SCSxx05/SCSxx20
Secure Console Server
User Guide

Models SCS3205, SCS4805, SCS820, SCS1620
with Firmware v4.3 and later

Part No. 900-287
Rev. B   August 2003

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LINUX GPL Compliance

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Sales Offices
For a current list of our domestic and international sales offices, go to the Lantronix web site at http://www.lantronix.com/about/contact/index.html

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.

Note: 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	Part No	Rev.	Comments
8/03	900-287	B	Combined SCSxx05 and SCSxx20 products (firmware v.4.3 and later) in one user guide. Updated warranty information.

Safety Precautions

Please follow the safety precautions described below when installing and operating the SCSxx05/SCSxx20 Secure Console Server.

Cover

- Do ***not*** remove the cover of the chassis. There are no user serviceable parts inside. Opening or removing the cover may expose you to dangerous voltage that could cause fire or electric shock.
- Refer all servicing to Lantronix.

Power Plug

- When disconnecting the power cable from the socket, pull on the plug, ***not*** the cord.
- Always connect the power cord to a properly wired and grounded power source. Do ***not*** use adapter plugs or remove the grounding prong from the cord.
- Only use a power cord with a voltage and current rating greater than the voltage and current rating marked on the unit.
- Install the unit near an AC outlet that is easily accessible.
- Always connect any equipment used with the product to properly wired and grounded power sources.
- To help protect the product from sudden, transient increases and decreases in electrical power, use a surge suppressor, line conditioner, or uninterruptible power supply (UPS).
- Do ***not*** connect or disconnect this product during an electrical storm.

Grounding

- Maintain reliable earthing of this product.
- Pay particular attention to supply connections when connecting to power strips, rather than directly to the branch circuit.

Fuses

For protection against fire, replace the power-input-module fuse with the same type and rating.

Rack

- Do ***not*** to install the unit in a rack in such a way that a hazardous stability condition results because of uneven loading. A drop or fall could cause injury.
- Before operating the SCS, make sure the SCS is secured to the rack.

Port Connections

- Only connect the network port to an Ethernet network that supports 10Base-T/100Base-TX.
- Only connect device ports to equipment with serial ports that support EIA-232 (formerly RS-232C).
- Only connect the terminal port to equipment with serial ports that support EIA-232 (formerly RS-232C).

Declaration of Conformity

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

Manufacturer's Name & Address:

Lantronix Inc., 15353 Barranca Parkway, Irvine, CA 92618 USA

Declares that the following product:

Product Name(s): Models SCS820, SCS1620, SCS3205, SCS4805 Secure Console Servers

Conform to the following standards or other normative documents:

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

Electromagnetic Emissions:

EN55022: 1994 (IEC/CSPIR22: 1993)

FCC Part 15, Subpart B, Class B

IEC 1000-3-2/A14: 2000
IEC 1000-3-3: 1994

Electromagnetic Immunity:

EN55024: 1998 Information Technology Equipment-Immunity Characteristics
IEC61000-4-2: 1995 Electro-Static Discharge Test
IEC61000-4-3: 1996 Radiated Immunity Field Test
IEC61000-4-4: 1995 Electrical Fast Transient Test
IEC61000-4-5: 1995 Power Supply Surge Test
IEC61000-4-6: 1996 Conducted Immunity Test
IEC61000-4-8: 1993 Magnetic Field Test
IEC61000-4-11: 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. The product complies with the requirements of the Low Voltage Directive 72/23/EEC and the EMC Directive 89/336/EEC.

This product 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

NEBS Level 3 compliant (applies to 1620B, 820A Rev. A14 and later AC powered models, and 820A Rev. A13 and later DC powered models.

Manufacturer's Contact:

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15353 Barranca Parkway, Irvine, CA 92618 USA
Phone: 949-453-3990
Fax: 949-453-3995

Warranty

Lantronix warrants each Lantronix product to be free from defects in material and workmanship for a period of **ONE YEAR** after the date of shipment. During this period, if a customer is unable to resolve a product problem with Lantronix Technical Support, a Return Material Authorization (RMA) will be issued. Following receipt of an RMA number, the customer shall return the product to Lantronix, freight prepaid. Upon verification of warranty, Lantronix will -- at its option -- repair or replace the product and return it to the customer freight prepaid. If the product is not under warranty, the customer may have Lantronix repair the unit on a fee basis or return it. No services are handled at the customer's site under this warranty. This warranty is voided if the customer uses the product in an unauthorized or improper way, or in an environment for which it was not designed.

Lantronix warrants the media containing its software product to be free from defects and warrants that the software will operate substantially according to Lantronix specifications for a period of **60 DAYS** after the date of shipment. The customer will ship defective media to Lantronix. Lantronix will ship the replacement media to the customer.

* * * *

In no event will Lantronix be responsible to the user in contract, in tort (including negligence), strict liability or otherwise for any special, indirect, incidental or consequential damage or loss of equipment, plant or power system, cost of capital, loss of profits or revenues, cost of replacement power, additional expenses in the use of existing software, hardware, equipment or facilities, or claims against the user by its employees or customers resulting from the use of the information, recommendations, descriptions and safety notations supplied by Lantronix. Lantronix liability is limited (at its election) to:

> Refund of buyer's purchase price for such affected products (without interest)
>
> Repair or replacement of such products, provided that the buyer follows the above procedures.

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For details on the Lantronix warranty replacement policy, go to our web site at http://www.lantronix.com/support/warranty/index.html

Contents

1: Introduction

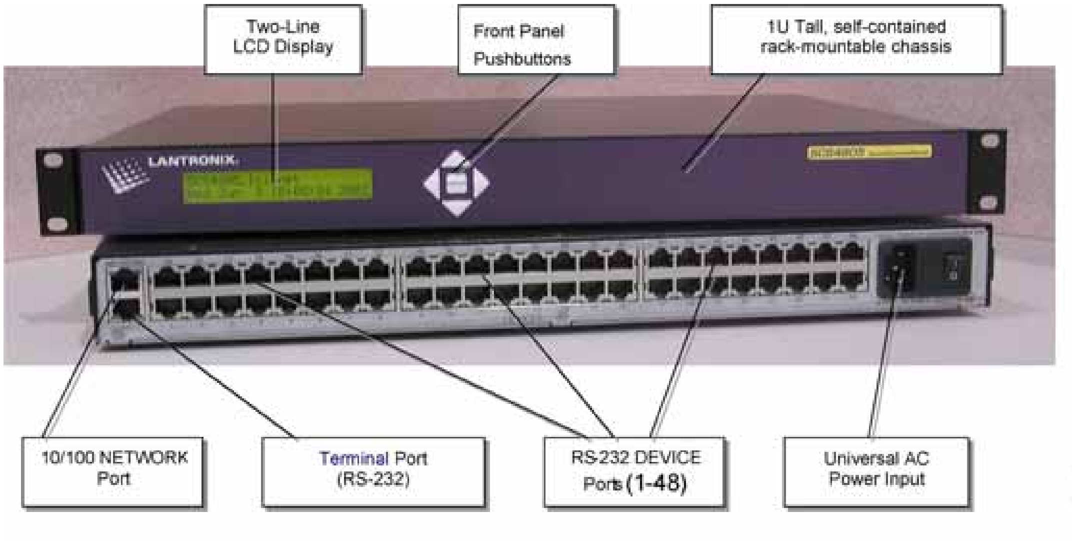
The Lantronix SCS family of Secure Console Servers enables IT professionals to remotely and securely configure and administer servers, routers, switches, telephone equipment, or other devices equipped with a serial port.

This chapter introduces you to the Lantronix SCSxx05 and SCSxx20 products. It includes the following topics:

SCSxx05 and SCSxx20

The Lantronix SCSxx05 and SCSxx20 are console servers offering authentication and secure encryption. These SCS models offer a compact solution for remote and local management of up to 48 devices (e.g., servers, routers, and switches) with RS-232C (now EIA-232) compatible serial consoles in a 1U-tall rack space. You can access the attached devices with keyboard commands from a local terminal, through a network, or through a dial-up connection. You can also access the attached devices through a Web interface.

Figure 1-1. SCS4805 – 48 Device Ports, 1 Network Port, 1 Terminal Port, AC Powered



This User Guide covers the following products:

- Model SCS820 - AC or DC Powered 8-Port Secure Console Server
- Model SCS1620 - AC or DC Powered 16-Port Secure Console Server
- Model SCS3205 - AC Powered 32-Port Secure Console Server
- Model SCS4805 - AC Powered 48-Port Secure Console Server

The SCS4805 is depicted above; the other models are similar. The products differ only in the number of device ports provided and in AC or DC power and modem availability. The SCSxx20 models have dual entry redundant power supplies for mission critical applications. They are available in AC or DC powered versions and can include an optional internal modem. In general, we refer to this product family as SCS products.

Figure 1-2. SCS3205 - 32 Device Ports, 1 Network Port, 1 Terminal Port, AC Powered

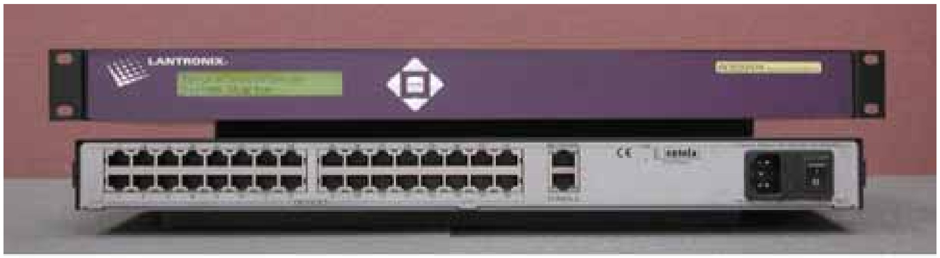


Figure 1-3. SCS1620A – 16 Device Ports, 1 Network Port, 1 Terminal Port, AC Powered

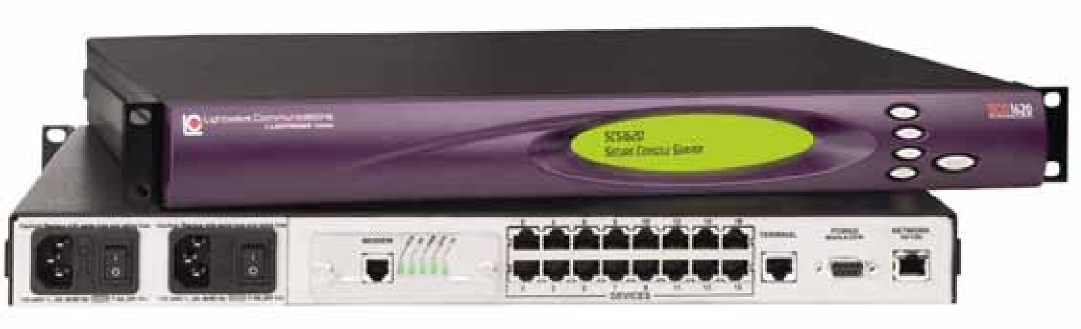
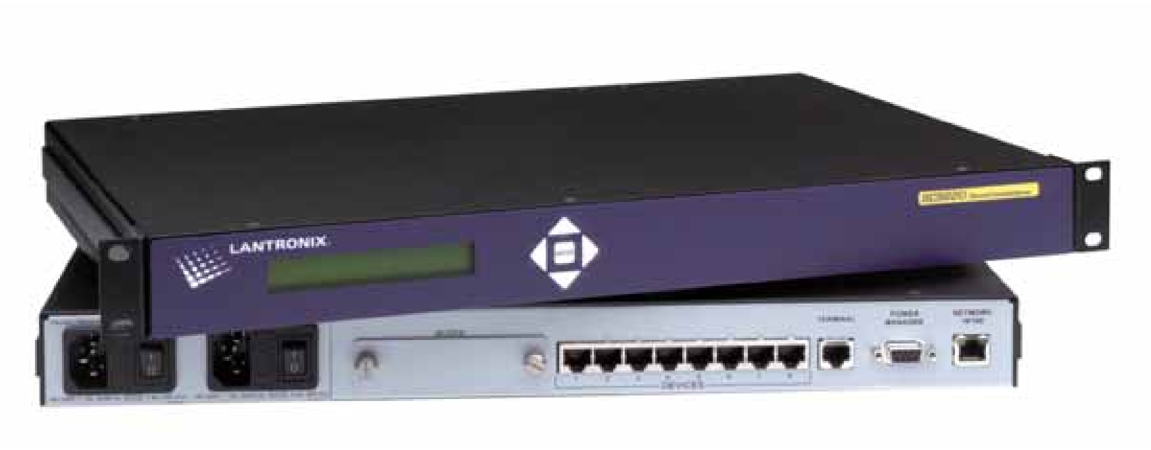


Figure 1-4. SCS820 – 8 Device Ports, 1 Network Port, 1 Terminal Port, AC Powered



Hardware Features

- 1U-tall (1.75 inches) rack-mountable secure console server
- One 10Base-T/100Base-TX network port for connection to your IP network
- Up to 48 RS232 serial device ports connected via Category 5 (RJ45) wiring
- One serial terminal port (console port) for VT100 terminal or PC with emulation
- (Optional) One modem module, for analog dial-up connections (SCSxx20 only)
- 256KB-per-port buffer memory for device ports; logging supported
- Front panel 2-line backlit LCD display and pushbutton controls
- 128MB flash memory; 128MB RAM; field-upgradeable
- Universal AC power input (100-240V, 50/60 Hz)
- –48VDC power option (SCSxx20 only)
- Convection cooled, silent operation, low power consumption
- Support for PCU8 power control unit

System Features

- Ability to connect up to 48 RS-232 serial consoles
- 10Base-T/100Base-TX IP network compatible
- Buffer logging to file
- ID/Password security, configurable access rights
- Email notification
- Secure shell (SSH) security
- Open Lightweight Directory Access Protocol (LDAP)
- Network File System (NFS) support
- Network Information Service (NIS) capable for centrally managed permissions
- Ability to Telnet to a serial port by IP address per port or by IP address and TCP port number
- Ability to work with an external modem (SCSxx05 and SCSxx20) and optional internal modem (SCSxx20)
- No unintentional break ever sent to attached servers (Solaris Ready Certified)
- Simultaneous access on the same port - "listen" mode
- Local access through terminal port
- Built-in setup routine for simple setup and administration
- Web administration (using any modern browser)

Protocol Support

The SCS supports the TCP/IP network protocol as well as:

- SSH, Telnet, and PPP for connections in and out of the SCS
- DNS for text-to-IP address name resolution
- SNMP for remote monitoring and management
- FTP for file transfers and firmware upgrades
- TFTP for firmware upgrades
- DHCP for IP address assignment
- HTTP/HTTPS for easy browser-based configuration
- NTP for time synchronization
- LDAP, NIS, RADIUS, CHAP, and PAP for user authentication

CHAP (Challenge Handshake Authentication Protocol)

A secure protocol for connecting to a system; more secure than the PAP.

DHCP (Dynamic Host Configuration Protocol)

Internet protocol for automating the configuration of computers that use TCP/IP.

DNS (Domain Name Servers)

A system that allows a network nameserver translate text host names into numeric IP addresses.

LDAP (Lightweight Directory Access Protocol)

A set of protocols for accessing information directories.

NFS (Network File System)

A protocol that allows file sharing across a network.

NIS (Network Information System)

A network-naming and administration system for smaller networks.

NTP (Network Time Protocol)

A protocol used to synchronize time on networked computers and equipment.

PAP (Password Authentication Protocol)

A method of user authentication in which the username and password are transmitted over a network and compared to a table of name-password pairs.

PPP (Point to Point Protocol)

A mechanism for creating and running IP and other network protocols over a serial link.

RADIUS (Remote Authentication Dial-In User Service)

An authentication and accounting system used by many Internet Service Providers (ISPs).

SNMP (Simple Network Management Protocol)

Commands that allow system administrators to monitor and manage nodes on a LAN (Local Area Network) and respond to queries from other network hosts. One community name can be configured with read/write access.

SSH (Secure Shell)

A secure transport protocol based on public-key cryptography.

Telnet

A terminal protocol that provides an easy-to-use method of creating terminal connections to a network host.

Technical Specifications

Table 1-1. SCSxx05 Technical Specifications

CPU, Memory	AMD SC520 133 MHz 128 MB FLASH Card Memory (non-volatile) 128MB RAM 256K FIFO Buffer RAM per Device Port
Serial Interface (Device)	RJ45-type 8-conductor connector (DTE default; configurable) Speed software selectable (2400 to 115,200 baud) Software selectable EIA-232 (formerly RS-232C)
Serial Interface (Terminal)	RJ45-type 8-pin connector (DTE default) Speed software selectable (2400 to 115,200 baud) Software selectable EIA-232 (formerly RS-232C)
Network Interface	10Base-T/100Base-TX RJ45 Ethernet
Power Supply	Universal AC Power input, 100-240VAC 50/60 Hz IEC-type regional cord set included
Dimensions	SCS3205: 1U, 1.75 in x 17.25 in x 12.25 in (4.45 cm x 43.8 cm x 31.1 cm) SCS4805: 1U, 1.75 in x 17.25 in x 14.75 in (4.45 cm x 43.8 cm x 37.5 cm)
Weight	SCS3205: 4.5 kg (10 lbs) SCS4805: 5.0 kg (11 lbs)
Temperature	Operating: 0 to 50 °C (32 to 122 °F), 30 to 90 %RH, non-condensing Storage: -20 to 70 °C (-4 to 158 °F), 10 to 90 %RH, non-condensing
Relative Humidity	Operating: 10% to 90% non-condensing; 40% to 60% recommended Storage: 10% to 90% non-condensing
Heat Flow Rate	62 BTU/hr.

Table 1-2. SCSxx20 Technical Specifications

CPU, Memory	AMD SC520 133 MHz 128 MB FLASH Card Memory (non-volatile) 128MB RAM (includes 256K FIFO Buffer RAM per device port)
Serial Interface (Device)	RJ45-type 8-conductor connector (DCE default; configurable) Speed software selectable (2400 to 115,200 baud) Software selectable EIA-232 (formerly RS-232C)
Serial Interface (Terminal)	RJ45-type 8-pin connector (DCE default) Speed software selectable (2400 to 115,200 baud) Software selectable EIA-232 (formerly RS-232C)
Network Interface	10Base-T/100Base-TX RJ45 Ethernet
Modem (optional)	RJ11C connector; analog POTS format; 38,400 baud max
Power Supply	**AC Power:** Universal AC Power input, 100-240VAC 50/60 Hz IEC-type regional cord set included **DC Power:** -48 VDC only, externally fused
Dimensions	SCS820: 1U, 1.75 in x 17.25 in x 12.25 in (4.45 cm x 43.8 cm x 31.1 cm) SCS1620: 1U, 1.75 in x 17.25 in x 13.00 in (4.45 cm x 43.8 cm x 33.0 cm)
Weight	SCS820: 4.8 kg (10.6 lbs) SCS1620: 5.0 kg (11 lbs)
Temperature	Operating: 0 to 50 °C (32 to 122 °F), 30 to 90 %RH, non-condensing Storage: -20 to 70 °C (-4 to 158 °F), 10 to 90 %RH, non-condensing
Relative Humidity	Operating: 10% to 90% non-condensing; 40% to 60% recommended Storage: 10% to 90% non-condensing
Heat Flow Rate	75 BTU/hr.

Product Information Label

The product information label on the underside of the unit contains the following information about your specific unit:

- Bar Code
- Serial Number/Date Code
- Regulatory Certifications and Statements
- Manufacturer's Contact Information

System Components

All system components are enclosed in a rack-mountable metal chassis. The chassis has 8, 16, 32, or 48 device ports, one terminal port, and one network port. An optional modem module is available for the SCSxx20 that you can add at any time. The front panel features an LCD display and pushbuttons for access to some system information.

Connection Formats

All physical connections to the product are made to the rear panel using industry-standard cabling and connectors. All serial connections and network connections use conventional Category 5 (Cat5) cabling (RJ45 jacks). Required cables and adapters for certain servers, switches, and other products are available from Lantronix (see http://www.lantronix.com/.)

Serial Devices

All devices attached to both the device ports and the terminal port must support the RS-232C (EIA-232) standard. Category 5 cabling with RJ45 connections is used for the device port connections and for the terminal port.

Device ports (numbered from port 1 to port 48) support seven baud rate options: 2400, 4800, 9600, 19200, 38400, 57600, and 115200 baud.

Network

The SCS network interface is a 10Base-T/100Base-TX connector, for use with a conventional TCP/IP network using standard RJ45-terminated Category 5 cables. The system administrator must configure the network parameters before the SCS can be accessed over the network.

Modem (SCSxx20)

The optional modem module connects to a conventional telephone line using standard RJ11 modular telephone cable. The analog modem on the card connects at speeds up to 38,400 baud. Any PPP features require a modem.

With the modem installed, the SCSxx20 supports:

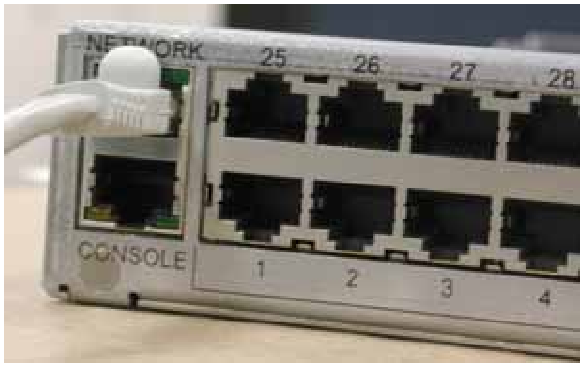
- Plain Text TTY
- PPP connection, with PAP or CHAP authentication
- Callback connection

Note: *Both the SCSxx05 and the SCSxx20 can work with an external modem.*

Power Manager

The SCSxx20 has an extra power manager port for connection to the Lantronix Power Control Unit (PCU8). However, any available device port may be used as the power manager port on the SCSxx05 and SCSxx20.

Figure 1-5. SCS4805 Rear Panel Connections for Network, Terminal (Console), and Device Ports



Access Control

The system administrator controls access to attached servers or devices by assigning access rights to up to 128 user profiles. Each user has an assigned ID, password, and access rights. Other access options may include externally configured authentication methods such as NIS and LDAP.

Device Port Buffer

The SCS products support port data buffering of the messages on the system's device ports. Port buffers are enabled by default.

256K FIFO Buffer

Each device port stores 256 KB (approximately 400 screens) of I/O data in a true FIFO buffer. You may view this data while the user is not directly interacting with the attached device.

Buffered data is not normally stored in memory and will be lost in the event of a power failure if it is not logged using an NFS mount solution (see Port Data Logging, below). If the buffer data overflows the buffer capacity, only the oldest data will be lost, and only in the amount of overrun (not in large blocks of memory).

Port Data Logging

The SCS supports real-time data logging for each device port. The port can save the data log to a file, send an email notification of an issue, or take no action.

SAVE (a system administrator command, discussed later) does not affect the buffer log files. Logging the data to an NFS mount location ensures that the device port data will be maintained (elsewhere) in the event of a power failure.

Logging to File

Data can be logged either to a file on the SCS or to a file on a remote NFS server. Data logged to a local SCS file is limited in size by the available space on the SCS, and may be lost in the event of a power loss. Data logged to a file on an NFS server does not have these limitations. The system administrator can define the path for logged data on a port-by-port basis and configure file size and number of files per port for each logging event.

Email Notification

The system administrator can configure the device log to automatically send an email alert message to the appropriate parties indicating a particular error. The email is triggered when a user-defined number of characters in the log from your server or device is exceeded.

System Resource Information

The SCS is programmable using OS-level commands and options. The system administrator configures the product using a command-line interface or one of several prepared scripts.

Numerous resources on the Internet (and elsewhere) provide information about security options, programming tools and techniques, and configuration advice. A few of the Internet sites are listed below:

- SSH info: www.openSSH.org
- RFC's (the standards and details behind the Internet): www.rfc-editor.org
- PuTTY, a free Win32 Telnet/SSH Client (recommended): http://www.chiark.greenend.org.uk/~sgtatham/putty/
- Security: www.bastille-linux.org
- An online manual on Linux security: http://www.linuxdoc.org/LDP/solrhe/Securing-Optimizing-Linux-RH-Edition-v1.3/

The following sites have more information about Linux (from basic to advanced):

- www.kernel.org
- www.linuxdoc.org
- www.linuxlinks.com

2: Installation

This chapter provides instructions for installing the SCS. It includes the following topics:

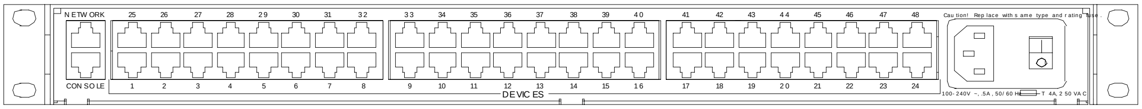
Caution: *To avoid physical and electrical hazards, please be sure to read Safety Precautions on page iii before installing the SCS.*

Physical Installation

You can install the SCS either in an EIA-standard 19-inch rack (1U tall) or as a desktop unit. For desktop use, you may remove the rack mount brackets and use the four rubber feet provided.

Make all physical connections to the rear of the SCS. You may use the backlit front-panel LCD display during initial setup and to view current network settings.

Figure 2-1. SCS4805 Rear Panel Connections and Labels (with Rack-Mount Brackets)



The SCS uses convection cooling to dissipate excess heat.

Note: *Be careful not to block the air vents on the sides of the unit. If you mount it in an enclosed rack, we recommended that the rack have a ventilation fan to provide adequate airflow through the unit.*

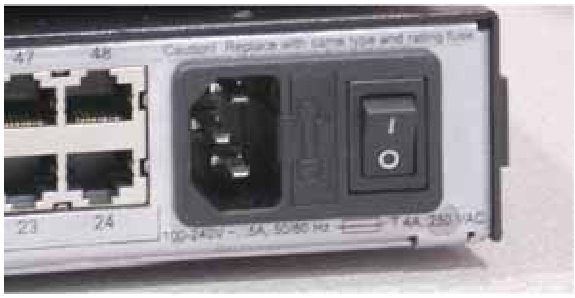
Power

The SCS consumes less than 25W of electrical power.

AC Input

The SCS has a universal auto-switching AC power supply. The power supply accepts AC input voltage between 100 and 240 VAC with a frequency between 50/60 Hz. The power inlet to the chassis uses a conventional IEC-type cord set, which Lantronix provides. Rear-mounted IEC-type AC power connector(s) are provided for your universal AC power input. The SCSxx05 has a single supply/input, while the SCSxx20 has dual inputs and dual supplies. The power connector also houses a replaceable protective fuse and the on/off switch. In addition, we provide the SCSxx20 with a “Y” cord.

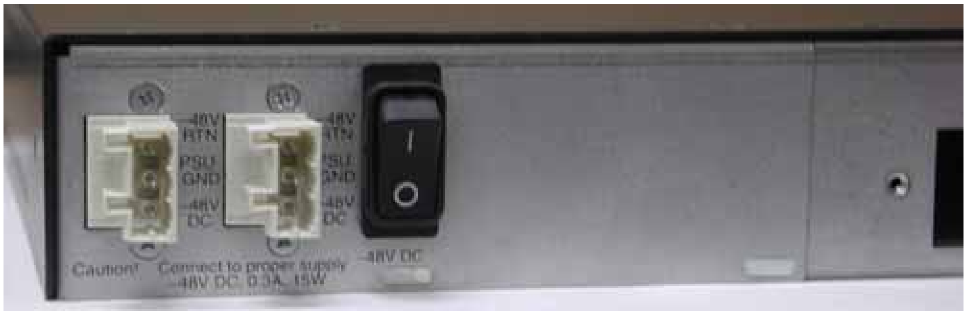
Figure 2-2. AC Power Input and Power Switch on Rear of SCS4805



DC Input

The DC version of the SCSxx20 accepts standard –48 VDC power. The SCSxx20 accepts two DC power inputs for supply redundancy. Lantronix provides the DC power via industry standard Wago connectors. The connectors are also available separately from Lantronix.

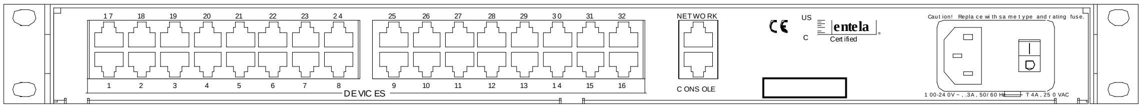
Figure 2-3. DC Power Input and Power Switch on Rear of SCS1620



Connecting a Terminal

The terminal port is for local access to the SCS and the attached devices. You may attach a dumb terminal or computer with terminal emulation to the terminal port. The SCS terminal port uses RS-232C protocol and supports VT100 emulation.

Figure 2-4. SCS3205 Rear Panel Connections and Labels (with Rack-Mount Brackets)



The default communication parameters for the terminal port are:

- 9600 baud
- 8 data bits
- 1 stop bit
- No parity
- XON/XOFF flow control
- DCE port type

Adapters from Lantronix may be used to connect the terminal port to the serial port on your terminal or other DTE device. See http://www.lantronix.com/ .

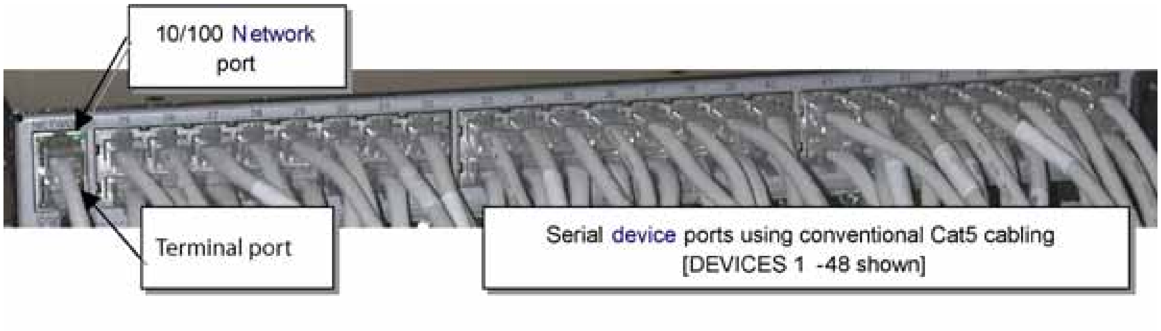
To connect a terminal:

1. Attach the Lantronix adapter to your terminal (use **PN 200.2066A** adapter for the SCSxx05 or **PN 200.0066** for the SCSxx20 in most cases) or your PC's serial port (use **PN 200.2070A** adapter for the SCSxx05 or **PN 200.0070** adapter for the SCSxx20).
2. Connect the Cat 5 cable to the adapter, and connect the other end to the SCS terminal port.
3. Turn on the terminal or start your computer's communication program (e.g., HyperTerminal for Windows).
4. Once the SCS is running, press **Enter** to establish connection. You should see an **SCSxxxx** and **login** prompt on your terminal. You are connected.
5. Refer to the Quick Start chapter for instructions on setting up the network port quickly.

Connecting to a Device Port

You can connect any device that has a serial console port to the SCS for consolidated remote administration. You can configure the device ports individually. The console port must support the RS-232C interface. Additionally, many servers must either have the serial port enabled as a console, or must have the keyboard and mouse detached. Consult the server hardware and/or software documentation for more information.

Figure 2-5. Connections on Rear of SCS4805 (Mostly Device Ports Using RJ45 Connectors)


10/100 Network port
Terminal port
Serial device ports using conventional Cat5 cabling [DEVICES 1 -48 shown]

The default communication parameters for the device ports are:

- 9600 baud
- 8 data bits
- 1 stop bit
- No parity
- XON/XOFF flow control
- DTE port type

You can configure each device port individually with the following values:

- Baud rates: 2400, 4800, 9600, 19200, 38400, 57600, or 115200 baud
- Data bits: 6,7, or 8
- Stop bits: 1 or 2
- Parity: none, odd, even, mark or space
- Flow control: XON/XOFF or RTS/CTS
- Port type: DTE or DCE; a port may also be disabled
- Buffering: may be inhibited on a port-by-port basis

Connecting the Network Port

The SCS's network port (10Base-T/100Base-TX) allows remote access to the attached devices and the system administrative functions.

