

Sage Instruments

Remote Test Server (RTS)

User's Guide

Part Number 9100-094X-02





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Sage 940/945 Remote Test Server Overview

The Sage Instruments 940/945 Remote Test Server (RTS) is a complete telecommunications trunk test system that supports multiple simultaneous test sessions. The RTS remotely performs on-demand and automatic testing on TDM and VoP networks.

The RTS is compact and modular, and features an easy-to-install rack mount system.

The RTS is designed to meet all of the testing needs associated with network switching, T-1 facilities, and echo cancellers. The system runs on a UNIX operating system with a simple command line and menu-based interface. Testing is controlled locally or remotely through the local area network using terminal emulation software.

Sage Instruments Test Methodology

For the best Quality of Service (QoS) results, Sage Instruments recommends using a single, consistent test methodology on all trunks in an interconnected system. This includes converged networks that combine circuit and packet switching.

All trunks, even those with different transmission rates (e.g., T1, DS-3, or higher rates) should be tested consistently. This includes those that transit a digital cross-connect system (DCS). Further, the same test methods are appropriate for both in-band and out-of-band signaling. The RTS provides consistent, reliable results for all trunk and switching types.

Trunks and Time Slots

Digital trunks connecting test equipment and the Public Switched Telephone Network (PSTN) consist of multiple time slots carrying digitized voice traffic. Traffic may be multiplexed at a T1, DS-3, or higher rate.

Test trunks may connect to the PSTN in at least three ways:

- directly to a telephone company end office
- to an access tandem office switch
- over inter-machine trunks to other offices with further interconnects to long distance carriers and/or end offices

Additionally, test trunks may, or may not, transit a digital cross connect system (DCS) with T1 or DS0 access.

Remote Office Test Line Methodology

Remote office test line (ROTL) tests described in this document follow the guidelines set forth in the Telcordia (formerly Bellcore) document Compatibility Bulletin 106.

There are two applications for the ROTL 105 test line:

- Tandem office (CLASS IV)
- End office (CLASS V)

For CLASS IV applications, the test equipment selects individual time slots for testing using a Maintenance Dial Plan specific to the interfacing switch or gateway. This allows a consistent test method for all interconnect trunks.

The CLASS V office is the termination for the CLASS IV test equipment. The end office terminates the CLASS IV test trunk.

Signaling

The RTS trunk test system can accommodate both in-band and out-of-band signaling types.

In-band Signaling

In-band signaling carries both the information about a call (e.g., request for service, billing details, and other supervision information), and the call itself (talk or data). Types of in-band signaling include:

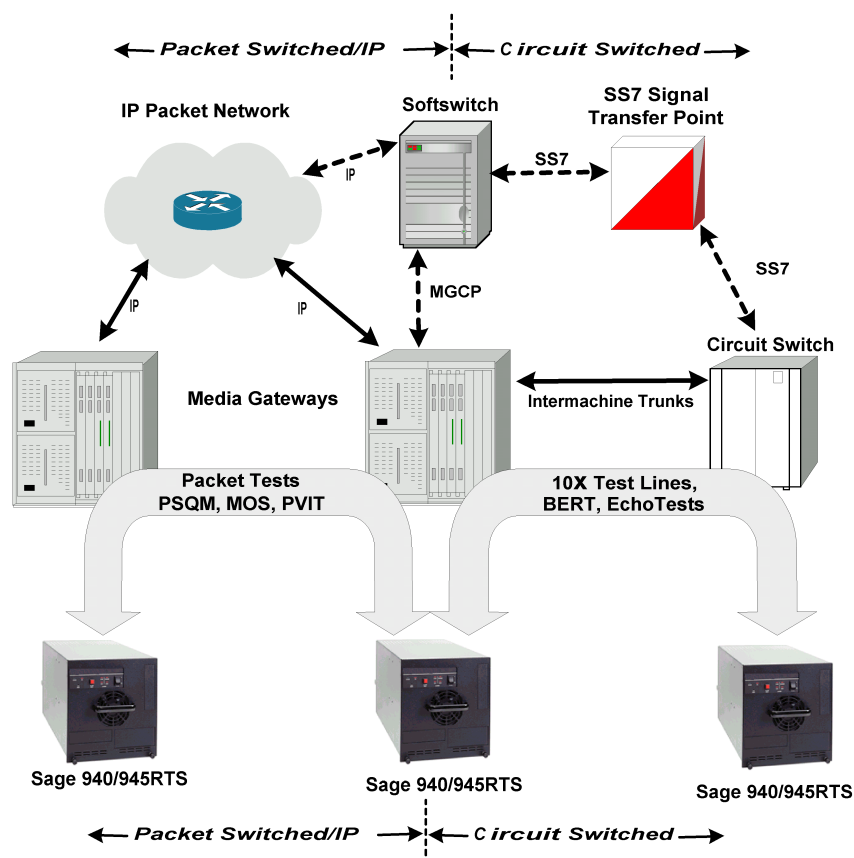
- Multi-frequency (MF)
- Dual tone multi-frequency (DTMF)

Out-of-Band Signaling

Out-of-band signaling, including Signaling System 7 (SS7), separates the information about a call from the channel carrying the call. SS7 carries call information in packets along a separate path through a signal transfer point (STP).

System Architecture

The RTS is typically situated so that tests can be performed on transmissions between both circuit and packet switched networks.



Sage 940/945 Remote Test System Architecture

Figure 1-1 Sage Remote Test Server architecture

RTS Components

Hardware

- Sage 940RTS or Sage 945RTS test server
- Rack mount shelf and hardware
- Optional test resource and interface cards

Software

- Voice Frequency Test Suite
- VoP Test Suite
- DS-0 Bit Error Rate Test Suite
- DS-1 Bit Error Rate Test Suite
- Sage Command Language and Sage Administration Utilities

GR-822 Test Lines and Tests

This section lists the Telcordia standard GR-822 test lines and tests available on the RTS. For detailed test specifications, see Chapter 4, Specifications.

NOTE Some of the tests in the list below are optional, and may not be installed on your RTS unit.

GR-822 Test Lines

The RTS provides the following test lines, or works in conjunction with these test line types:

- Type 100 Quiet Termination
- Type 102 Milliwatt Tone
- Type 105 Responder
- Type 108 DS-0 Loop Back

GR-822 Tests

100 Quiet Termination Tests

- Noise (C-message)
- Echo Return Loss (ERL)
- Singing Return Loss Low (SRL)
- Singing Return Loss High (SRH)

102 Milliwatt Tone Tests

- Level
- Noise (C-notch)

105 Responder Tests

- Loss
- Noise
- Noise/Tone
- Gain/Slope
- Echo Return Loss (ERL)
- Singing Return Loss Low
- Singing Return Loss High

108 DS-0 Loop Back Tests

- Bit Errors (BitErr)
- Bit Error Rate (BER)
- Synchronous Loss Seconds (SLS)
- Error Free Seconds (ESF)
- Percentage Error Free Seconds (%EFS)
- Errored Seconds (ES)
- Percentage Errored Seconds (%ES)
- Severely Errored Seconds (SES)
- Percentage Severely Errored Seconds (%SES)
- Degraded Seconds (Deg)

- Percentage of Degraded Seconds (%Deg)
- Failed Seconds (Fail)
- Percentage of Failed Seconds (%Fail)
- Available Seconds (Avail)
- Percentage of Available Seconds (%Avail)
- Unavailable Seconds (Unavail)
- Percentage of Unavailable Seconds (%Unavail)

Voice Frequency Tests

The voice frequency test application provides the following tests and measurements.

NOTE Some of the tests in the list below are optional, and may not be installed on your RTS unit.

VF Test	Measurements
Tone	• Frequency • Level
Noise	• C-notch Noise • C-message Noise • Signal-to-Noise Ratio (SRN) • 3K Flat Noise

VF Test	Measurements
Return Loss	• Echo Return Loss (ERL) • Singing Return Loss Low (SRL) • Return Loss High (SRH)
Impairments	• 4-tone Intermodulation Distortion • 2nd order intermodulation distortion • 3rd order intermodulation distortion • Impulse Noise and Hits • phase threshold • gain threshold • phase/gain measurement rate • impulse threshold (low) • impulse threshold spread • test time • Phase and Amplitude Jitter • filter • receive status • receive frequency • receive level • phase jitter • amplitude jitter • Envelope Delay Distortion • level • frequency • Absolute Delay • delay • receive level • Peak to Average Ratio (PAR) • 23Tones • frequency • level • delay

DS-0 Bit Error Tests

The DS-0 test suite provides the following measurements:

- Bit Errors (BitErr)
- Bit Error Rate (BER)
- Synchronous Loss Seconds (SLS)
- Error Free Seconds (ESF)
- Percentage Error Free Seconds (%EFS)
- Errored Seconds (ES)
- Percentage Errored Seconds (%ES)
- Severely Errored Seconds (SES)
- Percentage Severely Errored Seconds (%SES)
- Degraded Seconds (Deg)
- Percentage of Degraded Seconds (%Deg)
- Failed Seconds (Fail)
- Percentage of Failed Seconds (%Fail)
- Available Seconds (Avail)
- Percentage of Available Seconds (%Avail)
- Unavailable Seconds (Unavail)
- Percentage of Unavailable Seconds (%Unavail)

DS-1 Bit Error Rate Tests

The DS-1 test suite provides the following measurements:

- Bit (logic) Errors (BitErr)
- Bit Slips
- Bipolar Violation Errors (BPV)
- Bipolar Violation Ratio (BPV Ratio)
- Bit Error Rate (BER)
- Synchronous Loss Seconds (SLS)
- Frame Errors
- Frame Losses
- Frame Slips
- Error Free Seconds (ESF)
- Percentage Error Free Seconds (%EFS)
- Errored Seconds (ES)
- Percentage Errored Seconds (%ES)
- Severely Errored Seconds (SES)
- Percentage Severely Errored Seconds (%SES)
- Degraded Seconds (Deg)
- Percentage of Degraded Seconds (%Deg)
- Failed Seconds (Fail)
- Percentage of Failed Seconds (%Fail)
- Available Seconds (Avail)
- Percentage of Available Seconds (%Avail)
- Unavailable Seconds (Unavail)
- Percentage of Unavailable Seconds (%Unavail)
- Elapsed Time

This chapter contains detailed information about installing the Sage 945RTS to provide test line support in the telephone network. It also contains a description of how the 945RTS fits in the soft switch environment.

The 945RTS comes pre configured for use with network switches. In most cases, installation involves simply mounting the 945RTS equipment shelf onto a standard equipment rack, connecting the wiring, and applying power.

Overview of Installation Procedures

This chapter includes details for two types of 945RTS installation:

- Standard Hardware Installation
- Software Configuration

Standard Hardware Installation

Standard Hardware Installation instructions include:

- 1** Guidelines for provisioning maintenance trunks on the switch, as required.
- 2** Rack mounting and wiring the 945RTS shelf.
- 3** Sliding the 945RTS on to the shelf, and applying power.

Software Configuration

In some cases, you may want to perform additional, custom software configuration tasks. Software configuration steps connect maintenance terminals to the 945RTS allowing direct communication with the 945RTS system.

Software integration procedures add the following steps to the standard hardware installation:

- 1** Connecting the 945RTS to a local maintenance terminal and to your local area network (LAN).
- 2** Modifying the 945RTS's default gateway to recognize your LAN address.
- 3** Modifying the 945RTS to set up a local IP address.

Additional Documents and Information

The following are additional sources of information may be useful the installation and configuration process:

- Technical documentation provided by the manufacturer of the switching equipment.

- *SCO OpenServer Release 5 Documentation* for Santa Cruz Operation SCO OpenServer operating system, available on line at <http://osr5doc.sco.com/>

Operating the 945RTS in a Gateway Environment

The 945RTS provides a range of test capabilities as it is employed as part of a converged circuit and packet switched network. The 945RTS provides test capabilities outlined in Bell Compatibility Bulletin #106 and in Telcordia document GR-822 to meet end-user test requirements.

The Sage 945RTS works in conjunction with soft switch equipment within the system.

Sage Instruments Equipment

Sage Instruments equipment used in this installation/configuration is:

- Sage 945 Remote Test Server
- Sage 935AT Communications Test Set (optional)

Networks Switching Equipment

The 945RTS connects to a soft switch via a DS-1 interface. Each DS-0 is provisioned for an incoming or outgoing call, depending on the number of originating and terminating test lines. See Figure 2-1.

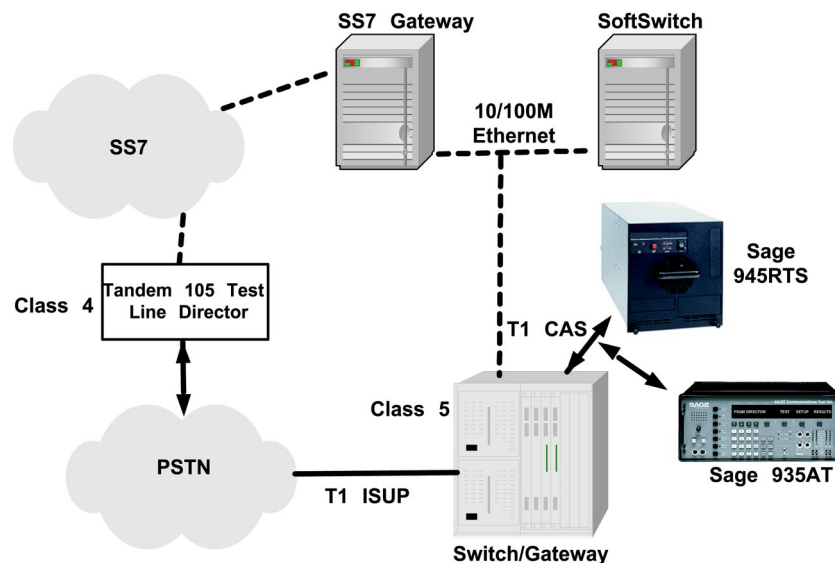


Figure 2-1 Sage 945RTS and soft switch equipment within the network

Terminating and Originating Test Lines

The 945RTS includes terminating test lines and can originate test line calls.

Terminating Test Lines

- Type 100 Quiet Termination
- Type 102 Milliwatt Tone
- Type 105 (Type 56 Responder)
- Type 108 DS-0 Loop Back

Test Line Directors

- Type 100 - Noise, Return Loss
- Type 102 - Notch Noise, Level
- Type 105 - Loss, Noise, Noise/Slope, ERL, SRL, SRH
- Type 108 - DS-0 BERT

Provisioning the Switch

This section describes the hardware and software interfaces between the Sage and switch equipment. The 945RTS comes from the factory provisioned with test lines. The switch must be provisioned to accommodate the 945RTS configuration.

NOTE The information in this section is useful for both standard hardware installation and software configuration.

Sage 945RTS Test Lines

The Sage 945RTS test line parameters are as follows:

- robbed bit signaling
- immediate start supervision
- R1:DTMF, ESF, B8ZS, and 0dB padding

DS-0 Channel Configuration

The Sage 945RTS comes from the factory with configured test lines on selected DS-0 channels.

945RTS Configuration Example

For use with 2 gateways, the configuration from Sage may include four terminating test lines and two director type test lines running on each of two DS-1 interfaces. This configuration may include:

- 1 dual T1 Interface (DTI) card
- 2 type 100 test lines
- 2 type 102 test lines
- 4 type 105 test lines
- 4 director 105 test lines

NOTE For details about how an individual Sage 945RTS unit is configured, refer to the configuration document shipped with the unit.

