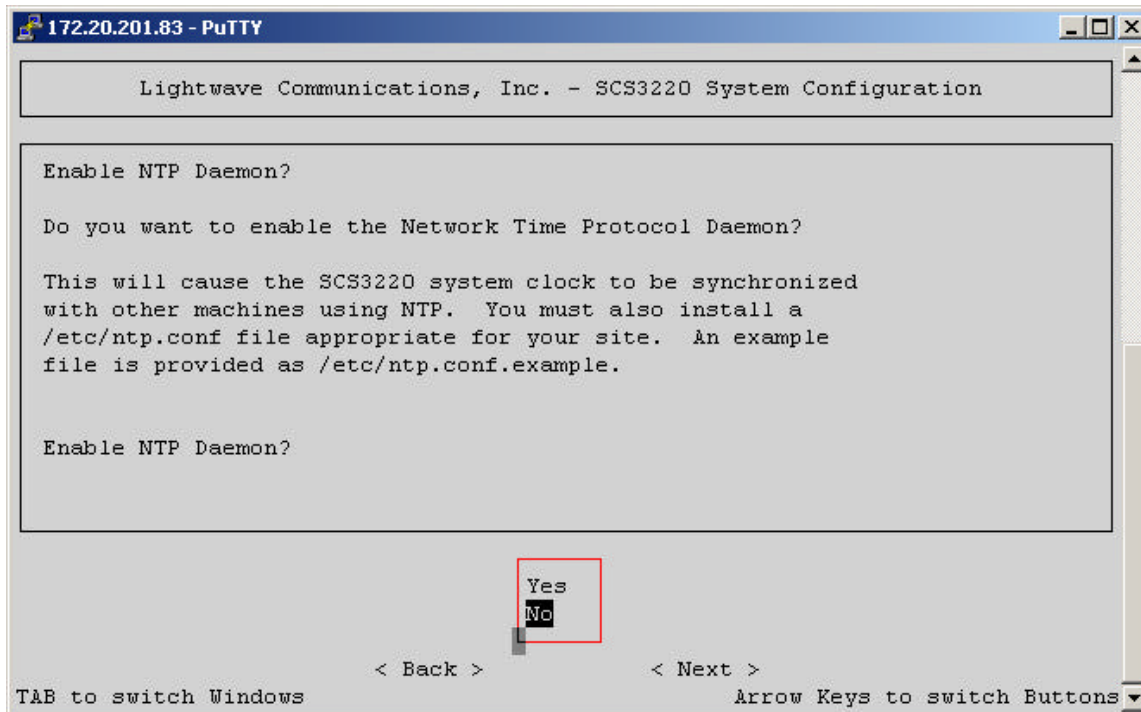


6.3.8 TELNET logins



6.3.9 NTP Daemon

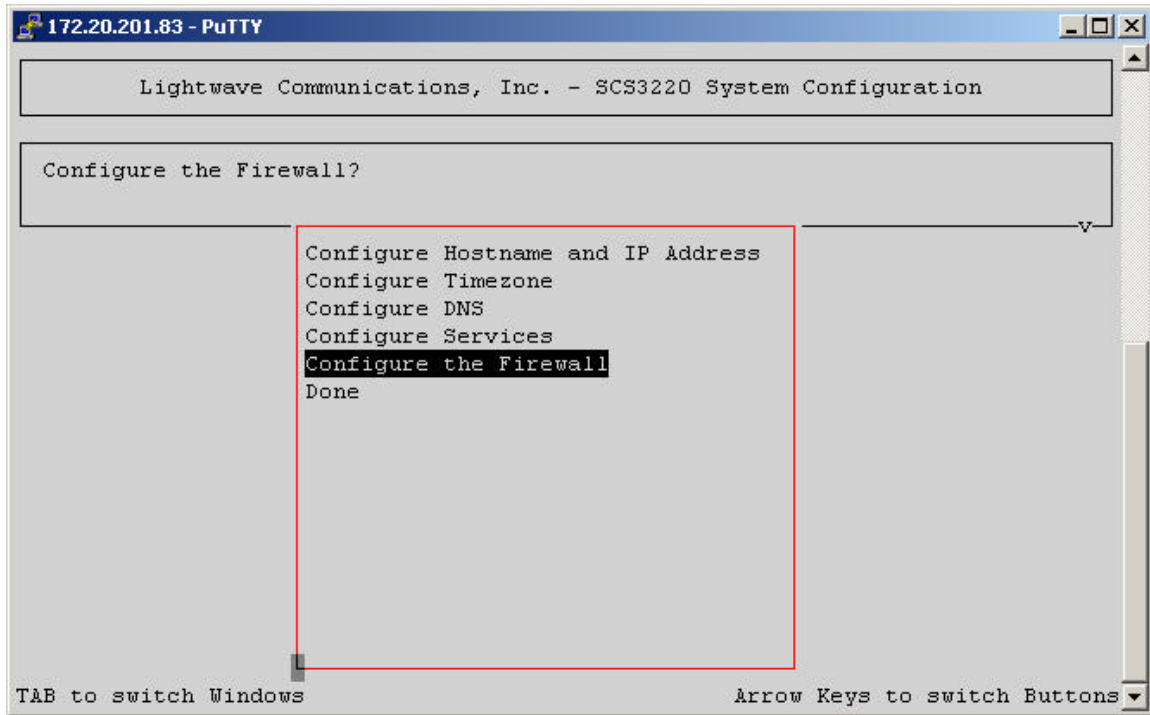
You can enable or disable the NTP Daemon, if desired.



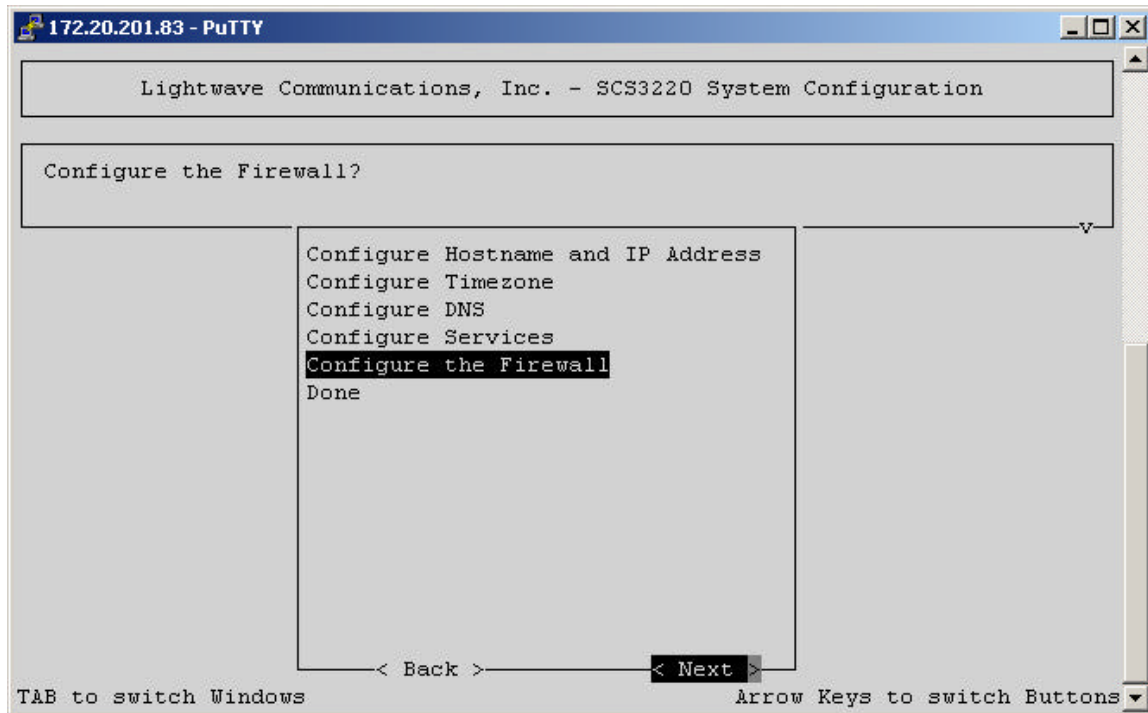
After setting the NTP Daemon, you are returned to the Script's Menu.

6.3.10 Configure the Firewall

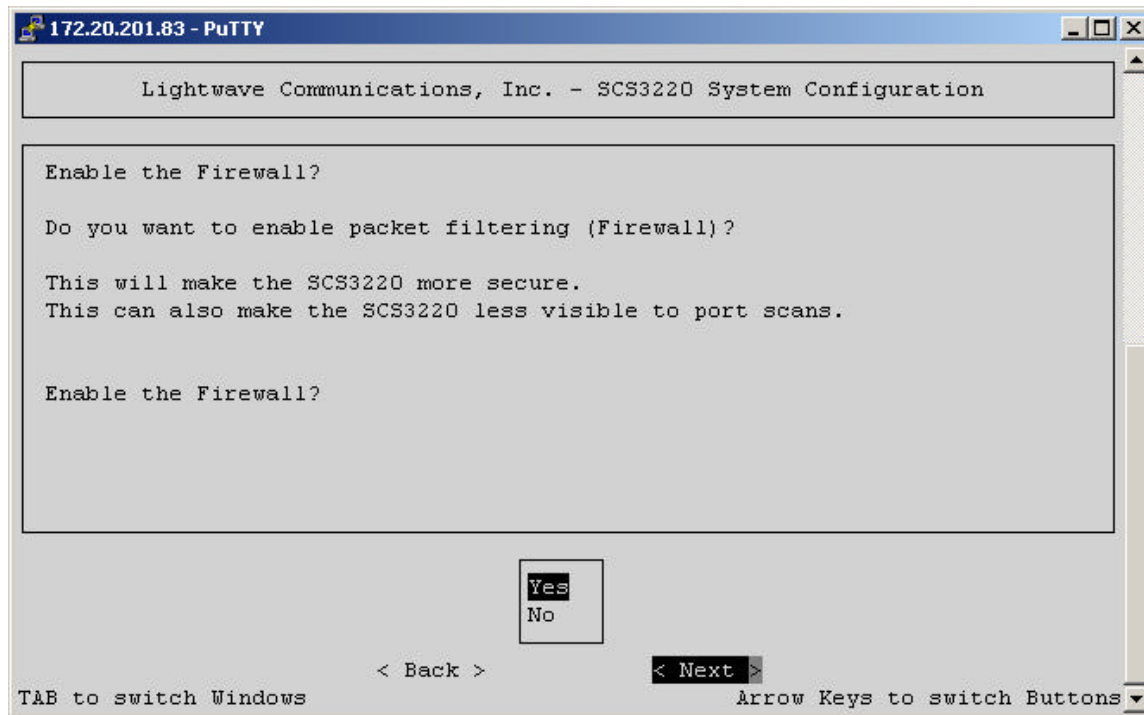
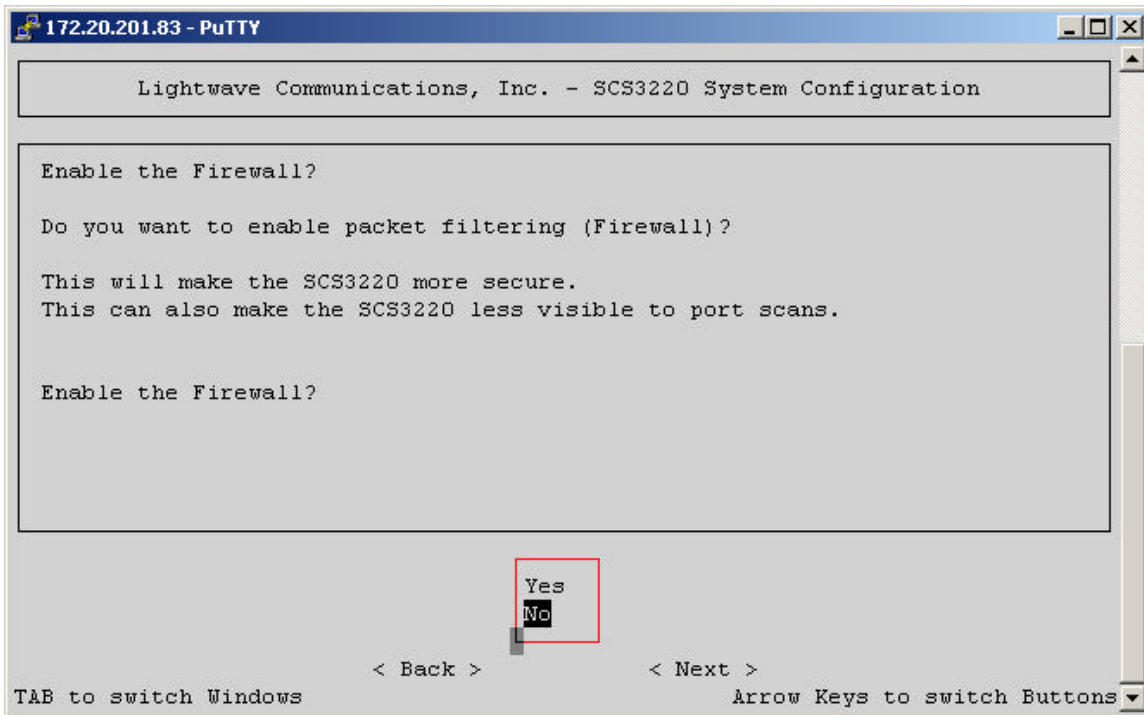
You can configure the firewall, for security in your system.