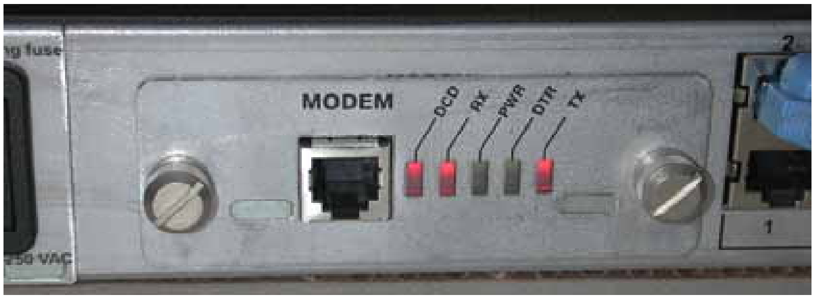
You must first set up the network parameters for the network port before you can reach the SCS remotely. You can change the network parameters from the front panel of the SCS, or you may Telnet to the default address. Refer to the Quick Start chapter for instructions.

Connecting the Modem Port (SCSxx20)

An optional modem module is available for the SCSxx20. The modem may be installed at the factory or can be ordered separately for later installation.

Caution: *When installing or removing a modem, be extremely careful to avoid contact with interior components. Contact could cause a short, resulting in fire or electric shock.*

Figure 2-6. SCS1620 Modem Module



The SCSxx20 modem is an analog modem supporting connection rates up to 38,400 baud. The modem has a single RJ11-type analog telephone jack plus five status LEDs. The user interface to the modem is identical to that found on the terminal port or the network port. The modem is configured as **device port 19 on the SCS1620** and **device port 11 on the SCS820**.

The default communication parameters for the modem port are:

- 38400 baud
- 8 data bits
- 1 stop bit
- No parity
- RTS/CTS flow control

You initially configure the modem using the system's setup program (see Configuration). If you are installing a modem into a working SCSxx20 system, refer to the Commands chapter.

Power Manager Interface

The SCSxx20 has a dedicated port for the Lantronix PCU8 Power Control Unit. With the SCSxx05 (and the SCSxx20, if desired), you may use any available device port. The PCU8 uses a DB9 connector on its serial connector and requires a **Part Number 200.0069** DB9 to RJ45 adapter for that connection. (Lantronix supplies one such adapter with each PCU8 system).

The required (default of PCU8) communication parameters for a device port for use as a power manager port are:

- 9600 baud
- 8 data bits
- 1 stop bit
- No parity
- XON/XOFF flow control
- DTE port type

Refer to the PCU8 documentation for baud rate options.

3: Quick Start

This chapter helps you get your IP network port up and running quickly, so you may administer the SCS using your network. There are two methods to quick start the network connections:

- You may use the front panel display and buttons, *or*
- You may use your existing IP network, accessing the default IP address

Once you have identified your IP network parameters to the SCS, you can use your IP network connections to configure and administer it.

Note: *Be sure to address security issues (access and passwords) first when administering the system. See the Commands chapter for a list of the commands, including steps to change the system's passwords.*

This chapter includes the following topics:

Before You Begin

Before you begin, make sure you know:

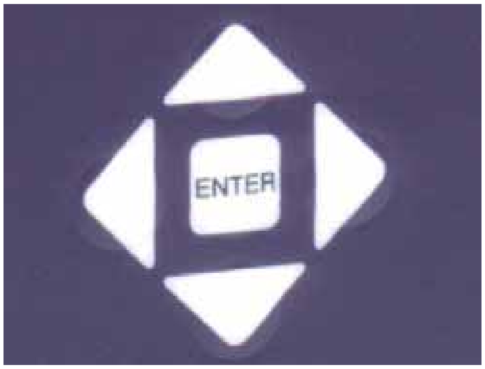
- An IP address that will be unique and valid on your network (Out of the box, the IP network port identity has a generic default value of 10.0.0.1.)
- Subnet mask (generic default value is 255.0.0.0)
- Gateway
- DNS settings
- Date, time, and time zone
- Terminal port settings

Make sure the SCS is plugged in to power and is turned on.

Method #1 – Using the Front Panel Display

You can use the front panel display and pushbuttons to set up the basic network interface. The system administrator can then access the SCS using your existing IP network.

Figure 3-1. **Front Panel LCD Display and Five Pushbuttons (Enter, Up, Down, Left and Right**



The front panel display initially shows the server name (e.g., SCS4805) and the date and time. Using the five pushbuttons, you can change the IP Address, subnet mask, gateway, and DNS settings; date/time and time zone features; and terminal port baud rate settings.

Note: *Have your information handy as the display will time out without accepting any unsaved changes if you take more than 30 seconds between entries.*

Once you save the values for your network, the network subsystem restarts (the front panel display indicates “restarting”), after which the network connection becomes active.

Navigating

The front panel has one **ENTER** button and four arrow buttons (up, left, right, and down). Press the arrow buttons to navigate from one option to another, or to increment or decrement a numerical entry of the selected feature. Use the **ENTER** button to select an option to change or to save your settings.

Note: *Some models have a **SELECT** button instead of an **ENTER** button. The instructions are the same for using the **SELECT** button.*

Entering the Settings

1. To change the front panel settings, press the right arrow on the front panel to enter the display programming mode and to scroll between the available options. Options include:
   - Network Settings
   - Terminal Settings
   - Release Date
   - Time/Date Settings
   - Return to normal display

2. In this example, stop at **Network Settings**.

Figure 3-2. Front Panel Setup Options with Associated Parameters

Normal	Network	Terminal	Release Dates	Time / Date Settings	>
	IP Setting	Settings	System	Timezone	
	Subnet Mask		LCD	Calendar	
	Gateway				
	DNS1				
	DNS2				
	DNS3				

3. When the display shows the feature that you wish to edit, press the **Enter** key on the keypad to enter the editing mode. In our example, the display shows **Editing Network Settings**. A cursor displays below one character of the existing IP address setting.
4. Enter a new IP address as follows:

   a) Use the left or right arrow to move the cursor to the left or to the right position. Use the up and down arrows to increment or decrement the numerical value.

   b) When you have the complete parameter value as you want it, press the **ENTER** button to complete the entry. The system will save your new value (indicated with an asterisk in the display) after you complete all required parameters.

   Note: *You must edit the IP Address, the Subnet Mask, and the Gateway parameters together for a valid IP address combination.*
5. Press the down arrow to move to the next parameter
6. Repeat steps 3-5 to select and complete the remaining options.
7. To save your entries for that group of parameters when you are done:

   a) In response to the **Save Changes?** prompt, press the down arrow button again. A **Yes/No** prompt displays.

   b) To save the changes, use the left/right arrow buttons to select **Yes**, and press the **ENTER** button.

   When network parameters are successfully changed, the front display indicates Network Restarting. If you do **not** see this display, there is an error with your entry, and no network changes were implemented. You must go back and re-enter the parameters.
8. Repeat steps 3-7 for each menu option.
9. To review the saved settings, press the up or down arrows to step through the current settings.

   When you are done, the front panel returns to the clock display. The network port resets to the new settings, and you can connect to your IP network for further administration. You should be able to Telnet or SSH to the SCS with your network connection.
10. Log in using **sysadmin** as the user name and the default password, **PASS**.
11. Continue entering settings using the **setup** command. (See Configuration.)

Method # 2- Using Telnet

You can use Telnet to connect to the SCS instead of using the terminal port if your workstation is configured to communicate with the default network settings of the SCS. The default IP address of the SCS is 10.0.0.1 with a subnet mask of 255.0.0.0. If you temporarily change your workstation to an IP address of 10.X.X.X with a subnet mask of 255.0.0.0, you can Telnet to the SCS using the following commands:

1. To access the SCS, on the command line type **telnet 10.0.0.1** and press **Enter**. You should be at the login prompt at this point.
2. Log in using **sysadmin** as the user name and the default password, **PASS**.
3. Continue entering settings using the **setup** command. (See Configuration.)

4: Configuration

The **setup** command provides a text-based interface for administering the SCS. It requires VT100 terminal support using the keyboard (no mouse support).

The **setup** command prompts the system administrator for appropriate entries to simplify the configuration process. The **setup** command runs automatically to initially configure the SCS; the sysadmin may run it manually at any time thereafter from a network connection or the terminal port.

Note: The Web-based interface uses the same terms and fields as the ***setup*** *user interface for its programming steps. After you have initially set up the unit using the* ***setup*** *command, you can easily switch from one administration method to the other if desired. (See Web Interface.)*

At default values, SSH is not enabled (encryption keys have not been generated), so Telnet or the terminal port is used to initially access and configure the SCS.

When you first install the SCS, the automatic setup script helps you configure the majority of the system functions and automatically saves the programming changes to non-volatile memory. Upon completion of this automated script file, the SCS automatically reboots to ensure that all processes are updated.

This chapter includes the following topics:

Connecting Using Telnet or Your Serial Terminal

If you are *not* already connected as described in Quick Start, you have two options:

- Connect the terminal port to a VT100 terminal device or computer using a VT100 terminal emulation program. (See Connecting a Terminal.)
- Telnet via your network connection.

Your screen displays the SCS name and a login prompt after power-up.

Logging in as System Administrator

If you are *not* already logged in as described in Quick Start, follow these steps:

1. Type **sysadmin** (a predefined user with special privileges) and press **Enter**. The Password prompt displays.

```
SCS4805 login: sysadmin
Password:

sysadmin>
```

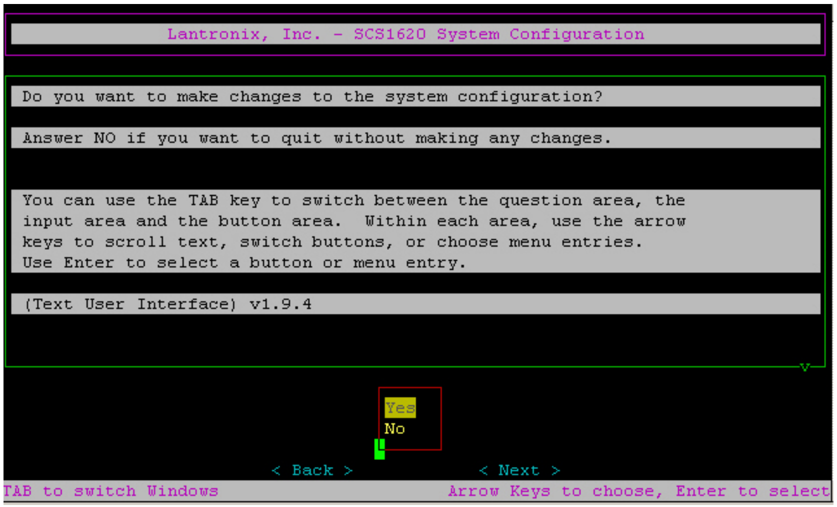
2. Type your password and press **Enter**. The default password is **PASS**. (The password does not display when you type it.) If this is the first time you have logged in as the system administrator, the setup (configuration) screen displays.

Accessing the Setup Menu

The following screen displays when the **setup** program starts, whether automatically (the first time the sysadmin logs in) or when the system administrator enters the **setup** command after logging in.

1. If this is *not* the first time you have logged in, type **setup** and press **Enter**.

Figure 4-1. Setup (System Configuration) Program

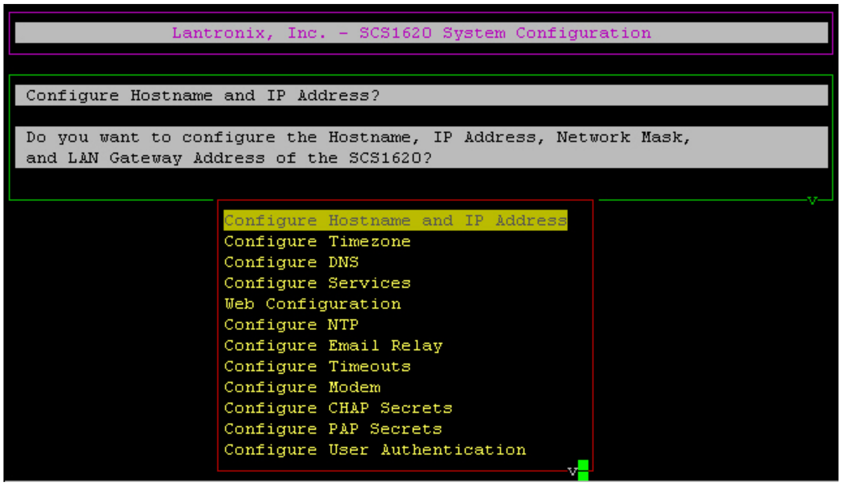


```
Lantronix, Inc. - SCS1620 System Configuration

Do you want to make changes to the system configuration?

Answer NO if you want to quit without making any changes.

You can use the TAB key to switch between the question area, the
input area and the button area.  Within each area, use the arrow
keys to scroll text, switch buttons, or choose menu entries.
Use Enter to select a button or menu entry.

(Text User Interface) v1.9.4
```

2. To make changes to the system configuration, select **Yes** and press **Enter**. A setup (configuration) menu, including the available configuration options and a **Done** option, displays. (You must scroll down to see all of the menu options.)

   Note: *If you select **No**, the **setup** program ends, and the command prompt displays.*

Figure 4-2. Setup Menu



```
Lantronix, Inc. - SCS1620 System Configuration

Configure Hostname and IP Address?

Do you want to configure the Hostname, IP Address, Network Mask,
and LAN Gateway Address of the SCS1620?

Configure Hostname and IP Address
Configure Timezone
Configure DNS
Configure Services
Web Configuration
Configure NTP
Configure Email Relay
Configure Timeouts
Configure Modem
Configure CHAP Secrets
Configure PAP Secrets
Configure User Authentication
```

Navigating

You can step through the menu and the configuration screens using the arrow, **Tab**, and **Enter** keys.

Table 4-1. Setup Menu Navigation

Action	Key
To select a menu option	Use the up and down arrows on your keyboard (*not* on the numeric keypad)
To select **Yes** or **No**	Use the up and down arrows to move between **Yes** and **No.**
To complete an entry and continue	Press **Enter**. ***Note:*** *Pressing **Enter** selects the default operation in most of the screens.*
To go to the next area of the screen	Press **Tab**.
To go to the next screen	Use the arrows and the **Tab** key to select **<Next>** and press **Enter**. ***Note:*** *With the exception of multiple choice or free-form text entries, just pressing **Enter** will take you to the next screen.*
To go back a screen	Use the **Tab** key and the arrows to select **<Back>**, and then press **Enter**.
To exit free-form text editing mode	Press the **Esc** key.

Done Option

The last item in the menu list is **Done**. You must use this option to complete your entries and to exit the setup script. **Done** prepares any entries to be written to flash memory, but it does **not** write them to flash memory. For more information about **Done**, refer to the end of this chapter.

The **Configure Device Ports** option (second to last menu item) uses **Done** differently. For the device port configuration, when you reach the end of a routine, **Done** prompts you to save the changes, and if you select **Yes,** writes your entries to flash memory. At this point, you can no longer “undo” your entries during this session.

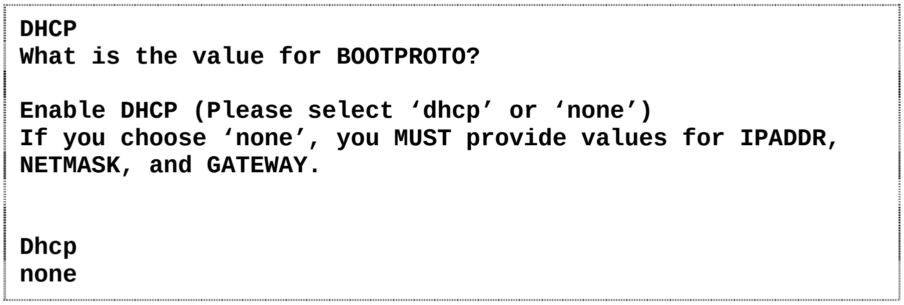
Note: *You can exit setup at any time by selecting* ***Done.***

Configuring Hostname and IP Address

While you can set the IP address and other network parameters using the front panel buttons (see Quick Start), to change all of the IP address parameters, you must complete the steps in the first option of the setup menu, **Configure Hostname and IP Address**. Use this option to specify the following parameters:

- DHCP (A DHCP server automatically assigns the IP address and network settings.)
- Hostname (including domain name)
- IP address (of the SCS)
- Network mask (of the IP address)
- Gateway (IP address of the router of this network)

1. Select **Configure Hostname and IP Address** and press **Enter**. The **DHCP** prompt displays.
2. Select **Yes** to use DHCP to obtain the IP address, netmask, and gateway, or **No** to enter your own values.



```
DHCP
What is the value for BOOTPROTO?

Enable DHCP (Please select ‘dhcp’ or ‘none’)
If you choose ‘none’, you MUST provide values for IPADDR,
NETMASK, and GATEWAY.


Dhcp
none
```

3. Press **Enter**. The hostname and IP address prompt displays.
4. Enter a value for the hostname. The default hostname is the SCS model name (e.g., SCS4805). There is a 64-character limit (contiguous characters).

```
Hostname and IP Address
What is the value of HOSTNAME?

Name of this Host (including domain, e.g.,
host.company.com).
We need the canonical name here to obtain the DNS domain.

IMPORTANT÷  The DNS domain name is determined from this
answer.


Answer:  SCS4805
```

Be sure to include the domain name as well. In the following example, we add **lantronix.com** to the default factory name of SCS4805 to get **SCS4805.lantronix.com**.

```
Hostname and IP Address


Answer:  SCS4805.lantronix.com
```

Note: After the value is accepted and saved, and you have rebooted the system, the hostname appears as your command prompt and on the front panel LCD display.

5. Press **Enter**. The IP address prompt displays.
6. If you selected DHCP in step 2, press **Enter** through the IP address, netmask, and gateway prompts (the system will ignore these values), and continue with Configuring Timezone.
7. If you did *not* select DHCP in step 2, enter the network IP address for the SCS.

   Do *not* use leading zeros in the numeric fields for "dot-quad" numbers less than 100. For example, if your IP address is 172.20.201.28, do not enter 028 for the last segment.

```
Hostname and IP Address
What is the value for IPADDR?

Ip Address in dot quad notation (e.g.,  10.2.3.4)


Answer:  172.20.201.28
```

8. Press **Enter.** The netmask prompt displays.

9. Enter the value of the netmask, in dot-quad notation.

```
Hostname and IP Address
What is the value for NETMASK?

IP Netmask in dot quad notation (e.g., 255.255.255.0)

Answer:  255.0.0.0
```

10. Press **Enter.** The gateway prompt displays.
11. Enter the IP address of your gateway.

```
Hostname and IP Address
What is the value for GATEWAY?

IP Address of the Gateway in dot quad notation (e.g.,
10.2.3.254)


Answer:  172.20.201.254
```

12. Press **Enter.** The setup menu returns with **Configure Timezone** selected.

Configuring Timezone

Use the **Configure TImezone** option to specify your local time zone.

1. With **Configure Timezone** selected, press **Enter**. The timezone prompt displays.
2. Use the arrow keys to select the local time zone from the list of international time zones (for example, Africa, America, Brazil), and press **Enter**.
3. If a sublist displays, select a more specific location (for example US/Hawaii) and press **Enter**.

```
Select your local timezone.

The SCS1620 supports all international timezones.


Select your local Timezone.

                    ..
                    US/Alaska
                    US/Aleutian
                    US/Arizona
                    US/Central
                    US/East – Indiana
                    US/Eastern
                    US/Hawaii
```

Note: *To go back one level in the Timezone script, select the "`..`" line from the top of the Timezone submenu. Select a value, tab to* ***< Next >,*** *and press* ***Enter*** *to continue.*

4. At the end of the Timezone script, press **Enter**. The setup menu returns with **Configure** DNS selected.

   At this point, you may continue with the next setup menu item, you may use the arrow keys to select another item in the list, or you may arrow down to **Done** to exit the setup script. (You can do this for any of the high level menu items.)

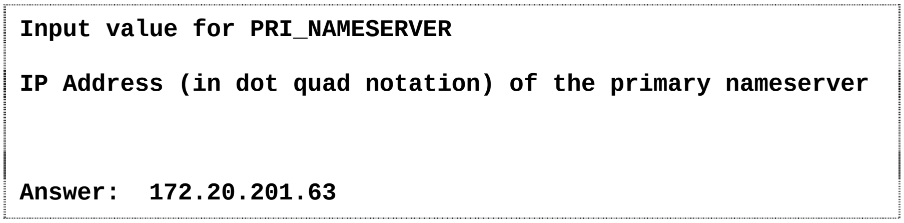
Configuring DNS

Use this option to configure the following parameters:

- Primary DNS nameserver (required if you choose to configure DNS servers).
- Secondary DNS nameserver (optional)
- Tertiary DNS nameserver (optional)

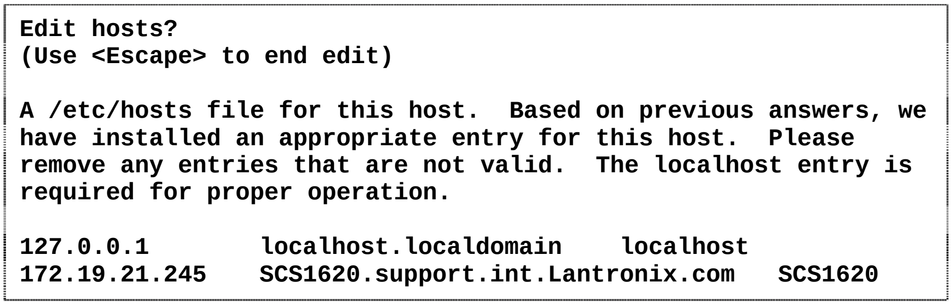
1. With **Configure DNS** selected, press **Enter**. The primary name server prompt displays.
2. Enter the IP address for the primary nameserver (required) and press **Enter**.

   Note: *If you cannot complete this entry now, enter an address of* ***0.0.0.0*** *for the primary nameserver. The system will accept this entry even though it is not a valid nameserver address. You must correct it later.*



```
Input value for PRI_NAMESERVER

IP Address (in dot quad notation) of the primary nameserver



Answer:  172.20.201.63
```

3. Enter the IP Address of your secondary nameserver (optional) and press **Enter**.
4. Enter the IP Address for the tertiary nameserver (optional) and press **Enter**. The system displays the **/etc/hosts** file for additional hostnames that you may wish to add. You may edit this list.



```
Edit hosts?
(Use <Escape> to end edit)

A /etc/hosts file for this host.  Based on previous answers, we
have installed an appropriate entry for this host.  Please
remove any entries that are not valid.  The localhost entry is
required for proper operation.

127.0.0.1        localhost.localdomain    localhost
172.19.21.245    SCS1620.support.int.Lantronix.com   SCS1620
```

5. Press the **<Esc>** key to end the editing, and then press **Enter.** The setup menu returns with **Configure Services** selected.

Configuring Services

With this menu option, you enable or disable the following:

- Syslog (system logging) (default is enabled)
- System logins using SSH (default is disabled)
- System logins using Telnet (default is enabled)
- Simple Network Management Protocol (SNMP Agent) (default is disabled)

1. With **Configure Services** selected, press **Enter.** The syslog prompt displays.
2. Select **Yes** to enable or **No** (default) to disable syslog, and press **Enter**. The SSH logins prompt displays.
3. Select **Yes** to enable or **No** (default) to disable SSH logins. Most system administrators enable SSH logins, which are the preferred method of accessing the system.

   Note: *If you enable SSH logins, the initial reboot process may take several minutes while the SCS regenerates SSH keys.*

   ```
   Enable ssh Logins?
   Do you want to enable system logins via ssh?
   This is the recommended method of login because of its
   security.


   Yes / No
   ```

4. Press **Enter.** The Telnet logins prompt displays.

   For Telnet logins, the default setting is **Yes** (to allow simple Telnet connections into the SCS even during its initial configuration). You may choose to disable Telnet access for security reasons, especially if you intend to use SSH.

5. Select **Yes** (default) to enable or **No** to disable Telnet logins, and press **Enter**. The enable SNMP Agent prompt displays.
6. Select **Yes** to enable or **No** (default) to disable SNMP agent.

   ```
   Enable SNMP Agent?

   Do you want to enable the Simple Network Management
   Protocol Agent?

   This will allow reading status and statistics via SNMP.
   This is a read-onlyl SNMP agent.


   Yes / No
   ```

7. Press **Enter**. The setup menu returns with **Web Configuration** selected.

Enabling/Disabling Web Configuration

The SCS offers a Web-based configuration interface, which you can only access through your browser using SSL (Secure Sockets Layer) (https://). The Web interface has most of the same options as the console-based setup routine and may be useful for updating configuration options after you complete the initial setup.

This option enables or disables the ability to update the SCS configuration using the Web interface.

1. With **Web Configuration** selected, press **Enter**. The enable Web configuration prompt displays. By default, the Web interface is disabled. Many system administrators consider a Web-based interface a security risk, and choose to disable the Web interface.

```
Enable Web Configuration?

Do you want to enable the LCI Web Configuration utility?

This will allow using a Web browser to configure the
SCS4805.
This uses https (SSL) only.


Yes / No
```

2. Select **Yes** to enable or **No** (default) to disable Web configuration, and press **Enter**. The setup menu returns with **Configure NTP** selected.

Configuring NTP

This option enables or disables the Network Time Protocol (NTP) function, which synchronizes the time clock in the SCS with other NTP devices on your network. The default is disabled.

1. With **Configure NTP** selected, press **Enter**. The NTP prompt displays.

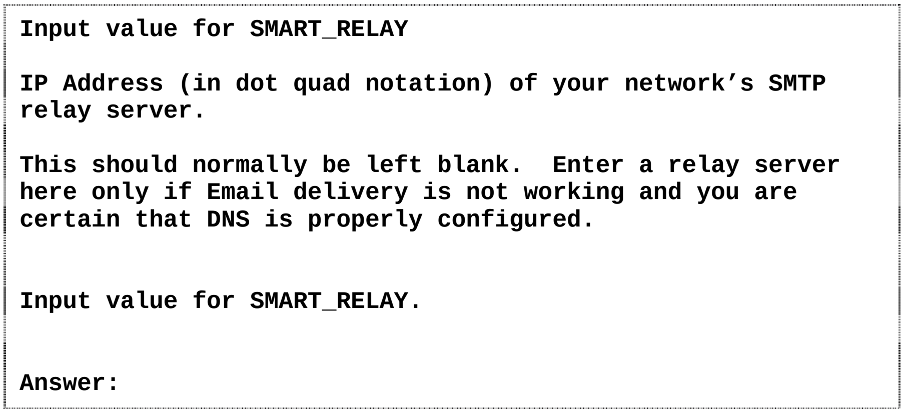
```
Enable NTP Daemon?
Do you want to enable the Network Time Protocol Daemon?

This will cause the SCS4805 system clock to be synchronized
with other machines using NTP

Enable NTP Daemon?


Yes / No
```

2. Select **Yes** to enable or **No** (default) to disable NTP and press **Enter**.
3. If you selected **Yes**, enter the IP addresses of up to three NTP servers. Identify at least two for best results. (Press **Enter** in between.)
4. Press **Enter** after the third server prompt displays. The setup menu returns with **Configure Email Relay** selected.

Configuring Email Relay

The SCS incorporates a mail transport agent for email delivery. Use this option to identify your network's SMTP relay server.

1. With **Configure Email Relay** selected, press **Enter**.
2. Leave this value blank unless email delivery is not working, in which case enter the IP address of your network's SMTP relay server.



```
Input value for SMART_RELAY

IP Address (in dot quad notation) of your network's SMTP
relay server.

This should normally be left blank.  Enter a relay server
here only if Email delivery is not working and you are
certain that DNS is properly configured.


Input value for SMART_RELAY.


Answer:
```

3. Press **Enter**. The setup menu returns with **Configure Timeouts** selected.

Configuring Timeouts

You can set up the SCS to disconnect from an idle Telnet or terminal connection after a specified period of time. You can enable or disable the timeout daemon to configure the disconnection of idle connections for:

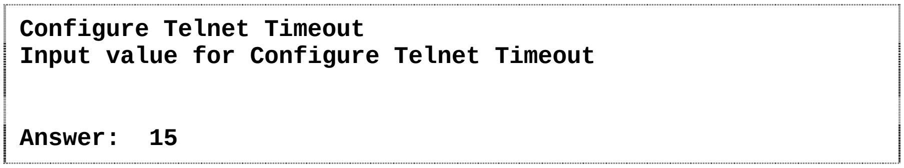
- Telnet timeout (default is disabled)
- PPP timeout (default is disabled)
- Terminal port timeout (default is disabled)

You can program each timer in a range of 1 to 30 minutes.

Note: *By default, all timers are disabled. Once you enable a timer, you can disable it by entering **0** (zero).*

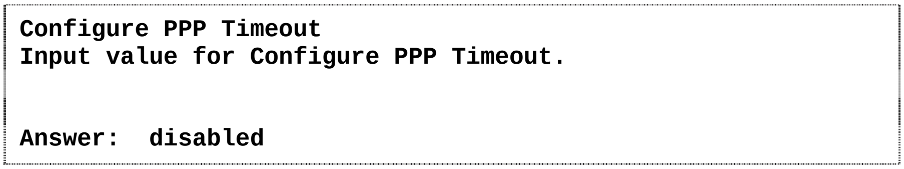
1. With **Configure Timeouts** selected, press **Enter**. The timeout prompt displays.
2. Select **Yes** to enable or **No** (default) to disable the timeout daemon, and press **Enter**. If you selected **Yes**, the Telnet timeout prompt displays.

   If you selected **No**, the setup menu returns with **Configure Modem (**SCSxx20) or **Configure CHAP Secrets** (SCSxx05) selected.
3. To cause an idle Telnet connection to be disconnected after a specified number of minutes, backspace over the existing value and enter a number between 1 and 30 (minutes).



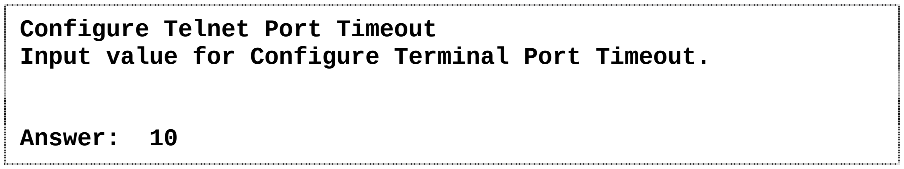
```
Configure Telnet Timeout
Input value for Configure Telnet Timeout


Answer:  15
```

4. Press **Enter**. The PPP timeout prompt displays.
5. To cause an idle PPP connection to be disconnected after a specified number of minutes, backspace over the existing value and enter a number between 1 and 30 (minutes).



```
Configure PPP Timeout
Input value for Configure PPP Timeout.


Answer:  disabled
```

6. Press **Enter**. The terminal port timeout prompt displays.
7. To cause an idle terminal port connection to be disconnected after a specified number of minutes, backspace over the existing value and enter a number between 1 and 30 (minutes).



```
Configure Telnet Port Timeout
Input value for Configure Terminal Port Timeout.


Answer:  10
```

8. Press **Enter**. The setup menu returns with the next available menu option, **Configure Modem** for the SCSxx20 or **Configure CHAP Secrets** for the SCSxx05, selected.

Configuring Modem (SCSxx20 only)

The internal modem is available, but optional, in the SCSxx20 products. The Configure Modem option does not display on the SCSxx05 setup menu.

