SINAP/SS7 Quick-Start Guide

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SINAP/SS7 Quick-Start Guide

Stratus Technologies
R8070-05

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Preface

The Purpose of This Manual

This manual provides an overview of how to install, configure, and test (in cross-over mode) the *Stratus Intelligent Network Applications Platform* (SINAP) MultiStack product and the U915, U916, U918, or U420 T1/E1 interface card. This will run on the HP-UX operating system on a Continuum Series 400-CO hardware platform, the Solaris operating system on the Sun Netra 20/T4[1] or SunFire V480 series hardware platforms, or the Stratus ft Linux® operating system on the ftServer T Series hardware platforms.

Audience

This document is intended for manufacturing personnel and customers who want to quickly install, configure, and test the SINAP/SS7 software on one of the supported platforms.

This document assumes the reader has a working knowledge of the SS7 protocol and the UNIX or Linux operating system. For additional information, see the ‘‘Related Manuals” section later in this manual.

Revision Information

This manual has the following changes from the previous version:

- New `quick_start` options `ttcj1` and `ttce1`
- TCAP cross-over test for TTC
- Miscellaneous changes

Manual Organization

This manual is divided into the following chapters.

Chapter 1 “Introduction” provides an overview of the Quick-Start process and lists the companion manuals you will locate and use with this Guide.

[1] Note that Sun Microsystems refers to this model as either “Netra 20 Server” or “Netra T4”, but it is referred as “Netra 20/T4” in SINAP documentation to avoid the confusion.

Chapter 2 “Installation: Continuum Systems” describes how to prepare the Continuum system and U916 or U420 PCI cards, verify the HP-UX operating system, and install the SINAP/SS7 software.

Chapter 3 “Installation: Netra and SunFire Systems” describes how to prepare the Netra 20/T4 or SunFire V480 system and U916 or U915 PCI cards, verify the Solaris operating system, install the U915/U916 driver package, and install the SINAP/SS7 software.

Chapter 4 “Installation: ftServer T Series Systems” describes how to prepare the ftServer T Series system and U918 PCI cards, verify the Stratus ft Linux operating system, and install the SINAP/SS7 software.

Chapter 5 “Quick-Start Configuration” describes how to do a Quick-Start configuration of the SINAP/SS7 software.

Chapter 6 “Cross-Over Test”explains how to run TCAP and ISUP cross-over tests for ANSI or ITU-T networks and provides examples of the results you will obtain.

Appendix A, ‘‘In Case of Difficulty,” provides a quick means of determining if the necessary software has been properly installed on your system.

Notation Conventions

This manual uses the following notation conventions.

- `Monospace` represents text that would appear on your display screen (such as commands, functions, code fragments, names of files and directories, and user input). For example:

  The alternative format for `CHANGE-REMSSN` is `CHG-REMSSN`.

- `Monospace italic` represents terms that are to be replaced by literal values. In the following example, the user must replace the monospace-italic term with a literal value. For example:

  The `nmtr` program has the following syntax (where *`filename`* is the name of the file to be converted).

- **`Monospace bold`** represents user input in examples and figures that contain both user input and system output (which appears in monospace).

- For example:

```
MML as built is
  CREATE-CPC:
Specify local subsystem number: LSSN=253
LSSN=253
Specify point codes for the remote node:
(pc# or pc#1&pc#2... up to pc#10)
RPC=3003
LSSN=253,RPC=3003
```

- *Italics* introduces or defines new terms. For example:

  The *Terminal Handler* accepts commands in Man-Machine Language (MML).

- **Boldface** emphasizes words in text. For example:

  You **must** create a link set before you provision its member links.

- The dollar sign ($) and the number sign (#) are standard default prompt signs that have a specific meaning at the UNIX prompt.
  - $ indicates you are logged in to a user account and are subject to certain access limitations.
  - # indicates you are logged in to the system administrator account and have *superuser* access. Users of this account are referred to as `root`. The # prompt sign used in an example indicates that the command can only be issued by `root`.

  NOTE

  There is an implied pressing of the RETURN key at the end of each command and menu response that you enter.

- Full path names are not included for commands in standard locations (`/sbin`, `/usr/sbin`, `/bin`, `/usr/bin`, and `/etc`) or for SINAP commands run when logged in as a SINAP user. (SINAP automatically sets up the proper environment variables for a SINAP user.). Full path names are provided when the command appears in a nonstandard location.

Syntax Notation

This manual uses the format conventions for documenting commands as shown in the following example.

```
CREATE-REMSSN:PC=pc,SSN=ssn[&ssn];
```

The following chart explains the notation used in command formats.

Notation	Meaning
argument_1	Required argument. You cannot issue the command without supplying a value for this argument. If an argument is required but has a default value, it is not labeled **required** because you do not have to include it.
argument_1...	Required argument for which you can specify multiple values.
element_1 «*element_2* »	Set of arguments that are mutually exclusive; you can specify only one of these elements.
[*argument_1*]	Optional argument.
[*argument_1*]...	Optional argument for which you can specify multiple values.
argument_1 «*argument_2*»	Set of optional arguments that are mutually exclusive; you can specify only one of these elements.
Note: Dots, brackets, and braces are not literal characters; you should **not** type them. Any list or set of arguments can contain more than two elements. Brackets and braces are sometimes nested.	

Related Manuals[2]

Refer to the following Stratus manuals for related documentation:

- *SINAP Products Glossary* (R8010)
- *SINAP/SS7 User's Guide* (R8051)
- *SINAP/SS7 Programmer's Guide* (R8052)
- *SINAP/SS7 ISDN User Part (ISUP) Guide* (R8053)
- *SINAP/SS7 Technical Overview* (R8055)
- *SINAP/SS7 Installation Guide* (R8060)
- *HP-UX Operating System: Fault Tolerant System Administration* (MAN0004) or (R1004H)
- *DNCP Series 400 and 400-CO: Site Planning Guide* (MAN0050) or (R454)

[2] Some manuals include two part numbers because there are two versions of the manual. When two part numbers appear, either version can be used.

- *DNCP Series 400 and 400-CO Operation and Maintenance Guide* (MAN0056) or (R025H)
- *U916 T1/E1 PCI Card Installation Guide* (R761)
- *U420 T1/E1 PCI Card Installation Guide* (R700)
- *U918 T1/E1 PCI Card Installation Guide* (R760)
- *Stratus ft LinuxSystem Administrator's Guide* (R003L).
- *Stratus ftServer T30: Operation and Maintenance Guide* (R004L)

Refer to the following Sun manuals for related documentation:

- *Solaris 8 (SPARC Platform Edition) Installation Guide* (806-0955-10)
- *Solaris 8 Advanced Installation Guide* (816-2411-10)
- *Netra T4 Service and System Reference Manual* (806-7336-11)
- *Netra T4 Installation and Users Guide* (806-7334-11)
- *SunFire V480 Server Quick Start Guide* (816-3313-10)
- *SunFire V480 Server Setup and Rack Mounting Guide* (816-0902-11)
- *SunFire V480 Server Administration Guide* (816-0904-10)

Accessing Documentation

SINAP product documentation is provided on CD-ROM. You can request a documentation CD-ROM in either of the following ways:

- Call the Stratus Customer Assistance Center (CAC) (see ‘‘Contacting the CAC”).
- If your system is connected to the Remote Service Network (RSN), add a call using the Site Call System (SCS). See the scsac(1) man page for more information.

When requesting a documentation CD-ROM, please specify the product and platform documentation you desire, as there are several documentation CD-ROMs available.

Commenting on the Documentation

To provide corrections and suggestions for improving this documentation, send email to Comments@stratus.com. If it is possible, please include the title and part number from the Notice page and the page numbers.

This information will assist Stratus Publications in making any needed changes to the documentation. Your assistance is most appreciated.

Contacting the CAC

If you need assistance, contact your local systems engineer, or telephone the Stratus Customer Assistance Center (CAC) that services your area. If you cannot reach the center that services your area, contact the CAC in the United States.

The table below lists the CAC telephone numbers, all of which are available 24 x 7. For the most current list of CAC telephone numbers, see the following Web site: `http://www.stratus.com/support/cac`.

Worldwide CAC Telephone Numbers *(Page 1 of 2)*

Customer Assistance Center (CAC)	**Telephone Numbers**
North America, Central America, and South America	800-221-6588 (toll-free within USA or Canada)
	800-828-8513 (toll-free within USA or Canada)
	+1-978-461-7200 (Maynard, MA; for local and international direct)
	+1-602-852-3200 (Phoenix, AZ; for local and international direct)
Australia	1800-025-046 (toll-free within Australia)
Belgium*	+32 2-512-63-70 (Dutch language)
	+32 2-512-77-06 (French language)
France	+33 (0) 1-41-20-37-08
Germany	+49 (0) 6196-472518
Hong Kong	800-900-938 (toll-free within Hong Kong)
Italy	+39 02-467440-216
Japan	0120-725530
Mexico	+52 55-5553-4792
The Netherlands*	+31 (0) 346-582-112
New Zealand	0800-443-051 (toll-free within New Zealand)
People's Republic of China	+86 139-010-39512 (Beijing)
	+86 21-63877700 (Shanghai)
Singapore	1800-2727482 (toll-free within Singapore)
South Africa	+27 11-2675-709
Spain	+34 91-383-4294

Worldwide CAC Telephone Numbers *(Page 2 of 2)*

Customer Assistance Center (CAC)	**Telephone Numbers**
United Kingdom	+44 (0) 1784-246056

*For the countries of Belgium, Denmark, Luxembourg, The Netherlands, Norway, and Sweden, you can also use the following toll-free number to call after hours: 00800-000-99999. Your call will be directed to Phoenix Support Coordination.

NOTES

1. The plus sign (+) indicates that an international access code is required. The access code for international calls varies from country to country; in the United States, it is 011.
2. When you call from within the same country as the CAC office, be sure to include any necessary long distance or STD call prefix. If you use an international telephone number within the same country, you must replace the country code with the necessary prefix. For example, within the United States, callers dial 1-800-221-6588.
3. The telephone numbers in the preceding list are for CACs operated by Stratus. If you receive service from a distributor of Stratus products, contact your distributor for instructions about obtaining assistance.

Chapter 1
Introduction

This guide documents a process to quickly install, configure, and test the following primary system components:

- T1/E1 PCI card (U915, U916, U918, or U420)
- SINAP/SS7 software

These are supported by the following systems:

- HP-UX, Solaris, or Stratus ft Linux operating system
- Continuum (400/400-CO), Sun (Netra 20/T4 or SunFire V480), or ftServer T Series hardware platform

What is SINAP/SS7?

The Stratus Intelligent Network Applications Platform (SINAP) SS7 product is an SS7 stack (node) designed to be portable across different hardware architectures. SINAP/SS7 runs in the following environments:

- The Continuum Series 400 and 400-CO (central office) family of general purpose servers, supporting both 32-bit and 64-bit user applications on the 32-bit and 64-bit HP-UX operating system and enabling operation in networks with large, in-memory, real-time databases. (The 32-bit operating system can run a 32-bit application only.)
- The Netra 20/T4 and SunFire V480 family of general purpose servers, supporting both 32-bit and 64-bit user applications on the 64-bit Solaris 8 operating system and enabling operation in networks with large, in-memory, real-time databases.
- The ftServer T Series family of general purpose servers, supporting 32-bit user applications on the 32-bit Stratus ft Linux operating system and enabling operation in networks with large, in-memory, real-time databases.

The MultiStack product is a four node version of the SINAP software and UniStack is the single node version. Each node contains a single instance of the SINAP SS7 software. The setup of UniStack or MultiStack is determined by your software license.You must obtain the correct license after the installation of the SINAP software. For more information on the SINAP software, see ‘‘Related Manuals” in the Preface.

NOTE

UniStack SINAP systems require the use of loopback plugs for Quick-Start because only one SS7 node can be configured.

Overview of the Quick-Start Process

This process guides you through the installation, configuration, and testing of the SINAP/SS7 product on either a Continuum system running the HP-UX operating system, a supported Sun platform (Netra 20/T4 or SunFire V480) running the Solaris operating system, or an ftServer T Series platform running the Stratus ft Linux operating system. A short procedure and/or inspection confirms if each major step in the process was successful. Some troubleshooting hints are provided in case of difficulty.

Major Steps of the Quick-Start Process

1. Prepare the hardware.
2. Install the U915, U916, U918, or U420 T1/E1 PCI card(s).
3. Configure the operating system for the SINAP/SS7 software.
4. Install the SINAP/SS7 software.
5. Obtain the license file.
6. Prepare for testing.
7. Install the cross-over test cable(s) or loopback connector(s).
8. Configure the SINAP/SS7 software for testing.
9. Perform test.
10. De-configure the SINAP/SS7 software.

NOTE

On a factory packaged and shipped system, several of these steps might have been performed by manufacturing.

Companion Manuals

Before you begin, locate and refer to the following manuals during the Quick-Start process:

- *SINAP/SS7 Installation Guide* (R8060)
- *U916 T1/E1 PCI Card Installation Guide* (R761) or *U420 T1/E1 PCI Card Installation Guide* (R700) or *U918 T1/E1 PCI Card Installation Guide* (R760)
- Appropriate hardware platform manuals (see ‘‘Related Manuals” in the Preface)

Chapter 2
Installation: Continuum Systems

This chapter describes how to install SINAP/SS7 on a Continuum system. The Quick-Start method supports a Continuum system running a 64-bit version of the HP-UX operating system with U916 PCI cards and a 32-bit version of the HP-UX operating system with U420 PCI cards. This chapter includes the following sections:

- ‘‘Installing the T1/E1 PCI Cards”
- ‘‘Installing the Test Cables”
- ‘‘Verifying the Operating System”
- ‘‘Preparing to Install the SINAP/SS7 Software”
- ‘‘Installing the SINAP/SS7 Package”

Prepare the System

Follow the instructions detailed in the *DNCP Series 400 and 400-CO Operation and Maintenance Guide* (MAN0056) and the *DNCP Series 400 and 400-CO: Site Planning Guide* (MAN0050). See the section ‘‘Verifying the Operating System” before installing the cards.

Installing the T1/E1 PCI Cards

To install the U916 PCI card, see the *U916 T1/E1 PCI Card Installation Guide* (MAN0064). To install the U420 PCI card, see the *U420 T1/E1 PCI Card Installation Guide* (R700). To use the Quick-Start configuration, the cards must be installed in bay 2, slot 3 and bay 3, slot 5.

Installing the Test Cables

One or two cross-over cables or loopback plugs must be installed depending on the version of the SINAP/SS7 software you are installing on your system.

MultiStack Systems

Install one or two cross-over cables[1] as follows:

- Between the two U916 PCI cards at bay 2, slot 3 and bay 3, slot 5 with Port 1 to Port 1, and Port 2 to Port 2.
- Between the two U420 PCI cards at bay 2, slot 3 and bay 3, slot 5.

See Figure 2-1 for an example of a cross-over cable connected on Port 1 of each U916 PCI card in a MultiStack system.

Figure 2-1. Installed Cross-Over Cable

UniStack Systems

Install two loopback plugs as follows:

---

[1] The SINAP product package comes with cross-over cables. To order additional ones, contact Stone Wall Cable, Inc. 126 Hawkensen Drive, Rumney, NH 03266-3548. Tel: (800)525-3303. The part number is SC-9598-X. Cross-over cables may also be constructed by connecting pin 1 to pin 4, pin 2 to pin 5, pin 4 to pin 1, and pin 5 to pin 2.

- In Port 1 of the U916 PCI card in bay 2, slot 3 and in Port 1 of the U916 PCI card in bay 3, slot 5.
- In the U420 PCI card in bay 2, slot 3 and in the U420 PCI card in bay 3, slot 5.

NOTE

The supplied cables are satisfactory for a MultiStack system, but quick start of UniStack systems requires the use of loopback plugs. Stratus recommends the following vendor as a supplier for loopback plugs: Radisys Corporation (www.radisys.com). Telephone in the USA at 800-950-0044 and in Europe at 31 36 546 1070. (Radisys Part Number 87H3588, ARTIC 1000/2000 1 Port RJ-48 Plug). Loopback plugs may also be constructed using a standard RJ-48 plug with a jumper from pin one to pin four and a second jumper from pin two to pin five.

Verifying the Operating System

A Continuum system comes with the operating system already installed, so it is unlikely you need to install it yourself. However, should the need arise, see the *HP-UX Operating System: Read Me Before Installing* (R1003H), *HP-UX Operating System: Installation and Update* (R1002H) and *HP-UX Operating System: Fault Tolerant System Administration* (R1004H) for information about installing the HP-UX operating system.

Verify that the operating system is properly installed by listing the installed components. To do this, enter

```
# swlist
```

The following is sample output from a system running HP-UX version 11.00.03:

```
#
# Bundle(s):
#
B2491BA       B.11.00     MirrorDisk/UX
B3901BA       B.11.01.20  HP C/ANSI C Developer's Bundle for HP-UX 11.00 (S800)
B3913CB       B.11.01.20  HP C++ Compiler  (S800)
B3913DB       C.03.25     HP aC++ Compiler (S800)
HPUXEng64RT   B.11.00     English HP-UX 64-bit Runtime Environment
UXCoreMedia   B.11.00     HP-UX Media Kit (Reference Only.See Description)
XSWGR1100     B.11.00.45  HP-UX Extension Pack, May 1999
#
# Product(s) not contained in a Bundle:
#
Flash-Contents 11.00.03   Stratus Flash Card Contents
PHCO_16583     1.0        umount(1M) - /etc/mnttab access redesign.
.....
Stratus-FT     11.00.03   Stratus Fault-Tolerant Services
```

Note that the `Flash-Contents` and `Stratus-FT` lines are the key lines in this output. Other components may vary depending on the optional packages installed on your system.

