Chapter 3 - Installing the Hardware

Introduction

The SRM/UX server process will run on any HP 9000 Series 300, Series 400,or Series 800 computer which runs HP-UX version 7.0 or later and is a standalone workstation or a diskless HP-UX server.

A Series 300 server may support both LAN and SRM interfaces simultaneously, but the Series 800 and Series 400 servers support LAN interfaces only. LAN interfaces provide increased performance compared to the SRM cards.

You could replace an existing SRM server with a Series 300 HP-UX computer (with SRM card installed) and no other hardware changes would be required.

An Example SRM/UX System

Figure 3-1. Example SRM/UX system (Series 300 server, both connections)
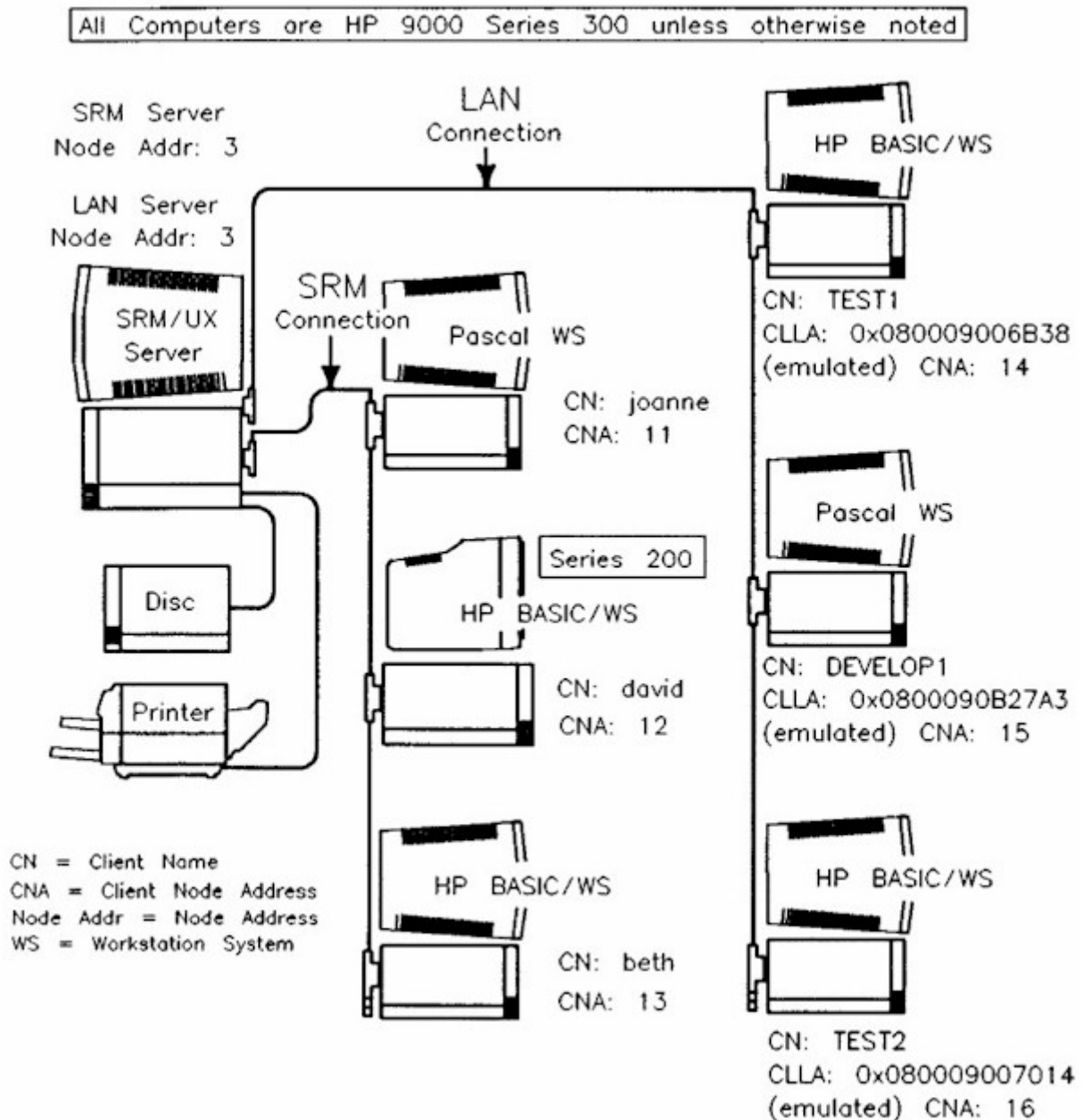
The System Hardware Components