Note: *You configure an external modem by enabling a port as an operator port in the* Configuring Device Ports *option.*

If a modem is installed, configure it as follows.

- Enable modem logins (to allow PPP and/or TTY) (default is disabled.)
- Enable modem TTY logins (default is enabled.)
- Enable modem TTY modem callbacks (The default is enabled.)
- Enter callback telephone number (if you enable callbacks)
- Enable PPP logins (The default is enabled.)
- Enter IP address(es) (local and remote) for PPP Link
- Enable CHAP for PPP Authentication (default is disabled; PAP will be used).

If you do not enable the modem, your system skips past the setup entries for CHAP secrets or PAP secrets, as they are related to operation of the modem. The system also bypasses steps related to TTY logins and callbacks.

1. With **Configure Modem** selected, press **Enter.** The enable modem logins prompt displays.
2. Select **Yes** to enable or **No** (default) to disable modem logins.

```
Enable Modem Logins?

Do you want to enable logins on the Modem?
This will allow PPP and TTY logins.



Enable Modem Logins?


Yes / No
```

If you selected **No**, the Configure User Authentication menu displays. Continue with Configuring User Authentication on page 4-16.

3. Press **Enter**. The TTY callbacks prompt displays.
4. Select **Yes** to configure the modem to do a TTY callback or **No** to bypass this configuration.

```
Configure Modem TTY Callbacks?

Do you want to have the Modem do a TTY callback?
If you do, you will next have to edit the callback
configuration.


Configure Modem TTY Callbacks?


Yes / No
```

5. Press **Enter**. If you selected **Yes**, the login configuration prompt displays.

   If you selected **No**, the PPP logins prompt displays. Continue with step 8.
6. Enter the TTY callback number (in xxx-xxx-xxx format) following the **–S** on the line beginning with **#Modem_cb**.

```
Edit login.config?
(Use <Escape> to end edit)


TTY Callback telephone numbers and callback login pseudo-usernames.
The telephone number the modem should callback to should be inserted
following the '-S' on the line beginning with 'modem_cb'.
In the telephone number use only digits and any of the following: ,-()


# A login by this user causes a text login callback
#modem_cb    -     -     /usr/sbin/callack  -S  callback-number-here
```

7. Press **Esc** to end the editing mode. The PPP logins prompt displays.

8. Select **Yes** to enable a direct PPP login, or **No** to disable a direct PPP login.

```
Enable PPP Logins?
Do you want to enable PPP logins?

This will allow a direct PPP login without having to log
into a user shell.


Yes / No
```

9. Press **Enter.** If you selected **Yes,** the PPP parameters options prompt displays.

   If you selected **No**, the Configure User Authentication menu displays. Continue with Configuring User Authentication on page 4-16.

10. Enter the local and remote IP addresses you want to use with the PPP link in the format: **Local_IP_Addr:Remote_IP_ADDR** (for example, 192.168.0.1:172.20.101.3). Both entries are optional.

```
PPP Options
Input value for PPP IP Addresses

Input the IP Address(s) you want to use with the PPP link.
The format is:

Local_IP_Addr:Remote_IP_Addr

Both addresses should be in dot quad notation with no
spaces before or after the ':'.  Both IP addresses are
optional.  Make the line blank if you do not want to
specify any address.

Input value for PPP IP Addresses


Answer:
```

11. Press **Enter.** The enable CHAP prompt displays.

    - If you select **Yes**, the setup menu returns with **Configure CHAP Secrets** selected.
    - If you select **No**, the setup menu returns with **Configure PAP Secrets** selected.

Configuring CHAP Secrets

The SCSxx20 supports either CHAP or PAP, but not both. PAP is the default authentication method.

The CHAP parameters include:

- Client
- Server
- Secret (password used for authentication; generated by the system administrator)
- IP address (acceptable local IP address)

1. With **CHAP Secrets** on the setup menu selected, press **Enter**. The CHAP secrets prompt displays.
2. Use the arrows to move the cursor to the end of the first line (**Secrets for authentication using CHAP**), and press **Enter** to create a new line.
3. Enter the CHAP secrets information as four separate fields, separating the entries with a space: **client**, **server**, **secret,** and **IP address**. (Do **not** use a # sign, which indicates a comment.)

```
Edit chap-secrets?
(Use <Escape> to end edit)

Each line should contain four fields containing:
Client   server   secret    IP-address

The second line usually contains the same info as the first line


# Secrets for authentication using CHAP
#clients            server              secret        IP addresses
#example            SCS.localdomain     password_1    *
#SCS.localdomain    example             password_2    *
*                   *                   *             *
```

4. Press **Esc** to exit editing mode. The setup menu returns with **Configure PAP Secrets**, selected.

Configuring PAP Secrets

PAP is the default authentication method. The parameters include:

- Client
- Server
- Secret (password used for authentication; generated by the system administrator)
- IP address (acceptable local IP address)

1. With **PAP Secrets** on the setup menu selected, press **Enter**. The PAP secrets prompt displays.
2. Use the arrows to move the cursor to the end of the first line (Secrets for authentication using PAP), and press **Enter** to create a new line.
3. Enter the PAP secrets information as four separate fields, separating the entries with a space: **client**, **server**, **secret,** and **IP address**. (Do **not** use a # sign, which indicates a comment.

```
Edit pap-secrets?
(Use <Escape> to end edit)

Each line should contain four fields containing:
Client   server   secret    IP-address

The second line usually contains the same info as the first line


# Secrets for authentication using PAP
#clients            server              secret        IP addresses
*                   *                   *             *
```

```
*                          *                    *
```

4. Press **Enter**. The setup menu returns, with **Configure User Authentication**, selected.

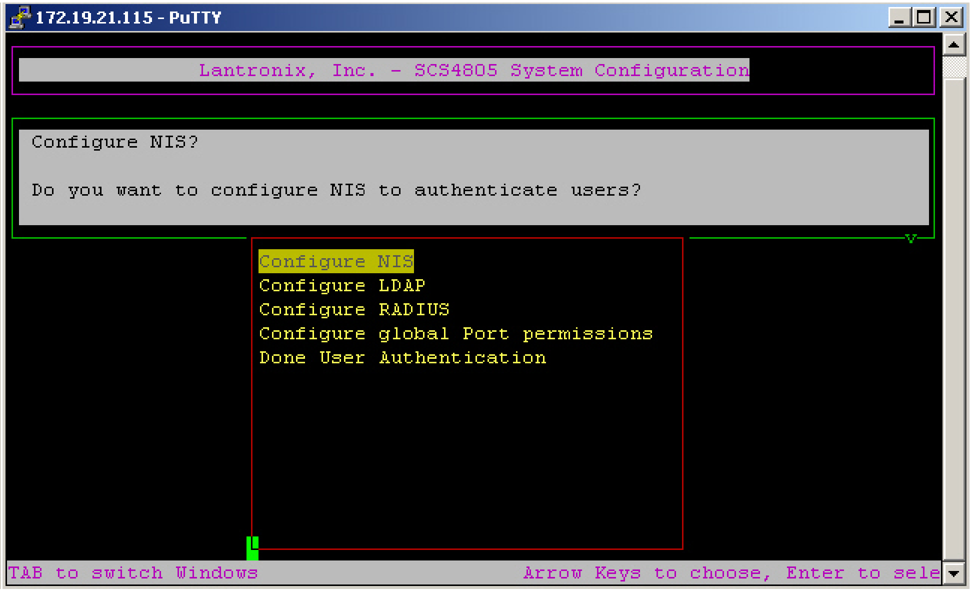
Configuring User Authentication

This option on the setup menu provides a submenu of user authentication methods. Only one external authentication method (NIS, LDAP, or RADIUS) may be enabled at a time. Enabling one method automatically disables the others.

- NIS (default is disabled)
- LDAP (default is disabled)
- RADIUS (default is disabled)
- Global port permissions

1. With **Configure User Authentication** selected, press **Enter**. The User Authentication menu displays with **Configure NIS** selected.

Figure 4-3. User Authentication Menu



```
172.19.21.115 - PuTTY

            Lantronix, Inc. - SCS4805 System Configuration

 Configure NIS?

 Do you want to configure NIS to authenticate users?

                    Configure NIS
                    Configure LDAP
                    Configure RADIUS
                    Configure global Port permissions
                    Done User Authentication

TAB to switch Windows                  Arrow Keys to choose, Enter to sele
```

2. Follow the instructions below for the method (NIS, LDAP, or RADIUS) you want to use. In addition to the selected method, you may configure global port permissions.

Configuring NIS

If you are using NIS authentication, you must:

- Identity the NIS domain name (often same as hostname).
- Enable NIS (default is disabled.)
- Identify NIS master server (required if NIS is enabled)
- Identify up to five NIS slave servers (optional)

Note: *You must **not** use packet filtering (firewall) if you are using NIS, because it would filter out the NIS packets.*

1. With **Configure NIS** selected, press **Enter**. The NIS domain name prompt displays.
2. Enter the NIS domain name.

```
NIS Domain Name
What is the value for NIS Domain?


Answer:  lantronix.com
```

3. Press **Enter**. The enable NIS prompt displays.
4. Select **Yes** to enable NIS to authenticate users and/or obtain port permissions.
5. Press **Enter**. The NIS master server prompt displays.

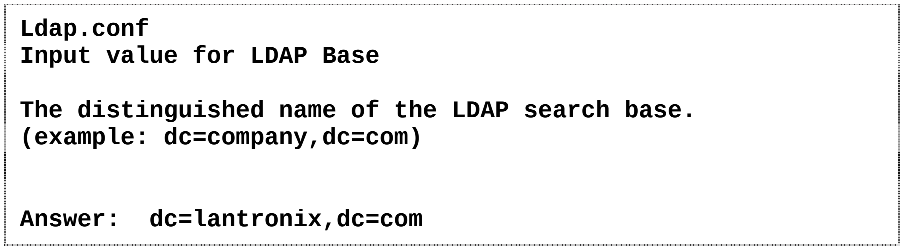
6. Enter the IP Address (in dot quad notation) of at least the NIS master server (required), and press **Enter**. The first slave server prompt displays. You may configure up to five NIS slave servers (SLAVE-1 through SLAVE-5). Slave server values are optional. There are five similar screens, one for each NIS slave server.
7. Enter the IP address of the first slave server and press **Enter**.
8. Repeat step 7 for each slave server, or just press **Enter** until the User Authentication menu returns. Continue with **Configure Global Port Permissions** or **Done User Authentication**.

Configuring LDAP

If you are using LDAP (Version 2), you must:

- Enable LDAP (version 2) authentication (default is disabled)
- Enter the IP address of the LDAP server
- Enter the input value for the LDAP base

1. With **Configure LDAP** selected, press **Enter**. The LDAP prompt displays.
2. Select **Yes** to enable LDAP to authenticate users.
3. Press **Enter**. The LDAP IP address prompt displays.
4. Enter the IP address of the LDAP server and press **Enter**. The LDAP base prompt displays.
5. Enter the name of the LDAP search base. There is no default value.



```
Ldap.conf
Input value for LDAP Base

The distinguished name of the LDAP search base.
(example: dc=company,dc=com)


Answer:  dc=lantronix,dc=com
```

6. Press **Enter**. The User Authentication menu returns. Continue with **Configure Global Port Permissions** or **Done User Authentication**.

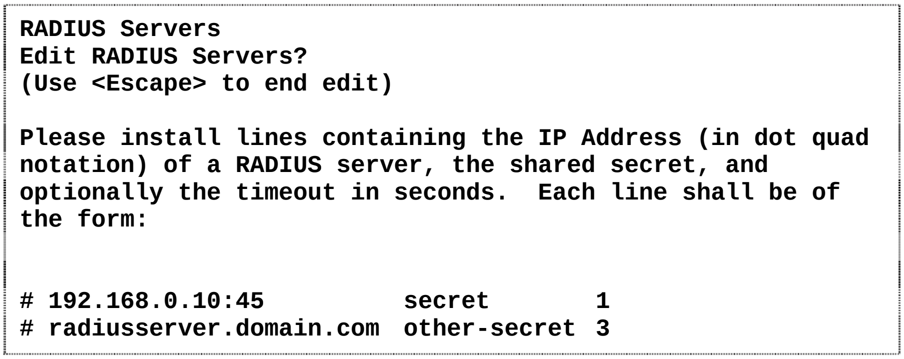
Configuring RADIUS

If you are using the RADIUS option for authenticating users, you must:

- Enable RADIUS (default is disabled)
- Enter the IP address of a RADIUS server
- Enter the shared secret (text string that serves as a password between a RADIUS client and the SCS)
- Enter the timeout (server connection timeout)

1. With **Configure RADIUS** selected, press **Enter**. The RADIUS prompt displays.
2. Select **Yes** to enable RADIUS to authenticate users, and press **Enter.**
3. Enter lines containing the IP Address of a RADIUS server, the shared secret, and the timeout in seconds (optional). You may specify an optional port with the IP Address (in the form IP Address:Port); if you do not specify an optional port, the SCS uses the default RADIUS ports, 1812 and 1813.
4. The format for each line is:

   server-IP-address[:port] secret [timeout]



```
RADIUS Servers
Edit RADIUS Servers?
(Use <Escape> to end edit)

Please install lines containing the IP Address (in dot quad
notation) of a RADIUS server, the shared secret, and
optionally the timeout in seconds.  Each line shall be of
the form:


# 192.168.0.10:45          secret       1
# radiusserver.domain.com  other-secret 3
```

5. Press **Esc.** The User Authentication Menu returns with **Configure Global Port Permissions** selected. Continue with **Configure Global Port Permissions** or **Done User Authentication**.

Configuring Global Port Permissions

With this option, you can configure global default port permissions for users. This is useful if you are using NIS, LDAP, or RADIUS to authenticate users and you have not used “adduser” to create a port permissions file for every user. The global port permissions will be used for users who do not have their own port permissions file or do not have port permissions specified in an NIS map.

You can configure the following permissions:

- **Allow Direct** (direct mode default port permissions; users may interact with a port) See page 7-5 for more information on direct mode.
- **Allow Listen** (listen mode default port permissions; users may only view the data on a port)
- **Allow Clear** (clear default port permissions; users may clear the port buffer)

1. With **Configure Global Port Permissions** selected, press **Enter**. The direct mode permissions prompt displays.
2. If desired, enter a range and/or list of ports (for example, 1, 3, 5-7) to which the direct mode permissions will apply.

```
Default Permissions
What is the value for ALLOW_DIRECT?

Specify the port-direct mode default port permissions.  The
ports can be specified using a range and/or list.
Example: 1, 3,

What is the value for ALLOW_DIRECT?
  (  Press TAB or ENTER to end editing  )


Answer:  1-48
```

3. Press **Enter**. The listen mode permissions prompt displays.
4. If desired, enter a range and/or list of listen mode permissions.
5. Press **Enter**. The clear mode permissions prompt displays.
6. If desired, enter a range and/or list of listen mode permissions.
7. Press **Enter**. The User Authentication Menu returns with **Done User Authentication** selected.

Done User Authentication

This option returns you to the main setup menu.

With **Done User Authentication** selected, press **Enter**. The setup menu returns with **Configure NFS Mount** selected.

Configuring NFS Mount

Here you can configure the NFS server that the SCS can use for port logging to a file. If you mount a network (shared) disk onto the SCS, device port logging can be to a file residing on a remote networked disk. This configuration avoids possible limitations in the amount of disk space available for the file.

Note: *You must **not** use packet filtering (firewall) if you are using NFS because it would filter out the NFS packets.*

You have the following options:

- Enable/disable mounting an NFS share (default is disabled)
- Identify the NFS server

1. With **NFS Mount** selected, press **Enter**. The NFS mount prompt displays.

```
Enable NFS?
Do you want to mount an NFS share from an NFS server?
Do not use packet filtering (firewall) if you are using NFS
or NIS

Enable NFS?



Yes
No
```

2. Select **Yes** to install the NFS server information to mount an NFS share, or **No** to disable this option. If you answer **Yes**, the NFS value prompt displays.

   If you answer **No**, the setup menu returns **Configure the Firewall**, selected.

3. Enter the NFS server path in the format: **nfs_server_hostname** *or* **ipaddr:/exported/path**

   The exported path will be mounted to /nfs on the SCS. **If the line begins with a '#', please remove it.**

   Note: *Exporting an incorrect NFS server path may degrade the performance of the system.*

```
Input value for NFS mount

Install the NFS server info to mount an NFS share.
The format is:
       nfs_server_hostname or ipaddr:/exported/path
The exported path will be mounted to /nfs on the SCS.
If the line begins with a ‘#’, please remove it.

Input value for NFS mount

  (Press TAB or ENTER to end editing)


Answer:  172.19.0.60:/home/share
```

4. Press **Enter**. The setup menu returns with **Configure the Firewall** selected.

Configuring Firewall (Packet Filtering)

The SCS incorporates a packet filtering option (a "firewall"). (The Web configuration interface uses the term “Packet Filtering.”)

Note: *You must **not** use packet filtering (firewall) if you are using NFS or NIS, because it would filter out the NFS or NIS packets.*

You may configure the firewall for your site by setting the following parameters.

- Enable/disable Firewall (default is disabled)
- Reject method (default is Reject; returns a connection denied on blocked ports.)
- Ping response (default is disabled, which makes the SCS visible to pings)
- TCP public services (default is ssh, telnet, and https allowed)
- UDP public services (default is ntp allowed)

1. With **Configure the Firewall** selected, press **Enter**. The firewall prompt displays.
2. Select **Yes** to enable or **No** (default) to disable packet filtering, and press **Enter**. If you selected **Yes**, the reject method prompt displays.

   If you selected **No**, the setup menu returns with **Configure Device Ports** selected.
3. To choose the reject method for attempts to access your site, select **Deny** or **Reject** (default). (The screen explains these responses.)

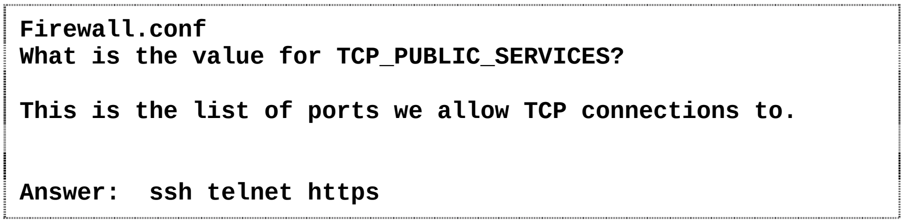
```
What is the value for REJECT_METHOD?

Use DENY to ignore connection attempt on blocked ports.
Use REJECT to return connection denied on blocked ports.


DENY / REJECT
```

4. Press **Enter**. The ping response prompt displays.
5. Select **Yes** to enable the SCS to be invisible to ping or traceroute inquiries, or **No** (default) to disable this feature.

```
Enable INVISIBLE_TO_PING?

Do you want the SCS4805 to be invisible to ping and
traceroute?
You will still be able to ping and traceroute outbound from
the SCS4805.  Yes is recommended for maximum security.


Yes / No
```

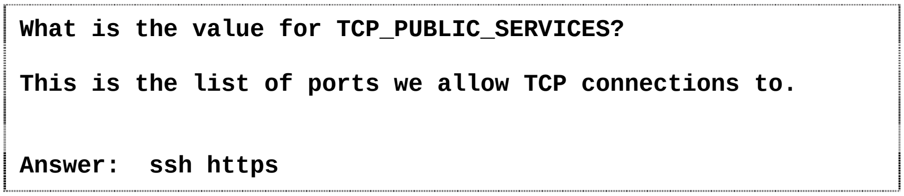
6. Press **Enter**. The TCP public services prompt displays.

7. To enter the list of TCP Public Services that the SCS should support, edit the text-entry list from the choices indicated in the **Answer** field (ftp-data, ftp, SSH, telnet, www, and https).



```
Firewall.conf
What is the value for TCP_PUBLIC_SERVICES?

This is the list of ports we allow TCP connections to.


Answer:  ssh telnet https
```

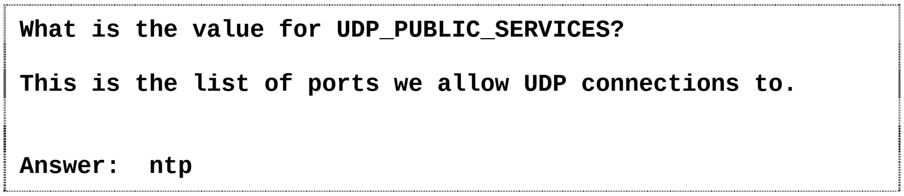
For example, you may choose to remove **telnet** from this list of services for security reasons, leaving only ssh and https .



```
What is the value for TCP_PUBLIC_SERVICES?

This is the list of ports we allow TCP connections to.


Answer:  ssh https
```

8. Press the **Esc** key to end the editing, and press **Enter**. The UDP public services prompt displays

9. To identify the UDP public services to be supported, enter the services required for your configuration in the **Answer** field.



```
What is the value for UDP_PUBLIC_SERVICES?

This is the list of ports we allow UDP connections to.


Answer:  ntp
```

10. Press the **Esc** key to end text entry, and press **Enter** to continue. The setup menu returns with **Configure Device Ports** selected.

Configuring Device Ports

Note: *It is generally not necessary to change the configuration of the terminal port, other than its data rate. Therefore, no options are available on the setup menu or Web interface for changing its configuration. If you need to make a change, use the **dtedce** command to change the DTE or DCE setting, and use the buttons on the front panel to change the baud rate (see Method #1 – Using the Front Panel Display).*

The **Configure Device Ports** option on the setup menu is actually a script running within the setup script. Therefore, some of its processes are different from those of other options. **Done in the Configure Device Ports routine causes your changes to be written to the flash memory**. This is different from **Done** at the end of the setup menu list, which just prepares the entries to be saved. Also, **<Back>** navigation is disabled in some places.

Device Port Configuration Options

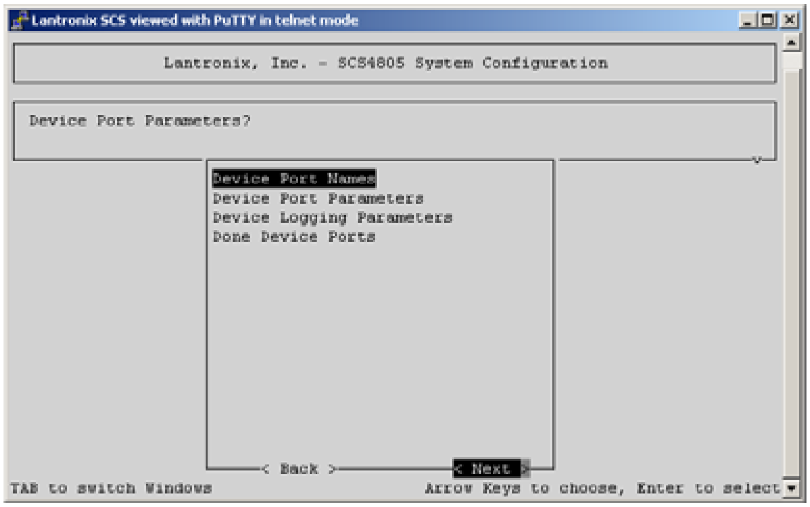
You can configure the device ports for port identity (apply a relevant name) and for feature access and buffer logging. You can configure device ports (for departments, for identifying equipment types, or for any other reason) in any combination; groups can be any individual port number, any range of numbers, or a combination of both. Device ports remain unique; the groups are not used for access, but merely to assist in your setup of the device ports.

- Device Port Names (change or accept defaults)
- Device Port Parameters (by port or group of ports)
- Device Logging Parameters (by port or group of ports)
- Done Device Ports (writes the device port parameters to flash when executed)

Device Port Menu

1. Select **Configure Device Ports** on the setup menu. The system may take a few seconds to show an intermediate screen and then continue to the Device Port menu with **Device Port Names** selected.
2. Continue with **Device Port Names**, or select one of the other options from the menu.

Figure 4-4. Configure Device Ports Menu



```
Lantronix, Inc. - SCS4805 System Configuration

Device Port Parameters?

Device Port Names
Device Port Parameters
Device Logging Parameters
Done Device Ports

                    < Back >            < Next >
TAB to switch Windows          Arrow Keys to choose, Enter to select
```

Device Port Names

The Device Port Names option allows you to assign a meaningful name to each device port. Default values are DEVICE_01 through DEVICE_48 (for the SCS4805). You can rename each port individually to have a server name, a description, or other relevant naming convention.

1. To administer port names, select **Device Port Names** and press **Enter.**
2. Enter a port number, and press **Enter**. You have two options. You can choose to name the device port or select **Done** to exit this option.
3. To name the device port, select **Set the Name of a Device Port** and press **Enter**. The existing information for that device port displays. The preset port names are DEVICE_01 through DEVICE_48 (in SCS4805).

4. Backspace over the existing data, and enter your name for this port. The device name cannot contain a space. Use an underscore if you need an empty space in the name.
5. Press **Enter.** You have two options:
   - To go back and name or rename the same device port, repeat steps 3-5.
   - To save your name change to flash memory **now**, select **Done** and press **Enter**: A confirmation screen displays. Continue with step 6.
6. To confirm, select **Yes**. You cannot undo these name changes after this point. (If you select **No**, you return to the previous screens to make changes.)
7. Press **Enter**. There is a short delay while the system saves the changes to flash memory. Now you can name a different port of group of ports.
8. You have two options:
   - To repeat the process of naming ports for a different port or group of ports, select **Yes.**
   - To move on to the next option, **Device Port Parameters**, select **No**.
9. Press **Enter**. If you selected **No**, the Configure Device Port menu returns with **Device Port Parameters** selected.

Device Port Parameters

You can configure the device port parameters on individual ports or in *ad hoc* groups. You determine the group and then apply selected features to the ports in that group.

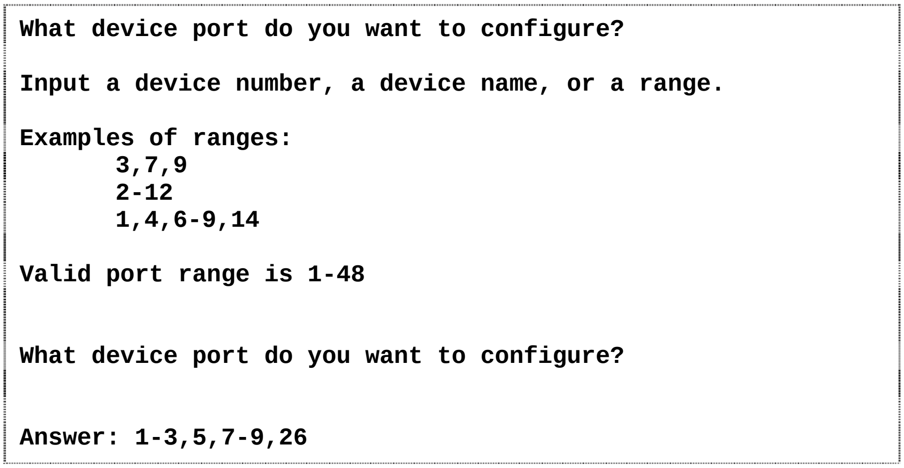
The device port parameters that you configure include:

- Enable/disable operator mode (default is disabled)
- Baud rate (default is 9600)
- Data bits (default is 8)
- Stop bits (default is 1)
- Parity (default is None)
- Flow control (default is XON/XOFF)
- Port type (default is DTE for the SCSxx05 and DCE for the SCSxx20))
- Inhibit buffering (default is no)

Define a Group of Ports to Configure

1. Select **Device Port Parameters** and press **Enter.**
2. Select **Setup the Device Parameters** and press **Enter**. You are prompted to identify the port or ports that should be configured with these steps.

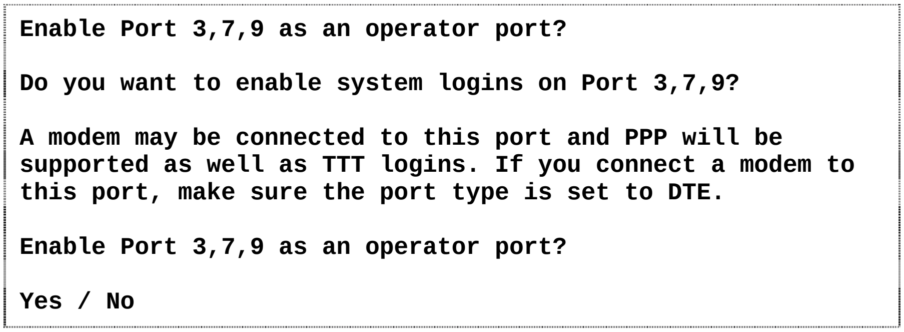
3. In the **Answer** field, enter the number, range, or combination of ports to be administered.



```
What device port do you want to configure?

Input a device number, a device name, or a range.

Examples of ranges:
       3,7,9
       2-12
       1,4,6-9,14

Valid port range is 1-48


What device port do you want to configure?


Answer: 1-3,5,7-9,26
```

4. Press **Enter**. The enable operator port prompt displays. This option allows PPP as well as terminal logins through an external modem.

   Note: *If you connect a modem, make sure to set the port type to DTE.*



```
Enable Port 3,7,9 as an operator port?

Do you want to enable system logins on Port 3,7,9?

A modem may be connected to this port and PPP will be
supported as well as TTT logins. If you connect a modem to
this port, make sure the port type is set to DTE.

Enable Port 3,7,9 as an operator port?

Yes / No
```

5. Select **Yes** to enable system logins, or **No** (default) to disable system logins, and press **Enter**. The operator port baud rate displays if you enabled an operator port or group of ports; otherwise the baud rate prompt displays.

Operator Port Baud Rate

You can select from seven device baud rates: 2400, 4800, 9600, 19200, 38400, 57600 and 115,200. The default is 115,200.

1. Use the arrow keys to select the baud rate for the operator port(s) from the list displayed.
2. Press **Enter**. The baud rate prompt displays.

Baud Rate

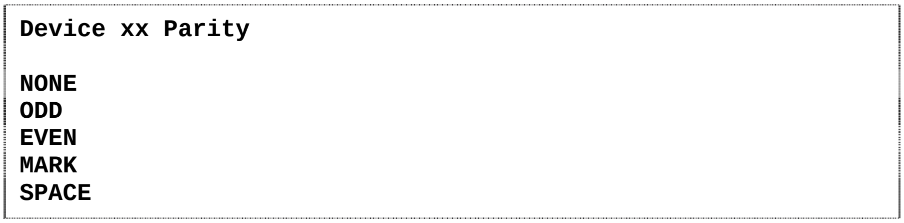
You can select from seven device baud rates: 2400, 4800, 9600, 19200, 38400, 57600 and 115,200. Most devices use 9600 as the terminal/administration port's baud rate, so the device port defaults to this value. Check the equipment settings and documentation for the proper baud rate.

1. Use the arrow keys to select the baud rate for the port(s) from the list displayed.
2. Press **Enter**. The data bits prompt displays.

Data Bits, Stop Bits, and Parity

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

1. Use the arrow keys to select the data bits for the port(s) from the list displayed.
2. Press **Enter.** The stop bits prompt displays.
3. Select the stop bits (1 or 2) for the port(s).
4. Press **Enter**. The parity prompt displays.
5. Select the parity for the port(s).



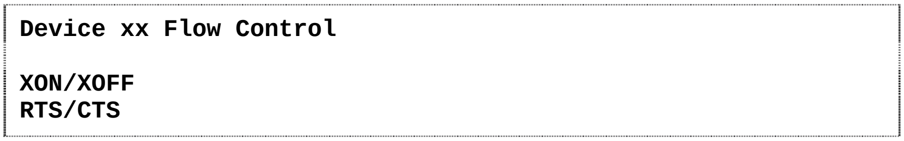
```
Device xx Parity

NONE
ODD
EVEN
MARK
SPACE
```

6. Press **Enter**. The flow control prompt displays.

Flow Control

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

1. Select the flow control for the port(s).



```
Device xx Flow Control

XON/XOFF
RTS/CTS
```

2. Press **Enter**. The port type prompt displays.

Port Type

Each SCSxx05 device port is factory configured as a DTE device, ad each SCSxx20 device port is factory configured as a DCE device.