In case of difficulty see Appendix A, ‘‘In Case of Difficulty.”

Install the SINAP/SS7 Software

The following sections describe how to install the SINAP/SS7 software.

Preparing to Install the SINAP/SS7 Software

Prior to installing the SINAP/SS7 software on a new system, you must create a group called `sinap` in `/etc/group`.

NOTE

The `quick_start` script will create `sinap[0-3]` users if needed, and will create `/home/sinap[0-3]` directories if needed.

1. Log in as `root`.
2. Create the `sinap` group with the following command:

   `groupadd sinap`

NOTE

For additional information on installing the SINAP/SS7 software, see Chapter 3, “HP-UX Operating System: Installing SINAP/SS7,” in the *SINAP/SS7 Installation Guide* (R8060). Keep this manual accessible for reference during the installation process.

Installing the SINAP/SS7 Package

Use the following procedure to install the SINAP/SS7 Software Package on your system:

1. Log in as `root`.
2. Insert the CD containing the correct SINAP release in the CD-ROM drive.
3. Use the `ioscan -fn -C disk` command to determine the disk block device for the CD-ROM (for example, `/dev/dsk/c3t3d0`).

4. Create the `/SD_CDROM` directory if it is not already there, then use the `mount` command to mount the disk block device for the CD-ROM. For example:

   `mount /dev/dsk/c3t3d0 /SD_CDROM`

5. Use the `swinstall` command to install the SINAP software package. For example:

   `swinstall -s /SD_CDROM SINAP`

6. Unmount the CD-ROM disk using the following command:

   `umount /SD_CDROM`

7. View the `/var/adm/sw/swagent.log` and `/var/adm/sw/swinstall.log` files for any errors or warnings that occurred during installation. The following is a sample log file.

```
Sample of SINAP Package Installation log
========================================


=======  02/11/04 06:00:33 EST  BEGIN swinstall SESSION (interactive)

NOTE:    The interactive UI was invoked, since no software was
         specified.

       * Session started for user "root@spook".

       * No CD-ROM devices could be found on spook.
       * Beginning Selection
            agent_auto_exitfalse
            agent_timeout_minutes10000
            allow_downdatefalse
            allow_incompatiblefalse
            allow_multiple_versionsfalse
            allow_split_patchesfalse
            ask false
            autorebootfalse
            autorecoverfalse
            autorecover_productfalse
            autoremove_jobfalse
            autoselect_dependenciestrue
            autoselect_patchestrue
            autoselect_reference_bundlestrue
            compress_filesfalse
            create_target_pathtrue
            defer_configurefalse
            enforce_dependenciestrue
            enforce_dsatrue
            enforce_kernbld_failuretrue
            enforce_locatabletrue
            enforce_scriptstrue
            job_polling_interval30
```

```
                layout_version1.0
                log_msgid0
                logdetailfalse
                logfile/var/adm/sw/swinstall.log
                loglevel1
                match_targetfalse
                mount_all_filesystemstrue
                patch_filter*.*
                patch_match_targetfalse
                patch_save_filestrue
                polling_interval2
                register_new_roottrue
                reinstallfalse
                reinstall_filesfalse
                reinstall_files_use_cksumtrue
                retry_rpc1
                rpc_binding_infoncacn_ip_tcp:[2121] ncadg_ip_udp:[2121]
                rpc_timeout5
                select_localtrue
                software_viewall_bundles
                source_cdrom/SD_CDROM
                source_typedirectory

            distribution_source_directory
tempo:/net/tempo/usr1/sinap/14.0/14.0.0.0_05AL/HP-UX11.00.03_gemini_pa8x00/dep
ot

                use_alternate_sourcefalse
                verbose1
                write_remote_filesfalse
          * Source:

tempo:/net/tempo/usr1/sinap/14.0/14.0.0.0_05AL/HP-UX11.00.03_gemini_pa8x00/dep
ot

          * Targets:                spook:/
          * Software selections:
                SINAP.FS1,r=Rel14.0.0.0_05AL02/04/04,a=PA-RISC
          * Beginning Analysis
          * The analysis phase succeeded for "spook:/".
          * Ending Analysis
          * Before starting Installation, you should be aware of the
            following:

            Kernel filesets will be installed on the local system.   The
            Installation process will include building a new kernel.

            Do you still wish to start Installation?
          * Beginning Task Execution
          * Proceeding with Task Execution on the following targets:
          * spook:/
          * The execution phase succeeded for "spook:/".
          * Ending Task Execution
WARNING: "spook:/":  There are other sessions in progress on this host
            that may affect the results of the Disk Space Analysis
```

```
          calculation.
        * Returning to Selection

=======  02/11/04 06:06:26 EST  END swinstall SESSION (interactive)
```

Verify Proper Installation

If the installation is successful, a "`The execution phase succeeded`" line appears near the end of the `/var/adm/sw/swinstall.log`.

Alternately, you can use the following command:

```
swlist SINAP
```

If a line similar to the following appears, the installation was successful:

```
# SINAP    Rel14.0.0.0_05AL02/04/04 Stratus Technologies SINAP/SS7 Product
  SINAP.FS1
```

In case of difficulty see Appendix A, ‘‘In Case of Difficulty.”

Next Step

After the SINAP/SS7 software is installed, the next step is to configure the software. The Quick-Start method allows you to quickly configure SINAP/SS7 for testing purposes, after which you can create a custom configuration. See Chapter 5, ‘‘Quick-Start Configuration,” for instructions on how to configure SINAP/SS7 using the Quick-Start method.

Chapter 3
Installation: Netra and SunFire Systems

This chapter describes how to install SINAP/SS7 on a Netra 20/T4 or SunFire V480 system. The Quick-Start method supports a Netra or SunFire system running the Solaris operating system with U916 or U915 PCI cards. This chapter includes the following sections:

- ‘‘Installing the U915 or U916 T1/E1 PCI Cards”
- ‘‘Installing the Test Cables”
- ‘‘Verifying the Operating System”
- ‘‘Preparing to Install the SINAP/SS7 Software”
- ‘‘Installing the Driver Package”
- ‘‘Verify Proper Installation”
- ‘‘Installing the SINAP/SS7 Package”
- ‘‘Configuring the Operating System for SINAP/SS7”

Prepare the Hardware

For a SunFire V480 series machine, follow the instructions detailed in the *SunFire V480 Server Quick Start Guide* (816-3313-10), *SunFire V480 Server Setup and Rack Mounting Guide* (816-0902-11), and *SunFire V480 Server Administration Guide* (816-0904-10).

For a Netra 20/T4 machine, follow the instructions detailed in the *Netra T4 Installation and Users Guide* (806-7334-11) and the *Netra T4 Service and System Reference Manual* (806-7336-11).

See the section ‘‘Verifying the Operating System” before installing the cards.

Installing the U915 or U916 T1/E1 PCI Cards

To install the U915 or U916 T1/E1 PCI cards, see the *U916 T1/E1 PCI Card Installation Guide* (R761).

Installing the Test Cables

One or two cross-over cables or loopback plugs must be installed depending on the version of the SINAP/SS7 software you are installing on your system.

MultiStack Systems

Install two cross-over cables[1] between the two U915 or U916 T1/E1 cards with Port 1 to Port 1, and Port 2 to Port 2.

See Figure 3-1 for an example of a cross-over cable connected on Port 1 of each U915 T1/E1 card in a MultiStack system.

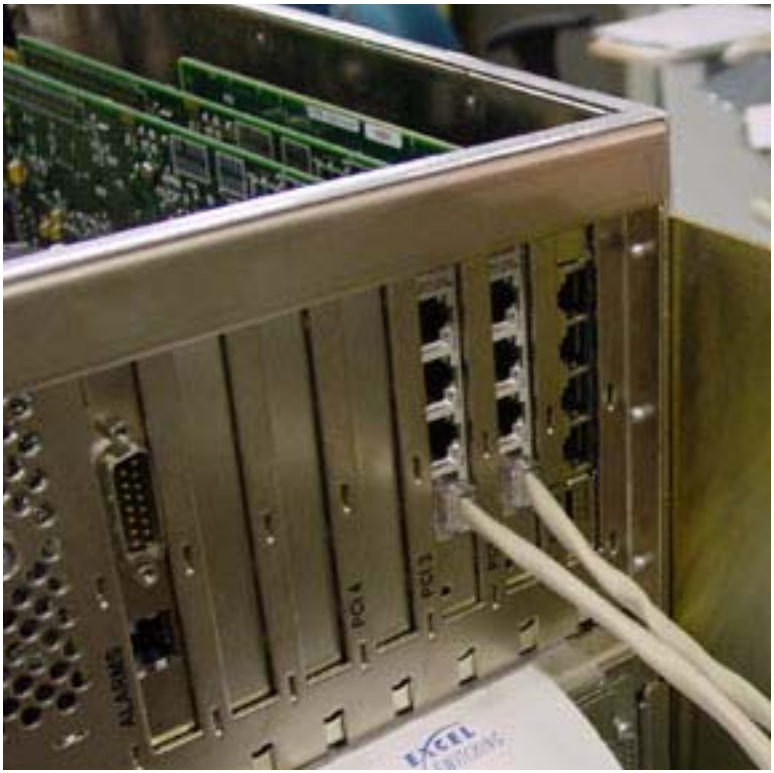

Figure 3-1. Installed Cross-Over Cable

[1] The SINAP product package comes with cross-over cables. If you need to order additional ones, please contact Stone Wall Cable, Inc. 126 Hawkensen Drive, Rumney, NH 03266-3548. Tel: (800)525-3303. The part number is SC-9598-X. Cross-over cables may also be constructed by connecting pin 1 to pin 4, pin 2 to pin 5, pin 4 to pin 1, and pin 5 to pin 2.

UniStack Systems

Install two loopback plugs, in Port 1 of the first U915 or U916 PCI card on the Netra and in Port 1 of the second U915 or U916 PCI card.

NOTE

The supplied cables are satisfactory for a MultiStack system, but a UniStack system requires two loopback plugs. Stratus recommends the following vendor as a supplier for loopback plugs: Radisys Corporation (www.radisys.com). Telephone in the USA at 800-950-0044 and in Europe at 31 36 546 1070. (Radisys Part Number 87H3588, ARTIC 1000/2000 1 Port RJ-48 Plug). Loopback plugs may also be constructed using a standard RJ-48 plug with a jumper from pin one to pin four and a second jumper from pin two to pin five.

Verifying the Operating System

A Netra or SunFire system comes with the operating system already installed, so it is unlikely you need to install it yourself. However, should the need arise, see the *Solaris 8 (SPARC Platform Edition) Installation Guide* (806-0955-10) and *Solaris 8 Advanced Installation Guide* (816-2411-10). See Chapter 2, “Solaris Operating System: Installing SINAP/SS7,”in the *SINAP/SS7 Installation Guide* (R8060) for recommended operating system set up.

Verify that the operating system is properly installed by checking the version of the operating system. To do this, enter

```
uname -srp
```

The following output indicates a successful installation:

```
SunOS 8.0 sparc
```

If you encounter a problem, see Appendix A, ‘‘In Case of Difficulty.”

Install the SINAP/SS7 Software

The following sections describe how to install the SINAP/SS7 software.

Preparing to Install the SINAP/SS7 Software

Prior to installing the SINAP/SS7 software on a new system, you must create a group called `sinap` in `/etc/group`.

NOTE

The `quick_start` script will create sinap[0-3] users if needed, and will create /home/sinap[0-3] directories if needed.

1. Log in as `root`.
2. Create the `sinap` group with the following command:

   `groupadd sinap`

NOTE

For additional information on installing the SINAP/SS7 software, see Chapter 2, "Solaris Operating System: Installing SINAP/SS7," in the *SINAP/SS7 Installation Guide* (R8060). Keep this manual accessible for reference during the installation process.

Installing the Driver Package

Prior to installing the SINAP/SS7 software, you must install the firmware driver package for the T1/E1 interface card. (The ARTICrpq driver supports both the U915 and U916 PCI cards.)

1. Log in as `root` with super-user privileges.
2. Insert the CD containing the SINAP Package software in the CD-ROM drive.
3. Add the U915/U916 driver package `ARTICrpq`. To do this (assuming the CD-ROM is located at `/dev/cdrom/pkg`), enter

   `pkgadd -d /dev/cdrom/pkg ARTICrpq`

4. Respond to the prompts as illustrated in the following sample session:

```
Sample of ARTICrpq Package Installation Screen
==============================================

Processing package instance <ARTICrpq> from </dev/cdrom/pkg>

ARTIC 1000/2000 Series Support for Solaris 8 on SPARC
(sparc) release 1.0.6
Licensed Material - Property of Radisys Corp.
ARTIC 1000/2000 Series Support for Solaris 1.0.6
(C) Copyright Radisys Corporation 2000 All Rights Reserved.


The default installation directory for ARTICrpq is /opt. Do you want to
install to this location? y

The default permissions to access the driver is 0666. This setting will give full read write
```

```
access to all groups and users. Do you want to keep this as
the default permissions? y

The default installation locations for the driver and libraries are /usr/kernel/drv and
/usr/lib. Do you want to install the driver and libraries to the default locations? y

The default directory for library installation is /usr/lib. Do you want to
install the libraries to this location? y
Using </opt> as the package base directory.
## Processing package information.
## Processing system information.
## Verifying disk space requirements.
## Checking for conflicts with packages already installed.
## Checking for setuid/setgid programs.

This package contains scripts which will be executed with super-user
permission during the process of installing this package.

Do you want to continue with the installation of <ARTICrpq> [y,n,?] y
```

Verify Proper Installation

The following two lines will appear at the end of a successful `pkgadd` process:

```
Installed 2 cards
Installation of <ARTICrpq> was successful.
```

Alternately, you can verify proper installation with the following command:

```
pkginfo | grep ARTICrpq
```

The following output indicates a successful installation:

```
system ARTICrpq ARTIC 1000/2000 Series Support for Solaris 8 on SPARC
```

If you encounter a problem, see Appendix A, ‘‘In Case of Difficulty.”

Installing the SINAP/SS7 Package

Use the following procedure to install the SINAP/SS7 Software Package on your system. (This procedure assumes the CD-ROM used to install the driver package is still in the drive.)

1. Add the SINAP package. To do this, enter

   ```
   pkgadd -d /dev/cdrom/pkg SINAP
   ```

2. Respond to the prompts as illustrated in the following sample session:

```
Sample of SINAP Package Installation Screen
===========================================
```

```
Processing package instance <SINAP> from </dev/cdrom/pkg>

SINAP SS#7 Platform
(SPARC) Rel 14.0 root 09/07/01

Enter SINAP module name (default: M1) [?,q] <ENTER>

Enter directory name to be created for SINAP product files
(default: /home/sinap_master) [?,q] <ENTER>

Group name for SINAP product files

Do you wish to see the list of valid group names (default: n) [y,n,?,q]
<ENTER>

Enter the group name (default: other) [?, q] sinap
-----------------------------------------------------
SINAP Module Name M1
SINAP Master directory /home/sinap_master
SINAP group name sinap
-----------------------------------------------------

Is this correct (default: y) [y,n,?,q] <ENTER>

Enter path to package base directory [?,q] /
Using </> as the package base directory.
## Processing package information.
## Processing system information.
## Verifying disk space requirements.
## Checking for conflicts with packages already installed.

The following files are already installed on the system and are being
used by another package:
  /etc <attribute change only>

Do you want to install these conflicting files [y,n,?,q] n

Do you want to continue with the installation of <SINAP> [y,n,?] y

## Checking for setuid/setgid programs.

The following files are being installed with setuid and/or setgid
permissions:
  /home/sinap_master/Bin/bibp <setuid root>
  /home/sinap_master/Bin/drda_daemon <setuid root>
  /home/sinap_master/Bin/l3mp <setuid root>
  /home/sinap_master/Bin/l3mt <setuid root>
  /home/sinap_master/Bin/l3rt <setuid root>
  /home/sinap_master/Bin/load_shm <setuid root>
  /home/sinap_master/Bin/lock_shm <setuid root>
  /home/sinap_master/Bin/nmcl <setuid root>
  /home/sinap_master/Bin/nmdm <setuid root>
  /home/sinap_master/Bin/nmip <setuid root>
  /home/sinap_master/Bin/nmkill <setuid root>
  /home/sinap_master/Bin/nmnp <setuid root>
  /home/sinap_master/Bin/remove_shm <setuid root>
  /home/sinap_master/Bin/rse_ss7dmn <setuid root>
  /home/sinap_master/Bin/sinap_pidclean <setuid root>
```

```
  /home/sinap_master/Bin/sinap_update <setuid root>

Do you want to install these as setuid/setgid files [y,n,?,q] y

This package contains scripts which will be executed with super-user
permission during the process of installing this package.

Do you want to continue with the installation of <SINAP> [y,n,?] y
```

Verify Proper Installation

The following two lines will appear at the end of a successful `pkgadd` process:

```
Driver (sinap) installed
Installation of <SINAP> was successful
```

Alternately, you can verify proper installation with the following command:

```
pkginfo | grep SINAP
```

If the following line is displayed, the installation was successful:

```
application SINAP   SINAP SS#7 Platform
```

If you encounter a problem, see Appendix A, ‘‘In Case of Difficulty.”