The SRM/UX system is made up of four categories of hardware components: the server and client workstations, the SRM connection, the LAN connection, and the shared peripherals.

Communication over the SRM/UX system is achieved through either or both of two cabling schemes: the SRM connection and the LAN connection. For both of these cabling schemes, interfaces must be installed, one in the server and one in each client workstation for each connection to which they are attached (built-in LAN interfaces can be used on Series 300). The SRM/UX system can be made up of a number of SRM connections and/or a number of LAN connections. The limits on the number of interfaces are:

- On Series 300 servers: 9 SRM interfaces and/or 5 LAN interfaces
- On Series 800 servers: On versions 7.x of HP-UX, 3 LAN interfaces
- On Series 800 servers: On versions 8.x of HP-UX, 5 LAN interfaces

Note
LAN and SRM coax cable must NEVER be connected together. The protocols and
electrical specifications are different for the two types of coax cable.

Other HP-UX networking software may use the server's LAN interfaces simultaneously with the SRM/UX server process. However, the server acquires exclusive access to the SRM cards. In particular, the existing SRM Access Utilities (e.g., srmcp) cannot be used on the same SRM cards used by the SRM/UX server. (They may be used on other SRM cards in the same machine, which are not used by the SRM/UX server process.)

Throughout this manual, the terms "SRM card" and "LAN interface" mean any of the interfaces listed in the table below.

Table 3-1. Valid Interfaces			
---	**Series 300**	**Series 800**	**Series 400**
SRM	98629A 98629 + 50961U 50962A	Not supported	Not supported
LAN	98643A 98171A built-in	36967A 91786B	98171A Built-in

Server and Client Workstations

The heart of the SRM/UX system is the resource management server hardware-platform, running special software -- the srmd(1M) daemon process -- which manages the data communication with the client workstations. In the SRM/UX system, the term "server" typically refers to the entirety of the HP-UX platform running the srmd(1M) process. The server also handles all mass storage and I/O activities related to the operation and use of shared system resources. Unlike the SRM server, the SRM/UX server can be simultaneously used as an HP-UX workstation.

HP-UX Host Platforms that run as servers:

- HP9000 Series 300 which can have SRM cards and/or LAN interfaces installed
- HP9000 Series 400 which can have only LAN interfaces installed
- HP9000 Series 800 which can have only LAN interfaces installed

The Series 400 and Series 800 can act as a server only over the LAN connection because SRM card support is not included in HP-UX on those workstations. As a result, some Series 200 clients could not use a Series 400 or 800 as a server because there would be no way to connect them together.

Platforms that run as clients:

- HP 9000 Series 300
- HP 9000 Series 200

Some Series 200 computers don't support LAN interfaces; they must use SRM cards. LAN interfaces are supported only for 226's and 236's.

The SRM Connection
The SRM connection has two different configurations: the SRM coax connection and the SRM multiplexer connection, which are functionally identical. Both connections are supported.

For instructions on how to correctly install your SRM interface cards and SRM cabling, see the "Installing the SRM/UX System Hardware" section later in this chapter.

The LAN Connection
See the "Inter-system Communication" chapter of the *HP9000 Workstations Configuration Guide* for details on how to correctly install your LAN interface cards and the LAN cabling.