Note: Make sure to select DTE if you enabled an operator port or group of ports.

1. Select the **Port Type** (OFF, DTE, or DCE) for this group of ports. OFF disables the port.
2. Press **Enter**. The inhibit buffering prompt displays.

Inhibit Buffering

By default, buffering is enabled (Inhibit Buffering is No). Inhibiting buffering disables the buffering on a port, including bi-directional traffic that a system administrator or user may record in direct mode. Therefore, a system administrator may choose to inhibit buffering temporarily when entering sensitive data, so the other users cannot view the data. Alert and panic messages from the attached device are still stored when nobody is connected.

1. Select **Yes** to disable buffering, or select **No** (default) to enable buffering.
2. Press **Enter**. You have two options:
   - To go back and change any of your settings for this port or group of ports, select the **Setup the Device parameters** option, *or*
   - When you are satisfied with the changes you have made, or you wish to administer additional ports, select **Done**.
3. Press **Enter.** If you selected **Done**, you now confirm your changes.

Confirm Changes

1. To commit your changes to flash memory **now**:

   a) Select **Yes**. You cannot undo this group of device parameter changes after this point. (If you select **No**, you return to the previous screens to make changes.)

   b) Press **Enter**. There is a short delay while the system saves the changes to flash memory. After the changes are confirmed, the system offers the ability to configure a different port or group of ports.
2. You have two options:
   - To repeat the process of setting device port parameters, select **Yes**, *or*
   - To move on to the next option, **Device Logging**, select **No**.
3. Press **Enter**. If you selected **No**, the Configure Device Port menu returns with **Device Logging Parameters** selected.

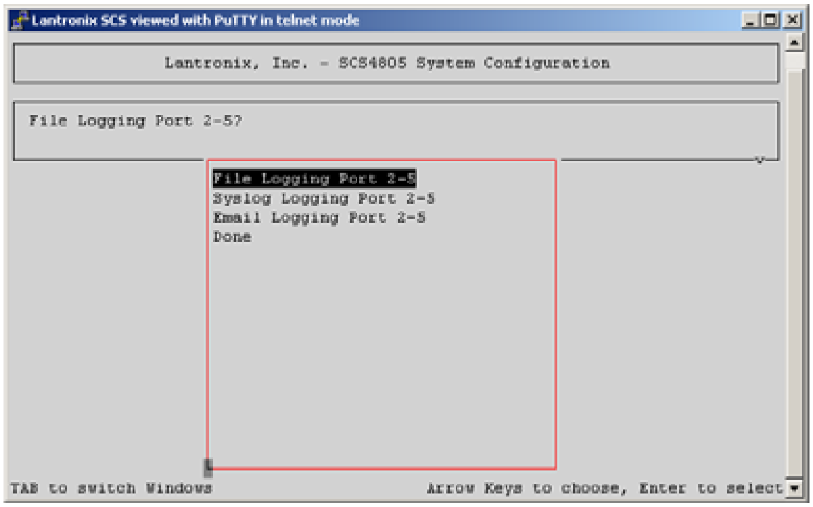
Device Logging Parameters

You can configure logging parameters on individual ports or on *ad hoc* groups of ports.

Device logging parameters include:

- File logging (default is disabled)
- Syslog logging (default is disabled)
- Email logging (default is disabled)

1. Define the port or group of ports. (See Define a Group of Ports to Configure on page 4-7.)
2. Select **Device Logging Parameters** from the Configure Device Port menu.
3. Press **Enter**. The Device Logging Parameters menu displays, with **File Logging Port** selected.



```
Lantronix, Inc. - SCS4805 System Configuration

File Logging Port 2-5?

File Logging Port 2-5
Syslog Logging Port 2-5
Email Logging Port 2-5
Done

TAB to switch Windows                    Arrow Keys to choose, Enter to select
```

File Logging by Port

This option includes the following parameters:

- Enable/disable (default is disabled)
- Number of files saved per port
- Log file path (can be NFS mounted)
- Log file size (in bytes)

1. With **File Logging Port** selected, press **Enter**. The log to file flag prompt displays.
2. Select **Enable** to enable file logging for the selected device port(s), or select **Disable** to disable file logging, and press **Enter**. The number of files saved per port prompt displays.
3. Enter the number of files to be logged for the device port(s). These files keep a history of the data received from the port(s). The default value is two files (even if no entry is made here); you may keep as many files as you wish.

   If you are specifying a range or a group of ports, remember that each port will have its own unique files (the log file name(s) contain the port number to differentiate the similar files in the log file directory).
4. Press **Enter**. The log file path prompt displays.
5. Enter the log directory path for the log file(s). The system defaults this path to ***/var/tmp/*** if you make no entry. Ensure that the directory exists and is writeable.

   ```
   Set Log File Path for Device Port xx.
   Set the Log File Path name (must end in / i.e.
   /var/log/tmp/) for Port xx


   Answer:  /var/tmp/
   ```
6. Press **Enter**. The log file size prompt displays.

7. Enter the desired log file size in bytes (2048 = 2K). The default is 2048 bytes. The amount of available memory limits the maximum size of the log file.
8. Press **Enter**. the Device Logging Parameters menu returns with **Syslog Port Logging,** selected.

Syslog Logging by Port

Next, you configure the following syslog options for the same port(s):

- Enable/Disable (default is disabled)
- Set Syslog Facility (user, local0, local1, local2, etc....local7)
- Set Syslog Level (Emergency, Alert, Critical, Error, Warning, Notice, Info, Debug)

1. With **Syslog Port Logging** selected, press **Enter**. The syslog flag prompt displays.
2. Select to **Enable** or **Disable** (default) syslogging for the port(s), and press **Enter**. The syslog facility prompt displays.
3. From the list, select the syslog facility to use for the port(s) and press **Enter**. The set syslog level prompt displays.
4. From the list, select the syslog alert level for the port(s). The levels are, from the top down, most severe to least severe. They classify the importance of each connected server within your configuration.
5. Press **Enter**. The Device Logging Parameters menu returns with **Email Logging Port** selected.

Email Logging

Email Logging (Email Notification) sends an email message to pre-defined email addresses when 'alert' criteria have been met. Data received on the SCS device port(s) trigger the alert. The default is disabled, although some preset values are entered for the timers.

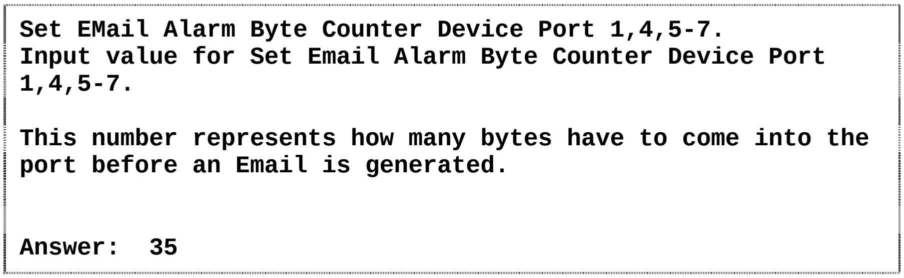
Email logging provides the following options for a port or group of ports:

- Enable/disable (default is disabled)
- Alarm byte count (count the number of characters to trigger an alarm)
- Alarm timer (how long to capture data after byte count trigger)
- Alarm ignore timer (how long, after byte count trigger, to ignore additional alarms)
- Email subject line (put in a message header to be read in the email subject)
- “Send To” email address
- “cc:” to email address

1. With **Email Logging Port** selected, press **Enter**. The email flag prompt displays.
2. Select **Enable** or **Disable** (default). If enabled, the email flag triggers an email message to be sent to the defined recipients when the alert condition has been met. Press **Enter**. The alarm byte counter prompt displays.

3. Enter the number (digits) of bytes of data the port will receive *after* which the SCS will capture log data and send an email regarding this port.

   In most cases, the terminal (console) port of your device does not send any data unless there is an alarm condition. After the SCS receives a small number of bytes, it can perceive that your device needs some attention. The SCS contacts your technician via email when that point has been passed, and the email includes the logged data. A threshold preset at 30 characters means that as soon as the SCS receives 30 bytes of data, it captures log data and sends an email regarding this port.



```
Set EMail Alarm Byte Counter Device Port 1,4,5-7.
Input value for Set Email Alarm Byte Counter Device Port
1,4,5-7.

This number represents how many bytes have to come into the
port before an Email is generated.


Answer:  35
```

4. Press **Enter**. The email timer prompt displays.
5. Enter the amount of time, in seconds, for the email to capture data after the initial byte counter trigger is met. The default is 40 seconds.

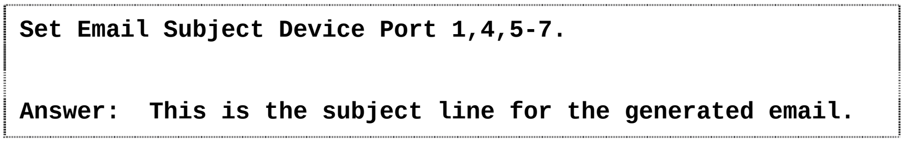
   Email timer is a time limit of how long, in seconds, the device port will capture data before closing the log file (with a fixed internal buffer maximum capacity of 1500 bytes) and sending it as an email message. The SCS sends the data as the body text in the email message to your predefined recipients.
6. Press **Enter**. The email ignore timer prompt displays.
7. Enter the number of seconds (digits) for the desired ignore time. The default is 600 seconds (10 minutes).

   This is a period of time, *after* the email message has been sent, for which the device port will ignore additional characters received. The data will simply be ignored and not trigger additional alarms until this time elapses.

   Note: The email buffer does not collect any additional characters in its buffer during this ignore time. However, if syslog is also active, the logger still buffers any data to syslog.
8. Press **Enter**. The email subject text prompt displays.
9. Delete the default text and enter a subject text appropriate for your site.

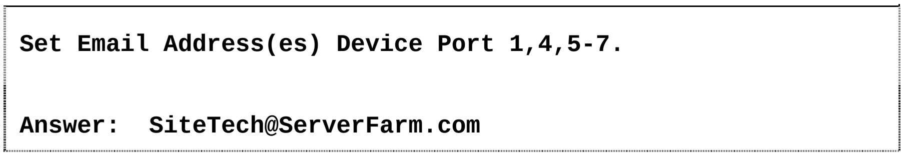
   The email subject line is pre-defined for each port with its port number. You can use the email subject to inform the desired recipients of the problem on a certain server or location (e.g., server location or other classification of your equipment). This is helpful if the email message goes to the sysadmin's or service technician's mobile or wireless device (e.g., text messaging via email).

   The message body will contain the ASCII data from the device port for as long as the sysadmin has indicated the SCS should capture the data.



```
Set Email Subject Device Port 1,4,5-7.


Answer:  This is the subject line for the generated email.
```

10. Press **Enter**. The email address prompt displays.
11. Enter the complete email address of the message recipient(s) for each device port(s). Each device port has its own recipient list. If you wish to enter more than one email address, separate the addresses with a **single space**.



```
Set Email Address(es) Device Port 1,4,5-7.

Answer:  SiteTech@ServerFarm.com
```

12. Press **Enter**. The cc: prompt displays.
13. Enter the email address(es), if any, to which the alert message should be copied. If entering more than one email address, separate the addresses with a **single space**. You may cc: as many parties as you wish.
14. Press **Enter**. The Device Logging Parameters menu returns with **Done** selected. You may select the other options to change you settings, if desired.
15. When you are satisfied with your entries and want to save them, press **Enter**. A confirmation prompt displays:
16. To confirm your entries, select **Yes**. The system saves the entries to flash memory. You have two options:
    - To configure additional device ports, select **Yes** and press **Enter**.
    - If you have finished configuring device ports, select **No** and press **Enter**. The Device Logging Parameters menu returns with **Done Device Ports** selected.

      Note: *Email notification changes do not take affect until after the system reboots.*

Done Device Ports

To return to the setup menu when you are satisfied with your device port settings:

1. Select **Done Device Ports**.
2. Press **Enter**. The setup menu displays with **Software Updates** selected.

Updating Software

Use this option to download the latest firmware for your SCS. You must have an ftp server set up on your network to perform these actions. You will need to enter:

- Server type: ftp or tftp (tftp is the default)
- IP address of the server
- FTP or TFTP path
- FTP user
- FTP password of the user
- Software update files (default is none)

1. With **Software Updates** selected, press **Enter**. The protocol prompt displays.

```
What is the value for PROTOCOL?
Please enter ‘tftp’ or ‘ftp’ to select the server type that
will be used to obtain Software update files and as the
server type for configuration save and restore.

tftp
ftp
```

2. Select the type of server you will use for obtaining updates and saving or restoring configurations, and press **Enter**. The server IP address prompt displays.

```
What is the value for SERVERIPADDR?

Please enter the IP address in dot quad notation of the
server that will be used to obtain Software update files
and as the server for configuration save and restore.
```

3. Enter the IP address of the server and press **Enter**. The default path prompt displays.

```
What is the value for FTPPATH?

Please enter the default path on the server that will be
used to obtain Software update files and as the location on
the server to get and put configuration save files.

What is the value for FTPPATH?

Answer: /scs-updates
```

4. Enter the default path on the server for obtaining software files and getting and putting configuration save files, and press **Enter**. The ftp user prompt displays.

```
What is the value for FTPUSER?

If you selected ‘ftp’ as the protocol, you will need to
specify an ftp user for the server.  The default entry will
work if the ftp server allows anonymous access and the
FTPPATH specified allows anonymous puts.

What is the value for FTPUSER?

Answer:  backup
```

5. Enter the ftp user and press **Enter**. The ftp password prompt displays.

```
What is the value for FTPPASSWORD?

If you selected ‘ftp’ as the protocol, you will need to
specify a password for the ftp user of the server.  The
default entry will work if the ftp server allows anonymous
access and the FTPPATH specified allows anonymous puts.

What is the value for FTPPASSWORD

Answer:  backup
```

6. Enter the ftp user password and press **Enter**. The install software updates prompt displays.

```
Input value for Install Software Update(s)

Enter a space separated list of software update files to
apply.
They will be obtained from the server specified by
SERVERIPADDR.
Unless the filename here is specified with a path, the
files will be obtained from FTPPATH.

Successfully applied updates will appear in the Updates
Applied item below.

Input value for Install Software Update (s)

Answer:  upgrade-to-4.3-part1.sh upgrade-to-4.3-part2.sh
```

7. Enter the software update files (with a space between file names), to obtain from the server you specified, and press **Enter**. The edit updates applied prompt displays.
8. Add, delete, or change any of the listed files, and press **Esc** to exit editing mode. The setup menu returns with **Done** selected.

Note: *To save or restore a configuration, use the **config-save** or **config-restore** commands, respectively.*

Using Done

After completing the setup menu, use **Done**, the last option, to finalize and exit the setup process.

1. Select **Done** and press **Enter**. The system asks whether to keep the recent parameter changes.
2. To save the parameter changes in RAM (volatile memory) in preparation for using the **SAVE** command, select **Yes**. It may take several minutes for the system to save your changes. Changes that the system accepts are marked **OK** in green. Changes that involve disabling an option that was enabled previously are marked **Failed** in red.

Saving

This **SAVE** command saves all changes and updates to non-volatile memory.

The SCS automatically saves the programmed parameters after running the setup script for **the first time only**. After that, the system administrator must run **SAVE** manually, as follows:

1. To permanently save any parameter changes, type **SAVE** (all caps) at the command prompt.
2. Press **Enter**. It may take a few minutes for the system to save your entries.

The **reboot** and the **poweroff** commands check for unsaved data before execution, just in case a **SAVE** is required. They prompt you to execute a **SAVE,** if necessary.

Note: ***SAVE** does not store the buffered data, which is only maintained in RAM. If you require the buffered data, you can poll the appropriate ports and capture the buffered data at any time.*

Rebooting

The very first time you log in to the SCS as sysadmin, a special routine runs to properly set up the system files, read/write operations, and other aspects of the file system. The SCS automatically reboots after running the setup script for the first time. All other setup script sessions require you to use the **reboot** command to ensure that all configuration changes are made.

1. To make the parameter changes take effect, type **reboot** at the command prompt.
2. Press **Enter**.
3. If file changes have not been saved into non-volatile memory, the reboot operation includes a prompt, allowing you to **SAVE** the files if desired.

Note: *The system administrator is automatically logged out.*

5: Web Interface

The SCS incorporates a browser-based interface for the system administrator. This interface provides an alternate method of updating most of the parameters initially set up using the **setup** command. The Web interface is password protected, using SSL encryption. Always use the **https://** prompt.

This chapter includes the following topics:

Accessing the Web Interface

Before using the Web interface, you should have:

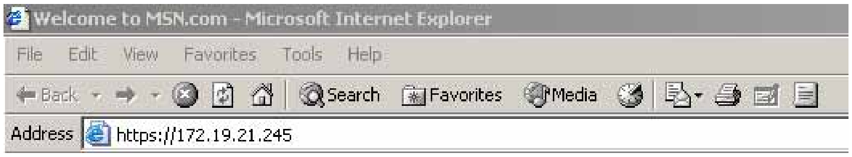
- Assigned the IP address of the SCS (using either the buttons on the front of the unit or the **setup** command)
- Initially configured the unit using the **setup** command.

You must log in using the sysadmin username and password. **Cookies must be enabled** in your browser.

1. Launch your Browser, and type **https://** followed by the IP Address (URL) of your SCS.

   For example, if the IP address is 172.20.201.245, the login URL is https:// 172.20.201.245.

Figure 5-1. IP Address of SCS in URL


Welcome to MSN.com - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back
Search
Favorites
Media
Address

https://172.19.21.245

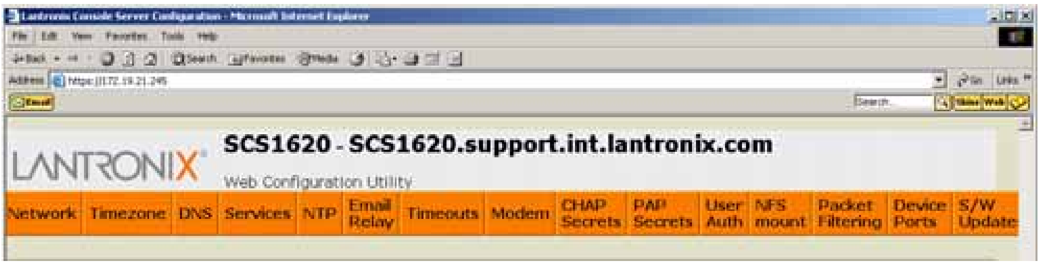
   An SSL security alert displays.

2. Click **Yes.**
3. Enter the username **sysadmin** and your sysadmin password (default is **PASS**).
4. Click **OK.** The Lantronix Web Configuration Utility Main page displays.

Web Configuration Utility Main Page

The Web Configuration Utility allows the system administrator to configure the SCS, much like the setup script does via a network or terminal connection.

Figure 5-2. The SCS Web Configuration Utility Main Page

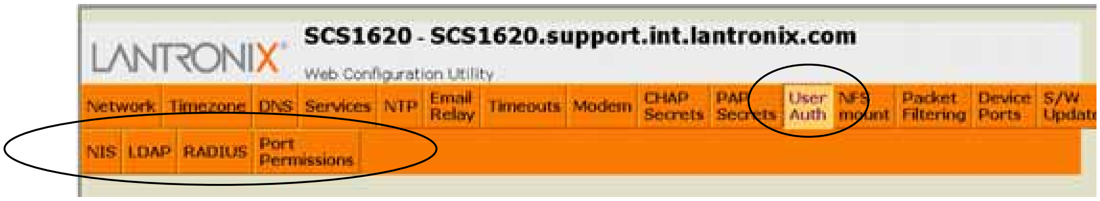


This section of the User Guide does not show each window, which are self-explanatory. **Apply**, **Cancel**, and **Save** buttons are at the bottom of each parameter window. (See Saving Web Interface Entries on page 5-4.)

Configurable Parameters

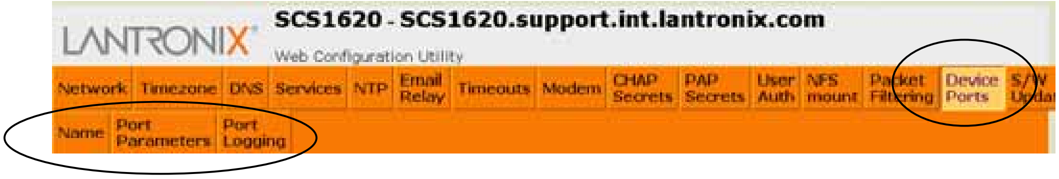
To use the Web interface, select any of the tabs near the top of the page. Each tab allows you to configure a particular parameter or set of parameters. When you select User Authentication, several sub-tabs display below the first line of tabs:

Figure 5-3: User Authentication Selection



The same is true for the Device Ports tab:

Figure 5-4: Device Ports Selection



The Configuration chapter explains the parameters in detail. The table below provides links to these explanations.

Table 5-1. Links to Setup Menu Parameters

Parameter	Link	Page
Network	Configuring Hostname and IP Address	4-5
Timezone	Configuring Timezone	4-7
DNS	Configuring DNS	4-8
Services	Configuring Services	4-9
NTP	Configuring NTP	4-10
Email Relay	Configuring Email Relay	4-11
Timeouts	Configuring Timeouts	4-11
Modem (SCSxx20 only)	Configuring Modem (SCSxx20 only)	4-12
CHAP Secrets	Configuring CHAP Secrets	4-15
PAP Secrets	Configuring PAP Secrets	4-16
User Auth.	Configuring User Authentication	4-16
NFS Mount	Configuring NFS Mount	4-2
Packet Filtering	Configuring Firewall (Packet Filtering)	4-4
Device Ports	Configuring Device Ports	4-5
S/W Updates	Updating Software	4-14

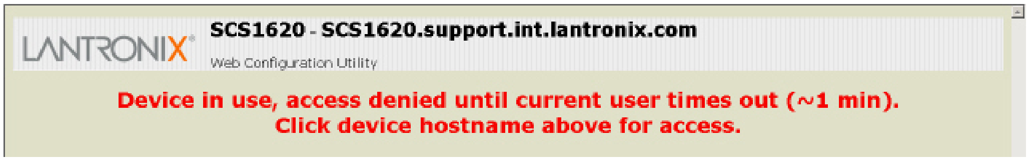
Some functions *cannot* be administered using the Web interface:

- Users cannot access the system using the Web interface (only the system administrator can).
- You cannot enable or disable the Web interface from the Web interface.
- You cannot reboot, power off, or access the command line interface from the Web interface.

Web Access Delay

The Web interface has a built-in delay of approximately one minute between sessions to allow the system to write files as required before the next Web interface session can open. This delay also prohibits two network users from accessing the system via the Web interface at the same time. After the current user closes the browser and the timeout expires, click the hostname (in this case SCS1620) at the top of the page. The login window displays.

Figure 5-5. Web Access Delay Message

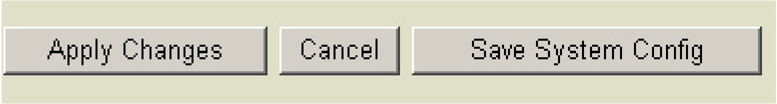

LANTRONIX
SCS1620 - SCS1620.support.int.lantronix.com
Web Configuration Utility

Device in use, access denied until current user times out (~1 min).
Click device hostname above for access.

Note: *If you properly exit the Web interface and then reconnect from the same IP connection, the delay might not occur.*

Saving Web Interface Entries

Figure 5-6. Buttons at Bottom of Web Utility Configuration Page



Apply Changes

Applies the changes for the current page, but does not save them to flash memory. Closing the Web window does *not* save or apply any changes.

You must apply changes after completing the changes for a single Web page.

Cancel

Clears changes on a Web page that you don’t want to apply.

Save System Config

Saves the configuration to flash memory, but does *not* apply or save any entries that have not been applied.

Can be used at any time, but is really only needed after you have applied all of the configuration changes.

Note: *For those entries that require a reboot to function (e.g., network parameter changes), the system administrator must reboot the system using the command line interface.*

Exiting

To **exit** the Web interface:

1. Press the **Save System Config** button to permanently store your changes in flash memory. The system implements most settings after you click the **Save System Config** button, but some changes may require a reboot to take effect.
2. To logout, close the browser window.

6: Modem Setup

If your SCSxx20 was shipped with a modem installed, it is not necessary to perform the modem setup, and you can skip this chapter. This procedure is for installing a modem in the field.

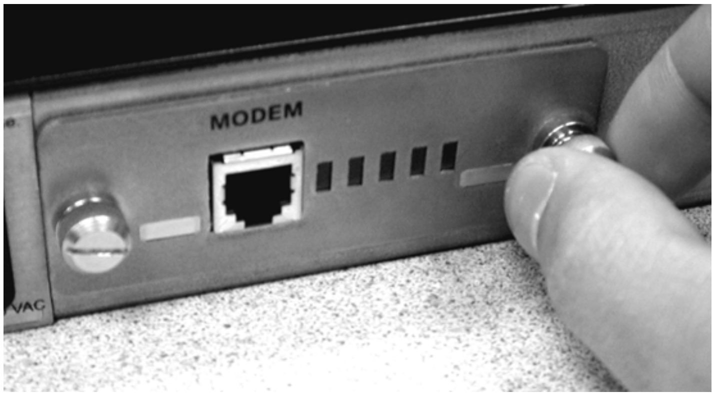
This chapter includes the following topics:

Installing a Modem Card

Note: It is not necessary to power down the unit before installing the modem card.

1. Remove the blank metal plate covering the modem slot on the SCSxx20.
2. Insert the modem card into the open slot in the rear of the SCSxx20.

Figure 6-1. Installing a Modem Card in the SCSxx20



3. Tighten the screws on the modem card by hand.
4. Connect the modem to your telephone line using the RJ11 telephone cord.

Initializing the Modem

If a modem card is installed into a working SCS1620, the system administrator must initialize it for proper operation with the system using the **install_modem** command. This command forces a hardware reset of the modem module and then sends an initialization string that configures the modem for the system. This string also saves these values into the modem's non-volatile memory.

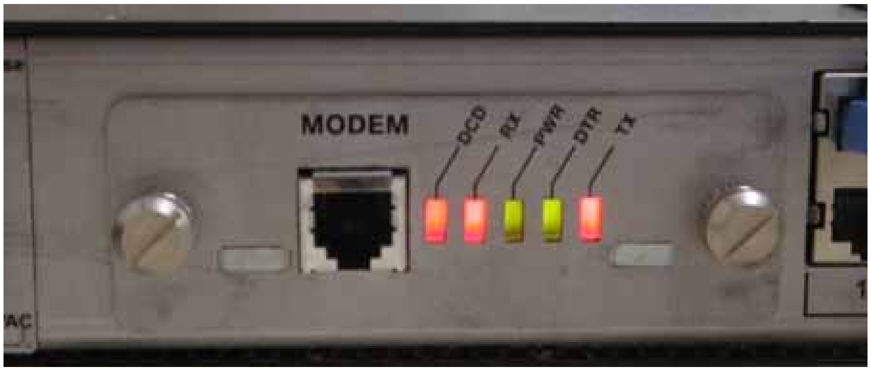
To initialize the modem (only needed when first installed):

1. Login as sysadmin
2. Type **install_modem** at the sysadmin> prompt.
3. When the command has run completely, the sysadmin> prompt displays. The modem has reset and is ready to use.

```
SCS1620 login: sysadmin
Password:

sysadmin>install_modem

sysadmin>
```

4. Check the status LEDs on the modem module.

Figure 6-2. Normal Modem LEDs (Red-Red-Green-Green-Red) for an idle Modem Port



A red LED indicates the “inactive” state, and a green LED indicates the “active” state. The **PWR** LED should always be green when the system is on.

7: System Administrator and User Functions

This chapter describes how the system administrator and users gain access to the system and the functions permitted for each role. It includes the following topics.

System Administrator Functions

The system administrator specifies settings such as user IDs, device configuration, and terminal and access rights to suit the application. The system administrator is also responsible for configuring the system to work in your network.

The system administrator initially uses Telnet or a terminal to access and configure the SCS, and may choose to use the Web-based interface to update the configuration.

Note: Please see the Configuration chapter for instructions on logging on and logging out as the system administrator.

Security and Passwords

The SCS uses Linux/UNIX commands to administer the system. The system administrator and the users access the system using a shell interface, which limits what they can affect in the operating system.

Note: *This guide discusses applicable Linux commands only.*

The shell offers the appropriate level of administration while maintaining the integrity of the system. The system administrator should change passwords upon installation to protect the system.

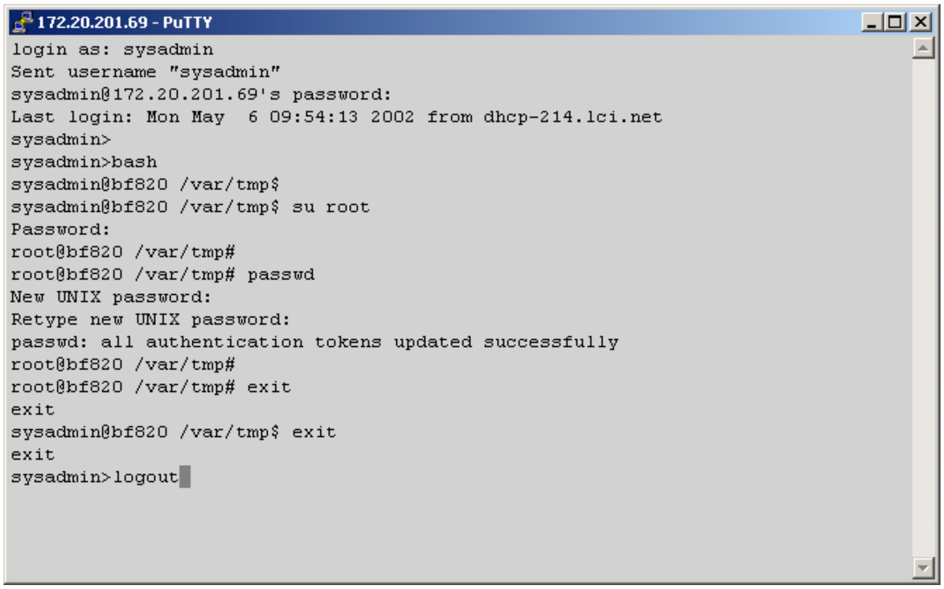
The sysadmin programming level is as close to “root” as is required to administer the SCS, but it is not the most senior root level. The most senior root level is intentionally removed from the shell; however, it exists in the system and the system administrator must change its password to protect against unauthorized access or changes.

Changing the Sysadmin Password

The system administrator must change the password for the **sysadmin** level before connecting the SCS to a network or making it accessible to others. The **passwd** command is discussed in the Commands chapter.

Changing the Root Password

The system administrator must also change the password for the root level. Although users do not require root access, the system administrator can access it using SSH. Make sure to know the root access password and be certain that it has not been left as the common default value. This is especially important if SSH is enabled, since SSH can offer the ability for root-level access by a remote system (depending on sysadmin settings).



```
login as: sysadmin
Sent username "sysadmin"
sysadmin@172.20.201.69's password:
Last login: Mon May  6 09:54:13 2002 from dhcp-214.lci.net
sysadmin>
sysadmin>bash
sysadmin@bf820 /var/tmp$
sysadmin@bf820 /var/tmp$ su root
Password:
root@bf820 /var/tmp#
root@bf820 /var/tmp# passwd
New UNIX password:
Retype new UNIX password:
passwd: all authentication tokens updated successfully
root@bf820 /var/tmp#
root@bf820 /var/tmp# exit
exit
sysadmin@bf820 /var/tmp$ exit
exit
sysadmin>logout
```

To change the root-level password of the SCS, follow the procedure below. It uses the **passwd** command but with some changes for root level. The default root password is **root**.