Press Next to advance.

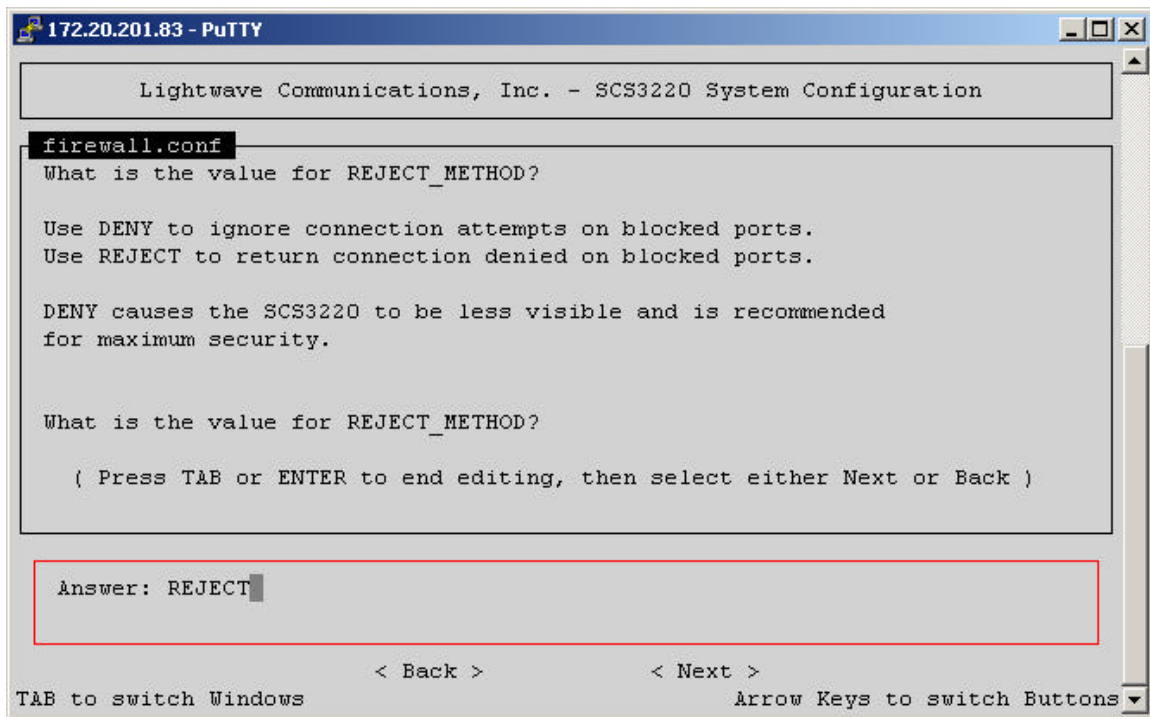


Enable the Firewall to see additional prompts. Choose No to end this step.

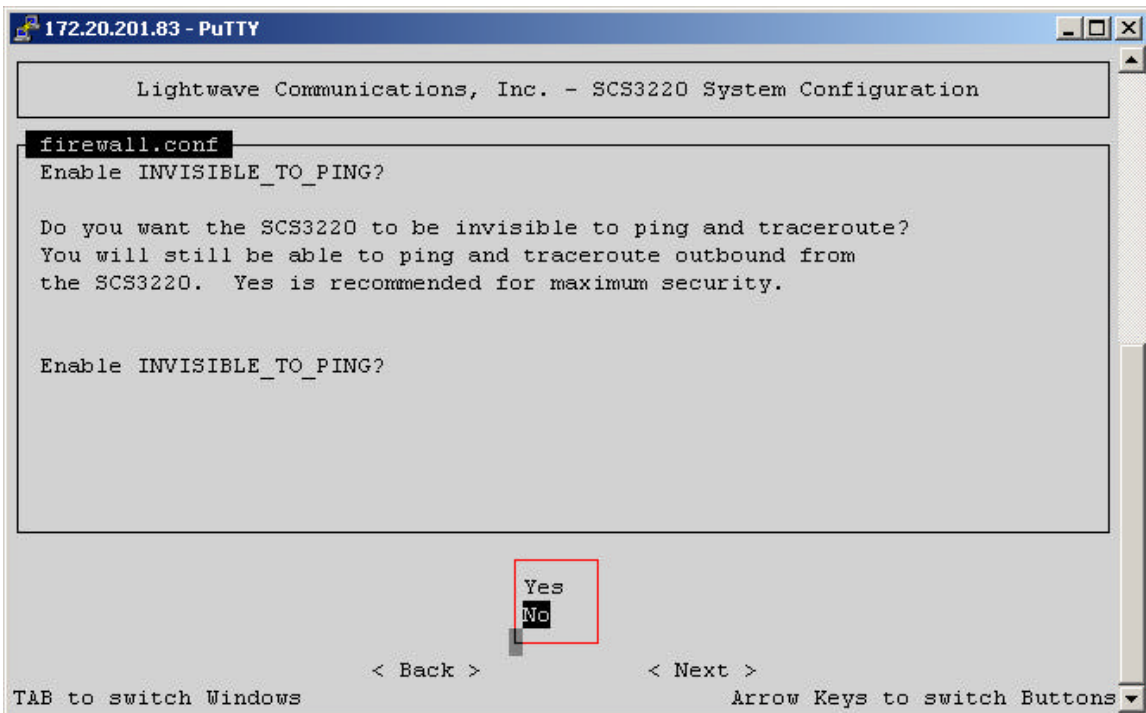


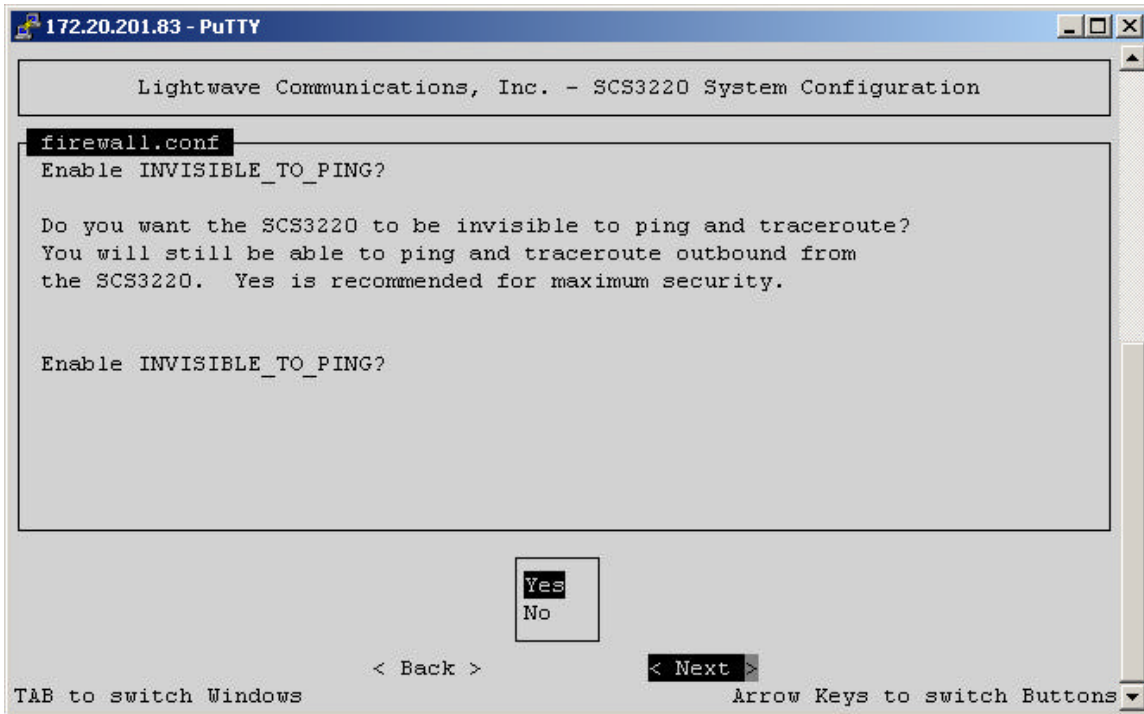
6.3.11 Firewall Reject Method

You can choose to Deny (ignore) connection attempts, or send back a 'Rejected' message.