The Shared Peripherals
The shared peripherals on the SRM/UX system which are attached to the server(s), will be installed and configured by the HP-UX system administrator at your site. Installing and configuring peripherals is no longer in the province of the SRM/UX system administrator, as it was for the SRM system administrator. The SRM/UX system administrator needs only to configure the SRM/UX system spooling environment to work within the HP-UX spooling environment. See chapters 2 and 4 for details about doing this.

The shared peripherals are connected to the SRM/UX server and include: printers, plotters, and disc drives. The number and kind of shared peripherals are dictated by user requirements. The number of disc/tape drives, printers, and plotters the SRM/UX server can support, is dependent on the constraints of your HP-UX system. See the *HP 9000 Workstations Configurations Guide* for details. Additional peripherals can be connected to individual client workstations for special needs, but they cannot be shared by other client workstations.

Glossary of Hardware Terminology

SRM:
Stands for Shared Resource Management, typically used to refer to the SRM server (HP50960A), its operating system software, and the peripherals attached to the SRM server. SRM/UX is an emulation of the SRM on HP-UX.

SRM card (or SRM interface):
Refers to one of the following HP SRM card part numbers: HP98629A,HP98629 + HP50961U combination, or HP50962A.

SRM Coax Adapter:
Refers to the HP 50961 Resource Management Coax Adapter. This adapter attaches to an HP 98629 to allow the use of this SRM interface on a coax connection.

SRM coax connection:
Describes the SRM hardware configuration that uses SRM coax interfaces or HP 50961 Resource Management Coax Adapters at the client and server workstations, and uses coax cabling to connect the client(s) and server(s) in a bus fashion.

SRM coax interface:
Refers to the HP50962A SRM card. This interface is functionally equivalent to the HP98629 SRM card and HP50961U Coax Adapter combination, which is also used on a coax connection.

SRM multiplexer connection:
Describes the SRM hardware configuration in which the HP 98028A Resource Management Multiplexer and HP 97061 cables are used to connect clients and the SRM server. This configuration is obsolete.

SRM/UX server:
An SRM/UX server is an HP Series 300, 400 or 800 HP-UX computer running a special application (srmd(1M)) that provides booting, file system, and spooling services to SRM/UX clients. It provides these services such that in most cases SRM/UX clients do not have to know that they are using an SRM/UX server instead of an SRM.

Installing the SRM/UX System Hardware

Site Preparation Checklist

To help make the hardware setup go smoothly, use the following checklist to verify the preparatory tasks:

- If needed, has EMI/RFI shielding been installed?
- Depending on local building codes, coaxial cables should either be run through conduits and ducts, or placed carefully out of the way of foot traffic. Have the T connectors installed, or ready to be installed, at the server and client workstation locations. Both ends of the entire coax link should be terminated with 50 ohm terminators, and one end should be at earth ground.
- Ensure at least one meter of coax cable exists between adjacent workstations and servers on the connection.
- Provide adequate clearances at the front, back, and sides of all workstations to allow for service and operator access, as well as for ventilation.
- It is highly recommended that you check for proper grounding before you make initial connections between the coax cable and the SRM/UX servers and client workstations.

Note
SRM coax cable and LAN coax cable have different specifications. In general, LAN coax can be used for both connections, but SRM coax can NOT be used for LAN.

Installing Series 300 and Series 200 Workstations On SRM

Series 300 and Series 200 workstations can communicate with the SRM/UX system through the HP 50962A SRM coax interface or the HP 98629 Resource Management interface. The HP 98629 can use an SRM coax connection configuration after you attach an HP 50961 Resource Management coax Adapter.

Individual client workstations are identified to a server by the workstation's unique node address. This address is set by the DIP switches on the SRM interface card, before the interface is installed in the workstation. This address is emulated in the SRM/UX software for the LAN connection. See chapter 4 if this manual for details on how this is done. Use your hardware configuration worksheets to record information as you configure your SRM/UX servers and clients.

Assigning Node Addresses (SRM Connection)
Once you have established the physical layout of the SRM/UX system, you should assign "node addresses" to every client workstation and server on the SRM connection; follow the procedures in the system Planing Guide in chapter 2 of this manual.