Table 2-1 provides an example of a Sage factory configuration:

Table 2-1 Gateway trunks configuration example

Gateway 1, DS-1 Interface 1		
Channel	Port Name	Purpose
DS0-1	g1_dir_rotl	ROTL Director
DS0-2	g1_dir_rotl	ROTL Director
DS0-21	tl100_g1	Type 100 Test Line
DS0-22	tl102_g1	Type 102 Test Line
DS0-23	tl105_g1	Type 105 Test Line
DS0-24	tl105_g1	Type 105 Test Line
Gateway 2, DS-1 Interface 2		
Channel	Port Name	Purpose
DS0-1	g2_dir_rotl	ROTL director
DS0-2	g2_dir_rotl	ROTL director
DS0-21	tl100_g2	Type 100 Test Line
DS0-22	tl102_g2	Type 102 Test Line
DS0-23	tl105_g2	Type 105 Test Line
DS0-24	tl105_g2	Type 105 Test Line

Provisioning Procedure

- 1 Provision incoming and outgoing DS-0 trunks on the switch to interface with the Sage 945RTS as described in the configuration document shipped with the unit.

Follow the procedures in the technical documentation provided with the switching equipment.

Standard Hardware Installation Procedure

This section includes the steps to perform hardware installation of one Sage 945RTS unit.

NOTE Do not modify the cable and wiring on the rear of the 945RTS unit. Connections from your facility to the 945RTS are made through the equipment mounting shelf's rear panel.

Tools and Equipment

You may need the following items during a standard hardware installation of the 945RTS:

- Screw Driver Set
- Wire Strippers
- Wrench
- RJ45 Crimper Tool

Shelf Description and Dimensions

The equipment shelf for the 945RTS includes a rear panel where all the wiring for the unit connects to your facility wiring. Utility power is also connected to the rear of the shelf.

The standard shelf fits 19" wide racks. Special extension "ears" allow mounting on 23" wide racks.

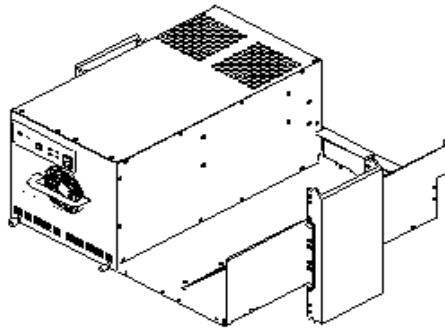


Figure 2-2 Mid mount installation of 945RTS shelf on 19" wide rack

Sage 945RTS Dimensions

- 8.75" high
- 8.75" wide
- 16.91 " deep with handle
- 5 19" rack units

Shelf Unit Dimensions for 19" Rack

- 5.50" high
- 17.75" wide
- 19.00" deep with handle
- 3 19" rack units

NOTE Use extension ears, available from Sage Instruments, to mount the equipment shelf on 23" wide rack.

Rear Shelf Wiring

All wiring for the 945RTS, including power, is connected to the rear panel of the shelf. Rear shelf panel connections are shown in Figure 2-3.

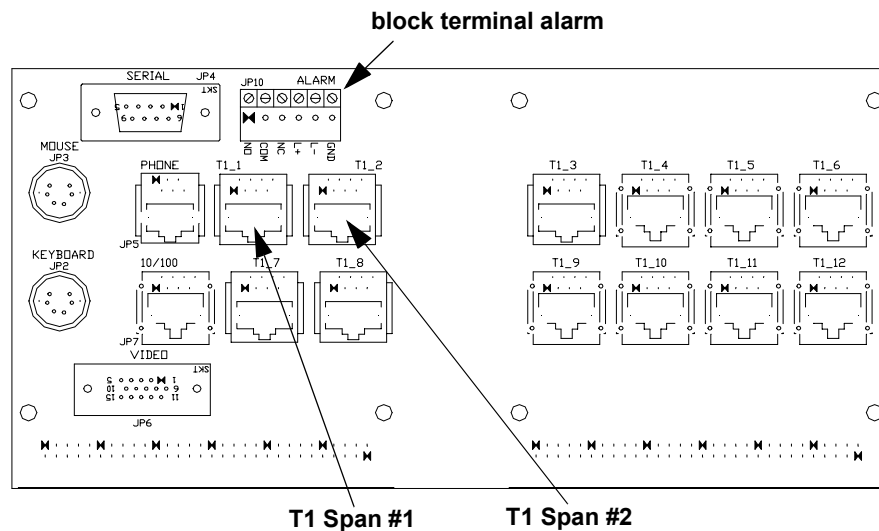


Figure 2-3 Rear shelf connection panel

Installing the Mounting Shelf

Follow the steps in this section to install the mounting shelf to your equipment rack. One fully installed shelf resembles the illustration in Figure 2-2.

- 1 Secure the supplied shelf to the equipment rack.

There are holes for mounting screws on each side of the shelf. Use at least two screws on each side.

To secure the 945RTS to a 23" wide rack, first attach the rack adapter ears to the shelf, then attach the shelf.

Connecting to Utility Power and T1 Spans

A 7 foot, 3 wire, 18 gauge power cable is provided with the Sage 945RTS shelf for connection to -48VDC.

- 1 Connect the three wire ends of the power cable to the DC power source.
 - brown (+)
 - blue (-48 VDC)
 - green/yellow to chassis ground

⚠ **Warning! Shock hazard! Do not connect wires when voltage is present.**

- 2 Terminate the power cable using stripped wire; 7.5 amp fuse protection.
- 3 Connect the provisioned T1 test spans from the switch to the designated T1 port. See Figure 2-3.

Use industry standard RJ48 modular connectors.

Table 2-2 T1 span RJ48 Pin Numbers and Signals

Pin 1	receive ring
Pin 2	receive tip
Pin 3	<i>not used</i>
Pin 4	transmit ring
Pin 5	transmit tip
Pin 6	<i>not used</i>
Pin 7	<i>not used</i>
Pin 8	<i>not used</i>

For Category 5 wire, if you use Blue/Blue White for pins 1 and 2, pins 4 and 5 should be Orange/Orange White.

Connecting the Alarm

- 1 Connect the alarm cable to the block terminal connection.

Use two 18 to 26 gauge wires.

Figure 2-3 shows the location of the alarm terminal connection.

- For Normally Closed alarm systems, use one wire in NC, and one in COM.
- For Normally Open alarm systems, use one wire in NO, and one in COM.

NO Normally Open pin

COM Common lead/ground
Use this pin for either Open or Closed alarms.

NC Normally Closed pin

L+ *Do not use*

L- *Do not use*

GND *Not used*

Docking the 945RTS on the Shelf

- 1 Slide the 945RTS into place on the shelf.

The 945RTS fits snugly against the bottom of the shelf's rear panel, connecting the shelf and the 945RTS.

Use the two thumb screws on the lower front corners of the 945RTS to secure it to the shelf.

- ⊗ **Warning! Observe proper polarity on the DC input power. Failure to do so may result in permanent damage to the RTS.**

Warning! Damage may occur to the power supply or other system components if the power supply is installed with the power switch on.

NOTE When the 945RTS is connected to the shelf, but its power toggle switch is off (**0**), an alarm condition exists at the alarm relay contacts. The alarm may be sent to other connected equipment.

Apply Power to the 945RTS

- 1 Press the toggle switch on the front of the 945RTS to **I** to apply power to the unit.

The **0** symbol indicates power off; the **I** symbol indicates power on.

945RTS Front Panel

The front panel of the Sage 945RTS includes the power toggle switch, light emitting diodes (LEDs), and other system status indicators. Figure 2-4 illustrates each element.

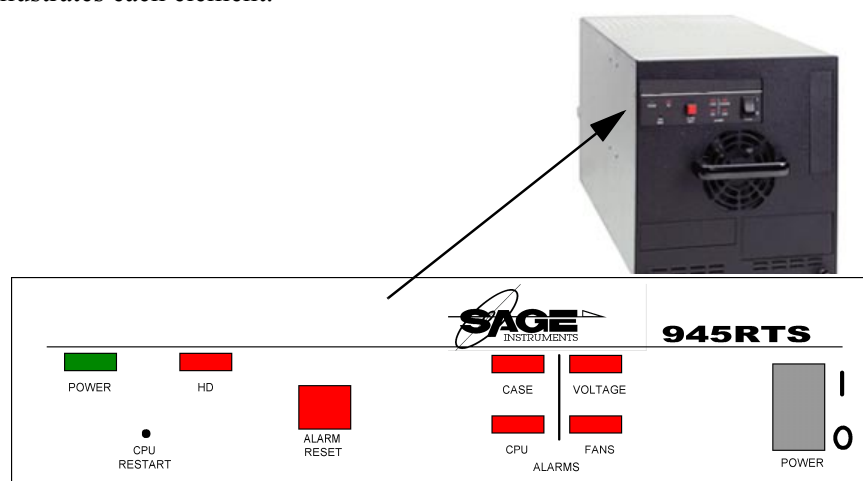


Figure 2-4 Sage 945RTS front panel

FRONT PANEL ALARM LEDs	
CASE	945RTS metal chassis alarm. Illuminates red when heat inside the RTS unit exceeds safe limits.
CPU	Central processing unit alarm. Illuminates red when the CPU is over a safe operating temperature.
VOLTAGE	Electric voltage alarm. Illuminates red when internal voltages exceed limits.
FANS	Cooling fans alarm. Illuminates red when one or more of the cooling fans changes speed or fails.

OTHER FRONT PANEL LEDs	
POWER	Electric power indicator. Illuminates steady green when power is on.
HD	Hard drive indicator. Flashes red when the hard drive is being accessed.
FRONT PANEL BUTTONS	
ALARM RESET	Push the button to reset alarms.
POWER	Toggle electric power off O , or on I .

Software Configuration Procedure

The steps in this section are optional, and are in addition to the steps in Standard Hardware Installation Procedure on page 13. Use this optional procedure to connect the 945RTS to a maintenance terminal, directly via serial port or via your local area network. A maintenance terminal connection allows you to perform administrative tasks on the 945RTS.

LAN Connection Requirements and Procedures

Operator access to the Sage 945RTS is through the rear panel serial port or network access.

Maintenance Terminal Physical Connection

Physical connection to the 945RTS via a local area network (LAN) consists of a CAT5 cable and a RJ-45 connector to the 10/100 Base-T Ethernet LAN serial port on the shelf rear wiring panel.

Maintenance Terminal Logical Connection

The logical connection to the 945RTS requires provisioning the LAN with an IP address for the Sage 945RTS.

NOTE You must obtain the **netmask** and **IP address for the default router/gateway**. This information is necessary as you follow the steps in this procedure.

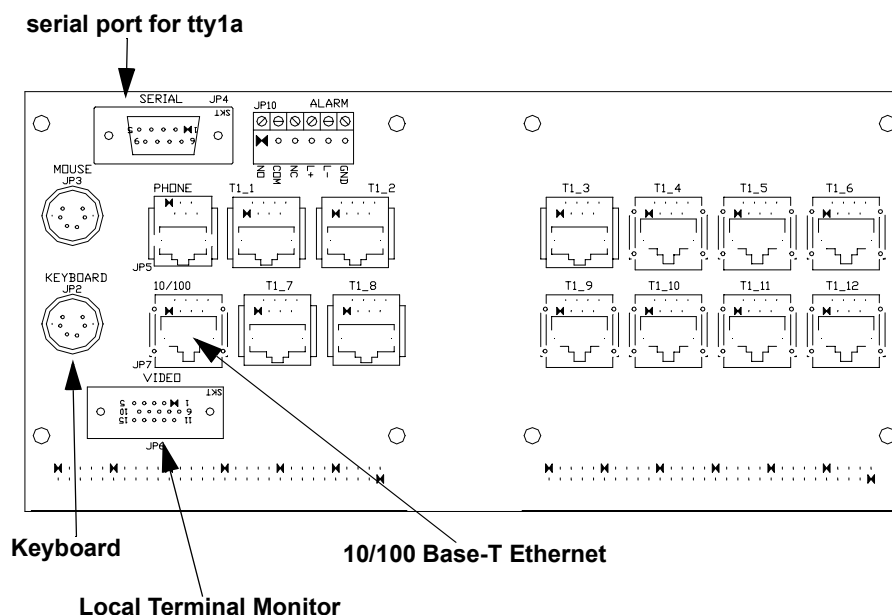


Figure 2-5 Rear panel connections for software configuration

Tools and Equipment

You may need the following items to complete software integration of the 945RTS:

- T1 Telephony Cable Set, including:
 - DS-1 bantam jack patch cords
 - RJ-45 to bantam cables]
- Screw Driver Set
- Wire Strippers
- Wrench
- RJ45 Crimper Tool
- Sage Instruments 935AT test set (optional, but recommended*)
 - * You can use the Sage 935AT test set to emulate a far end switch.

Connecting Maintenance Terminals

Follow the steps in this procedure after completing the steps in Standard Hardware Installation Procedure on page 13. The steps below connect the 945RTS to a local maintenance terminal and to your local area network (LAN).

- 1** Ensure the 945RTS has power (i.e., the power toggle switch is set to **I**).
- 2** Attach a local, maintenance terminal to the serial port at the rear of the 945RTS shelf.

See Figure 2-5 for location of the serial port, keyboard, and video monitor.

The local maintenance terminal can be either a "dumb terminal" or a desktop or laptop PC.

To connect a "dumb terminal," use a standard RS-232 serial connection.

For desktop or laptop PC, use a standard "null modem" cable with a RS-232/DB-9 connection.

A mouse is not used.

Terminal Emulation Software

To communicate with the Sage 945RTS, a locally connected desktop or laptop PC must have terminal emulation software installed (e.g., HyperTerminal or Telnet).

Terminal emulation settings for locally connected terminal emulation software should be as follows:

- terminal type is vt100
- 8 bit, no parity
- 1 stop bit
- 9600 baud rate

- 3** Attach a connection from your LAN to the 10/100 Base-T Ethernet port at the rear of the 945RTS shelf.

Use Category 5, 22 to 26 gauge wire, solid or stranded twisted pair. Transmit and receive pairs must stay as pairs within the cable.

Use an industry standard RJ48 modular connector.

Table 2-3 10/100 Base-T Ethernet RJ48 Pinouts

Pin 1	transmit +
Pin 2	transmit -
Pin 3	receive +
Pin 4	<i>not used</i>
Pin 5	<i>not used</i>
Pin 6	receive -
Pin 7	<i>not used</i>
Pin 8	<i>not used</i>

Logging In to the 945RTS

This section describes security levels and how to log in to the 945RTS. Perform the steps from the local maintenance terminal.

Security Levels

The Sage 945RTS includes three levels of password security; each requires a valid username and password.

Table 2-4 Login and password security levels

Security Level	Login/Password	System Prompt
Super User Level	Username: "root" Password: <i>contact Sage Instruments for root password for your server</i>	#
Administrative Level	Username: "admin" Password: "Sage"	\$
Technician Level	Username: "test" Password: "Sage"	\$

NOTE To obtain the default password for the root username, contact Sage Instruments:

- email: customersupport@sageinst.com
- telephone M-F, 8:00 am to 5:00 pm Pacific time: (831) 761-1000
- or contact your Sage sales representative

1 Ensure the 945RTS has power (i.e., the power toggle switch to **I**).

NOTE If the maintenance terminal connected via the serial port to the Sage 945RTS is a "dumb terminal," the initial Sage login screen automatically displays.