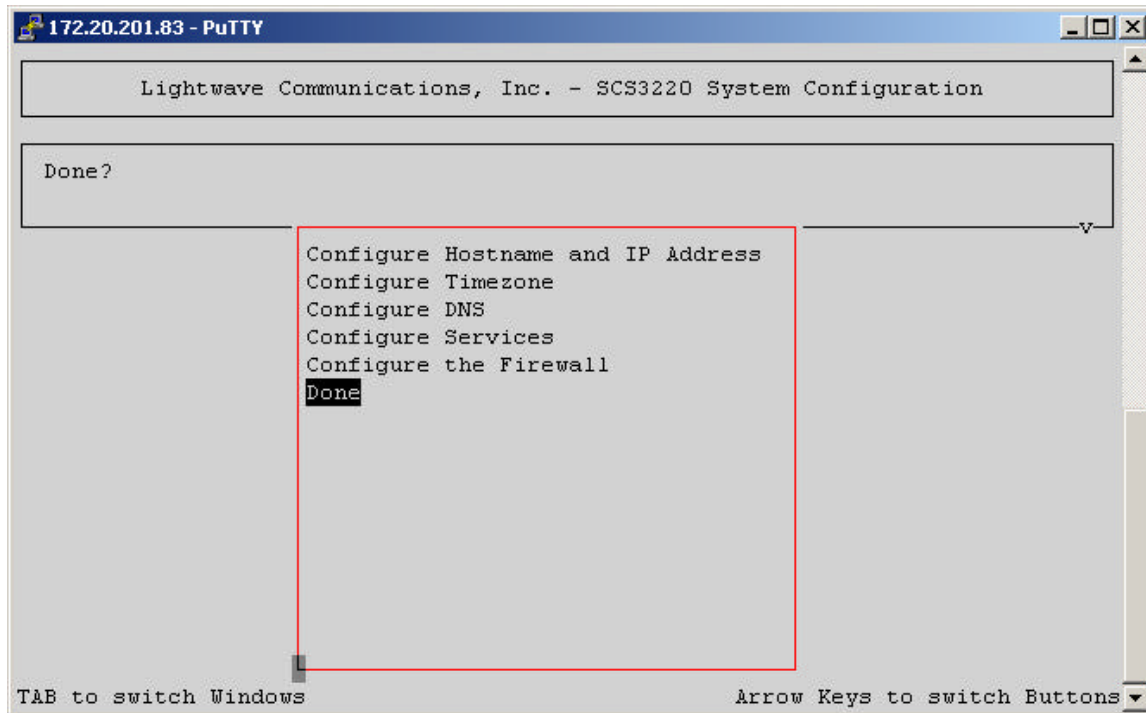


6.3.12 Ping Attempts

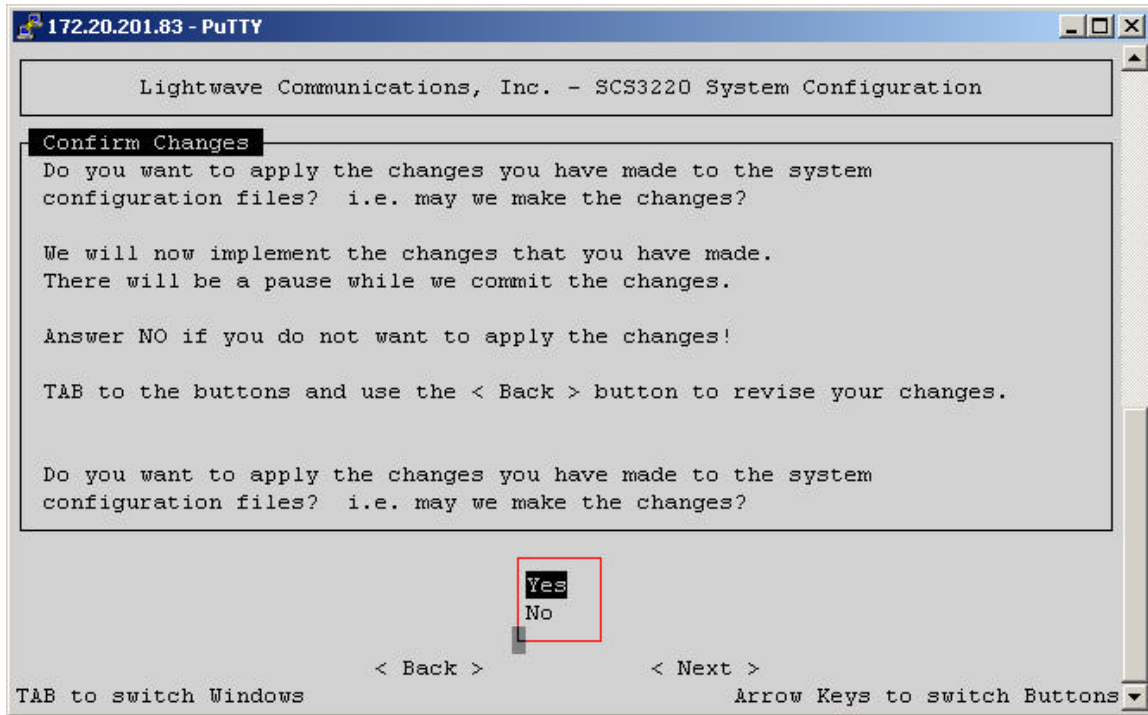




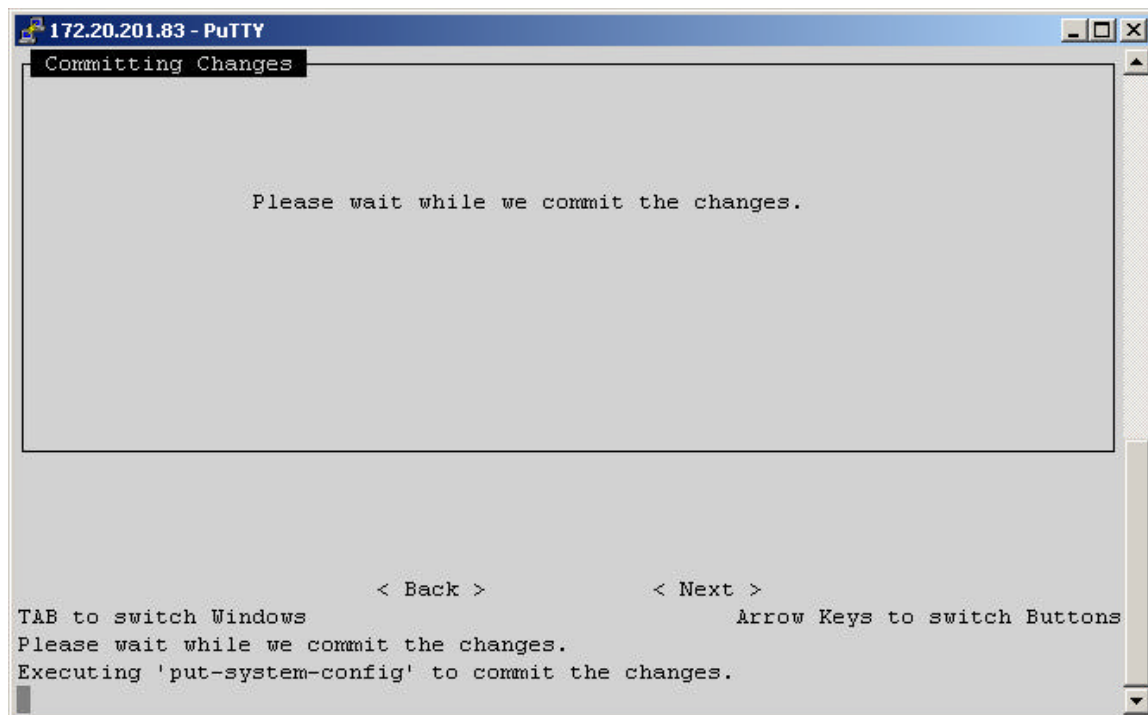
After finishing the 'Invisible to Ping' prompt, you will be returned to the Script Menu. There are no more script options to do. You may go back and re-do any prompts you wish, if necessary.



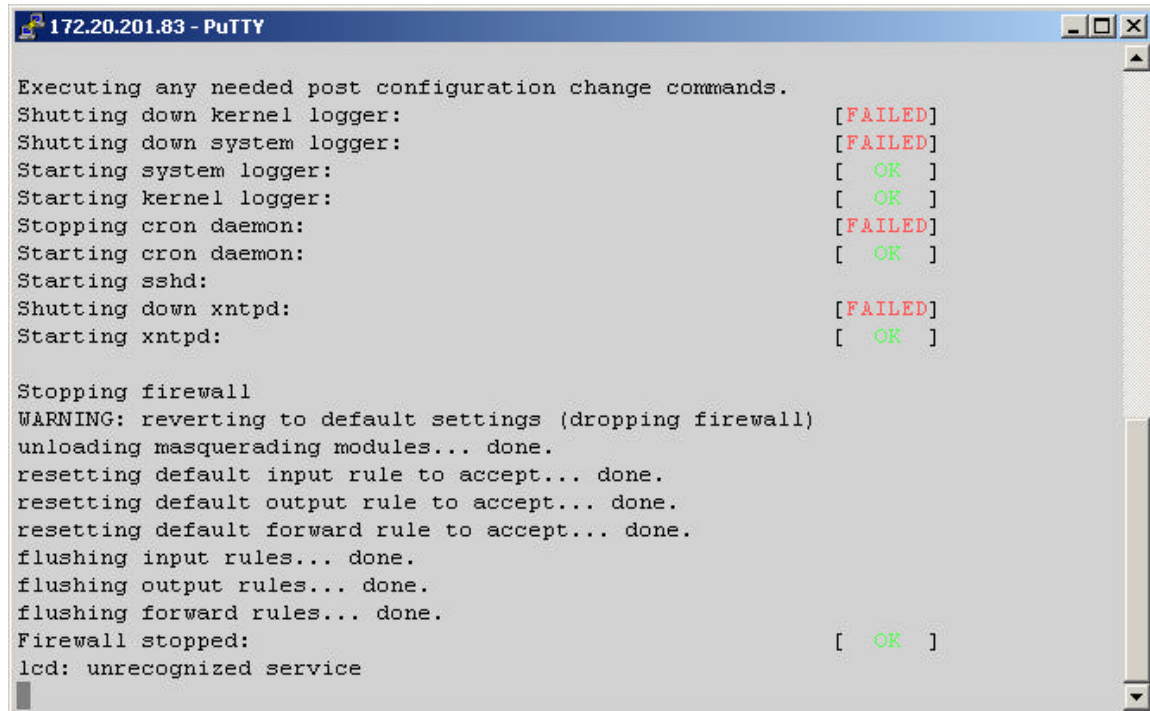
6.3.13 Confirm Changes



Selecting YES will 'commit' the changes to the System.



The System will run through the system configuration and make the appropriate changes. Note that some commands may show a 'fail' which may be normal for that instance. A 'fail' message may mean that a command was not previously running, and so the command to kill that application 'failed' (because it wasn't running). However, if you review the operations at a later time, you will probably see an 'OK' message for the same prompts and options.



```
172.20.201.83 - PuTTY
Executing any needed post configuration change commands.
Shutting down kernel logger: [ FAILED ]
Shutting down system logger: [ FAILED ]
Starting system logger: [ OK ]
Starting kernel logger: [ OK ]
Stopping cron daemon: [ FAILED ]
Starting cron daemon: [ OK ]
Starting sshd:
Shutting down xntpd: [ FAILED ]
Starting xntpd: [ OK ]

Stopping firewall
WARNING: reverting to default settings (dropping firewall)
unloading masquerading modules... done.
resetting default input rule to accept... done.
resetting default output rule to accept... done.
resetting default forward rule to accept... done.
flushing input rules... done.
flushing output rules... done.
flushing forward rules... done.
Firewall stopped: [ OK ]
lcd: unrecognized service
```

THE *VERY FIRST TIME* the System is run, the Setup script will automatically undergo a reset and reboot to save the features to the system.

6.3.14 SAVE Command

Every other operation of the Setup script file, the root-level system administrator will have to execute the **SAVE COMMAND** in order to preserve the changed values.

7: Creating and Managing Users

7.1 Adding a User ID

The **ADDUSER** command creates user IDs and assigns initial privileges. The following screen will be displayed when the command is used:

```
sys admin>>ADDUSER
Number of available user records: 200
Number of users defined: 0
Enter user id | USER ID >
```

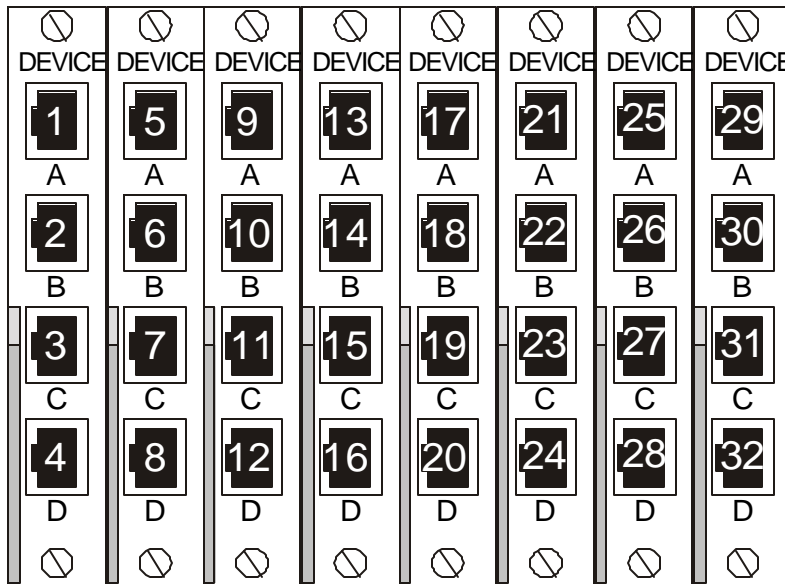
Press <ENTER> after typing the user ID. The user name is not case-sensitive. The next prompt asks for a password for the user ID. When the user logs in for the first time he will be asked for this password. This password is case-sensitive and is pre-expired. The user must change the password before accessing any of the SCS3230 device ports. The user password may be up to 10 alphanumeric characters long, and may not contain the "*" character. The SCS3230 will echo only stars when the sys admin enters the password and confirmation

```
Enter case sensitive password | PASSWORD > ****
Re-enter case sensitive password | PASSWORD > ****
0-17 | MAX CONCURRENT LOGINS: 1>17
```

This parameter limits the number of simultaneous logins a user may have. The sys admin may select between 0 and 17 concurrent logins. A user with 0 logins will have connect and listen permissions defined, but cannot login to access anything until a number of logins greater than 0 is defined.

```
Allowed devices example: 1-5, 10 | DEVICES 0 > 1, 5, 7, 8, 30
Allowed listen devices example: 1-5, 10 | DEVICES 0 > 1-32
```

The sys admin is now prompted to define the device ports that the user will be allowed to access for direct connections and listening connections. If more than one port is to be allowed, then the individual ports must be separated by a comma. A range of ports may be specified using the dash ("-").



Allowed devices determines which devices a user may select for direct access. **Allowed listen devices** determines which devices a user may use listen access. "Listening" is defined as being able to read from an existing device port connection without write ability. This feature is useful for sharing information among multiple users or for monitoring a user's session with an attached device.

Fig. 4 Device Port Numbering

HELPFUL HINT: Make a diagram or spreadsheet of connections indicating connections between devices and the SCS3230 device ports as numbered above.

The **Allow user to clear device buffer (Y/N) | YES >** option determines whether a user may use the **CLEAR** command to delete all the data stored in a device port FIFO buffer. The sys admin may want to inhibit this ability to preserve user accountability when accessing attached devices. Users are allowed to clear buffers by default. Pressing **<ENTER>** will allow the user to clear the buffer; typing **NO** and then pressing **<ENTER>** at the prompt when defining a user ID will disallow the user from clearing all device buffers.

The **Clear screen after a command (Y/N) | YES >** option determines if the screen clears when most commands are executed. Disallowing this screen behavior keeps the last few commands and responses on the terminal screen. The default value for this option is **YES**. Pressing **<ENTER>** will accept the default value; typing **NO** and then pressing **<ENTER>** disallows this screen behavior.

```
sys admin>>ADDUSER
Number of available user records: 200
Number of users defined: 0
Enter user id | USER ID > tom
Enter case sensitive password | PASSWORD > ****
Re-enter case sensitive password | PASSWORD > ****
0-17 | MAX CONCURRENT LOGINS: 1> 2
Allowed devices example: 1-5,10 | DEVICES 0 > 1-4
Allowed listen devices example: 1-5,10 | DEVICES 0 > 0
Allow user to clear device buffer (Y/N) | YES > n
Clear screen after a command (Y/N) | YES > n
Enter user id | USER ID >

Sys admin>>
```

The above procedure has defined one user. The SCS3230 will prompt for the next user ID to be defined. Repeat the set-up process until all users have been entered. To return to the sys admin prompt, simply press <ENTER> at the **USER ID**> prompt. More users may be added at any time by using the **ADDUSER** command. A maximum of 200 users may be defined.

7.2 Editing a User ID

```
sys admin>>EDITUSER TOM
Enter accepts present value
Enter case sensitive password | PASSWORD >
0-17 | MAX CONCURRENT LOGINS: 2>6
Allowed devices example: 1-5,10 | DEVICES 1-4 >
Allowed listen devices example: 1-5,10 | DEVICES 0 >
Allow user to clear device buffer (Y/N) | YES > n
Clear screen after a command (Y/N) | NO > n

sys admin>>
```

To edit or change parameters for a particular user after defining that user ID, use the **EDITUSER** command. For example, if the user 'Tom' needed to have more concurrent login capabilities, the sys admin would type **EDITUSER TOM** on the command line. As each line comes up, change the settings and press <ENTER>, or press <ENTER> to accept the current setting.

