

950RTS Remote Test System Installation and Administration Guide

Part Number 9105-0950-01 V.2.3

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SECTION I

GENERAL INFORMATION

1-1 INTRODUCTION

This manual describes the procedures for installing and administering the Sage Instruments **950RTS** Remote Test System.

Section I of this manual provides general reference information on the **950RTS**. **Section II** describes the installation procedure, including mechanical and electrical installation, basic system checks, and setting-up system files for the installation. **Section III** describes the administration procedures, including system setup, maintenance of user accounts and backups, and performance of other chores required to keep the system operating optimally.

1-1.1 Contacting Sage Instruments

To contact Sage Instruments in writing, send correspondence to:

Sage Instruments, Inc.
240 Airport Blvd.
Freedom, CA 95019-2614

or send E- mail to:

sales@sageinst.com or support@sageinst.com

To reach our Technical Support and Customer Service Departments by phone, call:

(831) 761-1000, M-F, 9 a.m. to 5 p.m., Pacific Time.

or fax our Technical Support and Customer Service Departments by fax any time at:

(831) 761-2452

To receive company and product information via the World Wide Web, visit our home page at:

<http://www.sageinst.com>

Be sure to specify *Model 950RTS* when asking for technical support. Customers located outside of the U.S. may also contact their nearest Sage distributor for assistance.

1-2 INVENTORY

The **950RTS** is shipped in two separate containers. One contains the **main cabinet with backplane**, and the other contains **mounting flanges and hardware, power supply, manuals, and miscellaneous cables**. Unpack both boxes carefully, checking for small items in the packing material.

Inventory the contents against the shipping lists. Verify that the correct mounting **flanges** are included. Flanges are approximately **28" long**; flanges for **19" racks** are approximately **1" x 1"**, while the flanges for **23" racks** are approximately **1" x 3"**. (Contact Sage Instruments regarding the availability of conversion kits for nonstandard rack sizes.)

The ten mounting screws required to attach the flanges to the rack are not included. You will need to supply these screws yourself. The size of these screws will vary with your rack.

1-3 PLANNING THE INSTALLATION

The following installation instructions are **general guidelines only**. **Do not** use them if they contradict company practices.

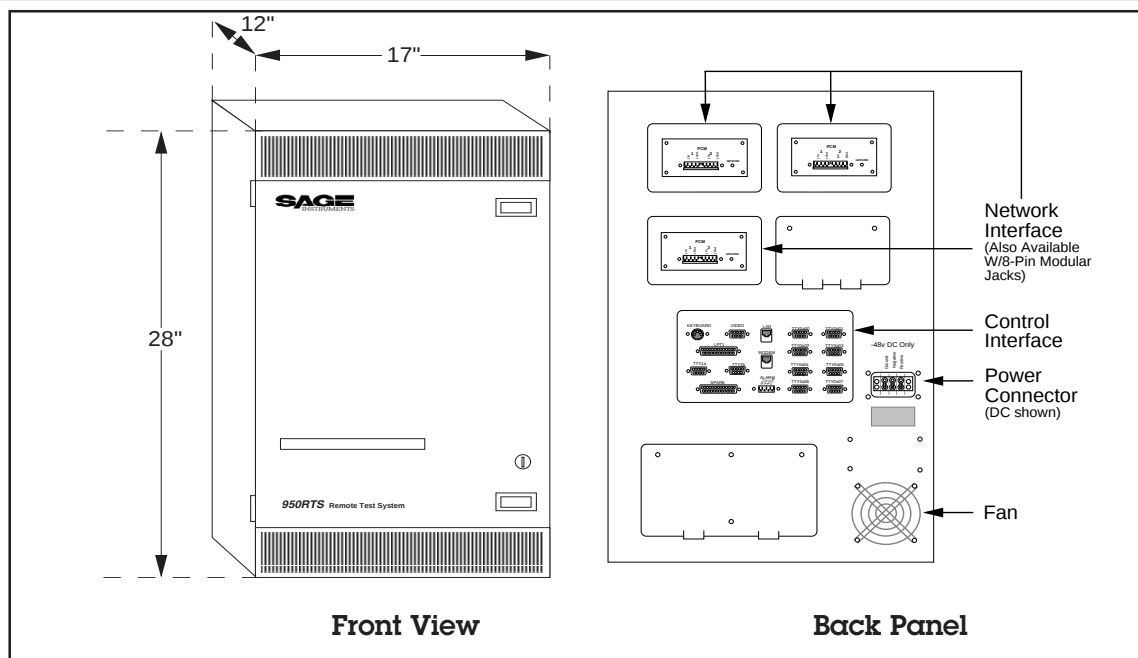


Figure 1-1
Physical Description of 950RTS

1-3.1 Mounting Considerations

The **950RTS** is packaged in a rack-mountable cabinet approximately **28" (or 16 rack units) high, 17" wide, and 12" deep**. (See **Figure 1-1**) All electrical connections are made at the rear of the cabinet. A locking front door provides access to all line-replaceable units.

The **950RTS** mounts in standard **19"** and **23" relay racks**. Since configurations vary, you should verify that you have received the correct mounting flanges with your unit before beginning installation.

Depending on how you attach the mounting flanges, you can position the front of the **950RTS 3"**, **5"**, **7"**, or **9"** in front of the rack so that it mounts flush with other installed equipment.

A **950RTS** fully loaded with optional boards and storage devices weighs approximately **100 lbs**. Mounting the unit in the relay rack with its front door and power supply removed lowers the weight of the cabinet during installation.

Do not locate the unit adjacent to other equipment that produces a lot of heat, dust (such as printers), ozone or sparks (such as electric motors), or strong magnetic fields. No special climate controls are required.

The **950RTS** draws in cooling air through the lower part of the front door, and expels exhausts through the upper part of the front door as well as through an air exhaust at the lower rear of the cabinet. Each of these cooling vents must have unrestricted air flow.

1-3.2 Power Requirements

1-3.2.1 AC Power Supply

A standard **950RTS** requires **115 or 230 volt AC** power. You should supply power via a dedicated circuit and use an adequate uninterruptible power supply (**UPS**). Depending on the number of optional boards that are installed, the unit draws between **150** and **500 watts** of power. **AC** power input is through a standard **IEC-type connector** on the rear of the cabinet. (See **Figure 1-2**)

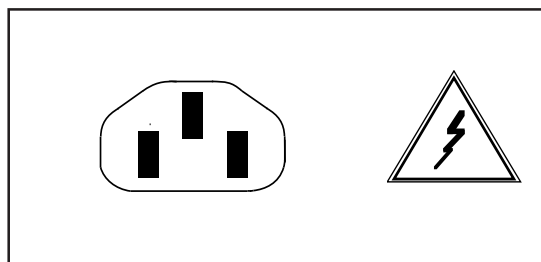


Figure 1-2
IEC-type Connector

1-3.2.2 DC Power Supply

You can purchase an optional **-48 volt DC** power supply with the **950RTS**, enabling it to use standard central office battery power. A dedicated, **fused 15 amp circuit** must be used to supply power via minimum **16 gauge wire**. **DC** power input is through a terminal strip on the rear of the cabinet. (See **Figure 1-3**)

You should use **crimp type lugs** for **#8 screws** to attach the wire to the terminal strip.

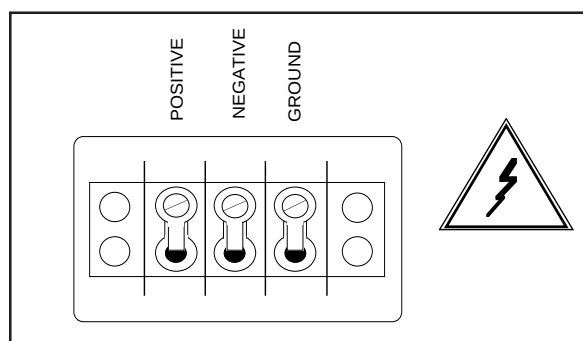


Figure 1-3
DC Terminal Strip

CAUTION! Observe proper polarity when connecting **DC** power to the **950RTS**. Reversing the power connection may result in permanent damage to the power supply. Wires should be clearly marked for polarity.

1-3.3 Control Interfaces

Control interface to the **950RTS** is via **serial ports**, **LAN interfaces**, or **local monitor and keyboard**, depending on optional equipment. These all connect to the large interface configuration panel on the center rear of the cabinet. (See **Figure 1-4**)

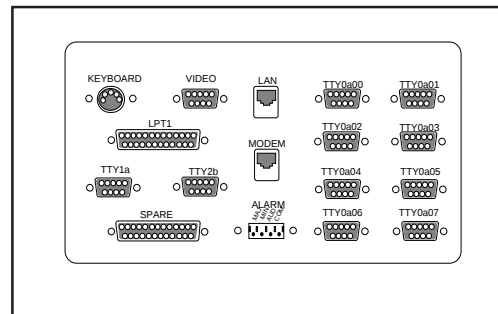


Figure 1-4
Control Interface Panel

1-3.3.1 Serial Connections

The basic **950RTS** has two serial interfaces. They consist of two **male DB9 connectors** that are **RS-232** compliant and are marked **tty1a** and **tty2a**. (See **Figure 1-5**) Connection to a terminal or personal computer generally requires a **null-modem cable**.

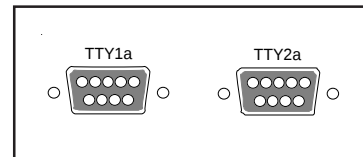


Figure 1-5
Serial Interfaces

In a basic system with no additional serial interfaces or **LAN/WAN cards**, **tty1a** and **tty2a** serve as user interfaces for testing from an attached terminal, and are used for setup and maintenance of the system. **tty2a** can also be used with **SWLINK** software to extract switch database information or control an external switch or **DCS**.

You can perform system maintenance using any access method (**tty**, **LAN**), but you must perform certain operations only at the system console, which is the VGA monitor and keyboard or the device (terminal) attached to **tty1a**. (See **Figure 1-5**) System messages are routed to the console. As the system boots, input/output is directed through the **system console** until the system has completed start-up and entered normal multi-user mode. Only the **system console** may be used during maintenance in single-user mode.

You can initiate shutdown procedures from any access point, although system shutdown messages are directed to **tty1a**, including the message that lets you know when it is OK to power off. If you initiate shutdown from a device other than the console, wait several minutes for the shutdown to complete before pulling the power.

Up to eight additional optional serial interfaces installed in the unit appear as **male DB25 connectors** labeled **TTY0a00** through **TTY0a07**. Use the optional serial interfaces to provide access for more users, and to connect to additional devices (like modems and terminals)

1-3.3.2 Printer Connections

Connections to a printer device can be made through the **DB25** connectors, labelled **LPT1** (See **Figure 1-6**) The **950RTS** will work with any printer provided that the printer:

- has an asynchronous **RS-232C** parallel input port
- prints both upper and lower case
- is ASCII compatible
- has a carriage width of at least 80 characters

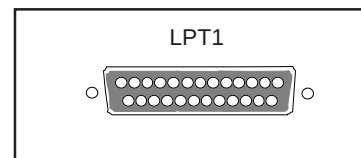


Figure 1-6
Printer Interface

1-3.3.3 LAN and Modem Connections

Most users will be connected to the **950RTS** through Local Area Network (**LAN**) or **dial-up** connection. **LAN** and dial-up connections can be made through the two **8-pin modular jacks** labelled **LAN** and **MODEM**. (See **Figure 1-7**)

Note: As of this release, the modem connection is nonfunctional. Connection to an external modem can be made through one of the serial interface ports. If you want to connect to the **950RTS** using a modem, you must use the RS-232 ports. Connections are described below.

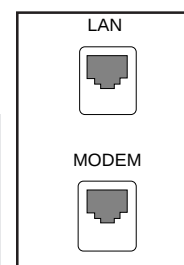


Figure 1-7
RS-232 Ports

1-3.3.3.1 Configuring Modems For Connection via Comport **tty1a** or **tty2a**

In order to connect a modem to **tty1a** or **tty2a**, the mode of the tty port must be modified. The following command sequence changes the mode of the **tty2a** port for modem connections. The user should login as **root** to execute the following commands:

```
disable tty2a
enable tty2A
```

The modem must be set to **Display Result Codes** and placed in **Smart Mode** (Usually set with dip switches)

	<u>USrobotics command</u>
Read factory defaults (Hayes standard)	at &f &w
Auto answer on	ats0=1
Show response messages	atx3
Show arq messages	at&a3
Serial speed fixed	at&b1
Carrier normal	at&c1
DTR normal	at&d2
Tx flow control off	at&ho
Rx flow control off	at&r1
Compression Off	at&k0
Baud rate 9600	at&n6
Save settings as power up defaults	at &w &w0 &w1

Section I General Information

1-3.3.3.2 Configuring Modems For Connection via the Stallion Card

The **Stallion tty port** must be defined as a dial in/out and enabled for login.

The modem must be set to **Display** result codes and set for **Smart Mode** (Usually set with dip switches)

	<u>USrobotics command</u>
Read factory defaults (Hayes standard)	at &f &w
Auto answer on	ats0=1
Show response messages	atx3
Show arq messages	at&a3
Serial speed fixed	at&b1
Carrier normal	at&c1
DTR normal	at&d2
Tx flow control on	at&h1
Rx flow control on	at&r2
Compression on	at&k1
Auto Baud	at&n0
Save settings as power up defaults	at &w &w0 &w1

1-3.3.3.3 Available File Transfer Protocols

The **950RTS** provides **ftp**, **Zmodem**, and **Ckermit (ACTS option)** protocols for file transfer.

1-3.3.4 Keyboard and Video Connections

You can connect a monitor and keyboard to the **950RTS** directly for the purpose of running **ACTS** (Automated Cellular Trunk System) or to provide a local terminal appearance.

Connection to a monitor can be made through the **male DB15 connector** labelled **VIDEO**. The keyboard can be connected through the round **DIN 5-pin** connector labelled **KEYBOARD**. (See **Figure 1-8**) This allows for the use of color, multiple logins and GUI desktop or networked systems.

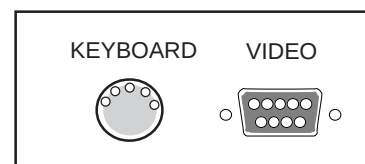


Figure 1-8
Keyboard and Video
Connections

1-3.4 Network Interfaces

The **950RTS** appears as a **DS1 terminal**, with the standard **660 foot cable** length restriction between it and the **DSX**.

IMPORTANT! The standard **DS1 interfaces** should only be connected directly to a **T1 span** with an intermediate office repeater or **CSU**.

The **DS1 signal** is through either **8-pin modular jacks** or **wire wrap connectors**, depending on the option selected. The jacks are labeled **PCM1** and **PCM2**. (See **Figure 1-9**)

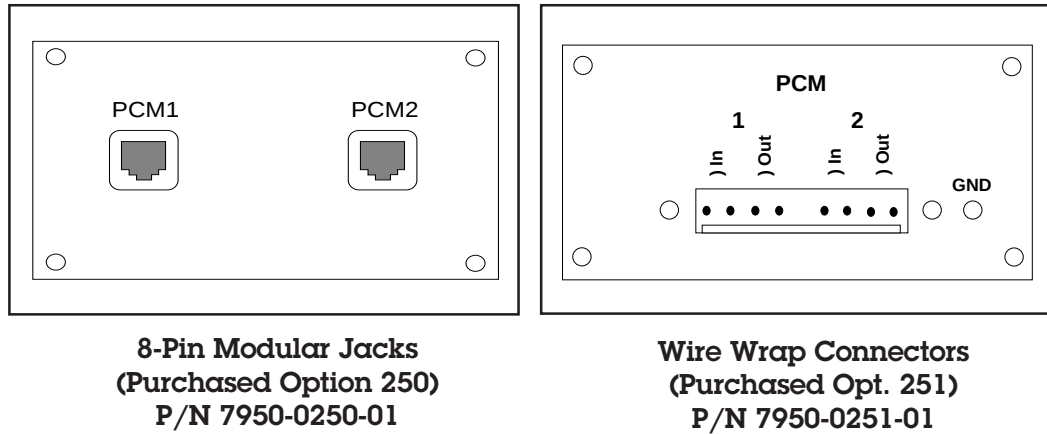


Figure 1-9
Network Interfaces

Note: There is one **network interface panel** per **dual T1 card**.

1-4 INSTALLATION CHECKLIST

Before proceeding with the physical installation, verify that all of the following items have been checked:

Table 1-1 Installation Checklist

Mounting		√ 28" or 16U of rack space √ 19 or 23" relay racks √ 10 screws for mounting flange to rack (not included) √ adjacent areas/equipment free of excess dust, ozone, heat, and static
Power	AC	√ 115-230V/47-63Hz available √ uninterruptible power supply √ dedicated circuit
	DC	√ 48V power supply √ fused 15 amp circuit √ 16 gauge wire to connect power supply √ dedicated circuit √ wires correctly marked for polarity √ crimp type wire plugs
Control Interface		√ serial connections √ tty1a or local monitor and keyboard (optional) available for maintenance √ tty2a for switch/DCS connection √ LAN/WAN connections (optional) √ null modem cable for tty to terminal/computer connection
Network Interface		√ DSX level √ 8-pin modular connector √ cable (up to 660ft) for connection to DSX

SECTION II

INSTALLING THE 950RTS

2-1 MECHANICAL AND ELECTRICAL INSTALLATION

2-1.1 Mounting

To mount the **950RTS** cabinet:

1. Attach the mounting flanges to the cabinet sides with the supplied hardware. Use the appropriate set of mounting holes in the flanges. (See **Figure 2-1**)

Using either set of mounting holes on the side of the cabinet, position the flange with the rack mount either towards the front or the rear of the unit as appropriate to keep the front of the cabinet flush with other equipment in the rack.