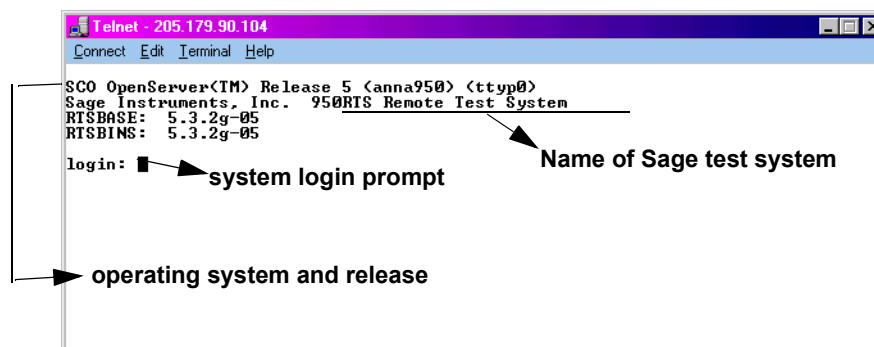


Figure 2-6 Login screen on the 94XRTS

If a desktop or laptop PC is connected directly to the serial port, first launch your terminal emulation software. Typically, the Sage login screen displays automatically.

NOTE You use SCO UNIX and special Sage Instruments commands at the terminal prompt to complete the tasks in this section.

2 At the login prompt, type *username* and press return.

3 At the password prompt, type *your_password* and press return.

The login and password are case sensitive.

4 The initial Sage Instruments copyright screen displays.

```
SCO OpenServer(TM) Release 5 (antioch.sageinst.com) (tty0)
Sage Instruments, Inc. 950RTS Remote Test System
RTSALTS: 5.3.2g
RTSBASE: 5.3.2g

login: root
Password:
Last successful login for root: Fri Oct 12 10:58:37 2001 on tty0
Last unsuccessful login for root: Wed Oct 03 13:57:05 2001 on tty01

      SCO OpenServer(TM) Release 5
      (C) 1976-2000 The Santa Cruz Operation, Inc.
      (C) 1980-1994 Microsoft Corporation
      All rights reserved.

      For complete copyright credits,
      enter "copyrights" at the command prompt.

      **** Sage Instruments, Inc. ****
      950RTS Remote Test System

      RTSALTS: 5.3.2g
      RTSBASE: 5.3.2g

you have mail
TERM = (ansi) vt100
```

Figure 2-7 Sage Instruments copyright screen

5 Press <Enter> to accept the default terminal type.

- or -

Type the appropriate terminal type at the system prompt (for example `vt100`), and press <Enter>.

You are now connected to the 945RTS via the SCO UNIX operating system.

```
Terminal type is VT100
#
```

Figure 2-8 System prompt

Setting Up Local IP and Default Gateway Addresses

Use the steps in this section to link your IP address with the 945RTS system. These steps modify the hardware configuration on the 945RTS.

NOTE Perform the steps in this section from the local maintenance terminal connected via the serial port (**tty1a** or **Com1**).

NOTE You must be logged in to the 945RTS as **root** to perform the steps below. Log in steps are described above in Logging In to the 945RTS on page 19.

Screen Navigation

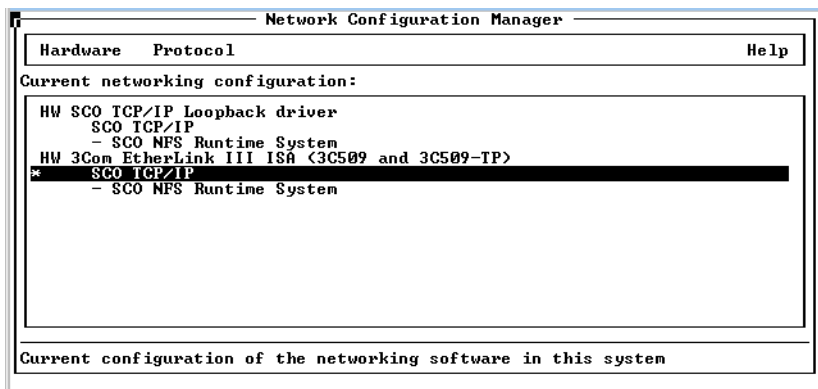
In the steps that follow, use <Tab>, <Shift+Tab>, and the arrow keys to move the cursor and navigate among the windows. Press <Enter> to select the desired item and move to the next window, or to make a selection from a list.

Setting Up Local IP Address

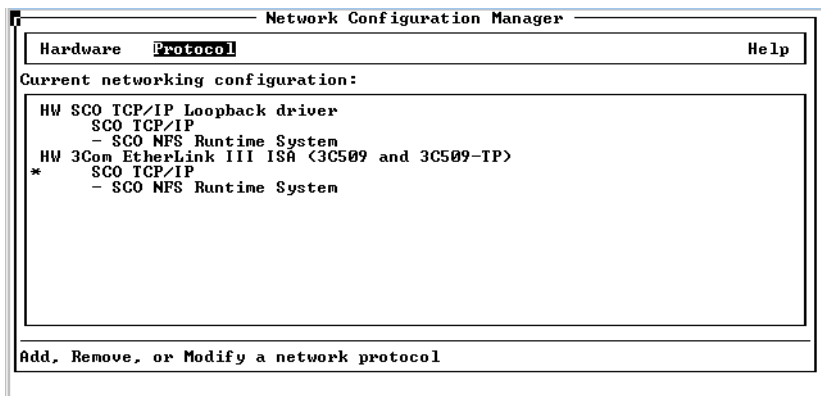
1 Log in to the 945RTS as root.

The steps to log in are detailed in Logging In to the 945RTS on page 19.

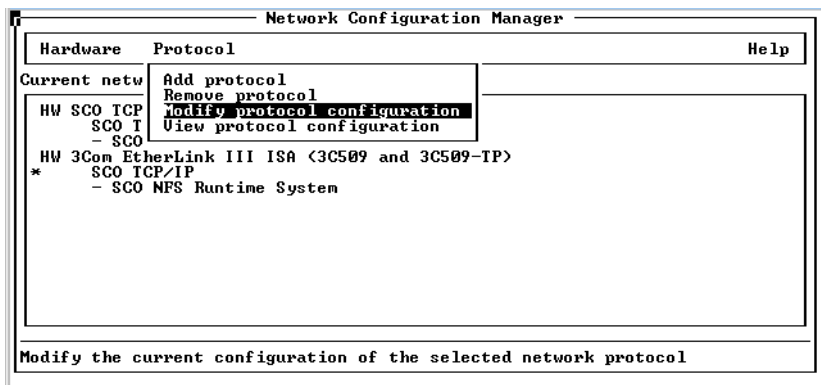
- 2 At the system prompt, type **netconfig** to launch the Network Configuration Manager.



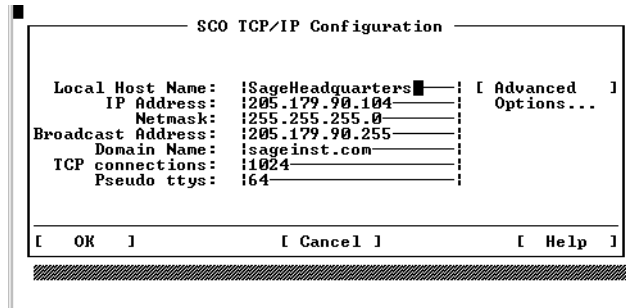
- 3 Use the Tab key to move the cursor to the lower window.
- 4 Use the arrow key to place the * next to **SCO TCP/IP**.
- 5 Press <Shift+Tab> to move the cursor to the top of the window.
- 6 Select **Protocol**.



- 7 Use the down arrow key to display the Protocol pull down menu.
- 8 Select **Modify protocol configuration**.



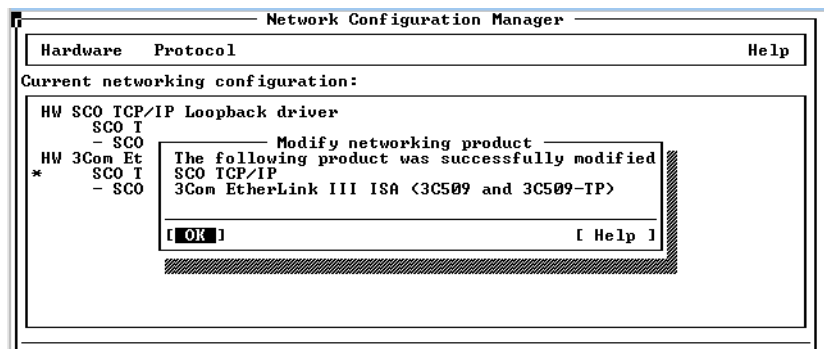
- 9 In the SCO TCP/IP configuration window, modify the values in the fields as necessary.



- Type your host name in the **Local Host Name** field.
- Type your IP Address in the **IP Address** field
- Type your netmask address in the **Netmask** field.
- Type your broadcast address in the **Broadcast Address** field.
- Type your domain in the **Domain Name** field.

NOTE Do not modify the data in the **TCP connections** or **Pseudo ttys** fields.

10 Select **OK** to accept your modifications.

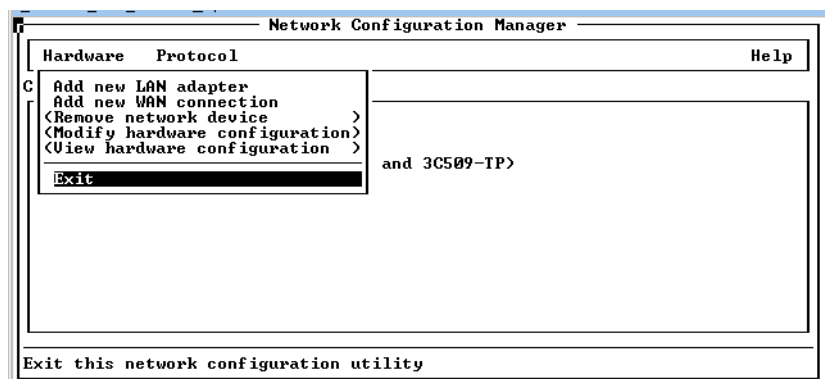


11 Select **OK** again to verify your changes.

12 Use the Tab key to select **Hardware**.

13 Use the down arrow key to display the pull down menu.

14 Select **Exit**.



Your system must now rebuild to acknowledge your local IP address modifications.

- 15 Select **y** (yes) at the question **Do you want this kernel to boot by default?**
- 16 Select **y** (yes) at the question **Do you want the kernel environment rebuilt?**

```

The UNIX Operating System will now be rebuilt.
This will take a few minutes. Please wait.

Root for this system build is /

The UNIX Kernel has been rebuilt.

Do you want this kernel to boot by default? <y/n> y
Backing up unix to unix.old
Installing new unix on the boot file system

The kernel environment includes device node files and /etc/inittab.
The new kernel may require changes to /etc/inittab or device nodes.

Do you want the kernel environment rebuilt? <y/n> y

```

Wait as the system rebuild continues.

```

The UNIX Kernel has been rebuilt.

Do you want this kernel to boot by default? <y/n> y
Backing up unix to unix.old
Installing new unix on the boot file system

The kernel environment includes device node files and /etc/inittab.
The new kernel may require changes to /etc/inittab or device nodes.

Do you want the kernel environment rebuilt? <y/n> y

The kernel has been successfully linked and installed.
To activate it, reboot your system.

Setting up new kernel environment
/opt/K/SCO/link/1.1.1Ga/etc/conf/bin/idmknod: Cannot make block special /dev/ins
tall: File exists (error 17)
/var/opt/K/SCO/link/1.1.1Ga/etc/conf/node.d/fd, line 185: fd      install
b      64      bin      bin      666
/opt/K/SCO/link/1.1.1Ga/etc/conf/bin/idmknod: Cannot make character special /dev
/rinstall: File exists (error 17)
/var/opt/K/SCO/link/1.1.1Ga/etc/conf/node.d/fd, line 186: fd      rinstall
c      64      bin      bin      666

Press Enter to continue

```

- 17 Press <Enter> to continue.

The system completes its rebuilding process, and then returns to the SCO UNIX system prompt.

Modifying the Default Gateway

Follow the steps in this section to edit the file that contains the default gateway address. These steps use the **vi** UNIX editor to modify the **tcp** file.

- 1 At the system prompt, type **cd /etc/default** and press <Enter>.
- 2 At the prompt, type **vi tcp** and press <Enter>.

This opens the **tcp** file in the **vi** editor program.

```

#          SCCS IDENTIFICATION
#
#  DEFAULT TCP parameters
#
#  These parameters are read by the TCP startup script as
#  default values.
#
#  The ROUTER_DAEMON keyword can be used to start your choice of router daemon.
#  For example, to use routed, set ROUTER_DAEMON=/etc/routed. You can also
#  pass argument to the daemon, using the ROUTER_DAEMON_ARGS keyword. Note
#  that is you set ROUTER_DAEMON, it must point to an executable file, which
#  is executed by /etc/tcp. Usually, if you set a default GATEWAY, you do not
#  set a routing daemon.
#
DOMAIN=sageinst.com
NETMASK=255.255.255.0
BROADCAST=205.179.90.255
ROUTER_DAEMON=
ROUTER_DAEMON_ARGS=
GATEWAY=205.179.90.1
DFLTMETRIC=

```



3 Use the arrow keys to navigate to the **GATEWAY=** line.

4 Type in your IP Gateway address.

This is the IP address of the router on your local network.

5 Follow the steps below to exit the vi editor and return to the system prompt.

- Press <Esc>
- Type :
- Press w
- Press q
- Press <Enter>

6 You must now shut down the system using the auto restart feature.

At the system prompt, type **shutdown -g0 -y -i6**

Press <Enter>.

This command shuts down the system, then automatically restarts the system, and then returns you to the SCO UNIX prompt.

```

#          SCCS IDENTIFICATION
#
#  DEFAULT TCP parameters
#
#  These parameters are read by the TCP startup script as
#  default values.
#
#  The ROUTER_DAEMON keyword can be used to start your choice of router daemon.
#  For example, to use routed, set ROUTER_DAEMON=/etc/routed. You can also
#  pass argument to the daemon, using the ROUTER_DAEMON_ARGS keyword. Note
#  that is you set ROUTER_DAEMON, it must point to an executable file, which
#  is executed by /etc/tcp. Usually, if you set a default GATEWAY, you do not
#  set a routing daemon.
#
DOMAIN=sageinst.com
NETMASK=255.255.255.0
BROADCAST=205.179.90.255
ROUTER_DAEMON=
ROUTER_DAEMON_ARGS=
GATEWAY=205.179.90.1
DFLTMETRIC=
"tcp" 29 lines, 868 characters
# shutdown -g0 -y -i6

```



Modifying the DNS and Search Servers

Follow the steps in this section to edit the `resolv.conf` file in the `/etc` directory. If you do not modify the `resolv.conf` file with correct settings, a 60 second delay occurs each time you attempt to remotely connect (for example, via telnet or ftp) to the 94XRTS.