1. Log in as **sysadmin**. The command-line prompt displays.
2. Type **bash** to start a shell process (notice: sysadmin level = $).
3. **su** (switch user**)** to root level; enter the existing root password (default = **root**). After the system accepts the password, notice that the root level = **sysadmin@SCSXXYY**/#.
4. Type **passwd** to change the root level password. The “authentication tokens updated” message displays.
5. Type **exit** to leave root level (**sysadmin@ $**).
6. Type **exit** to leave shell level (**sysadmin>**).
7. Type **logout** to log out of the system.

Note: Before you **SAVE** the system data, verify that your new root password is correct. Repeat step 3, and when you are prompted for a password, enter the new password.

If You Misplace the Sysadmin Password

You can lock the system down and prevent programming access if you misplace your password. If this should happen, recover the system as follows:

1. Connect a terminal or PC running terminal software to the terminal port on the SCS.
2. Power up the SCS.
3. At the boot prompt, type **?**.
4. At the second boot prompt, type **linux single** and press **Enter.**
5. At the # prompt, type **passwd sysadmin** and press **Enter**.
6. Enter the new password and press **Enter**.
7. At the prompt, enter the new password again and press **Enter**.
8. Type **reboot** and press **Enter**.
9. Once the system reboots, log in using the new sysadmin password.

User Access and Functions

The user can be any person who is assigned a **user name** and **password** by the system administrator. The system may have up to **200 unique users** (including **sysadmin**, the only default user). For security reasons, users can change their own password.

For the most part, users access the SCS through the network connection. In general, only the system administrator uses the terminal port, as it is hardwired to the chassis.

Network Port Access

To connect to the SCS network port, use a TCP/IP Telnet client to Telnet to the IP address assigned to the SCS, or use SSH.

```
OCTANE_65 10# Telnet 172.16.1.31
Trying 172.16.1.31...
Connected to 172.16.1.31
Escape character is ‘^]’.

SCS4805 login: imauser
Password:
imauser>
```

Once connected, you may access the SCS ports for which you have permission.

Terminal Port Access

To form a terminal port connection to the SCS, use a hardwired VT100 terminal or terminal emulation program that is connected to the terminal connector on the SCS. The system administrator normally uses this type connection during service events; however, any user who has access to the VT100 terminal and a password can log into the system this way.

```
SCS4805

SCS4805 login:
SCS4805 login: imauser
Password:
imauser>
```

1. At the SCS login prompt, enter your user name and press **Enter**.

   Note: *Always use the* ***Enter*** *key near the alphanumeric keys on your keyboard.*

2. At the Password prompt, enter your password and press **Enter**. (The system does not display the characters you type.) The command prompt changes to the user's login name (as above).

Modem Module

The SCSxx20 with the optional modem module can support three configurations:

- **Plain text tty:** Provides an interface identical to that of the terminal port or a telnet-ed user, with the standard login and password prompts.
- **PPP connection:** Allows a remote user to establish a PPP connection with the SCS. You need a standard SCS user/password pair to authenticate to the system. IP traffic can then be forwarded through the SCS to the Ethernet port. This allows standard Internet applications to communicate to systems, including the SCSxx20, on the network attached to the Ethernet port of the SCSxx20. These applications include but are not limited to telnet, ftp, and SSH. CHAP is also supported.
- **Callback Connection:** Allows a remote user to establish a connection with the SCSxx20 only after the user logs in with a callback pseudo user, at which time the SCSxx20 drops the connection, delays for a period of time (30 sec.), and then dials the user back at a pre-assigned phone number. Callback may be tty or PPP.

Selecting a Device Port

The system administrator assigns permission to connect to specific device ports in your user profile. If you try to connect, but you do not have access, the message "NO ACCESS TO DEVICE CHANNEL" displays.

1. To select a server connected to a device port, type **select** followed by a device port ID. For example, to connect to a server named Alpha on device port 2, you may either type **select Alpha** or **select 2**.

2. Press **Enter**.

Monitoring the Buffered Data for a Port

When you select a server, the prompt changes to the server name in the general form **USER_NAME-SERVER_NAME>**. For example, if user GEORGE selects

Alpha, the prompt would read GEORGE-Alpha>. When this prompt displays, you are in monitor mode. There is no direct communication between you and the server.

Note: *You may select a server already selected by another user.*

The system saves any output from the server to a buffer that you may access (using **cat** or **less**), but you may *not* issue commands to the server. If you want to issue commands to the server, you must enter direct mode.

Deselecting a Server

You may exit from the current device port by using the **exit** command or selecting another device port.

Direct Mode

If you want to interact directly with a server rather than only monitor its output, you must enter direct mode.

To enter direct mode using the **direct** or **dir n** command:

1. Select a device port.
2. Do *one* of the following:
   - To enter direct mode for the currently selected device port only, enter the **direct** command.
   - To select a device port and enter direct mode in one step, enter the **dir n** command, where n is the device port number or the name assigned to the port.
3. Press **Enter.**

Your terminal directly connects to the server and acts as if the terminal was physically connected to the server. The SCS displays the last page of the device buffer along with a system information message indicating the device port selected.

To escape from direct mode, use the **direct mode escape sequence**. The direct mode escape sequence is a series of two to five characters that allow you 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"); you may change the sequence by using the **editesc** command.

Edit Escape Sequence

We recommend that you only change the escape sequence if it causes problems with your hardware or software. Also, we recommend that you avoid combinations of the **Ctrl** key and other keys, as these combinations are usually for sending and receiving special characters through the terminal. When you change the escape sequence, a window with the hexadecimal representation of the old escape sequence displays.

Note: *Pressing **Esc** to exit from the edit prompt does **not** work; it adds more **Esc** characters to the direct mode escape sequence. Use **\x** to prefix any hexadecimal characters entered in the escape sequence. (The default sequence is **\x1BA = Esc+A**, where 1B is the Hex value for Esc, and A is the letter A.)*

- To keep the existing sequence, press **Enter**.

- To change the sequence, enter the new sequence and press **Enter**. If for some reason the sequence is unacceptable, an error message displays, and the sequence reverts to the existing character values.

A list of hexadecimal character settings is provided at the end of this User Guide.

Logging Out

Always log out when you are finished with your session activity.

To log out from a user session:

1. Type **logout**.
2. Press **Enter**.

If you are logging out from a network, the SCS disconnects the Telnet or SSH session. If you are logging out from a direct serial session, the SCS returns to the login prompt.

The system administrator may configure the SCS to automatically log you out if the terminal connection has been idle for a period of time. This is a security precaution. Depending on your terminal's settings, you may have an inactive window open if the SCS has disconnected.

8: Commands

This chapter includes the following topics:

Summary of Commands

A summary of the SCS commands is provided below. Some commands only **sysadmin** can access, while all defined users can access others.

Table 8-1. Summary of Commands

sysadmin	User	Command	Purpose
x		**adduser**	Adds a user.
x	x	**alias**	Lists command aliases.
x		**bash**	Go to a Linux bash prompt.
x		**break**	Breaks a connection.
x	x	**cat**	Displays the history buffer for a port.
x		**changes**	Lists files changed from factory settings
x	x	**clear**	Clears port buffer.
x		**config-restore**	Restores a configuration.
x		**config-save**	Saves a configuration.
x	x	**connections**	Lists all users in direct mode.
x		**deluser**	Deletes a user.
x	x	**direct**	Enters direct mode.
x		**dtedce**	Configures the device port type.
x	x	**editbrk**	Edits user 'send break' sequence.
x		**editdev**	Edits device settings.
x	x	**editesc**	Edits user direct mode 'escape' sequence.
x	x	**edituser**	Edits user settings.
x	x	**exit**	Deselects a port.
x	x	**help**	Displays help.
x	x	**info**	Shows system information.
x		**install-modem**	Installs internal modem. (SCSxx20 only)
x	x	**less**	Browses history buffer.
x	x	**listdev**	Lists device names.
x	x	**listen**	Listens to a port.
x		**listusers**	Lists users.
x	x	**logout**	Logs out.
x	x	**man**	Displays online manual pages.
x		**modem-hangup**	Hangs up internal modem. (SCSxx20 only)

sysadmin	User	Command	Purpose
x	x	**passwd**	Sets user password.
x		**poweroff**	Powers-off (shuts down) the SCS.
x		**reboot**	Reboots the SCS.
x		**reset-modem**	Resets the internal modem. (SCSxx20 only)
x		**SAVE**	Commits (saves) programming changes.
x	x	**select**	Selects a port.
x	x	**scp**	Secures copy.
x		**setup**	Initially configures the SCS.
x	x	**sftp**	Secures ftp.
x	x	**ssh**	Establishes an SSH connection.
x	x	**ssh-keygen**	Generates SSH keys.
x	x	**Telnet**	Uses Telnet.
x		**telnetconfig**	Assigns a unique TCP port or IP address to a device port.
x	x	**timeout**	Sets the timeout timers.
x		**unsaved**	Lists files saved since last save.
x	x	**version**	Shows version information.

Note: ***Command-line entries are case sensitive.*** *Some system commands display the syntax options when you access them. Many OS-related functions are described in the online MAN pages, accessible from the bash shell.*

System Commands

The following commands (not necessarily in order) are used to set up the system. All commands are case sensitive.

SAVE

SAVE saves any new system data to the system's non-volatile memory. All parameters and settings that the sysadmin changes remain in RAM until then. The sysadmin should run **SAVE** before powering off or rebooting the system.

SAVE is not required **the very first time** (only) that the sysadmin sets up the system using the automated setup script. In this instance, the system automatically runs the setup program, automatically stores the files properly, and reboots upon completion of the program.

reboot

To reboot the SCS any time, use the **reboot** command. The system resets, disconnects all users, and runs the power-on self-test. Only the system administrator may issue the **reboot** command.

```
sysadmin>reboot
Broadcast message from root (ttyM9) Tue Oct  2 14:24:49
2001...
The system is going down for reboot NOW !!
```

System reboot is delayed by one minute from the time you enter the command. Any active network sessions disconnect while the system reboots, and no network sessions can be established while the system reboots.

Note: Use ***reboot now*** *to prevent the one-minute delay and to reboot immediately.*

poweroff

Use the **poweroff** command to shut the system off. This command allows the system to properly close any open files and gracefully exit and shut down. If you turn off the system without using the **poweroff** command (including power failure), the system will require some extra self-checks and start-up time the next time it boots up.

```
sysadmin>poweroff
Broadcast message from root (ttyterm) Tue Oct 2 14:27:12
2001...
The system is going down for system halt NOW !!
```

After you enter the **poweroff** command, the system may take up to two minutes to close all files and prepare to be shut off.

Turn off the power supply switch (or power off the circuit) only after the front panel display says "OK to power off". The SCS must be power-cycled to restart.

help

About help files:

- **?** accesses a list of available commands.
- Command-specific help is provided for some commands, when you type **' --h'** (**space, dash, dash, the letter h**) after the command.
- Other commands use **' -h' (space, dash, letter h)**.
- Some commands offer pop-up help if your entry is in an invalid format.
- Some commands do not provide a help file.
- **q** exits help.

Note: *Some system commands (e.g.,* ***poweroff, reboot****) operate immediately and do not have a help file using* ***--help*** *or* ***-h****.*

alias

Use **alias** to get a list of some of the system command aliases.

```
sysadmin>alias
Command aliases:
dir           - direct
devl          - listdevice
sel           - select
?             - help
ver           - version
lu            - listusers
devices       - editdev
dev           - editdev
```

setup

The setup program runs automatically the first time the system administrator logs into the system. The program steps the system administrator through a majority of the configuration options for the system. The command does *not* configure devices or users.

After the initial running of the system, use the **setup** command to change system settings or parameters. Always remember to use **SAVE** if you are manually running the setup program.

passwd

At the first login, the SCS uses the factory default password, **PASS** (all upper case). The sysadmin should change this default password as soon as possible to prevent access by unauthorized personnel.

```
sysadmin>passwd
Changing password for sysadmin
(current) UNIX password:
New UNIX password:
Retype new UNIX password:
passwd: all authentication tokens updated successfully
sysadmin>
```

To change the sysadmin factory default password, type **passwd** (all lower case) at the sysadmin> prompt. The system prompts you to enter a new password. The new password must be six or more alphanumeric characters and is case-sensitive.

The sysadmin must also change the root password. While root access is not required in the SCS system; changing the root password from the default ensures the security of your system. The root password is more senior than the sysadmin password and is administered differently. (See Changing the Root Password.)

break

Use this command to break a connection. The syntax is **break <**port # **>** (e.g., **break** 1, **break** 2, **break** 3).

changes

Use this command to list files that have been changed from factory settings.

config-save

Use this command to place a backup of the system configuration on the ftp or tftp server configured in the setup process. The sysadmin must first configure the ftp/tftp server parameters as described in Updating Software.

config-restore

Use this command to load the saved backup of the system configuration from the ftp or tftp server configured in the setup process. The sysadmin must first configure the ftp/tftp server parameters as described in Updating Software.

install-modem

Use this command to install an internal modem. (SCSxx20 only)

man

Use **man <command name>** to search for a help file (online manual pages) or descriptive information for a Linux/UNIX command.

modem-hangup

Use this command to hang up an internal modem. (SCSxx20 only)

info

The **info** command displays the shell version.

```
sysadmin>
sysadmin>info
SCS4805 Shell V4.00
sysadmin>
```

reset-modem

Use this command to reset the internal modem. (SCSxx20 only)

scp

Use **scp** to perform a **secure copy**, using SSH, between two hosts. The file copy is encrypted and is therefore secure.

Refer to the **man** pages for **scp** for a description and command options.

sftp

Use **sftp** to perform a secure file transfer transaction, using SSH, between two servers. It is similar to ftp except that it is encrypted for security.

Refer to the **man** pages for **sftp** for a description and command options.

ssh

Use **ssh** to open up a secure shell connection between two hosts to transfer files or data between the systems. In this case, the SCS is a client device and is connected to an SSH host elsewhere. You may need to generate the security keys for SSH using **ssh-keygen**, depending on your application of SSH.

Refer to the man pages for **SSH** for a description and command options.

ssh-keygen

Use **ssh-keygen** to create the security keys for your client system to interact with an SSH host elsewhere. After the keys have been generated, the user can establish a secure shell connection using SSH over a network.

See Advanced Sysadmin Commands later in this chapter for an **ssh-keygen** tutorial. Refer to the **man** pages for **SSH** for a description and command options.

syslog

The SCS keeps a system log file called **/var/log/syslog**. The level of logging is controlled by the file **/etc/syslog.conf**.

The SCS can log the following:

- Warning level events: no events
- Notice level events:
  - Device settings changed
  - Begin and end direct mode
  - Device buffer cleared
  - Begin and end listen mode
  - Begin and end bash shell
- Info level events
  - User settings modified
  - User begin and end of SCS command shell
  - Device selected
  - Device unselected (**exit** command)

- Device buffer examined (**less** or **cat**)
- User becomes **root**

The SCS comes set to log all warnings and higher events. The default file entry is ***.warning**, with lower level settings (a lower level generates more messages) in ***.notice** and ***.info** (even more events).

To change the logging level:

1. Log in as sysadmin.
2. Type **bash** and press **Enter**.
3. Edit the file **/etc/syslog.conf** (**vi /etc/syslog.conf**) and press **Enter**.
4. Restart the system logger by typing **service syslog restart** and pressing **Enter**.
5. To return to the SCS command shell, type **exit** and press **Enter**.

timeout

When a user logs into the system, a timeout clock starts for that connection. It checks for continuous idle time on that connection. There are three separate timers in the system for the two possible methods of accessing the system (via terminal or via network port connection). The system senses periods of “no activity” on the connection, and if the idle time exceeds the timeout duration, the system disconnects the port.

- Use **timeout -h** to get a help file for the timeout feature.
- Use **timeout -c [value = 0, or 1-30]** for the terminal port timeout.
- Use **timeout -t [value = 0, or 1-30]** for the Telnet (network) timeout.

You may disable timeout for any or all of the connection ports. The timeout duration may be from 1 to 30 minutes. Each time is approximate, and may be as much as 59 seconds longer than the programmed time (e.g., setting a timeout to 3 minutes can take from 3:00 to 3:59 minutes to occur). Setting a timeout to **0** disables that timeout operation.

Type **timeout** or **timeout ?** to list the current timeout settings.

unsaved

Use this command to list files that have changed since the last save.

version

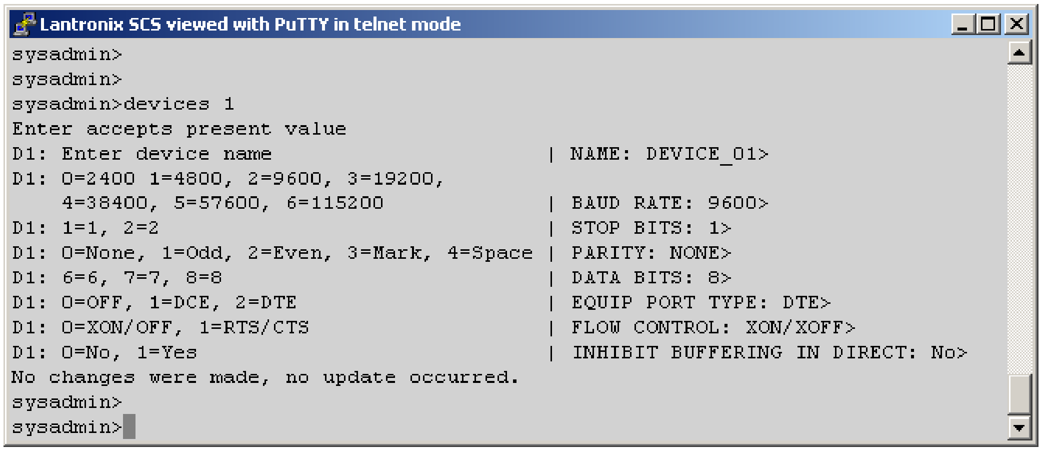
Use **version** to determine the version of the shell. Use **version -a** to get a display of the version of the system files.

```
sysadmin>
sysadmin>ver
ci V3.13
sysadmin>
sysadmin>version -a
SAVE V3.23
break V3.08
ci V3.13
connections V3.04
devices V3.11
direct V3.14
dtedce V3.17
```

```
edituser V3.05
lcd V3.13
lciclear V3.06
lcistty V3.06
listen V3.21
listend V3.22
ltxloggerd V1.17
lu V3.05
modem_reset V3.10
perms V3.09
timeout V3.08
timeoutd V3.06
lci-system-configure V1.22
EXAR-XR16L788 Device Driver V2.8
SCS4805 release date: Thu Sep 19 16:14:49 2002 V4.0
sysadmin>
```

Device Commands

The system administrator may define the device port parameters using the **devices, editdev,** and **listdev** commands.



```
sysadmin>
sysadmin>
sysadmin>devices 1
Enter accepts present value
D1: Enter device name                         | NAME: DEVICE_01>
D1: 0=2400 1=4800, 2=9600, 3=19200,
    4=38400, 5=57600, 6=115200                | BAUD RATE: 9600>
D1: 1=1, 2=2                                  | STOP BITS: 1>
D1: 0=None, 1=Odd, 2=Even, 3=Mark, 4=Space    | PARITY: NONE>
D1: 6=6, 7=7, 8=8                             | DATA BITS: 8>
D1: 0=OFF, 1=DCE, 2=DTE                       | EQUIP PORT TYPE: DTE>
D1: 0=XON/OFF, 1=RTS/CTS                      | FLOW CONTROL: XON/XOFF>
D1: 0=No, 1=Yes                               | INHIBIT BUFFERING IN DIRECT: No>
No changes were made, no update occurred.
sysadmin>
sysadmin>
```

devices

Use **devices** to obtain a list of all options for all device ports. Press the spacebar to continue the list, and press **q** when you reach the end prompt.

editdev

Use **editdev -u <device number or name>** to edit and update the parameter settings of a device. Step through each device option; when you are done, the system prompts “Are you sure?” before accepting the changes. Remember to **SAVE**.

listdev

Use the **listdev** command to display a list of device port names and their corresponding port numbers.

Programmable elements include: device name, baud rate, stop bits, parity, data bits, DCE/DTE, flow control, and inhibit buffering in direct mode. Pressing **Enter** accepts the parameter as is. If you need to make changes, you can edit each parameter as it comes up after each **>** prompt.

Device Name

The device name cannot contain a space. Use an underscore if you need an empty space in the name.

Baud Rate

Seven device baud rates are offered: 2400, 4800, 9600, 19200, 38400, 57600, and 115,200. Most devices use 9600 as the terminal/administration port's baud rate, so the device port defaults to this value. Check the equipment settings and documentation for the proper baud rate.

Stop Bits, Parity, Data Bits

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

DCE/DTE

The SCSxx05 device and terminal ports are factory configured as DTE devices. The SCSxx20 device and terminal ports are factory configured as DCE devices.

Flow Control

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

Buffering

The Inhibit Buffering in Direct 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. You may disable direct mode buffering so other users cannot view sensitive data, but the system stores alert and panic messages from the attached device when nobody is connected. This setting is disabled by default, so buffer data is collected both in and out of direct mode.

connections

Use **connections** to display a snapshot list of all users connected in direct mode.

cat

Use **cat <port name or number>** to display the buffer information for that port.

clear

Use **clear <port name or number>** to clear the buffer for that port.

less

Use **less <port name or number>** to browse the buffer for that port. When the buffer reaches the capacity of the screen, it pauses; press the spacebar to continue the display. When the buffer reaches the end, it displays "END"; press **q** to quit the **less** program and return to the command line.

logout

Use **logout** to quit your session with the system.

User Management Commands

The system administrator uses the following commands to add and delete users and to add and change settings for system users. The **sysadmin** is also a user, although one who cannot be deleted.

listusers

Use **listusers** to get a list of all assigned users in the SCS.

```
sysadmin>listusers
test
sysadmin
user1
kevin
ross
bill
anthony
tom
harry
george
```

adduser

Use **adduser <user name>** to add a new user profile including the user's password, port configuration, and default operational sequences.

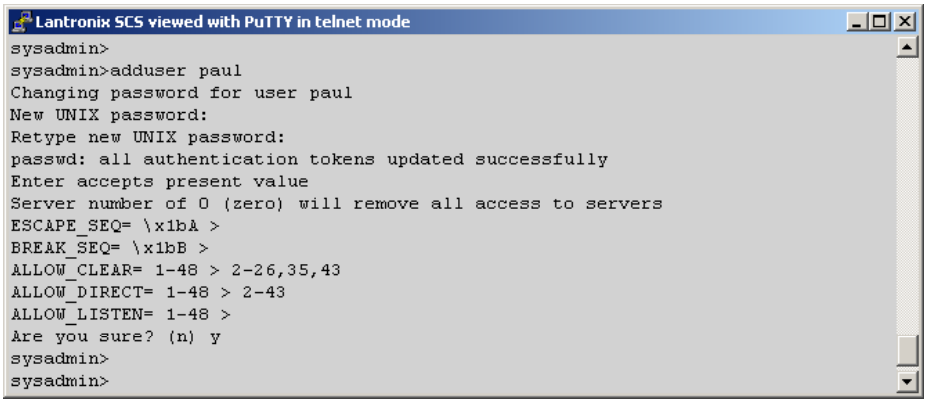
```
sysadmin>
sysadmin>adduser
usage: /lci/bin/adduser name
sysadmin>adduser newuser
Changing password for user newuser
New UNIX password:
Retype new UNIX password:
passwd: all authentication tokens updated successfully
Enter accepts present value
Server number of 0 (zero) will remove all access to servers
ESCAPE_SEQ= \x1bA >
BREAK_SEQ= \x1bB >
ALLOW_CLEAR= 1-9 > 1-8
ALLOW_DIRECT= 1-9 > 1,3,5,7
ALLOW_LISTEN= 1-9 > 1-3,5,7-9
Are you sure? y
sysadmin>
```

1. Type **adduser** and press **Enter**.
2. Type the desired user name (case sensitive) and press **Enter**. A prompt asks for a password for the new user.

   Note: *Passwords **should be** at least six characters long. If a password is less than 6 characters long, the system warns you that it is "bad password: too short." However, if you ignore the message and re-enter the password (to confirm it), the system will accept it.*

As soon as you enter the password, the system creates the new user identity and authenticates and creates the default parameters for it.

When the user logs in for the first time, the system asks for this password. This password is case-sensitive. Users can change their own passwords using the **passwd** command at a later time.



```
sysadmin>
sysadmin>adduser paul
Changing password for user paul
New UNIX password:
Retype new UNIX password:
passwd: all authentication tokens updated successfully
Enter accepts present value
Server number of 0 (zero) will remove all access to servers
ESCAPE_SEQ= \x1bA >
BREAK_SEQ= \x1bB >
ALLOW_CLEAR= 1-48 > 2-26,35,43
ALLOW_DIRECT= 1-48 > 2-43
ALLOW_LISTEN= 1-48 >
Are you sure? (n) y
sysadmin>
sysadmin>
```

The system automatically enters the **edituser** mode for this new user, allowing the system administrator to change any of the preset parameters.

edituser

Use this command to edit the port configuration and default operational sequences for that user profile. This command creates user IDs and privileges.

The system prompts the sysadmin to define the device ports that the user will be allowed to access for direct connections. You can administer ports:

- Individually (e.g., 4)
- As a range (e.g., 5-7)
- As selective ports (e.g., 1,4,5,6,9)
- As combinations of the above (e.g., 1-4,6,8)

The **ALLOW_CLEAR** option determines whether a user may use the **clear** command to delete all the data stored in a device port FIFO buffer. The administrator may want to inhibit this ability to preserve user accountability when accessing attached devices. Users are allowed to clear buffers by default.

The **ALLOW_DIRECT** option determines which devices a user may select for direct access.

The **ALLOW_LISTEN** option determines which devices a user may select for listen mode.

1. You have two options:
   - To edit or change parameters for the sysadmin, enter the command **edituser** without a user name.
   - To edit or change parameters for a particular user after defining that user ID, use the **edituser** command.

     For example, if the user **newuser** needed to have more concurrent login capabilities, the administrator would type **edituser newuser** on the command line.
2. 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, press **Enter** to accept the current value and move to the next parameter in the list.*

   If you change any parameters, the system prompts "Are you sure?"

3. To accept the changes, type **y** for yes, *or* to reject the changes, type **n** or do not enter anything.

4. Press **Enter**.

```
sysadmin>
sysadmin>edituser
Enter accepts present value
Server number of 0 (zero) will remove all access to servers
ESCAPE_SEQ= \x1bA >
BREAK_SEQ= \x1bB >
ALLOW_CLEAR= 1-8 > 1-9
ALLOW_DIRECT= 1-9 >
ALLOW_LISTEN= 1-8 >
Are you sure? y
sysadmin>

sysadmin>
sysadmin>edituser newuser
Enter accepts present value
Server number of 0 (zero) will remove all access to servers
ESCAPE_SEQ= \x1bA >
BREAK_SEQ= \x1bB >
ALLOW_CLEAR= 1-8 >
ALLOW_DIRECT= 1,3,5-7 >
ALLOW_LISTEN= 1-4,8-9 >
sysadmin>
```

deluser

To delete an existing user ID from the system, use **deluser <user name>** (all on the same line).

Note: *The* ***deluser*** *command does* ***not*** *verify whether you wish to delete the user or not.* ***Be careful!***

Use the **listusers** command after deleting a user ID to verify the deletion.

editbrk

Use **editbrk <user name>** to edit the break sequence for a user. The break sequence (user key strokes; default is **Esc+B**) displays to the system administrator in its ASCII form in the **edituser** list. See Break Sequence on page 8-12 for more information.

editesc

Use **editesc <user name>** to edit the escape sequence for a user. The escape sequence (user key strokes; default is **Esc+A**) displays to the system administrator in its ASCII form in the **edituser** list. See Escape Sequence on page 8-12 for more information.

passwd

When logged in as sysadmin, use **passwd** to change the sysadmin password. Use **passwd <user name>** to change a user's password. Passwords should be six characters or longer, and are case-sensitive.

User Commands

After the user logs in to the system, the user name becomes the command prompt. For example, **ross>** displays after Ross logs in.

Users log in to identify themselves to the system and to access the device ports to which the system administrator has assigned them privileges.

select

Use **select <port name or number>** to select a port (only applies to ports for which this user is allowed **clear**, **direct**, or **listen** access).

direct

Use **direct <port name or number>** to connect to a port (only applies to a port for which this user is allowed **direct** access).

telnetconfig

Use **telnetconfig < port name or number>** or **telnetconfig <IP address>** to assign a unique TCP port or IP address to a device port so that Telnet can be used to connect to the device port. Only the sysadmin user has permission to run **telnetconfig**. Users who wish to Telnet to a device port must have must have direct access rights to use this command.

listen

Use **listen <port name or number>** to listen to a port (only applies to ports for which this user is allowed **listen** access).

clear

Use **clear <port name or number>** to clear the buffer of a device port (only applies to ports for which this user is allowed **clear** access).

exit

Use **exit** to disconnect from a port that you are connected to. When you are disconnected, the command line displays.

logout

The user can log out of a port connection by typing **logout** on the command line.

Break Sequence

The user can send a break signal to the external device using a programmed break sequence. The preset value for this option is **Esc+B** (performed quickly but not simultaneously).

Escape Sequence

The user can disconnect from a port by using a programmed escape sequence. The preset value for this option is **Esc+A** (performed quickly but not simultaneously).

Advanced Sysadmin Commands

You can access the following features from the command line interface or administer them using a Linux command line prompt through your network.

Using ssh Keys and keygen Procedures

The following info is taken, with great liberties, from an open source article discussing ssh and keygen. It is online at: http://igloo.its.unimelb.edu.au/Webmail/security/msg00010.html.

ssh-agent: Type My Passphrase Once

Ssh-agent makes this all so easy. Basically, it loads my private key into memory once per session, prompting me for a passphrase to decrypt the key at the time of load. At that point, I can use this key as if it had no passphrase until I end that session or remove the key from memory. Since it's never written to disk in its decrypted form, this is pretty darn safe. Let's see this at work:

```
[max@miraclehut ~]$  ssh-agent /bin/bash


[max@miraclehut max]$ ssh-add

Need passphrase for /home/max/.ssh/identity (max@miraclehut).

Enter passphrase:

Identity added: /home/max/.ssh/identity (max@miraclehut)


[max@miraclehut jay]$ ssh humperdink@castle
```

In the first step, I invoke the ssh-agent, giving it a child program to run. The agent gives access to my key(s) *only* to its children. I run bash here, so that every program I run in this new bash shell can have access to my private key. I just as well could have typed "ssh-agent xterm" or "ssh-agent startx" to give all programs run in a specific xterm or in X session, respectively, this kind of access.

In the second step, I actually give the agent my key. I decrypt it once, by entering my passphrase. I won't have to type my passphrase again until I quit bash.

Finally, in the third step, I ssh to my "humperdink" account on the "castle" host. As long as I have set up that account properly, by appending this account's *~/.ssh/identity.pub* to the end of humperdink@castle *~/.ssh/authorized_keys* file, I'll connect with no password whatsoever! I can keep doing things like this over and over, using scp to copy files, ssh to login interactively, or *ssh user@target "command"* to execute commands on a remote host. When I'm done, I can type **exit** to kill off the bash shell, and thus the agent.