2. Remove the door from the cabinet by opening it approximately 90 degrees and lifting straight up. This will make it easier to lift the unit into position in the rack.
3. Position the unit at the desired mounting location.

WARNING!

The unit weighs approximately 75 pounds. Have an assistant help lift it into position.

4. Attach the cabinet to the rack with appropriate hardware. (See **Figure 2-2**)

IMPORTANT!

Use as many mounting screws (not supplied) as possible to secure the rack flanges to the rack.

5. Replace the door.

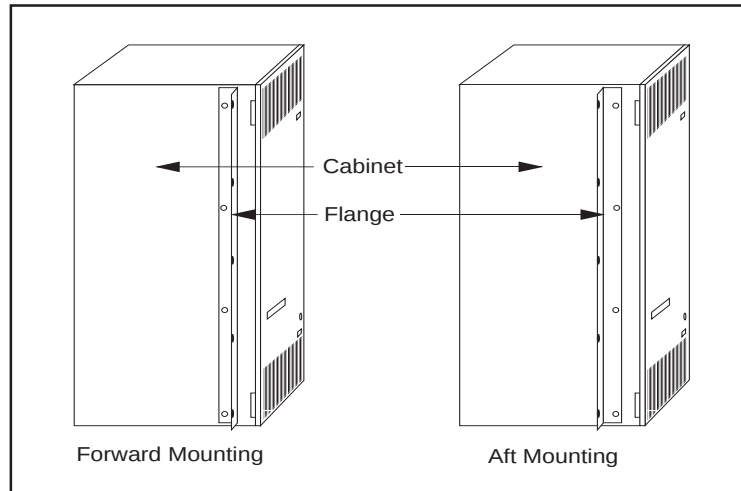


Figure 2-1
Mounting the Flanges

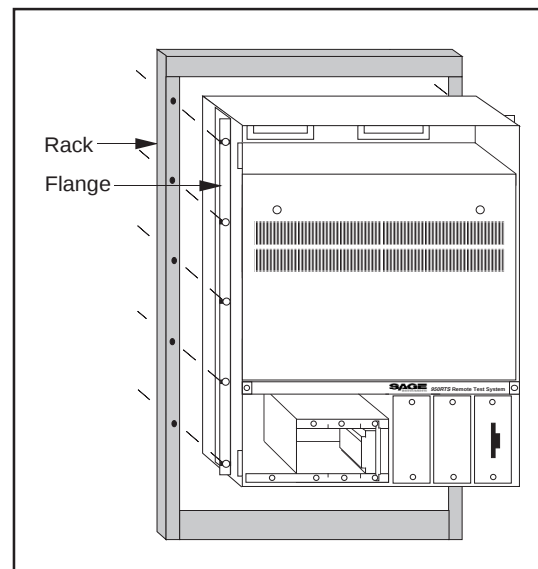


Figure 2-2
Mounting the Unit

Section II Installing the 950RTS

2-1.2 Power Supply

2-1.2.1 AC Power Versions



If the **950RTS** has the standard **AC** power supply (**115/220V, 47-63Hz**), use the supplied line cord to attach power to the **IEC connector** on the back of the cabinet. Power must be supplied from a dedicated **AC circuit**. Use of an uninterruptible power supply (**UPS**) between the **950RTS** and the **AC power supply** is strongly recommended.

2-1.2.2 -48V DC Power Versions

If the **950RTS** has the optional **-48 volt DC power supply**, attach power to the unit via the terminal block on the lower rear panel. Power must be supplied from a dedicated **15 amp circuit** using minimum **16 gauge wire**. Use of **crimp-type wire lugs** on the wire is recommended.

CAUTION! Observe proper polarity on the **DC** input power. Failure to do so may result in permanent damage to the **950RTS**.

2-1.2.3 Installing the Power Supply

The power supply is shipped separately from the main cabinet. Install it as follows:

1. Remove the vented front panel at the bottom left front of the unit by removing the four captive screws. (Refer to **Figure 2-3**)
2. Verify that the power switch on the power supply is turned **off**.

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

3. Slide the supply into its slot in the bottom left of the cabinet all of the way. Install the supply with the black connectors at the upper back and the power switch at the front left.
4. Secure the supply with the captive screw on the bottom front.
5. Reinstall the panel removed in step 1.

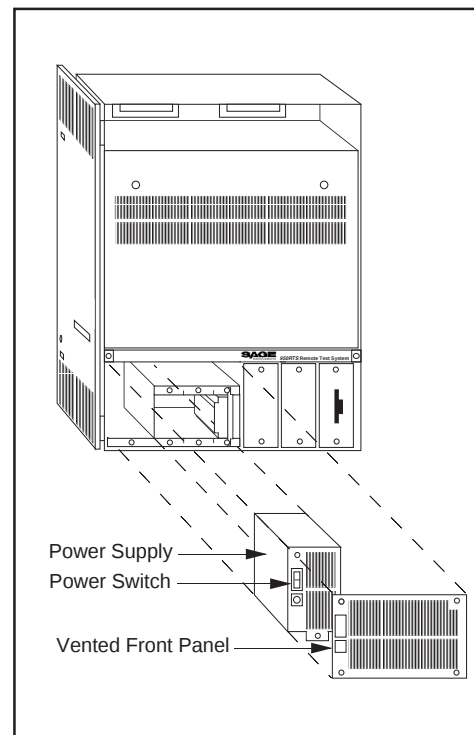


Figure 2-3
Installing the Power Supply

2-1.3 Network Interfaces

2-1.3.1 T1 Interfaces

If you have **Purchased Option 251Config, Wire Wrap** installed, connect **T1** to the **950RTS** via the wire wrap connector pins located at the rear panel labelled **PCM**. The connector pinouts are as follows:

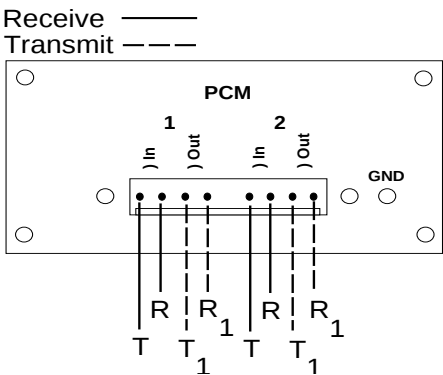


Figure 2-4
Network Interface Pinout
(Wire Wrap Connector)

If you have **Purchased Option 250 Config, Dual PCM, RJs** installed, connect **T1** to the **950RTS** via the **RJ48X 8-pin modular connectors** at the rear panel labelled **PCM1** and **PCM2**. The connector pinouts are as follows:

Pin Number	Signal Name
1	Receive Ring
2	Receive Tip
3	No Connection
4	Transmit Ring
5	Transmit Tip
6	No Connection
7	No Connection
8	No Connection

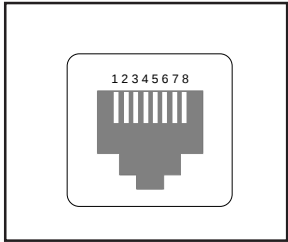


Figure 2-5
Network Interface Pinout
(RJ48x Connector)

IMPORTANT! The **950RTS** should only be connected directly to a **T1 span** with an intermediate office repeater or **CSU**.

2-1.3.2 Control Interfaces

Two **male DB-9 connectors** provide control interface to the system. The interfaces are identical and are labeled **tty1a** and **tty2a**. You can use them interchangeably except in two special cases:

- You will need access to **tty1a** when you install the system and for system maintenance.
- Some installations require a **tty2a** connection to the switch. This port may also be used for interface to external equipment, such as **DCS**. This is dependent on your particular installation and **950RTS** configuration. Pinouts are as follows:

Pin Number	Signal Name
1	Carrier Detect (CD)
2	Receive Data (RD) (in)
3	Transmit Data (TD) (out)
4	Data Terminal Ready (DTR)
5	Signal Ground
6	Data Set Ready (DSR)
7	Request to Send (RTS)
8	Clear to Send (CTS)
9	Ring Indicator (RI)

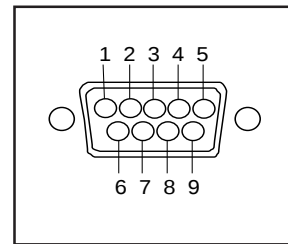


Figure 2-6
Control Interface Pinouts (For all TTY Connectors)

If connection to the serial ports is via a direct wire connection only (and not a modem or any other data communication device), you may only need to use **pins 2, 3, and 5**.

2-1.4 Board Area

Check that the components in the board area are ready for operation as follows:

1. Remove the board retainer panel by removing the two captive screws above the panel ventilation slots and then lifting the retainer panel out of the cabinet. (See **Figure 2-7**)
2. Check that the boards installed are firmly seated in the backplane by pressing firmly on the front edge of each board.
3. Check that the cables installed on the boards are firmly seated.
4. Reinstall the retainer panel removed in step 1.

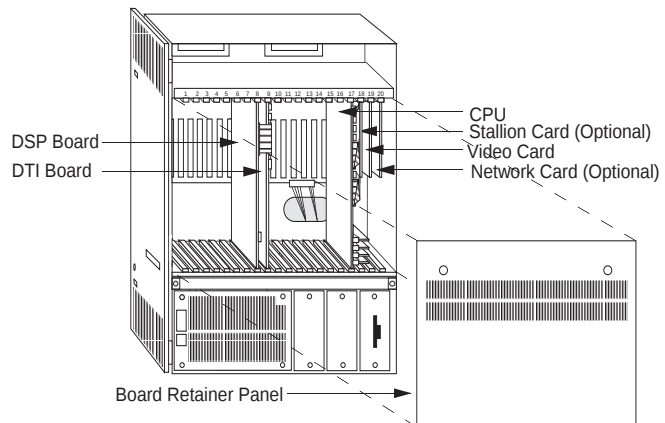


Figure 2-7
Checking Board Area

2-2 SYSTEM TESTING

2-2.1 Final Power Check

If the **950RTS** has the **-48 volt DC power supply** option, make a final check of input polarity before turning on the power. Use a voltmeter to check polarity at the rear panel power entry terminal strip.

2-2.2 Initial System Checks

You will need a terminal for initial system checks. You can use virtually any **ASCII terminal** (**DEC VT510**, **Televideo 950**, etc.), or a terminal emulation program running on a personal computer (such as **TinyTerm** from **Century Software**).

1. Set the terminal (or terminal emulator program) to operate at **9600 baud**, **8 data bits**, **1 stop bit**, **no parity**.
2. Connect the terminal to the control port marked **TTY1a** on the rear of the cabinet. If you are using a terminal or a terminal emulator program on a personal computer with a **DB25**, you will need a **DB9 to DB25 "null modem" cable** or appropriate adaptors.

Note: If your system was purchased with the optional VGA monitor and keyboard as a system console, they should be connected to the video and keyboard connectors on the back of the unit.

2-2.3 Initial Power-up

1. Verify that the terminal (or PC with terminal emulator program) is on and connected, if running an ASCII terminal.
2. Turn on the power switch on the **950RTS**. The unit's fans should start.

IMPORTANT! If the system does not act as expected during the initial power-up, turn off the power and recheck the installation.

The system's processor board performs self-checks that take approximately one minute, and when these are complete, the system console will display:

```
SCO UNIX System V/386 on i80486
Boot:
```

After about **15 seconds**, the system will enter its automatic boot sequence. Depending upon installed options, booting takes between **one** and **five minutes**, during which messages will be displayed on the console.

Section II Installing the 950RTS

A boot sequence will produce messages on the console similar to the ones below.

```
hd(40)unix systty=sio auto
Loading kernel hd(40)unix .text
.....
.....
Loading kernel hd(40)unix .data
.....
Loading kernel hd(40)unix .bss

      UNIX is a registered trademark of UNIX System
      Laboratories, Inc. in the U.S.A. and other countries.
      Copyright (C) 1976-1990 UNIX System Laboratories, Inc.

      Copyright (C) 1980-1989 Microsoft Corporation
      Copyright (C) 1983-1993 The Santa Cruz Operation, Inc.
      Copyright (C) 1988-1990 SecureWare, Inc.
      All Rights Reserved
      SCO UNIX System V/386 Release 3.2v4.2 Operating System
      kernel id 94/02/14 on i80486 Serial Number: 2BL021566

device  address      vector dma   comment
-----
%fpu    -           13   -   type=80387
%serial 0x03F8-0x03FF 4    -   unit=0 type=Standard nports=1
%serial 0x02F8-0x02FF 3    -   unit=1 type=Standard nports=1
%floppy  0x03F2-0x03F7 6    2    unit=0 type=135ds18
%pri0    0x01E0-0x01EF 10   -   PRI Rev. 4.1.0 mem 000D0000 - 000D1FFF
%vsp     0x0200-0x0207 11   -   unit 0, 8 vsps; VPRO4 Release 3.21
%disk    0x01F0-0x01F7 14   -   type=W0 unit=0 cyls=1024 hds=16 secs=63
I0 mem: total = 7808k, kernel = 1980k, user = 5828k
Autoboot from rootdev = 1/40, swapdev = 1/41, pipedev = 1/40, dumpdev =1/41
nswap = 30000, swplo = 0, Hz = 100
kernel: i/o bufs = 600k
INIT: New run level: 2
Current System Time is Mon Feb 13 12:10:00 EST 1995
Enter new time ([yymmdd]hhmm):
Copyright (C) 1983-1993 The Santa Cruz Operation, Inc.
Copyright (C) 1980-1989 Microsoft Corporation
Copyright (C) 1976-1990 UNIX System Laboratories, Inc.
Copyright (C) 1988-1990 SecureWare, Inc.
Copyright (C) 1989 Acer Corporation
Copyright (C) 1995 Sage Instruments Incorporated
Copyright (C) 1993-1994 Primary Rate Incorporated
All Rights Reserved.
Checking tcb ...
Checking auth database ...
Checking protected subsystem database ...
Checking ttys database ...
The system is coming up. Please wait.
fsstat: /dev/u okay
Mounted /u filesystem
System auditing is not enabled.
! *** cron started ***  pid = 151 Mon Feb 13 12:10:26 EST 1995
Print services started.
The system is ready.
```

When booting is complete, the system will wait with a login prompt similar to the following:

```
00101
Sage Instruments 950RTS Remote Test System

00101!login:
```

The number preceding **! login** is the system serial number which is different for each system.

This completes the initial system check. At this point, you can configure the system to the specifics of the site.

IMPORTANT! If the login prompt is not displayed, turn off the power and recheck the installation, paying special attention to board seating and cable routing. Contact the factory for assistance if the system still does not come up correctly.

2-3 INSTALLING ADDITIONAL DTI AND DSP BOARDS

2-3.1 Preparing for Board Installation

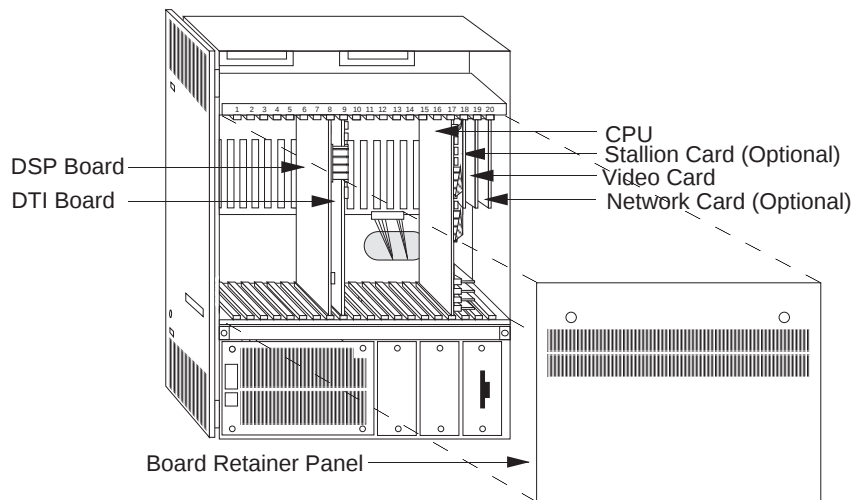
Warning! The following procedures should be carried out using static-safe procedures to minimize potential damage to the boards. Failure to comply will void your warranty.

To prepare the **950RTS** to accept additional **DTI** and **DSP** boards:

1. Notify users to log off the system and initiate shut down procedures. (Refer to the section on shutdown procedures in the *SCO Open Desktop/Open Server System Administrator's Guide*)

Note: Some X-based programs do not allow users to receive shutdown notification.