Configuring the Operating System for SINAP/SS7

Before you can configure the SINAP/SS7 software on your system, key operating system parameters must be set to values that will support the configuration. Table 2-1 lists the shared memory parameters required for installing the SINAP/SS7 software on Solaris operating systems. These parameters are automatically set by the `sinap_osconf` script, which also creates SINAP user accounts for all four nodes.

Parameter	Value
MSGMNB	65535
SHMAX	16000000
SHMSEG	15

Table 3-1. Solaris Parameter Values for SINAP/SS7 Installation

NOTE

A reboot (`init 6`) is required after running the `sinap_osconf` script.

Next Step

After the SINAP/SS7 software is installed, the next step is to configure the software. The Quick-Start method allows you to quickly configure SINAP/SS7 for testing purposes, after which you can create a custom configuration. See Chapter 5, ‘‘Quick-Start Configuration,” for instructions on how to configure SINAP/SS7 using the Quick-Start method.

Chapter 4
Installation: ftServer T Series Systems

This chapter describes how to install SINAP/SS7 on an ftServer T Series system. The Quick-Start method supports an ftServer T Series system running the Stratus ft Linux operating system with U918 PCI cards. This chapter includes the following sections:

- ‘‘Installing the U918 T1/E1 PCI Cards”
- ‘‘Installing the Test Cables”
- ‘‘Verifying the Operating System”
- ‘‘Preparing to Install the SINAP/SS7 Software”
- ‘‘Installing the SINAP/SS7 Package”

Prepare the Hardware

For an ftServer T Series system, follow the instructions detailed in the *Stratus ftServer T30: Operation and Maintenance Guide* (R004L) and *Stratus ft Linux System Administrator’s Guide* (R003L). See the section ‘‘Verifying the Operating System” before installing the cards.

Installing the U918 T1/E1 PCI Cards

To install the U918 T1/E1 PCI cards, see the *U918 T1/E1 PCI Card Installation Guide* (R760). To use the Quick-Start configuration, the cards must be installed in CRU 10, slot 2 and CRU 11, slot 2.

Installing the Test Cables

Two cross-over cables or loopback plugs must be installed depending on the version of the SINAP/SS7 software you are installing on your system.

MultiStack Systems

Install two cross-over cables[1] between the two U918 T1/E1 cards, each in PCI slot 2 in each enclosure, with Port 1 to Port 1, and Port 2 to Port 2.

UniStack Systems

Install two loopback plugs, in Port 1 of the first U918 PCI card and in Port 1 of the second U918 PCI card, each in PCI slot 2 in each enclosure.

NOTE

The supplied cables are satisfactory for a MultiStack system, but a UniStack system requires two loopback plugs. Stratus recommends the following vendor as a supplier for loopback plugs: Radisys Corporation (www.radisys.com). Telephone in the USA at 800-950-0044 and in Europe at 31 36 546 1070. (Radisys Part Number 87H3588, ARTIC 1000/2000 1 Port RJ-48 Plug). Loopback plugs may also be constructed using a standard RJ-48 plug with a jumper from pin one to pin four and a second jumper from pin two to pin five.

Verifying the Operating System

An ftServer T Series system comes with the operating system already installed, so it is unlikely you need to install it yourself. However, should the need arise, see the *Stratus ft Linux System Administrator's Guide* (R003L). See Chapter 4, "Stratus ft Linux Operating System: Installing SINAP/SS7,"in the *SINAP/SS7 Installation Guide* (R8060) for recommended operating system set up.

Verify that the operating system is properly installed by checking the version of the operating system. To do this, enter

```
uname -srp
```

The following output indicates a successful installation:

```
Linux 2.4.18 i686
```

If you encounter a problem, see Appendix A, ''In Case of Difficulty."

Install the SINAP/SS7 Software

The following sections describe how to install the SINAP/SS7 software.

[1] The SINAP product package comes with cross-over cables. If you need to order additional ones, please contact Stone Wall Cable, Inc. 126 Hawkensen Drive, Rumney, NH 03266-3548. Tel: (800)525-3303. The part number is SC-9598-X. Cross-over cables may also be constructed by connecting pin 1 to pin 4, pin 2 to pin 5, pin 4 to pin 1, and pin 5 to pin 2.

Preparing to Install the SINAP/SS7 Software

Prior to installing the SINAP/SS7 software on a new system, you must create a group called `sinap` in `/etc/group`.

NOTE

The `quick_start` script will create sinap[0-3] users if needed, and will create /home/sinap[0-3] directories if needed.

1. Log in as `root`.
2. Create the `sinap` group with the following command:

   `groupadd sinap`

NOTE

For additional information on installing the SINAP/SS7 software, see Chapter 4, "Stratus ft Linux Operating System: Installing SINAP/SS7," in the *SINAP/SS7 Installation Guide* (R8060). Keep this manual accessible for reference during the installation process.

Installing the SINAP/SS7 Package

This section provides instructions for performing an installation of the SINAP/SS7 software from a CD-ROM.

1. Log in as `root`.
2. Ensure that the `/mnt/cdrom` directory exists, and if it does not, create it. To do this, enter

   `ls /mnt`
   (if no `/mnt/cdrom` directory)
   `mkdir /mnt/cdrom`

3. Insert the SINAP/SS7 product CD-ROM into the CD-ROM drive.
4. Issue the command: **`mount /dev/cdrom /mnt/cdrom`**
5. Issue the command: **`cd /mnt/cdrom/SINAP*`**
6. Issue the command: **`./sinap_install`**

Figure 4-1 shows a sample SINAP installation on the Stratus ft Linux operating system.

```
# ls /mnt
cdrom  cdrom1
# mount /dev/cdrom /mnt/cdrom
mount: block device /dev/cdrom is write-protected, mounting read-only
# cd /mnt/cdrom
# ls
SINAP14.0_08AL
# cd SINAP14.0_08AL;ls
ohrsd-1.0.0.0_03AL-1.i386.rpm  sinap-14.0.0.0_08AL-1.i386.rpm  sinap_install
# pwd
/mnt/cdrom/SINAP14.0_08AL
# ./sinap_install

PLEASE READ THE FOLLOWING STATEMENT CAREFULLY.

                STRATUS TECHNOLOGIES
END-USER LICENSE AGREEMENT FOR STRATUS SINAP SOFTWARE
    .
    .
<license text>
    .
    .
Press ENTER to continue:
    .
    .
Do you accept the above statement? (y/n)y

Starting Preremove scripts ...
Preremove: complete !

Postremove Script Starts  ...
Do nothing for Linux !
Postremove: complete !

Starting SINAP installation...
Preparing...                ########################################### [100%]
   1:sinap                  ########################################### [100%]

Starting Postinstall Script ...
/etc/SS7links created.
/etc/sinap_master created.
Sinap device files in /dev/ss7 directory created.
SINAP scripts populated under /etc directory.
/opt/ARTICrpq/out created.
Shared object libraries in /usr/lib directory linked.

postinstall: Establish cron job to perform daily backup and purge
Cron job to perform daily backup and purge established.

Postinstall: complete !

Preparing...                ########################################### [100%]
   1:ohrsd                  ########################################### [100%]
```

Figure 4-1. Sample Stratus ft Linux Operating System SINAP Installation

```
# ps -ef|grep download|grep -v grep
root      5511     1  0 14:04 pts/3    00:00:00 /sbin/tomcat/odownloadd -s
root      5512  5511  0 14:04 pts/3    00:00:00 /sbin/tomcat/odownloadd -s
# rpm -q sinap
sinap-14.0.0.0_08AL030304-1
# rpm -q ohrsd
ohrsd-1.0.0.0_03AL-1
```

Figure 4-1. (Continued) Sample Stratus ft Linux Operating System SINAP Installation

Verify Proper Installation

You can verify proper installation with the following commands:

```
# rpm -q sinap
# rpm -q ohrsd
```

If the following lines are displayed, the installation was successful:

```
sinap-14.0.0.0_08AL030304-1
ohrsd-1.0.0.0_03AL-1
```

If you encounter a problem, see Appendix A, ‘‘In Case of Difficulty.”

Next Step

After the SINAP/SS7 software is installed, the next step is to configure the software. The Quick-Start method allows you to quickly configure SINAP/SS7 for testing purposes, after which you can create a custom configuration. See Chapter 5, ‘‘Quick-Start Configuration,” for instructions on how to configure SINAP/SS7 using the Quick-Start method.

Chapter 5
Quick-Start Configuration

This chapter describes how to use the Quick-Start method to quickly configure SINAP/SS7. You can use this method to automatically configure the SINAP/SS7 software for CCITT, ANSI, or TTC (with J1 or E1 connections) cross-over or loopback testing (see Chapter 6, ‘‘Cross-Over Test”).

NOTE

Before configuring the SINAP/SS7 software, you must have a valid software licence set up on the host system. See Appendix B, “SINAP Products License Management,” in the *SINAP/SS7 Installation Guide* (R8060) for instructions on how to obtain a license.

Configuring the SINAP/SS7 Software

A configuration script for the MultiStack software and the UniStack software (`/etc/quick_start`) is included on the CD to automatically configure the SINAP/SS7 software for cross-over or loopback tests, as detailed in Chapter 6, ‘‘Cross-Over Test.”

NOTE

When you are ready to create a custom configuration, see Chapter 4, “Configuring SINAP/SS7,” in the *SINAP/SS7 Installation Guide* (R8060).

Run the Configuration Script

To automatically configure the node(s), do the following:

1. Login as `root`.
2. Run the configuration script:

- MultiStack configuration with four nodes or UniStack configuration with one node (select one):

  `/etc/quick_start ccitt`

  `/etc/quick_start ansi`

  `/etc/quick_start ttcj1`

  `/etc/quick_start ttce1`

  NOTE

  The `quick_start` script determines whether to configure UniStack or MultiStack based on the license file.

The following sample display shows the MultiStack software being automatically configured for Quick-Start CCITT testing on a Continuum system with U916 PCI cards. (The display using U420 PCI cards or on a Netra or SunFire or ftServer T Series system would be nearly identical to this sample.)

NOTE

Once the script is started, no user input is required. (Any input is ignored until the script completes.)

```
Sample of SINAP Configuration Screen
========================================
# /etc/quick_start ccitt
SINAP license verified...
saving /etc/lucent/opersonality.conf as
/etc/lucent/opersonality.conf.20050111_0820


        Make a Selection to:

        d) Display SINAP configuration
     a) Add a SINAP Node
     r) Remove a SINAP Node
     l) Link Configuration for all SINAP Nodes
     n) Network Variant Change for a SINAP Node
     t) TCAP Protocol Change for a SINAP Node
     q) Quit the configuration process

     Please select one of the above (d,a,r,l,u,n,t,q):
Current Configuration: /etc/sinap_master
NODES=0 MODULE=M1 MASTER=/opt/sinap_master GROUP=sinap;
INDEX=0 NODE=- HOME=- NETWORK=- TCAP=- USER=-;
INDEX=1 NODE=- HOME=- NETWORK=- TCAP=- USER=-;
INDEX=2 NODE=- HOME=- NETWORK=- TCAP=- USER=-;
INDEX=3 NODE=- HOME=- NETWORK=- TCAP=- USER=-;
```

```
configured nodes are 0
SINAP license verified...

Enter NODE name [?,q]
Enter NODE home directory [?,q]
Enter Network Variant to run (default: ccitt) [ansi,ccitt,ttc,china,ntt,?,q]
Standard TCAP is ccitt, or a hybrid stack can be configured.

Enter TCAP Protocol to run (default: ccitt) [ansi,ccitt,?,q]
NODE account login name

Do you wish to see the list of valid user names (default: n) [y,n,?,q]
Enter the user name for the NODE account [?, q]
Do you wish to start SINAP from inittab (default: n) [y,n,?,q]
Do you wish to restore saved MML (default: n) [y,n,?,q]
Do you wish to configure SNMP for this node (default: n) [y,n,?,q]
Updated Configuration: /etc/sinap_master
NODES=1 MODULE=M1 MASTER=/opt/sinap_master GROUP=sinap;
INDEX=0 NODE=N0 HOME=/home/sinap0 NETWORK=CCITT TCAP=CCITT USER=sinap0;
INDEX=1 NODE=- HOME=- NETWORK=- TCAP=- USER=-;
INDEX=2 NODE=- HOME=- NETWORK=- TCAP=- USER=-;
INDEX=3 NODE=- HOME=- NETWORK=- TCAP=- USER=-;


Do you wish to configure this node as an LPCR (default: n) [y,n,?] Creating the
environment files...
Creating SINAP and SYSOPR accounts...
Creating links to SINAP_MASTER...
Copying Sample files...
Please wait, it is going to take a few minutes...

Installing SINAP crontab jobs
warning: commands will be executed using /usr/bin/sh
gen_ipct: Wrote 96740 bytes to IPCTBL_load
gen_ipct: initial IPCTBL_load image generated
gen_stat: Wrote 1955512 bytes to STATIC_load
gen_stat: initial STATIC_load image generated
Compiling /home/sinap0/treat.tab to tm_treat.lod in default directory
tm_treat.lod correctly written
Installing tm_treat.lod version of /home/sinap0/treat.tab for SINAP use


        Make a Selection to:

        d) Display SINAP configuration
      a) Add a SINAP Node
      r) Remove a SINAP Node
      l) Link Configuration for all SINAP Nodes
      n) Network Variant Change for a SINAP Node
      t) TCAP Protocol Change for a SINAP Node
      q) Quit the configuration process

      Please select one of the above (d,a,r,l,u,n,t,q):
1 Nodes(s) added
```

```
Links were NOT configured



Sample of SS7 Link Configuration Screen
=======================================

Make a Selection to:

        d) Display SINAP configuration
      a) Add a SINAP Node
      r) Remove a SINAP Node
      l) Link Configuration for all SINAP Nodes
      n) Network Variant Change for a SINAP Node
      t) TCAP Protocol Change for a SINAP Node
      q) Quit the configuration process

      Please select one of the above (d,a,r,l,u,n,t,q):

This script will populate the link configuration information needed for SINAP
nodes.


!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!

The /etc/orse/orsdinfo and /etc/SS7links files will be modified by this script

The current /etc/orse/orsdinfo file will be saved as
/etc/orse/orsdinfo.20050111_0821

The current /etc/SS7links file will be saved as /etc/SS7links.20050111_0821

!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!


Do you wish to add SINAP devices to /etc/SS7links only [ default = n ]
[y, n, ?, or q]:
The following NODEs have been created:
INDEX=0 NODE=N0 HOME=/home/sinap0 NETWORK=CCITT TCAP=CCITT USER=sinap0;
INDEX=1 NODE=N1 HOME=/home/sinap1 NETWORK=CCITT TCAP=CCITT USER=sinap1;
INDEX=2 NODE=N2 HOME=/home/sinap2 NETWORK=CCITT TCAP=CCITT USER=sinap2;
INDEX=3 NODE=N3 HOME=/home/sinap3 NETWORK=CCITT TCAP=CCITT USER=sinap3;

Enter the name of the NODE you wish to configure
[NODE name, ?, or q]:
Make a Selection to:
    n) Start configuring links for a different node
    g) Configure G703 (T1/E1) links for node 'N0'
    x) Complete configuration and Exit
[n, g, or x]:
Please wait while the /etc/SS7links file is prepared to add links for node 'N0'

List of U916 boards available on this system
```

```
u91600 0/2/3/0       WILDCAT(4port T1E1   CLAIM -         -    Online  -       0
u91600 0/3/5/0       WILDCAT(4port T1E1   CLAIM -         -    Online  -       0

Enter PCI bay number [ default = 2 ]
[2, 3, ? or q]:
Enter IOA slot number [ default = 3 ]
[0...7, ? or q]:
Enter Cable Connection Port [ default = 1 ]
[1, 2, 3, 4, ?, or q]:
Total unused links on port = 31

Enter number of links to configure [ default = 1 ]
[1...31 , ? ]:
   PCI bay:          2
   IO Adapter slot:  3
   Connection Port:  1
   Number of links:  8

Are these values correct? [ default = y ]
[y, n, or ?]:
Please wait while device '0/2/3/0' property is set to SS7

Enter Jitter [ default = 1 ]
    Provide one of the following values
    1    PH_BYPASS
    2    PH_XMIT_PATH
    3    PH_RECV_PATH
    4    PH_TEST_MODE
[Jitter, ?, or q]:
Enter Signalling [ default = 1 ]
    Provide one of the following values
    1    PH_SIG_MOS
    2    PH_SIG_DDS_T1DM
[Signalling, ?, or q]:
Enter Loopback [ default = 1 ]
    Provide one of the following values
    1    PH_NO_LOOPBACK
    2    PH_EXTERNAL_LOOPBACK
    3    PH_REMOTE_LOOPBACK
    4    PH_INTERNAL_LOOPBACK
[Loopback, ?, or q]:
Enter Carrier [ default = 1 ]
    Provide one of the following values
    1    PH_LC_CEPT
[Carrier, ?, or q]:
Enter Distance [ default = 1 ]
    Provide one of the following values
    1    PH_DX_PQ_SHORT
    2    PH_DX_PQ_LONG
[Distance, ?, or q]:
Enter format [ default = 1 ]
    Provide one of the following values
    1    PH_FRM_CRC_4
    2    PH_FRM_DUTCH
```

```
[format, ?, or q]:
Enter Coding [ default = 1 ]
    Provide one of the following values
    1    PH_LC_HDB3
[Coding, ?, or q]:
Enter Clocking [ default = 1 ]
    Provide one of the following values
    1    PH_SLAVE_CLOCK
    2    PH_MASTER_CLOCK
    3    PH_RECOVERED_CLOCK
[clocking, ?, or q]:
Enter Primary Clocking Port [ default = 1 ]
    Provide one of the following values
    1    PH_CLOCK_PORT_1
    2    PH_CLOCK_PORT_2
    3    PH_CLOCK_PORT_3
    4    PH_CLOCK_PORT_4
[Clock From, ?, or q]:
Enter First Backup Clocking Port [ default = 2 ]
    Provide one of the following values
    1    PH_CLOCK_PORT_1
    2    PH_CLOCK_PORT_2
    3    PH_CLOCK_PORT_3
    4    PH_CLOCK_PORT_4
[Clock From, ?, or q]:
Enter Second Backup Clocking Port [ default = 3 ]
    Provide one of the following values
    1    PH_CLOCK_PORT_1
    2    PH_CLOCK_PORT_2
    3    PH_CLOCK_PORT_3
    4    PH_CLOCK_PORT_4
[Clock From, ?, or q]:
Enter Third Backup Clocking Port [ default = 4 ]
    Provide one of the following values
    1    PH_CLOCK_PORT_1
    2    PH_CLOCK_PORT_2
    3    PH_CLOCK_PORT_3
    4    PH_CLOCK_PORT_4
[Clock From, ?, or q]:
    Jitter:            PH_BYPASS
    Signalling:        PH_SIG_MOS
    Loopback:          PH_NO_LOOPBACK
    Carrier:           PH_LC_CEPT
    Distance:          PH_DX_PQ_SHORT
    Format:            PH_FRM_CRC_4
    Coding:            PH_LC_HDB3
    Primary Clk Port:  PH_CLOCK_PORT_1
    1st Bkup Clk Port: PH_CLOCK_PORT_2
    2nd Bkup Clk Port: PH_CLOCK_PORT_3
    3rd Bkup Clk Port: PH_CLOCK_PORT_4
    Clocking:          PH_MASTER_CLOCK

Are these values correct? [ default = y ]
[y, n, or ?]:
Please wait while the next available minor number is calculated
```

```
Enter an E1 time-slot index [default 1 ]
[1...31, ?, or q]:
Enter an E1 time-slot index [default 2 ]
[1...31, ?, or q]:
Enter an E1 time-slot index [default 3 ]
[1...31, ?, or q]:
Enter an E1 time-slot index [default 4 ]
[1...31, ?, or q]:
Enter an E1 time-slot index [default 5 ]
[1...31, ?, or q]:
Enter an E1 time-slot index [default 6 ]
[1...31, ?, or q]:
Enter an E1 time-slot index [default 7 ]
[1...31, ?, or q]:
Enter an E1 time-slot index [default 8 ]
[1...31, ?, or q]:
Do you want to add another U916 IOA entry for node 'N0'? [ default = n ]
[y, n, or ?]:
Make a Selection to:
    n) Start configuring links for a different node
    g) Configure G703 (T1/E1) links for node 'N0'
    x) Complete configuration and Exit
[n, g, or x]:
Please wait while /usr/sbin/otelrsd is called to add newly created devices
```