- 1 At the system prompt, type `cd /etc` and press <Enter>
- 2 At the system prompt, type `vi resolv.conf` and press <Enter>

This opens the `resolv.conf` file in the vi editor program. The file contains four lines similar to the following:

```
nameserver      65.209.221.241
nameserver      65.209.221.242
hostresorder    local bind
search          sageinst.com
~
~
~
~
~
"resolv.conf" 4 lines, 102 characters
```

- 3 On the first `nameserver` line, type the IP addresses of your DNS, replacing the default IP address.

This is the internet address (in dot notation) of a name server that the resolver queries. Up to three name servers may be listed, one per line. If there are multiple servers, the resolver library queries them in the order listed. If no `nameserver` entries are present, the name server on the RTS is used.

NOTE The use of DNS servers is optional. To disable this feature, type # in front of all instances of `nameserver` in the file. See `resolve.conf` File Example below.

- 4 If applicable, on the second `nameserver` line, type the IP addresses of another DNS, replacing the default IP address.

- or -

Type # in front of other instances of `nameserver` to disable them.

- 5 Do not change the `hostresorder` line.

The `hostresorder` line specifies the database search order for the `gethostbyname` and `gethostbyaddr` routines. These routines are located in (SLIB).

- 6 On the `search` line, type the domain name of your local network, replacing the default network domain name (for example, replacing `sageinst.com`).

In most cases the local domain name is your search domain name. If desired, you can type another domain search path. Use spaces or tabs to separate the names.

NOTE The use of a search domain name is optional. To disable this feature, type # in front of the `search` line.

- 7** Follow the steps below to exit the vi editor and return to the system prompt.
 - Press <Esc>
 - Type :
 - Press w
 - Press q
 - Press <Enter>

resolve.conf File Example

The example `resovle.conf` file below is for a 94XRTS attached to a network where the use of DNS and search are not required. Note the use of the # character to disable those lines:

```
# nameserver      65.209.221.241
# nameserver      65.209.221.242
hostresorder      local bind
# search          sageinst.com
~
~
~
~
~
"resolv.conf" 4 lines, 102 characters
```

Verifying the Default Gateway Address

Use the steps in this section to verify that the RTS recognizes the new IP address of your default gateway.

- 1** Log on to the RTS at the admin level.
At the login prompt, type **admin** and press <Enter>.
At the password prompt, type **sage** and press <Enter>.
- 2** At the system prompt, type **ping** followed by your default gateway IP address.
The system attempts to detect the address you entered. Screen messages scroll by as you wait.
- 3** Press <Delete> to stop the process.
A screen message similar to the following indicates success:
XX packets transmitted, XX packets received, 0% packet loss
The screen message similar to the following indicates an error:
ping: sendto: Host is down
In the case of an error, repeat the steps above.

Checking the T1 and Interface

Follow the steps in this section to confirm the factory settings for the RTS hardware and interfaces. For example, to verify the number of dual T1 interface (DTI) cards, and to verify which T1 channels are assigned to test lines.

Checking T1 Status (t1mstat)

Use the `t1mstat` command to view the status of installed dual T1 interface (DTI) boards. Use it to verify that the system recognizes installed dual T1 interface (DTI) cards, and that they are "in service" (operating properly).

1 Log in at the admin security level.

2 At the system prompt, type `t1mstat`

In the example below, note the following:

- the DTI card status is In Svc (in service, and properly recognized by the system)
- the status of each T1 line is No Errs (no errors)

```

Terminal type is vt100
143$ t1mstat
t1mstat <c> 1997-2001 Sage Instruments Rev 5.3.2g-05.081301.0
bd  type      status ifc  name  frame  code  length  perf  status
1  DS1-DTI    In Svc  1   B010   ESP    B8ZS  0-133ft None  No Errs
2             2   B011   ESP    B8ZS  0-133ft None  No Errs
144$
  
```

T1 Span 1 and 2

T1 Line Status

NOTE See the Chapter 5, Administration Utilities and Commands for complete details about using the `t1mstat` command.

Checking Test Line Status (itl stat)

Use the `itl stat` command to view integrated test line configurations. This command accesses the integrated test line daemons to display process and channel information. Use it to verify that the channels assigned to test lines are recognized by the system.

1 Log in at the admin level.

2 At the system prompt, type `itl stat`

The system displays two types of information about ITL processes:

- ITL processes
- ITL channels

The information in the ITL channels portion of the screen shows:

- number of test lines
- channel numbers on each test line
- test line type assigned to each channel

In the example below, you see the system has one dual T1 interface card with two T1 test lines (lines 1 and 2). On T1 line 1, channels 22 and 24 are designated type 105 test lines.

On T1 line 2, channels 21 and 23 are also designated type 105 test lines.

```

143$ tlimstat
tlimstat (c) 1997-2001 Sage Instruments Rev 5.3.2g-05.081301.0
bd type status ifc name frame code length perf status
1 DS1-DTI In Svc 1 B010 ESF B8ZS 0-133ft None No Errs
144$ itl stat
ITL processes
admin 549 1 0 15:35:34 ? 00:00:00 itld t1105 t1105
admin 554 1 0 15:35:39 ? 00:00:00 itld t1105 t1105
admin 559 1 0 15:35:44 ? 00:00:00 itld t1105 t1105
admin 564 1 0 15:35:49 ? 00:00:00 itld t1105 t1105
ITL channels
1 22 0000 549 admin ? 15:35:34 itld t1105 t1105
24 0000 554 admin ? 15:35:39 itld t1105 t1105
2 21 0000 559 admin ? 15:35:44 itld t1105 t1105
23 0000 564 admin ? 15:35:49 itld t1105 t1105
145$

```

Annotations in the image:

- An arrow points from the text "DS-0 Channel Number" to the value "22" in the first row of the ITL channels section.
- An arrow points from the text "T1 Number" to the value "1" in the first row of the ITL channels section.
- An arrow points from the text "Type of Test Line" to the value "itld" in the first row of the ITL channels section.

NOTE See the Chapter 5, Administration Utilities and Commands for complete details about using the `itl stat` command.

Shutting Down the 945RTS

Follow the steps in this section to safely shut down the 945RTS using UNIX system commands.

- 1 Log in to the 945RTS at the root security level.
- 2 At the system prompt, type `shutdown -g1 -y` and press <Enter>.

This shutdown command and its arguments tells the system to:

- broadcast a message to other logged on users informing them that in one minute the system will shut down
- answer yes to all system questions during the shutdown process.

The screen displays resembles the following:

```

# shutdown -g1 -y
Shutdown started.      Fri Aug 31 16:33:13 PDT 2001

Broadcast Message from root (tty0) on rays950   Aug 31 16:
The system will be shut down in 60 seconds.
Please log off now.

Broadcast Message from root (tty0) on rays950   Aug 31 16:
THE SYSTEM IS BEING SHUT DOWN NOW ! ! !
Log off now or risk your files being damaged.

```

- 3 Wait until no new screen messages display (approximately three minutes).
- 4 If the shutdown command string is sent to the 945RTS via the serial port (tty1a), the screen also displays a message similar to the following:

```

** Safe To Power Off **
-or-
** Press Any Key To Reboot **

```

- 5 If desired, it is now safe to toggle the power switch on the front of the 945RTS to the off **O** position.

Shutting Down and Restarting

Use the steps below to shut down the 945RTS and immediately restart it.

- 1 Log in to the 945RTS at the root security level.

- 2** At the system prompt, type `shutdown -g1 -y -i6` and press <Enter>. The system proceeds as in the shutdown steps above, and then immediately restarts.

Introduction

Director tests are those initiated by the 94XRTS test server. The 94XRTS provides two methods to perform director tests:

- Automatic Trunk Routining (ATR), the test utility you set up to run automatically between switches on selected test trunks
- On demand in real time, initiated by operator commands or menu selections

Scheduled Director Testing Using Automatic Trunk Routining (ATR)

The 94XRTS performs scheduled director testing using the automatic trunk routining (ATR) feature. ATR allows you to schedule automatic trunk testing between system switches. Multiple schedules can be created to run selected tests on selected trunks at selected times.

The ATR system uses site files and schedules to create and store automatic tests. Filter files allow you to print or save selected test results, for example, only those that fail performance criteria.

You can set up the ATR schedules and configuration at any time following basic 94XRTS system installation. For details about installing the RTS, see Chapter 2, Integration Procedures.

Type 105 Testing with ATR

The automatic trunk routining feature on the 94XRTS automates type 105 test line testing. The 94XRTS utility, **vsched**, provides a simple menu interface to schedule tests between switches on selected trunks. The vsched utility uses a site file located in the Sage 950's /u/950RTS/lib/sites directory, and a trunks file, located in the Sage 950's /u/945RTS/lib directory.

All ATR testing is based on trunk groups from the trunk file. The test expands trunk groups into their constituent members.

A trunk file can be obtained by downloading data from a near-end switch database. For the Sonus Gateway, a script program, 105filegen33.ksh, is provided to generate both the trunk file and the site file. This script resides in the 945RTS library directory, /u/945RTS/lib.

After ATR schedules are defined, the 94XRTS automatically runs tests and reports results.

ATR Programs

ATR system consists of several programs, described in Table 3-1.

Table 3-1 ATR utilities and programs

ATR Programs	Description
vsched	Visual Schedule Manager utility. Provides a menu user interface to create, update, and review ATR schedules.
105filegen33.ksh	Trunk and Site File Generator. Creates the trunk and site files necessary to use the vsched Visual Schedule Manager utility.

Figure 3-1

ATR Configuration Files

The programs that run the ATR feature use information stored in configuration and data files, described in Table 3-2. These files are located in **/u/945RTS/lib**.

You must be logged on to the RTS system at the **admin security level** to edit configuration files. All users should be allowed to read (not edit) the files.

Configuration files are all plain text, and are edited using any UNIX test editor (for example, Vi). Lines that begin with the pound symbol (#) are comments.

NOTE To perform properly, the names of ports, sites, schedules, etc. must be no more than 20 characters long, limited to letters, numbers, and simple punctuation, including only dot (.), hyphen (-) and comma (,). The system is case sensitive, distinguishing between upper and lower case letters. Filenames must not contain embedded spaces.

Table 3-2 ATR configuration files in the **/u/950rts/lib** directory

Configuration Files	Description
default.trks	Trunk Database files. Contain information on near-end switch trunk groups and members.
sites/*	Site Files. Contain far-end switch and test path information
filters/*	Filter Files. Contain test results pass and fail limits.

Trunk and Site Files

All ATR testing is based on trunk groups from trunk files and site files. Both trunk and site files must be in place before you use the scheduling utility to define ATR test schedules.

Generating Trunk and Site Files

For networks with a Sonus GSX9000 gateway, a software program (i.e., a script file) is available to generate both the trunks file and the sites file. The script file is **105filegen33.ksh**.

Running the Sonus Utility

If your network includes a Sonus Networks GSX9000 with any combination of CNS10, CNS30, or CNS31 cards, use the Sonus script, 105filegen33.ksh, to generate the trunks and sites files necessary for using the 94XRTS ATR functions.

Use the steps in this section to create a custom script file for your network.

```
105filegen33.ksh -n wchsgsx1 -s 5 -c CNS30 -f BLASOHDPS0
-d 5135550105 -a
```

called party phone number

near end switch name

card slot number

card type

far end switch name

Figure 3-2 Script file example for Sonus GSX9000 switch

For ease of use, follow the naming conventions in Table 3-3 when defining the near and far end switch names in the script file:

Table 3-3 Switch naming conventions for 105filegen33.ksh script files

card	CNS10, CNS30/31
site files	<code><testtype><shelf><slot><port><nearendswitchname>.</code> <code><farendswitchname></code> where <code><testtype></code> is "a" when using the <code>-a</code> option, "m" when using the <code>-m</code> option, or "s" for the selected trunks default.
trunks files	<code><farendswitchname>.<shelf>.<slot>.<port>.all.trks</code> for a <code>-a</code> option - or - <code><farendswitchname>.<shelf>.<slot>.<port>.first.trks</code> for a <code>-m</code> option - or - <code><farendswitchname>.<shelf>.<slot>.<port>.selected.trks</code>

105filegen33.ksh Switch Syntax

The 105filegen33.ksh script includes both mandatory and optional switches, shown in Table 3-4. Usage syntax for 105filegen33.ksh.

NOTE To view usage information from the system terminal, at the command prompt, type `105filegen33.ksh -h`

Mandatory switches `-n`, `-s`, `-c`, `-f`, and `-d` must be input on the command line. The 105filegen33.ksh must be executed on the Sage 94XRTS in the

/u/rts950/lib directory. Trunks files are created in the /u/rts950/lib directory; the site file is created in the /u/rts950/lib/sites directory.

Table 3-4 105filegen33.ksh script switches

Argument	Description	Required?
-n	near-end switch name	Mandatory
-u	near-end shelf number	Optional
-s	near-end switch slot	Mandatory
-c	near-end slot's card type (CNS10 or CNS30)	Mandatory
-a or -m	type of test for near-end trunks Note: If the -a and -m options are omitted, the script prompts the user for individual T1s. All DS0s on the requested T1 will be tested. The trunks file uses this syntax: <code>nearendswitchname.shelf.slot.cardtype .selected.trks</code>	Optional
-T	alternate trunks filename	Optional
-f	far-end switch name	Mandatory
-d	called party number on far-end switch	Mandatory
-S	alternate site filename	Optional

105filegen33.ksh Creation Procedure

Follow the steps in this section to define names and gather the information necessary to create the 105filegen33.ksh script. Then, place the names and information into the script file as shown in the final step.

NOTE Use the steps in this section for each switch-to-switch route for which you will schedule automatic trunk routing tests.

1 Define a name for the near end switch.

For ease of use later, use a name that identifies the switch location as described in Table 3-3.

NOTE Names are case sensitive, and may be no more than 20 characters long. Use only alphanumeric characters and dot (.), hyphen (-) and comma (,). Names may not contain spaces.

2 Determine the slot number of the CNS card on the near end Sonus GSX9000 switch.

Slot numbers can be either one or two digits, and between 3 and 16.

- 3 Determine the card type.
 - Use CNS10 for CNS10 cards
 - Use CNS30 for either CNS30 or CNS31 cards

- 4 Define a name for the far end switch.

For ease of use later, use a name that identifies the switch location as described in Table 3-3.

NOTE Names are case sensitive, and may be no more than 20 characters long. Use only alphanumeric characters and dot (.), hyphen (-) and comma (,). Names may not contain spaces.

- 5 Determine the telephone number of the test line on the far end switch.

- 6 Determine which channel indicator to use, **-a**, **-m** or none.
 - Use **-a** to test all channels on each T1
 - Use **-m** to test the first channel on each T1
 - Use no channel indicator if you want to identify individual T1 lines. All DS0s on the T1 can be identified. If no value is placed in this part of the file, the script prompts you to identify individual DS0 lines on the T1.
- 7 Using the examples above and below, write out the complete 105filegen33.ksh in the spaces provided. The script must include all information exactly as shown; spaces are allowed only as shown in the example, and no carriage returns are allowed.

```
105filegen33.ksh -n near-end-switch-name -s slot# -c card-type
-f far-end-switch-name -d far-end-phone-number __
```

```
105filegen33.ksh -n _____ -s ____ -c _____ -f _____ -d _____
```

Running the 105filegen33.ksh Script

Use the steps in this section to type the script file into the /u/950rts/lib directory, and run it. Use standard SCO UNIX commands.