2. After the system has shut down, disconnect the power supply.
3. Open the front door of the cabinet.
4. Remove the board retainer panel. Refer to **Figure 2-8**.



Note: Some units may have **PRI** boards installed in addition to **DTI** and **DSP** boards, so that the board arrangement may differ from the one shown here. Consult the factory for directions on installing additional DTI and DSP boards when a PRI board is installed.

Figure 2-8
Interior View of the 950RTS

5. Determine your current board configuration.

Figure 2-8 shows the typical card arrangement in the **950RTS** as shipped from the factory. One **DSP** board occupies **slot 8**, and a single **DTI** board occupies **slot 9**. In addition, the **CPU** is in **slot 17**, the **Stallion serial card** is in **slot 18**, and the **video card** is in **slot 19**.

New boards should not be installed indiscriminately. Additional **DSP** boards should be installed in slots **1** through **7**, and are identified in sequence from right to left. Additional **DTI** boards should fill the slots **10** through **16**, and are identified from left to right. Refer to **Figure 2-9**.

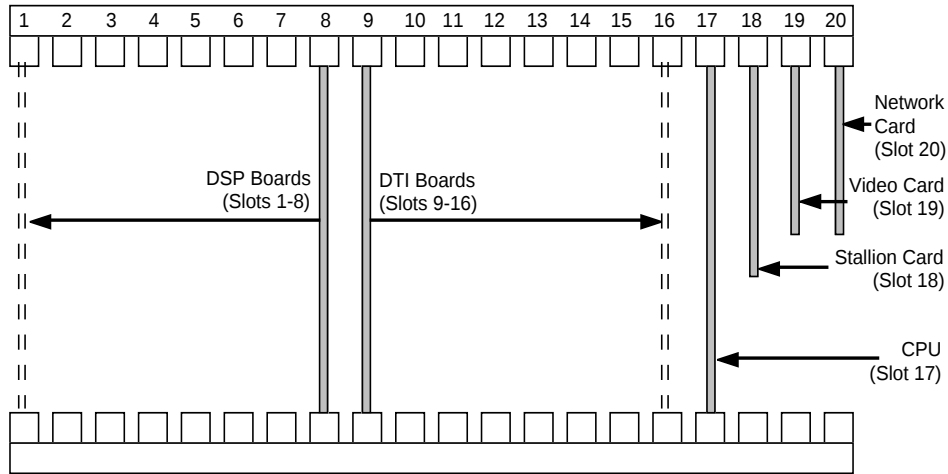


Figure 2-9
Board Configuration

2-3.2 Installing a new DTI Board

To install new **DTI** boards:

1. Remove the **MVIP cable** from connector **J-7** on all installed **DTI** board(s). Refer to **Figure 2-10**.
2. Remove the **IRQ** cable from connector **J-5** on all installed boards. Refer to **Figure 2-10**.
3. Set the bottom set of DIP switches (**SW 1**) on the new **DTI** boards. The switches should be set to the same configuration on all **DTI** boards. Refer to **Table 2-1**.

SW1	
Switch	Setting
1	on
2	on
3	off
4	on

Table 2-1
DIP Switch Settings (SW1)

4. Set the top set of DIP switches (**SW2**) on the new **DTI** boards. These settings will be unique for each board. Refer to **Table 2-2**.

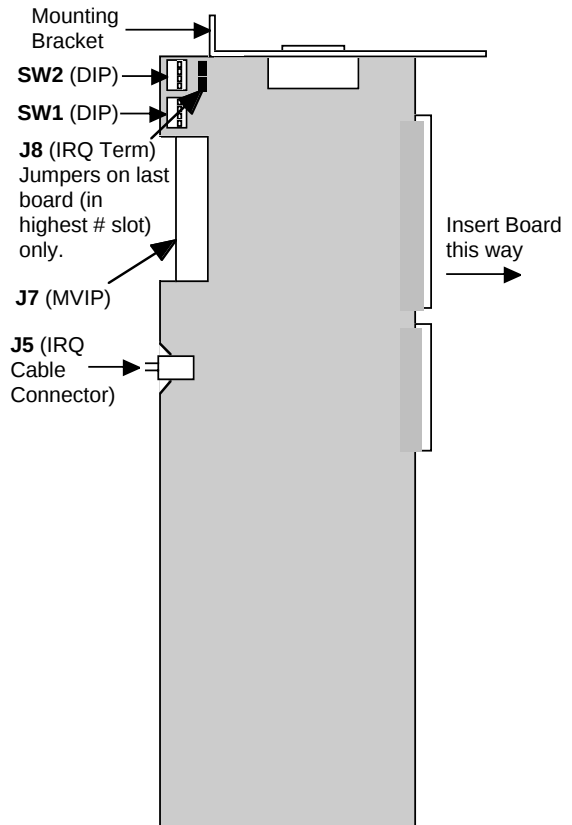


Figure 2-10
DTI Board

Section II Installing the 950RTS

5. On the **last** board in the chain of **DTI** boards, make sure that there is a jumper on the **IRQ Termination** connector (**J8**). You should remove the jumpers (if any) from the **IRQ Termination** connectors on all other **DTI** boards.
6. With connector **J-7** facing the front of the unit and the mounting bracket on top, slide each new **DTI** card into place. Refer to **Figure 2-10**.
7. Reconnect the **MVIP** cable to **J-7** on all **DTI** boards. Refer to **Figure 2-10**.
8. Reconnect the **IRQ** cable to **J-5** on all **DTI** boards.
9. After insuring that your boards are installed correctly, screw the mounting brackets to the cabinet.

SW2				
Slot #	Dip Switch Settings			
	1	2	3	4
9	on	on	on	on
10	off	on	on	on
11	on	off	on	on
12	off	off	on	on

Table 2-2
Dip Switch Settings (SW2)

2-3.3 Installing a new DSP Board

To install new **DSP** boards:

1. Remove the **MVIP** cable from connector **P5** on all installed **DSP** boards. Refer to **Figure 2-11**.
2. Remove the **IRQ** cable from the **IRQ** connector (**P2**) on all installed boards. Refer to **Figure 2-11**.
3. On the new **DSP** boards, set the first array of DIP switches (**S1**) located at the center of the DSP boards. The switches should be set to the same configuration on all **DSP** boards. Refer to **Table 2-3**.

S1	
Switch	Setting
1	off
2	off
3	off
4	off

Table 2-3
DSP Dip Switch Settings (S1)

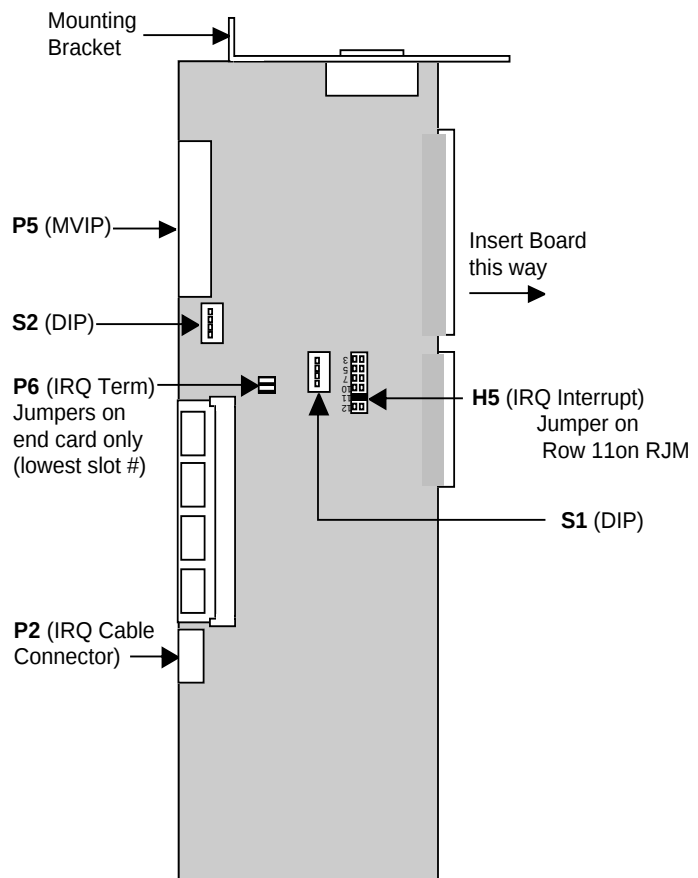


Figure 2-11
DSP Board

4. On all new **DSP** boards, set the second array of DIP switches (**S2**) located on the front edge of the **DSP** boards. The switch settings should be unique for each **DSP** board. Refer to **Table 2-4**.
5. On all **DSP** boards, make sure that there is a jumper on the two pins in **row 11** on the **IRQ Interrupt** connector (**H5**).
6. On the **last** (lowest) board in the chain of **DSP** boards, make sure that there is a jumper on the **IRQ Termination** connector (**P6**). You should remove the jumpers (if any) from the **IRQ Termination** connectors on all other **DSP** boards.

S2				
Slot #	Switch Settings			
	1	2	3	4
8	closed	closed	closed	closec
7	open	closed	closed	closec
6	closed	open	closed	closec
5	open	open	closed	closec
4	closed	closed	open	closec
3	open	closed	open	closec
2	closed	open	open	closec
1	open	open	open	closec

Closed=on Open=off

Table 2-4
Dip Switch (S2)

7. With the **MVIP** connector facing the front of the unit and the mounting bracket on top, slide each new **DSP** card into place.
8. Reconnect the **MVIP** (at connector **P5**) to all installed **DSP** boards.
9. Reconnect the **IRQ** cable (at connector **P2**) to all installed **DSP** boards.
10. When you are sure that your boards are installed correctly, screw the mounting brackets to the cabinet.

2-3.4 Configuring the Software for New DTI and DSP Boards

To configure the software after installing new **DTI** or **DSP** boards:

1. Turn on and reboot the system.
2. Log in as root.
3. At the root prompt, type:

```
/u/950RTS/bin/config950
```

The **950RTS** will check the hardware setup and then list the current configuration. It will then ask you if the current setup is correct.

4. If the setup listed is correct, type **y** and then press **Enter**.
5. Restart the system so that all changes can take effect.

SECTION III

CONFIGURING AND ADMINISTERING THE 950RTS

3-1 GENERAL INFORMATION

Access to the **950RTS** is configured in three levels:

- The **Technician Level** provides access for **Tier 1 technicians** to use the demand tests and view test results.
- The **Administration Level** allows access for a **950RTS** systems administrator to do all technician level tasks plus modify site configuration files and schedule ATR tests if purchased , and import the switch database.
- The **Super User Level** allows the **UNIX** system administrator to modify **UNIX** files, add and remove user accounts, change passwords, and use all system administration tools.

The administrative functions discussed in this section of the manual are carried out by users at the **Administration** and **Super User** levels only. Users at the **Technician Level** should refer to the *950RTS Remote Test System Operator's Manual*.

3-1.1 UNIX Documentation

Refer to the **SCO UNIX System** documentation provided with the **950RTS** for details on the operating system. The *UNIX System Administrator's Guide*, *UNIX System Administrator's Reference*, *UNIX Release Notes*, and *UNIX Installation Guide* have information useful to install, configure and administer the system.

UNIX users should refer to the *UNIX User's Guide*, *UNIX User's Reference*, *UNIX Operating System Tutorial*, and *SCO Shell User's Guide* to gain familiarity with the system.

The following sections refer to the **UNIX** documentation on operating system specific issues.

3-1.2 Root Password

The system **super-user** logs in as "**root**" to perform various administrative tasks.

Super-user privileges should not be used during routine operation of the system, as it is possible for the super-user to change or delete system files, which can render the system inoperable.

Section III Configuring the 950RTS

The password for “**root**” is set to “**Sage**” (note the upper-case ‘S’) at the factory. You should change it during installation by using the **passwd** command while logged in as **root**. The system will prompt you for a new password twice; it does not echo the new password as you type it. See the *SCO UNIX Operating System User’s Reference* and the *UNIX User’s Guide* for details on passwords.

IMPORTANT!

DO NOT LOSE the root password. The operating system will have to be reinstalled at the factory if the root password is unavailable. Restrict access to the root password to as few users as possible as misuse—whether intentional or unintentional—can render the system inoperable.

You should always use the sequence described under *Stopping the System* in chapter 3 of the *SCO UNIX Operating System — System Administrator’s Guide*, which describes the shutdown procedure. If you need to shut down power to the system at any time, shut down the operating system first.

3-1.3 Admin Password

The **950RTS** comes with another account pre-installed with user name of **admin**. Like “**root**”, this account also has the default password “**Sage**.” The administrator uses this account when configuring the **DS1 span** (framing, etc), carrying out other administrative tasks, and maintaining **ATR** configuration files.

3-2 CONFIGURING THE SYSTEM

You can modify two text files for each site after the system is installed and running. These files are:

- **motd**
- **MAKEDB**

These files usually need attention only at the initial installation or when system resources are added or changed. You can edit these files using one of the text editors included with the **950RTS** software. These editors are:

- **vi**-a standard **UNIX** screen-based text editor. (See the manual pages for this editor by typing **man vi** at the **UNIX** prompt). To use **vi** in “**novice mode**”, use **vedit**.

You also have the option of using your own **UNIX** text editor, or editing files using a PC and transferring files to your **UNIX** system. Editing the system files is described briefly in the following sections.

3-2.1 motd

The “**message of the day**” is in **/etc/motd**. This file is printed to each user as they log in, and can be changed at any time to provide reminders about system downtime, etc.

3-2.2 Interface Database

Makedb is a shell script that allows you to use the **950RTS** command line interface to create the **Interface Database** in directory `/u/950rts/lib`. This database includes 3 files:

- **950intfc** hardware connection definitions
- **950dintfc** framing configuration definitions
- **950chan** channel definitions

You can define the hardware connections and framing configuration using the **t1config** utility which provides a graphic user interface. **MAKEDB**, however, provides the only way to define channel info.

The **makedb** script that comes with your system shows the setup information for interfaces 0 and 1 on board 0 (first board). (refer to **Appendix V** of this manual to see the sample **makedb** file.) You can use this as a model to write a new **makedb** script to configure additional boards and interfaces. (The **makedb** script file can be modified using the SCO shell text editor, vi, or any text editor). The following is a description of each of the fields in the sample **makedb** script that must be modified for each new board:

3-2.2.1 Board Setup (950intfc Database)

example

```
# set-up board 0 interface 0
db c 950intfc id=1
db m 950intfc 1 name=B0I0
db m 950intfc 1 board=0 intfNum=0
db m 950intfc 1 mgr=tlim type=digital
db m 950intfc 1 subtype=ds1-xircom
db m 950intfc 1 bandwidth=1.544000
db m 950intfc 1 cabinet=1
```

description

<code>id= 1</code>	Creates DS-1 name (unique for each DS-1)								
<code>name= B0I0</code>	Specifies the name of span. (B<board#>I<interface#>)								
<code>board= 0</code>	Specifies board number (board #s start at 0, not 1)								
<code>intfNum= 0</code>	Specifies the interface number (0 or 1)								
<code>mgr=tlim</code>	Always fixed at tlim .								
<code>type=digital</code>	Always set to digital .								
<code>subtype=ds1-dti</code>	set to one of the following:								
	<table border="0"> <tbody> <tr> <td><code>ds1-dti</code></td> <td>T1, Sage DTI board</td> </tr> <tr> <td><code>e1-dti</code></td> <td>E1, Sage (DTI) board</td> </tr> <tr> <td><code>ds1-xircom</code></td> <td>T1, Xircom ISA-48 board</td> </tr> <tr> <td><code>e1-xircom</code></td> <td>E1, Xircom ISA-48 board</td> </tr> </tbody> </table>	<code>ds1-dti</code>	T1, Sage DTI board	<code>e1-dti</code>	E1, Sage (DTI) board	<code>ds1-xircom</code>	T1, Xircom ISA-48 board	<code>e1-xircom</code>	E1, Xircom ISA-48 board
<code>ds1-dti</code>	T1, Sage DTI board								
<code>e1-dti</code>	E1, Sage (DTI) board								
<code>ds1-xircom</code>	T1, Xircom ISA-48 board								
<code>e1-xircom</code>	E1, Xircom ISA-48 board								
<code>bandwidth=1.544000</code>	Set to either 1.544 (T1) or 2.048 (E1).								
<code>cabinet=1</code>	Not currently used. Set to 1 .								

Section III Configuring the 950RTS

3-2.2.2 Framing Configuration (950dintfc Database)

example

```
db c 950dintfc id=1 framing=sf coding=ami length=0-133 monitor=none
```

description

id= 1	Specifies DS-1 name (unique for each DS1)
framing= sf	Specifies framing. Set to one of the following: For T1: none, SF, ESF For E1: none, pcm31-crc, pcm31, pcm30-crc, pcm30
coding= ami	Specifies line coding. Set to one of the following: For T1: none, ami, b8zs, b7stuff For E1: none, ami, hdb3
length= 0-133	Specifies distance (in feet) of 950RTS from the switch. (0-133, 133-266, 266-399, 399-533, 533-655)
monitor= none	Specifies performance monitor type (ANSI, AT&T, None)

3-2.2.3 Channel Definition (950chan Database)

example

```
db c 950chan name=z101 id=1 port=rb101 num=1 type=ds0rbs
```

description

name= z101	Creates channel name. Typically <port name>.<channel num>. This is used by the database as the key field and is used to sort channel sequence.
id= 1	Specifies DS-1 name (Should be unique for each DS-1)
port= rb101	Specifies port name. (Can be any name but should be unique.) By giving multiple channels the same port name, (for example, all of the channels out to Houston are listed port=Houston) you can tell the 950RTS to test on a channel of that type, and it will search through those channels for the first one that is available. If Purchased Option # 950RTS-603, ROTL Responder is installed on your system, a 105 far-end testline can be started automatically on a given channel by setting the port name to TL105 on the channels where a 105 responder is required.