Using Single Signon to Save Time

To automate and save time, try this:

```
[max@miraclehut ~]$  ssh-agent /bin/bash


[max@miraclehut max]$ ssh-add



Need passphrase for /home/max/.ssh/identity (max@miraclehut).

Enter passphrase:

Identity added: /home/max/.ssh/identity (max@miraclehut)

[max@miraclehut max]$ for target_host in host1 host2 host3

                    host4 host5 host[678] host9; do

> ssh root@$target_host "./tripwire --initialize"

> ssh root@$target_host "echo \"This host protected by

                     Tripwire\" >> /etc/motd"

> done
```

This process allows me to type in my passphrase once, and then run two commands, on nine hosts, without having to type any more passphrases. I can walk away now, content that I don't have to manually start Tripwire on each of the nine hosts. I can use more "for" loops now, since I don't have to re-enter my passphrase again until I exit out of the bash shell! This saves tons of time, without the insecurity of rsh or rlogin's rhost authentication.

Mounting File Systems During Boot

You can configure the SCS to mount a file system at boot time. Configure this feature from the bash shell as the root user. To access the bash shell as root user:

1. Log in as **sysadmin**. The command-line prompt displays.
2. Type **bash** to start a shell process (notice: sysadmin level = $).
3. **su** (switch user**)** to root level; enter the existing root password (default = **root**). After the system accepts the password, notice that the root level = **sysadmin@** # (e.g., **[root@SCS1620 /var/tmp]#?**)

To mount a file system at boot time, the **/etc/fstab** file must have an entry that is associated with the directory to mount. Following is an example of how to use this facility to automatically mount an NFS file on the SCS.

In **/etc/fstab** the following entry must be present:

```
/dev/device     /dir/to/mount    ftype    parameters     fs_freq fs_passno
```

where

/dev/device The device to be mounted. In the case of mounting an NFS file system, the entry should be in the form of **server name:/dir/exported**, where server name is the name of the NFS file server, and the **/dir/exported** is the exported directory found on the NFS server.

/dir/to/mount The location at which the file system should be mounted on the SCS. This directory has to be defined on the SCS, or it will not work.

ftype The file system type. For an NFS-mounted file system, use nfs.

parameters These are the parameters that are passed to the **mount** command. They are in a comma-delimited format.

fs_freq This is used by dump to determine whether a file system needs to be dumped.

fs_passno The fsck program uses this to determine the order to check disks at boot time.

An example of an entry in **/etc/fstab** is as follows:

```
erh62:/export/var/test          /var/test       nfs       rw,bg,intr,soft    0    0
```

To manually test whether the system will automatically mount a file system at boot time, enter the following command to manually mount the file:

```
mount –a
```

This command reads the **/etc/fstab** file and mounts all of the entries in the file that are not already mounted. Once the system verifies the **/etc/fstab** file, you must configure the SCS to have the portmap service and the netfs script executed when the system boots.

To do this, execute the **chkconfig** command for both. The following commands configure the SCS:

```
chkconfig –add portmap
```

```
chkconfig –add netfs
```

The system is now configured to start the portmap service and make sure the NFS file system is mounted when the system boots.

Mounting File Systems Dynamically Using autofs

autofs is a kernel module that allows the SCS to dynamically mount file systems only when needed. An example would be to have all of the user’s home directories on an NFS-mounted disk. When the user logs into the SCS, the system immediately mounts the user’s directory instead of at boot.

You can only configure this feature from the bash shell as the root user. (See instructions for changing to the root user in Mounting File Systems During Boot.)

The following files are needed to insure that **autofs** works properly:

/usr/sbin/

automount

/etc/rc.d/init.d/

autofs

/etc/

auto.master

auto.export

/usr/lib/autofs/

lookup_file.so
lookup_multi.so
lookup_nisplus.so
lookup_program.so
lookup_userhome.so
lookup_yp.so
mount_afs.so
mount_autofs.so
mount_changer.so
mount_ext2.so
mount_generic.so
mount_nfs.so
parse_sun.so

All of these files, with the exception of the two listed in the **/etc** directory, are system files. The **auto.master** and **auto.export** files are configuration files for automount.

The following example describes how to set up the SCS so that whenever user tomv logs into the SCS and accesses its home directory, the system uses the NFS-mounted file system on the erh62 server.

1. Look at the configuration files. The **auto.master** file tells **automount** where to mount the list of files that are present in the **auto.export** file.

   a) In **auto.master**, add the following line:

      /export/home   /etc/auto.export   --timeout 60

      where

      /export/home The mount point on the SCS. Must be defined.

      /etc/auto.export The file that contains the list of mounts for **/export/home**.

      --timeout Number of seconds the mount is inactive before being unmounted. (0 = file will not be unmounted.)

b) In the **auto.export** file, add the following:

tomv -fstype=nfs,rw,intr,soft,bg erh62:/home/tomv

where

tomv	The NFS mounted directory name.
fstype	The comma-delimited option list that mount will use.
erh62:/home/tomv	The server name and directory that the SCS will use.

2. Once the configuration files are complete, start the **autofs** service by issuing the following command:

   service autofs start

   For completeness, you can place a symlink in the **/home** directory:

   ln –s /export/home/tomv tomv

   Now the user can access the user's home directory using the path **/home/tomv**.

   If you need to change the **autofs** configuration files, you must restart the service by doing one of the following:

   service autofs restart

   or

   service autofs stop

   service autofs start

9: Port Access

The SCS provides various ways of accessing serial ports. This chapter includes the following topics:

Telnet to Serial Port Feature

This section describes how to set up and use the Telnet to a Serial Port feature of the SCS. It assumes that you have otherwise configured the unit, and that the console server has connectivity to the network.

The system administrator can assign the serial ports individual IP port numbers and/or distinct IP addresses. You can disable authentication on the console server for directly connected serial ports. This section discusses the setup, use, and security considerations for port access.

Accessing Serial Ports

You can set up the Telnet to a Serial Port feature so that you can access a serial port by entering a predefined IP port number on the Telnet client's command line or by using distinct IP addresses assigned to each serial port. You can set up the console server in several simple steps.

The reason to use one access method or the other is site specific:

- If your site has limited IP addresses available, then you may want to define separate IP port numbers for the serial ports and use these numbers in combination with the console server's IP address.
- If you have enough IP addresses available and would like to assign names to each IP address (using your DNS server), then you may want to define an IP address per serial port.

IP Port Numbers

If you assign an IP port number to a serial port, enter the full command on the client machine to directly access the serial port:

$ Telnet console_server_ip_addr ip_port_number

or, if the name of the console server can be resolved to an IP address (DNS):

$ Telnet console_server_name ip_port_number

You must predetermine and establish the cross-reference of the console server serial port number and the specific console server IP port number on the console server. To access the proper port, users must be aware of this cross-reference.

If you are using multiple console servers, the IP port number assignments can be the same on each console server. An example of this cross-reference is:

IP Port Number	Serial Port Number
9001	1
9002	2
9003	3
...	...
9008	8
...	...
9046	46
9047	47
9048	48

IP Port Number/Serial Port Number Cross-Reference

If you are assigning an IP address per console server serial port, enter the following command on the client machine to directly access a serial port:

$ Telnet ip_addr_of_serial_port

or, if the name of the console server can be resolved to an IP address (DNS):

$ Telnet dns_name_of_serial_port

This last method is more simple and straightforward for users to access serial ports (actually, to access the device connected to the serial port).

Assume we have three devices connected to three different serial ports.

- Serial port 1 is connected to the console of a Sun server named “quasar.”
- Serial port 2 is connected to the console of a SGI named “seyfert.”
- Serial port 3 is connected to the console of an HP named “stellar.”

We assigned a distinct IP address to each console server serial port. Then, we associated these three IP addresses to the names **c_quasar**, **c_seyfert,** and **c_stellar** in the DNS system.

The command to access the console of “seyfert” is:

$ Telnet c_seyfert

Using either of the two methods above, the user can directly connect to a serial port without actually logging on to the console server and entering the appropriate *direct* command. Note that the only action supported is the direct connection to a port.

Assigning an IP Port Number to a Serial Port

You need to modify two files to assign an IP port number to a serial port.

In our example we specify that:

- IP port number 9001 correlates to serial port 1
- IP port number 9002 correlates to serial port 2

and so on, up to 9048 correlating to device port 48 in the SCS4805. These IP addresses are simply the default values and the convention chosen in this example. If you choose your own port numbers, ensure that they do not conflict with existing entries in **/etc/inetd.conf**.

1. The first file to edit is **/etc/inetd.conf.** In this file, uncomment the existing entries in the (supplied)**/etc/inetd.conf**, as follows:

   a) Log in to the sysadmin account:

```
sysadmin>bash
sysadmin@km3210 /var/tmp$ su
Password:
root@km3210 /var/tmp# cd /etc
root@km3210 /etc# vi inetd.conf
```

   b) Uncomment the entries for ports 9001 to 9017. Save and exit vi. The entries should look like:

```
9001 stream tcp nowait root /usr/sbin/tcpd in.telnetd
```

   c) Tell the inetd process to re-read the **/etc/inetd.conf file**:

```
root@km3210 /etc# kill –SIGHUP `cat /var/run/inetd.pid`
```

2. Edit the second file, **/lci/lwip_serial.conf**, as follows:

```
root@km3210 /etc# cd /lci
root@km3210 /lci# vi lwip_serial.conf
```

3. Uncomment the entries that correspond to the IP port numbers 9001 to 9017 for device ports 1 through 17. The entries should look like:

```
1 0.0.0.0 9001 1
2 0.0.0.0 9002 1
3 0.0.0.0 9003 1
...
16 0.0.0.0 9016 1
17 0.0.0.0 9017 1
```

and so on.

Testing

If you have not set up the (local or NIS) port permission file for users on the console server, they will not be able to access the serial ports.

If the user does not have the appropriate serial port permissions, attempting to connect via Telnet gives the following results:

```
kerrym@erh62 $ Telnet km3210 9004
Trying 192.168.201.60...
Connected to km3205.lci.net (192.168.201.60).
Escape character is '^]'.
km3205.lci.net
login: kerrym
Password:
Last login: Thu Mar 14 15:51:10 from quasar
No access to Device channel.
Connection closed by foreign host.
kerrym@erh62 $
```

Notice the message “No access to Device channel.” If the user has the appropriate serial port permissions, then the output appears as:

```
kerrym@quasar $ Telnet km3210 9005
Trying 192.168.201.60...
Connected to km3205.lci.net (192.168.201.60).
Escape character is '^]'.
km3205.lci.net
login: kerrym
Password:
Last login: Thu Mar 14 11:19:54 from quasar
Entering Direct mode...Server = 5
```

Saving the Changes to Flash

Once you complete the setup, save the changes to flash. (Note that on the system shown below, NIS was running. NIS was used for both the login authentication of “kerrym” and to obtain the permissions for the serial port.)

```
root@km3210 /lci# exit
exit
sysadmin@km3210 /var/tmp$ exit
exit
sysadmin>SAVE
Shutting down Timeout daemon: [ OK ]
Shutting down NIS services: [ OK ]
Saving random seed [ OK ]
Initializing random number generator [ OK ]
mounting filesystem read-write
delete /etc.old
copy files from ram disk to /etc.new
copy complete - moving /etc to /etc.old
move complete - /etc updated
mounting filesystem read-only
ram disk mounted as /etc
Starting Timeout daemon: [ OK ]
Binding to the NIS domain... [ OK ]
Listening for an NIS domain server: quasar.lci.net
system SAVE complete
sysadmin>
```

IP Address per Serial Port Feature

The IP Address per Serial Port feature allows you to set multiple network addresses on the same low-level network device driver (e.g., two IP addresses in one Ethernet card). It is typically used for services that act differently based on the address they listen on (e.g., multihosting, virtual domains, or virtual hosting services).

Setting up an IP Address per serial port is only slightly more involved than setting up the IP port number per serial port. It involves editing **/lci/lwip_serial.conf** and creating a five-line config file per distinct IP address. You do *not* have to change **/etc/inetd.conf**.

Setting the IP Addresses

The first file to edit is **/lci/lwip_serial.conf**. In this file we specify the IP addresses for the corresponding serial ports. In the example below we chose the IP addresses 192.168.202.11 through 192.168.202.26. These correspond to serial ports 1 through 16 respectively. The IP addresses do not need to be in consecutive order. Obtain or choose IP addresses that are appropriate for your site.

1. Log in to the sysadmin account and then go into the bash shell.

```
sysadmin>bash
sysadmin@km3210 /var/tmp$ su
Password:
root@km3210 /var/tmp# cd /lci
root@km3210 /lci# vi lwip_serial.conf
```

2. Modify the entries for the serial ports to be similar to:

```
1 192.168.202.11 - 1
2 192.168.202.12 - 1
3 192.168.202.13 - 1
*
*
16 192.168.202.26 - 1
```

3. Save and exit vi.

4. Set up the aliased IP addresses on the console server. There will be one config file per aliased IP address.

   The config files will reside in **/etc/sysconfig/network-scripts/** and are named **ifcfgeth0:*nn*,** where nn corresponds to the aliased device number (0, 1, 2, … 16).

   You may find it easier to create these files on your workstation and then **scp** them to **/etc/sysconfig/network-scripts**/ on the console server. The first file is named **ifcfgeth0:0**, the second file is **ifcfg-eth0:1**, and so on.

```
root@km3210 /lci# cd /etc/sysconfig/network-scripts
```

The content of the first file, **ifcfg-eth0:0**, is:

```
DEVICE="eth0:0"
BOOTPROTO="none"
ONBOOT="yes"
IPADDR="192.168.202.11"
NETMASK="255.255.255.0"
```

The content of the second file, **ifcfg-eth0:1** is:

```
DEVICE="eth0:1"
BOOTPROTO="none"
ONBOOT="yes"
IPADDR="192.168.202.12"
NETMASK="255.255.255.0"
```

5. In this manner, set up the remaining 14 config files. Note that there are *two* lines that must be changed in *each* file. The **DEVICE** line and the **IPADDR** line. **ONBOOT** indicates that this device will be set up on each subsequent boot of the console server.

6. Once the files are set up in **/etc/sysconfig/network-scripts/,** as the **root** user, cycle the eth0 interface. **You must do this from the terminal port (not a network login)**. The **ifup** command will take a few seconds to configure a total of (up to) 16 IP addresses.

```
root@km3210 /etc/sysconfig/network-scripts# ifdown eth0
root@km3210 /etc/sysconfig/network-scripts# ifup eth0
```

7. Verify the values that you entered in the config files. (Only one of the eth0:n output values is shown below). Note that your **Hwaddr** will not match the one that is shown below.

```
root@km3210 /etc/sysconfig/network-scripts# ifconfig
eth0 Link encap:Ethernet HWaddr 00:30:31:00:27:D5
inet addr:192.168.201.60 Bcast:192.168.201.255
Mask:255.255.255.0
UP BROADCAST RUNNING MULTICAST MTU:1500 Metric:1
RX packets:164716 errors:0 dropped:0 overruns:0 frame:0
TX packets:8039 errors:0 dropped:0 overruns:0 carrier:0
collisions:0 txqueuelen:100
Interrupt:11 Base address:0x1000
eth0:0 Link encap:Ethernet HWaddr 00:30:31:00:27:D5
inet addr:192.168.202.11 Bcast:192.168.255.255
Mask:255.255.255.0
UP BROADCAST RUNNING MULTICAST MTU:1500 Metric:1
Interrupt:11 Base address:0x1000
lo Link encap:Local Loopback
inet addr:127.0.0.1 Mask:255.0.0.0
UP LOOPBACK RUNNING MTU:3924 Metric:1
RX packets:49 errors:0 dropped:0 overruns:0 frame:0
TX packets:49 errors:0 dropped:0 overruns:0 carrier:0
collisions:0 txqueuelen:0
```

8. If any of the values is not correct, update your config file(s) accordingly. From the **terminal port (not a network login)**, cycle the eth0 interface:

```
root@km3210 /etc/sysconfig/network-scripts# ifdown eth0
root@km3210 /etc/sysconfig/network-scripts# ifup eth0
```

Note: *If you need to set up an* additional *gateway to access the aliased IP addresses from client workstation(s), for example, set up the* ***/etc/sysconfig/static-routes*** *file. (This is an* additional *gateway – the* default *gateway is set up through the sysadmin* ***setup*** *program.) By default, the* ***static-routes*** *file does not exist.*

9. To create and populate the **static-routes** file, go the **/etc/sysconfig/** directory, and issue the following command (all on a single line):

```
root@km3210 /etc/sysconfig/# echo “eth0 net 192.168.202.0
netmask 255.255.255.0 gw xxx.xxx.xxx.xxx” > static-routes
```

where:

net 192.168.202.0 is the network segment being connected (substitute 192.168.202.0 with your segment number); netmask 255.255.255.0 is your desired netmask; and gw xxx.xxx.xxx.xxx is the IP address of the gateway to the segment. After assigning your static route, cycle the eth0 interface.

```
root@km3210 /etc/sysconfig/network-scripts# ifdown eth0
root@km3210 /etc/sysconfig/network-scripts# ifup eth0
```

Testing

Now verify that you can access the serial ports on an IP address basis. You can test this from the SCS itself. Exit the **root** user and perform this from the **sysadmin** shell level. If you have not set up the (local or NIS) port permission file for the user on the console server, the user will not have access to the serial port.

```
root@km3210 /etc/sysconfig/network-scripts # exit
exit
sysadmin@km3210 /var/tmp$ Telnet 192.168.202.11
Trying 172.20.202.11...
Connected to 172.20.202.11.
Escape character is '^]'.
km3205.lci.net
km3205.lci.net login: kerrym
Password:
Last login: Fri Mar 15 12:20:14 from quasar
Entering Direct mode...Server = 1
(Press Esc+A here to break the connection – see below.)
Connection closed by foreign host.
sysadmin@km3210 /var/tmp$
```

If you have not changed the escape sequence, press **Esc+A** to break the connection and return to the client. In this manner, verify that you are able to connect to all of your configured serial ports. Once you have verified connectivity to all ports, you are ready to save to flash.

Saving the Changes to Flash

Once you have completed the setup and test, change the file system back to read-only and save the changes to flash. (Note that on the system shown below, NIS was running. NIS was used for both the login authentication of “kerrym” and to obtain the permissions for the serial port.)

```
root@km3210 /var/tmp$ exit
exit
sysadmin@km3210 /var/tmp$ exit
exit
sysadmin>SAVE
Shutting down Timeout daemon: [ OK ]
Shutting down NIS services: [ OK ]
Saving random seed [ OK ]
Initializing random number generator [ OK ]
mounting filesystem read-write
delete /etc.old
copy files from ram disk to /etc.new
copy complete - moving /etc to /etc.old
move complete - /etc updated
mounting filesystem read-only
ram disk mounted as /etc
Starting Timeout daemon: [ OK ]
Binding to the NIS domain... [ OK ]
Listening for an NIS domain server: quasar.lci.net
system SAVE complete
sysadmin>
```

Final Testing

Reboot the SCS to verify that the test procedures above operate. If not, return to the appropriate section above and verify your setup. From the command-line shell of the sysadmin login, command a reboot:

sysadmin>reboot

Once the console server reboots, attempt to access the ports from your Telnet client workstation or machine. Access from a Unix workstation is similar to that shown below:

```
kerrym@quasar $ Telnet 192.168.202.11
Trying 192.168.202.11...
Connected to 192.168.202.11 (192.168.202.11).
Escape character is '^]'.
km3205.lci.net
login: kerrym
Password:
Entering Direct mode...Server = 1
```

or, Telneting to a port:

```
kerrym@quasar $ Telnet km3210 9013
Trying 192.168.201.60...
Connected to km3205.lci.net (192.168.201.60).
Escape character is '^]'.
km3205.lci.net
login: kerrym
Password:
Last login: Wed Mar 20 10:00:58 from 192.168.201.60
Entering Direct mode...Server = 13
```

Bypassing Authentication

Note: *The ability to bypass the authentication mechanisms, as described below, may not be deployed on your particular console server. If it has been deployed on your console server **and** you have specified that authentication should not take place on certain serial ports, **beware!** Enable this feature only if the console server is located within a fully protected **internal** network, and all of the users can be trusted.*

The console server requires each user of a serial port to be authenticated by the console server itself. The console server also requires each user who accesses the serial ports to have the proper direct, listen, and/or clear port permissions on a per port basis. This is the default operation. The authentication within the Linux login program is done using the *Pluggable Authentication Module (PAM)*. This authentication module supports a wide variety of authentication types, for example, local password files, NIS, NIS+, LDAP, and Kerberos. The SCS supports the use of local password files, NIS, and LDAP.

On some console server systems, you can allow a Telnet connection directly to a serial port to bypass the authentication mechanism on the console server. This allows a client to connect directly to a serial port from anywhere on your network (segment). Of course, this can introduce security concerns. As a minimum, the device that is connected to the other end of the serial port should use some type of authentication method. Some sites may have their console servers on a dedicated internal network that only a system administrator (or a console management software application) can access. This additional step of authentication becomes either a nuisance or causes problems with the console management software application. In this case, you can indicate, on a port-by-port basis, that authentication not be done by the console server.

When you designate a serial port to have the console server authentication scheme bypassed, the appropriate sections of the login program are bypassed. Although the system never prompts the user for a username or password, the user automatically defaults to “nobody” on the console server.

To disable the authentication mechanism for directly connected serial ports, make two sets of changes.

1. Set a flag in the **/lci/lwip_serial.conf** file based on the specific serial port/IP/port number entry. The login process checks this file. A one (1) in the **authentication** column indicates that authentication must be done. A zero (0) indicates that authentication will not be done for this serial port/IP/port number entry.

   Note: *The authentication flag is specific to each serial port/IP/port number entry You can allow direct access to a serial port by an IP port number or by an assigned IP address. You may require authentication for serial ports accessed by assigned IP addresses and not require authentication for serial ports accessed by the IP port numbers. You can configure this; however, you can make only one direct connection to a serial port at a time.*

2. Set up the **nobody.conf** file and modify it accordingly.

   a) Log in to the sysadmin account, and then go into the bash shell.

```
sysadmin>bash
sysadmin@km3210 /var/tmp$ su
Password:
root@km3210 /var/tmp# cd /lci/users
root@km3210 /lci# cp ../default.user.conf nobody.conf
root@km3210 /lci# vi nobody.conf
```

   b) Set the desired port permissions for **ALLOW_DIRECT**, **ALLOW_LISTEN**, and **ALLOW_CLEAR** accordingly. Use a zero (0) to specify that this action (direct, listen, or clear) cannot be done on any of the ports. Otherwise, specify a range and/or comma-separated entries (e.g., 1,4,6-12,16).

   c) Save and exit this file.

3. Once you have tested your changes, save them to flash.

```
root@km3210 /lci# exit
exit
sysadmin@km3210 /var/tmp$ exit
exit
sysadmin>SAVE
Shutting down Timeout daemon: [ OK ]
Shutting down NIS services: [ OK ]
Saving random seed [ OK ]
Initializing random number generator [ OK ]
mounting filesystem read-write
delete /etc.old
copy files from ram disk to /etc.new
copy complete - moving /etc to /etc.old
move complete - /etc updated
mounting filesystem read-only
ram disk mounted as /etc
Starting Timeout daemon: [ OK ]
Binding to the NIS domain... [ OK ]
Listening for an NIS domain server: quasar.lci.net
system SAVE complete
sysadmin>
```

A: Unix Command Help

The system administrator uses some UNIX/Linux commands in administering the SCS. Some of the system commands automatically invoke the **less** command (e.g., if you run the **devices** command, **less** displays the information.) You may use the vi editor when you run **setup**.

less command

Use the **less** command when the data output to the terminal is longer than one screen can display. The output pauses, and a "**:**" (colon) displays at the bottom of the screen. To continue the display, press **Enter** (to step one more line) or the **spacebar** (to fill one more page). At the end of the lengthy output, an **(END)** displays. To end the **less** program, press **q** to return to the command line.

```
                    SUMMARY OF LESS COMMANDS

      Commands marked with * may be preceded by a number, N.
      Notes in parentheses indicate the behavior if N is given.

  h  H                 Display this help.
  q  :q  Q  :Q  ZZ     Exit.
 -----------------------------------------------------------------
                           MOVING

  ?pattern          *  Search backward for (N-th) matching line.
HELP -- Press RETURN for more, or q when done

HELP -- Press RETURN for more, or q when done
HELP -- Press RETURN for more, or q when done
  e  ^E  j  ^N  CR  *  Forward  one line   (or N lines).
  y  ^Y  k  ^K  ^P  *  Backward one line   (or N lines).
  f  ^F  ^V  SPACE  *  Forward  one window (or N lines).
  b  ^B  ESC-v      *  Backward one window (or N lines).
  z                 *  Forward  one window (and set window to N).
  w                 *  Backward one window (and set window to N).
  ESC-SPACE         *  Forward  one window, but don't stop at end-of-file.
  d  ^D             *  Forward  one half-window (and set half-window to N).
  u  ^U             *  Backward one half-window (and set half-window to N).
  ESC-(  RightArrow *  Left  8 character positions (or N positions).
  ESC-)  LeftArrow  *  Right 8 character positions (or N positions).
  F                    Forward forever; like "tail -f".
  r  ^R  ^L            Repaint screen.en done
  R                    Repaint screen, discarding buffered input.
        ---------------------------------------------------
        Default "window" is the screen height.
        Default "half-window" is half of the screen height.
```

```
                         SEARCHING

 /pattern          *  Search forward for (N-th) matching line.
 ?pattern          *  Search backward for (N-th) matching line.
 ESC-^B <c1> <c2>  *  Find open bracket <c1>
 ?pattern          *  Search backward for (N-th) matching line.
 n                 *  Repeat previous search (for N-th occurrence).
 N                 *  Repeat previous search in reverse direction.
 ESC-n             *  Repeat previous search, spanning files.
 ESC-N             *  Repeat previous search, reverse dir. & spanning files.
 ESC-u                Undo (toggle) search highlighting.
       ---------------------------------------------------
       Search patterns may be modified by one or more of:
       ^N or !  Search for NON-matching lines.
       ^E or *  Search multiple files (pass thru END OF FILE).
       ^F or @  Start search at FIRST file (for /) or last file (for ?).
       ^K       Highlight matches, but don't move (KEEP position).
       ^R       Don't use REGULAR EXPRESSIONS.
------------------------------------------------------------------------
                          JUMPING

 g  <  ESC-<       *  Go to first line in file (or line N).
 G  >  ESC->       *  Go to last line in file (or line N).
 p  %              *  Go to beginning of file (or N percent into file).
 {  (  [           *  Find close bracket } ) ].
 }  )  ]           *  Find open bracket { ( [.
 ESC-^F <c1> <c2>  *  Find close bracket <c2>.
 ESC-^B <c1> <c2>  *  Find open bracket <c1>

       Each "find close bracket" command goes forward to the close bracket
         matching the (N-th) open bracket in the top line.
       Each "find open bracket" command goes backward to the open bracket
         matching the (N-th) close bracket in the bottom line.

 m<letter>            Mark the current position with <letter>.
 '<letter>            Go to a previously marked position.
 ''                   Go to the previous position.
 ^X^X                 Same as '.
       ---------------------------------------------------
       A mark is any upper-case or lower-case letter.
       Certain marks are predefined:

            ^  means  beginning of the file
            $  means  end of the file
------------------------------------------------------------------------
                       CHANGING FILES

 :e [file]            Examine a new file.
 ^X^V                 Same as :e.
 :n                *  Examine the (N-th) next file from the command line.
 :p                *  Examine the (N-th) previous file from the command line.
 :x                *  Examine the first (or N-th) file from the command line.
 :d                   Delete the current file from the command line list.
 =  ^G   :f           Print current file name.
---------------------------------------------------------------------------
```

```
                     MISCELLANEOUS COMMANDS

  -<flag>              Toggle a command line option [see OPTIONS below].
  --<name>             Toggle a command line option, by name.
  _<flag>              Display the setting of a command line option.
  __<name>             Display the setting of an option, by name.
  +cmd                 Execute the less cmd each time a new file is examined.
  !command             Execute the shell command with $SHELL.
  |Xcommand            Pipe file between current pos & mark X to shell command.
  v                    Edit the current file with $VISUAL or $EDITOR.
  V                    Print version number of "less".
 ---------------------------------------------------------------------------

                            OPTIONS

        Most options may be changed either on the command line,
        or from within less by using the - or -- command.
        Options may be given in one of two forms: either a single
        character preceded by a -, or a name preceded by --.

  -?  ........  --help
                  Display help (from command line).
  -a  ........  --search-skip-screen
                  Forward search skips current screen.
  -b [N]  ....  --buffers=[N]
                  Number of buffers.
  -B  ........  --auto-buffers
                  Don't automatically allocate buffers for pipes.
  -c  -C  ....  --clear-screen  --CLEAR-SCREEN
                  Repaint by scrolling/clearing.
HELP -- Press RETURN for more, or q when done
```

vi Editor Commands

The vi editor is a powerful command editor used to modify Unix commands.

Note: *It is possible to damage a file, which might render the system inoperative, by improper use of a file or command editor on system files. This section is only meant as a review for those familiar with vi commands.*

Using vi

To edit a file using the vi editor on a file with a name <file_name>, from the command line, type:

```
vi <file_name>
```

Use the following commands to edit and then close the file.

vi Modes

vi is a three-mode line editor: it has a command mode, a line mode, and an editing mode. It is very useful for editing a file, for navigating within an open file, and for opening or saving a file.

Command mode	For moving around within an open file
Editing mode	For text editing in the file
Line mode	For file opening, saving, closing, exiting

To enter **vi** in the line mode, from the command mode, type **:** (colon).

If you are not sure which mode you are in at any time, press **Esc**, which returns you to the command mode. A summary of the modes and some **vi** commands follows.

Using vi in Command Mode

The following keyboard commands apply to **vi** in command mode.

Move the cursor within the open file using the following position commands:

h	Moves cursor to left (left arrow).
j	Moves cursor to next line (down arrow).
k	Moves cursor to previous line (up arrow).
l	Moves cursor to right (right arrow).

Edit the text within the open file using the following commands:

i	Inserts text before the cursor position. All existing text to the right of the cursor shifts to the right (and is not overwritten).
o	Creates a new line below the current line, and inserts the text. All existing text shifts down and follows the text you are about to insert.
u	Reverts to the previous text (“undo”).
x	Deletes the letter at the current cursor position.
dd	Deletes the current line.

Once you have completed all editing, you must close or save the file in line mode.

Closing a File Opened in vi

After you are done editing, enter line mode by typing the colon (**:**). Use one of the following commands to work with your file as desired:

e <filename>	Opens the file named <filename>.
w <filename>	Writes (saves) this file with the name <filename>. ***Note:*** *This will overwrite an existing file with that exact name without warning.*
q	Quits.
q!	Quits and disregards changes.
w	Writes the file (saves it) with its existing filename.
wq	Writes the file and closes the file (saves and quits).
<ESC>	Goes to command mode.