For the SRM connection, select codes and node addresses are physically set via switches on the SRM interface cards that plug into each client and server.

Handling interfaces
Note the following guidelines to avoid equipment damage when handling any interface cards:
      * Make sure the workstation's power is OFF before installing or removing interface cards.

Caution
Inserting or removing an interface with the power on may damage the interface and the workstation. Most interfaces contain components that are sensitive to damage from electrostatic discharge. Therefore, use protective measures, including anti-static workstation and personnel grounding devices. Be especially careful when working in carpeted areas.

Caution
Whenever you install, remove, or handle an interface, hold it by its extractors, edges, or cover plate. Do NOT touch its electronic components or circuit board traces.

Caution
If you remove an interface from an anti-static bag to view or to set switches, place the bag on a flat, dry surface and place the interface on top of the bag.

Set the interface Select Code and Node Address

The interface configuration switches are manufactured as clusters of two to eight individual switches combined in a single molded plastic housing. Rocker switches may be flush with the housing, or they may protrude above the housing on one side or the other. The switch value is always determined by which end of the rocker is depressed. If the switch is a slider or a flip switch, the switch position is determined by the position of the tab on the switch.

The following figures show how to interpret switch settings correctly. Each of the four clusters has the identical setting: 01110000.
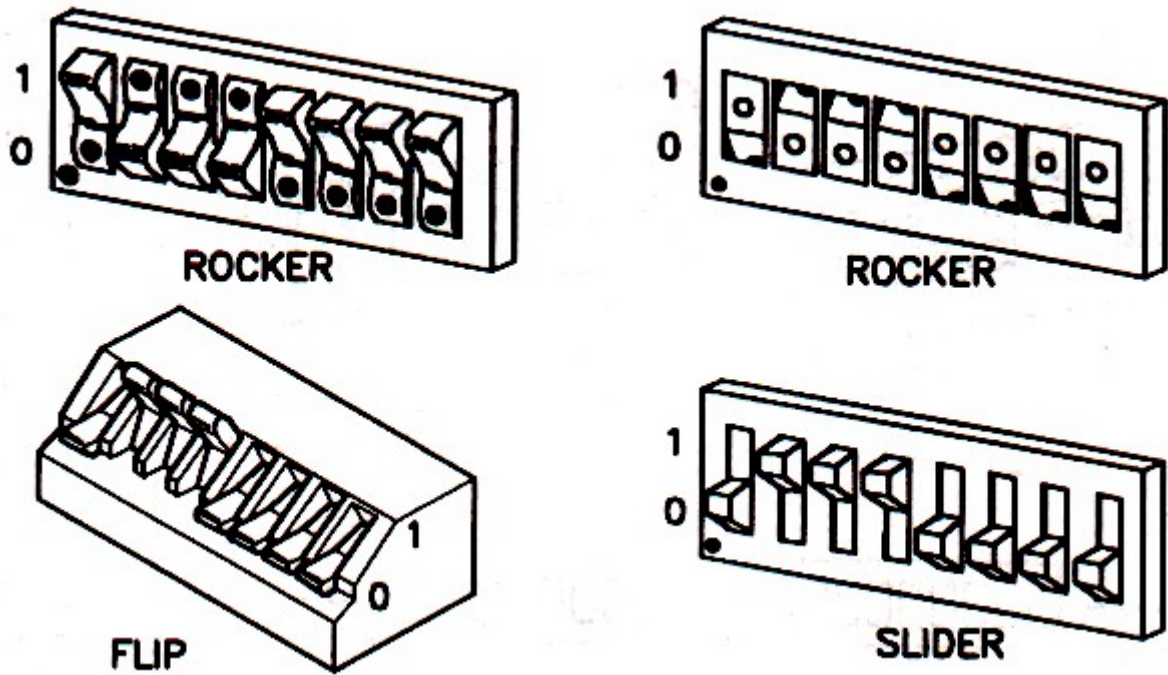

Figure 3-2. Interface card DIP Switch Types

To set rocker switches, use a ballpoint pen or other pointed tool to depress each rocker until it is fully seated. To set slide and flip switches, use your fingers or a suitable tool, such as a small screwdriver.