- 1 Log in to the Sage 94XRTS at the admin security level.
- 2 Change directory to /u/950rts/lib
- 3 Issue the command 105filegen33.ksh with the correct input parameters.
If neither -a nor -m is the last parameter, you are prompted to supply the number or numbers of the DS0 channels to test.
- 4 Verify that the script generated a trunks file in the /u/950rts/lib directory.
- 5 Note the name of the trunks file:

6 Verify that the script generated a corresponding site file in the /u/950rts/lib/sites directory.

7 Note the name of the site file:

The 94XRTS is now ready to schedule ATR type 105 tests.

Scheduling ATR Tests

Automatic trunk routing tests are defined and scheduled using a simple menu driven program.

This section describes the information you need before you begin defining test schedules, and provides step-by-step procedures for setting up ATR tests, including:

- Required information
- Vsched screen and menu navigation
- ATR schedule worksheet
- Details about each type of field in the ATR schedule database (e.g., time fields, test description fields, reporting fields, status fields, etc.)

Gathering Information

Use the supplied ATR Schedule Worksheet as a guide to setting up all ATR test schedules.

Required Information

The following information must be available as you use the vsched program to define an ATR test schedule:

Name for the schedule	For example, Dallas105, LA105, NYC,102 Region1, Region2. etc.
Trunk groups to test	Use the listgroups command to view defined trunk groups.
Test line or responder to use	Common test lines include type 100 quiet termination, 102 milliwatt, 105 responder.
Tests to run	For example, for a 105 responder test line, available tests are: • loss • noise • slope • echo return loss • singing return loss high • singing return loss low.
945RTS test port to use	Use the listports command to view a list of available ports.

Optional Information

You can define other ATR scheduling setup parameters, however these have default values:

- How often to repeat the test
- Reporting style for test results
- Filename for test results

ATR Schedule Worksheet

Use the tables in this section as a guide as you create ATR schedules using the vsched program. Table 3-5 describes each field in the vsched program that accepts input

Table 3-5 ATR Schedule Descriptive Worksheet

ATR Field	Description	Example
Schedule Name	Enter a name for the schedule. Names must be fewer than 20 characters, include no spaces, and can contain only letters, numbers, and simple punctuation.	Dallas
Time to Run	Enter the date and time the schedule will run. Use the format HH:MM for hours and minutes; mm/dd/yyyy for month, day and year. Special options are "never" to disable and "now" to run immediately.	03:00 12/22/2001
Repeat	Repeat intervals define when the tests run again. Repeat intervals may be in: • days • months • minutes • hours Use 0 for no repeat.	1 month
Site	This field identifies the site file for the remote switch. A pull down list displays the names of defined sites. If a site file is not configured, enter <i>none</i> .	Dallas05
Test Port	This field identifies a test port type. A pull down list displays available ports (e.g., rb100, rb102, rb105).	Rb105
Trunk Groups	This field identifies trunk groups from the trunk file. Use a hyphen to indicate a range of trunk groups; separate group numbers with commas. For example 1-3, 9. Enter <i>all</i> for all trunk groups.	1-3, 9

Table 3-5 ATR Schedule Descriptive Worksheet

ATR Field	Description	Example
TL Type	This field identifies the test line type: • 100 (Quiet Term) • 102 (Milliwatt) • 105 (Responder)	105
TL Access	This field defines the type of dialing digits to use (either DTMF or MF), followed by the access code, if any, and the telephone number to dial to reach the test line. This field accepts the following: dial digits 0-9*#abcd w for a wink ~ for a pause	DTMF 8319879876
Tests	This field allows you to select the tests to run. Available tests depend on the test line type selected in the TL Type field. 100 (Quiet Term) - noise, ERL, SRL, SRH 102 (Milliwatt) - loss, noise 105 (Responder) - loss, noise, slope, ERL, SRL, SRH	loss, noise, ERL
Reporting	This field allows you select the amount of test results reporting: • FailedTrunks - shows all results on trunks where any test failed • FailedTests - shows only tests that failed • All - shows all test results	FailedTests
Limits	This field identifies the limits file against which test parameters either pass or fail. Default limits files are provided with the 94XRTS; custom files are also allowed. A drop down list displays the available files (e.g., Standard.100, Standard.102, Standard.105)	Standard.105

Table 3-5 ATR Schedule Descriptive Worksheet

ATR Field	Description	Example
Results	Use this field to name a results file for test results. Typically ATR results files are located in the /u/admin/ directory. You can date and time stamp results files: %m (month), %d (day) %H (hour) %M (minute) If no file name is specified, the 94XRTS system creates a default file name based on the time the test runs and the schedule name.	/u/admin/ Dallas105%d

Tips for Creating ATR Schedules

To determine which trunk group to test in a particular schedule, and when to run it, estimate how long it will run, and consider other uses of test resources during this time.

For switches with maintenance dial plans that have negligible call set up time, consider the following as you estimate the length of time the schedule will run:

- Each test requires a single test resource, unless tests are looped back to the 945RTS as a far-end responder. In other words, 2 test resources are required.
- Each test requires a single test port (T1 interface channel).
- A test schedule will fail if there is no test resource available, no test port of the proper type is free, or if the far-end responder is busy.

Defining a New Schedule

Use the steps in this section to create a new ATR test schedule. Use the information defined in Table 3-5 for additional help selecting valid values and defining test names and times to run, etc.

Screen Navigation

Navigate vsched screens using the arrow keys, <Tab>, or <Enter>. Press the <Space Bar> to display a drop down list of available selections, or to select and deselect check boxes. Read the message on the bottom of the screen for help with the currently selected field.

- 1** Log into the 94XRTS at the admin security level.
- 2** At the system prompt, type **vsched**.

This launches the vsched program and displays the initial screen. The initial screen lists all defined ATR schedules.

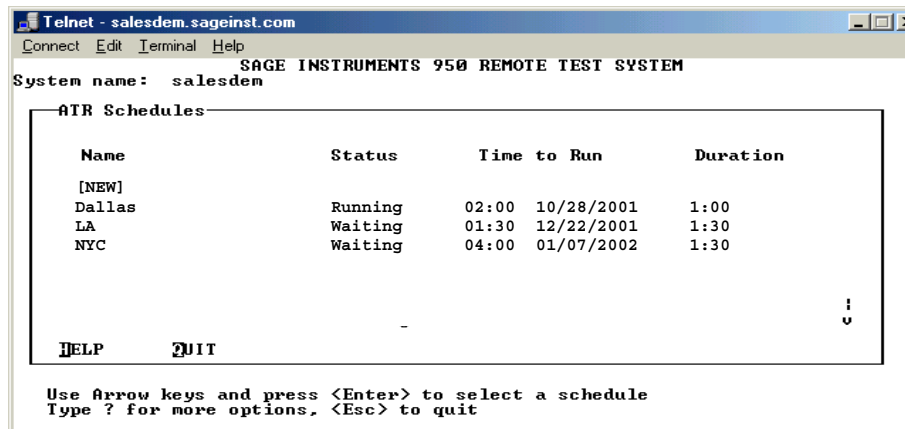


Figure 3-3 ATR Schedule window

Use the Arrow keys to highlight a schedule; press <Enter> to accept the selection.

The system lists the ATR schedules alphabetically by schedule name. The summary list also contains three other columns of information:

The **Status** field displays the current status of the schedule (either running or waiting).

The **Time to Run** field displays the time and date at which the next test will take place, or **Never** if the schedule is not scheduled to run.

The **Duration** field shows the elapsed time (HH:MM) of the most recent execution of the schedule. Use this information when selecting a time to run to minimize the chance of two schedules overlapping. This should be avoided if both schedules require a test resource that is not shareable.

You can sort the schedule list by time to run or by any of the status fields by typing the first letter of the column header. For example, type T to sort the list by Time to Run.

3 Select **NEW** to create a new schedule,

- or -

Select an existing schedule to edit, and then save it with a new name.

If you select **NEW**, the New screen displays; the **Schedule name** is highlighted, as in Figure 3-4.

```

telnet - 65.209.221.201
Connect Edit Terminal Help
SAGE INSTRUMENTS 950 REMOTE TEST SYSTEM
System name: salesdem

ATR Schedules
[NEW]

Schedule Name: _____
Site           : None                      Status      : Waiting
Test Port      : rb101                     User        : admin
Trunk Groups   : All
TL Type        : 100 (QuietTerm)
TL Access      : DTMF 0
Tests          : Noise,ERL,SRL,SRH

Reporting      : All
Limits         : Standard.100
Results        :
Last Results   :

Enter a name for the new schedule, followed by <Enter>
Press <Esc> to cancel

```

Figure 3-4 ATR new schedule name screen

- 4 Type a name in the field, and press <Enter>.

The ATR test schedule edit screen displays for the newly named schedule.

NOTE Table 3-5 describes the valid values for edit fields. Use it as a guide as you type or select values.

If you select an existing schedule, the ATR test schedule edit screen displays, as shown below. The **Time to run** field is highlighted.:

```

SAGE INSTRUMENTS 950 REMOTE TEST SYSTEM
System name: salesdem

ATR Schedules
Dallas

Time to run   : Never                      Last Run    : Never
Repeat        : 1 days                     Duration    : 0:00
Site          : Xample                     Status      : Waiting
Test Port     : DialOut                     User        : admin
Trunk Groups   : All
TL Type        : 100 (QuietTerm)
TL Access      : DTMF 0
Tests          : Noise,ERL,SRL,SRH

Reporting      : FailedTests
Limits         : Standard.100
Results        : /u/950rts/results/Dallas.
Last Results   :

EDIT  DELETE  COPY  KILL  HELP  QUIT

Type E to edit schedule, D to delete, C to copy, K to kill
Type Q to quit

```

- 5 Press **E** to edit the schedule.

The first edit field, **Time to run**, is highlighted.

```

SAGE INSTRUMENTS 950 REMOTE TEST SYSTEM
System name: salesden

ATR Schedules
Dallas
Time to run : Never
Repeat      : 1 days
Site       : Xample
Test Port  : DialOut
Trunk Groups : All
TL Type    : 100 <QuietTerm>
TL Access  : DIMF 0
Tests      : Noise, ERL, SRL, SRH

Last Run   : Never
Duration   : 0:00
Status     : Waiting
User       : admin

Reporting  : FailedTests
Limits     : Standard.100
Results    : /u/950rts/results/Dallas.
Last Results :

Enter a time as HH:MM mm/dd/yyyy, "now" or "never".
Press <Tab> for next field, <Esc> to continue

```

6 Select a time to run.

The Time to Run field contains the time of day and date when the schedule will run. The ATR daemon uses this field to determine if a schedule is ready to run.

Time to Run defines the hour and minute at which the test routine is scheduled to run. Use the format displayed on the bottom of the screen to enter the time and days to run. By default, the schedule will run when the time you indicate occurs next (today or tomorrow).

Type **now** to indicate that a schedule will be executed immediately, or type **never** to indicate that a schedule is not ready to run.

7 Press <Tab> to move to the **Repeat** field.

8 Enter a number in the first **Repeat** field to request that a test be rescheduled after it runs.

The number must be between 1 and 999, (or 0 for no repeat).

The Repeat function controls automatic test rescheduling. The fields have two sub-fields - a numeric field and a selection field defining the rescheduling interval. When an ATR schedule completes, the scheduling daemon uses the values in the **Repeat** field to calculate the new time to run.

9 Press <Tab> to move to the next **Repeat** field.

10 Press <Space Bar> to display the valid values.

Select minutes, hours, days, or months.

11 Press <Tab> to accept the interval and move to the **Site** field.

12 Press <Space Bar> to display the list of available site file names.

The site file contains trunk groups and test equipment for the far-end switch.

NOTE The **Test Port**, **TL Type** and **TL Access** fields are secondary fields that you must set if you do not specify a site file in the **Site**

field. If you have specified a site file, you can set these secondary fields to override the settings in the sites directory.

- 13** Select a site file from the drop down list, and press <Esc> to continue.

- 14** With the **Test Port** field highlighted, press <Space Bar> to display the drop down list of available ports to test.

The **Test Port** drop down list indicates which of the 945RTS T1 channels are suitable for testing the trunks listed in the schedule. The system selects an available interface and channel of the specified type from the Interface Database.

- 15** Select a test port, and press <Tab> to move to the **Trunk Groups** field.

The **Trunk Groups** field contains a list of trunk groups to be tested, or the default value, All. If the default is set, the test engine will test all trunks listed in the trunks file, /u/950rts/lib/default.trks, or all trunks in the Site File.

- 16** Type the trunk groups to test.

Use a hyphen (-) to indicate all groups between two values (e.g., 1-13).
Use commas (,) to separate trunk groups (e.g., 3, 5, 8-11).

- 17** Press <Tab> to move to the **TL Type** field.

The test line field indicates the type of far-end test equipment used during the test. Test line types include:

- 100 quiet termination
- 102 milliwatt
- 105 responder

- 18** Press <Space Bar> to select the test line type, and then press <Tab> to move to the **TL Access** field.

The TL Access field contains the dial digits to access the far-end equipment. The field contains two sub-fields:

- format field to select either DTMF or MF
- digits field to enter the line access and dial digits

- 19** Press <Space Bar> to select DTMF or MF. Press <Tab> again to move to the digits input field.

- 20** Enter the desired dial digits, then press <Tab> to move to the **Tests** field.

- 21** Press <Space Bar> to display the drop down list of tests. Use <Space Bar> to select and deselect tests.

```

SAGE INSTRUMENTS 950 REMOTE TEST SYSTEM
System name: salesdem

AIR Schedules
Dallas
Time to run : Never          Last Run : Never
Repeat      : 1 days        Duration  : 0:00
Site        : bertresults.060409  Status   : Waiting
Test Port   : DialOut       User      : admin
Trunk Groups: All
TL Type     : 105 <Responder>

Type 105 Tests
[ ] Loss    [X] Noise    [ ] Slope
[X] ERL     [X] SRL     [X] SRH

Limits      : Standard.105
Results     : /u/950rts/results/Dallas.
Last Results:

Press <Space bar> to select or unselect, <Tab> for next test, <Esc> to end
Press <Tab> for next field, <Esc> to continue

```

Test types available depend on the test line selected in the **TL Type** field.

- 22** Press <Esc> to complete test selection, then <Tab> to move to the **Reporting** field.

The **Reporting** field determines how many test results the system saves. By default the system saves results from all tests (the **All** option). Other options are:

- Failed Trunks - Saves test results only for trunks with test failures
- Failed Tests - Saves results only for tests that fail

- 23** Press <Space Bar> to select the desired reporting option, then press <Tab> to move to the **Limits** field.

The file name in the **Limits** field determines the pass/fail limits file used to determine if tests pass or fail.

By default, the system uses the standard limits files that correspond to the test line type selected. Test limits files are located in the /u/950rts/lib/filters/ directory. Default test limits files are:

- Standard.100
- Standard.102
- Standard.105

You can also select custom limits files if they reside in the /u/950rts/lib/filters/ directory.

- 24** Press <Space Bar> to display the available limits files, then press <Tab> to select the desired file.