NOTE: When editing any group of parameters, pressing the <ENTER> key will accept the current value and move to the next parameter in the list.

7.3 Listing User IDs

To list the users that have been defined, use the **LISTUSERS** command. When used alone, the command will display all user ID's. When a user ID is specified after the command, the parameters for that user ID will be displayed. If the **/ALL** qualifier is

included after the **LISTUSERS** command, then the parameters for all users are displayed.

```
sys admin>>LISTUSERS
1: User id > PETE
2: User id > KEVIN
3: User id > TONY

sys admin>>LISTUSERS /ALL
1: User id > PETE
Allowed devices > 1-32
Allowed listen devices > 1-32
Max logins > 17
Allow user to clear device buffer > YES
Clear screen after a command > YES
2: User id > KEVIN
Allowed devices > 1-32
Allowed listen devices > 1-32
Max logins > 17
Allow user to clear device buffer > YES
Clear screen after a command > YES
3: User id > TONY
Allowed devices > 1-32
Allowed devices > 1-32
Max logins > 17
Allow user to clear device buffer > YES
Clear screen after a command > YES

sys admin>>
```

7.4 Deleting a User ID

To delete a user, use the **DELETEUSER** command, followed by the user ID on the same line. The **LISTUSERS** command will allow verification after deleting a user ID. The following command sequence is an example of the use of **DELETEUSER** with **LISTUSERS**:

```
sys admin>>DELETEUSER PETE
Delete user: pete                Yes or No (N): y

sys admin>>listusers
2: User id > KEVIN
3: User id > TONY

sys admin>>
```

User IDs may also be deleted by their record number. As each user ID is created, it is assigned a sequential record number. This number is associated with the user ID and will be displayed using the **LISTUSER** command.

```
sys admin>> deleteuser /3
Delete user: tony                Yes or No (N): y

sys admin>>
```

To delete a user ID using the record number, specify the number as a qualifier after the **DELETEUSER** command in the form **DELETEUSER /N**, where N is the user record number.

7.5 Devices Command

Device port parameters must be defined by the sys admin using the **DEVICES** command. If a single device port is to be changed, the port number must follow the **DEVICES** command. If the **DEVICES** command is entered by itself, the configuration of all device ports will be listed. To edit all possible device ports for a unit, enter the command **DEVICES /ALL**.

Programmable elements include: device name, baud rate, stop bits, parity, data bits, DCE/DTE, flow control and inhibit direct mode. Pressing <ENTER> accepts the parameter as is. If changes need to be made, each parameter may be edited as it comes up after each > prompt.

The device name may not contain the * character. If a name is entered with this character, the administrator will be asked to re-enter the name.

Four baud rates are offered: 9600, 19200, 38400, and 57600. Most devices use 9600 as the console/admin port baud rate, so the device port defaults to this value. Check the equipment documentation for the proper baud rate.

The format of the bit-wise transmission of data is determined by the stop bits, parity, and data bits parameters. The default settings are 1 stop bit, no parity, and 8 data bits. Check the equipment documentation for the proper settings.

Each device port may be separately configured as either DCE or DTE. The DCE setting is used when connecting to a DTE device such as a computer. The DTE setting is used when connecting to a DCE device such as a managed switch. The device ports are configured as DCE by default.

The device port flow control setting determines the method of flow control. The two most common settings are XON/XOFF (a.k.a. software) and RTS/CTS (a.k.a. hardware). DTR/DSR is used very infrequently. The default setting for the device ports is XON/XOFF. Check the equipment documentation for the correct flow control setting.

The **INHIBIT DIRECT MODE** setting allows the administrator to turn off port buffering while a user is connected to the device and is in direct mode. The device port buffer still collects data while not in direct mode when this setting is active. It may be desirable to disable direct mode buffering so sensitive data is not viewable by other users, but alert and panic messages from the attached device are still stored when nobody is connected. This setting is disabled by default, so buffer data is collected both in and out of direct mode.

```

sys admin>>terminal 1
Enter accepts present value
T1: 0=9600, 1=19200, 2=38400, 3=57600 | BAUD RATE: 9600>
T1: 0=1, 1=2 | STOP BITS: 1>
T1: 0=None, 1=Odd, 2=Even | PARITY: None>
T1: 0=8, 1=7, 2=6 | DATA BITS: 8>
T1: 0=DCE, 1=DTE | EQUIP PORT TYPE: DCE>
T1: 0=XON/OFF, 2=RTS/CTS | FLOW CONTROL: XON/XOFF>
Card installed, settings updated
sys admin>>

```

A list of device port names and their corresponding port number may be displayed by using the **LISTDEVICES** command.

7.6 Terminal Command

The sys admin defines terminal port parameters using the **TERMINALS** command in a manner similar to the **DEVICES** command. If the command is entered by itself, the terminal settings will display. If the terminal port number is specified after the command, then the settings for that terminal port may be altered. Programmable elements include: device name, baud rate, stop bits, parity, data bits, DCE/DTE, and flow control as in the example below.

```

sys admin>>TERMINALS 1
Enter accepts present value
T1: 0=9600, 1=19200, 2=38400, 3=57600 | BAUD RATE: 38400>
T1: 0=1, 1=2 | STOP BITS: 1>
T1: 0=None, 1=Odd, 2=Even | PARITY: None>
T1: 0=8, 1=7, 2=6 | DATA BITS: 8>
T1: 0=DCE, 1=DTE | EQUIP PORT TYPE: DTE>
T1: 0=XON/OFF, 1=DTR/DSR, 2=RTS/CTS | FLOW CONTROL: XON/XOFF>
Card installed, settings updated

sys admin>>

```

Terminal port connection location reference template:

7.7 Network Commands

The **NETWORK** command setup is changed, if compared to the CS3200 system.

The **NETWORK** or access ports in chassis slots B, C, D and E are connected to the **CONTROL/NETWORK** card using **CHANNEL EXTENDER** cards. All chassis backplane Network ports are accessed through the 10/100 IP network port on the **CONTROL/NETWORK** card.

When used without qualifiers, the **NETWORK** command will display the network settings assigned to each card slot. The IP address, subnet mask, default gateway, secondary route, and bootp settings are displayed for each slot. These parameters are assigned to the slots rather than the cards. If a network card is moved from one slot to another, it will have the parameters assigned to its new slot rather than those previously assigned to it.

When used with the **/ALL** qualifier, the **NETWORK** command will allow the system administrator to change the network parameters for all the card slots in order. The sys admin will be prompted to enter the IP address, subnet mask, default gateway, secondary route, and bootp settings for each card slot. If **<ENTER>** is pressed at the prompt, the value displayed in the prompt will be used. After entering the parameters for each slot, the sys admin will be asked if the new parameters should be used. If **NO** is entered (or just **<ENTER>** is pressed), then the previously entered changes will be discarded and the system will move on to the next slot's parameters. If **YES** is entered, then the slot's network parameters will update in control card memory and the control card will send the new parameters immediately to the card in that slot.

If the card is a network card, it will immediately acquire the new network parameters and disconnect all telnet sessions to that card. If a terminal card is in the slot, or if the slot is empty, the network parameter update is refused, but the network parameters for that slot will be saved to control card memory.

When the **NETWORK** command is used with a card slot letter as a command qualifier, it will attempt to change the parameters only for that card slot. In all other aspects, the command behaves the same as if the **/ALL** qualifier was used.

If a bootp server is present on the same network as the SCS3230 network card and bootp is enabled on the network card, then the network card will use the IP address and subnet mask assigned by the bootp server rather than those assigned by the sys admin.

Once a network card has been assigned an IP address either by a bootp server or by the sys admin, then the ConsoleServer may be accessed by telnet. Connecting to the default telnet port reaches the user login; connecting to port 5000 reaches the sys admin login.

7.8 Modem Command

The **MODEM** command allows manipulation of the modem card initialization string. When the command is entered, the sys admin is prompted for the new initialization string. Typing a new initialization string and pressing **<ENTER>** will create a new initialization string for the modem, while just pressing **<ENTER>** will accept the current value. After pressing **<ENTER>**, the sys admin is asked to confirm the changes to send the string to the modem. Typing **YES** and **<ENTER>** will send the initialization string immediately to the modem card, while typing **NO** and **<ENTER>** discards the entered initialization string and keeps the old string. If the modem card is not currently installed, the settings are not sent, but are kept in control card memory. The control card will send those settings in memory when a modem card is installed.

```
sys admin>>MODEM
Enter accepts present value
Init string | > ATB2H0
Save changes and update modem card? Yes or No: No>yes
Modem card not installed in slot A, init string saved

Sys admin>MODEM /DEFAULT
Current modem init string is: ATB2H0
Set modem to factory default value of: ATH0S0=1
(write out YES) Yes or No: No>yes
Modem card not installed in slot A, init string saved

sys admin>>
```

The sys admin may also reset the initialization string to the default value by entering the command with the default qualifier in the form **MODEM /DEFAULT**. When using the **/DEFAULT** qualifier, the current initialization string is displayed, along with the factory default string. The sys admin is asked to confirm the use of the default modem string; typing **YES** and **<ENTER>** will send the default initialization string immediately to the modem card, while typing **NO** and **<ENTER>** keeps the old modem string.

It is recommended that the default modem initialization string be used unless the application requires that it be changed. The default initialization string is **ATHOSO=1**, which disconnects any active phone connections when the initialization string is sent, and sets the modem to auto-answer on one ring.

7.9 Status Commands

There are six commands which allow the sys admin to check the status of the SCS3230: **CONNECTIONS**, **LISTCARDS**, **VERSION**, **INFO**, **POWERSTATUS** and **LOG**.

7.9.1 CONNECTIONS Command

The sys admin may monitor the status of connections made through the terminal cards by using the **CONNECTIONS** command. This command will display all the active connections and the mode of those connections as follows:

```

sys admin>>CONNECTIONS
Terminal Connection List
01 KEVIN                01 SERVER                ( Monitor mode )
02                      00                      ( Channel present )
03                      00                      ( Channel present )
04                      00                      ( Channel present )
05                      00                      ( Channel present )
06                      00                      ( Channel present )
07                      00                      ( Channel present )
08                      00                      ( Channel present )
09                      00                      ( Channel present )
10                      00                      ( Channel present )
11                      00                      ( Channel present )
12                      00                      ( Channel present )
13                      00                      ( Channel present )
14                      00                      ( Channel present )
15                      00                      ( Channel present )
16                      00                      ( Channel present )
17 <not installed>
sys admin>>

```

The above example shows that user KEVIN is logged in on terminal port 01, is connected to device port 01 (which is named "Server" in the SCS3230), and is in monitor mode. The list will display the user ID of any logged-in users, the device port to which they are connected, the device name assigned to that port, and the mode of that connection (see sections 7.8, 7.9, and 7.10 for an explanation of the various connection modes). If the user is not connected to any device, they shall simply be listed as "User Logged-In".

When used with the **/MONITOR** command line qualifier, the **CONNECTIONS** command updates the connection list on screen every time a user logs in or out or changes login level (i.e., goes into direct mode), rather than simply displaying the list once as occurs when the

CONNECTIONS command is used alone. (See section 6.8, Sys Admin Session Management Commands).

The **CONNECTIONS** command will also tell the sys admin which terminal ports are present (in the list, they are referred to as "channels"). If the port is not functioning (i.e., the card is not present or there is a fault with the individual port), the port will be listed as "**<not installed>**". It will also list Telnet Active for an active Telnet session.

7.9.2 LISTCARDS Command

```
Sys admin>>LISTCARDS
Installed cards
Slot A : <card not installed>
Slot B : Terminal card installed
Slot C : Terminal card installed
Slot D : Terminal card installed
Slot E : Terminal card installed
Slot F : Switch card 1 installed
Slot G : Switch card 2 installed
Slot H : Device card installed
Slot I : Device card installed
Slot J : Device card installed
Slot K : Device card installed
Slot L : Device card installed
Slot M : Device card installed
Slot N : Device card installed
Slot O : Device card installed

sys admin>>
```

The **LISTCARDS** command will simply tell the sys admin which cards are plugged into the SCS3230 chassis. It only lists the cards (by type) as present or not present, and does not indicate whether the cards are functioning properly.