If the rocker or slider is not fully seated, the SRM/UX system may malfunction.

Installing the Interface
1. If you haven't already done so, unpack your Series 300 or Series 200 workstation from its shipping carton. Set up the computer according to its instructions. Situate the computer so that the backplane is accessible.
2. If you haven't already done so, unpack your Series 300 or Series 200 workstation from its shipping carton. Set up the computer according to its instructions. Situate the computer so that the backplane is accessible.
3. Handling the interface carefully by its cover plate and edges only, remove it from the protective envelope, place the envelope on a dry, flat surface, and place the interface on the bag, oriented as shown in the figure below.
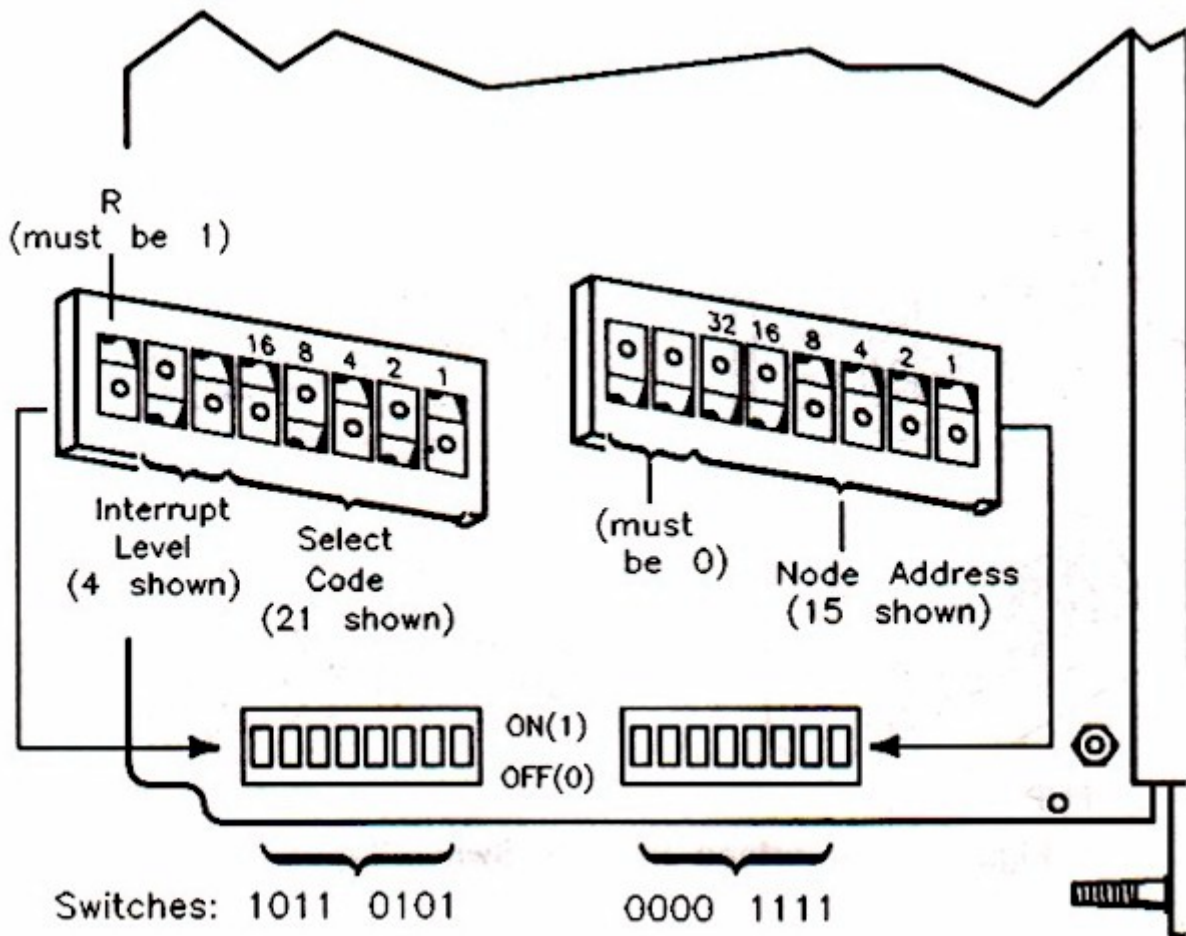
Figure 3-3 SRM Interface Card - Set Select Code and Node Address