Verify Proper Configuration

Use the following procedure to verify the configuration.

1. Verify the node configuration. To do this, view the contents of the `/etc/sinap_master` file. The following is a sample `sinap_master` file for a MultiStack system.

```
Sample of /etc/sinap_master File
========================================

# Field               Description                    Value/Limit
# NODES      Number of Nodes configured on MODULE      0-4
# MODULE     Name of the system                        1-4 characters
# MASTER     Name of the SINAP Master Directory        (System limit apply)
# GROUP      Group name for SINAP USER                 (System limit apply)
# INDEX      Node indexes, used by SINAP               0-3
# NODE       Node id chosen by USER at configuration   1-4 characters
# HOME       Working directory of SINAP USER           (System limit apply)
# NETWORK    Network Variant for this NODE CCITT, ANSI, TTC,CHINA
# TCAP       TCAP Protocol for this NODE               CCITT, ANSI
# USER       Login name for USER on this NODE          (System limit apply)
#
NODES=4 MODULE=M1 MASTER=/home/sinap_master GROUP=sinap;
INDEX=0 NODE=N0 HOME=/home/sinap0 NETWORK=CCITT TCAP=CCITT USER=sinap0;
```

```
INDEX=1 NODE=N1 HOME=/home/sinap1 NETWORK=CCITT TCAP=CCITT USER=sinap1;
INDEX=2 NODE=N2 HOME=/home/sinap2 NETWORK=CCITT TCAP=CCITT USER=sinap2;
INDEX=3 NODE=N3 HOME=/home/sinap3 NETWORK=CCITT TCAP=CCITT USER=sinap3;
```

2. Verify the SS7 link configuration. To do this, view the contents of the `/etc/SS7links` file. The following is a sample `SS7links` file for a MultiStack system.

```
Sample of /etc/SS7links File
========================================

NODE=N0

device = /dev/rsd/ss7_0203001 wan = /dev/rsd/wan_0203001
        jitter     = PH_BYPASS
        signalling = PH_SIG_MOS
        loopback   = PH_NO_LOOPBACK
        carrier    = PH_LC_CEPT
        distance   = PH_DX_PQ_SHORT
        format     = PH_FRM_CRC_4
        coding     = PH_LC_HDB3
        master_clock    = PH_MASTER_CLOCK
        prmclk          = PH_CLOCK_PORT_1
        bkupclk1        = PH_CLOCK_PORT_2
        bkupclk2        = PH_CLOCK_PORT_3
        bkupclk3        = PH_CLOCK_PORT_4;
link = 0 device = /dev/rsd/ss7_0203001 slot = 1;

device = /dev/rsd/ss7_0203002 wan = /dev/rsd/wan_0203002
        jitter     = PH_BYPASS
        signalling = PH_SIG_MOS
        loopback   = PH_NO_LOOPBACK
        carrier    = PH_LC_CEPT
        distance   = PH_DX_PQ_SHORT
        format     = PH_FRM_CRC_4
        coding     = PH_LC_HDB3
        master_clock    = PH_MASTER_CLOCK
        prmclk          = PH_CLOCK_PORT_1
        bkupclk1        = PH_CLOCK_PORT_2
        bkupclk2        = PH_CLOCK_PORT_3
        bkupclk3        = PH_CLOCK_PORT_4;
link = 1 device = /dev/rsd/ss7_0203002 slot = 2;

device = /dev/rsd/ss7_0203003 wan = /dev/rsd/wan_0203003
        jitter     = PH_BYPASS
        signalling = PH_SIG_MOS
        loopback   = PH_NO_LOOPBACK
        carrier    = PH_LC_CEPT
        distance   = PH_DX_PQ_SHORT
        format     = PH_FRM_CRC_4
        coding     = PH_LC_HDB3
        master_clock    = PH_MASTER_CLOCK
        prmclk          = PH_CLOCK_PORT_1
        bkupclk1        = PH_CLOCK_PORT_2
        bkupclk2        = PH_CLOCK_PORT_3
```

```
        bkupclk3        = PH_CLOCK_PORT_4;
link = 2 device = /dev/rsd/ss7_0203003 slot = 3;


device = /dev/rsd/ss7_0203004 wan = /dev/rsd/wan_0203004
        jitter     = PH_BYPASS
        signalling = PH_SIG_MOS
        loopback   = PH_NO_LOOPBACK
        carrier    = PH_LC_CEPT
        distance   = PH_DX_PQ_SHORT
        format     = PH_FRM_CRC_4
        coding     = PH_LC_HDB3
        master_clock    = PH_MASTER_CLOCK
        prmclk          = PH_CLOCK_PORT_1
        bkupclk1        = PH_CLOCK_PORT_2
        bkupclk2        = PH_CLOCK_PORT_3
        bkupclk3        = PH_CLOCK_PORT_4;
link = 3 device = /dev/rsd/ss7_0203004 slot = 4;

device = /dev/rsd/ss7_0203005 wan = /dev/rsd/wan_0203005
        jitter     = PH_BYPASS
        signalling = PH_SIG_MOS
        loopback   = PH_NO_LOOPBACK
        carrier    = PH_LC_CEPT
        distance   = PH_DX_PQ_SHORT
        format     = PH_FRM_CRC_4
        coding     = PH_LC_HDB3
        master_clock    = PH_MASTER_CLOCK
        prmclk          = PH_CLOCK_PORT_1
        bkupclk1        = PH_CLOCK_PORT_2
        bkupclk2        = PH_CLOCK_PORT_3
        bkupclk3        = PH_CLOCK_PORT_4;
link = 4 device = /dev/rsd/ss7_0203005 slot = 5;

device = /dev/rsd/ss7_0203006 wan = /dev/rsd/wan_0203006
        jitter     = PH_BYPASS
        signalling = PH_SIG_MOS
        loopback   = PH_NO_LOOPBACK
        carrier    = PH_LC_CEPT
        distance   = PH_DX_PQ_SHORT
        format     = PH_FRM_CRC_4
        coding     = PH_LC_HDB3
        master_clock    = PH_MASTER_CLOCK
        prmclk          = PH_CLOCK_PORT_1
        bkupclk1        = PH_CLOCK_PORT_2
        bkupclk2        = PH_CLOCK_PORT_3
        bkupclk3        = PH_CLOCK_PORT_4;
link = 5 device = /dev/rsd/ss7_0203006 slot = 6;

device = /dev/rsd/ss7_0203007 wan = /dev/rsd/wan_0203007
        jitter     = PH_BYPASS
        signalling = PH_SIG_MOS
        loopback   = PH_NO_LOOPBACK
        carrier    = PH_LC_CEPT
        distance   = PH_DX_PQ_SHORT
```

```
        format     = PH_FRM_CRC_4
        coding     = PH_LC_HDB3
        master_clock    = PH_MASTER_CLOCK
        prmclk          = PH_CLOCK_PORT_1
        bkupclk1        = PH_CLOCK_PORT_2
        bkupclk2        = PH_CLOCK_PORT_3
        bkupclk3        = PH_CLOCK_PORT_4;
link = 6 device = /dev/rsd/ss7_0203007 slot = 7;

device = /dev/rsd/ss7_0203008 wan = /dev/rsd/wan_0203008
        jitter     = PH_BYPASS
        signalling = PH_SIG_MOS
        loopback   = PH_NO_LOOPBACK
        carrier    = PH_LC_CEPT
        distance   = PH_DX_PQ_SHORT
        format     = PH_FRM_CRC_4
        coding     = PH_LC_HDB3
        master_clock    = PH_MASTER_CLOCK
        prmclk          = PH_CLOCK_PORT_1
        bkupclk1        = PH_CLOCK_PORT_2
        bkupclk2        = PH_CLOCK_PORT_3
        bkupclk3        = PH_CLOCK_PORT_4;
link = 7 device = /dev/rsd/ss7_0203008 slot = 8;

NODE=N1

device = /dev/rsd/ss7_0305001 wan = /dev/rsd/wan_0305001
        jitter     = PH_BYPASS
        signalling = PH_SIG_MOS
        loopback   = PH_NO_LOOPBACK
        carrier    = PH_LC_CEPT
        distance   = PH_DX_PQ_SHORT
        format     = PH_FRM_CRC_4
        coding     = PH_LC_HDB3
        master_clock    = PH_SLAVE_CLOCK
        prmclk          = PH_CLOCK_PORT_1
        bkupclk1        = PH_CLOCK_PORT_2
        bkupclk2        = PH_CLOCK_PORT_3
        bkupclk3        = PH_CLOCK_PORT_4;
link = 0 device = /dev/rsd/ss7_0305001 slot = 1;

device = /dev/rsd/ss7_0305002 wan = /dev/rsd/wan_0305002
        jitter     = PH_BYPASS
        signalling = PH_SIG_MOS
        loopback   = PH_NO_LOOPBACK
        carrier    = PH_LC_CEPT
        distance   = PH_DX_PQ_SHORT
        format     = PH_FRM_CRC_4
        coding     = PH_LC_HDB3
        master_clock    = PH_SLAVE_CLOCK
        prmclk          = PH_CLOCK_PORT_1
        bkupclk1        = PH_CLOCK_PORT_2
        bkupclk2        = PH_CLOCK_PORT_3
        bkupclk3        = PH_CLOCK_PORT_4;
link = 1 device = /dev/rsd/ss7_0305002 slot = 2;
```

```
device = /dev/rsd/ss7_0305003 wan = /dev/rsd/wan_0305003
        jitter     = PH_BYPASS
        signalling = PH_SIG_MOS
        loopback   = PH_NO_LOOPBACK
        carrier    = PH_LC_CEPT
        distance   = PH_DX_PQ_SHORT
        format     = PH_FRM_CRC_4
        coding     = PH_LC_HDB3
        master_clock    = PH_SLAVE_CLOCK
        prmclk          = PH_CLOCK_PORT_1
        bkupclk1        = PH_CLOCK_PORT_2
        bkupclk2        = PH_CLOCK_PORT_3
        bkupclk3        = PH_CLOCK_PORT_4;
link = 2 device = /dev/rsd/ss7_0305003 slot = 3;

device = /dev/rsd/ss7_0305004 wan = /dev/rsd/wan_0305004
        jitter     = PH_BYPASS
        signalling = PH_SIG_MOS
        loopback   = PH_NO_LOOPBACK
        carrier    = PH_LC_CEPT
        distance   = PH_DX_PQ_SHORT
        format     = PH_FRM_CRC_4
        coding     = PH_LC_HDB3
        master_clock    = PH_SLAVE_CLOCK
        prmclk          = PH_CLOCK_PORT_1
        bkupclk1        = PH_CLOCK_PORT_2
        bkupclk2        = PH_CLOCK_PORT_3
        bkupclk3        = PH_CLOCK_PORT_4;
link = 3 device = /dev/rsd/ss7_0305004 slot = 4;

device = /dev/rsd/ss7_0305005 wan = /dev/rsd/wan_0305005
        jitter     = PH_BYPASS
        signalling = PH_SIG_MOS
        loopback   = PH_NO_LOOPBACK
        carrier    = PH_LC_CEPT
        distance   = PH_DX_PQ_SHORT
        format     = PH_FRM_CRC_4
        coding     = PH_LC_HDB3
        master_clock    = PH_SLAVE_CLOCK
        prmclk          = PH_CLOCK_PORT_1
        bkupclk1        = PH_CLOCK_PORT_2
        bkupclk2        = PH_CLOCK_PORT_3
        bkupclk3        = PH_CLOCK_PORT_4;
link = 4 device = /dev/rsd/ss7_0305005 slot = 5;

device = /dev/rsd/ss7_0305006 wan = /dev/rsd/wan_0305006
        jitter     = PH_BYPASS
        signalling = PH_SIG_MOS
        loopback   = PH_NO_LOOPBACK
        carrier    = PH_LC_CEPT
        distance   = PH_DX_PQ_SHORT
        format     = PH_FRM_CRC_4
        coding     = PH_LC_HDB3
        master_clock    = PH_SLAVE_CLOCK
```

```
        prmclk          = PH_CLOCK_PORT_1
        bkupclk1        = PH_CLOCK_PORT_2
        bkupclk2        = PH_CLOCK_PORT_3
        bkupclk3        = PH_CLOCK_PORT_4;
link = 5 device = /dev/rsd/ss7_0305006 slot = 6;

device = /dev/rsd/ss7_0305007 wan = /dev/rsd/wan_0305007
        jitter     = PH_BYPASS
        signalling = PH_SIG_MOS
        loopback   = PH_NO_LOOPBACK
        carrier    = PH_LC_CEPT
        distance   = PH_DX_PQ_SHORT
        format     = PH_FRM_CRC_4
        coding     = PH_LC_HDB3
        master_clock    = PH_SLAVE_CLOCK
        prmclk          = PH_CLOCK_PORT_1
        bkupclk1        = PH_CLOCK_PORT_2
        bkupclk2        = PH_CLOCK_PORT_3
        bkupclk3        = PH_CLOCK_PORT_4;
link = 6 device = /dev/rsd/ss7_0305007 slot = 7;

device = /dev/rsd/ss7_0305008 wan = /dev/rsd/wan_0305008
        jitter     = PH_BYPASS
        signalling = PH_SIG_MOS
        loopback   = PH_NO_LOOPBACK
        carrier    = PH_LC_CEPT
        distance   = PH_DX_PQ_SHORT
        format     = PH_FRM_CRC_4
        coding     = PH_LC_HDB3
        master_clock    = PH_SLAVE_CLOCK
        prmclk          = PH_CLOCK_PORT_1
        bkupclk1        = PH_CLOCK_PORT_2
        bkupclk2        = PH_CLOCK_PORT_3
        bkupclk3        = PH_CLOCK_PORT_4;
link = 7 device = /dev/rsd/ss7_0305008 slot = 8;

NODE=N2

device = /dev/rsd/ss7_0203033 wan = /dev/rsd/wan_0203033
        jitter     = PH_BYPASS
        signalling = PH_SIG_MOS
        loopback   = PH_NO_LOOPBACK
        carrier    = PH_LC_CEPT
        distance   = PH_DX_PQ_SHORT
        format     = PH_FRM_CRC_4
        coding     = PH_LC_HDB3
        master_clock    = PH_MASTER_CLOCK
        prmclk          = PH_CLOCK_PORT_1
        bkupclk1        = PH_CLOCK_PORT_2
        bkupclk2        = PH_CLOCK_PORT_3
        bkupclk3        = PH_CLOCK_PORT_4;
link = 0 device = /dev/rsd/ss7_0203033 slot = 33;

device = /dev/rsd/ss7_0203034 wan = /dev/rsd/wan_0203034
        jitter     = PH_BYPASS
```

```
        signalling = PH_SIG_MOS
        loopback   = PH_NO_LOOPBACK
        carrier    = PH_LC_CEPT
        distance   = PH_DX_PQ_SHORT
        format     = PH_FRM_CRC_4
        coding     = PH_LC_HDB3
        master_clock    = PH_MASTER_CLOCK
        prmclk          = PH_CLOCK_PORT_1
        bkupclk1        = PH_CLOCK_PORT_2
        bkupclk2        = PH_CLOCK_PORT_3
        bkupclk3        = PH_CLOCK_PORT_4;
link = 1 device = /dev/rsd/ss7_0203034 slot = 34;

device = /dev/rsd/ss7_0203035 wan = /dev/rsd/wan_0203035
        jitter     = PH_BYPASS
        signalling = PH_SIG_MOS
        loopback   = PH_NO_LOOPBACK
        carrier    = PH_LC_CEPT
        distance   = PH_DX_PQ_SHORT
        format     = PH_FRM_CRC_4
        coding     = PH_LC_HDB3
        master_clock    = PH_MASTER_CLOCK
        prmclk          = PH_CLOCK_PORT_1
        bkupclk1        = PH_CLOCK_PORT_2
        bkupclk2        = PH_CLOCK_PORT_3
        bkupclk3        = PH_CLOCK_PORT_4;
link = 2 device = /dev/rsd/ss7_0203035 slot = 35;

device = /dev/rsd/ss7_0203036 wan = /dev/rsd/wan_0203036
        jitter     = PH_BYPASS
        signalling = PH_SIG_MOS
        loopback   = PH_NO_LOOPBACK
        carrier    = PH_LC_CEPT
        distance   = PH_DX_PQ_SHORT
        format     = PH_FRM_CRC_4
        coding     = PH_LC_HDB3
        master_clock    = PH_MASTER_CLOCK
        prmclk          = PH_CLOCK_PORT_1
        bkupclk1        = PH_CLOCK_PORT_2
        bkupclk2        = PH_CLOCK_PORT_3
        bkupclk3        = PH_CLOCK_PORT_4;
link = 3 device = /dev/rsd/ss7_0203036 slot = 36;

device = /dev/rsd/ss7_0203037 wan = /dev/rsd/wan_0203037
        jitter     = PH_BYPASS
        signalling = PH_SIG_MOS
        loopback   = PH_NO_LOOPBACK
        carrier    = PH_LC_CEPT
        distance   = PH_DX_PQ_SHORT
        format     = PH_FRM_CRC_4
        coding     = PH_LC_HDB3
        master_clock    = PH_MASTER_CLOCK
        prmclk          = PH_CLOCK_PORT_1
        bkupclk1        = PH_CLOCK_PORT_2
        bkupclk2        = PH_CLOCK_PORT_3
```

```
        bkupclk3        = PH_CLOCK_PORT_4;
link = 4 device = /dev/rsd/ss7_0203037 slot = 37;


device = /dev/rsd/ss7_0203038 wan = /dev/rsd/wan_0203038
        jitter     = PH_BYPASS
        signalling = PH_SIG_MOS
        loopback   = PH_NO_LOOPBACK
        carrier    = PH_LC_CEPT
        distance   = PH_DX_PQ_SHORT
        format     = PH_FRM_CRC_4
        coding     = PH_LC_HDB3
        master_clock    = PH_MASTER_CLOCK
        prmclk          = PH_CLOCK_PORT_1
        bkupclk1        = PH_CLOCK_PORT_2
        bkupclk2        = PH_CLOCK_PORT_3
        bkupclk3        = PH_CLOCK_PORT_4;
link = 5 device = /dev/rsd/ss7_0203038 slot = 38;

device = /dev/rsd/ss7_0203039 wan = /dev/rsd/wan_0203039
        jitter     = PH_BYPASS
        signalling = PH_SIG_MOS
        loopback   = PH_NO_LOOPBACK
        carrier    = PH_LC_CEPT
        distance   = PH_DX_PQ_SHORT
        format     = PH_FRM_CRC_4
        coding     = PH_LC_HDB3
        master_clock    = PH_MASTER_CLOCK
        prmclk          = PH_CLOCK_PORT_1
        bkupclk1        = PH_CLOCK_PORT_2
        bkupclk2        = PH_CLOCK_PORT_3
        bkupclk3        = PH_CLOCK_PORT_4;
link = 6 device = /dev/rsd/ss7_0203039 slot = 39;

device = /dev/rsd/ss7_0203040 wan = /dev/rsd/wan_0203040
        jitter     = PH_BYPASS
        signalling = PH_SIG_MOS
        loopback   = PH_NO_LOOPBACK
        carrier    = PH_LC_CEPT
        distance   = PH_DX_PQ_SHORT
        format     = PH_FRM_CRC_4
        coding     = PH_LC_HDB3
        master_clock    = PH_MASTER_CLOCK
        prmclk          = PH_CLOCK_PORT_1
        bkupclk1        = PH_CLOCK_PORT_2
        bkupclk2        = PH_CLOCK_PORT_3
        bkupclk3        = PH_CLOCK_PORT_4;
link = 7 device = /dev/rsd/ss7_0203040 slot = 40;

NODE=N3

device = /dev/rsd/ss7_0305033 wan = /dev/rsd/wan_0305033
        jitter     = PH_BYPASS
        signalling = PH_SIG_MOS
        loopback   = PH_NO_LOOPBACK
```

```
        carrier    = PH_LC_CEPT
        distance   = PH_DX_PQ_SHORT
        format     = PH_FRM_CRC_4
        coding     = PH_LC_HDB3
        master_clock    = PH_SLAVE_CLOCK
        prmclk          = PH_CLOCK_PORT_1
        bkupclk1        = PH_CLOCK_PORT_2
        bkupclk2        = PH_CLOCK_PORT_3
        bkupclk3        = PH_CLOCK_PORT_4;
link = 0 device = /dev/rsd/ss7_0305033 slot = 33;

device = /dev/rsd/ss7_0305034 wan = /dev/rsd/wan_0305034
        jitter     = PH_BYPASS
        signalling = PH_SIG_MOS
        loopback   = PH_NO_LOOPBACK
        carrier    = PH_LC_CEPT
        distance   = PH_DX_PQ_SHORT
        format     = PH_FRM_CRC_4
        coding     = PH_LC_HDB3
        master_clock    = PH_SLAVE_CLOCK
        prmclk          = PH_CLOCK_PORT_1
        bkupclk1        = PH_CLOCK_PORT_2
        bkupclk2        = PH_CLOCK_PORT_3
        bkupclk3        = PH_CLOCK_PORT_4;
link = 1 device = /dev/rsd/ss7_0305034 slot = 34;

device = /dev/rsd/ss7_0305035 wan = /dev/rsd/wan_0305035
        jitter     = PH_BYPASS
        signalling = PH_SIG_MOS
        loopback   = PH_NO_LOOPBACK
        carrier    = PH_LC_CEPT
        distance   = PH_DX_PQ_SHORT
        format     = PH_FRM_CRC_4
        coding     = PH_LC_HDB3
        master_clock    = PH_SLAVE_CLOCK
        prmclk          = PH_CLOCK_PORT_1
        bkupclk1        = PH_CLOCK_PORT_2
        bkupclk2        = PH_CLOCK_PORT_3
        bkupclk3        = PH_CLOCK_PORT_4;
link = 2 device = /dev/rsd/ss7_0305035 slot = 35;

device = /dev/rsd/ss7_0305036 wan = /dev/rsd/wan_0305036
        jitter     = PH_BYPASS
        signalling = PH_SIG_MOS
        loopback   = PH_NO_LOOPBACK
        carrier    = PH_LC_CEPT
        distance   = PH_DX_PQ_SHORT
        format     = PH_FRM_CRC_4
        coding     = PH_LC_HDB3
        master_clock    = PH_SLAVE_CLOCK
        prmclk          = PH_CLOCK_PORT_1
        bkupclk1        = PH_CLOCK_PORT_2
        bkupclk2        = PH_CLOCK_PORT_3
        bkupclk3        = PH_CLOCK_PORT_4;
link = 3 device = /dev/rsd/ss7_0305036 slot = 36;
```

```
device = /dev/rsd/ss7_0305037 wan = /dev/rsd/wan_0305037
        jitter     = PH_BYPASS
        signalling = PH_SIG_MOS
        loopback   = PH_NO_LOOPBACK
        carrier    = PH_LC_CEPT
        distance   = PH_DX_PQ_SHORT
        format     = PH_FRM_CRC_4
        coding     = PH_LC_HDB3
        master_clock    = PH_SLAVE_CLOCK
        prmclk          = PH_CLOCK_PORT_1
        bkupclk1        = PH_CLOCK_PORT_2
        bkupclk2        = PH_CLOCK_PORT_3
        bkupclk3        = PH_CLOCK_PORT_4;
link = 4 device = /dev/rsd/ss7_0305037 slot = 37;

device = /dev/rsd/ss7_0305038 wan = /dev/rsd/wan_0305038
        jitter     = PH_BYPASS
        signalling = PH_SIG_MOS
        loopback   = PH_NO_LOOPBACK
        carrier    = PH_LC_CEPT
        distance   = PH_DX_PQ_SHORT
        format     = PH_FRM_CRC_4
        coding     = PH_LC_HDB3
        master_clock    = PH_SLAVE_CLOCK
        prmclk          = PH_CLOCK_PORT_1
        bkupclk1        = PH_CLOCK_PORT_2
        bkupclk2        = PH_CLOCK_PORT_3
        bkupclk3        = PH_CLOCK_PORT_4;
link = 5 device = /dev/rsd/ss7_0305038 slot = 38;

device = /dev/rsd/ss7_0305039 wan = /dev/rsd/wan_0305039
        jitter     = PH_BYPASS
        signalling = PH_SIG_MOS
        loopback   = PH_NO_LOOPBACK
        carrier    = PH_LC_CEPT
        distance   = PH_DX_PQ_SHORT
        format     = PH_FRM_CRC_4
        coding     = PH_LC_HDB3
        master_clock    = PH_SLAVE_CLOCK
        prmclk          = PH_CLOCK_PORT_1
        bkupclk1        = PH_CLOCK_PORT_2
        bkupclk2        = PH_CLOCK_PORT_3
        bkupclk3        = PH_CLOCK_PORT_4;
link = 6 device = /dev/rsd/ss7_0305039 slot = 39;

device = /dev/rsd/ss7_0305040 wan = /dev/rsd/wan_0305040
        jitter     = PH_BYPASS
        signalling = PH_SIG_MOS
        loopback   = PH_NO_LOOPBACK
        carrier    = PH_LC_CEPT
        distance   = PH_DX_PQ_SHORT
        format     = PH_FRM_CRC_4
        coding     = PH_LC_HDB3
        master_clock    = PH_SLAVE_CLOCK
```

```
        prmclk          = PH_CLOCK_PORT_1
        bkupclk1        = PH_CLOCK_PORT_2
        bkupclk2        = PH_CLOCK_PORT_3
        bkupclk3        = PH_CLOCK_PORT_4;
link = 7 device = /dev/rsd/ss7_0305040 slot = 40;
```