- 25** Press <Esc> to complete the selection and move to the **Results** field.

The **Results** field specifies the UNIX pathname of the file where the test engine saves test results. By default, this file is created in your current directory, with a filename containing the schedule name and the time the test executed.

If the results file already exists, the test engine will append the new results to the end of the file. If you cannot write to the test file the results will be saved in the 945RTS default results directory, /u/950rts/lib/results. In either case, the name of the results will appear in the **Last Results** field of the schedule upon test completion.

You can enter the results filename as a relative or absolute (starting with /) UNIX pathname. Include the schedule name in the results file, to assure uniqueness. (If schedules run concurrently with output to the same results file, the results will be interleaved in the file). You can include a time-stamp in the filename by embedding any special character sequence by the UNIX date command. Useful sequences include:

\$m - month

\$d - day

\$H - hour

\$M - minute

Status Fields

The schedule edit screen includes five display-only status fields. The ATR daemon automatically updates these status fields.

```

SAGE INSTRUMENTS 950 REMOTE TEST SYSTEM
System name: salesdem

ATR Schedules
Dallas
Time to run : Never          Last Run : Never
Repeat      : 1 days        Duration  : 0:00
Site       : Xample         Status   : Waiting
Test Port  : DialOut        User     : admin
Trunk Groups : All
IL Type    : 100 <QuietTerm>
IL Access  : DTMF 0
Tests     : Noise,ERL,SRL,SRH

Reporting  : FailedTests
Limits    : Standard.100
Results   : /u/950rts/results/Dallas.
Last Results :

EDIT  DELETE  COPY  KILL  HELP  QUIT
Type E to edit schedule, D to delete, C to copy, K to kill
Type Q to quit

```

ATR test status details

Figure 3-5 ATR test status details

Status fields relate to the selected test schedule (for example, Figure 3-5 shows the status for the ATR test schedule named Dallas.)

Table 3-6 describes status field defaults:

Table 3-6 ATR schedule screen status fields

Status Field	Description	Initial Value
Last Run	Date and time of the last time the schedule began running. When the execution of a schedule completes, the ATR daemon copies the information in the Time to Run field to this field.	Never
Duration	Elapsed hours:minutes of last run. When a schedule completes, the scheduling daemon saves the elapsed time since the schedule began.	Unknown (0:0)
Status	Current state (either waiting or running)	Waiting
User	User name of schedule creator (e.g., your system login name). This field is set only by the vsched program when a new schedule is created.	User-name
Last Results	This field contains the SCO UNIX pathname of the test results file written during the last run of the schedule.	<i>none</i>

Managing ATR Tests and Results

This section provides information about how to cancel tests, view test results, and bypass the scheduling daemon.

Running a Schedule on Demand

You can run an ATR test schedule on demand using the vsched schedule edit screen. This is a good way to test newly created schedules.

To run a test schedule immediately, follow these steps:

- 1** Select the schedule from the ATR Schedules screen.
- 2** Select the schedule you want to run.
- 3** Type E to allow field editing.
- 4** In the Time to run field, type **now**.
- 5** Press <Esc>.
- 6** Type S to save and return to the ATR Schedules screen.

The value in the Status column for the test you selected is now **Running**. You can see ASCII format test results in the directory identified in the **Results** field (e.g., /u/admin/*).

Canceling a Scheduled Test

Use the vsched schedule edit screen to cancel a test before it executes. Select the desired schedule, and change the **Time to Run** field to **Never**.

Removing a Schedule

Use the vsched schedule edit screen to delete an ATR schedule from the database. Select the schedule from the ATR Schedules screen, then type **d** (**Delete**). Select **y** (**Yes**) to confirm your selection.

Aborting a Running Test

Use the vsched schedule edit screen to cancel a test that is already running. Select the schedule from the ATR Schedules screen, then type **k** (**Kill**). Select **y** (**Yes**) to confirm your selection.

Viewing Test Results

ATR test results are saved in a file with a name based on the Results File field of the ATR schedule. When the test completes, the actual results filename used is shown in the **Last Results** status field. Test results are stored in plain ASCII files, and can be reviewed using any UNIX text editor or viewing utility (e.g., vi).

Example Results File

This section shows examples of results from ATR scheduled testing to a type 105 responder.

Results from ATR test schedules are saved in ASCII text format with the filename you specify when you set up the schedule (e.g., /u/admin/**Dallas105%d**).

Test Complete Example

The first lines of test results shows:

- Trunk
- Trunk group
- Start time
- Date
- Completion time (in seconds)

These lines are followed by test results in both directions (near and far end). In the example below, the following tests were selected in the ATR schedule:

- Loss
- Noise
- Noise/Tone
- Gain/Slope (for 404, 1004, and 2804)

- Echo Return Loss (ERL)

```
*** Results for trunk 01248 group 881 Test start
20:00,05/08/2000
Call complete time 4.3
Loss Near: 0.0 dB Far: 0.1 dB
Noise Near: 13.4 dBrnC Far: 15.0 dBrnC
Noise/Tone Near: 36.9 dBrnC Far: 37.5 dBrnC
Slope 404 Near: 0.0 dB Far: 0.1 dB
Slope 1004 Near: 0.0 dB Far: -0.1 dB
Slope 2804 Near: 0.0 dB Far: 0.0 dB
ERL Near: 64.2 dB Far: 40.0 dB
--- Trunk 01248 test complete
```

Incomplete Trunk Tests Examples

In the examples below show specific trunk tests which did not complete. Following the first identifying lines, a call failed message displays. This message explains the reason the test did not complete on that trunk.

Call failed: TPT NOT DETECTED Line Stat: Busy

Test calls fail for a variety of reasons, including:

Busy	Indicates the trunk was in use. The RTS detected a 60 TPM busy tone.
Dead Line	Usually the result of an undefined blocking condition (e.g., no tone)
Reorder	Usually due to invalid call routing. The RTS detected a 120 TPM fast busy tone.

```
*** Results for trunk 01249 group 881 Test start
20:01,05/08/2000
Call failed: TPT NOT DETECTED Line Stat: Busy
--- Trunk 01249 test complete
```

```
*** Results for trunk 01252 group 881 Test start
20:02,05/08/2000
Call failed: TPT NOT DETECTED Line Stat: Dead Line
--- Trunk 01252 test complete
```

```
*** Results for trunk 01254 group 881 Test start
20:04,05/08/2000
Call failed: TPT NOT DETECTED Line Stat: Reorder
--- Trunk 01254 test complete
```

Pass/Fail Test Limits

ATR test results are compared to pass/fail criteria established in limits files. There are individual files for each test line type (for example, type 100 quiet termination, type 102 milliwatt, and type 105 responder). Default limits files contain low and high values used to compare against test results to determine whether a test fails.

Changing Pass/Fail Criteria

The 94XRTS comes equipped from the factory with default limits files. These contain low and high values based on telecommunications industry standards. To change the default pass/fail criteria, use standard SCO UNIX procedures to edit the default files. The default limits files are found in the **/u/950rts/lib/filters** directory. For example, for demand 105 tests, the default limits file is **Standard.105**.

To see a list of demand 105 test limits file, see **listlimits** on page 67. To view the high and low limits for an individual limits file, see **printlimits** on page 68.

Demand Testing

This section describes how to run tests on demand, using a simple menu interface. Demand testing allows you to perform a test in real time, and to view formatted results on the terminal screen.

NOTE Discussion and examples in this section describe how to run test line type 105 demand tests, however, the general set up procedure is the same for other types of voice frequency demand testing (e.g., other test line types, DS-0 and DS-1 tests, and Bit Error Rate Tests).

105 Demand Testing

The 105 test line tests that can be run on demand are:

- Loss
- Noise
- Noise/Tone
- Gain/Slope
- Echo Return Loss (ERL)
- Singing Return Loss Low
- Singing Return Loss High

Demand Test Configuration

During demand-105 testing, the 94XRTS performs the functions of a near end. The far end equipment performs the functions of a type 105 responder.

Setting Up

Follow the steps in this section to set up the 94XRTS for demand 105 testing.

Screen Navigation

Navigate the demand test screens using the arrow keys, <Tab>, or <Enter>. Press the <Space Bar> to display a drop down list of available selections, or to select and deselect check boxes. Read the message on the bottom of the screen for help with the currently selected field.

- 1** Log on to the 94XRTS system at the test or admin security level.
- 2** At the system prompt, type **vftest** and press <Enter>.

This launches the voice frequency demand test application and presents the DS0 Circuit Select window.

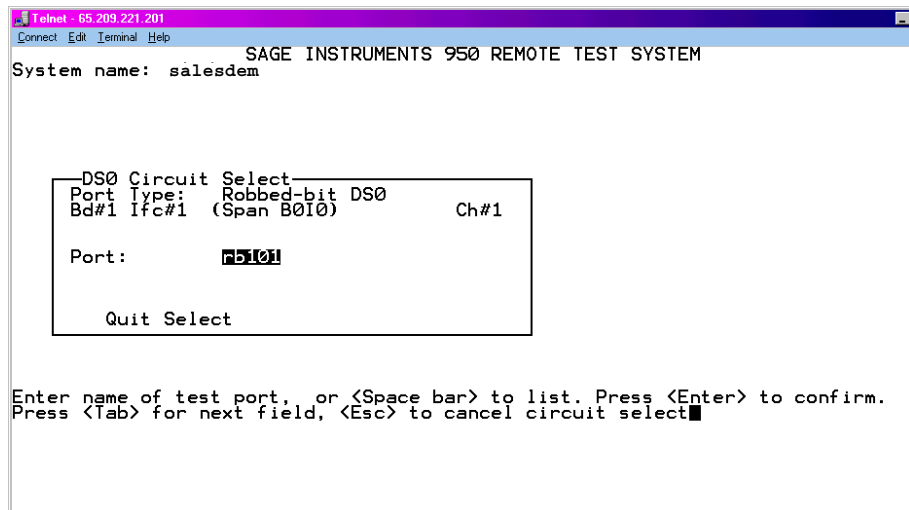


Figure 3-6 Demand test circuit select window

- 3** Press <Space Bar> to display a list of available test ports. Use the arrow keys to highlight a port, and then press <Enter> to select it.
- 4** Press <Tab> to move the cursor to the Quit Select field, and then press <Enter>.

This establishes the test port and displays the vftest Measurement window.

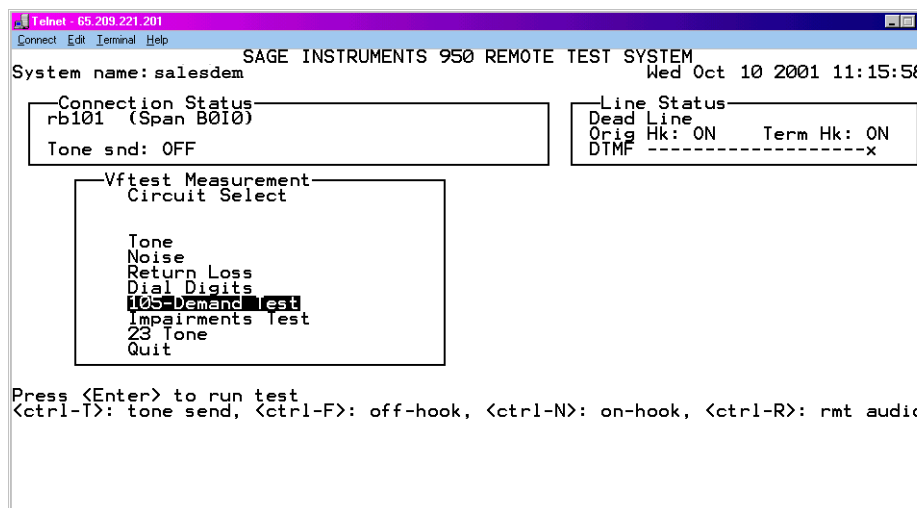


Figure 3-7 Demand test measurement window

Note the **Connection Status** and **Line Status** information in the upper portion of the screen. These windows display the selected test port, and the status of the line to the far end responder.

- 5** Use the arrow keys to select **105 Demand Test** and press <Enter>.

This displays the Demand 105 Testing window. Use this window to:

- Set up the dialing sequence to the far end responder
- Select the tests to run

SAGE INSTRUMENTS 950 REMOTE TEST SYSTEM
 System name: salesdem Wed Aug 29 2001 09:11:03

Connection Status DialOut Tone snd: OFF	Line Status Test in progress Orig Hk: ON Term Hk: DTMF -----x
--	---

Demand 105 Testing

Seq	Pre-dial	Format	Digits
1	Immediate	DTMF	_____
2	off	DTMF	_____
3	off	DTMF	_____
4	off	DTMF	_____

Start test
 Quit

Results file: <none> _____

[X]-Loss	[X]-ERL
[X]-Noise	[X]-SRL
[X]-Noise/Tone	[X]-SRH
[X]-Gain Slope	

Select action: wait for Wink, 2 second Pause, send Immediately, or sequence Off
 <space> for selection menu, then <enter> to select

Figure 3-8 Demand 105 testing window

Setting Up Dialing Sequence

The system provides four input lines to specify dialing and signaling event sequences to the far end responder. You can use either DTMF format, MF format, or a combination of both.

On each input line, you can specify pre-dial requirements, select either DTMF or MF format, and type in dialing digits and signals.

- 1 With the cursor on the **Pre-dial** column on sequence line 1 (Seq 1), press <Space Bar> to display the pre-dial selections.

Telnet: 65.209.221.201
 Connect Edit Terminal Help

SAGE INSTRUMENTS 950 REMOTE TEST SYSTEM
 System name: salesdem Wed Oct 10 2001 14:36:

Connection Status rb101 (Span B010) Tone snd: OFF	Line Status Test in progress Orig Hk: ON Term Hk: ON DTMF -----x
--	--

Demand 105 Testing

Seq	Pre-dial	Format	Digits
1	Pre-Dial		
2	Immediate		_____
3	Pause		_____
4	Wink		_____

Star
 Quit

Results file: <none> _____

[X]-Loss	[X]-ERL
[X]-Noise	[X]-SRL
[X]-Noise/Tone	[X]-SRH
[X]-Gain Slope	

Select action: wait for Wink, 2 second Pause, send Immediately, or sequence 0
 <space> for selection menu, then <enter> to select

Figure 3-9 Demand 105 Pre-Dial selections

You can select from the following choices:

- **Immediate** - sends the digits and signals in the **Digits** column immediately when you start the test.

- **Pause** - waits for two seconds before sending the digits and signals in the **Digits** column when you start the test.
 - **Wink** - instructs the system to wait for a wink from the far end before sending the digits and signals in the **Digits** column.
- 2 Use the arrow keys to highlight your selection, and then press <Enter>.
 - 3 Use the right arrow key to move the cursor to the **Format** column, then press <Space Bar> to display the **Digit Format** selections.