Save and Quit = **:wq <enter>** Quit, do not Save = **:q! <enter>**

B: Hexadecimal Conversion Chart

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

Table 9-1. Hexadecimal to Character Conversion

Hexadecimal Code	Equivalent Character		Hexadecimal Code	Equivalent Character
00	***NUL***		20	*SP*
01	***SOH***		21	!
02	***STX***		22	“
03	***ETX***		23	#
04	***EOT***		24	$
05	***ENQ***		25	%
06	***ACK***		26	&
07	***BEL***		27	‘
08	***BS***		28	(
09	***HT***		29	)
0A	***NL***		2A	*
0B	***VT***		2B	+
0C	***NP***		2C	,
0D	***CR***		2D	-
0E	***SO***		2E	.
0F	***SI***		2F	/
10	***DLE***		30	0
11	***DC1***		31	1
12	***DC2***		32	2
13	***DC3***		33	3
14	***DC4***		34	4
15	***NAK***		35	5
16	***SYN***		36	6
17	***ETB***		37	7
18	***CAN***		38	8
19	***EM***		39	9
1A	***SUB***		3A	:
1B	***ESC***		3B	;
1C	***FS***		3C	<
1D	***GS***		3D	=
1E	***RS***		3E	>
1F	***US***		3F	?
40	@		60	`
41	A		61	a

Hexadecimal Code	Equivalent Character		Hexadecimal Code	Equivalent Character
42	B		62	b
43	C		63	c
44	D		64	d
45	E		65	e
46	F		66	f
47	G		67	g
48	H		68	h
49	I		69	i
4A	J		6A	j
4B	K		6B	k
4C	L		6C	l
4D	M		6D	m
4E	N		6E	n
4F	O		6F	o
50	P		70	p
51	Q		71	q
52	R		72	r
53	S		73	s
54	T		74	t
55	U		75	u
56	V		76	v
57	W		77	w
58	X		78	x
59	Y		79	y
5A	Z		7A	z
5B	[		7B	{
5C	\		7C	|
5D	]		7D	}
5E	^		7E	~
5F	_		7F	*DEL*

C: Pinouts and Adapters

The serial device ports of the SCSxx05/SCSxx20 products match the RJ45 pinouts of the console ports of many popular devices found in a network environment. The SCS uses conventional Category 5 fully pinned network cables for all connections; the cables are available from Lantronix in various lengths.

In some cases you will need an adaptor for your serial devices. Lantronix offers a variety of RJ45 to serial-connector adapters for many devices. These adapters convert the RJ45 connection on the SCS to a 9-pin or 25-pin serial connector found on some other manufacturer's serial devices.

You can configure the SCSxx05/SCSxx20 device ports as either DTE or DCE ports, using a software command, thus reducing the issues in making custom-pinned cables for different devices.

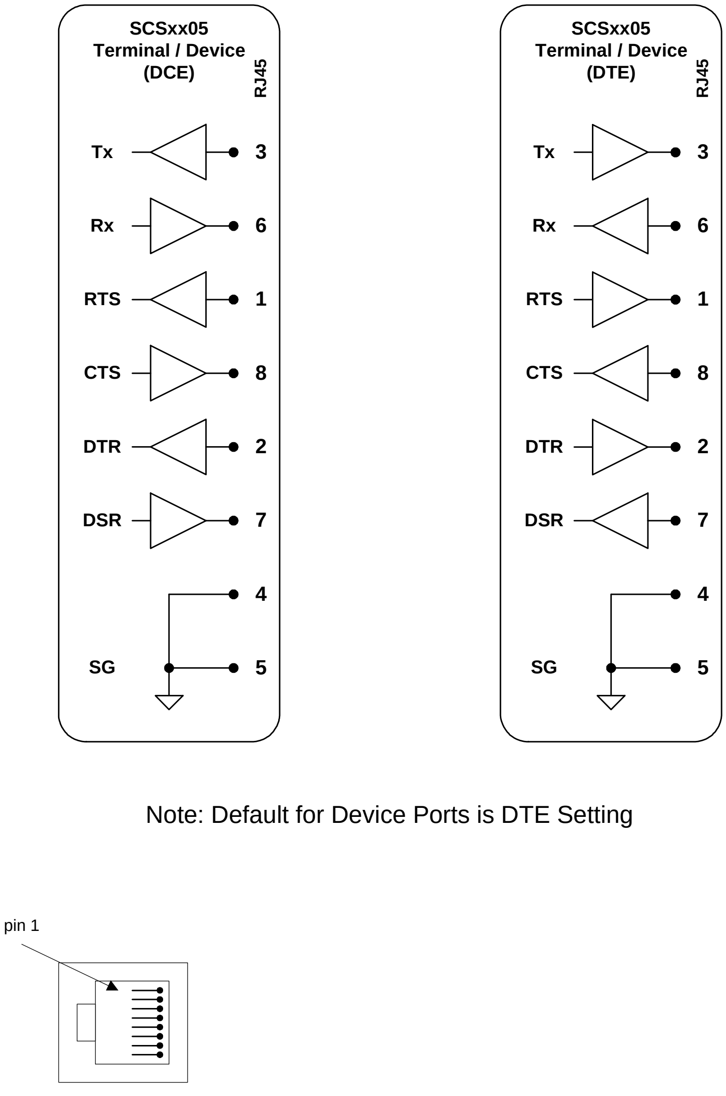
The serial terminal port is wired in the same manner as the device ports and has the same signal options.

Note: *It is generally not necessary to change the configuration of the terminal port, other than its data rate. Therefore, no options are available on the setup menu or Web interface for changing its configuration. If you need to make a change, use the dtedce command to change DTE or DCE setting, and use the buttons on the front panel to change the baud rate (see Method #1 – Using the Front Panel Display in the Quick Start chapter).*

SCSxx05

SCSxx05 Pinouts

Figure 9-1. Pinouts for SCSxx05 Terminal and Device Ports (DCE and DTE)



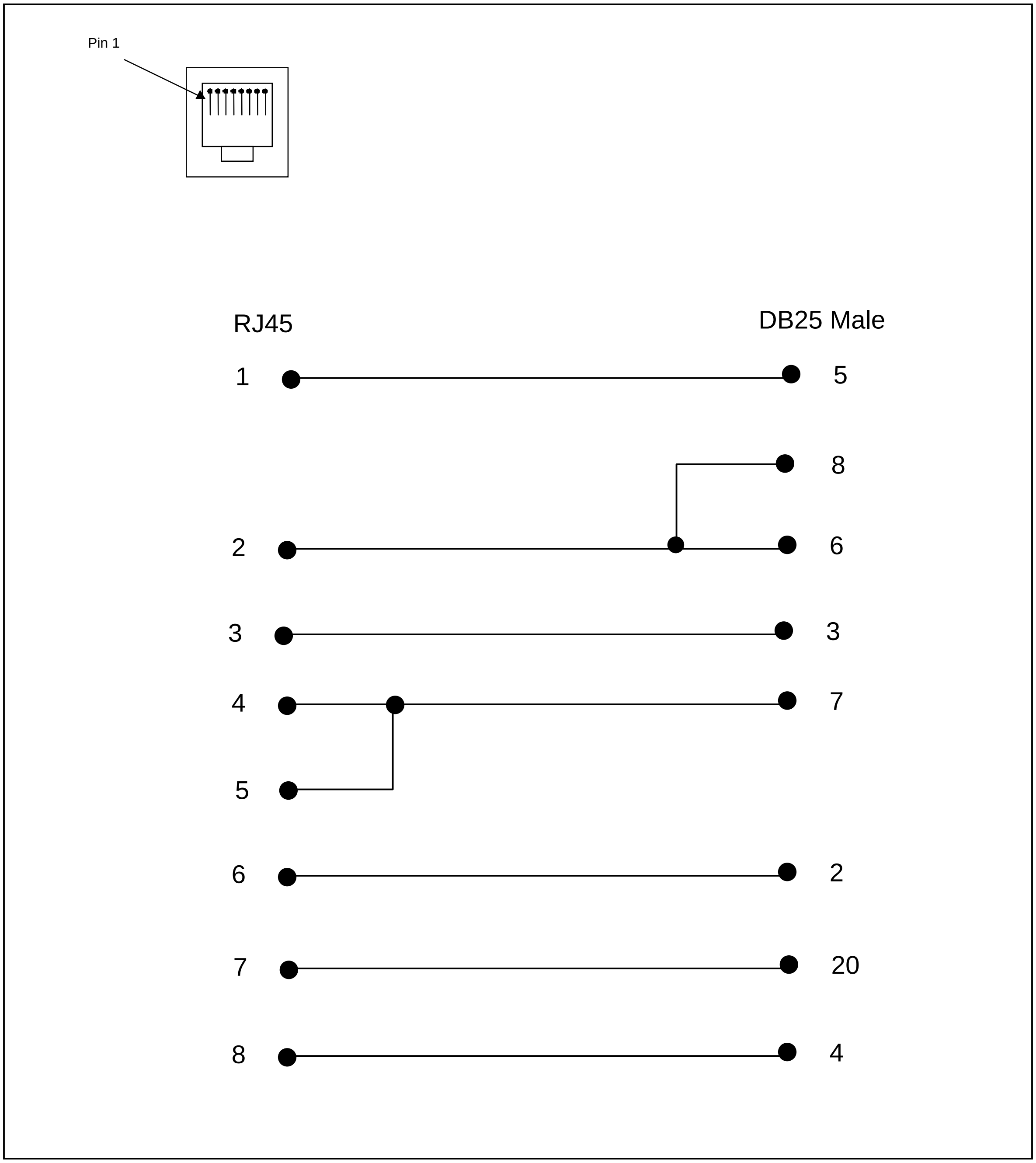
Note: Default for Device Ports is DTE Setting

RJ45 Connector

SCSxx05 Adapters

The adapters illustrated below are compatible with the Lantronix SCSxx05 models.

Figure 9-2. RJ45 Receptacle to DB25M DCE Adapter for the SCSxx05 (Part# 200.2066A)



Use PN 200.2066A adapter with a dumb terminal or with most SUN applications.

Figure 9-3. RJ45 Receptacle to DB25F DCE Adapter for the SCSxx05 (Part# 200.2067A)

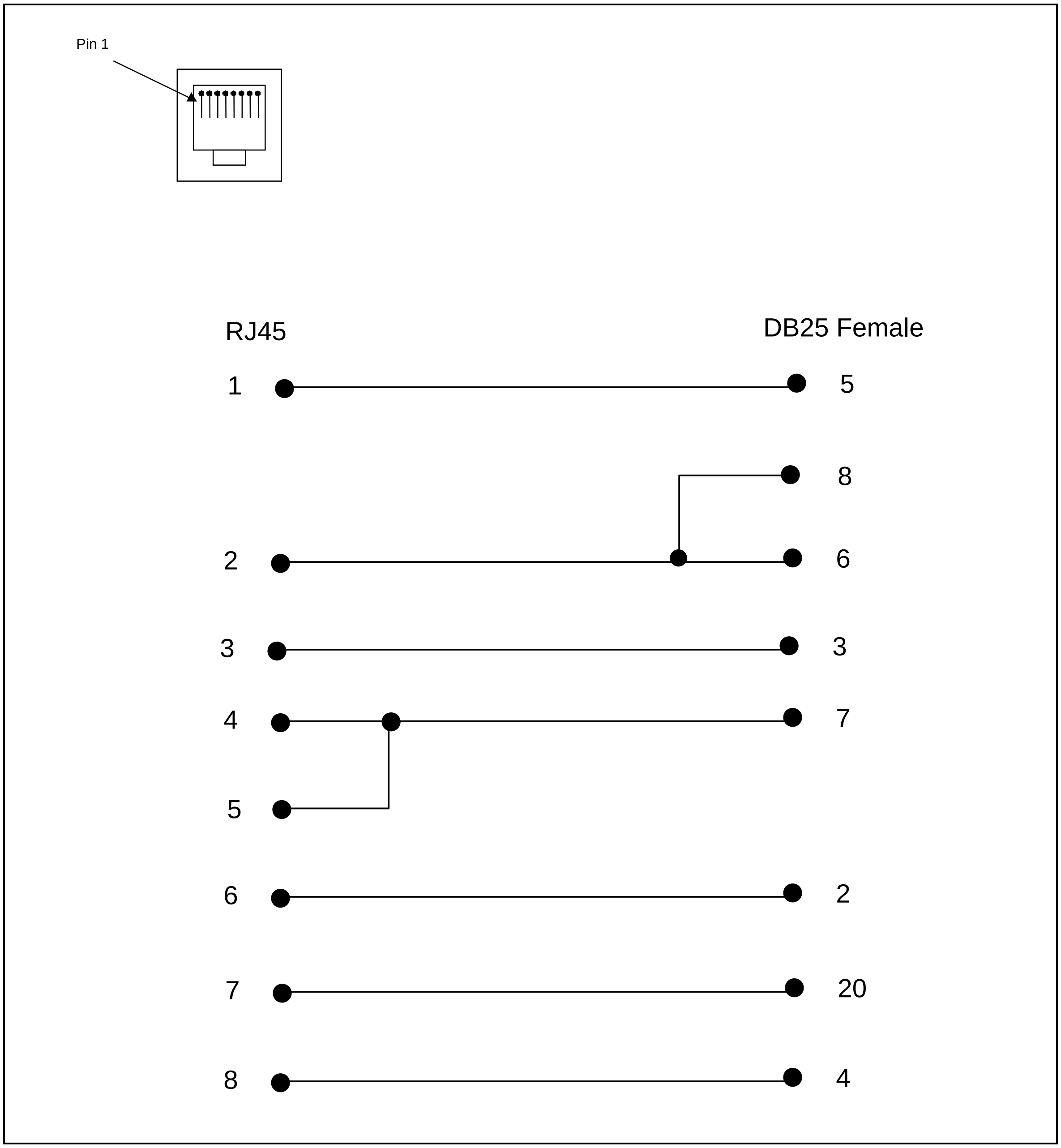


Figure 9-4. RJ45 Receptacle to DB9M DCE Adapter for the SCSxx05 (Part# 200.2069A)

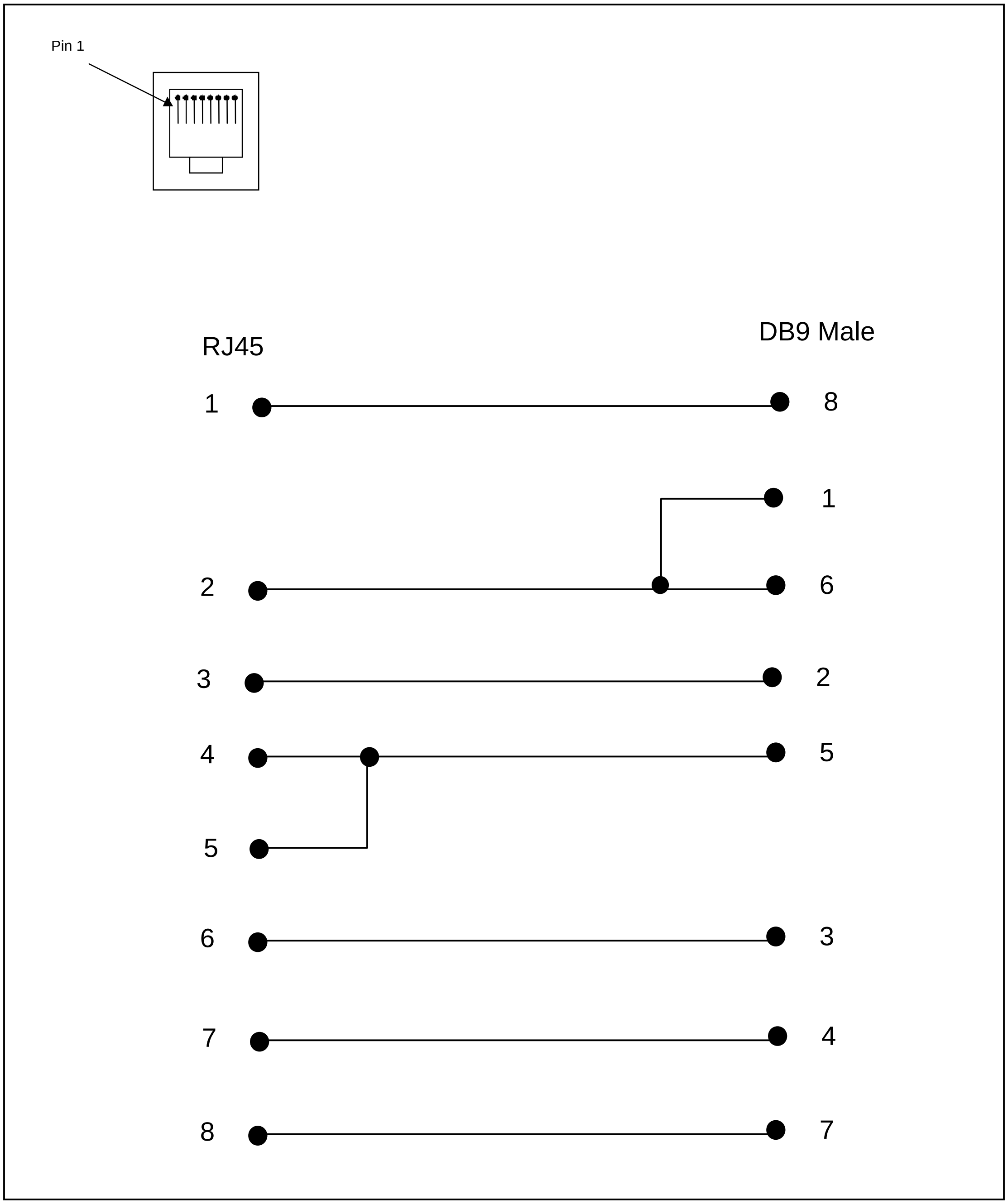
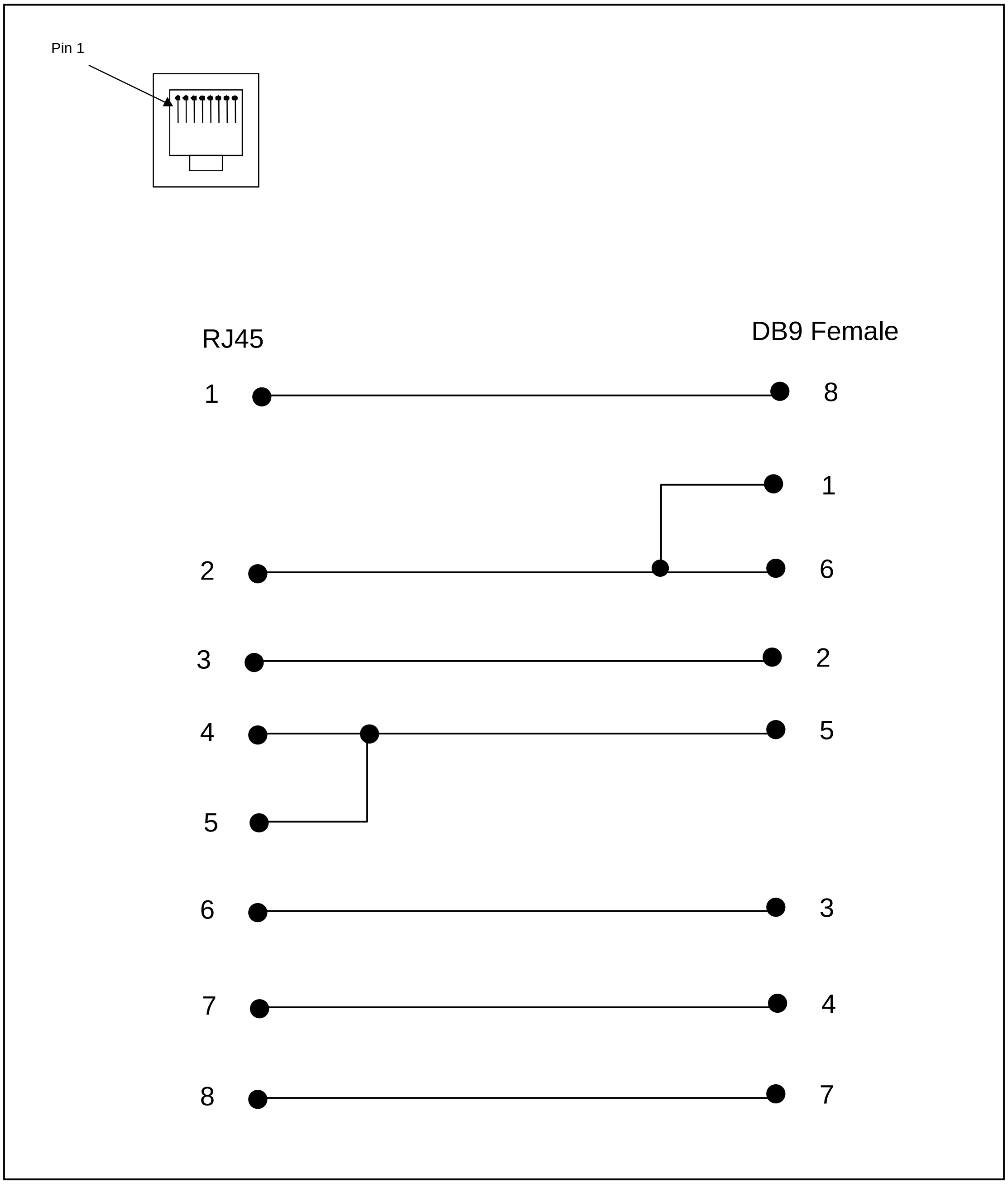


Figure 9-5. RJ45 Receptacle to DB9F DCE Adapter for the SCSxx05 (Part# 200.2070A)



Use PN 200.2070A adapter with a PC's serial port.

Figure 9-6. RJ45 Receptacle to DB9M DTE Adapter for the SCSxx05 (Part# 200.2071)

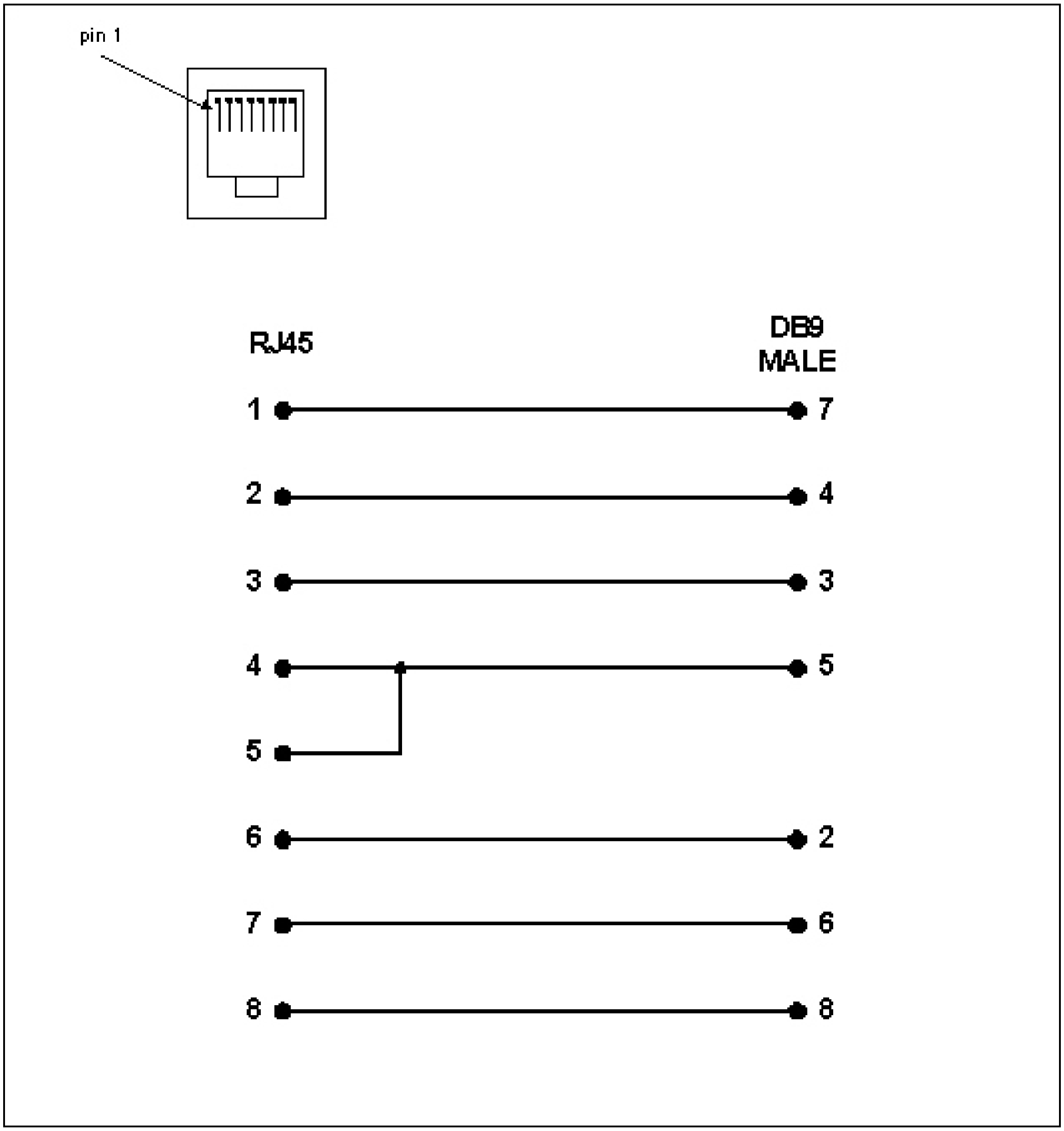


Figure 9-7. RJ45 Receptacle to DB9F DTE Adapter for the SCSxx05 (Part# 200.2072)

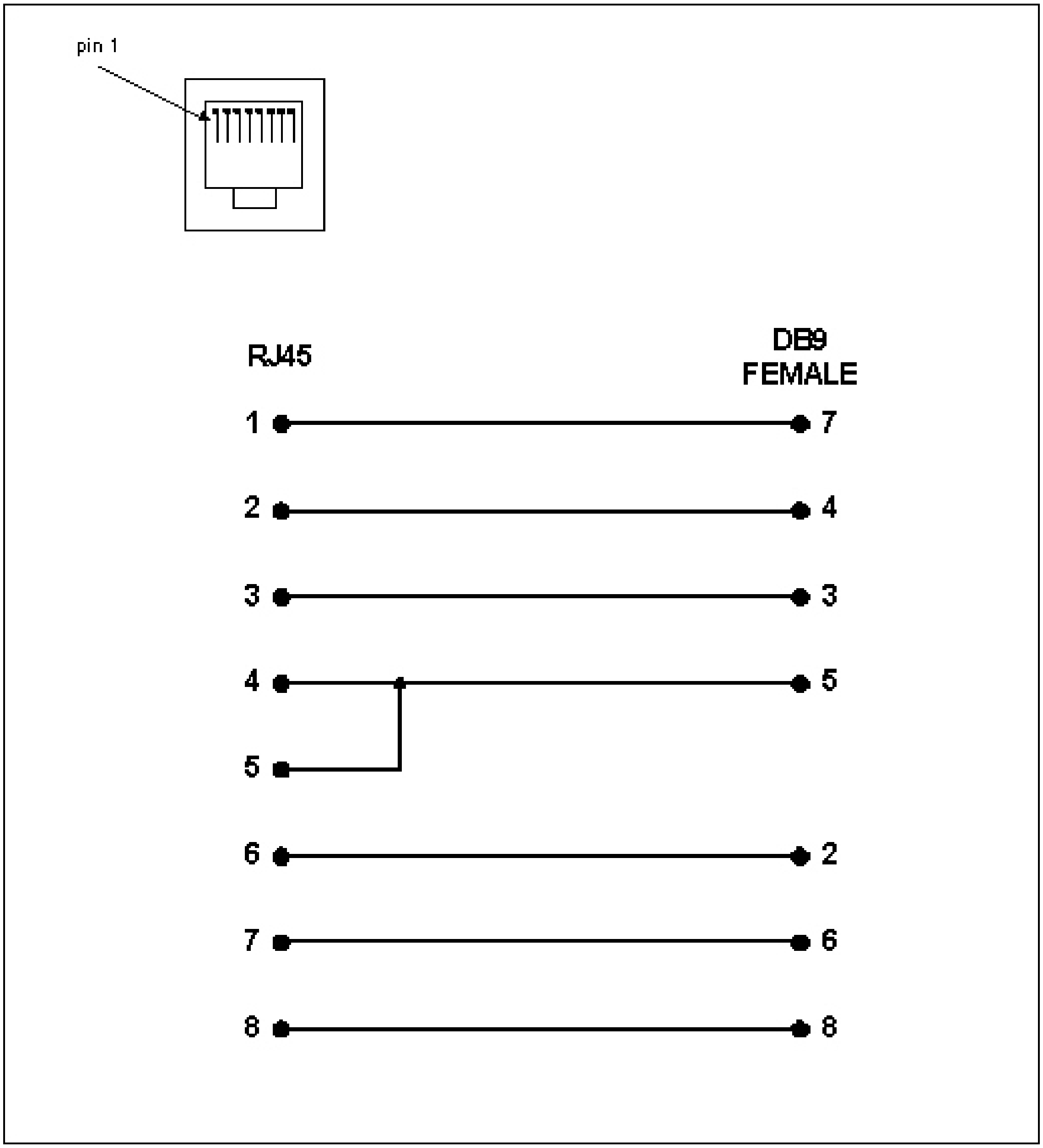


Figure 9-8. RJ45 Receptacle to DB25M DTE Adapter for the SCSxx05 (Part# 200.2073)

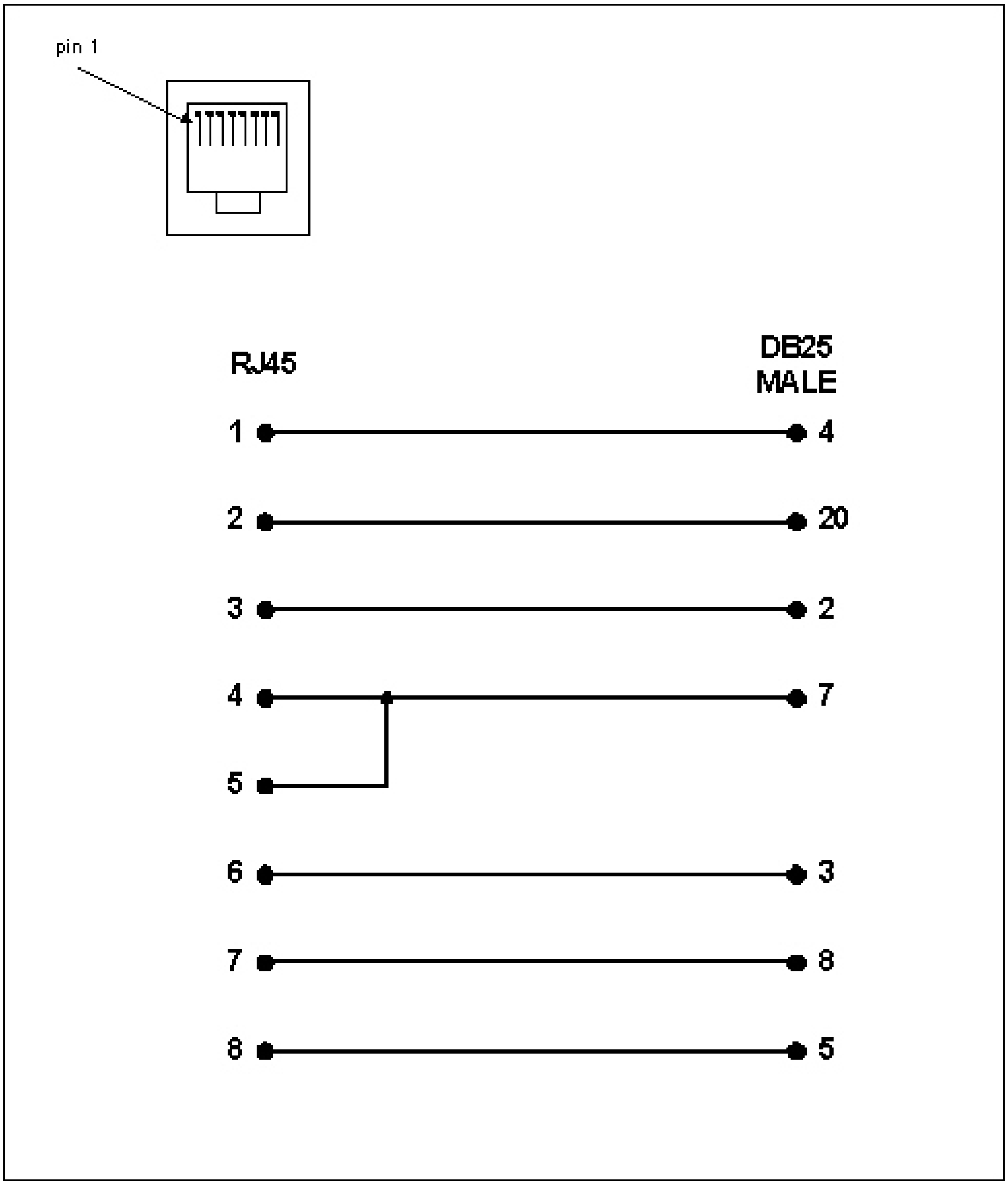


Figure 9-9. RJ45 Receptacle to DB25F DTE Adapter for the SCSxx05 (Part# 200.2074)