<code>num= 1</code>	Specifies the channel number on that interface. Set to one of the following: <table> <tr><td>T1 TAP</td><td>1-12</td></tr> <tr><td>E1 TAP</td><td>1-15</td></tr> <tr><td>T1 DS0</td><td>1-24</td></tr> <tr><td>E1 DS0</td><td>1-31</td></tr> <tr><td>others</td><td>1</td></tr> </table>	T1 TAP	1-12	E1 TAP	1-15	T1 DS0	1-24	E1 DS0	1-31	others	1										
T1 TAP	1-12																				
E1 TAP	1-15																				
T1 DS0	1-24																				
E1 DS0	1-31																				
others	1																				
<code>type= ds0rbs</code>	Specifies the channel type. Set to one of the following: <table> <tr><td><code>e1-fad</code></td><td>E1, facility access digroup to DCS</td></tr> <tr><td><code>t1-fad</code></td><td>T1, facility access digroup to DCS</td></tr> <tr><td><code>e1</code></td><td>Full E1 pipe</td></tr> <tr><td><code>e1-tad</code></td><td>E1, test access digroup to DCS</td></tr> <tr><td><code>t1</code></td><td>Full T1 pipe</td></tr> <tr><td><code>t1-tad</code></td><td>T1, test access digroup to DCS</td></tr> <tr><td><code>ds0clear</code></td><td>DS0, clear channel</td></tr> <tr><td><code>ds0rbs</code></td><td>DS0, with robbed bit signaling</td></tr> <tr><td><code>dtapclear</code></td><td>Test access path to DCS, clear channel</td></tr> <tr><td><code>dtaprbs</code></td><td>Test access path to DCS, with robbed-bit signalling</td></tr> </table>	<code>e1-fad</code>	E1, facility access digroup to DCS	<code>t1-fad</code>	T1, facility access digroup to DCS	<code>e1</code>	Full E1 pipe	<code>e1-tad</code>	E1, test access digroup to DCS	<code>t1</code>	Full T1 pipe	<code>t1-tad</code>	T1, test access digroup to DCS	<code>ds0clear</code>	DS0, clear channel	<code>ds0rbs</code>	DS0, with robbed bit signaling	<code>dtapclear</code>	Test access path to DCS, clear channel	<code>dtaprbs</code>	Test access path to DCS, with robbed-bit signalling
<code>e1-fad</code>	E1, facility access digroup to DCS																				
<code>t1-fad</code>	T1, facility access digroup to DCS																				
<code>e1</code>	Full E1 pipe																				
<code>e1-tad</code>	E1, test access digroup to DCS																				
<code>t1</code>	Full T1 pipe																				
<code>t1-tad</code>	T1, test access digroup to DCS																				
<code>ds0clear</code>	DS0, clear channel																				
<code>ds0rbs</code>	DS0, with robbed bit signaling																				
<code>dtapclear</code>	Test access path to DCS, clear channel																				
<code>dtaprbs</code>	Test access path to DCS, with robbed-bit signalling																				

3-2.2.4 Channel Definition (FAD)

example

```
db c 950chan name=dti1 id=3 port=Hadax num=1 type=t1-fad sysname=1-16-2
```

description

<code>name= dti1</code>	This is used by the database as the key field and is used to sort channel sequence. (Should be unique)						
<code>id= 3</code>	Specifies the first interface of the T1 board connected to the FAD. (Normally 3)						
<code>port= Hadax</code>	Specifies port name. (Must match the map file.)						
<code>num= 1</code>	Specifies the channel number on that interface. Set to one of the following: <table> <tr><td>T1 DS0</td><td>1-24</td></tr> <tr><td>E1 DS0</td><td>1-31</td></tr> <tr><td>others</td><td>1</td></tr> </table>	T1 DS0	1-24	E1 DS0	1-31	others	1
T1 DS0	1-24						
E1 DS0	1-31						
others	1						
<code>type= t1-fad</code>	Specifies the channel type. Set to one of the following: <table> <tr><td><code>e1-fad</code></td><td>E1, facility access digroup to DCS</td></tr> <tr><td><code>t1-fad</code></td><td>T1, facility access digroup to DCS</td></tr> </table>	<code>e1-fad</code>	E1, facility access digroup to DCS	<code>t1-fad</code>	T1, facility access digroup to DCS		
<code>e1-fad</code>	E1, facility access digroup to DCS						
<code>t1-fad</code>	T1, facility access digroup to DCS						
<code>sysname=1-16-2</code>	Specifies the ID# of the test access port. This identifies the FAD provisioning on the DCS.						

3-2.2.5 Channel Definition (TAD)

for TAD testing, you will have 13 channel definition lines: one to set up the TAD, and 12 to setup each of the twelve test access paths within the TAD.

example

```
db c 950chan name=tad1 id=2 port=TestDacs num=1 type=t1-tad

db c 950chan name=tap1 id=2 port=tap-rbs num=1 type=dtaprbs
db c 950chan name=tap2 id=2 port=tap-rbs num=2 type=dtaprbs
db c 950chan name=tap3 id=2 port=tap-rbs num=3 type=dtaprbs
db c 950chan name=tap4 id=2 port=tap-rbs num=4 type=dtaprbs
db c 950chan name=tap5 id=2 port=tap-rbs num=5 type=dtaprbs
db c 950chan name=tap6 id=2 port=tap-clr num=6 type=dtapclear
db c 950chan name=tap7 id=2 port=tap-clr num=7 type=dtapclear
db c 950chan name=tap8 id=2 port=tap-clr num=8 type=dtapclear
db c 950chan name=tad9 id=2 port=tap-clr num=9 type=dtapclear
db c 950chan name=tap10 id=2 port=tap-clr num=10 type=dtapclear
db c 950chan name=tap11 id=2 port=tap-clr num=11 type=dtapclear
db c 950chan name=tap12 id=2 port=tap-clr num=12 type=dtapclear
```

description

name= **tad**

This is used by the database as the key field and is used to sort channel sequence. (Should be unique)

id= **2**

Specifies the number of the DS1 connected to the TAD (Normally set to 2)

port= **TestDacs**

Specifies port name. (Can be any name but should be unique.) By giving multiple channels the same port name, (for example, all of the channels are listed **port=tad**) you can tell the **950RTS** to test on a channel of that type, and it will search through those channels for the first one that is available.

num= **1**

Specifies the channel number on that interface. In the TAD definition line, it should be set to **1**. In the channel lines, it should be set between **1** and **12**.

type= **t1-fad**

Specifies the channel type.

In the TAD definition line, set the type to one of the following:

e1-tad	E1, test access digroup to DCS
t1-tad	T1, test access digroup to DCS

In each the channel lines, set the type to one of the following:

dtapclear Test access path to DCS, clear channel
dtaprbs Test access path to DCS, with robbed-bit signalling

When assigning board and interface numbers in **makedb**, it is important to note that it is different from the naming system in **T1config** and in the **command line** common usage sequence. The differences are listed in **Table 3-1**.

Table 3-1 Board and Interface Names in makedb, T1config, and Command Line.

makedb		T1config		command line
board name	intfc name	board name	intfc name	interface/ board name
0	0	1	1	1
0	1	1	2	2
1	0	2	1	3
1	1	2	2	4

If you are setting up a channel that is attached to a **DCS**, you must make sure that the name field has a 2 digit, zero padded string corresponding to the tap number. (i.e. db c 950chan name= **rb101.01** rather than db c 950chan name= **rb101.1**)

To modify the database files using your updated **makedb** script, place the **makedb** file in directory / **u/950/11b** and type **makedb** at the normal **UNIX** command prompt (**\$**). The database will be automatically updated.

After updating the makedb file, you must restart the **950RTS** using the **950 restart** command for changes to become available.

3-2.3 T1 Configuration

The **t1config** utility allows you to configure and check the status of the **T1 interfaces** into the **950RTS**. The configuration includes: **framing, line coding, distance to the DSX, and ESF data link type**.

You can view the current state of all interfaces into the system, as well as their configurations, at any time. However, before running **t1config** and changing any of the configuration parameters, you should confirm the following setup:

1. The system is operating in multiuser mode so that the **T1 interface manager process** is running.

Section III Configuring the 950RTS

2. You are logged in as user **admin**.
3. You have stopped any tests using channels on the board that you are reconfiguring. The **t1config** utility will not allow you to attempt to re-configure an interface when channels are in use.

3-2.3.1 Starting the Utility

To use **t1config**, type **t1config** at the **UNIX** command prompt (usually **\$**). The utility will display a screen similar to the following:

SAGE INSTRUMENTS 950 REMOTE TEST SYSTEM
System name: s950p3 Mon Jan 30 16:25:59 1995

T1 Board Status and Configuration

Commands	Board	1	2	3	4
Board Sel	Type	Dual T1	Dual T1	NOT	NOT
Configure	Status	In Service	Maintenance	INSTALLED	INSTALLED
Perf Mon	Intf 1	No Alarm:	CFA (RedAlm)		
Ckt Usage	Intf 2	No Alarm:	RAI (YelAlm)		
Quit					

Board 1 Interface Configuration

Interface 1	Interface 2
Span name: INTFC1	Span name: INTFC2
Framing: ESF	Framing: D4/SF
Line Code: B8ZS	Line Code: AMI
Length: 0-133ft	Length: 533-655ft
Perf mon: ANSI	Perf mon: None
Quit	

Arrow keys highlight, <Enter> selects

Figure 3-1
T1 Board Status and Configuration Menu

The display screen has four menus:

- The **Commands Menu**, at the upper left, allows you to select a board to configure, configure a board, view performance monitor information, check circuit usage, or quit the utility.
- The **Interface Status Menu** displays information about each interface board installed in the system (its type, status, and the alarm status of each interface).
- The two **Interface Configuration Menus** display information about each of the interfaces on the selected board.

3-2.3.2 Selecting a Board

To select a board:

1. Use the **Up and Down Arrow** keys to highlight the **Board Sel Field** in the **Commands Menu** at the upper left of the screen. (See **Figure 3-3**)

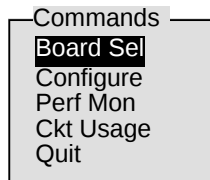


Figure 3-3
Commands Menu

2. Press **Enter**. A menu with a list of all installed boards appears.
3. Use the **Arrow** keys to highlight the number of the board you want to configure.
4. Press **Enter** to accept the selection.

3-2.3.3 Configuring a Board

To configure an interface board:

1. Use the **Up and Down Arrow** keys to highlight the **Configure** field in the **Commands** menu at the upper left of the screen. (Refer to **Figure 3.3**)
2. Press **Enter**. The **Interface Configuration Menu** is selected, and the message "Quit" at the bottom. Initially, the **Framing Field** on **interface 1** is highlighted. (See **Figure 3-3**)

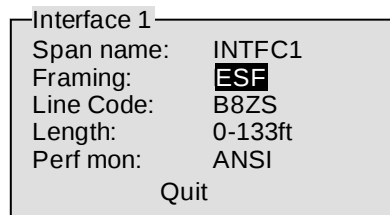


Figure 3-3
Interface Configuration pop-up

(You can use the **Left and Right Arrow** keys to change between **interface 1** and **interface 2**.)

Section III Configuring the 950RTS

3. Use the **Up and Down Arrow** keys to highlight the **framing**, **line code**, **length**, or **Perf Mon** for that interface. The options are shown below:

• Framing	SF, ESF, SLC-96, ZBTSI
• Line coding	B8ZS, AMI, B7STUFF
• Length	0-133, 133-266, 266-399, 399-533, 533-655 (distance, in feet of cable, between the 950RTS and the switch)
• Perf mon	ATT, ANSI, None

4. Press the **Space bar** to cycle through the possible selections for the highlighted menu item.
5. Press **Enter** to accept an argument.
6. After making your changes, use the **Arrow** keys to highlight the **Quit** label and press **Enter** to return to the **Commands** menu.

The **Perf Mon** and **Ckt Usage** functions in the **Commands** menu are currently not implemented.

3-2.3.4 Quitting T1 Config

To exit **t1config**:

1. Select **Quit** in the **Commands Menu**.
2. Press **Enter**. A window will pop up asking you to confirm that you want to quit. (See **Figure 3-4**)

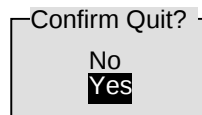


Figure 3-4
Quit Confirmation Pop-up

3. Select **Yes** if you want to exit **t1config**, and **No** if you do not.

3-2.3.5 Warning Messages in T1 Config

You may get some error messages when using **t1config**. The following table describes the messages, causes, and remedies.

Table 3-1 Warning Messages

Warning Message	What it means	What to do
"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. Verify that all of the configurations on all of the boards are correct, and then answer "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.	Be certain you are logged in as user "admin" before trying to change 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 board for testing.	Use the "whodo" command to see who else is running tests and have them stop. Make certain no automatic tests 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 will be the case if the system is still in single-user mode.	Bring the system into multi-user mode. If it is already in multiuser mode, use the command startt1im to restart the interface manager.

3-2.4 Clock Source Configuration

When performing DS0 testing, the **950RTS** is typically synchronized to an incoming T1 or E1 span which originates at a digital switch, digital cross-connect system, or other network element which contains a **Stratum 3** or better clock.

Up to three T1/E1s may be specified as clock sources, and they are specified as the primary reference, secondary reference, and tertiary reference. The **950RTS** uses the highest priority reference that is not in alarm as its clock reference. If none of the specified references are alarm-free, the **950RTS** reverts to its internal **Stratum 4** clock until one of the specified references returns to service.

If there are no T1s connecting to higher stratum clock references (i.e., the **950RTS** is only connected to a channel bank), the internal clock reference may be specified as the primary system clock reference.

Note that the file `/u/950rts/lib/clocksources` is no longer used in **release 4.1.1 and later**. The information formerly in this file is now kept in one of the system databases.

3-2.4.1 Determining the T1s to Use

The installer will need to determine which T1 or T1s to use for synchronization based on their references. Typically DCSs and switches are synchronized to a **network clock** or **GPS/Loran reference**, so any of them may be used.

If only one T1 has a connection to a higher stratum clock reference, then plan on using only one clock reference. Likewise, if only two T1s are connected to higher stratum clock references, specify only two references.

Note: Only TAD connections (i.e., DS0 testing) to a DCS should be used; FAD connections may not actually be synchronous.

The names of the T1s to be used need to be determined. These are in the interface database, and can be listed by using the `tlimstat` command:

```
$ tlimstat
tlimstat (c) 1997 Sage Instruments, Inc.
bd      type      status ifc name      frame Code      length  perf status
1  DS1-Xircom  In Serv 1  B0I0      D4-SF B7Stuff  0-133ft  None No errs
                2  B0I1      D4-SF B7Stuff  0-133ft  None No errs
2  DS1-DTI     In Serv 1  B1I0      D4-SF B7Stuff  0-133ft  None No errs
                2  B1I1      D4-SF B7Stuff  0-133ft  None No errs
```

For each T1 interface to be used as a clock reference, note the name in the fifth field (**B0I0** through **B1I1** in the previous example).

3-2.4.2 Selecting Clock Sources for Each Interface

Every interface must have a clock source. This source may be the **950RTS** system clock reference, the T1/E1 line to which the interface is connected, or the internal clock source on the interface board.

The valid clock source terms for each reference are as follows:

primary	This interface provides the primary system reference clock from its recovered T1/E1.
secondary	This interface provides the secondary system reference clock from its recovered T1/E1.
tertiary	This interface provides the tertiary (third) system reference clock from its recovered T1/E1.
slave	This interface uses the system reference clock (recovered from a primary, secondary, or tertiary interface)
looptime	For FAD or full-pipe T1/E1 testing, use recovered clock from the test interface.
internal	For FAD or full-pipe T1/E1 testing, use the board's internal clock source

Determine the clock source by asking the following questions:

1. Is this a DTI board used for full T1 or T1-FAD testing (I.e., full T1 bit error rate testing)?

If **YES**, use looptime if the interface should slave its clock to the recovered clock from its receiver.

If **NO**, use internal.

Otherwise, this is a DTI or Xircom board used for channel access or FAD testing.

2. Is this interface to be used as a primary, secondary, or tertiary clock source?

If **YES**, set it to primary, secondary, or tertiary as appropriate.

If **NO**, this interface should be set to slave.