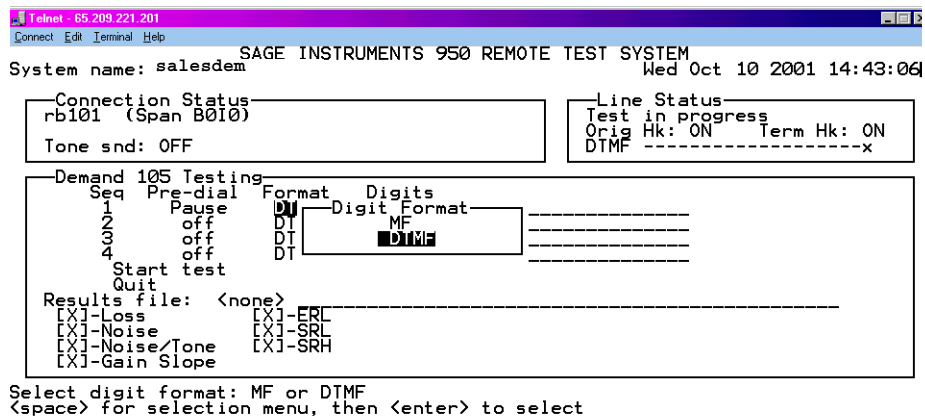


Figure 3-10 Demand 105 Digits Format selections

- 4 Use the arrow keys to highlight your selection, and then press <Enter>.
- 5 Use the right arrow key to move the cursor to the **Digits** column.
- 6 Type the dialing digits (the telephone number) to the far end responder.
If the digit format is DTMF, valid digits are 0-9, A-D, *, and #.

If the digit format is MF, valid digits are 0-9 and the signals displayed on the bottom of the screen.

The screenshot shows a terminal window titled 'Telnet - 65.209.221.201'. The main header is 'SAGE INSTRUMENTS 950 REMOTE TEST SYSTEM'. Below this, it says 'System name: salesdem' and 'Wed Oct 10 2001 14:55:14'. There are two status boxes: 'Connection Status' showing 'rb101 (Span B010)' and 'Tone snd: OFF'; and 'Line Status' showing 'Test in progress', 'Orig Hk: ON', 'Term Hk: ON', and 'DTMF -----x'. The main menu is 'Demand 105 Testing' with options: 'Seq', 'Pre-dial', 'Format', and 'Digits'. A sequence of four digits is shown: 1 (Immediate), 2 (off), 3 (off), 4 (off). Below this are 'Start test' and 'Quit' options. At the bottom, there is a 'Results file: <none>' field and a list of test options with checkboxes: [X]-Loss, [X]-Noise, [X]-Noise/Tone, [X]-Gain Slope, [X]-ERL, [X]-SRL, and [X]-SRH. A footer line reads 'Enter digits: <ctrl-C>: clear, <Enter>=dial K=KP, S=ST, A=STP, B=ST2P, C=ST3P'.

Figure 3-11 Demand 105 testing dialing digits

Repeat the steps above if necessary. You can use up to four lines to set up the necessary dialing sequence to the far end responder.

Demand test results display on the terminal screen at the conclusion of the test, however, if desired, you can save the results of this demand test to a file. To do so, use the arrow keys to move the cursor to the **Results file** field. Type a valid path and filename. This field is optional.

Use the arrow keys to move the cursor to the check box fields at the bottom of the screen. Press <Space Bar> to select or deselect the demand 105 tests to run.

Tests selections are:

- Loss
- Noise
- Noise/Tone
- Gain/Slope
- ERL (Echo Return Loss)
- SRL (Singing Return Loss Low)
- SRH (Singing Return Loss High)

7 Use the arrow keys to move the cursor up to the **Start Test** field.

8 Press <Enter> to start the test.

Pressing <Enter> initiates the dialing sequence you specified, and then performs the tests you selected. Results display on the screen as the tests complete.

```

SAGE INSTRUMENTS 950 REMOTE TEST SYSTEM
System name: rjm950                               Fri Oct 12 2001 15:45:33

Connection Status: rb224 (Span B011)
Tone snd: OFF

Line Status:
ROT complete
Orig Hk: ON   Term Hk: ON
DTMF

Demand 105 Testing
Test start 15:44 10/12/2001
Call complete. Time to connect 1.2
Loss Near: 0.0 dB Far: 0.1 dB
Noise Near: 0.0 dBBrnC Far: 15.0 dBBrnC
Noise/Tone Near: 35.1 dBBrnC Far: 35.0 dBBrnC
Slope 404 Near: 0.0 dB Far: 0.1 dB
Slope 1004 Near: 0.0 dB Far: 0.1 dB
Slope 2804 Near: 0.0 dB Far: 0.1 dB
ERL Near: 99.0 dB Far: 40.0 dB
SRL Near: 99.0 dB Far: 40.0 dB
SRH Near: 99.0 dB Far: 40.0 dB
DONE: hit any key to continue
Hit any key to continue

```

Figure 3-12 Demand 105 test results example

Quitting a Test

You can quit a test before it starts, or you can abort a test after it has begun.

- **To quit a test before it has begun**, move the cursor to the **Quit** field, and press <Enter>. This returns the screen to the vftest Measurement window where you select the type of voice frequency test from the menu.
- **To abort a test after it has begun**, press **Q**, and then press any key. This returns you to the Demand 105 Testing window.

This section provides details about the standard and optional features of the Sage 940RTS and the 945RTS. This section also includes measurement details about each test line and test.

Standard Test Server Hardware

- 1 Central Processing Unit: Intel Celeron 366 MHz
- UNIX Operating System: SCO OpenServer 5.X
- 5-User License; additional user licenses available
- 20 GB Hard Drive

DSP and T1 Access Card Slots

- 940RTS: Three expansion slots available for test resources and/or T1 access cards
- 945RTS: Nine expansion slots available for test resources and/or T1 access cards

Real Panel Connections

The number of rear panel connections on the RTS depends on the type of system.

940RTS Rear Panel Connections		945RTS Rear Panel Connections	
No.	Description	No.	Description
1	DB-15 Video (SVGA)	1	DB-15 Video (SGVA)
1	PS/2 Keyboard	1	PS/2 Keyboard
1	PS/2 Mouse	1	PS/2 Mouse
1	DB-9 Serial Port	1	DB-9 Serial Port
1	RJ45 T1, 10/100Base-T, or Token Ring	8	RJ45 T1, 10/100Base-T, or Token Ring
4	RJ45 T1	5	4 RJ45 T1
1	Terminated bulk alarm	1	Terminated bulk alarm

Bus

- 10 slot standard ISA/PCI
- Passive backplane

Chapter 4

Alarm/System Management

- Form-C Alarm Relay System
- Multiple In-Band and Out-of-Band options

Power Supply

-48 Volts Direct Current

Dimensions

The Sage 940RTS and 945RTS fit in standard 19" and 23" wide rack systems.

940RTS Dimensions	945RTS Dimensions
8.75" (H) x 4.35" (W) x 16.91" (D), 17.9" (D) with handle	8.75" (H) x 8.75" (W) x 16.91" (D), 17.9" (D) with handle
22.23 cm (H) x 11.01 cm (W) x 42.95 cm (D), 45.47 cm (D) with handle	22 cm (H) x 22 cm (W) x 43 cm (D), 45 cm (D) with handle
940RTS Weight	945RTS Weight
8.8 lbs. (3.99 kg) with power supply, fan, backplane, and faceplate	14.9 lbs. (6.76 kg) with power supply, fan, backplane, and faceplate

Rack Mounting

- Mid-mount for 19" and 23" standard racks
- Quick disconnect system
- One shelf accommodates four 940RTS units, or two Sage 945RTS units

Cooling

- Two 17 CFM (0.5 m³/min)
- One 43 CFM (1.2 m³/min)
- 50,000-hour ball bearing ventilation fans allow no more than 10°C rise above ambient temperature

Compliance

Safety

UL 1950, CSA C22.2 No. 950

IEC 60950/EN 60950

Emissions

FCC Part 15, Class A

EN 55022/CISPR 22 Class A

IEC 61000-3-2 Harmonics

IEC 61000-3-3 Flicker

Immunity

IEC 61000-4-2-ESD

IEC 61000-4-3-Radiated RF

IEC 61000-4-4-EFT

Certifications

UL, C-UL, CE

NEBS

Level 3 compliant

T1 Specifications

Format:	DS-1 AMI or B8ZS Line Code
DS-1 Input Frequency:	1.544 Mbps $\pm$ 15 kbps
Jitter Tolerance:	Exceeds Bell Pub 43802 Requirements
Channel Numbering Sequence:	D3/D4/D5
Framing Format:	D4 Superframe, Extended Superframe
Input Mode:	Terminated: 100 Ohms nominal
Input Level:	200 mV to 6.0 V. base-to-peak
DS-1 Output:	1.544 Mbps $\pm$ 40 bps (Stratum 4) in INTERNAL Clock mode. Output rate equal to input rate in LOOP-TIMED mode
Output Pulse Level:	3.0 V. nominal base-to-peak into 100 Ohms resistive load
Output Imbalance:	Positive and Negative pulses are within 0.2 V. base-to-peak
Frame Loss Criteria:	Loss of frame occurs when 2 out of 4 Ft bits are in error for Superframe. Loss of frame for ESF occurs when 2 out of 4 FPS bits are in error

Voice Band Test Lines

Voice band test lines provide far end test termination functions, including sending digits and tones, taking measurements, and returning measurement data. Test lines allow the RTS to make end-to-end measurements in two directions (near to far, and far to near).

The RTS provides four types of test lines; types 100, 102, 108, and 105/105E. This section describes each type.

Type 100

Use type 100 test lines (also called **quiet termination** lines) for balance and noise tests.

Type 100 Test Specifications

Tone

Level: <10 dBrn

Type 102

Use type 102 test lines (also called **milliwatt test lines**) for one way loss measurements.

Type 102 Test Specifications

ToneFrequency: 1004 Hz $\pm$ 1 HzLevel: 0 dBrn $\pm$ 0.1dB**Type 108**

Use type 108 test lines (also called **digital non inverting loop-back test lines**) to test between digital exchanges and digital PBXs. Type 108 test lines provide a 4-wire capability, and the ability to pass 64 KB clear signals.

Type 108 Test Specifications

Digital Loop Back

56K/64K

Type 105

Use type 105 test lines to perform automatic transmission measurements. Automatic testing means that multiple test calls are made with one command. Calls queue in the system, awaiting a free channel to complete the call connection.

Type 105 test lines permit the following two-way loss and noise measurements:

- Loss
- C-message noise
- C-notch noise
- Gain/Slop
- Return loss
 - Echo return loss
 - Singing return low
 - Singing return high

Type 105 Test Specifications

Loss

Frequency: 1004 Hz

Level: -16.0 dBm

Range: +2.0 dBm to -15.8 dBm

Accuracy: $\pm$ 1.0 dBC-Message Noise

Range: 15 dBrnC to 55 dBrnC

Accuracy: $\pm$ 1 dB

Filter: C-Message

C-Notch Noise

Frequency: 1004 Hz

Level: -16.0 dBm
Range: 34 dBrnC to 74 dBrnC
Accuracy: ± 1 dB

Gain Slope

Frequencies: 404 Hz, 1004 Hz, 2804 Hz
Level: -16.0 dBm
Range: +2.0 dB to -20.8 dB
Accuracy: ± 0.2 dB

Return Loss

Bands: ERL, SRL, SRH
Level: -10 dBm0
Range: 0 dB to +40 dB
Accuracy: ± 1 dB

Voice Frequency Tests

This section provides details about the voice frequency tests available on the RTS.

3-Tone Gain Slope

Frequency: Programmable 50-5000 Hz
Level: 40 to 0 dBm
Loss: -20 dB to +20.0 dB
Accuracy: ± 0.2 dB

C-Message Noise

Range: 10-90 dBrnC
Accuracy: ± 1 dB

C-Notch Noise

Frequency: 1020 Hz
Holding Tone: -40 to 0 dBm
Range: 20-70 dBrnC
Accuracy: ± 1 dB

Return Loss

Bands: ERL, SRL High, and SRL Low
Level: -40 to 0 dBm
Range: 0-40.0 dB
Accuracy: ± 1 dB

3kHz Flat Noise

Range: 20-90 dBrnC
Accuracy: ± 1 dB
Filter: 3 kHz flat

Phase and Amplitude Jitter

(standard and low frequency)

Frequency: 1020 Hz

Level: -40 to 0 dBm

Filters: 20-300 Hz or 4-300 Hz

Range: 0-20.0% amplitude, 0°-20.0° phase

Accuracy: $\pm 5\%$ of reading, ± 0.2

Impulse Noise/Hits

Frequency: 1020 Hz

Level: -40 to 0 dBm

Threshold: 50-90 dBmC

Spread: 1-9 dB (± 1 dB)

Phase Hit Threshold: 5°-30° ($\pm 10\%$, $\pm 5^\circ$)

Gain Hit Threshold: 1-8 dB (± 5 dB)

Test Length: 1-99 minutes (each way)

Range: 0-999 impulses/hits

Accuracy: ± 1 impulse/hit

23-Tone Test

Transmitter

Composite Level: -40 to 0 dBm

Individual Tones: Level: -13.6 dB below composite level

Flatness: ± 0.2 dB

Frequencies: 203.125-3640.625 Hz in 156.25 Hz steps, ± 10 ppm

Phase per IEEE 743 $\pm 0.25^\circ$

Peak to RMS Ratio 8.79

Receive

Range: -40 dBm to -6 dBm

Accuracy: ± 0.2 dB

Envelope Delay Distortion

Accuracy: ± 10 μ s

Range: 0-10,000 μ s

Frequencies: 281.15-3562.5 Hz in 156.25 Hz steps

Signal-to-Noise

± 2 dB from 10-24 dB

± 1 dB from 25-40 dB

± 2 dB from 41-45 dB

Signal-to-Total Distortion

± 2 dB from 10-24 dB

± 1 dB from 25-40 dB

± 2 dB from 41-45 dB

Intermodulation Distortion

(2nd and 3rd order)

± 2 dB from 20-29 dB

±1 dB from 30-46 dB
 ±2 dB from 47-55 dB
 ±3 dB from 56-60 dB

Absolute Delay

Modes: Send and Repeat

Transmitter: 50% AM signal with a Modulation Frequency of 83.3 Hz
 Frequency: 1020 Hz Send, 1800/1850 Hz Repeat

Level: 0.0 dBm to -40.0 dBm

Flatness: ±0.2 dB

Delay Range: 0-1.2 s

Accuracy: ±0.1 ms

Harmonic Distortion: 35 dB below tone level

Level, Frequency, and Noise Measurements

PCM Channel Encoder

Analog Tone Generation: 20 Hz to 3904 Hz selectable in 1.0 Hz steps

Tone Level: +3.0 dBm to -50.0 dBm in 0.1 dB steps

Frequency Response: 0.1 dB (20 Hz to 3904 Hz)

Basic Accuracy:

<u>Accuracy</u>	<u>Level</u>
0.1 dB+3.0 dBm	0 to -30 dBm0
0.2 dB-30 dBm	0 to -40 dBm0
0.5 dB-40 dBm	0 to -50 dBm0

PCM Channel Decoder

Recovered Analog Tones: 20 Hz to 3904 Hz

Recovered Level: +3.0 dBm to -40.0 dBm (Average and rms)

Basic Accuracy: 0.1 dB with Digital Milliwatt

<u>Accuracy</u>	<u>Level</u>
0.1 dB	+3.0 dBm0 to -30 dBm0-30
0.2 dB	-30.0 dBm0 to -40 dBm0-30
0.5 dB	-40.0 dBm0 to -50 dBm0-30

Frequency Response: 0.1 dB @ 204 Hz to 3904 Hz with 0 dBm applied.