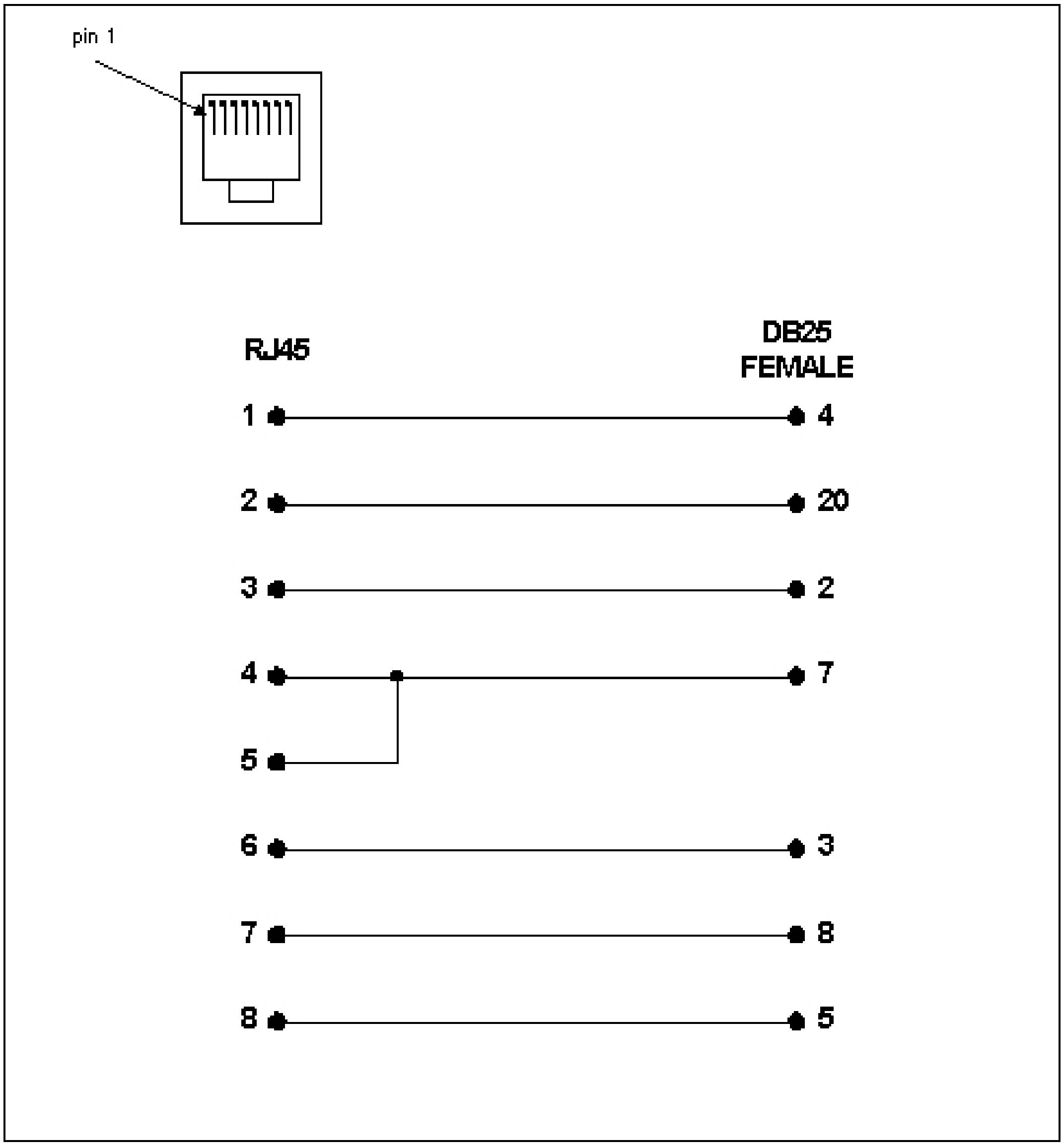
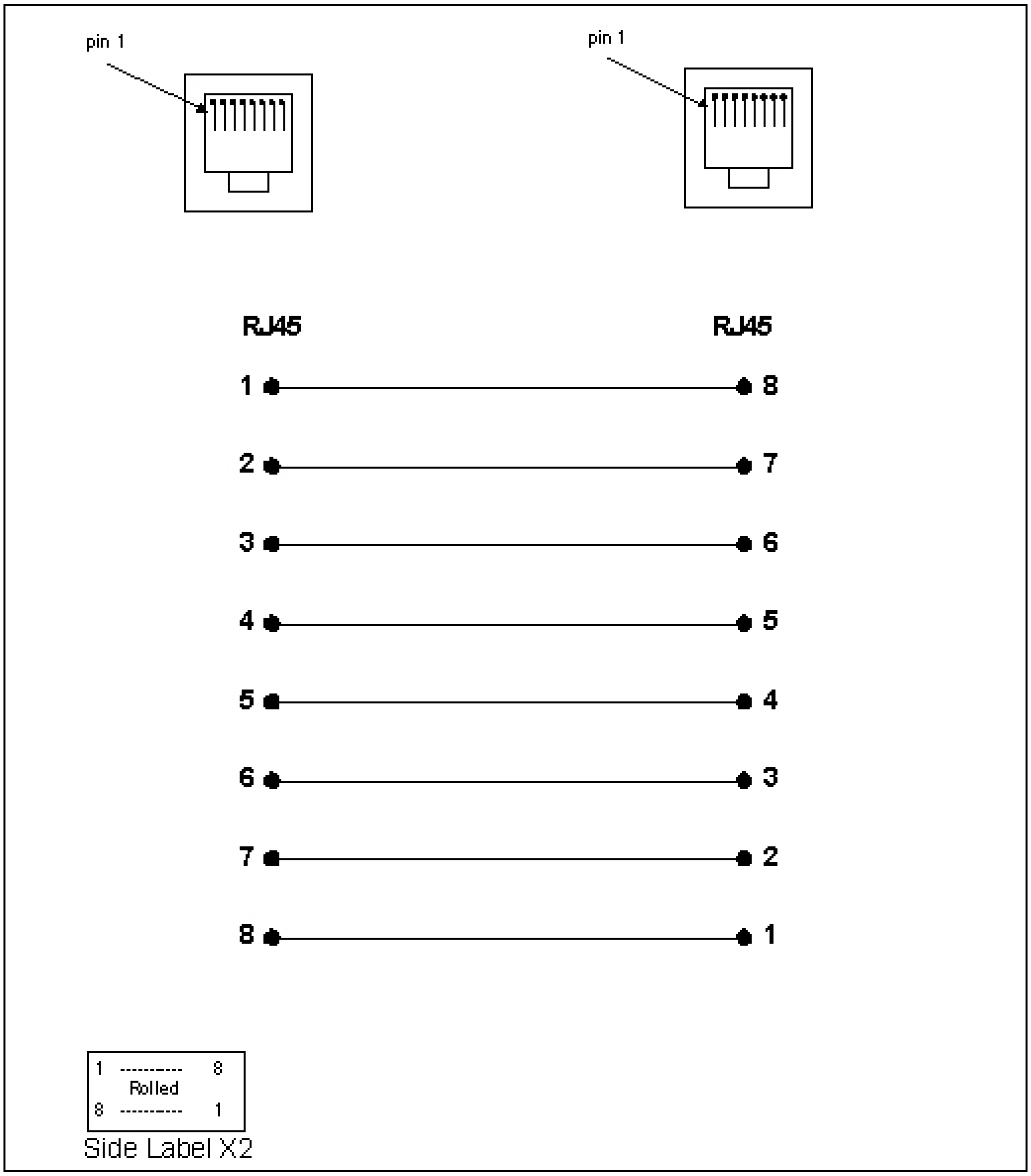


Figure 9-10. RJ45 to RJ45F Netra Adapter for the SCSxx05 (Part# 200.2225)

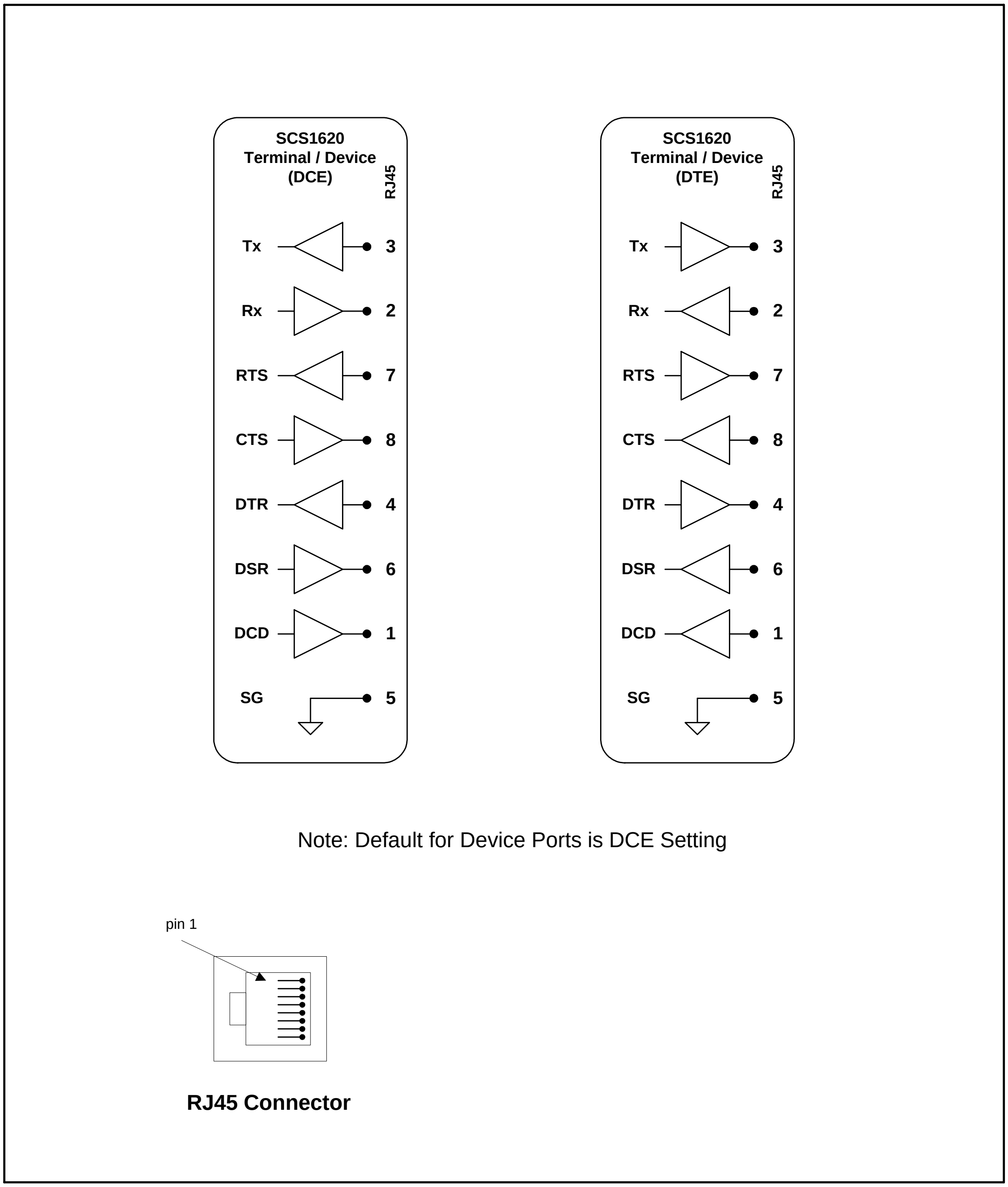


Use this adapter for Netra/SUN/CISCO and others.

SCSxx20

SCSxx20 Pinouts

Figure 9-11. Pinouts for SCSxx20 Terminal and Device Ports (DCE and DTE)

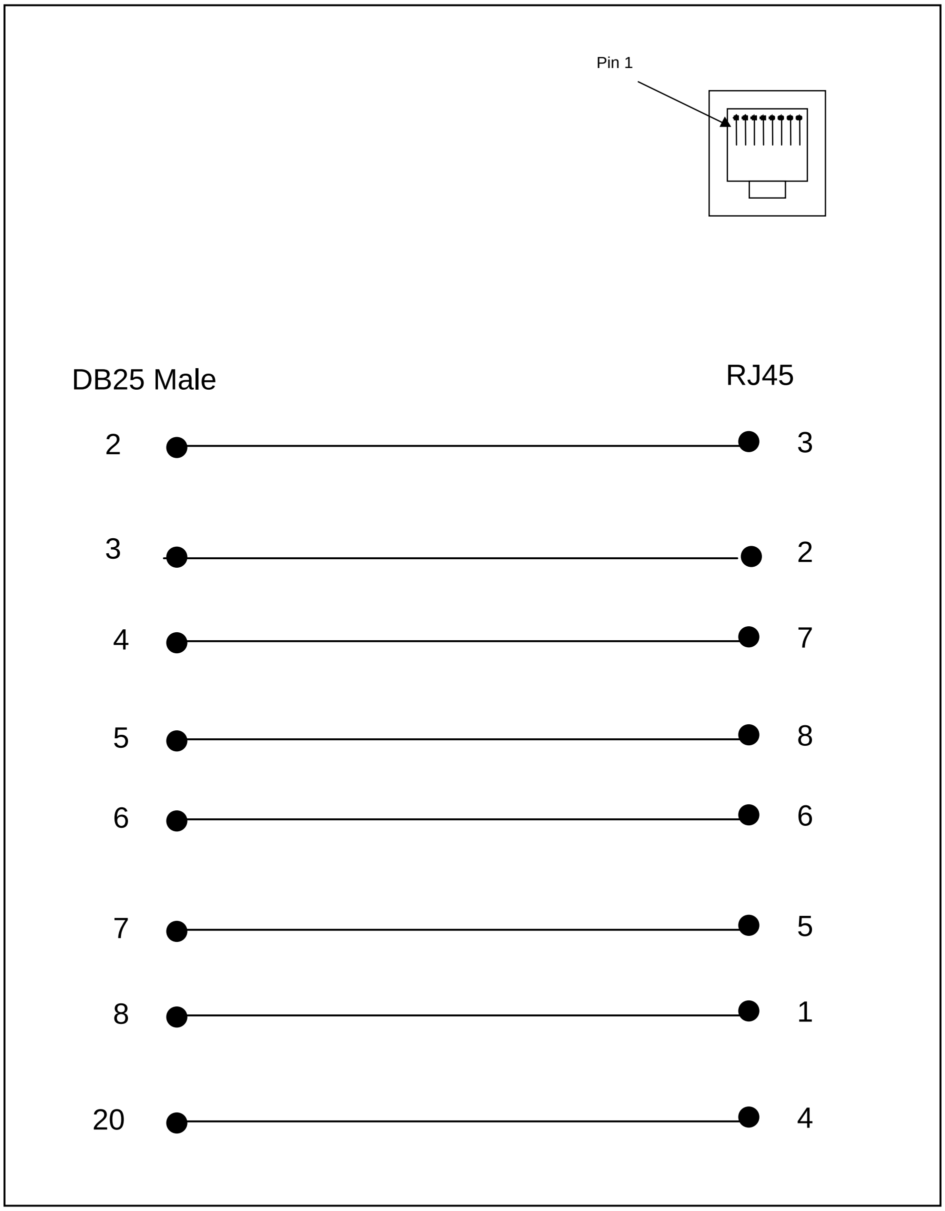


Note: Default for Device Ports is DCE Setting

SCSxx20 Adapters

The adapters illustrated below are compatible with the Lantronix SCSxx20 models.

Figure 9-12. RJ45 Receptacle to DB25M DCE Adapter for the SCSxx20 (Part# 200.0066)



Use PN 200.0066 adapter with a dumb terminal or with most SUN applications.

Figure 9-13. RJ45 Receptacle to DB25F DCE Adapter for the SCSxx20 (Part# 200.0067)

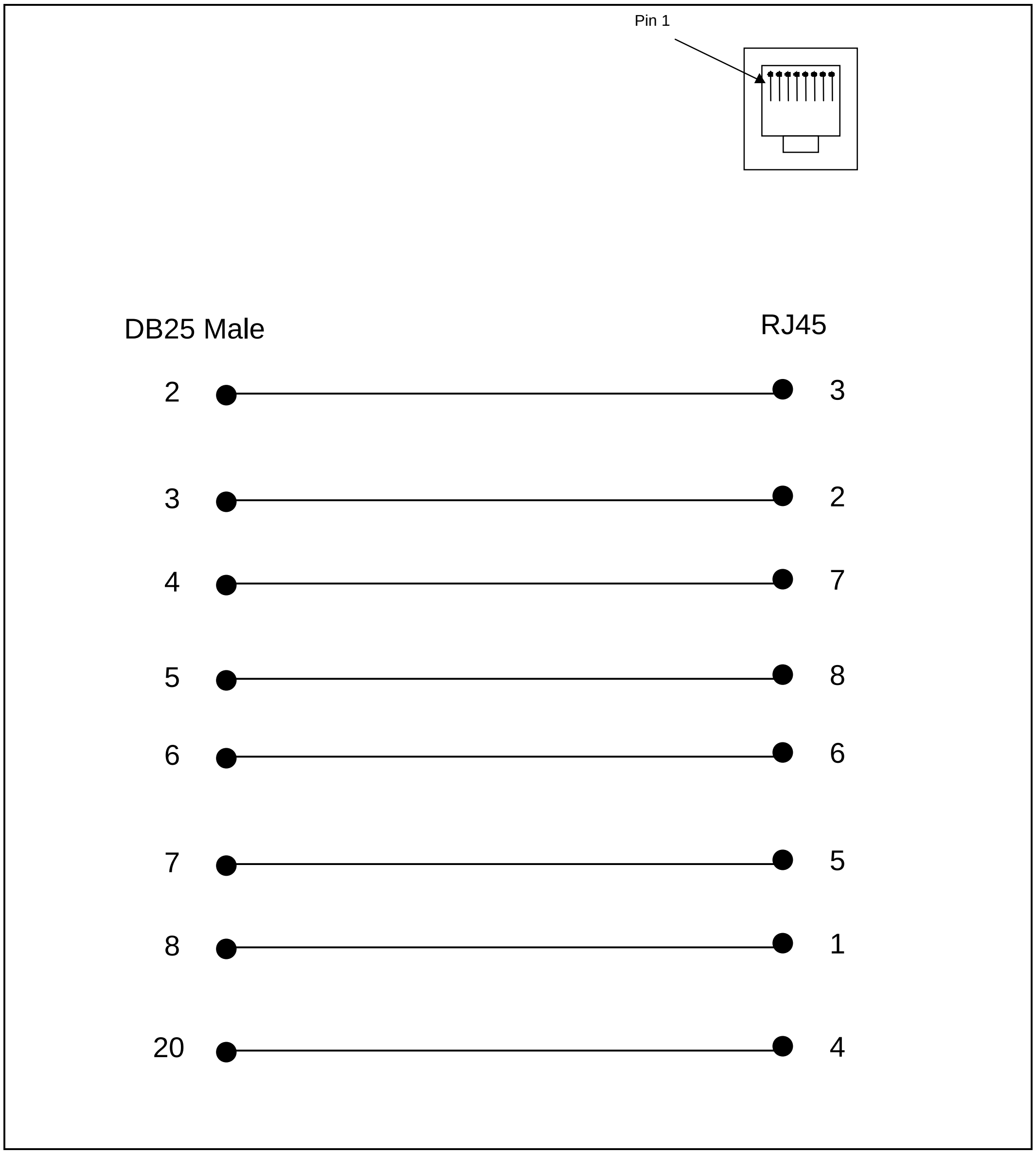


Figure 9-14. RJ45 Receptacle to DB9M Adapter for SCSxx20 (Part # 200.0069)

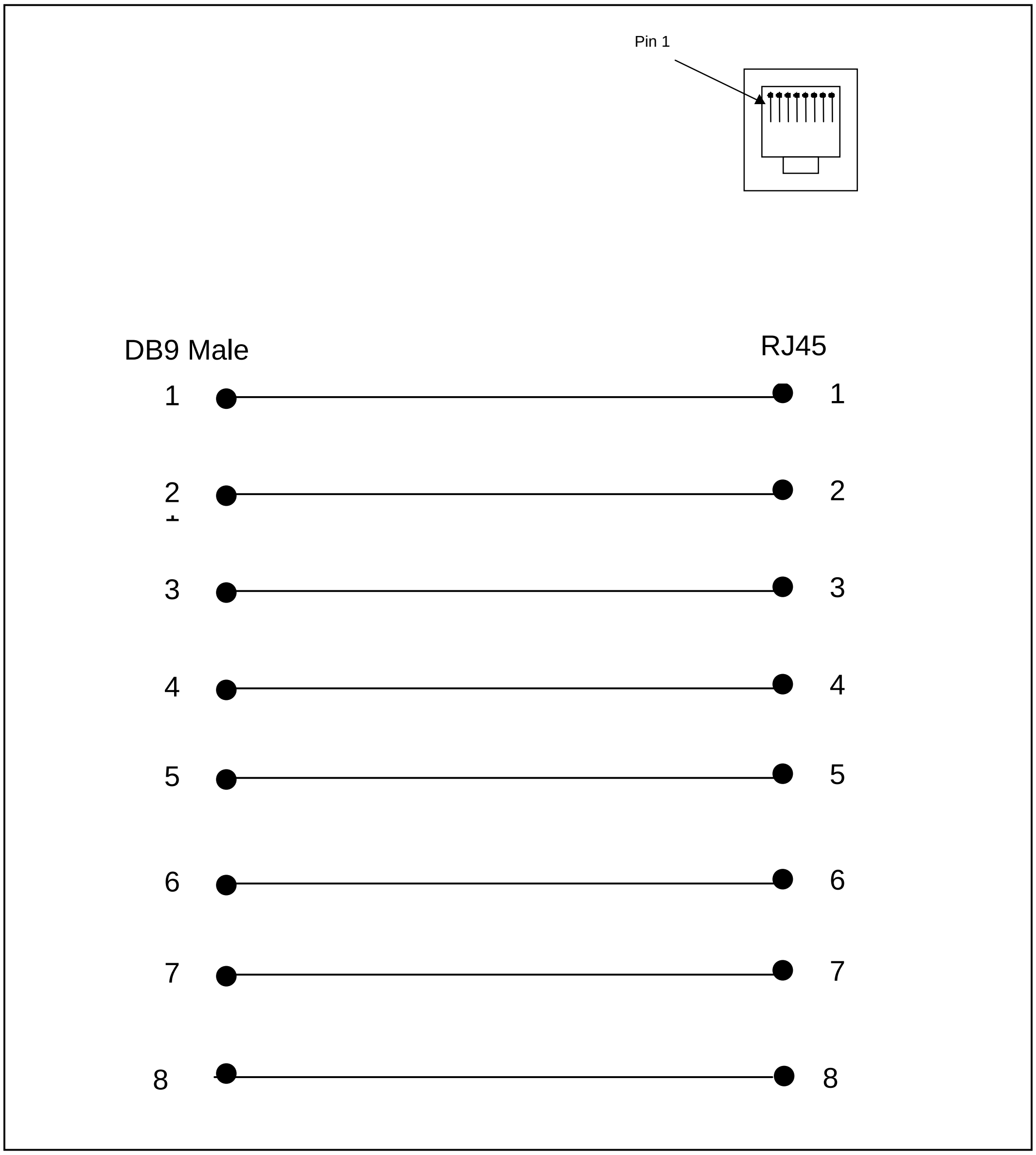
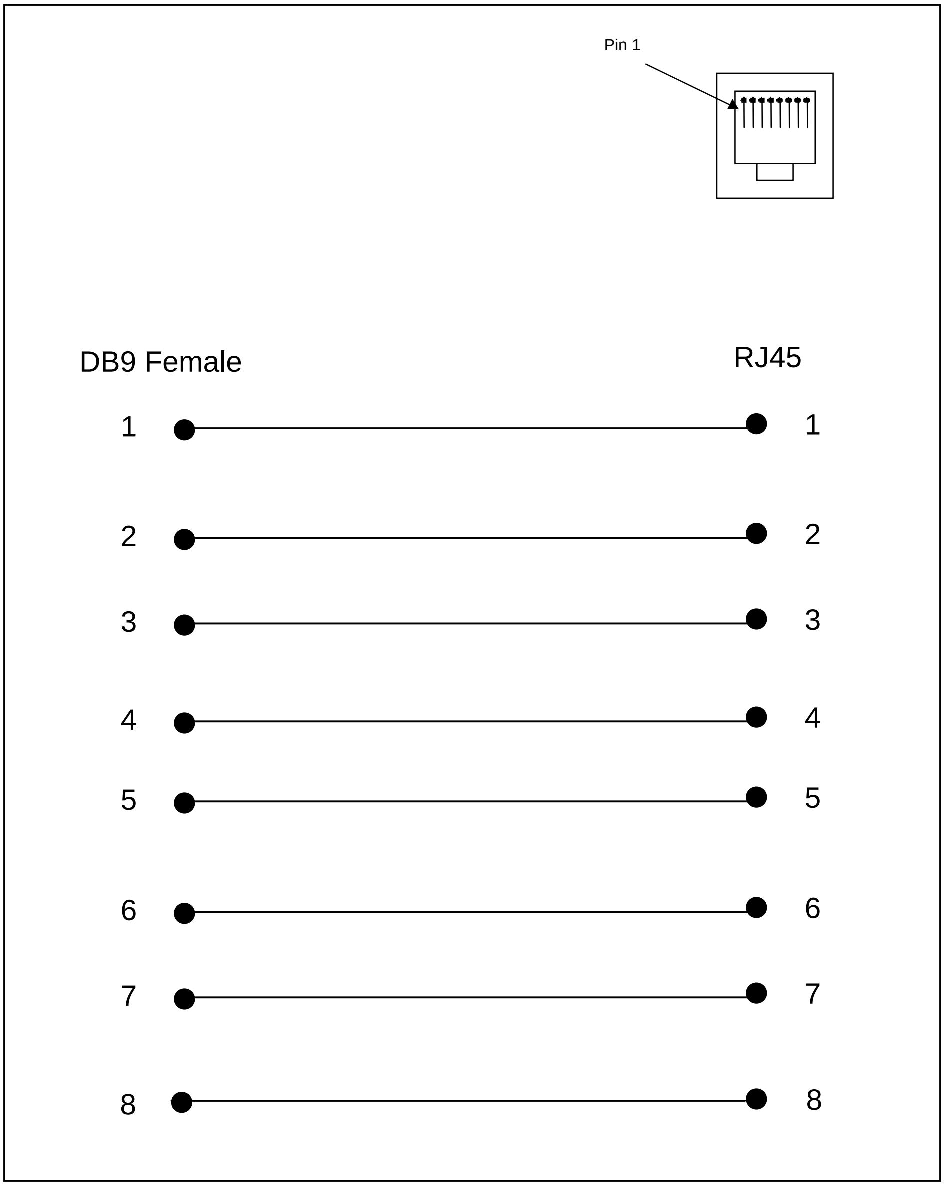
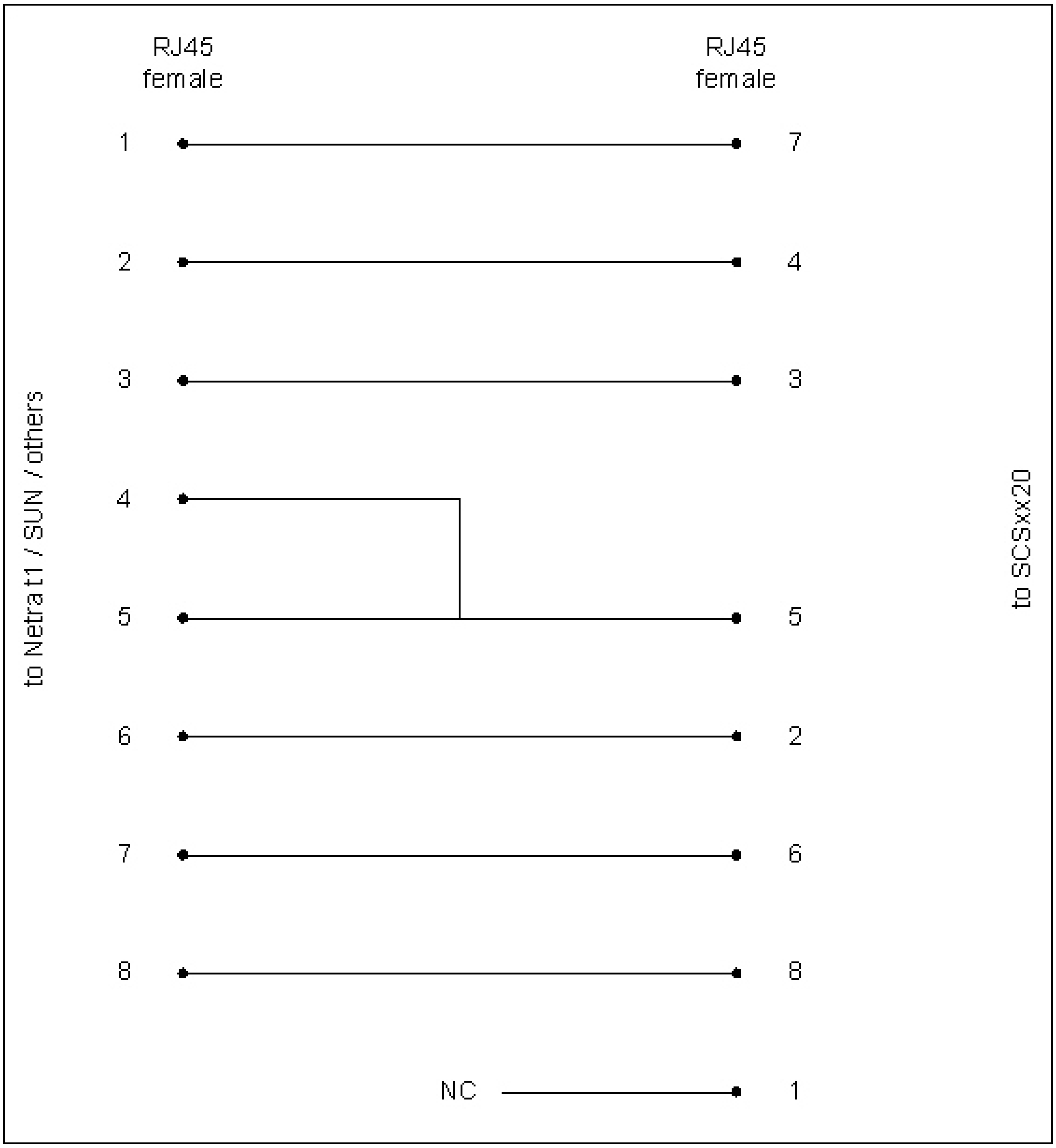


Figure 9-15. RJ45 Receptacle to DB9F Adapter for SCSxx20 (Part# 200.0070)



Use PN 200.0070 adapter with a PC's serial port.

Figure 9-16. Netra t1 to SCSxx20 RJ45 Adapter (Part# 200.0225)



Use this adapter for Netra/SUN/CISCO and others.