7.9.3 VERSION Command

```
sys admin>>VERSION /ALL
SCS3230
Slot B1: V2.15 10/01/99 Terminal Boot V1.62 (Sep 30 1999) (14:33:12)
Slot C1: V2.15n 10/01/99 Net Terminal Boot V1.62 (Sep 30 1999) (12:44:32)
Slot C2: V1.16 Build 7 09/29/99 Network Boot V1.62 (Sep 30 1999) (14:45:52)
Ethernet Address: 00-30-31-00-01-D5
Slot F1: V 1.03 Switch 1
Slot G1: V 1.03 Switch 2
Slot H1: V2.15 10/04/99 Device Boot V1.62 (Sep 30 1999) (14:40:51)
Slot P1: V2.12 Build 15 10/01/99 Control Boot V1.62 (Oct 01 1999) (11:13:06)

sys admin>>
```

By itself, the **VERSION** command lists the boot and flash software version for the control card. The version information for a single card other than the control card may be displayed by typing the card slot letter ID after the **VERSION** command. If the sys admin

desires to list the software version for all cards, he should type **VERSION /ALL** at the command prompt. This will list the versions of the boot and flash software for all cards, listed by card slot letter designation. Each network card will display two sets of software versions: one set for the network portion of the card and one for the user terminal portion, while all other cards will only return one set of version information.

7.9.4 INFO Command

```

sys admin>>INFO A
Slot A1: Modem: No Active Call Timeout = 1 mins.
Current Modem State: in command mode
Modem Init String: ATHOS0=1
Modem error: none

sys admin>INFO C
Slot C2: 0 Active Telnet Sessions Timeout = 1 mins.
Ethernet Address: 00-30-31-00-00-4F
IP=172.16.1.31 SM=255.255.255.0 GW=172.16.1.151
2nd route: IP=255.255.255.255 SM=255.255.255.255 GW=255.255.255.255

sys admin>>INFO D
Slot D1:
Port 9(A) DCE 38400, N, 8, 1 Flow=XON/XOFF RTS=0 DTR=1
Port 10(B) DCE 38400, N, 8, 1 Flow=XON/XOFF RTS=0 DTR=1
Port 11(c) DCE 38400, N, 8, 1 Flow=XON/XOFF RTS=0 DTR=1
Port 12(D) DCE 38400, N, 8, 1 Flow=XON/XOFF RTS=0 DTR=1

sys admin>>

```

The **INFO** command allows the sys admin to list the properties of a card. The switch cards are incapable of returning information, and any request to view information from the switch cards will be refused.

The **INFO** command is used in the form **INFO <slot letter>**, where **<slot letter>** is the letter designation of the card slot in the SCS3230 chassis. The modem card will always be in card slot A, while the network card may be in slots B, C, D, or E.

The modem card will return the following information:

- The slot letter and processor number (which will always be "A1")
- The connection status of the modem
- The current modem session timeout limit (see Section 6.9, Breaking User Connections)
- The current modem state, listed as either power-up mode or command mode
- The modem initialization string sent at startup
- Any miscellaneous modem error messages

The network card will return the following information:

- The slot letter and processor number (the number will always be "2")
- The amount of active telnet sessions
- The telnet session timeout limit
- Sys Admin sessions

- The unique hardware (MAC) address of the card, expressed as six groups of one-byte hexadecimal numbers
- IP source 3200, BootP, RARP
- The primary IP information, including: IP address, subnet mask, and gateway
- The secondary IP information, including: destination address, subnet mask, and gateway

The terminal and device cards will return the following information:

- The terminal or device port number
- The port letter as indicated on card label
- Equipment port type (DCE or DTE)
- Baud rate
- Parity; N=none, E=even, O=odd
- Data bits
- Stop bits
- Flow control type
- Status of RTS line; 0=off, 1=on
- Status of DTR line; 0=off, 1=on

The labels “RTS” and “DTR” do not change when the port type is changed from DCE to DTE. When the port type is changed, the label “RTS” indicates the status of the CTS line, and “DTR” indicates the status of the DSR line.

7.9.5 POWERSTATUS Command

```
sys admin>>powerstatus
Power supply A is OK
Power supply B is OK

sys admin>>
```

The **POWERSTATUS** command displays the status of the two redundant power supplies in the SCS3230 chassis. Power supplies will either be listed as **OK** or **Failed**. The SCS3230 will continue to function with one failed power supply. Contact Lightwave for information regarding replacement if a power supply fails.

7.9.6 LOG Command

```
sys admin>>log /enable
```

The SCS3230 can report current system activity through control card port B. The report is enable using the command **LOG /ENABLE**, and disabled using the command **LOG /DISABLE**.

The system will report user logins, logouts, device port selections, and entry/exit from direct mode. Note that there is no system clock on the SCS3230, so there is no time/date stamp on system activity. If a time/date stamp is required, it must be provided by the system capturing the data output.

Connection instructions for the logging port:

1. Turn on power to the terminal or computer. If using a computer, start the desired communication program. The terminal or communications program used must be in VT100 emulation mode
2. Ensure that the communications settings are correct. The factory defaults for the control card, which may only be changed by a hardware DIP switch, are 9600 baud, 8 data bits, 1 stop bit, and no parity (9600 8N1). If in doubt as to the current communication settings on the control card, check the DIP switches and refer to Figure 2, Control Card Layout with DIP Switch Settings, on page 9.
3. Locate the serial port on the terminal or computer and determine what type of connector is used. The cable kit included with the SCS3230 contains each of the following: one RJ45 serial cable, an RJ45 to male DB9 adapter, an RJ45 to female DB9 adapter, an RJ45 to male DB25 adapter, and an RJ45 to female DB25 adapter. Select the appropriate adapter for the serial port on the terminal or computer.
4. Firmly seat the adapter in the serial port. Screw down the adapter to secure it to the serial port.
5. Insert one end of the serial cable into the adapter until a click is heard. Insert the other end of the serial cable into port "B" of the control card, again until a click is heard.
6. At the `sys admin>>` prompt, enter the command `LOG /ENABLE`. Log in as a user as outlined in chapter 7. Check for output on the logging port. If no output has appeared, check all cable connections. If "garbage" characters appear, check that all communications parameters match.
7. The SCS3230 will continue to output logging information through the "B" port of the control card until the command `LOG /DISABLE` is entered at the `sys admin>>` prompt. Configure any text captures or scripts as needed to receive the logging data.

7.10 Sys Admin Session Management Commands

The SCS3230 features two commands that allow the sys admin to manage properties of the control port terminal session.

7.10.1 LINESPERPAGE Command

```
sys admin>>linesperpage
Lines per page set to 22

sys admin>linesperpage 10
Lines per page set to 10

sys admin>>
```

The **LINESPERPAGE** command allows the sys admin to change the number of lines displayed per terminal page on the control card port before the **MORE** prompt is displayed. The number of lines to display per page is entered after the command. Entering the command without a number following will display the current number of lines displayed per page. The default value is 22, which will work properly with a 24-line display.

7.10.2 TIMEOUT Command

```
sys admin>>TIMEOUT
Timeout set to 1 minutes

sys admin>>TIMEOUT 0
Timeout set to 0 minutes
0 disables the timeout from occurring

sys admin>>TIMEOUT 5
Timeout set to 5 minutes

sys admin>>
```

The **TIMEOUT** command allows the sys admin to define a time limit on how long an idle sys admin terminal may remain logged in. If there is no interaction for the defined amount of time, the control card will log out the sys admin. The time limit in minutes is entered as a command qualifier after the command, and must be entered as a whole number. Defining the time limit as 0 will disable this function. The default value is one minute.

7.11 Breaking User Connections

The sys admin has four commands available to forcibly break user connections to devices. The commands **BREAK** and **FORCELOGOUT** allow the sys admin to break any connection on demand, while **TELNETTIMEOUT** and **MODEMTIMEOUT** automatically break idle user sessions for the network or modem card.

7.11.1 BREAK Command

```
sys admin>>BREAK 1
Break this connection? (write out YES) Yes or No: No>yes
sys admin>>
```

The **BREAK** command allows the sys admin to disconnect a user from the device port to which they were connected if they are in monitor, listen, or direct mode. The user is still logged in after the connection is broken, but there is no longer any connection between the terminal port and the device port. The sys admin must specify the terminal port number (as listed with the **CONNECTIONS** command) of the connection to be severed when using the **BREAK** command. Pressing <ENTER> or typing **NO** at the confirmation prompt will abort the command. To execute the command, enter **YES** at the confirmation prompt.

7.11.2 FORCELOGOUT Command

```
sys admin>>FORCELOGOUT 1
Force this user off? (write out YES) Yes or No: No>yes
sys admin>>
```

The **FORCELOGOUT** command causes the forcible logout of a user at any level of connection. The user will be returned to the **LCI 3200>** prompt after being forced off, and may login again unless their allowed logins are reduced to 0 before they can attempt another login. When using the **FORCELOGOUT** command, the sys admin must specify the terminal port number (as listed with the **CONNECTIONS** command) of the user to be forced off. Pressing <ENTER> or typing **NO** at the confirmation prompt will abort the command. To execute the command, enter **YES** at the confirmation prompt.

```
sys admin>>FORCELOGOUT SYSADMIN B
Force logout sys admin? (write out YES) Yes or No: No>yes
sys admin>>
```

The **FORCELOGOUT** command may also be used to disconnect a network sys admin session. The qualifiers **SYSADMIN** and the network card slot ID must be specified after the command.

7.11.3 TELNETTIMEOUT Command

```
sys admin>>TELNETTIMEOUT
Timeout set to 5 minutes

Sys admin>>TELNETTIMEOUT 0
Timeout set to 0 minutes
0 disables the timeout from occurring

sys admin>>TELNETTIMEOUT 2
Timeout set to 2 minutes

sys admin>>
```

The **TELNETTIMEOUT** command allows the sys admin to define the amount of time that a network card may have an idle telnet session before breaking the network connection. A telnet session is considered to be idle if no characters are sent from the user's terminal. Once the time limit has been reached, the user will be logged out and the network connection will be broken. The connection will be broken if there is no activity at any login level (from logged out up to direct mode). This is intended to prevent a "dead" session from tying up system resources. This command will define the idle time limit for all network cards present in the chassis.

To display the current system value for the idle telnet session time limit, type **TELNETTIMEOUT** at the command prompt. To change the time limit, the command is entered in the form **TELNETTIMEOUT <t>**, where <t> is the time limit in whole minutes. The valid range for <t> is 0 to 30, with the default value set as 1. If the value is set to 0, then the time limit is disabled.

7.11.4 MODEMTIMEOUT Command

```
Sys admin>>modemtimeout
Timeout set to 5 minutes

Sys admin>>modemtimeout 0
Timeout set to 0 minutes
0 disables the timeout from occurring

Sys admin>>modemtimeout 2
Timeout set to 2 minutes

sys admin>>
```

The **MODEMTIMEOUT** command is identical to the **TELNETTIMEOUT** command, but causes the automatic disconnection of idle modem card sessions. The modem card will deselect any currently selected device port channel, log the user out, and disconnect the telephone connection once the idle session time limit has been reached. Entering the time limit in whole minutes after the command sets the idle time limit. Entering a value of 0 will disable the timeout. Entering the command by itself will display the current modem idle call time limit.

Any users listening to a connection that is broken by **BREAK**, **FORCELOGOUT**, **TELNETTIMEOUT**, or a **MODEMTIMEOUT** will lose the connection as well.

8: User Access and Interface

8.1 Terminal Card

Each terminal card has four (4) RJ45 connector ports to which a terminal may be attached, giving a maximum of 16 physically connected terminals per SCS3230 unit. The terminal card may be installed in slots B, C, D, or E.

To access servers through the SCS3230 terminal card, the user must have at least a text terminal capable of serial communication, a serial cable terminating in an RJ45 connector, and the proper serial communication settings as determined by the system administrator. The default communication settings are 38400, N, 8, or 1.

Once the hardware is properly connected and configured, the user may issue commands to the terminal card. Before entering any commands, the user should be sure that the terminal card is ready to accept commands by checking that there is a prompt on screen. This is best accomplished by pressing <ENTER> until a prompt appears on the screen (a prompt will not appear on the screen if the terminal port is in direct mode, or if the serial cable is not connected properly).

8.2 Network Card

The network card must be connected to a network that uses TCP/IP. There is one 10/100 IP Network port, part of the NETWORK/CONTROL card.

Network settings are entered via the Sys Admin port.

To connect to the SCS3230 network card, the user should use a TCP/IP telnet client to telnet to the IP address assigned to the network card.

```
OCTANE_65 10# TELNET 172. 16. 1. 31
Trying 172. 16. 1. 31...
Connected to 172. 16. 1. 31
Escape character is '^]'.

Welcome to the SCS3230
You are connected to Port 5 via 172. 16. 1. 31

LCI3200>
```

The user interface for the network card is exactly the same as that for the terminal card, with a few minor exceptions. When a user first connects to the network card, the card will display **Welcome to the Console Server 3200**, the SCS3230 terminal port number for the connection, and the IP address of the network card. Once at the **LCI 3200>** prompt, the user interface behaves exactly the same as for the terminal cards.

At power-up, the network card does not respond to network connect requests until the control card has completed its system initialization. Once the power-up sequence is complete, the network card obtains its network parameters from the control card, and is ready to accept connections over the network. It is important to note that the network card does not retain its network parameters (i.e., IP address, subnet mask, gateway address) if moved from one card slot to another. The network parameters remain assigned to a card slot, and will be assigned to whatever network card is in that slot.