In case of difficulty see Appendix A, ‘‘In Case of Difficulty.”

Chapter 6
Cross-Over Test

Eight Quick-Start test scripts are included on your SINAP Installation CD and were copied to the `$SINAP_HOME/Samples/` directory during the SINAP package installation. These test scripts simulate SEND and RECEIVE traffic (MSUs) for TCAP or ISUP in an ANSI or ITU-T network configuration environment and demonstrate proper system functionality.

You can specify the number of MSUs in the SEND test or use the default setting to run continuously until stopped. For example, the following command specifies a test with 5000 MSUs sent:

```
test_tcap_send 5000
```

Test results are reported on the screen every 100 MSUs until the test is stopped or the specified number of MSUs have be sent. If you don't specify the number of test MSUs, the test runs continuously (default mode).

After a successful Quick-Start test, you can remove the test configuration and reconfigure SINAP for your application.

NOTE

Make sure the cross-over test cable or loopback plug is properly connected before proceeding. See ''Prepare the System'' in Chapter 2, 3, or 4 for instructions.

ITU-T (CCITT) Configuration

The ITU-T configuration is used to verify proper system functionality.

TCAP Cross-Over Test

The TCAP test scripts (`$SINAP_HOME/Samples/ccitt/test_tcap_send` and `$SINAP_HOME/Samples/ccitt/test_tcap_recv`) test proper system functionality by sending and receiving thousands of MSUs. A sample screen of a successful test is provided for reference.

NOTE

The `test_tcap_recv` script must be run before the `test_tcap_send` script.

Running test_tcap_recv (CCITT)

The following procedure runs the `test_tcap_recv` test.

1. Log in as `sinap0` (UniStack systems) or `sinap1` (MultiStack systems).
2. Move to the test script location by entering