Supervision: On-hook and Off-hook supervision

Signal-to-Total Distortion:

Input	7 5/6 Signaling	CCIS
0 to -30 dBm0	38 dB	40 dB
-30 to -40 dBm0	36 dB	36 dB
-40 to -50 dBm0	32 dB	32 dB

Gain Tracking Error:

Input	Maximum Deviation
+3.0 to -30 dBm0	0.1 dB
-30 to -40 dBm0	0.2 dB
-40 to -50 dBm0	0.5 dB

Intrinsic Noise: 10 dBmC (with Idle Code received)

Return Loss MeasurementsGeneral Return Loss

Modes: ERL, SRL-Low, SRL-High, or Sine wave (OSC)

Transmitted Signal: Meets the specifications of Bell Publication 41009 (Tables D, E, and F, page 13) and IEEE Standard P743-1995

4-Wire Return Loss

Transhybrid Loss Compensation: - 30 dB to +30 dB

Transmitter Level: - 10 dBm0 relative to TLP

Receiver Range: - 10 dB to +50 dB

Resolution: 1.0 dB

Accuracy: ± 0.5 dB

Administration Utilities and Commands 5

Introduction

You can perform administration tasks on the RTS from the system prompt on a terminal connected directly from the RTS serial port, or on a PC connected through your LAN. The RTS displays the UNIX Operating System prompt for the SCO OpenServer 5.X operating system. You can use several types of commands at the system prompt:

- UNIX commands
- Sage administration commands
- Sage Command Language (SCL) commands
- Tool Control Language (TCL) commands

This chapter presents information about the RTS administration commands you can use at the system prompt. See **www.sageinst.com** for details about using SCL commands, and for tips about using SCL to write test scripts.

Overview

This chapter presents details about using administration utilities and commands to perform system setup and testing functions. This chapter included the following topics:

- List of Administration Commands and Utilities
- Using the Sage T1 Configuration Utility
- Administration Commands

List of Administration Commands and Utilities

The administration commands and utilities described in this chapter include those in the following list.

- t1config (T-1 configuration utility)
- counttrunks
- itl
- listgroups
- listports
- show950opts
- t1imstat
- tremstat
- 950rts

Using the Sage T1 Configuration Utility

This section describes how to use the **t1config** utility program.

The **t1config** utility allows you to configure and check the status of the T1 interfaces into the RTS. The configuration includes: framing, line coding, distance to the DSX, and ESF data link type.

The t1config program uses a simple menu interface, shown below:

```

SAGE INSTRUMENTS REMOTE TEST SYSTEM
System name: testsystem          Fri Aug 24 2001 12:18:20
T1 Board Status and Configuration

  Commands      Interface status
  Board Sel     Board      1          2          3          4
  Configure     Type      DTI T1      NOT      NOT      NOT
  Quit          Status    In Service INSTALLED INSTALLED INSTALLED
  Intf 1        No Errs
  Intf 2        No Errs

Board 1 Interface Configuration

  Interface 1      Interface 2
  Span name: B0I0  Span name: B0I1
  Framing: ESF     Framing: ESF
  Line code: AMI   Line code: AMI
  Length: 0-133ft Length: 0-133ft
  Perf mon: None   Perf mon: None

```

Arrow keys highlight, <enter> selects

Setting Up to Use t1config

There are no special requirements prior to using t1config to simply *view* the current configurations and state of all interfaces into the system.

Before using t1config to *make changes* to any configuration parameters, perform the following steps:

- 1** Log in at the admin security level.
- 2** Set the system to operate in multiuser mode.
This is necessary so that the T1 interface manager process is running.
- 3** Stop any tests that are using channels on the board that you are configuring.
This is necessary because the t1config utility will not allow you configure an interface when channels are in use.

After these steps are complete, simply use the menus to select a board, channel, and to select configuration parameters.

Error Messages

You may encounter error messages as you use the t1config utility. Use the table below to handle errors.

Table 5-1 T1config warning messages, causes, and remedies

Message	Cause	Remedy
Warning: T1 board(s) configured differently than prescribed in the configuration file.	There is a difference between the current configuration on the boards and the configuration in the permanent configuration file. The configuration was probably not saved the last time t1config was run.	1 Verify that all configurations on all of the boards are correct. 2 Select “yes” when t1config asks if you want to save the new configuration.
Warning: Couldn’t open the configuration file for writing! Changes will not be permanent.	You do not have write permission on the configuration file.	Verify that you are logged in as “admin” before changing the configuration.
Unable to put the board into maintenance mode. It is probably in use at this time.	You cannot reconfigure the board when other users are using channels on that aboard for testing.	1 Use the “whodo” command to see who else is running tests, and have them stop. 2 Verify that no automatic test are running.
t1config: couldn’t get/open IPC msg queues T1 interface manager is probably not running.	The interface manager process is not running. This occurs when the system is in single-user mode.	1 Change the system to multi-user mode. 2 If it is already in multi-user mode, use the command startt1im to restart the interface manager.

Administration Commands

This section describes RTS administration commands. Use these commands to view or modify equipment and test configurations.

Password Security and Administration Commands

Permission to use the commands described in this section are generally limited to users at the admin and root security level.

counttrunks

Use the counttrunks command to list all trunks, or a specified trunk group, and the number of trunks in the specified group.

counttrunks Syntax

```
usage: counttrunks [ all | <grp1>[-grp2] ] [ <trunkfile> ]
```

Arguments

- all** lists all trunks
- grp1-grpN** lists group1 through group N
- trunkfile** lists the groups in the specified trunk file

The following results example shows a portion of the results of using the counttrunks all command:

```
$ counttrunks all
Counting trunks in file '/u/950rts/lib/default.trks'
Group      #Trunks
-----
4          1
5          1
6          1
8          2
9          1
12         4
13         20
14         7
17         48
18         24
.
.
.
```

itl

Itl stands for integrated test line. Use the itl command to start, stop, or restart these processes. Use the stat argument to view the status of test line processes and channels.

itl Syntax

```
Usage: itl [ start | stop | restart | stat ]
```

itl stat Example

The following example shows the results of using the `itl` command with the `stat` argument:

```
252$ itl stat
ITL processes
  admin   547 1 0 07:42:46 ? 00:00:00 itld t1105 t1105
  admin   552 1 0 07:42:51 ? 00:00:00 itld t1105 t1105
  admin   557 1 0 07:42:56 ? 00:00:00 itld t1105 t1105
  admin   562 1 0 07:43:01 ? 00:00:00 itld t1105 t1105

ITL channels
  1  22  0000  547 admin  ?  07:42:46 itld t1105 t1105
    24  0000  552 admin  ?  07:42:51 itld t1105 t1105
  2  21  0000  557 admin  ?  07:42:56 itld t1105 t1105
    23  0000  562 admin  ?  07:43:01 itld t1105 t1105
```

listgroups

Use this command to list the trunk groups.

listgroups Syntax

```
usage: listgroups [ all | <grp1>[-grp2] ] [ <trunkfile> ]
```

Arguments

all lists all trunks

grp1-grpN lists group1 through group N

trunkfile lists the groups in the specified trunk file

listgroups all Example

The following show a partial result of the `listgroups` command using the `all` argument:

```
$ listgroups all
Listing trunk groups in file '/u/950rts/lib/default.trks'

4
5
6
8
9
12
13
14
17
.
.
.
```

listlimits

Use this command to list the test limits files for demand and automatic trunk routining (ATR) test line tests. The test limits files contain pass/fail criteria,

and are found in the **/u/950rts/lib/filters** directory. This command uses no arguments; it simply lists the existing test limits files.

listlimits Example

```
$ listlimits
Listing limits filters in directory '/u/950rts/lib/filters'

Standard.100
Standard.102
Standard.105
```

listports

Use this command to list all the ports available for test access. Port names are stored in the **spanid** file.

This command has no arguments; it simply lists all port names.

listports Example

The following example shows a portion of a list of port names:

```
$listports
Listing test ports in interface database:
G1_Dir1_chan1
G1_Dir2_chan2
t1105
t1105
G2_Dir1_chan1
G2_Dir2_chan2
t1105
t1105
.
.
.
```

printlimits

Use this command to display the test limits (pass/fail criteria) for a test line test. For example, type 100 quiet termination, type 102 milliwatt, or type 105 responder test lines. Test limits files are found in the **/u/950rts/lib/filters** directory.

To list existing test line test limits files, use the **listlimits** command.

printlimits Syntax

usage: **printlimits** <limits>

where *limits* is the name of the limits file, for example **Standard.100**, **Standard.102**, or **Standard.105**.

printlimits Example

The following example shows the pass/fail criteria for the test limits file **Standard.105**:

```
$ printlimits Standard.105
#( #) SageRTS 5.3.2i $RCSfile: Standard.105,v $
# $Revision: 1.4 $ $State:
Exp $ $Date: 1996/08/09 21:56:43 $ GMT
```

```

# ResultsVersion = 00.01-02-17a
# Start of Result Filter Limits
# Test      Nearend: Lo      Hi      Farend: Lo      Hi      (Units)
# -----
Loss        -2.0      20.0      -1.0      20.0      (dB)
Noise       0.0      40.0       0.0      40.0      (dBrnC)
Noise/Tone   0.0      45.0       0.0      45.0      (dBrnC)
Slope 404    -2.0      17.0      -1.0      17.0      (dB)
Slope 1004   -2.0      17.0      -1.0      17.0      (dB)
Slope 2804   -2.0      17.0      -1.0      25.0      (dB)
ERL          0.0     100.0       0.0      40.0      (dB)
SRL          0.0     100.0       0.0      40.0      (dB)
SRH          -2.0     100.0       0.0      40.0      (dB)
# $1         $-4     $-3         $-2     $-1     $-0
# End of Result Filter Limits

```

show950opts

Use this command to display the standard and special purchase options installed on the RTS.

show950rts Example

```

$show950opts: display 950RTS options license file
(c) 2001 Sage Instruments, Inc.
The following options are enabled for serial number 2GH028298
Basic voiceband testing
Voiceband data impairments testing
ROTL Responder
ATME-ROTL Responder
Automatic trunk routining
23-Tone Line Quality Analysis
*** Unknown option 7 enabled
*** Unknown option 8 enabled
*** Unknown option 9 enabled
DS0/Subrate Bit Error Rate Test
Fractional T1 Bit Error Rate Test
DS1 Bit Error Rate Test
Remote Audio
Cellular ACTS
Automated Local Loop Test System
PSQM Testing in ALTS
*** Unknown option 17 enabled
*** Unknown option 18 enabled

```

t1imstat

Use the T1 interface manager command, **t1imstat**, with arguments to view the status of all the T1 lines connected to the RTS. You must be logged in at the admin security level to use this command.

t1imstat Syntax

```
t1imstat {[-i [<intfc>]] | [-c [<intfc> [<chan>]]} [-n]
```

where

-i : print interface status. If <intfc> is given, print it for that interface only.

-c : print channel status. If <intfc> is given, print status for all channels on that interface. If <intfc> <chan> is given, print status for that one channel only

Note: -i and -c flags are mutually exclusive

-n : do not print headers

default is -i

or `tlimstat -b[l]` = Display DTI BOARD status info (bl = LONG format)

tlimstat -i Example

The following example shows the default command and argument, `tlimstat -i`. Results display in columnar format. Each column is explained below the example.

```
tlimstat -i
tlimstat (c) 1997-2001 Sage Instruments Rev 5.3.2i.083001.0
bd   type   status ifc name      frame   code   length  perf status
1 DS1-DTI  In Svc  1  B0I0      ESF     AMI    0-133ft None No Errs
      2      B0I1      ESF     AMI    0-133ft None No Errs
2 DS1-DTI  In Svc  3  B1I0      ESF     AMI    0-133ft None No Errs
      4      B1I1      ESF     B8ZS   0-133ft None No Errs
3 DS1-DTI  In Svc  5  B2I0      ESF     AMI    0-133ft None No PCM
      6      B2I1      ESF     AMI    0-133ft None Frm Loss
```

bd identified the board number

type identifies the type of board (in the example, a DS-1 Dual T-1 Interface, or DS1-DTI, board)

status shows if the board is in or out of service (in the example, the board is in service)

ifc indicates the interface number, either one or two

name indicates the interface name. In the example, interface one is named B0I0 for board zero and interface zero. Note that DSP boards are numbered zero, one, two, and so on.

frame identifies the framing scheme (in the example, ESF for extended super frame)

code indicates the line coding format, typically B8ZS or AMI

length the recommended physical distance in feet of the copper T1 line between the point where it exits the RTS rear panel and connects to a switch or digital cross connect system.

perf indicates whether or not performance monitoring is currently active on the line. In most cases, the status is none.

status indicates whether or not the T1 line "sees" clock and is functioning properly.

tremstat

Use the test resource manager command, **tremstat**, with arguments to view the status of test resources. You must be logged in at the admin security level to use this command.

tremstat Syntax

```
tremstat [-s] [-l] [-b]
```

```
-s show short form of test resource display(default)
-l show long form of test resource display
-b show BOARD STATUS info (TREMD need NOT be RUNNING)
```

tremstat -b Example

The following example shows the `tremstat` command using the `-b` argument. Results show the status of installed boards:

```
$ tremstat -b
Board 1 QDSP 1, DSPs 0-3 Adr 0x0210 RUNNING
Board 2 QDSP 2, DSPs 4-7 Adr 0x1210 RUNNING
```

tremstat -l Example

The following example shows the `tremstat` command using the `-l` argument. Results show the long form test resource display:

```
$ tremstat -l
TREMDstat Rev 5.3.2i.083001.2 (c)1996-2001 Sage Instruments

TREMDinfo: 2 Boards Installed (0 VPRO) (2 QDSP)
TREMDinfo: 8 DSPs Installed Allocated 5

dsp  type  bd  state      pid    user    tty  lastResp cmd
0:0  QDSP  1:1  ASSIGNED   728    admin   25   10:32   0:00 itld t1100 t11
1:1  QDSP  1:1  ASSIGNED   733    admin   25   10:32   0:00 itld t1102 t11
2:2  QDSP  1:1  ASSIGNED   755    admin   25   10:33   0:00 itld t1105 t11
3:3  QDSP  1:1  ASSIGNED   760    admin   25   10:34   0:00 itld t1108 t11
4:0  QDSP  2:2  ASSIGNED   765    admin   25   10:34   0:00 itld t1alts t1
5:1  QDSP  2:2  UNASSIGNED
6:2  QDSP  2:2  UNASSIGNED
7:3  QDSP  2:2  UNASSIGNED
```

dsp indicates the board number and whether it is the first (zero), second (1), third (2), or fourth (3) DSP on that board

type indicates the type of DSP card

bd indicates which board out of the total number of boards

state indicates whether or not the board is assigned to a test line.

pid process identification number

user indicates the security level or name of the person logged on to the system.

tty *not applicable*

lastResp *not applicable*

cmd Shows the command used to assign the corresponding DSP process.

950rts

Use the `950rts` command to start, stop, or restart the RTS software. This command does not restart the SCO UNIX operating system on the RTS.

- ⊗ Use this command only with the assistance of qualified Sage Instruments technical personnel. This command abruptly stops all running processes

on the RTS system. It is intended for use only during coordinated system maintenance operations.

950rts Syntax

```
usage: 950rts [ start | stop | restart ]
```