8.3 Modem Card

The modem card allows users to remotely access the servers attached to the SCS3230 via a dial-up connection. The modem automatically detects the connection speed, and allows connections of up to 38.4K baud. The control card must complete its start-up initialization check before a user may access the SCS3230 through the modem card.

The modem card must be installed in card slot "A" of the SCS3230 chassis. The modem card will not function if it is inserted in any other card slot, nor will any other card type function in slot A. To connect the modem card to the telephone network, insert an ordinary telephone cable (RJ11) in the jack on the modem card, and insert the other end in a telephone network jack, as outlined in section 5.3. See section 6.6 for instructions on setting the modem initialization string.

The user interface for the modem card is identical to that found on the terminal card with the exception of one command, which is outlined below. Only one user at a time may connect to the modem card.

8.3.1 The Bye Command

A user may disconnect from the modem card and automatically log out from the SCS3230 by sending the **BYE** command. This command will work at any login level that the user may send commands to the SCS3230 (i.e., logged out, logged in, and monitor mode). When the command is received, the modem card disconnects the telephone connection, and then logs the user out from the SCS3230. This command is unique to the modem card user interface.

8.4 Overview of Commands

Several levels of access are available to the user, from simple access of the SCS3230 to direct access of servers attached to the SCS3230. Many of the commands are sensitive to which level the user is in, and not all commands are available at all levels.

The first prompt the user should see after connecting to the SCS3230 is the **LCI 3200>** prompt (additional information may be on the screen as indicated in the sections above). This indicates that the user is not currently logged in and that no servers may be reached through the SCS3230. The prompt will change to reflect the level in which the user is, and in monitor mode, will also indicate which server is selected.

The help screens also change according to the user's login level. There are separate help screens for a logged out user, a logged in user, and a user in monitor (a.k.a. device) mode.

LOGGED OUT HELP:

```
F1 - Display Help Screen    (VT100 mode)
F2 - Display Pull Down Menu (VT100 mode)
TTY COMMANDS: (LOGGED OUT MODE)
LOGIN                       - Login with ID and Password
INFO                        - Display System Info
```

LOGGED IN HELP:

```
F1 - Display Help Screen    (VT100 mode)
F2 - Display Pull Down Menu (VT100 mode)
TTY COMMANDS: (LOGGED IN MODE)
LOGOUT, LOGOFF              - Logout
SELECT [SERVER NAME\#]     - Select a server by name or number
LISTEN [SERVER NAME\#]     - Listen to a server by name or number
DISELECT[SERVER NAME\#]   - Select a server and enter direct mode
CHANGEPSWD or PASSWD      - Change user password
CONNECTIONS                 - Display connections list
DEVLIST                     - Display installed devices list
EDITESC                     - Edit direct mode escape sequence
EDITBRK                     - Edit Break generation escape sequence
```

MONITOR (A.K.A. DEVICE) MODE HELP:

```

F1 - Display Help Screen      (VT100 mode)
F2 - Display Pull Down Menu (VT100 mode)
TTY COMMANDS: (MONITOR MODE)
LOGOUT, LOGOFF                - Logout
SELECT [SERVER NAME\#]      - Select a server by name or number
LISTEN [SERVER NAME\#]      - Listen to a server by name or number
DISELECT[SERVER NAME\#]    - Select a server and enter direct mode
EXIT                          - Deselect from a server
DEVLIST                       - Display installed devices list
TOP                            - Go to begining of device buffer
BOTTOM                        - Go to end of device buffer
NEXT                          - Display next page of device data
PREVIOUS                      - Display previous page of device data
FORWARD [n LINES]           - Go forward n lines and display page
REVERSE [n LINES]           - Go reverse n lines and display page
CAT                           - Display entire contents of device buffer
CAFILTER                      - Display entire contents of device buffer with
                              filter
CLEAR                         - Clear device buffer
DIRECT                        - Enter direct mode

```

The user may see a complete list of available commands at any prompt by typing **HELP**, **H**, or **?** and pressing **<ENTER>**, by pressing **<F1>**, or by selecting **DISPLAY HELP SCREEN** from a pull-down menu. To use the pull-down menu of commands available at each user level, the user may press **<F2>** or **<CTRL>+D**. By using the up and down arrow keys, the user may move the highlight bar to the desired command, and then press **<ENTER>** to select that command. The user may use the **<F1>** and **<F2>** keys only if the terminal or terminal emulation supports VT100 function keys. If the terminal or emulation program does not support VT100 function keys, then the user may press the **<CTRL>** and **D** key simultaneously to use the pull-down menu. To exit from a menu without selecting a command, press **<ESC><ESC>** or **<CTRL>+C**.

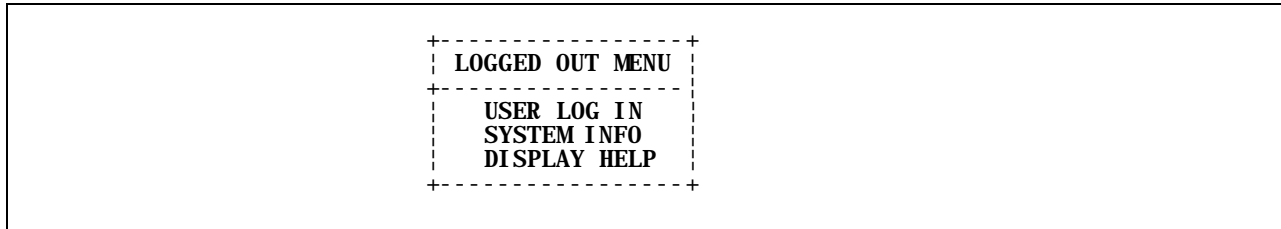
Pressing **<CTRL>+U** (the control and **U** key simultaneously) will erase all typed commands on the current command line back to the system prompt. Pressing **<CTRL>+R** retypes the last command executed and waits for the user to hit **<ENTER>** to execute it.

Use **<CTRL>+F** for the down arrow and **<CTRL>+E** for the up arrow.

Most commands may be abbreviated to one extent or another. See Appendix E for allowed abbreviations.

8.5 Logging In and Changing Passwords

F2 PULL-DOWN MENU SHOWING INITIAL MENU CHOICES



To login, the user must type **LOGIN** at the **LOGGED OUT>** prompt or select **USER LOG IN** from the pull-down menu. The user ID may also be entered as a command qualifier after the login command.

```

LOGGED OUT>LOGIN
Please Enter User ID user_ID
Please Enter Password ****

```

- OR -

```

LOGGED OUT>login user_ID
Please Enter Password ****

```

If using the pull-down menu or if no user ID was entered as a qualifier, the SCS3230 will prompt the user for their user ID by displaying **Please Enter User ID**. At this prompt, they should type the user ID assigned to them by the system administrator. After the user has entered their ID, they will be prompted for their password when the SCS3230 displays **Please Enter Password**. On the first login, this will be a password assigned by the system administrator. The password is case sensitive, so the user must be sure to type the password exactly as it is in the system. The SCS3230 will only echo stars for each character typed at the password prompt. Once the user has entered their password, the screen will clear, and a prompt displaying their user ID will appear, indicating that the SCS3230 is ready for use. For example, a user with an ID of "GEORGE" will have a prompt of **GEORGE>** once they have logged in.

When a user profile is created by the sys admin, the password is pre-expired. The user must change the password assigned by the sys admin before selecting a device or listening to a device port for the first time.

To change the password, the user must use the command **CHANGEPSWD** or **PASSWD**. The SCS3230 will first prompt the user for the old password by displaying **PLEASE ENTER OLD PASSWORD**. At this prompt, the user should enter the old password and press **<ENTER>**. The SCS3230 will then prompt the user for the new password by displaying the prompt **PLEASE ENTER NEW PASSWORD**. The user should enter the new password (which may be up to ten

alphanumeric characters and is case-sensitive) at this prompt and press <ENTER>. After entering the new password, the user will be asked to verify the new password by the prompt **PLEASE VERIFY PASSWORD**. The user should enter the new password again at this prompt exactly as it was typed the first time and press <ENTER>. If both new password entries match, the SCS3230 will display **New password accepted.** on the screen and return to the user prompt. If the new entries do not match, the message **New and verify password mismatch** is displayed, the new password is rejected, and the old password remains valid. The SCS3230 will also reject a new password if the incorrect password is entered when prompted for the old password, or if the new password is the same as the old password.

8.6 Logging Out

A user may logout at any time that commands may be made to the SCS3230 by typing **LOGOUT**, **LOGOFF**, or by selecting **LOGOUT** from a pull-down menu. When a user is connected to a server and they logout, the connection to that server will be broken and any other users that are listening to that session will lose their connection to that server as well.

8.7 Checking Connections

CONNECTION INFO SCREEN

CONNECTION INFO		
01 - TEST	00 -	User logged-in
02 -	00 -	Channel present
03 -	00 -	Channel present
04 -	00 -	Channel present
05 -	00 -	Channel present
06 -	00 -	Channel present
07 -	00 -	Channel present
08 -	00 -	Channel present
09 -	00 -	
10 -	00 -	
11 -	00 -	
12 -	00 -	
13 -	00 -	
14 -	00 -	
15 -	00 -	
16 -	00 -	
17 -	00 -	

Press Any Key To Continue

Only one user at a time may connect to a device on the SCS3230, except when using listen mode (see Section 7.9, Listening to a Server Session for more details). Before attempting to select a device port, the user may desire to check if the device port is free. The **CONNECTIONS** command allows the user to list the users that are logged in, which devices they have currently selected, and which mode they are in. Users may also view this information by selecting **DISPLAY CONNECTED LIST** from the pull-down menu when logged in.

8.8 Selecting a Device Port

F2 PULL-DOWN MENU TO SELECT A DEVICE PORT, PART 1

```

+-----+
|               |
|   LOGGED IN   |
|   MENU       |
|               |
| CONNECT TO    |
| SERVER       |
| DIR CONNECT  |
| TO SERVER    |
| LISTEN TO    |
| SERVER       |
| DISPLAY      |
| CONNECTED   |
| LIST        |
| DISPLAY      |
| SERVER      |
| NAMES       |
| DISPLAY      |
| ACTIVE      |
| DEVICES     |
| LOGOUT      |
| CHANGE      |
| PASSWORD    |
| CHANGE      |
| DIRECT      |
| MODE ESC   |
| CHANGE      |
| BREAK      |
| MODE ESC   |
| DISPLAY     |
| HELP       |
|               |
+-----+

```

F2 PULL-DOWN MENU TO SELECT A DEVICE PORT, PART 2

```

+-----+
|               |
|   SELECT      |
|   SERVER     |
|               |
| 01 - DEVICE_1 |
| 02 - DEVICE_2 |
| 03 - DEVICE_3 |
| 04 - DEVICE_4 |
| 05 -          |
| 06 -          |
| 07 -          |
| 08 -          |
| 09 -          |
| 10 -          |
| 11 -          |
| 12 -          |
| 13 -          |
| 14 -          |
| 15 -          |
| 16 -          |
| 17 -          |
| 18 -          |
| 19 -          |
| 20 -          |
| 21 -          |
| 22 -          |
| 23 -          |
| 24 -          |
| 25 -          |
| 26 -          |
| 27 -          |
| 28 -          |
| 29 -          |
| 30 -          |
| 31 -          |
| 32 -          |
|               |
+-----+

```

To select a device port, the user must type **SELECT** along with a device port name or number, or select **CONNECT TO SERVER** from the pull down menu, and then select the device port to be connected. The user must also have permission to connect to a device port as defined by the system administrator in their user profile. For example, to connect to a server named Alpha on device port 23, the user may either type **SELECT Alpha**, **SELECT 23**, or select **CONNECT TO SERVER** and then select **Alpha** from the next menu that appears. If the system administrator has determined that the user does not have permission to access a server, the SCS3230 will display the message **NO ACCESS TO DEVICE CHANNEL**, and the connection will not be made.

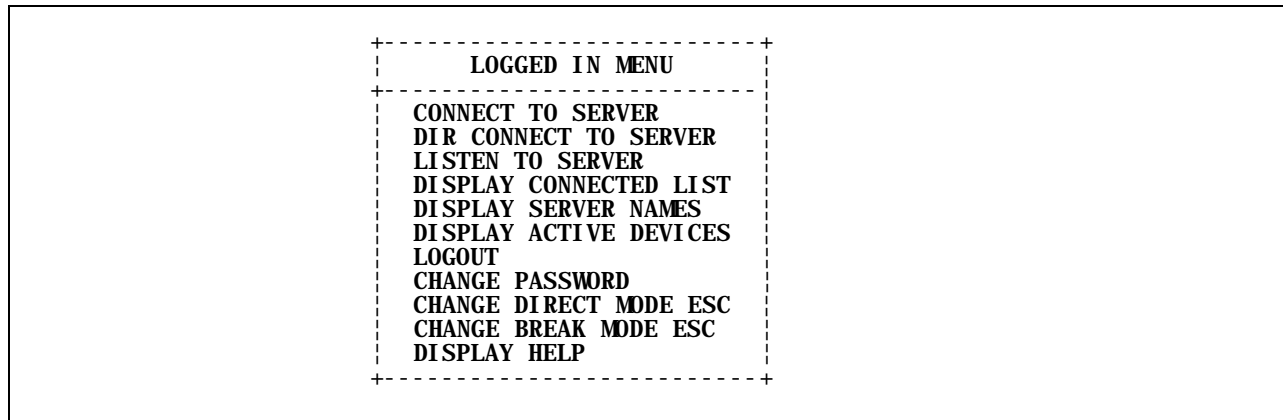
The user may exit from their current device port first by using the **EXIT** command or selecting **EXIT FROM SERVER** from the pull-down menu to free the device port for use by other users. A user may not select a server that is already selected by another user. When a server has been selected, the prompt will change to show which server has been selected by displaying the user ID, a dash, and then the server name in the general form **USER_NAME- SERVER_NAME>**. For example, if the user GEORGE selects Alpha, the prompt would read **GEORGE- Alpha>**.