   `cd $SINAP_HOME/Samples/ccitt`

3. Start the test by entering

   `test_tcap_recv`

4. To stop the test, enter `Ctrl–C` from the keyboard.

The following is sample output for `test_tcap_recv`.

```
Sample Screen for test_tcap_recv
================================

gen_stat: Wrote 1955512 bytes to STATIC_load

gen_stat: initial STATIC_load image generated

<<<<<<<<<<<<<<<<<<< STARTING SINAP... >>>>>>>>>>>>>>>>>>>

-t option set: Running in test environment...

-v option set: Running in verbose mode...

Re-executing the stop_sinap procedure...

>>>>>>>>>>>>>>>>>>> STOPPING SINAP... <<<<<<<<<<<<<<<<<<<

-v option set: Running in verbose mode...

SINAP has already been stopped.

Re-executing stop procedure anyways...

Moving to the executable directory...

Stopping all registered SINAP processes...

Could not use SINAP ipc table to stop SINAP processes...

All registered SINAP processes stopped...
```

```
Stopping all links and devices...

All links and devices stopped...

Stopping SINAP drda_daemon process...

SINAP drda_daemon process stopped...

Removing SINAP shared memory segments...

SINAP shared memory segments removed...

Stopping SINAP ss7dmn process...

SINAP ss7dmn process stopped...

>>>>>>>>>>>>>>>>>>>> SINAP STOPPED <<<<<<<<<<<<<<<<<<<<

Starting the ss7 daemon (ss7dmn)...

ss7 daemon (ss7dmn) is started...

Starting SINAP as background process...

SINAP Node Manager parent process (nmnp) started...

Starting drda_daemon process in startappl.sh...

LOAD: Read 96744 bytes from /home/sinap1/Bin/shm/pri/IPCTBL_load

LOAD: K_IPCTBL load successful

LOAD: Read 76880 bytes from /home/sinap1/Bin/shm/pri/TREAT_load

LOAD: K_TREAT load successful

LOAD: Read 1955512 bytes from /home/sinap1/Bin/shm/pri/STATIC_load

LOAD: K_STATIC load successful

NM-PP(0002):starting NM child processes.......

NM-PP(0002):..... NMCL started

NM-CL(0002):Entering main loop, pid = 20283

NM-PP(0002):..... NMDM started

NM-PP(0002):..... NMIP started

NM-PP(0002):..... NMDS started

NM-DS(0002):Disk server entering main loop

NM-PP(0002):..... NMTM started

NM-PP(0002):..... NMNI started
```

```
NM-NI(0002):Network interface entering main loop

NM-PP(0002):..... NMMC started

NM-PP(0002):..... NMCM started

NM-PP(0002):.....all NM child processes started

NM-PP(0002):starting BIBP.....

BI-MI(0002):initialization complete

BI-LF(0002):initialization complete

BI-ID(0002):initialization complete

BI-TU(0002):initialization complete

NM-PP(0002):........ BIBP started

NM-PP(0002):starting L3MP.....

NM-PP(0002):........ L3MP started

NM-PP(0002):starting SCMG.....

-(0004):entering scmg()

NM-PP(0002):........ SCMG started

NM-PP(0002):starting SCOC.....

-(200000):entering sccp_scoc()

SCOC:restart started

NM-PP(0002):........ SCOC started

NM-PP(0002):starting ISMG.....

SCOC:restart DONE

-(0004):entering ismg()

IS-MG(0002):ISUP process configured, isup_version=1

NM-PP(0002):........ ISMG started

NM-PP(0002):***** All SINAP subsystems started *****

<<<<<<<<<<<<<<<<<<<< SINAP STARTED >>>>>>>>>>>>>>>>>>>>

NM-CM(0002):CREATE-OSP:NETWORK=INAT00,SPC=3003;

result=1,sub_cat=0,msg=command completed

NM-CM(0002):CREATE-LSET:LINKSET=LSET1,ADPC=2730,LOADLINK=8,ACTLINK=8;
```

```
result=1,sub_cat=0,msg=command completed

NM-CM(0002):CREATE-LINK:LINK=LINK1,PORTNUM=0,LINKSET=LSET1,SLC=0,PRIORITY=0,SPEED=64000;

result=1,sub_cat=0,msg=command completed

NM-CM(0002):CREATE-LINK:LINK=LINK2,PORTNUM=1,LINKSET=LSET1,SLC=1,PRIORITY=1,SPEED=64000;

result=1,sub_cat=0,msg=command completed

NM-CM(0002):CREATE-LINK:LINK=LINK3,PORTNUM=2,LINKSET=LSET1,SLC=2,PRIORITY=2,SPEED=64000;

result=1,sub_cat=0,msg=command completed

NM-CM(0002):CREATE-LINK:LINK=LINK4,PORTNUM=3,LINKSET=LSET1,SLC=3,PRIORITY=3,SPEED=64000;

result=1,sub_cat=0,msg=command completed

NM-CM(0002):CREATE-LINK:LINK=LINK5,PORTNUM=4,LINKSET=LSET1,SLC=4,PRIORITY=4,SPEED=64000;

result=1,sub_cat=0,msg=command completed

NM-CM(0002):CREATE-LINK:LINK=LINK6,PORTNUM=5,LINKSET=LSET1,SLC=5,PRIORITY=5,SPEED=64000;

result=1,sub_cat=0,msg=command completed

NM-CM(0002):CREATE-LINK:LINK=LINK7,PORTNUM=6,LINKSET=LSET1,SLC=6,PRIORITY=6,SPEED=64000;

result=1,sub_cat=0,msg=command completed

NM-CM(0002):CREATE-LINK:LINK=LINK8,PORTNUM=7,LINKSET=LSET1,SLC=7,PRIORITY=7,SPEED=64000;

result=1,sub_cat=0,msg=command completed


SCMG_PROV: CHANGE TYPE: 1 AFFECTED NWORK ELEM: 1 ELEM NBR: 2730


AFFECTED ELEMENT ARRAY

     0     0     0     0     0     0     0     0     0     0

NM-CM(0002):CREATE-RSET:ROUTESET=RSET1,DPC=2730,ROUTES=LSET1,LOADSHR=ENABLE;

result=1,sub_cat=0,msg=command completed

affected_element[]=2730,0,0,0,0,0,0,0,0,0


SCMG_PROV: CHANGE TYPE: 1 AFFECTED NWORK ELEM: 9 ELEM NBR: 13


AFFECTED ELEMENT ARRAY
```

```
  2730     0     0     0     0     0     0     0     0     0
NM-CM(0002):CREATE-CPC:LSSN=13,RPC=2730;
result=1,sub_cat=0,msg=command completed
affected_element[]=2730,0,0,0,0,0,0,0,0,0

SCMG_PROV: CHANGE TYPE: 1 AFFECTED NWORK ELEM: 9 ELEM NBR: 12

AFFECTED ELEMENT ARRAY
  2730     0     0     0     0     0     0     0     0     0
NM-CM(0002):CREATE-CPC:LSSN=12,RPC=2730;
result=1,sub_cat=0,msg=command completed
affected_element[]=13,0,0,0,0,0,0,0,0,0

SCMG_PROV: CHANGE TYPE: 1 AFFECTED NWORK ELEM: 10 ELEM NBR: 0

AFFECTED ELEMENT ARRAY
    13     0     0     0     0     0     0     0     0     0
NM-CM(0002):CREATE-REMSSN:PC=2730,SSN=13;
result=1,sub_cat=0,msg=command completed
affected_element[]=12,0,0,0,0,0,0,0,0,0

SCMG_PROV: CHANGE TYPE: 1 AFFECTED NWORK ELEM: 10 ELEM NBR: 0

AFFECTED ELEMENT ARRAY
    12     0     0     0     0     0     0     0     0     0
NM-CM(0002):CREATE-REMSSN:PC=2730,SSN=12;
result=1,sub_cat=0,msg=command completed
NM-CM(0002):CONFIGURE-LSET:LINKSET=LSET1,STATE=ACTIVE;
result=1,sub_cat=0,msg=command completed
```

```
NM-CM(0002):CONFIGURE-LINK:LINK=LINK1,STATE=ACTIVE;

result=1,sub_cat=0,msg=command completed

NM-CM(0002):CONFIGURE-LINK:LINK=LINK2,STATE=ACTIVE;

result=1,sub_cat=0,msg=command completed

NM-CM(0002):CONFIGURE-LINK:LINK=LINK3,STATE=ACTIVE;

result=1,sub_cat=0,msg=command completed

NM-CM(0002):CONFIGURE-LINK:LINK=LINK4,STATE=ACTIVE;

result=1,sub_cat=0,msg=command completed

NM-CM(0002):CONFIGURE-LINK:LINK=LINK5,STATE=ACTIVE;

result=1,sub_cat=0,msg=command completed

NM-CM(0002):CONFIGURE-LINK:LINK=LINK6,STATE=ACTIVE;

result=1,sub_cat=0,msg=command completed

NM-CM(0002):CONFIGURE-LINK:LINK=LINK7,STATE=ACTIVE;

result=1,sub_cat=0,msg=command completed

NM-CM(0002):CONFIGURE-LINK:LINK=LINK8,STATE=ACTIVE;

result=1,sub_cat=0,msg=command completed

NM-CM(0002):CONFIGURE-RSET:ROUTESET=RSET1,STATE=ACTIVE;

result=1,sub_cat=0,msg=command completed


TCRECV: pid 20331: Beginning operation with

TCRECV: pid 20331: ------------------------

TCRECV: pid 20331: MSU batch count:           25

TCRECV: pid 20331: Local SSN:                 12

TCRECV: pid 20331: Remote SSN:                13

TCRECV: pid 20331: Tblock count:              512

TCRECV: pid 20331: Maximum input queue size:  30

TCRECV: pid 20331: Maximum output queue size: 30

TCRECV: pid 20331: Register for XUDT/UDT:     0
```

```
TCAP_RECV: registration is successful

TCAP RECV: sent user in service to sccp

NSTATE UIS RECEIVED FOR SSN 12
```

At this point, the `test_tcap_recv` script starts to wait for the send side. Now create another session (MultiStack systems) or start a session on the same system (UniStack systems) and start the `test_tcap_send` script (see ‘‘Running test_tcap_send (CCITT)”).

```
L3-MT(0002):ucomm 0: Link in service

L3-MT(0002):ucomm 7: Link in service

L3-MT(0002):ucomm 6: Link in service

L3-MT(0002):ucomm 5: Link in service

L3-MT(0002):ucomm 4: Link in service

L3-MT(0002):ucomm 3: Link in service

L3-MT(0002):ucomm 2: Link in service

L3-MT(0002):ucomm 1: Link in service

SSA RECEIVED FOR SSN 13 AT PC 2730

SSN 13 AT PC 2730 SSN FOUND

TCAP RECV: Recd & echoed(100) msus, TBlocks->tx=(300),rx=(300)

TCAP RECV: Recd & echoed(200) msus, TBlocks->tx=(600),rx=(600)

TCAP RECV: Recd & echoed(300) msus, TBlocks->tx=(900),rx=(900)

TCAP RECV: Recd & echoed(400) msus, TBlocks->tx=(1200),rx=(1200)

TCAP RECV: Recd & echoed(500) msus, TBlocks->tx=(1500),rx=(1500)

TCAP RECV: Recd & echoed(600) msus, TBlocks->tx=(1800),rx=(1800)

TCAP RECV: Recd & echoed(700) msus, TBlocks->tx=(2100),rx=(2100)

TCAP RECV: Recd & echoed(800) msus, TBlocks->tx=(2400),rx=(2400)

TCAP RECV: Recd & echoed(900) msus, TBlocks->tx=(2700),rx=(2700)

TCAP RECV: Recd & echoed(1000) msus, TBlocks->tx=(3000),rx=(3000)

TCAP RECV: Recd & echoed(1100) msus, TBlocks->tx=(3300),rx=(3300)

TCAP RECV: Recd & echoed(1200) msus, TBlocks->tx=(3600),rx=(3600)

TCAP RECV: Recd & echoed(1300) msus, TBlocks->tx=(3900),rx=(3900)
```

```
TCAP RECV: Recd & echoed(1400) msus, TBlocks->tx=(4200),rx=(4200)
TCAP RECV: Recd & echoed(1500) msus, TBlocks->tx=(4500),rx=(4500)
TCAP RECV: Recd & echoed(1600) msus, TBlocks->tx=(4800),rx=(4800)
TCAP RECV: Recd & echoed(1700) msus, TBlocks->tx=(5100),rx=(5100)
TCAP RECV: Recd & echoed(1800) msus, TBlocks->tx=(5400),rx=(5400)
TCAP RECV: Recd & echoed(1900) msus, TBlocks->tx=(5700),rx=(5700)
TCAP RECV: Recd & echoed(2000) msus, TBlocks->tx=(6000),rx=(6000)
TCAP RECV: Recd & echoed(2100) msus, TBlocks->tx=(6300),rx=(6300)
TCAP RECV: Recd & echoed(2200) msus, TBlocks->tx=(6600),rx=(6600)
TCAP RECV: Recd & echoed(2300) msus, TBlocks->tx=(6900),rx=(6900)
TCAP RECV: Recd & echoed(2400) msus, TBlocks->tx=(7200),rx=(7200)
TCAP RECV: Recd & echoed(2500) msus, TBlocks->tx=(7500),rx=(7500)
TCAP RECV: Recd & echoed(2600) msus, TBlocks->tx=(7800),rx=(7800)
TCAP RECV: Recd & echoed(2700) msus, TBlocks->tx=(8100),rx=(8100)
TCAP RECV: Recd & echoed(2800) msus, TBlocks->tx=(8400),rx=(8400)
TCAP RECV: Recd & echoed(2900) msus, TBlocks->tx=(8700),rx=(8700)
TCAP RECV: Recd & echoed(3000) msus, TBlocks->tx=(9000),rx=(9000)
TCAP RECV: Recd & echoed(3100) msus, TBlocks->tx=(9300),rx=(9300)
TCAP RECV: Recd & echoed(3200) msus, TBlocks->tx=(9600),rx=(9600)
TCAP RECV: Recd & echoed(3300) msus, TBlocks->tx=(9900),rx=(9900)
TCAP RECV: Recd & echoed(3400) msus, TBlocks->tx=(10200),rx=(10200)
TCAP RECV: Recd & echoed(3500) msus, TBlocks->tx=(10500),rx=(10500)
TCAP RECV: Recd & echoed(3600) msus, TBlocks->tx=(10800),rx=(10800)
TCAP RECV: Recd & echoed(3700) msus, TBlocks->tx=(11100),rx=(11100)
TCAP RECV: Recd & echoed(3800) msus, TBlocks->tx=(11400),rx=(11400)
TCAP RECV: Recd & echoed(3900) msus, TBlocks->tx=(11700),rx=(11700)
TCAP RECV: Recd & echoed(4000) msus, TBlocks->tx=(12000),rx=(12000)
TCAP RECV: Recd & echoed(4100) msus, TBlocks->tx=(12300),rx=(12300)
TCAP RECV: Recd & echoed(4200) msus, TBlocks->tx=(12600),rx=(12600)
```

```
TCAP RECV: Recd & echoed(4300) msus, TBlocks->tx=(12900),rx=(12900)

TCAP RECV: Recd & echoed(4400) msus, TBlocks->tx=(13200),rx=(13200)

TCAP RECV: Recd & echoed(4500) msus, TBlocks->tx=(13500),rx=(13500)

TCAP RECV: Recd & echoed(4600) msus, TBlocks->tx=(13800),rx=(13800)

TCAP RECV: Recd & echoed(4700) msus, TBlocks->tx=(14100),rx=(14100)

TCAP RECV: Recd & echoed(4800) msus, TBlocks->tx=(14400),rx=(14400)

TCAP RECV: Recd & echoed(4900) msus, TBlocks->tx=(14700),rx=(14700)

TCAP RECV: Recd & echoed(5000) msus, TBlocks->tx=(15000),rx=(15000)

SSP RECEIVED FOR SSN 13 AT PC 2730

SSN 13 AT PC 2730 SSN FOUND

SSN 13 AT PC 2730 SET PROHIBITED
```

If you want to continue testing, stop the SINAP software and proceed to the section on ‘‘Stopping SINAP/SS7.” Select and run another test script. However, if you have completed your testing and want to remove the test configuration, stop the SINAP software and proceed to the section on ‘‘Removing the Test Configuration,” later in this chapter.

Running test_tcap_send (CCITT)

The following procedure runs the `test_tcap_send` test.

NOTE

The `test_tcap_recv` script must be run **before** running the `test_tcap_send` script.