If the interface is to be used for channel access/FAD testing, and the **950RTS** is to provide the clock reference (I.e., the reference is not slaved to an incoming T1/E1), set all of the interfaces to slave (I.e., do not specify a primary, secondary, or tertiary interface). The **950RTS** will automatically pick an internal clock source.

3-2.4.3 Modifying the Database

Clock source information is kept in the **950dintfc** database. This is the same database that contains information about framing, line coding, and line length. The field containing clock information is called "clock."

Edit the **makedb** file as necessary, and update the clock field for each interface as previously determined.

Examples:

```
db m 950dintfc 1 clock=primary    # primary system clock source
db m 950dintfc 2 clock=secondary  # secondary system clock source
db m 950dintfc 3 clock=slave      # slave from system clock
db m 950dintfc 4 clock=slave      # slave from system clock
db m 950dintfc 5 clock=looptime   # FAD/full-t1, loop time
db m 950dintfc 6 clock=internal   # FAD/full-t1, use internal clk
```

3-2.4.3.1 Making the Change Take Effect

It is necessary to run **makedb** and restart the T1 interface manager to have the new clock sources take effect. All tests must be stopped on the system first (i.e., **vfctest**, **berttest**, **scl**, or **nearend**). Then, as user **admin**, give the command:

```
$ 950rts restart
```

which shuts down, then restarts all of the system processes.

3-2.4.3.2 Verifying the Clock Source

All clock source selections are noted in the file `/u/950rts/log/tlim.log`. A typical startup sequence appears as follows:

```
14:52:13 09/19/97 (8841) primary   clock src board 1 intf 1
14:52:13 09/19/97 (8841) secondary clock src board 1 intf 2
14:52:13 09/19/97 (8841) New clock source bd 1 int 1 (primary)
```

When the clock source changes due to an alarm:

```
10:22:49 09/15/97 (3449) Stat change board 1 intf 1: Rmt Alrm
10:22:49 09/15/97 (3449) New clock source bd 1 int 2 (secondary)
```

Note that all log messages that deal with clock sources contain the keyword **clock**, so clock messages can be extracted as follows:

```
$ grep clock tlim.log
09:54:34 09/23/97 (461) System on internal clock (NOT LOOP TIMED)
09:54:34 09/23/97 (461) New clock source bd 1 int 1 (internal)
```

3-2.5 950RTS TCP/IP Network Configuration

3-2.5.1 Modifying the 950RTS Network Address

To modify the network address:

1. Power up the **950RTS**.
2. At the prompt, press the **Enter** key.
3. Enter the root password to enter system maintenance mode.
4. At the # prompt type the following command:

```
# netconfig
```

This will bring up the network configuration menu. The menu will show the currently configured chains:

Currently configured chains:

```
1. nfs->sco_tcp
    nfs      SCO NFS Runtime System for SCO Unix
    sco_tcp  SCO TCP/IP for UNIX
2. sco_tcp->lo0
    sco_tcp  SCO TCP/IP for UNIX
    lo0      SCO TCP/IP Loopback driver
3. sco_tcp->e3E0
    sco_tcp  SCO TCP/IP for UNIX
    e3E0     3Com EtherLink III Ethernet driver, board 0
```

Available options:

1. Add a chain
2. Remove a chain
3. Reconfigure an element in a chain
- q. Quit

Select option:

5. Type **3** to reconfigure the chain and press **Enter**. The screen will advance to read:

Currently configured chains:

```
1. nfs->sco_tcp
    nfs      SCO NFS Runtime System for SCO Unix
    sco_tcp  SCO TCP/IP for UNIX
```

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```
2. sco_tcp->lo0
   sco_tcp SCO TCP/IP for UNIX
   lo0      SCO TCP/IP Loopback driver
3. sco_tcp->e3E0
   sco_tcp SCO TCP/IP for UNIX
   e3E0     3Com EtherLink III Ethernet driver, board 0
Select a chain to reconfigure ('q' to quit):
```

6. Type **3** to reconfigure `sco_tcp>e3E0` and press **Enter**. The screen will then ask you which element in the chain you want to reconfigure:

These elements support reconfiguring:

- ```
1. sco_tcp SCO TCP/IP for UNIX
2. e3E0 3Com EtherLink III Ethernet driver, board 0
```

Select an element to reconfigure ('q' to quit):

7. Type **1** to select `sco_tcp` SCO TCP/IP and press **Enter**. The display will reconfirm that you want to reconfigure the chain:

Reconfigure `sco_tcp` (y/n) :

8. Type **y** to confirm your selection and press **Enter**. The screen will advance to show the current configuration:

TCP/IP Reconfiguration of `sco_tcp->e3E0`

The current configuration is shown below:

```
Interface Address: XXX.XXX.XXX.XX
Netmask: XXX.XXX.XXX.XXX
Broadcast Address: XXX.XXX.XXX.XX
Local host name: <Hostname>
```

Please enter the revised parameters:

Enter the internet address of this interface  
(default: XXX.XXX.XXX.XX) :

9. Type the internet address and press **Enter**. The screen will advance to read:

Enter the netmask for this interface (default: 255.255.255.224):

10. Type the netmask and press **Enter**. The screen will advance to read:

Does the interface use a broadcast address of all 1's? (y/n) (default: y):

11. Type **y** and press **Enter**. The screen will advance to read:

Enter the broadcast address for this interface  
(default: XXX.XXX.XXX.XX):

12. Type the broadcast address and press **Enter**. The screen will advance to read:

Enter local name for this interface or enter q to quit [localname]:

The text in the square brackets is the default.

13. Type the local name and press **Enter**. The screen will confirm your setup:

Do you wish to change any of these parameters (y/n):

14. Type **n** to confirm that you do not wish to make further changes and press **Enter**. The screen will update your files:

Updating configuration files ...  
Adding host turnip.sageinst.com to /etc/hosts

32 Pseudo ttys are currently configured, do you want to:

1. Add Pseudo ttys
2. Remove Pseudo ttys

Select an option or enter q to quit [q]:

15. Type **q** to quit. The screen will advance to read:

256 TCP connections currently configured, do you want to:

1. Add TCP Connections
2. Remove TCP Connections

Select an option or enter q to quit [q]:

16. Type **q** to quit. The screen will return to the first setup menu:

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---

TCP/IP Reconfiguration Complete.

Currently configured chains:

1. nfs->sco\_tcp  
    nfs        SCO NFS Runtime System for SCO Unix  
    sco\_tcp    SCO TCP/IP for UNIX
2. sco\_tcp->lo0  
    sco\_tcp    SCO TCP/IP for UNIX  
    lo0        SCO TCP/IP Loopback driver
3. sco\_tcp->e3E0  
    sco\_tcp    SCO TCP/IP for UNIX  
    e3E0       3Com EtherLink III Ethernet driver, board 0

Available options:

1. Add a chain
2. Remove a chain
3. Reconfigure an element in a chain
- q. Quit

Select option: **q**

This will write and quit vi.

17. Type **q** to quit. The screen will show the root prompt.

18. Go to the directory in which tcp resides.

19. At the root prompt, type:

```
vi tcp
```

20. Scroll down until you see the lines:

```
if [-x/etc/routed -a ! -f /etc/gated.conf; then
 routed -k $k; echo "routed \c"
fi
```

21. At the root prompt, type **i** to enter vi insert mode.

22. At the root prompt, type:

```
route add default XXX.XXX.XXX.XXX 1
```

Where XXX.XXX.XXX.XXX is the IP address of the default router.

23. Press the **esc** key.

24. At the root prompt, type:

```
:wq
```

This will write and quit vi.

25. At the root prompt, type:

```
shutdown -g0 -y
```

26. When prompted, press any key to reboot the system.

**Note:** Do not touch any keys while the system is rebooting. If left alone, the system will reboot.

### 3-2.6 Adding Users to the System

---

The system comes with accounts for "**test**" and "**admin**". You may add additional user accounts to allow users individual working directories. (See **Chapter 4** of the *System Administrator's Guide* for details on adding accounts using the **sysadmsh** utility.)

Some guidelines for adding accounts:

- The home directory for each user should be on the **/u filesystem**. This is a logically separate file system from that used for **UNIX** system files, and allows easier recovery should the user file systems use up all available disk space.
- The default groups are **test** and **admin**. Most users should be put into the test group; this allows them to read and write files in their directories and read system files as needed; they will not be able to reconfigure or modify any system files. Only those users who will be doing maintenance or modification to the **950RTS** should be in the admin group. If a user does both routine testing and occasional administrative tasks, it may be best to give the user two accounts so that they only use the administrative login as necessary; this can prevent accidental modification of system files.

### 3-3 ADMINISTRATION

---

#### 3-3.1 Manager Processes

---

Two manager processes coordinate access to the **T1 spans** and to the test resource (**DSP**) boards among multiple users. Use the **ps** command to verify that the manager processes are active. For example:

```
ps -ae | grep tlim
```

should display the status of the **tlim** (T1 interface manager) processes. (Two processes are associated with the tlim manager.)

```
ps -ae | grep trem
```

will show status of the **trem** (test resource manager) process.

If any of these processes is missing, your system has experienced an abnormal condition. You should reboot using the command:

```
950rts restart
```

#### 3-3.2 System Security

---

The **950RTS** is shipped from the factory with system security set to its lowest level. Several system security levels are available, up to **DOD Orange Book C2 class of trust**. (Refer to chapter 9, "Maintaining System Security" in the *UNIX System Administrators Guide* and chapter 7, "Using a Secure System" in the *UNIX User's Guide*.)

#### 3-3.3 Making an Emergency Boot Floppy Set

---

In the unlikely event that a critical operating system file becomes corrupted to the point that the system will not start, it is important that you have a set of emergency boot floppies to restart the system. (See Appendix G, "Creating an emergency boot floppy set," in the *UNIX Installation Guide*.)

#### 3-3.4 Backups

---

You do not need to backup the operating system files on **/dev/root**. If the hard disk fails or become corrupted, you should obtain a replacement pre-loaded hard disk from the factory.

You should regularly backup the **/u** filesystem, which contains site-specific data and user files. Backup frequency — whether daily, weekly, or monthly — can only be judged on a site-by-site basis, depending on the magnitude of the potential loss. To backup the system, login as **"root"** use the system administration program, **sysadmsh**, and select backups. (See the *UNIX System Administration Guide* for more information.)

### 3-3.5 Other Administrative Tasks

---

Some administrative tasks may or may not be relevant to any given site. These are detailed in **Chapter 1** of the *Unix System Administrator's Guide*, "Understanding system administration." As with backups, the exact tasks which need to be performed at any site can only be determined by the system administrator, based on the specifics of that site.

### 3-4 ROUTINE MAINTENANCE

---

Very little routine maintenance is required of the system beyond regular backups. Depending on the cleanliness of the installation site, the following procedures should be performed on a regular basis:

To clean the filter:

1. Remove the filter medium from the lower part of the front door.
2. Rinse the filter in clean water.
3. Dry the filter.
4. Return the filter to the unit.

This procedure may be performed monthly in some sites and yearly in others. You should clean the filter if dust is noticeable on the filter or the air inlets on the front door.

To verify that the fans are operational:

Routinely check for air exhaust at the lower rear of the unit and along the vents at the top of the card retainer panel. On a monthly basis, remove the retainer panel and visually check that all three fans are operating.



## SECTION IV

### AUTOMATIC TRUNK ROUTINING

### CONFIGURATION AND ADMINISTRATION

#### 4-1 REQUIRED INFORMATION

---

Before using the Automatic Trunk Routining (**ATR**) feature, several configuration files must be set up. The following information is needed during configuration:

- routing of the **950RTS** test ports to near-end switches
- test line and responder access numbers on far-end switches
- trunk group locations

Dial-up access to nearend switches is needed for database download.

All steps in the basic **950RTS** installation should be completed before beginning **ATR** configuration. Verify operation of the **950RTS** by running the demand testing utility, **vfctest**.

#### 4-2 TEST PORT CONFIGURATION

---

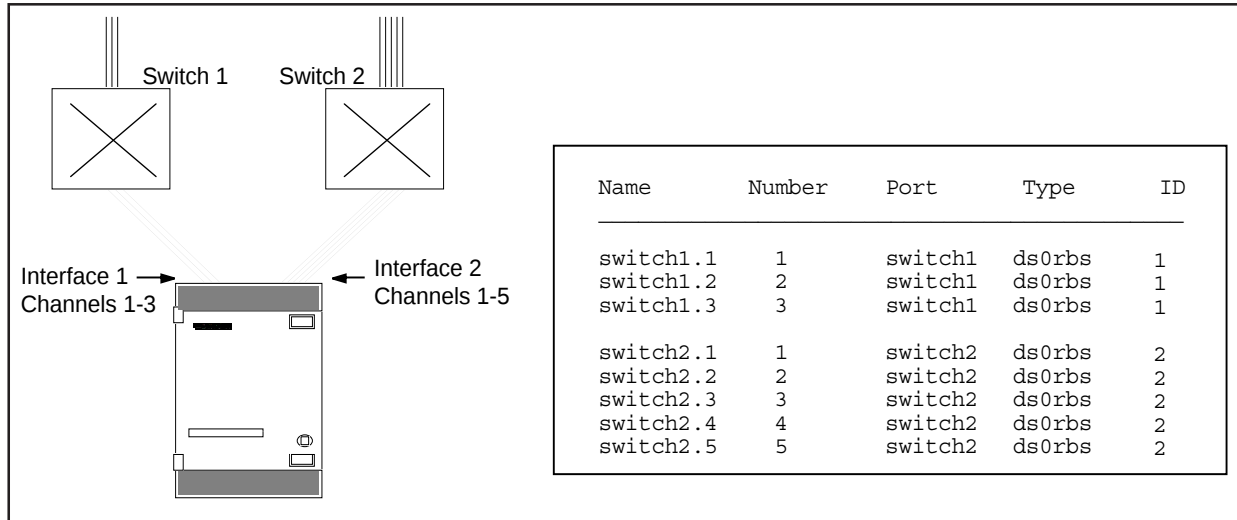
As part of the basic **950RTS** installation, the local test configurations set up in the **Interface Database** using the **makedb** shell script.

The existing database may suffice for **ATR**, or it may be desirable to rename some of the test ports to indicate equivalence of test ports, called a **hunt group**. If this is done, the **ATR** software can choose test ports on a “**next available**” basis to reduce contention for test ports.

Refer to **Section 3.2.2.3** for information on configuring a 105 far-end responder on the **950RTS**.

## Section IV Automatic Trunk Routing Configuration and Administration

If the **950RTS** is connected to more than one near-end switch, you should include the switch name in the port name, as illustrated below:



**Figure 4-1**  
**950RTS Connected to Multiple Switches**

(See **Section 3-2.4** of this manual for a description of the **makedb** shell script and the **Interface Database**).

### 4-3 CONFIGURATION FILES

The following configuration files are used by the **950RTS**:

| Function     | Name                                    | Contains                                       |
|--------------|-----------------------------------------|------------------------------------------------|
| trunk files  | <b>default.trks</b><br><i>name.trks</i> | Near-end switch trunk groups and members       |
| site files   | <b>sites/name</b>                       | Far-end switch access numbers and trunk groups |
| limits files | <b>filters/name</b>                     | Low and high limits for failure reporting      |

All files are located in the **950RTS** library directory, `/u/950rts/lib`. In the configuration files, lines that begin with the pound sign (#) are comments.

All files should be owned by the **admin** user, and should be readable by all. Editing these files should be performed as the **admin** user (not as **root**).

The configuration files are all plain text, and are edited using any **UNIX** text editor (e.g. vi). (See **Section 3-2** of this manual for a description of editing facilities on the **950RTS**.)

Note that names of ports, sites, schedules, etc. must be no more than **20 characters** long, limited to letters, numbers, and simple punctuation—dot (.) hyphen (-) and comma (,). Upper and lower-case are significant, and the names must not contain embedded spaces.

### 4-3.1 Trunk Database Download

---

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

The trunk file is normally obtained by downloading it from a near-end switch database. For **DSC switches**, the utility **swlink** can be used to establish the serial connection to the switch and capture output from switch database accesses. (Complete instructions on using **swlink** are in **Appendix II** of this manual.)

For **Ericsson switches**, use the database import script, **EricssonImport**. (Complete instructions on using **EricssonImport** are in **Appendix II**.)

The default trunk file is named **default.trks**. Systems connected to multiple near-end switches will require multiple trunk files. These trunk files should be named *switch-name.trks*, and must be located in the **950RTS** library directory, **/u/950rts/lib**.

The trunk files contain a line for each trunk, with the trunk group in the first column, and the trunk member in the second. Lines beginning with the pound sign (#) are treated as comments. The trunk files may contain a "switch information" line, inserted by the database import program. An example for **Ericsson** switches is:

```
#switch info: ericsson 1 none switch 5
```

An example of a **trunk file** is:

```
-- 07-24-92 - 15:53:24 *--*
DISPLA CP TRKLST 1-2000
TRKGRP(S) : 1-500

TRK(S) TRKGRP INONLY ECHOSUP

 337 4 N N
 72 5 N N
 336 6 N N
 340 8 N N
 341 8 N N
 345 9 N N
 1340 12 N N
 1341 12 N N
 1342 12 N N
 1343 12 N N
 1320 13 N N
 1321 13 N N
 1322 13 N N
 1323 13 N N
```

## Section IV Automatic Trunk Routining Configuration and Administration

---

| TRK(S) | TRKGRP | INCONLY | ECHOSUP |
|--------|--------|---------|---------|
| 1324   | 13     | N       | N       |
| 1325   | 13     | N       | N       |
| 1326   | 13     | N       | N       |
| 1327   | 13     | N       | N       |
| 1328   | 13     | N       | N       |
| 1329   | 13     | N       | N       |
| 1330   | 13     | N       | N       |
| etc.   |        |         |         |

To check the file format after downloading, run the utility **listgroups**. For a single default trunk file, use:

```
% listgroups all
```

For an alternate trunkfile, e.g. one named *Oxnard05.trks*, use:

```
% listgroups all Oxnard05.trks
```

### 4-3.2 Site File Setup

---

Site files are optional files which describe trunks to, and test resources on far-end switches. Setting up site files makes the job of creating test schedules easier for test personnel.

The following information is included in a site file:

- access codes for test lines and responders
- trunk groups connected to the switch
- name of trunk file for near-end switch (only needed if there are multiple trunk files)

**Appendix II** of this manual includes **ATR Site Worksheets** which give detailed information on the entries in a site file. A worksheet should be filled out before creating a site file.

After the worksheet is complete, enter the site file by creating a file with the name of your site, in the **950RTS sites directory**. This should be done by copying the sample site file, **Xample**. This file is then edited to include the information from the worksheet:

```
login: admin
password:

% cd /u/950rts/lib/sites
% cp Xample Ventura05
% vi Ventura05
```

(edit fields to correspond with worksheet)

An example of a **site file** in `/u/950rts/lin/sites` is:

```
Xample - sample equipment and trunks file for a remote site

#####
Test equipment types and access codes
Supported types: S ("silent", 100)
M ("milliwatt", 102)
R ("responder", 105)

Default digit format is DTMF. For MF, prepend an "m" to the digits:
e.g. m9201007

Type Access Code
S 9201007
M 9201002

#####
Trunk file to use instead of 'default.trks'
This file is created with 'swlink', and must reside in /u/95r0rts/lib

#T alternate.trks

#####
Trunk Groups
9
10
12
```

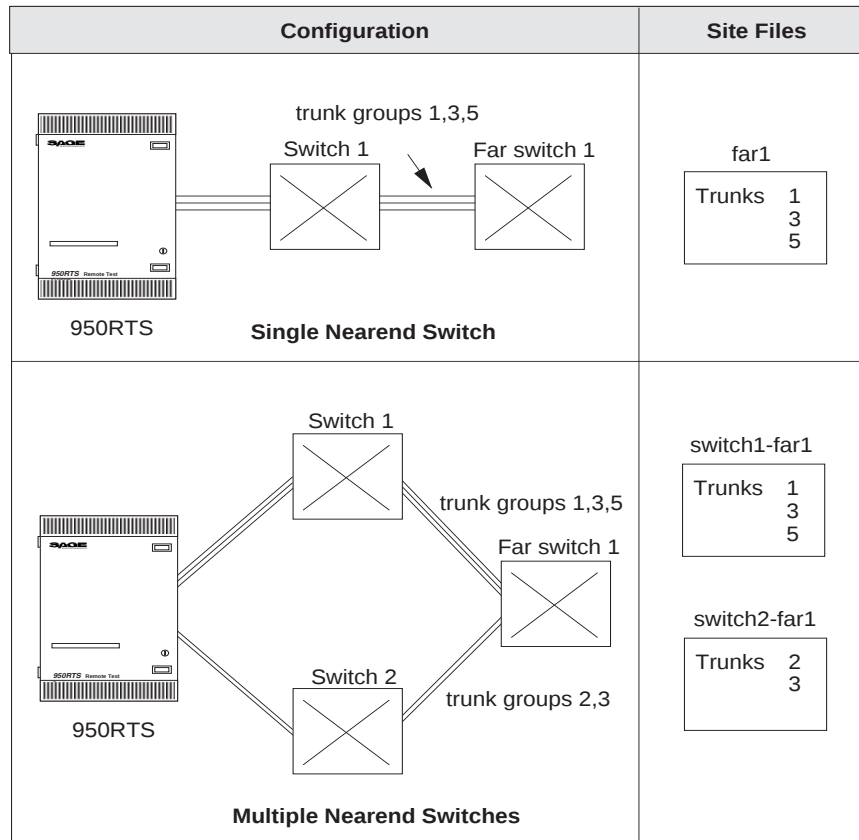
Note: For Ericsson site files, lines containing the trunk groups (routes) must begin with the character G. This is allowed but not required in non-Ericsson site files. For example:

```
trunk groups
G pntci
F xyz
```

After editing is complete, check the file format by running the utilities **listsites** and **printsites**:

```
% listsites
% printsites Ventura05
```

Note that where a **950RTS** is connected to multiple switches, multiple site files might be required for a far-end switch. In this case, each site file would represent a different path to the far-end switch. The following diagram illustrates how site files should be set up for **single nearend switches** and **multiple nearend switches**.



**Figure 4-2**  
950RTS Connected to Single and Multiple Nearend Switches

### 4-3.3 Limits File Customization

The **950RTS** has a set of standard “**limits files**” — one for each supported test line type (**100**, **102**, **105**). These files contain low and high values which are compared against test results when determining whether a test failed.

The **950RTS administrator** can setup additional, custom, limits files by creating new files in the **950RTS** directory **/u/950rts/lib/filters**. To do this, copy a standard limits file, and then edit as desired.

To check the new file format, run the utilities **listlimits** and **printlimits**.

## APPENDIX I

### SOFTWARE UPGRADES

The **950RTS** has the capability of being upgraded in the field via its **3 1/2" floppy disk drive** located behind the front access door. There are two types of upgrades:

- **Upgrading the system software release.** This type of upgrade typically fixes bugs and provides enhancements to existing applications.
- **Upgrading to add new options.** This type of upgrade adds new features to the **950RTS**.

In some instances you may need to upgrade the **950RTS** system software to accept a new option. You should upgrade the system first, then add the new option.

**Warning!:** Improperly performing this procedure can result in a loss of data or cause the system to become inoperable. Read this procedure thoroughly and familiarize yourself with each step before performing the upgrade. If you do not feel comfortable performing this procedure, contact Sage Customer service for assistance.

#### 1-1 UPGRADING THE SYSTEM SOFTWARE RELEASE

---

To upgrade the system software:

1. Check that no other users are logged in.
2. Log in as root.

**Important:** This procedure cannot be performed over a network connection of an X-Windows terminal. You must log on to the system console, or a terminal connected to a serial port of the **950RTS** to perform this procedure.

If a new remove script is provided with the upgrade disks, you can add it to your system files by entering the command:

```
cd/usr/lib/custom
tar xv sageRTS.rmv
```

3. Enter the single user maintenance mode by entering the following command line:

```
init 1
```

4. Once the **950RTS** system is in the single user maintenance mode, enter the following command line to mount the **/u** file system:

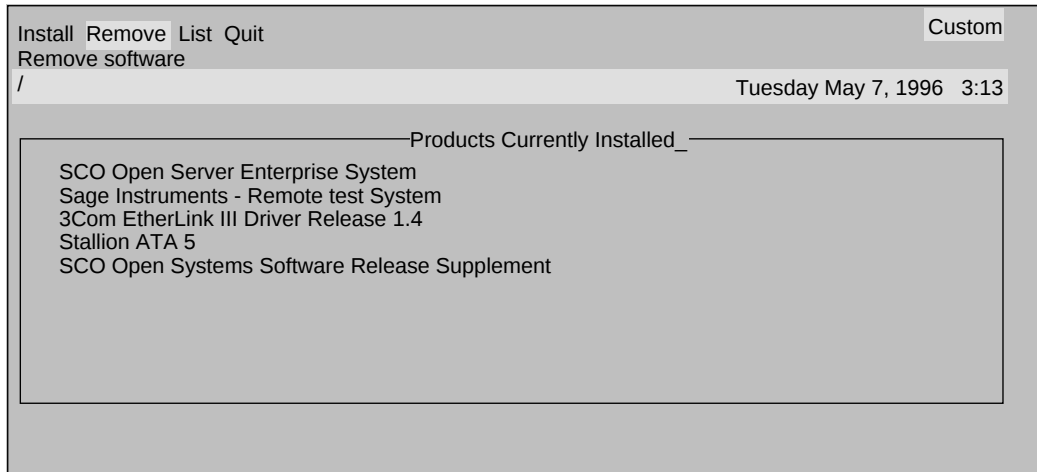
```
mount /u
```

## Appendix I Software Upgrades

5. Enter the custom install/deinstall program by entering the following command line:

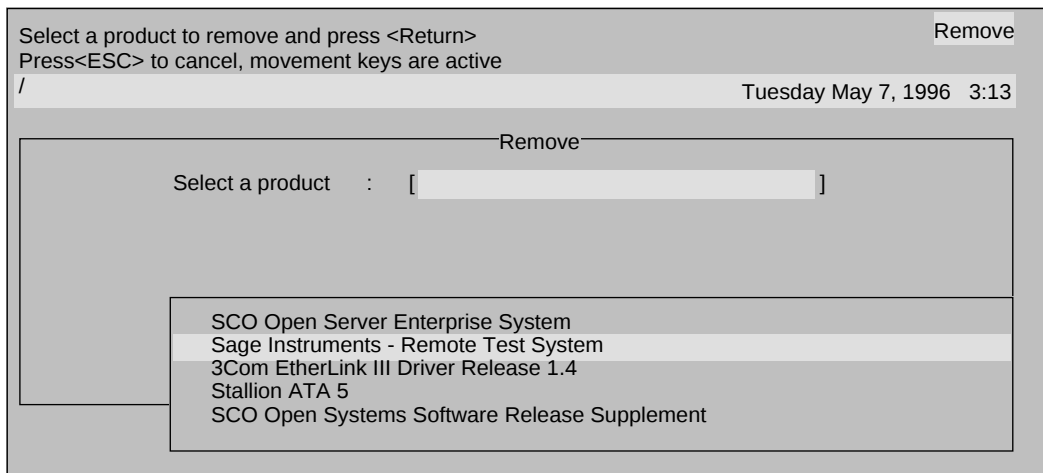
**custom**

You will advance to the **Custom** screen. (Refer to **Figure A1-1**.)



**Figure A1-1**  
**Custom Screen**

6. Use the **Arrow** keys to select **Remove** and press **Return** in order to remove the old **950RTS** system software. You will advance to the **Remove** screen. (Refer to **Figure A1-2**.)



**Figure A1-2**  
**Remove Screen**

7. Use the **Arrow** keys to select the **Sage Instruments remote test system software** for removal and press **Return**.
8. Use the **Arrow** keys to select **Entire Product, Packages, or Files** to be removed. You will advance to the **Product Selection** screen. (Refer to **Figure A1-4**.)

Select a product to remove and press <Return>  
Press<ESC> to cancel, movement keys are active

Remove

/ Tuesday May 7, 1996 3:13

Remove

Select a product : [Sage Instruments - Remote Test System ]

Sage Instruments - 950 Remote Test System

| Name    | Inst | Size  | Description                                      |
|---------|------|-------|--------------------------------------------------|
| ALL     | Yes  | 10988 | Entire Sage Instruments - Remote Test System Set |
| RTSBASE | Yes  | 10960 | Sage Instruments - 950 Remote Test System        |

**Figure A1-3**  
**Product Selection Screen**

- Use the **Arrow** keys to select **ALL** to choose the entire **remote test system software** package for removal and press **Return**. You will advance to a display prompting you to confirm your selection. (Refer to **Figure A1-4**.)

Proceed\_

Remove

/ Tuesday May 7, 1996 3:13

Please verify the removal of the following packages:

ALL

Do you wish to continue? Yes No

**Figure A1-4**  
**Verify Removal Screen**

- Use the **Arrow** keys to select **Yes** and press **Return**. The system software will be removed.
- After removal of old software you must shut down the system using the command:

```
shutdown -g 0 -y
```

- Enter maintenance mode by typing:

```
init1
```

## Appendix I Software Upgrades

13. Remount the `u`/file using the command:

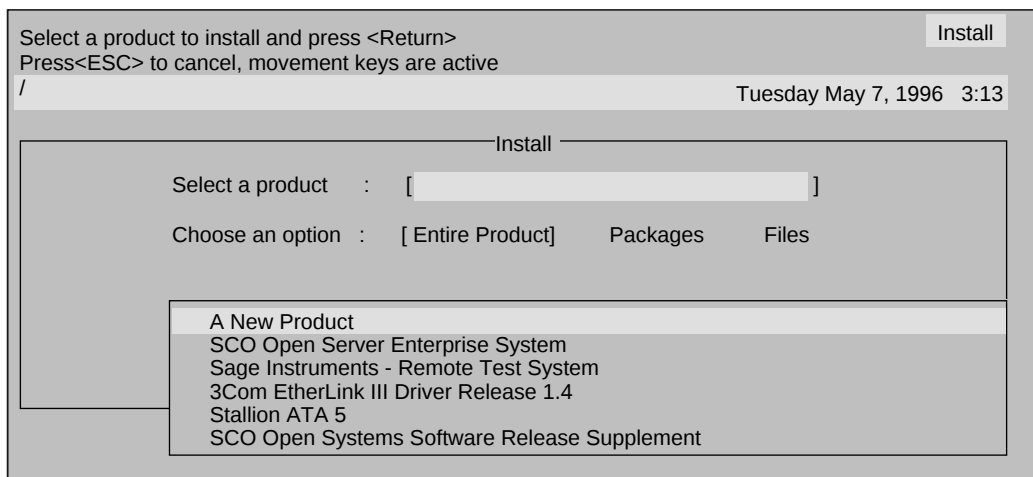
```
mount/u
```

14. At the prompt type:

```
custom
```

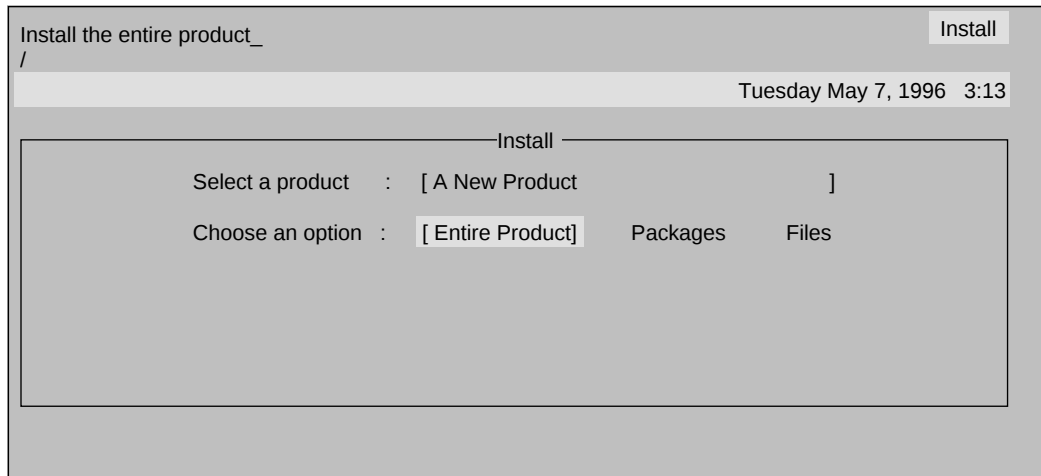
You will reenter the **Custom** screen. (Refer to **Figure A1-1**)

15. Use the **Arrow** keys to select **Install** from the **Custom** screen to install the new system software. You will advance to the **Install** screen. (Refer to **Figure A1-5**.)



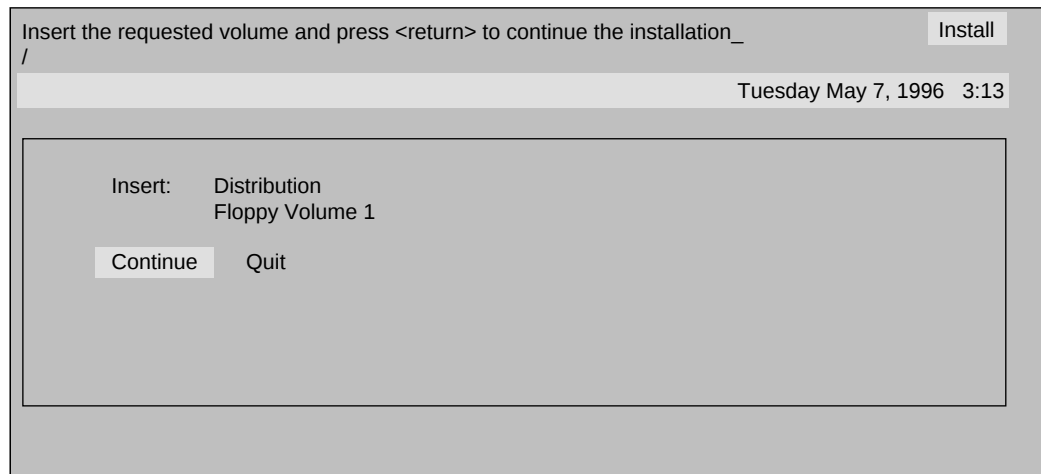
**Figure A1-5**  
**Install Screen**

16. Use the **Arrow** keys to select **A New Product** and press **Return**.
17. Use the **Arrow** keys to select **Entire Product**, **Packages**, or **Files** to be installed. You will advance to the **Option Selection** screen. (Refer to **Figure A1-6**.)



**Figure A1-6**  
**Option Selection Screen**

18. Use the **Arrow** keys to select the option for installing the **Entire Product** and press **Return**. You will advance you to a screen prompting the insertion of the new system disks. (refer to **Figure A1-7**)



**Figure A1-6**  
**Disk Insertion Screen**

19. Insert the floppies into the drive of the **950RTS** as the system prompts you.
20. Use the **Arrow** keys to select **Quit** from the menu once the installation is complete.
21. Rebuilt the operating system kernel by entering the following command lines:

```
cd /etc/conf/cf.d
./link_unix
```

## Appendix I Software Upgrades

---

22. Reboot the system to make the changes effective by entering the following command line:

```
shutdown -g 0 -y
```

The system will shut down and reset itself and boot back up again.

### 1-2 UPGRADING TO ADD NEW OPTIONS

---

New software features are contained on a set of floppy disks for each system to be upgraded.

To add a new feature to the **950RTS** system:

1. Enter the following command lines to backup the old options file:

```
cd /u/950rts/lib
cp options options.back
```

2. Insert the floppy disk into the **950RTS**'s disk drive.
3. Enter the following command line:

```
tar tv
```

The files located on the floppy disk will be displayed.

4. Look for the file called **options.xxxxx**, where **xxxxxx** is the serial number of your **950RTS** unit. Make a note of this file name since you will need it in the subsequent step.
5. Enter the following command lines:

```
tar xv options.xxxx
cp options.xxx options
```

**options.xxxxx** is the filename noted in the **tar tv** command.

The new options have now been added to the system.

Some options may require a more complicated installation procedure that will be included with the installation disks.

## APPENDIX II

### SUPPORT UTILITIES

#### A2-1 USING SWLINK AND ERICSSON IMPORT

---

**swlink** is a utility in the **950RTS** for use with **DSC switches**. It allows you to connect through the test system to a serial port. A duplex communication path is established — that is, every character typed by the user is sent out the serial port, and every character received on the port is displayed at the user's terminal. The received data can also be written to a logging file for use later. Finally, there is a scripting language which allows a login sequence to be pre-programmed, allowing the **950RTS** to perform automatic logins, data extraction, etc.

**EricssonImport** is a database import script for use with **Ericsson switches**. It enables you to download the trunks database by creating a trunkfile containing the trunk database, and adds a line containing switch information, such as the **TCON** port, and the communication parameters.

This section describes using **swlink** and **EricssonImport** to extract trunk databases via a serial maintenance port on a CO switch. With appropriate command and script files, the system can be configured to perform the entire database extraction off-hours without user intervention.

**swlink** and **EricssonImport** can use any serial port on the **950RTS** system for connection to the switch. If the port is also used for a user serial terminal, that user must log off and the port must be disabled for login (described in this document) before connecting to the switch.

##### A2-1.1 CONNECTING TO A SWITCH

---

To connect to a switch:

1. Give the command:

```
swlink -s systemname
```

For example, if the system name in the **Systems File** was **Omaha**, give the command:

```
swlink -s Omaha
```

The system responds with:

```
swlink rev 1.0
Copyright (C) 1995 Sage Instruments, Inc.
Connecting to <Omaha>. Use "<Enter>~." to quit.
Connected
```

## Appendix II Support Utilities

---

All characters that you type will now be transferred to the remote system, and its responses will appear on your screen.

When you are finished, press **Enter**, then enter a tilde (~) and a period (.). This will disconnect you from the remote system. The **950RTS** will display its system name after you enter the tilde and then display the following lines.

```
~[mkc01] .
Disconnected
$
```

### A2-1.2 Logging the Connection to Disk

---

You can save everything from the remote system to a file as well as displaying it to the screen. Give the regular **swlink** command with a **-f logfile** argument added. For example, to log everything to the file **omaha.trk**, give the command:

```
swlink -s Omaha -f omaha.trks
```

### A2-1.3 Using a Command File

---

You can create a **command file** that can send commands to the remote system, wait for responses back, turn on or off logging, and turn on or off display of the retrieved information to the screen. Create the **command file** using a text editor, and pass the **command file** name to **swlink** with a **-c commandfile** argument added. For example, if your **command file** is called **omahatrks.get**, give the command:

```
swlink -s Omaha -c omahatrks.get
```

You can still give the **Log File** on the command line, or open it inside of the **command file**. Note that the flag-argument pairs can be given in any order.

### A2-1.4 Command File Format

---

The **command file** is a regular **ASCII text file**, created with a text editor. You can put comments in the file with a # sign. Empty lines are simply ignored.

The following sample **command file** is used to extract the trunk database from a switch. It gives a good example of how the commands are used; each will be explained in detail.

```
this is a comment
so ignore it
DSC 600/600E login and extract trunk/trunk group
information
```

```
#
#
transmit "\r"
waitfor ">"
transmit "LOGIN\r"
waitfor "USERNAME:"
transmit "JOEL\r"
waitfor "PASSWORD:"
transmit "FIASCO\r"
waitfor ">"
logfile omaha.trks
log on
transmit "DISPLAY CP TRKLST 1-4000\r"
this starts the trunk dumping... wait ~ 3 hours for completion
waitfor "TRKGRP(S) :" 10000
transmit "^A"
waitfor ">"
transmit "LOGOUT\r"
exit
```

---

#### A2-1.4.1 The Transmit Command

The **transmit** command has the format:

```
transmit "string to send\r"
```

This causes the **950RTS** to send "**string to send**," with a carriage return, to the remote system. You send carriage returns, line feeds, and other special characters with the following "**escape sequences**":

| <u>To send</u>      | <u>Use sequence</u> |
|---------------------|---------------------|
| Carriage return     | \r                  |
| Line feed (newline) | \n                  |
| Tab                 | \t                  |
| Backspace           | \b                  |
| Backslash (\)       | \\                  |

---

#### A2-1.4.2 The Waitfor Command

The **waitfor** command has the format:

```
waitfor "something to wait for" 60
```

## Appendix II Support Utilities

---

The **950RTS** waits for something to be sent to it from the remote system for as many seconds as are specified on the end of the line (a maximum of **65000**, or about **18 hours**). If no time is specified, the **950RTS** waits for **20 seconds**. If the string is not received within the timeout given, the **950RTS** prints the error message:

```
Timed out waiting for "something", cmd file aborted
and execution of the command file is terminated.
```

Characters that you type are still sent to the remote system, even if you are in a **waitfor** command. This allows you to enter some data by hand; for example, you may wish to have the system not supply a password automatically for security reasons.

If you wish to abort the session during a **waitfor**, use the regular “~.” sequence.

### A2-1.4.3 The Logfile Command

---

The **logfile** command allows you to specify the **log results file** from inside of the command file. The command has the format:

```
logfile filename
```

If the file cannot be opened, an error message is given. If the file already exists, new log data is appended to the end.

logfile does not enable logging; it just specifies the file name. You must give the “**log on**” command to actually start logging.

### A2-1.4.4 Log On/Off Command

---

The **log on/off command** allows you to turn on and off logging selectively. By using the **log** command, you can keep from recording the login sequence, for example, while still collecting all of the data you wish to keep. To turn logging on, give the command:

```
log on
```

and to turn it off,

```
log off
```

### A2-1.4.5 The Pause Command

---

The **pause** command allows you to pause between transmits if necessary to keep the remote system from overflowing. The pause interval is given in seconds. Data received from the remote system continues to be displayed (and logged, if enabled) during the pause, and characters typed on the **950RTS** still appear on the remote system.

The format is:

```
pause time-in-seconds
```

For example:

```
pause 10
```

will pause for **10 seconds**.

#### **A2-1.4.6 The View Command**

---

The **view** command allows you to turn on and off output to the local screen. In some cases (for example, extracting a large database) it may be distracting to have characters scrolling by while logging data to disk. This allows **swlink** to work “**silently**.”

The **view** command looks just like the log command: to turn viewing on, give the command:

```
view on
```

and to turn it off,

```
view off
```

If you only have the two serial ports in the base system (**tty1a** and **tty2a**) and there are other applications running (background trunk routing, for example), turning off viewing may improve system performance somewhat by lowering the number of interrupts the system has to respond to. If you are using a **multiport serial I/O card** or a **network connection** to the system, the loading is not that critical.

#### **A2-1.4.7 The Exit Command**

---

The **exit** command forces **swlink** to abort. As the last entry in a command file, **swlink** will disconnect upon reading the exit command. If you do not give the exit command, **swlink** remains running, allowing you to continue to communicate with the remote system.

#### **A2-1.5 The Sample Command File**

---

The **command file** shown earlier will be explained here in detail. It is an actual script used to extract the trunks database from a **DSC 600E switch**.

## Appendix II Support Utilities

---

1. The file starts with several lines of comments, which can be used to document what the script is supposed to do, who wrote it, and the revision history:

```
this is a comment
so ignore it
DSC 600/600E login and extract trunk/trunk group
information
#
#
```

2. The **950RTS** sends a carriage return and waits (the **default 20 seconds**) for a prompt from the switch:

```
transmit "\r"
waitfor ">"
```

3. User **JOEL** logs in using **FIASCO** as his password:

```
transmit "LOGIN\r"
waitfor "USERNAME:"
transmit "JOEL\r"
waitfor "PASSWORD:"
transmit "FIASCO\r"
waitfor ">"
```

4. Turn logging on to the file *omaha.trk*.

```
logfile omaha.trk
log on
```

5. Send the trunk display command:

```
transmit "DISPLAY CP TRKLST 1-4000\r"
```

6. Wait for the completion of the display. Since this can take quite a while, a large number is passed to the **waitfor** command; in this case, almost three hours.

```
this starts the trunk dumping... wait ~ 3 hours for completion
waitfor "TRKGRP(S) :" 10000
```

7. Finally, give the **LOGOUT** command and exit:

```
transmit "LOGOUT\r"
exit
```

## A2-2 DOWNLOADING THE SWITCH DATABASE USING ERICSSON IMPORT

---

To use **EricssonImport** to download the trunks database, use the invocation:

```
EricssonImport <outfile> <tcon> <b-origin> | NONE <route> | ALL <comm params>
```

where:

|                    |                                                                  |
|--------------------|------------------------------------------------------------------|
| <b>outfile</b>     | name of trunk file to create                                     |
| <b>tcon</b>        | number of TCON port on the Ericsson switch                       |
| <b>b-origin</b>    | number of B-ORIGIN value for the switch, or NONE if not needed   |
| <b>route</b>       | name of the route (trunk group), or ALL if all routes are needed |
| <b>comm params</b> | parameters to the "cu" communications program                    |

*for example:*

```
EricssonImport /u/u950rts/lib/default.trks 1 NONE -e T3
```

This example creates a trunk file in `/u/u950rts/lib/default.trks`, containing the TCON and B-ORIGIN info. Switch communication will be initiated by the command `cu -e T3`. -e refers to even parity. An entry for the T3 switch must be included in `/usr/lib/uucp/Systems`. (See **Appendix 1-9** of the *950RTS Remote Test System Operating Manual* for the "cu" man page and details on transferring files.)

## A2-3 FINISHING UP

---

If you had to disable the tty port for login, you should re-enable it when you are finished so that it can be used for users to log in to the system again. You must be logged in as **admin** to do this. Give the command:

```
as root enable tty2a
```

(give whichever port will be used to connect to the switch).



## APPENDIX III

### ATR SITE FILE WORKSHEETS

The site file worksheets are for use by **950RTS administrators** who are setting up **ATR site files**. Creating site files allows centralization of information about far-end switch test resources and trunk connections, which can be referenced by multiple test schedules.

The first worksheet in this appendix is a tutorial, showing formatting instructions and example selections. The second worksheet is a concise form that you can copy and use when setting up site files.

Once you complete a concise worksheet, use it as the basis for creating a file in the **950RTS site directory**, `/u/950rts/lib/sites`. To create a new site file, copy the example file, "**Xample**", to the chosen "**Site Name**", and then edit this file to contain the information in the worksheet. For example:

```
% su admin
Password:

% cd /u/950rts/lib/sites

% cp Xample Dallas05

% vi Dallas05

(edit file)
```

(See **Section V** of this manual for more information)

Worksheets are shown on the following pages.

### Appendix III ATR Site File Worksheets

| ATR SITE FILE WORKSHEET (Tutorial)                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                       |                                                                                       |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| <p>This worksheet is for use by 950RTS administrators who are setting up ATR site files. Creating site files allows centralizing information about far-end switch test resources and trunk connections, which can be referenced by multiple test schedules.</p>                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                       |                                                                                       |
| Field                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Your Selection                                                                                                                                                                                                                                                                                                        | Example                                                                               |
| Site Name                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <div><div></div><div>* Enter name for the site.<br/>* Limit names to 20 characters or less.<br/>* Limit names to letters, numbers, and punctuation.<br/>* Include the farend switch identifier in the name.</div></div>                                                                                               | <div>Dallas05</div>                                                                   |
| Silent Term TL<br>Milliwatt TL<br><br>Responders                                                                                                                                                                                                                                                                                                                                                                                                                                    | <div><div>DTMF/MF<br/>DTMF/MF</div><div>DTMF/MF<br/>DTMF/MF<br/>DTMF/MF<br/>DTMF/MF<br/>DTMF/MF</div><div>* Enter access code for all test lines and responders.<br/>* Circle DTMF or MF<br/>* Follow with DTMF access digits, (0-9*#abcd),<br/>MF digits (0-9abcks), wink(w), and/or pause(~) as needed.</div></div> | <div>DTMF/MF 95052<br/>DTMF/MF 95053</div> <div>DTMF/MF 54321<br/>DTMF/MF 54322</div> |
| Trunk File                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <div><div></div><div>* Use this field only if the 950RTS is connected to multiple switches.<br/>* Enter the filename of the trunk file for the nearend switch. This file is created by the 950RTS administrator.<br/>* Use the same name listed above for the "Site Name" field.</div></div>                          | <div>Austin03.trks</div>                                                              |
| Trunk Groups                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <div><div></div><div>* Enter the trunk groups from the nearend switch to the switch indicated by this site file.</div></div>                                                                                                                                                                                          | <div>5<br/>6<br/>101<br/>134</div>                                                    |
| <p>Once the worksheet is complete, it is used as the basis for creating a file in the 950RTS site directory, /u/950rts/lib/sites. To create a new site file, copy the example file, "Xample", to the chosen "Site Name", and then edit this file to contain the information in the worksheet. For example:</p> <pre>% su admin  Password:  % cd /u/950rts/lib/sites % cp Xample Dallas05 % vi Dallas05 (edit file)</pre> <p>See Section IV of this manual for more information.</p> |                                                                                                                                                                                                                                                                                                                       |                                                                                       |

| ATR SITE FILE WORKSHEET                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                   |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| <p>This worksheet is for use by experienced 950RTS administrators who are setting up ATR site files. An expanded "tutorial" worksheet that describes the fields precedes this worksheet in <i>Appendix II</i> of the <i>950RTS Installation and Administration Guide</i>. See <i>Section IV</i> of the <i>950RTS Installation and Administration Guide</i> for more information on setting up ATR site files.</p> |                                                                                   |
| Field                                                                                                                                                                                                                                                                                                                                                                                                             | Your Selection                                                                    |
| Site Name                                                                                                                                                                                                                                                                                                                                                                                                         | _____                                                                             |
| Silent Term TL<br>Milliwatt TL                                                                                                                                                                                                                                                                                                                                                                                    | DTMF/MF _____<br>DTMF/MF _____                                                    |
| Responders                                                                                                                                                                                                                                                                                                                                                                                                        | DTMF/MF _____<br>DTMF/MF _____<br>DTMF/MF _____<br>DTMF/MF _____<br>DTMF/MF _____ |
| Trunk File                                                                                                                                                                                                                                                                                                                                                                                                        | _____                                                                             |
| Trunk Groups                                                                                                                                                                                                                                                                                                                                                                                                      | _____<br>_____<br>_____<br>_____<br>_____<br>_____<br>_____<br>_____<br>_____     |



## APPENDIX IV

### ATR SCHEDULE WORKSHEETS

The schedule worksheets are for use by **950RTS** test personnel who are setting up test schedules for use with **Automatic Trunk Routining (ATR)**.

The first worksheet in this appendix is a tutorial, showing formatting instructions and example selections for new users. The second worksheet is a concise form that you can copy and use when setting up site files.

Once you complete a concise worksheet, use it as the basis for creating a test schedule using the **950RTS** schedule manager, "**vsched**."

For example:

login: test  
Password:

% vsched

select [NEW] to create new schedule  
enter schedule name to prompt  
edit schedule

(Refer to **Section V** of this manual for more information on the **ATR** function)

Worksheets are shown on the following pages.

## Appendix IV ATR Schedule Worksheets

| ATR SCHEDULE WORKSHEET (Tutorial)                                                                                                  |                                                                                                                                                                                                                                                                                                                   |                          |
|------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|
| This worksheet is for use by 950RTS test personnel who are setting up test schedules for use with Automatic Trunk Routining (ATR). |                                                                                                                                                                                                                                                                                                                   |                          |
| Field                                                                                                                              | Your Selection                                                                                                                                                                                                                                                                                                    | Example                  |
| Schedule Name                                                                                                                      | <div>_____</div> <ul style="list-style-type: none"> <li>* Enter name for the schedule.</li> <li>* Limit names to 20 characters.</li> <li>* Limit names to letters, numbers, and punctuation. (.-)</li> <li>* Include the farend switch identifier in the name.</li> </ul>                                         | <u>Dallas.nightly</u>    |
| Time to Run                                                                                                                        | <div>_____</div> <ul style="list-style-type: none"> <li>* Enter the date and time that the schedule will run.</li> <li>* Use format HH:MM, mm/dd/yy or other formats described in the <i>950RTS Operating Manual</i>.</li> <li>* Special options are "never" to disable, and "now" to run immediately.</li> </ul> | <u>3:00 10/16/95</u>     |
| Repeat                                                                                                                             | <div>_____ hrs/days/months</div> <ul style="list-style-type: none"> <li>* Enter the repeat interval (0 for no repeat). Circle the desired time unit for the repeat interval.</li> </ul>                                                                                                                           | <u>1 hrs/days/months</u> |
| Site                                                                                                                               | <div>_____</div> <ul style="list-style-type: none"> <li>* If the 950RTS administrator has configured a site file for the remote switch, enter the site name. (vsched will show configured sites in the site field pop-up). Otherwise enter "none."</li> </ul>                                                     | <u>Dallas05</u>          |
| Test Port                                                                                                                          | <div>_____</div> <ul style="list-style-type: none"> <li>* Select an appropriate test port type that the 950RTS administrator has configured. (vsched will show configured ports in the test port field pop-up)</li> </ul>                                                                                         | <u>StdChan.</u>          |
| Trunk Groups                                                                                                                       | <div>_____</div> <ul style="list-style-type: none"> <li>* Enter "All" to use all trunks in the trunk file, or in the site file if you selected one. Otherwise, enter a list of all trunk groups from the trunk file.</li> <li>* Use a hyphen to indicate a range of trunk groups to test.</li> </ul>              | <u>6-10, 101</u>         |
| TL Type                                                                                                                            | <div>100/102/105</div> <ul style="list-style-type: none"> <li>* Circle the type of test line to be used</li> </ul>                                                                                                                                                                                                | 100/102/ <u>105</u>      |

| ATR SCHEDULE WORKSHEET (Tutorial)...cont'd.                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                        |                            |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|
| Field                                                                                                                                                                                                                                                                                            | Your Selection                                                                                                                                                                                                                                                                                                                                                                                         | Example                    |
| TL Access                                                                                                                                                                                                                                                                                        | DTMF/MF _____<br><br>* Enter 0 to select code from site file, or circle DTMF or MF, then enter access code for test line.<br><br>* DTMF access digits are (0-9*#abcd), MF digits are (0-9abcks), Use wink (w), and/or pause (-) if needed.                                                                                                                                                             | DTMF <del>(MF)</del> 95952 |
| Tests                                                                                                                                                                                                                                                                                            | _____<br><br>* Enter desired tests from the list: Loss, Noise, Slope ERL, SRL, SRH                                                                                                                                                                                                                                                                                                                     | Noise, Loss                |
| Reporting                                                                                                                                                                                                                                                                                        | All/FailedTrunks/FailedTests<br><br>* Circle the type of test reporting desired.<br><br>* FailedTrunks shows all results on trunks where any test failed. FailedTests shows only tests that failed.                                                                                                                                                                                                    | FailedTests                |
| Limits                                                                                                                                                                                                                                                                                           | _____<br><br>* Enter limits file for results exception reporting if Reporting is set to FailedTrunks or FailedTests.<br><br>* Standard limits files are provided for each type test line.<br><br>* The 950RTS administrator may add custom limits files. These are displayed in the 'vsched' limit field pop-up.                                                                                       | Standard.105               |
| Results                                                                                                                                                                                                                                                                                          | _____<br><br>* Enter UNIX filename for test reporting. If no directory name is given, the file will be created in current directory when 'vsched' is run.<br><br>* The filename can be time stamped by including %m (month) %d (day), %H (hour), or %M (minute).<br><br>* If no filename is specified, 'vsched' will select a default filename based on the time the test runs, and the schedule name. | Dallas05.%d                |
| <p>Once you complete a concise worksheet, use it as the basis for creating a test schedule using the 950RTS schedule manager, "vsched."</p> <p>For example:</p> <pre> login: test Password:  % vsched     select [NEW] to create new schedule     enter schedule name to prompt           </pre> |                                                                                                                                                                                                                                                                                                                                                                                                        |                            |

**Appendix IV ATR Schedule Worksheets**

---

| ATR SCHEDULE WORKSHEET                                                                                                                                                                                                                                                                                                                                                                                                                    |                              |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <p>This worksheet is for use by 950RTS administrators who are setting up test schedules for Automatic Trunk Routining (ATR). An expanded "tutorial" worksheet that describes the fields precedes this worksheet in <i>Appendix III</i> of the <i>950RTS Installation and Administration Guide</i>. See <i>Section IV</i> of the <i>950RTS Installation and Administration Guide</i> for more information on setting up ATR schedules.</p> |                              |
| Field                                                                                                                                                                                                                                                                                                                                                                                                                                     | Your Selection               |
| Schedule Name                                                                                                                                                                                                                                                                                                                                                                                                                             | _____                        |
| Time to Run                                                                                                                                                                                                                                                                                                                                                                                                                               | _____                        |
| Repeat                                                                                                                                                                                                                                                                                                                                                                                                                                    | _____ hours/days/months      |
| Site                                                                                                                                                                                                                                                                                                                                                                                                                                      | _____                        |
| Test Port                                                                                                                                                                                                                                                                                                                                                                                                                                 | _____                        |
| Trunk Groups                                                                                                                                                                                                                                                                                                                                                                                                                              | _____                        |
| TL Type                                                                                                                                                                                                                                                                                                                                                                                                                                   | 100/102/105                  |
| TL Access                                                                                                                                                                                                                                                                                                                                                                                                                                 | DTMF/MF_____                 |
| Tests                                                                                                                                                                                                                                                                                                                                                                                                                                     | _____                        |
| Reporting                                                                                                                                                                                                                                                                                                                                                                                                                                 | All/FailedTrunks/FailedTests |
| Limits                                                                                                                                                                                                                                                                                                                                                                                                                                    | _____                        |
| Results                                                                                                                                                                                                                                                                                                                                                                                                                                   | _____                        |

## APPENDIX V

### SERIAL CONNECTION TO A SWITCH

#### A5-1 Configuring the System

---

Before using **swlink** or **EricssonImport**, configure the **950RTS** system to associate a serial port and baud rate with a switch name. Two files must be edited; they are both in the directory `/usr/lib/uucp`. You must be a super-user in order to modify these files.

For more details, refer to the sub-section *Detailed descriptions of UUCP configuration files* in the section *Building a remote network with UUCP* in the *SCO UNIX Operating System System Administrator's Guide*.

##### A5-1.1 The Systems File

---

Edit the file `/usr/lib/uucp/Systems` (note the capital **S** on **Systems**) in order to establish a system name for the switch you are connecting to. This name can be any convenient string which identifies the system you are connecting to; the default entry is for a system called **switch** at **9600 baud**. Edit the file (using **vi** or any other text editor available). The default entry is near the end of the file. You can copy or modify the default line. The syntax for the line is:

```
systemname Never Direct baudrate
```

For example, the entry for switch is:

```
switch Never Direct 9600
```

and if you wanted to add an entry for **Omaha** at **2400 baud**, it would be:

```
Omaha Never Direct 2400
```

Valid baud rates are **300**, **1200**, **2400**, **4800**, and **9600**.

The word **Never** must begin with a capital letter!

The word **Direct** refers to an entry in the next file, the **Device File**. If you need to connect to different destinations via different serial ports, use different names here. Typically, however, you can use the default name of **Direct**.

### A5-1.2 The Devices File

---

The **Device File** maps the **Direct** entry in the **Systems File** to a serial port on the **950RTS**. Edit the file `/usr/lib/uucp/Devices`. The default entry for **Direct** is towards the end of the file. The syntax for the line is:

```
Direct comm port - baudrate
```

For example, the default entry is:

```
Direct tty2a - 9600
```

This uses **tty2a**, the second serial port on the basic system, at **9600 baud**.

### A5-1.3 Disabling the Port

---

If you share a serial port between normal user sessions and connection to the switch, follow the directions in this section. If you can dedicate a serial port to connect to the switch, you can disregard the following.

Before attempting to connect to the external system, the port that you are using out from the **950RTS** must not be in use (that is, no one logged in to the system using that serial port to connect to their terminal). Verify this by using the **who** command, which will print out a list of users and the tty ports to which they are connected.

1. Login as **admin**.
2. If someone is logged in to the port, contact them and ask them to log out.
3. Disable the port for login. You must be logged in as admin in order to do this. Give the command:

```
asroot disable tty2a
```

(give whichever port will be used to connect to the switch).

The **950RTS** may respond that the port is busy (if the person who was logged in has not logged off yet) or that the port was already disabled.

4. Make the physical connection between the **950RTS** and the switch.

## APPENDIX VI

### DACSD

#### A6-1 INTRODUCTION

---

**dacsd** is a program that provides communication and control over **Digital Cross-connect System (DCS)** units by client programs. This program allows test programs such as berttest to request access to a **Test Access Path (TAP)** and then change that ports status from monitor to split or release.

For simplicity in the following discussion, the keyword **DCS** refers to digital cross-connect devices in general. Each manufacturer has a different specific term to describe their cross-connect device; This release supports several **PDS/TL1** language cross-connect devices.

dacsd starts up during the system boot and remains active until system shutdown. When the dacsd starts up, it creates a communication channel to each configured **DCS**. A tty port on the **950RTS** is used to access the **DCS**.

#### A6-2 SYSTEM MANAGER CONTROLS OVER DACSD

---

The system manager or administrator may control and communicate with dacsd using the following commands:

|                               |                                                                                                         |
|-------------------------------|---------------------------------------------------------------------------------------------------------|
| <code>dacs start</code>       | starts the dacsd in normal mode                                                                         |
| <code>dacs stop</code>        | stops the dacsd and logs out of the DCS units                                                           |
| <code>dacs stat</code>        | sends a message to the dacsd to see if it is alive                                                      |
| <code>dacs start debug</code> | starts the dacsd in verbose debug mode, all out but is stored in<br><code>/u/950rts/log/dacs.log</code> |

The debug feature is intended primarily for use by **Sage Customer Support** and **Engineering**.

#### A6-3 DCS CONFIGURATION

---

The only configuration requirement for dacsd is creating the mapping from the tty ports to the DCS system. The **Network Elements Database (ne.db)** is used to discover what ttylines are allocated for its use. **ne.db** is located in the directory `/u/950rts/lib/ne.db`.

## Appendix VI DACSD

In the **ne.db**, most entries are commented out. The configuration requirement will be to decide among the listed dialects, and which kind of DCS is connected to the configured ttyline. The installation requires a ttyline name, a system name, and interface number. These lines must be configured according to the following guidelines:

- The ttyline name is assigned by the system installer.
- The system name must be set manually. It should be the same as the name field in the board setup line of the makedb file.
- The interface number must be set manually. It is the same as the id number in the board setup line of the makedb file. This number is a non-zero, non-negative integer.

To illustrate a typical install, some sample command sequences will be provided. In these samples, the '#' is the system prompt and the installer should actually type what follows the prompt. Note also, when expect is called, it will not provide any prompt. This is correct behavior.

To configure a new DCS connection, locate a section of the **ne.db** that looks like the below.

```
#
keyword ttyline dacs_typ dia db_name intf user code

DACS_TTYNAM tty0a00 3 1 santacruz 1 batman robin
DACS_TTYNAM tty0a01 5 1 london 2 NextGen 7of9
DACS_TTYNAM tty0a02 7 2 paris 2 LAConf BobWhite
DACS_TTYNAM tty0a03 11 2 warsaw 3 LethalW MelGibson
#
```

Using an editor of your choice, select a line from this section of the **ne.db** that is most like the DCS that you want to connect to and make the following changes:

1. Delete the leading '#' so that the first character of the line is the **D** in **DACS\_TTYNAM**.
2. Modify the ttyline name to match the system assigned tty line.
3. Verify that the dacs type code matches the DCS you are configuring.
4. Edit the **db\_name** column making the name match the one used in the port field of the **makedb** script (Refer to **Sections 3.2.2.3 through 3-2.2.5** of this manual.).
5. Edit the user field to be the dacs login user name.
6. Edit the code field to be the dacs login password.
7. Save the file and exit the editor.

For our example, we will assume the ttyline is **ttty0a01**. This means that the actual device accessed by cu will be **/dev/ttty0a01**. The installer will make sure there are entries in the **/usr/lib/uucp/Devices** file for this ttyline. More information on this setup may be found in the *SCO System Administrators Reference* under *Working With Modems*. Each line is configured as a dialout modem.

The installer may test the access to the ttyline directly by typing:

```
cu -l tty0a01
```

The message "Connected" should appear on the terminal indicating a successful access to the serial port. At this point the installer is directly connected to the DCS control port and could start entering native DCS commands. This approach may be useful even after the installation for determining DCS problems. The installer must enter two characters to cause cu to disconnect and exit. If the sequence fails the first time, repeat it. The command is:

```
<enter> ~.
```

(enter key, tilde, followed by period).

**Note:** In **makedb**, the name field in the configuration line for each DCS tap must correspond to TAPs that are actually groomed on the DCS.

Scripts are used by the dacsd to do a logon to each DCS during the startup process. Before this can work properly, the installer must enter the appropriate passwords in the **ne.db**. The customer will supply the required username and password.

The script files are stored in the `/u/950rts/lib/` directory. They are named as follows:

```
#
dacs_type is used to associate a particular expect script to a dacs rs232
line. these files are located in the /u/950rts/bin directory. supported
dacs types include:
#
dacs_type = 3 = frederick dacs /u/950rts/bin/fredericks.exp
dacs_type = 5 = dsc dacs /u/950rts/bin/dsc.exp
dacs_type = 7 = tellabs dacs /u/950rts/bin/tellabs.exp
dacs_type = 11 = alcatel dacs /u/950rts/bin/alcatel.exp
dacs_type = 13 = hadax dacs /u/950rts/bin/hadax.exp
dacs_type = 17 = dsc(ecs flavor) dacs /u/950rts/bin/ecs.exp
dacs_type = 19 = tellabs 5500 dacs /u/950rts/bin/tellabs5500.exp
```

DACSD

The installer can verify expect is working with the ttyline by entering:

```
cd /u/950rts/bin
expect ???_exp tty0a01 <usr> <password> (where ??? is the correct file from the above
list.)
login
logout
discon
exit
```

This series of commands will login, logout and disconnect from the DCS unit. Once this works correctly, the dacsd should start without problems.

### A6-4 TROUBLESHOOTING STARTUP PROBLEMS

---

There are several problems that may cause dacs to fail during its startup. If dacs fails to start, it is suggested that you use the command:

```
dacs stop
```

To verify there are no orphan **cu** sessions left from a fatal halt, issue the command:

```
ps -ef | grep cu
```

If you see resulting **cu** processes, use the `kill -9 <pid>` command to terminate them.

Then use the command:

```
dacs start debug
```

This will log failure messages to the file `/u/950rts/log/dacs.log`. Error messages are described in the following section.

### A6-5 STARTUP TIME ERRORS

---

The following lines are common error messages that indicate a failure to establish communication with other **950RTS** software elements due to an internal error. If any of these appear on your system, note them and contact Sage Customer Service.

```
main: expect procedures library(??) missing, err=??
main: expect binary(??) missing, err=??
main: start_dacs failure, DCS Exiting.
main: dacs unable to fork, err=??"
main: dacs unable to setsid, err=??"
main: dacs unable to makePidFile

open_msg: MSG_init failed
open_msg: MSG_createMQM failed
open_msg: MSG_bindName failed
open_msg: MSG_registerMQ failed

read_nedb: unable to locate dacs map, err=??
read_nedb: unable to open dacs map, err=??
read_nedb: ?? interface(s) cfg'd

scan_interface: entry, i=?? l=??
scan_interface: start_line failed, di=?? dl=??

start_line: spawn_expect failed, err=??
start_line: malloc failure, Very Bad ...
```

```
spawn_expect: call to run_expect failed, err=?? r=??
spawn_expect: line ?? read (??)\n??
spawn_expect: line ?? cu connection failed
spawn_expect: line ?? responding
spawn_expect: trying to login
spawn_expect: marking line ?? alive
spawn_expect: line ?? gets no response.
```