When this prompt is displayed, the user is in monitor mode. There is no direct communication between the user and the server. Any output from the server is saved to a buffer that may be accessed by the user (see Section 7.11, Using the Buffer), but the user may issue no commands to the server. If the user desires to issue commands to the server, they must enter direct mode (see Section 7.10, Direct Mode).

Note that when selecting a server from a pull-down menu, only those device ports that are installed shall be displayed.

8.9 Listening to a Server Session

F2 PULL-DOWN MENU TO LISTEN TO A DEVICE PORT PART 1



F2 PULL-DOWN MENU TO LISTEN TO A DEVICE PORT PART 2

SELECT SERVER	
01 - DEVICE_1	02 - DEVICE_2
03 - DEVICE_3	04 - DEVICE_4
05 -	06 -
07 -	08 -
09 -	10 -
11 -	12 -
13 -	14 -
15 -	16 -
17 -	18 -
19 -	20 -
21 -	22 -
23 -	24 -
25 -	26 -
27 -	28 -
29 -	30 -
31 -	32 -

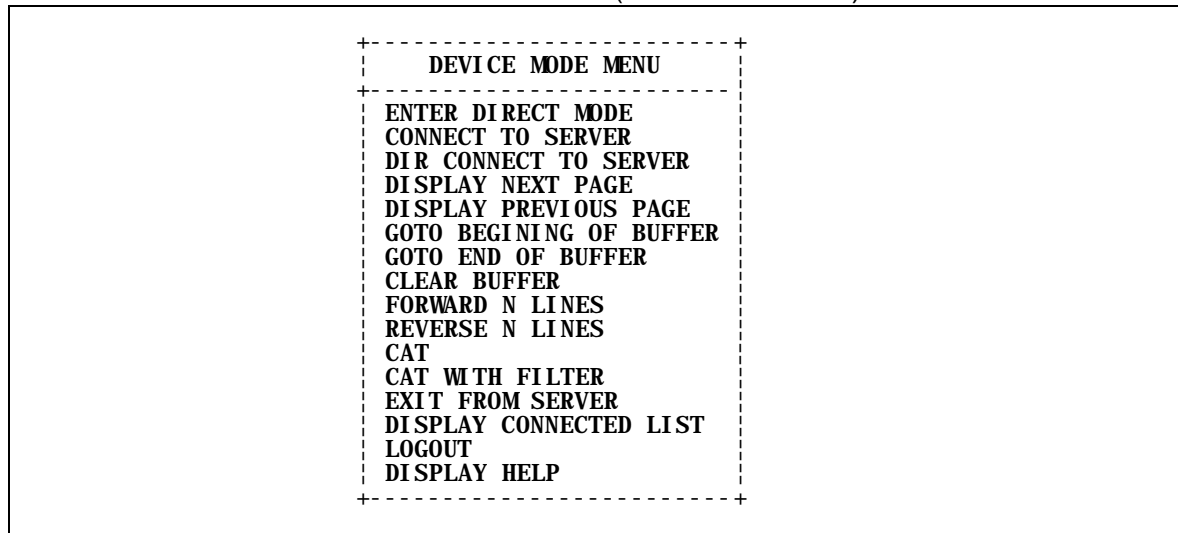
To monitor another user's server session, the user must type **LISTEN** followed by the device port name or number, or select **LISTEN TO SERVER** and a device port from the pull-down menu. There must be a connection between a user and a device port for another user to be able to listen to the connection. Also, the user must have permission to listen to the server as defined by the system administrator in their user profile. Any user that can log in and has listen permission for a device port may listen to a session on that device port. If the user does not have permission to listen to a server, the SCS3230 will display the message **NO ACCESS TO DEVICE CHANNEL**.

When listen mode is entered, the screen will clear, and the message **LISTEN MODE, PRESS ANY KEY TO EXIT. . . .** will appear. To exit listen mode the user may press any key. The user will also exit listen mode if the connection between the other (interactive) user and the device port is broken.

Note that when selecting a server from a pull-down menu, only those device ports that are installed shall be displayed.

8.10 Direct Mode

F2 PULL-DOWN MENU SHOWING DEVICE (A.K.A. MONITOR) MODE OPTIONS



If a user desires to interact directly with a server rather than only monitor its output, then they must enter direct mode. To enter direct mode using the **DIRECT** command, the user must first select a device port as outlined in Section 7.8, Selecting a Server. Then at the prompt, the user must use the command **DIRECT** or select the command **ENTER DIRECT MODE** from the pull-down menu. The user may also select a device port and enter direct mode in one step by using the **DISELECT** command or selecting **DIR CONNECT TO SERVER** from the pull-down menu. The **DISELECT** command must have either the device port number or the name assigned to the port as the command qualifier; if using the pull-down menu, a prompt box will appear to select the device port.

The user's terminal will then be directly connected to the server, and will act as if the terminal was physically connected to the server. The SCS3230 displays the last page of the device buffer along with a system information message indicating which device port is selected as the user enters direct mode.

8.10.1 Direct Mode Escape Sequence

To escape from direct mode, the direct mode escape sequence must be used. The direct mode escape sequence is a series of two to five characters that allow the user to leave direct mode and return to monitor mode. The factory default for the direct mode escape sequence is **<ESC>A** (escape key, then uppercase "a"), but the user may change the sequence by using the command **EDITESC** or selecting **CHANGE DIRECT MODE ESC** from the pull-down menu at the user prompt. It is recommended that the user only change the escape sequence if it causes problems with the hardware or software used. It is also recommended that the user avoid combinations of the **<CTRL>** key and other keys, as these combinations are usually reserved for sending and receiving special characters through the terminal. When the user changes the escape sequence, a window with the hexadecimal representation of the old escape sequence will appear. Pressing **<ESC>** to exit from the edit prompt will not work; it will add additional

<ESC> characters (hexadecimal value **1B**) to the direct mode escape sequence. If the user wishes to keep the old sequence, they need only to press <ENTER>. Otherwise, they should press backspace to delete the old characters, then enter the new sequence and press <ENTER>. If for some reason the selection is unacceptable, an error message will appear and the sequence will revert to the old character values. The escape sequence is stored with the user profile, therefore it is possible to have different sequences for different users. A hardcoded escape sequence is provided in the event that the programmed sequence is lost. It is semi-colon, exclamation, semi-colon, exclamation or ‘ ; ! ; ! ’ none of these characters should echo and no <ENTER> is required.

Appendix F lists the hexadecimal codes for the ASCII character set.

8.11 Using the Buffer

F2 PULL-DOWN MENU FOR DEVICE (A.K.A. MONITOR) MODE

```

+-----+
|               |
|   DEVICE MODE MENU   |
|               |
| ENTER DIRECT MODE   |
| CONNECT TO SERVER   |
| DIR CONNECT TO SERVER |
| DISPLAY NEXT PAGE   |
| DISPLAY PREVIOUS PAGE |
| GOTO BEGINING OF BUFFER |
| GOTO END OF BUFFER   |
| CLEAR BUFFER        |
| FORWARD N LINES     |
| REVERSE N LINES     |
| CAT                 |
| CAT WITH FILTER     |
| EXIT FROM SERVER    |
| DISPLAY CONNECTED LIST |
| LOGOUT              |
| DISPLAY HELP        |
|               |
+-----+

```

Each device port saves the output of a server to a FIFO buffer. Each buffer can store up to 64K of data, giving approximately 100 text pages. However, the actual amount of pages may vary according to the data. The user must be in monitor mode to view or clear the data stored in the buffer.

```
user- DEVICE_1>TOP
```

When at the monitor mode prompt, the user may view the contents of the buffer using the commands **TOP**, **BOTTOM**, **NEXT**, **PREVIOUS**, **FORWARD**, and **REVERSE**, or by selecting the commands **DISPLAY NEXT PAGE**, **DISPLAY PREVIOUS PAGE**, **GOTO BEGINNING OF BUFFER**, **GOTO END OF BUFFER**, **FORWARD N LINES**, and **REVERSE N LINES** from the pull down menu. The monitor mode prompt will appear at the bottom of the displayed buffer data, and the user may enter commands normally at this prompt. The prompt is prefixed with the position of the currently displayed screen in the buffer; the top of the buffer is indicated by **TOP**,

the bottom of the buffer is indicated as **BOTTOM**, and any other position is indicated as a percentage of the total buffer (e.g., 51%>).

```

Connecting...
W. O. P. R.

LOGIN: GUEST
PASSWORD: *****

LOGIN FAILED

LOGIN: SFALKEN
PASSWORD: *****

LOGIN FAILED

LOGIN: JOSHUA

Greetings Professor Falken

How are you today? Shall we play a game?
>

TOP>usr1- DEVICE_1>
    
```

The following table outlines the functions of the individual commands and pull down menu items.

COMMAND	MENU ITEM	FUNCTION
TOP	GOTO BEGINNING OF BUFFER	displays first 24 lines of buffer data
BOTTOM	GOTO END OF BUFFER	displays last 24 lines of buffer data
NEXT	DISPLAY NEXT PAGE	displays next 24 lines of buffer data
PREVIOUS	DISPLAY PREVIOUS PAGE	displays previous 24 lines of buffer data
FORWARD	FORWARD N LINES	skip forward N lines in buffer
REVERSE	REVERSE N LINES	skip back N lines in buffer

The commands **FORWARD** and **REVERSE** must be followed by the number of lines the user wants to move in the buffer. The command will not execute if the number of lines is omitted.

The user may also clear the buffer by using the command **CLEAR** or by selecting **CLEAR BUFFER** from the pull-down menu. All data stored in the device buffer will be erased and is not recoverable. The sys admin may inhibit this ability on a per-user basis by either creating the user ID without this ability or editing the user parameters after the user is created.

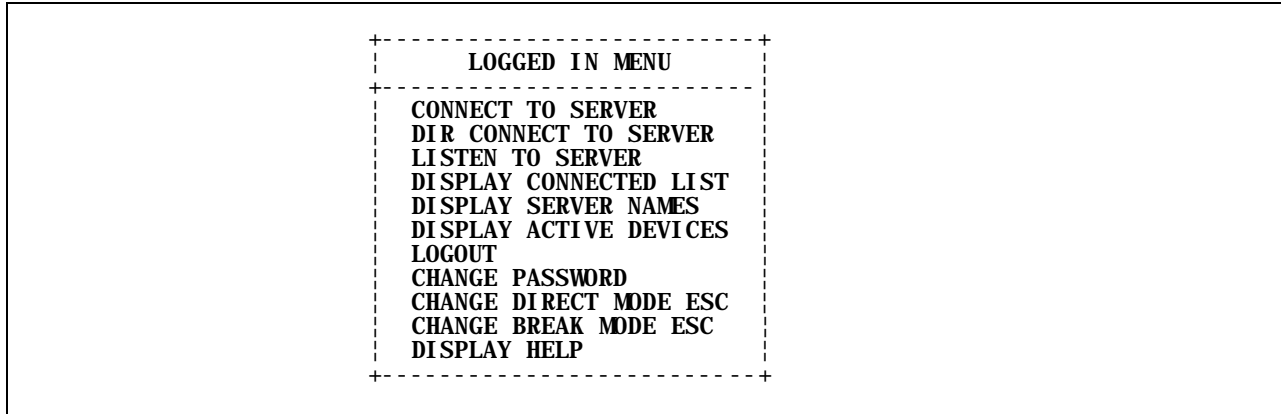
The CAT and CAT WITH FILTER commands allow a user to output the content of the device buffer to the screen. This allows a user to capture the contents of a device buffer by using the telnet client/terminal emulation software's text capture capabilities.

CAT outputs the data in the buffer exactly as it was received without any additional formatting.

CAF outputs the data in the buffer by applying the same formatting that is used by the **TOP**, **BOTTOM**, **NEXT**, and **PREVIOUS** type commands. Characters are counted and a <CR><LF> is added after 80 characters if one is not found in the data. Due to the counting, escape sequences may not be preserved. Tabs are considered one character.