1. Log in as `sinap0`.
2. Move to the test script location by entering

   `cd $SINAP_HOME/Samples/ccitt`

3. For MultiStack, to start the test with 5000 MSUs, enter

   `test_tcap_send 5000`

4. For UniStack, to start the test with 5000 MSUs, enter

   `tcsend -c 3 -l 13 -p 2730 -q 5000 -r 12 -w 10`

The following is sample output for `test_tcap_send` with 5000 MSUs.

```
Sample Screen for test_tcap_send
================================

gen_stat: Wrote 1955512 bytes to STATIC_load

gen_stat: initial STATIC_load image generated

<<<<<<<<<<<<<<<<<<< STARTING SINAP... >>>>>>>>>>>>>>>>>>>

-t option set: Running in test environment...

-v option set: Running in verbose mode...

Re-executing the stop_sinap procedure...

>>>>>>>>>>>>>>>>>>> STOPPING SINAP... <<<<<<<<<<<<<<<<<<<

-v option set: Running in verbose mode...

SINAP has already been stopped.

Re-executing stop procedure anyways...

Moving to the executable directory...

Stopping all registered SINAP processes...

Used SINAP ipc table to stop SINAP processes...

Now using the process table to stop SINAP processes...

All registered SINAP processes stopped...

Stopping all links and devices...

All links and devices stopped...

Stopping SINAP drda_daemon process...

SINAP drda_daemon process stopped...

Removing SINAP shared memory segments...

Shared memory reset K_IPCTBL

SINAP shared memory segments removed...

Stopping SINAP ss7dmn process...

SINAP ss7dmn process stopped...

>>>>>>>>>>>>>>>>>>>>> SINAP STOPPED <<<<<<<<<<<<<<<<<<<<<

Starting the ss7 daemon (ss7dmn)...

ss7 daemon (ss7dmn) is started...
```

```
Starting SINAP as background process...

SINAP Node Manager parent process (nmnp) started...

Starting drda_daemon process in startappl.sh...

LOAD: Read 96744 bytes from /home/sinap0/Bin/shm/pri/IPCTBL_load

LOAD: K_IPCTBL load successful

LOAD: Read 76880 bytes from /home/sinap0/Bin/shm/pri/TREAT_load

LOAD: K_TREAT load successful

LOAD: Read 1955512 bytes from /home/sinap0/Bin/shm/pri/STATIC_load

LOAD: K_STATIC load successful

NM-PP(0002):starting NM child processes.......

NM-PP(0002):..... NMCL started

NM-CL(0002):Entering main loop, pid = 20412

NM-NI(0002):Network interface entering main loop

NM-PP(0002):..... NMIP started

NM-PP(0002):..... NMDM started

NM-PP(0002):..... NMNI started

NM-PP(0002):..... NMDS started

NM-DS(0002):Disk server entering main loop

NM-PP(0002):..... NMTM started

NM-PP(0002):..... NMMC started

NM-PP(0002):..... NMCM started

NM-PP(0002):.....all NM child processes started

NM-PP(0002):starting BIBP.....

BI-MI(0002):initialization complete

BI-LF(0002):initialization complete

BI-ID(0002):initialization complete

BI-TU(0002):initialization complete

NM-PP(0002):........ BIBP started

NM-PP(0002):starting L3MP.....
```

```
NM-PP(0002):........ L3MP started

NM-PP(0002):starting SCMG.....

-(0004):entering scmg()

NM-PP(0002):........ SCMG started

NM-PP(0002):starting SCOC.....

-(200000):entering sccp_scoc()

SCOC:restart started

NM-PP(0002):........ SCOC started

NM-PP(0002):starting ISMG.....

SCOC:restart DONE

-(0004):entering ismg()

IS-MG(0002):ISUP process configured, isup_version=1

NM-PP(0002):........ ISMG started

NM-PP(0002):***** All SINAP subsystems started *****

<<<<<<<<<<<<<<<<<<<< SINAP STARTED >>>>>>>>>>>>>>>>>>>>

NM-CM(0002):CREATE-OSP:NETWORK=INAT00,SPC=2730;

result=1,sub_cat=0,msg=command completed

NM-CM(0002):CREATE-LSET:LINKSET=LSET1,ADPC=3003,LOADLINK=8,ACTLINK=8;

result=1,sub_cat=0,msg=command completed

NM-CM(0002):CREATE-LINK:LINK=LINK1,PORTNUM=0,LINKSET=LSET1,SLC=0,PRIORITY=0,SPEED=64000;

result=1,sub_cat=0,msg=command completed

NM-CM(0002):CREATE-LINK:LINK=LINK2,PORTNUM=1,LINKSET=LSET1,SLC=1,PRIORITY=1,SPEED=64000;

result=1,sub_cat=0,msg=command completed

NM-CM(0002):CREATE-LINK:LINK=LINK3,PORTNUM=2,LINKSET=LSET1,SLC=2,PRIORITY=2,SPEED=64000;

result=1,sub_cat=0,msg=command completed

NM-CM(0002):CREATE-LINK:LINK=LINK4,PORTNUM=3,LINKSET=LSET1,SLC=3,PRIORITY=3,SPEED=64000;

result=1,sub_cat=0,msg=command completed

NM-CM(0002):CREATE-LINK:LINK=LINK5,PORTNUM=4,LINKSET=LSET1,SLC=4,PRIORITY=4,SPEED=64000;

result=1,sub_cat=0,msg=command completed
```

```
NM-CM(0002):CREATE-LINK:LINK=LINK6,PORTNUM=5,LINKSET=LSET1,SLC=5,PRIORITY=5,SPEED=64000;

result=1,sub_cat=0,msg=command completed

NM-CM(0002):CREATE-LINK:LINK=LINK7,PORTNUM=6,LINKSET=LSET1,SLC=6,PRIORITY=6,SPEED=64000;

result=1,sub_cat=0,msg=command completed

NM-CM(0002):CREATE-LINK:LINK=LINK8,PORTNUM=7,LINKSET=LSET1,SLC=7,PRIORITY=7,SPEED=64000;

result=1,sub_cat=0,msg=command completed


SCMG_PROV: CHANGE TYPE: 1 AFFECTED NWORK ELEM: 1 ELEM NBR: 3003


AFFECTED ELEMENT ARRAY

     0     0     0     0     0     0     0     0     0     0

NM-CM(0002):CREATE-RSET:ROUTESET=RSET1,DPC=3003,ROUTES=LSET1,LOADSHR=ENABLE;

result=1,sub_cat=0,msg=command completed

affected_element[]=3003,0,0,0,0,0,0,0,0,0


SCMG_PROV: CHANGE TYPE: 1 AFFECTED NWORK ELEM: 9 ELEM NBR: 13


AFFECTED ELEMENT ARRAY

  3003     0     0     0     0     0     0     0     0     0

NM-CM(0002):CREATE-CPC:LSSN=13,RPC=3003;

result=1,sub_cat=0,msg=command completed

affected_element[]=3003,0,0,0,0,0,0,0,0,0


SCMG_PROV: CHANGE TYPE: 1 AFFECTED NWORK ELEM: 9 ELEM NBR: 12


AFFECTED ELEMENT ARRAY

  3003     0     0     0     0     0     0     0     0     0

NM-CM(0002):CREATE-CPC:LSSN=12,RPC=3003;

result=1,sub_cat=0,msg=command completed
```

```
affected_element[]=13,0,0,0,0,0,0,0,0,0

SCMG_PROV: CHANGE TYPE: 1 AFFECTED NWORK ELEM: 10 ELEM NBR: 0

AFFECTED ELEMENT ARRAY
    13     0     0     0     0     0     0     0     0     0
NM-CM(0002):CREATE-REMSSN:PC=3003,SSN=13;
result=1,sub_cat=0,msg=command completed
affected_element[]=12,0,0,0,0,0,0,0,0,0

SCMG_PROV: CHANGE TYPE: 1 AFFECTED NWORK ELEM: 10 ELEM NBR: 0

AFFECTED ELEMENT ARRAY
    12     0     0     0     0     0     0     0     0     0
NM-CM(0002):CREATE-REMSSN:PC=3003,SSN=12;
result=1,sub_cat=0,msg=command completed
NM-CM(0002):CONFIGURE-LSET:LINKSET=LSET1,STATE=ACTIVE;
result=1,sub_cat=0,msg=command completed
NM-CM(0002):CONFIGURE-LINK:LINK=LINK1,STATE=ACTIVE;
result=1,sub_cat=0,msg=command completed
L3-MT(0002):ucomm 7: Link in service
L3-MT(0002):ucomm 5: Link in service
L3-MT(0002):ucomm 2: Link in service
L3-MT(0002):ucomm 0: Link in service
L3-MT(0002):ucomm 6: Link in service
L3-MT(0002):ucomm 4: Link in service
L3-MT(0002):ucomm 3: Link in service
L3-MT(0002):ucomm 1: Link in service
NM-CM(0002):CONFIGURE-LINK:LINK=LINK2,STATE=ACTIVE;
```

```
result=1,sub_cat=0,msg=command completed

NM-CM(0002):CONFIGURE-LINK:LINK=LINK3,STATE=ACTIVE;

result=1,sub_cat=0,msg=command completed

NM-CM(0002):CONFIGURE-LINK:LINK=LINK4,STATE=ACTIVE;

result=1,sub_cat=0,msg=command completed

NM-CM(0002):CONFIGURE-LINK:LINK=LINK5,STATE=ACTIVE;

result=1,sub_cat=0,msg=command completed

NM-CM(0002):CONFIGURE-LINK:LINK=LINK6,STATE=ACTIVE;

result=1,sub_cat=0,msg=command completed

NM-CM(0002):CONFIGURE-LINK:LINK=LINK7,STATE=ACTIVE;

result=1,sub_cat=0,msg=command completed

NM-CM(0002):CONFIGURE-LINK:LINK=LINK8,STATE=ACTIVE;

result=1,sub_cat=0,msg=command completed

NM-CM(0002):CONFIGURE-RSET:ROUTESET=RSET1,STATE=ACTIVE;

result=1,sub_cat=0,msg=command completed


TCSEND: pid 20455: Beginning operation with

TCSEND: pid 20455: ------------------------

TCSEND: pid 20455: Local SSN:                13

TCSEND: pid 20455: Remote SSN:               12

TCSEND: pid 20455: Dest point code:          3003

TCSEND: pid 20455: Number of Msgs to send:   5000

TCSEND: pid 20455: MSU sent before wait:     10

TCSEND: pid 20455: Component timer value:    3

TCSEND: pid 20455: Delay between MSUs:       0

TCSEND: pid 20455: Count of components:      2

TCSEND: pid 20455: MSU batch count:          1

TCSEND: pid 20455: Tblock count:             255

TCSEND: pid 20455: Maximum input queue size:  50
```

```
TCSEND: pid 20455: Maximum output queue size: 50

TCSEND: pid 20455: Register for XUDT/UDT:     0


TCAP SEND: registration is successful

TCAP SEND: sent user in service to sccp

NSTATE UIS RECEIVED FOR SSN 13

TCAP SEND: TCAP Messages=100 TBlocks->tx=300 rx=300 local cancel=0

TCAP SEND: TCAP Messages=200 TBlocks->tx=600 rx=600 local cancel=0

TCAP SEND: TCAP Messages=300 TBlocks->tx=900 rx=900 local cancel=0

TCAP SEND: TCAP Messages=400 TBlocks->tx=1200 rx=1200 local cancel=0

TCAP SEND: TCAP Messages=500 TBlocks->tx=1500 rx=1500 local cancel=0

TCAP SEND: TCAP Messages=600 TBlocks->tx=1800 rx=1800 local cancel=0

TCAP SEND: TCAP Messages=700 TBlocks->tx=2100 rx=2100 local cancel=0

TCAP SEND: TCAP Messages=800 TBlocks->tx=2400 rx=2400 local cancel=0

TCAP SEND: TCAP Messages=900 TBlocks->tx=2700 rx=2700 local cancel=0

TCAP SEND: TCAP Messages=1000 TBlocks->tx=3000 rx=3000 local cancel=0

TCAP SEND: TCAP Messages=1100 TBlocks->tx=3300 rx=3300 local cancel=0

TCAP SEND: TCAP Messages=1200 TBlocks->tx=3600 rx=3600 local cancel=0

TCAP SEND: TCAP Messages=1300 TBlocks->tx=3900 rx=3900 local cancel=0

TCAP SEND: TCAP Messages=1400 TBlocks->tx=4200 rx=4200 local cancel=0

TCAP SEND: TCAP Messages=1500 TBlocks->tx=4500 rx=4500 local cancel=0

TCAP SEND: TCAP Messages=1600 TBlocks->tx=4800 rx=4800 local cancel=0

TCAP SEND: TCAP Messages=1700 TBlocks->tx=5100 rx=5100 local cancel=0

TCAP SEND: TCAP Messages=1800 TBlocks->tx=5400 rx=5400 local cancel=0

TCAP SEND: TCAP Messages=1900 TBlocks->tx=5700 rx=5700 local cancel=0

TCAP SEND: TCAP Messages=2000 TBlocks->tx=6000 rx=6000 local cancel=0

TCAP SEND: TCAP Messages=2100 TBlocks->tx=6300 rx=6300 local cancel=0

TCAP SEND: TCAP Messages=2200 TBlocks->tx=6600 rx=6600 local cancel=0

TCAP SEND: TCAP Messages=2300 TBlocks->tx=6900 rx=6900 local cancel=0
```

```
TCAP SEND: TCAP Messages=2400 TBlocks->tx=7200 rx=7200 local cancel=0

TCAP SEND: TCAP Messages=2500 TBlocks->tx=7500 rx=7500 local cancel=0

TCAP SEND: TCAP Messages=2600 TBlocks->tx=7800 rx=7800 local cancel=0

TCAP SEND: TCAP Messages=2700 TBlocks->tx=8100 rx=8100 local cancel=0

TCAP SEND: TCAP Messages=2800 TBlocks->tx=8400 rx=8400 local cancel=0

TCAP SEND: TCAP Messages=2900 TBlocks->tx=8700 rx=8700 local cancel=0

TCAP SEND: TCAP Messages=3000 TBlocks->tx=9000 rx=9000 local cancel=0

TCAP SEND: TCAP Messages=3100 TBlocks->tx=9300 rx=9300 local cancel=0

TCAP SEND: TCAP Messages=3200 TBlocks->tx=9600 rx=9600 local cancel=0

TCAP SEND: TCAP Messages=3300 TBlocks->tx=9900 rx=9900 local cancel=0

TCAP SEND: TCAP Messages=3400 TBlocks->tx=10200 rx=10200 local cancel=0

TCAP SEND: TCAP Messages=3500 TBlocks->tx=10500 rx=10500 local cancel=0

TCAP SEND: TCAP Messages=3600 TBlocks->tx=10800 rx=10800 local cancel=0

TCAP SEND: TCAP Messages=3700 TBlocks->tx=11100 rx=11100 local cancel=0

TCAP SEND: TCAP Messages=3800 TBlocks->tx=11400 rx=11400 local cancel=0

TCAP SEND: TCAP Messages=3900 TBlocks->tx=11700 rx=11700 local cancel=0

TCAP SEND: TCAP Messages=4000 TBlocks->tx=12000 rx=12000 local cancel=0

TCAP SEND: TCAP Messages=4100 TBlocks->tx=12300 rx=12300 local cancel=0

TCAP SEND: TCAP Messages=4200 TBlocks->tx=12600 rx=12600 local cancel=0

TCAP SEND: TCAP Messages=4300 TBlocks->tx=12900 rx=12900 local cancel=0

TCAP SEND: TCAP Messages=4400 TBlocks->tx=13200 rx=13200 local cancel=0

TCAP SEND: TCAP Messages=4500 TBlocks->tx=13500 rx=13500 local cancel=0

TCAP SEND: TCAP Messages=4600 TBlocks->tx=13800 rx=13800 local cancel=0

TCAP SEND: TCAP Messages=4700 TBlocks->tx=14100 rx=14100 local cancel=0

TCAP SEND: TCAP Messages=4800 TBlocks->tx=14400 rx=14400 local cancel=0

TCAP SEND: TCAP Messages=4900 TBlocks->tx=14700 rx=14700 local cancel=0

TCAP SEND: TCAP Messages=5000 TBlocks->tx=15000 rx=15000 local cancel=0

Send more msus?(N)n

TCAP SEND: TCAP Messages=5000 TBlocks->tx=15000 rx=15000 lost=0
```

```
TCAP_SEND: Terminating this process

TCAP_SEND: Terminating this process

TCAP SEND: sent user out of service to sccp

NSTATE UOS RECEIVED FOR SSN 13

TCAP SEND: TCAP Messages=5000 TBlocks->tx=15000 rx=15000 lost=0

NM-CL(0002):LASTPROC_TERM sent for application TC2

I_LAST_PROC_TERM RECEIVED FOR SSN: 13

NSTATE UOS RECEIVED FOR SSN 13

$ SSP RECEIVED FOR SSN 12 AT PC 3003

SSN 12 AT PC 3003 SSN FOUND

SSN 12 AT PC 3003 SET PROHIBITED
```

If you want to continue testing, stop the SINAP software and proceed to the section on ‘‘Stopping SINAP/SS7.” Select and run another test script. However, if you have completed your testing and want to remove the test configuration, stop the SINAP software and proceed to the section on ‘‘Removing the Test Configuration,” later in this chapter.

ISUP Cross-Over Test

The ISUP test scripts (`$SINAP_HOME/Samples/ccitt/test_isup_send` and `$SINAP_HOME/Samples/ccitt/test_isup_recv`) test proper system functionality by sending and receiving thousands of MSUs each. Sample output from a successful test is provided on the Installation CD for reference (see `$SINAP_HOME/Samples/ccitt/test_isup_send.scr` and `$SINAP_HOME/Samples/ccitt/test_isup_recv.scr`).

NOTE

The ISUP loopback test is not available for UniStack, as ISUP send and receive Samples programs cannot both be run in a single node.

Running test_isup_recv (CCITT)

The following procedure runs the `test_isup_recv` test.

1. Log in as `sinap1` (MultiStack systems).
2. Move to the test script location by entering

   `cd $SINAP_HOME/Samples/ccitt`

3. Start the test by entering

   `test_isup_recv`

4. To terminate the test script, enter `Ctrl-C` from the keyboard.

Running test_isup_send (CCITT)

The following procedure runs the `test_isup_send` test.

1. Log in as `sinap0`.
2. Move to the test script location by entering

   `cd $SINAP_HOME/Samples/ccitt`

3. For MultiStack, to start the test with 5000 MSUs, enter

   `test_isup_send 5000`

ANSI Configuration

Cross-over test scripts for TCAP and ISUP are included on your SINAP installation CD. These test scripts are automatically copied to the `$SINAP_HOME/Samples/ansi` directory on your system during the SINAP package installation.

TCAP Cross-Over Test

The TCAP test scripts (`$SINAP_HOME/Samples/ansi/test_tcap_send` and `$SINAP_HOME/Samples/ansi/test_tcap_recv`) test proper system functionality by sending and receiving thousands of MSUs each. This test is the same as the sample provided earlier in the ITU-T section except for the network configuration portion. Sample output from a successful test is provided on the Installation CD for reference (see `$SINAP_HOME/Samples/ansi/test_tcap_send.scr` and `$SINAP_HOME/Samples/ansi/test_tcap_recv.scr`).

Running test_tcap_recv (ANSI)

The following procedure runs the `test_tcap_recv` test.

1. Log in as `sinap0` (UniStack systems) or `sinap1` (MultiStack systems).
2. Move to the test script location by entering

   `cd $SINAP_HOME/Samples/ansi`

3. Start the test by entering

   `test_tcap_recv`

4. To terminate the test script, enter `Ctrl-C` from the keyboard.

If you want to continue testing, stop the SINAP software and proceed to the section on ‘‘Stopping SINAP/SS7.” Select and run another test script. However, if you have completed your testing and want to remove the test configuration, stop the SINAP software and proceed to the section on ‘‘Removing the Test Configuration,” later in this chapter.

Running test_tcap_send (ANSI)

The following procedure runs the `test_tcap_send` test.

NOTE

The `test_tcap_recv` script must be run **before** running the `test_tcap_send` script.

1. Log in as `sinap0`.
2. Move to the test script location by entering

   `cd $SINAP_HOME/Samples/ansi`

3. For MultiStack, to start the test with 5000 MSUs, enter

   `test_tcap_send 5000`

4. For UniStack, to start the test with 5000 MSUs, enter

   `tcsend 0 5000 251 252 254 54 1`

5. To terminate the test script, enter `Ctrl–C` from the keyboard.

If you want to continue testing, stop the SINAP software and proceed to the section on ‘‘Stopping SINAP/SS7.” Select and run another test script. However, if you have completed your testing and want to remove the test configuration, stop the SINAP software and proceed to the section on ‘‘Removing the Test Configuration,” later in this chapter.

ISUP Cross-Over Test

The ISUP test scripts (`$SINAP_HOME/Samples/ansi/test_isup_send` and `$SINAP_HOME/Samples/ansi/test_isup_recv`) test proper system functionality by sending and receiving thousands of MSUs each. Sample output from a successful test is provided on the Installation CD for reference (see `$SINAP_HOME/Samples/ansi/test_isup_send.scr` and `$SINAP_HOME/Samples/ansi/test_isup_recv.scr`).

NOTE

The ISUP loopback test is not available for UniStack, as ISUP send and receive Samples programs cannot both be run in a single node.

Running test_isup_recv (ANSI)

The following procedure runs the `test_isup_recv` test.

1. Log in as `sinap1` (MultiStack systems).
2. Move to the test script location by entering

   `cd $SINAP_HOME/Samples/ansi`

3. Start the test by entering

   `test_isup_recv`

4. To terminate the test script, enter `Ctrl-C` from the keyboard.

Running test_isup_send (ANSI)

The following procedure runs the `test_isup_send` test.

1. Log in as `sinap0`.
2. Move to the test script location by entering

   `cd $SINAP_HOME/Samples/ansi`

3. For MultiStack, to start the test with 5000 MSUs, enter

   `test_isup_send 5000`

TTC Configuration

Cross-over test scripts for TCAP are included on your SINAP installation CD. These test scripts are automatically copied to the `$SINAP_HOME/Samples/ttc` directory on your system during the SINAP package installation.

NOTE

There are no cross-over test scripts for ISUP for TTC.

TCAP Cross-Over Test

The TCAP test scripts (`$SINAP_HOME/Samples/ttc/test_tcap_send` and `$SINAP_HOME/Samples/ttc/test_tcap_recv`) test proper system functionality by sending and receiving thousands of MSUs each. This test is the same as the sample provided earlier in the ITU-T section except for the network configuration portion.

Running test_tcap_recv (TTC)

The following procedure runs the `test_tcap_recv` test.

1. Log in as `sinap0` (UniStack systems) or `sinap1` (MultiStack systems).
2. Move to the test script location by entering

   `cd $SINAP_HOME/Samples/ttc`

3. Start the test by entering

   `test_tcap_recv`

4. To terminate the test script, enter `Ctrl–C` from the keyboard.

If you want to continue testing, stop the SINAP software and proceed to the section on ‘‘Stopping SINAP/SS7.” Select and run another test script. However, if you have completed your testing and want to remove the test configuration, stop the SINAP software and proceed to the section on ‘‘Removing the Test Configuration,” later in this chapter.

Running test_tcap_send (TTC)

The following procedure runs the `test_tcap_send` test.

NOTE

The `test_tcap_recv` script must be run **before** running the `test_tcap_send` script.

1. Log in as `sinap0`.
2. Move to the test script location by entering

   `cd $SINAP_HOME/Samples/ttc`

3. For MultiStack, to start the test with 1000 MSUs, enter

   `test_tcap_send`

4. For UniStack, to start the test with 1000 MSUs, enter

   `tcsend 1 3003 13 12 0 1000 0 10 0`

5. To terminate the test script, enter `Ctrl–C` from the keyboard.

If you want to continue testing, stop the SINAP software and proceed to the section on ‘‘Stopping SINAP/SS7.” Select and run another test script. However, if you have completed your testing and want to remove the test configuration, stop the SINAP software and proceed to the section on ‘‘Removing the Test Configuration,” later in this chapter.

Stopping SINAP/SS7

Use the `stop_sinap` command to stop the SINAP/SS7 software. The following is sample output for `stop_sinap`.

```
$ stop_sinap

>>>>>>>>>>>>>>>>>>> STOPPING SINAP... <<<<<<<<<<<<<<<<<<<

NMNP pid=20382 killed

NMTM pid=20417 killed

NMCL pid=20412 killed

NMDS pid=20415 killed

NMCM pid=20416 killed

NMNI pid=20418 killed

NMIP pid=20413 killed

NMDM pid=20414 killed

Killed

Node Management Parent Process (nmnp) died....

Please restart SINAP at next opportunity...

NMMC pid=20419 killed

BIPP pid=20420 killed

BIMI pid=20421 killed

BILF pid=20422 killed

BIID pid=20423 killed

BITU pid=20424 killed

L3PP pid=20425 killed

L3MT pid=20426 killed

L3DT pid=20427 killed

L3RT pid=20428 killed

L3RC pid=20429 killed

L3LA pid=20430 killed

L3CO pid=20431 killed

L3CB pid=20432 killed

L3FR pid=20433 killed

L3CR pid=20434 killed
```

```
L3LS pid=20435 killed

SCMG pid=20443 killed

SCSO pid=20444 killed

ISMG pid=20445 killed

Used SINAP ipc table to stop SINAP processes...

Now using the process table to stop SINAP processes...

Killed

Shared memory removed K_STATIC

Shared memory removed K_SCCP

Shared memory removed K_SCCP_LRM

Shared memory removed K_SCCP_LRN

Shared memory removed K_ISUP_PC

Shared memory removed K_MTP

Shared memory removed K_MONITOR

Shared memory removed K_MEASURE

Shared memory reset K_IPCTBL

Shared memory removed K_TREAT

Shared memory removed K_TIME

Shared memory removed K_SYSTEM

Shared memory removed K_BITE

Shared memory removed K_MTP_DISPLAY

Shared memory removed K_L3SD

Killed

>>>>>>>>>>>>>>>>>>>>> SINAP STOPPED <<<<<<<<<<<<<<<<<<<<<

$ exit
```

Removing the Test Configuration

After a successful test, remove the test configuration before shutting down the system or reconfiguring the SINAP/SS7 software for an application.

NOTE

You should run `stop_sinap` before proceeding.

1. Log in as `root`.
2. Deconfigure the SS7 node(s) by entering the following command:
   - Multistack and UniStack systems:

     `/etc/quick_remove`

The following is sample output from a MultiStack system.

```
Sample quick_remove Screen on a MultiStack system
=================================================

# /etc/quick_remove

quick_remove: remove node N3

INDEX=3, HOME=/home/sinap3
Read 1955512 bytes from the input file
Staticfile Rel 14.0.0.0_05AL 02/04/04
Program    Rel 14.0.0.0_05AL 02/04/04
Empty configuration.
Removing SINAP crontab jobs
warning: commands will be executed using /usr/bin/sh
Deleting files in NODE=N3, HOME=/home/sinap3
Updating SS7links file

quick_remove: remove node N2

INDEX=2, HOME=/home/sinap2
Read 1955512 bytes from the input file
Staticfile Rel 14.0.0.0_05AL 02/04/04
Program    Rel 14.0.0.0_05AL 02/04/04
Empty configuration.
Removing SINAP crontab jobs
warning: commands will be executed using /usr/bin/sh
Deleting files in NODE=N2, HOME=/home/sinap2
Updating SS7links file

quick_remove: remove node N1

INDEX=1, HOME=/home/sinap1
Read 1955512 bytes from the input file
Staticfile Rel 14.0.0.0_05AL 02/04/04
Program    Rel 14.0.0.0_05AL 02/04/04
```

```
Empty configuration.
Removing SINAP crontab jobs
warning: commands will be executed using /usr/bin/sh
Deleting files in NODE=N1, HOME=/home/sinap1
Updating SS7links file

quick_remove: remove node N0

INDEX=0, HOME=/home/sinap0
Read 1955512 bytes from the input file
Staticfile Rel 14.0.0.0_05AL 02/04/04
Program    Rel 14.0.0.0_05AL 02/04/04
Empty configuration.
Removing SINAP crontab jobs
warning: commands will be executed using /usr/bin/sh
Deleting files in NODE=N0, HOME=/home/sinap0
Updating SS7links file
saving /etc/SS7links as /etc/SS7links.20040211_0818
saving /etc/orse/orsdinfo as /etc/orse/orsdinfo.20040211_0818
saving /etc/lucent/opersonality.conf as /etc/lucent/opersonality.conf.20040211_0818
```

Appendix A
In Case of Difficulty

This appendix provides a quick means of determining if the necessary software has been properly installed on your system. This is the first place to check if you encounter a problem during the installation of the SINAP/SS7 software.

For additional information, see the *SINAP/SS7 Installation Guide* (R8060), *SINAP/SS7 User's Guide* (R8051), and *SINAP/SS7 Programmer's Guide* (R8052).

Check List

If you experience a problem, try the follow steps to diagnose and correct the problem:

1. If you have a Continuum or ftServer T Series system, skip to step 2. If you have a Netra or SunFire system, check the following:

   a. In the `/opt/ARTICrpq/bin` directory, check that the following files exist: `rpq.txt`, `rpq_skrn.rel`, `rpqfrmt.def`, `rpqprntf`, `rpqsymln`, `rpq_cxb.rel`, `rpq_wanm.rel`, `rpqhotp`, `rpqreset`, `rpqtest`, `rpq_jdc.rel`, `rpq_wans.rel`, `rpqistat`, `rpqromup`, `rpq_mtp2.rel`, `rpqdump`, `rpqload`, `rpqstat`

      If not, then the `ARTICrpq` package needs to be installed.

   b. In the `/opt/ARTICrpq/bin` directory, check that the following files exist: `odownloadd`, `rsedload`, `ss7_pq.rel`, `ss7_wan_e1.cfg`, `otelrsd`, `ss7_get_inst`, `ss7_ric_skrn.cfg`, `ss7_wan_t1.cfg`

      If not, then the `SINAP` software package needs to be installed.

   c. Check that the following devices exist in the `/dev` directory: `mtp0`, `rpqcntl1`, `rpqloop0`, `rpqloopdrvr1`, `rpqswan0`, `mtp1`, `rpqct_drvr0`, `rpqloop1`, `rpqmwan0`, `rpqswan1`, `rpqcntl0`, `rpqct_drvr1`, `rpqloopdrvr0`, `rpqmwan1`

      If not, then both the `ARTICrpq` and the `SINAP` packages need to be installed. In addition, verify that the U915 or U916 card(s) are installed.

2. Check the appropriate `opersonality.conf` (for U915, U916, and U918 PCI cards) or `personality.conf` (for U420 PCI cards) file to verify that the T1/E1 PCI cards are configured:

- HP-UX version 11.00.03:

  `/etc/lucent/opersonality.conf`

- HP-UX version 11.00.01:

  `/etc/stratus/personality.conf`

- Solaris and Stratus ft Linux operating systems:

  `/etc/dncp/comm/opersonality.conf`

If the correct entries are not present, edit the `opersonality.conf` or `personality.conf` file. There must be an entry (line) for each card. The following `opersonality.conf` example illustrates an E1 configuration for a Continuum system with two U916 PCI cards, while the `personality.conf` example illustrates a Continuum system with one U420 PCI card:

- `opersonality.conf` example:

```
U916 SS7 0/2/3/0 /etc/dncp/comm/orseconfg_e1.hornet /etc/dncp/comm/ocardinfo.hornet
U916 SS7 0/3/5/0 /etc/dncp/comm/orseconfg_e1.hornet /etc/dncp/comm/ocardinfo.hornet
```

- `personality.conf` example:

```
U42000 SS7 0/2/5/0 /etc/ss7_420.pm
```

See the "Adding PCI Card Entries" sections in Chapters 2, 3, and 4 of the *SINAP/SS7 Installation Guide* (R8060) for more information about adding these entries.

NOTE

The following steps are associated with `quick_start` or `config_sinap` after the SINAP software is installed.

3. In the `/etc/orse/orsdinfo` file on HP-UX, check that lines similar to the following exist:

```
<2 3> <  1> <0 mtp 1 1 10 10> </dev/rsd/ss7_0203001>
<2 3> <  2> <0 mtp 2 1 10 10> </dev/rsd/ss7_0203002>
<2 3> <  3> <0 mtp 3 1 10 10> </dev/rsd/ss7_0203003>
<2 3> <  4> <0 mtp 4 1 10 10> </dev/rsd/ss7_0203004>
<2 3> <  5> <0 mtp 5 1 10 10> </dev/rsd/ss7_0203005>
<2 3> <  6> <0 mtp 6 1 10 10> </dev/rsd/ss7_0203006>
<2 3> <  7> <0 mtp 7 1 10 10> </dev/rsd/ss7_0203007>
<2 3> <  8> <0 mtp 8 1 10 10> </dev/rsd/ss7_0203008>
<2 3> <  9> <1 ric_wan 0 1 10 10> </dev/rsd/wan_0203001>
<2 3> < 10> <1 ric_wan 0 1 10 10> </dev/rsd/wan_0203002>
<2 3> < 11> <1 ric_wan 0 1 10 10> </dev/rsd/wan_0203003>
<2 3> < 12> <1 ric_wan 0 1 10 10> </dev/rsd/wan_0203004>
<2 3> < 13> <1 ric_wan 0 1 10 10> </dev/rsd/wan_0203005>
<2 3> < 14> <1 ric_wan 0 1 10 10> </dev/rsd/wan_0203006>
<2 3> < 14> <1 ric_wan 0 1 10 10> </dev/rsd/wan_0203006>
```

```
<2 3> < 16> <1 ric_wan 0 1 10 10> </dev/rsd/wan_0203008>
<3 5> < 17> <0 mtp 1 1 10 10> </dev/rsd/ss7_0305001>
<3 5> < 18> <0 mtp 2 1 10 10> </dev/rsd/ss7_0305002>
<3 5> < 19> <0 mtp 3 1 10 10> </dev/rsd/ss7_0305003>
<3 5> < 20> <0 mtp 4 1 10 10> </dev/rsd/ss7_0305004>
<3 5> < 21> <0 mtp 5 1 10 10> </dev/rsd/ss7_0305005>
<3 5> < 22> <0 mtp 6 1 10 10> </dev/rsd/ss7_0305006>
<3 5> < 23> <0 mtp 7 1 10 10> </dev/rsd/ss7_0305007>
<3 5> < 24> <0 mtp 8 1 10 10> </dev/rsd/ss7_0305008>
<3 5> < 25> <1 ric_wan 0 1 10 10> </dev/rsd/wan_0305001>
<3 5> < 26> <1 ric_wan 0 1 10 10> </dev/rsd/wan_0305002>
<3 5> < 27> <1 ric_wan 0 1 10 10> </dev/rsd/wan_0305003>
<3 5> < 28> <1 ric_wan 0 1 10 10> </dev/rsd/wan_0305004>
<3 5> < 29> <1 ric_wan 0 1 10 10> </dev/rsd/wan_0305005>
<3 5> < 30> <1 ric_wan 0 1 10 10> </dev/rsd/wan_0305006>
<3 5> < 31> <1 ric_wan 0 1 10 10> </dev/rsd/wan_0305007>
<3 5> < 32> <1 ric_wan 0 1 10 10> </dev/rsd/wan_0305008>
```

There should be a wan device for each ss7 device. If not, run `quick_start` or `config_sinap`, or manually edit the `orsdinfo` file (as `root`).

4. In the `/etc/SS7links` file, check that lines similar to the following exist:

```
NODE=N0

device = /dev/rsd/ss7_0203001 wan = /dev/rsd/wan_0203001
         jitter     = PH_BYPASS
         signalling = PH_SIG_MOS
         loopback   = PH_NO_LOOPBACK
         carrier    = PH_LC_CEPT
         distance   = PH_DX_PQ_SHORT
         format     = PH_FRM_CRC_4
         coding     = PH_LC_HDB3
         master_clock    = PH_MASTER_CLOCK
         prmclk          = PH_CLOCK_PORT_1
         bkupclk1        = PH_CLOCK_PORT_2
         bkupclk2        = PH_CLOCK_PORT_3
         bkupclk3        = PH_CLOCK_PORT_4;

link = 0 device = /dev/rsd/ss7_0203001 slot = 1;
```

If not, run `quick_start` or `config_sinap`, or else manually edit the `SS7links` file (as root).

5. In the `/etc/sinap_master` file, check that lines similar to the following exist:

```
INDEX=0 NODE=N0 HOME=/home/sinap0 NETWORK=CCITT TCAP=CCITT USER=sinap0;
INDEX=1 NODE=N1 HOME=/home/sinap1 NETWORK=CCITT TCAP=CCITT USER=sinap1;
INDEX=2 NODE=N2 HOME=/home/sinap2 NETWORK=CCITT TCAP=CCITT USER=sinap2;
INDEX=3 NODE=N3 HOME=/home/sinap3 NETWORK=CCITT TCAP=CCITT USER=sinap3;
```

If not, run `quick_start` or `config_sinap`.

NOTE

Do **not** manually edit the `/etc/sinap_master` file.

6. Check that the `/dev/rsd` directory contains SS7 and wan device entries for each configured T1/E1 channel. If not, do one of the following:
   - For Continuum systems with U916 PCI cards (64-bit HP-UX operating system), enter

     `otelrsd -v`
   - For Netra or SunFire systems with U916 or U915 PCI cards (64-bit Solaris operating system), enter

     `otelrsd -v`
   - For ftServer T Series systems with U918 PCI cards (32-bit Stratus ft Linux operating system), enter

     `otelrsd -v`
   - For Continuum systems with U420 PCI cards (32-bit HP-UX operating system), enter

     `telrsd -v`

   NOTE

   The `otelrsd` command takes `/etc/orse/orsdinfo` as input, while the `telrsd` command takes `/etc/rse/rsdinfo` as input. Therefore, any errors in the `orsdinfo` or `rsdinfo` file will be detected.

7. Verify the links come up when running test scripts that invoke the `start_sinap` script. If the links do not come up, try the following steps on a 64-bit HP-UX operating system:
   a. Check the `$(SINAP_HOME)/ss7dmn.out` file. If `errno 5` (EIO) is there, the firmware is not downloaded.
   b. Check to see if any download daemons are running. In the following example, the `ps` command is used to check for the `odownloadd` process:

```
# ps -ef | grep odownloadd
  root   310   309  0  Jan 10  ?         0:00 /sbin/tomcat/odownloadd
  root   309     1  0  Jan 10  ?         0:00 /sbin/tomcat/odownloadd
```

   If no `odownloadd` process is present, restart the download daemon processes (as `root`) by entering the following command:

   `/sbin/tomcat/odownloadd -rescan`

   This command takes the `opersonality.conf` file as input to determine whether to download E1 or T1 parameters.

c. If `odownloadd` is running, use the HP-UX `ftsmaint` command to reset the T1/E1 card, as illustrated in the following example for a PCI card in bay 2, slot 3:

```
ftsmaint disable 0/2/3/0
ftsmaint reset 0/2/3/0
ftsmaint enable 0/2/3/0
```

For Solaris, use the command:

```
rsedload <instance #>
```

For the Stratus ft Linux operating system, use the commands:

```
ftmaint down <CRU #> <slot #>
ftmaint up <CRU #> <slot #>
```

d. Check the cable connection(s) and then check that the card(s) status light is green.

e. Log in as the SINAP user (sinap0...sinap3) and execute the `sy` command when that SINAP node is running. At the prompt, enter "`#l3,port`" and verify that all the links show the "`PROV_IN`" response. If not, then initialization has failed. If there are no `M_ERROR` or `errno` indications in the `ss7dmn.out` file, then the MML configuration may have failed. The configuration can be examined through the `sy` utility or as `sysopr`.

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