9: The Break Generation Sequence

F2 PULL-DOWN MENU TO CHANGE BREAK SEQUENCE



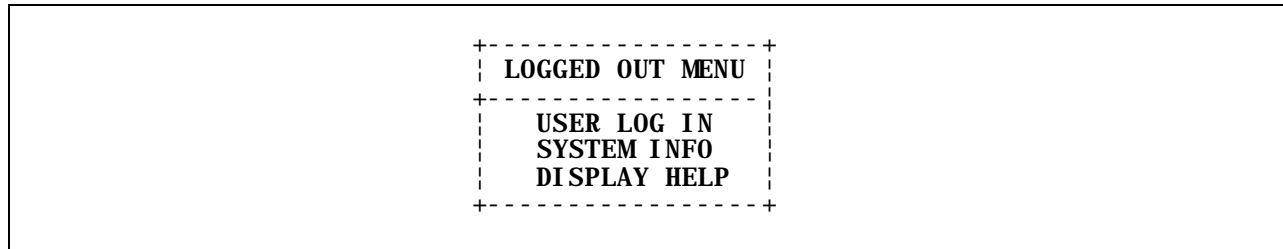
The user may find it necessary to send a break to the selected server. The break generation sequence is a two to five character sequence. The factory default break generation sequence is <ESC> **B** (the escape key, then uppercase "b").

The user may edit the break generation sequence in a manner similar to the direct mode escape sequence. The user may use the command **EDITBRK** or select **CHANGE BREAK MODE ESC** from the pull-down menu. It is recommended that the user only change the break generation sequence if it causes problems with the hardware or software used. It is also recommended that the user avoid combinations of the <CTRL> key and other keys, as these combinations are usually reserved for sending and receiving special characters through the terminal. When the user changes the break generation sequence, a window with the hexadecimal numerical equivalent of the old break generation sequence will appear. Pressing <ESC> to exit from the edit prompt will not work; it will add additional <ESC> characters (hexadecimal value **1B**) to the break generation sequence. If the user wishes to keep the old sequence, they need only to press <ENTER>. Otherwise, they should press backspace or delete to remove the old characters, then type the new sequence and press <ENTER>. If for some reason the selection is unacceptable, an error message will appear and the sequence will revert to the old character values.

Appendix F lists the hexadecimal codes for the ASCII character set.

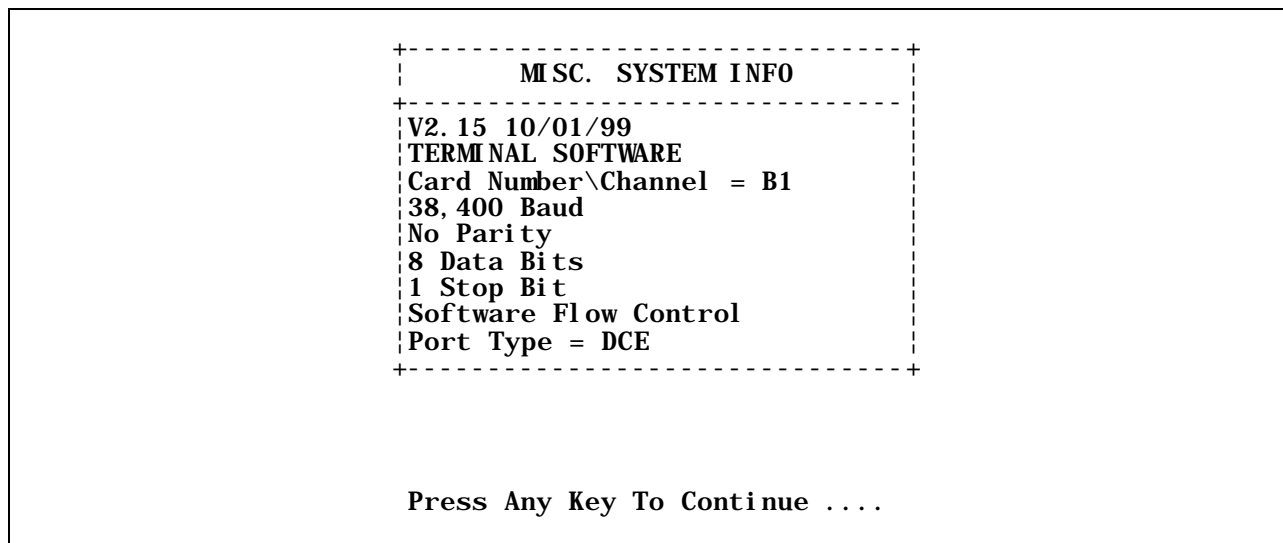
10: Displaying System Information

F2 PULL-DOWN MENU TO DISPLAY SYSTEM INFO



The user access cards are capable of displaying information about their software and communications settings. This information can be accessed only at the **LCI 3200>** prompt by selecting **SYSTEM INFO** from the pull-down menu, or typing the command **INFO** or **MISC** at the prompt.

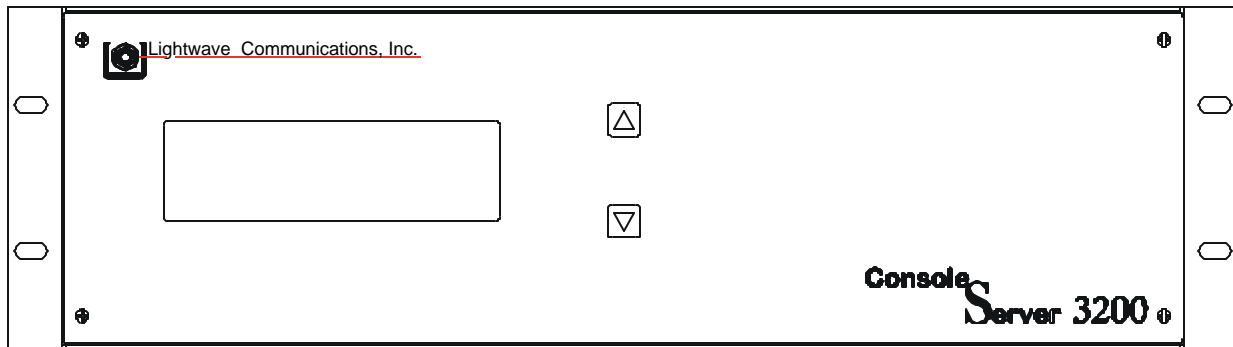
The command line **INFO/MISC** commands are also available at the user prompt **USER>**.



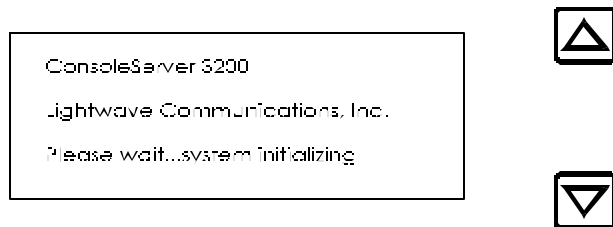
The system information appears in a pop-up window. The first two lines show the version of the software in flash memory and the type of software. The third line shows the position of the terminal or network card in the SCS3230 chassis. The next six lines show the current communication settings for the port. Pressing any key that sends a character through the terminal exits the window.

11: Front Panel Display Information:

The up/down arrow keys are used to scroll through multi-page displays.



The LCD displays the panel below at power up time. This will be displayed for as long as five minutes while the SCS3230 is in the initialize mode.



After the SCS3230 has gone through the initialization phase, the terminal connection list will automatically be displayed. To display the next panel in a function, press the down arrow on the SCS3230. To display the previous panel, press the up arrow.

Panel 2 (press down)

```
Terminal Connection List 1/3
01
02
03
04
05
06
07
```



Panel 3 (press down)

```
Terminal Connection List 2/3
08
09
10
11
12
13
14
```



Panel 4 (press down)

```
Terminal Connection List 3/3
15
16
17 <not installed>
```



The next series of panel shows the port number along with the name of the device connected to that port.

Panel 5 (press down)

```
Server Names List 1/5
01 DEVICE_1
02 DEVICE_2
03 DEVICE_3
04 DEVICE_4
05 DEVICE_5
06 DEVICE_6
07 DEVICE_7
```



Panel 6 (press down)

```
Server Homes L&I 2/5  
08 DEVICE_8  
09 DEVICE_9  
10 DEVICE_10  
11 DEVICE_11  
12 DEVICE_12  
13 DEVICE_13  
14 DEVICE_14
```



Panel 7 (press down)

```
Server Homes L&I 3/5  
15 DEVICE_15  
16 DEVICE_16  
17 DEVICE_17  
18 DEVICE_18  
19 DEVICE_19  
20 DEVICE_20  
21 DEVICE_21
```



Panel 8 (press down)

```
Server Homes L&I 4/5  
22 DEVICE_22  
23 DEVICE_23  
24 DEVICE_24  
25 DEVICE_25  
26 DEVICE_26  
27 DEVICE_27  
28 DEVICE_28
```



Panel 9 (press down)

```
Server Homes L&I 5/5  
29 DEVICE_29  
30 DEVICE_30  
31 DEVICE_31  
32 DEVICE_32
```



The next series of panels displays the inventory of cards that are installed in the chassis.

Panel 10 (press down)

```

Installed Cards 1/3
A <card not present>
B Terminal card found
C Terminal card found
D Terminal card found
E Terminal card found
F Switch card 1 found
G Switch card 2 found
    
```



Panel 11 (press down)

```

Installed Cards 2/3
H Device card found
I Device card found
J Device card found
K Device card found
L Device card found
M Device card found
N Device card found
    
```



Panel 12 (press down)

```

Installed Cards 3/3
O Device card found
P Central card found
    
```



The last panel displays the status of the power supplies.

Panel 13 (press down)

```

Status 1/1
Power Supply A is OK
Power Supply B is OK
    
```



12: Appendix A – Command Abbreviations

Most, but not all, commands available on the SCS3230 may be abbreviated. The following list outlines the allowed maximum abbreviations for all commands. Command qualifiers for a command may be found immediately below that command.

Sys Admin Commands:

<u>command</u>	<u>abbreviation</u>
adduser	addu, au
backup	backup
break	break
changepasswd	passwd, passwd
connections	c
/monitor	/m
deleteuser	deleteu
devices	dev
/all	/a
edituser	editu, eu
forcelogout	forcelogout
help	h, ?
info	info
lciupdate	lciupdate
/tftp	/tftp
linesperpage	linespp, lines, lpp
listcards	listc, lc
listdevices	listd, ld
listusers	listu, lu
/all	/a
login	logi
logout, logoff	lo
modem	modem
modemtimeout	modemt, mt
network	net
/all	/a
powerstatus	po, ps
telnettimeout	telnett, tt
terminals	term
/all	/a
timeout	time
version	ver
/all	/a

Terminal, Network, and Modem Commands:

<u>command</u>	<u>abbreviation</u>
bottom	bo
bye	bye
changepasswd	ch
clear	cl
connections	co
devlist	de
direct	dir
diselect	dis
editbrk	editb
editesc	edite
exit	ex
forward	f
listen	li
login	logi
logout, logoff	logou, logof
next	n
passwd	pa
previous	pr
reverse	r
select	se
top	t

13: Appendix B – Hexadecimal ASCII Code

Equivalent characters in italics are non-printing characters or signals.

Hexadecimal Code	Equivalent Character
00	<i>NUL</i>
01	<i>SOH</i>
02	<i>STX</i>
03	<i>ETX</i>
04	<i>EOT</i>
05	<i>ENQ</i>
06	<i>ACK</i>
07	<i>BEL</i>
08	<i>BS</i>
09	<i>HT</i>
0A	<i>NL</i>
0B	<i>VT</i>
0C	<i>NP</i>
0D	<i>CR</i>
0E	<i>SO</i>
0F	<i>SI</i>
10	<i>DLE</i>
11	<i>DC1</i>
12	<i>DC2</i>
13	<i>DC3</i>
14	<i>DC4</i>
15	<i>NAK</i>
16	<i>SYN</i>
17	<i>ETB</i>
18	<i>CAN</i>
19	<i>EM</i>
1A	<i>SUB</i>
1B	<i>ESC</i>
1C	<i>FS</i>
1D	<i>GS</i>
1E	<i>RS</i>
1F	<i>US</i>

Hexadecimal Code	Equivalent Character
20	<i>SP</i>
21	!
22	"
23	#
24	\$
25	%
26	&
27	'
28	(
29)
2A	*
2B	+
2C	,
2D	-
2E	.
2F	/
30	0
31	1
32	2
33	3
34	4
35	5
36	6
37	7
38	8
39	9
3A	:
3B	;
3C	<
3D	=
3E	>
3F	?

Hexadecimal Code	Equivalent Character
40	@
41	A
42	B
43	C
44	D
45	E
46	F
47	G
48	H
49	I
4A	J
4B	K
4C	L
4D	M
4E	N
4F	O
50	P
51	Q
52	R
53	S
54	T
55	U
56	V
57	W
58	X
59	Y
5A	Z
5B	[
5C	\
5D]
5E	^
5F	_

Hexadecimal Code	Equivalent Character
60	`
61	a
62	b
63	c
64	d
65	e
66	f
67	g
68	h
69	i
6A	j
6B	k
6C	l
6D	m
6E	n
6F	o
70	p
71	q
72	r
73	s
74	t
75	u
76	v
77	w
78	x
79	y
7A	z
7B	{
7C	
7D	}
7E	~
7F	<i>DEL</i>

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