4. Locate and set the clusters of switches as follows:

Table 3-2 HP 50962A SRM Coax Interface Configuration Switches		
Switch Function	**Value**	**Switch Setting**
Remote (R)	true	1
Interrupt Level (INT)	4 (for client's SRM cards) 3 (for server's SRM cards)	01 (for the client's SRM cards) 00 (for the server's SRM cards)[1]
Select Code (Sel. Code)	21 is recommended, unless you have a LAN interface whose select code has also been set to 21. To avoid a conflict, change the select code for one of the interfaces to a value other than 21.	10101
Node Address (Node Addr.)	unique address in the range 10 through 63	see table

[1] Note that the two switches governing the interrupt level do NOT follow binary numbering conventions

Note that the leftmost switch in the left cluster must be set to 1. Also, the leftmost two switches in the right cluster must be set to 00.

The following tables inllustrate the correct switch settings for node addresses and select codes.

Table 3-3. Node Address Switch Settings

Decimal Value	2^6 2^5 2^4 2^3 2^2 2^1 2^0	Decimal Value	2^6 2^5 2^4 2^3 2^2 2^1 2^0
10	0 0 1 0 1 0	37	1 0 0 1 0 1
11	0 0 1 0 1 1	38	1 0 0 1 1 0
12	0 0 1 1 0 0	39	1 0 0 1 1 1
13	0 0 1 1 0 1	40	1 0 1 0 0 0
14	0 0 1 1 1 0	41	1 0 1 0 0 1
15	0 0 1 1 1 1	42	1 0 1 0 1 0
16	0 1 0 0 0 0	43	1 0 1 0 1 1
17	0 1 0 0 0 1	44	1 0 1 1 0 0
18	0 1 0 0 1 0	45	1 0 1 1 0 1
19	0 1 0 0 1 1	46	1 0 1 1 1 0
20	0 1 0 1 0 0	47	1 0 1 1 1 1
21	0 1 0 1 0 1	48	1 1 0 0 0 0
22	0 1 0 1 1 0	49	1 1 0 0 0 1
23	0 1 0 1 1 1	50	1 1 0 0 1 0
24	0 1 1 0 0 0	51	1 1 0 0 1 1
25	0 1 1 0 0 1	52	1 1 0 1 0 0
26	0 1 1 0 1 0	53	1 1 0 1 0 1
27	0 1 1 0 1 1	54	1 1 0 1 1 0
28	0 1 1 1 0 0	55	1 1 0 1 1 1
29	0 1 1 1 0 1	56	1 1 1 0 0 0
30	0 1 1 1 1 0	57	1 1 1 0 0 1
31	0 1 1 1 1 1	58	1 1 1 0 1 0
32	1 0 0 0 0 0	59	1 1 1 0 1 1
33	1 0 0 0 0 1	60	1 1 1 1 0 0
34	1 0 0 0 1 0	61	1 1 1 1 0 1
35	1 0 0 0 1 1	62	1 1 1 1 1 0
36	1 0 0 1 0 0	63	1 1 1 1 1 1

Table 3-4 Select Code Switch Setings

Decimal Value	2^4 2^3 2^2 2^1 2^0
21	1 0 1 0 1
22	1 0 1 1 0
23	1 0 1 1 1
24	1 1 0 0 0
25	1 1 0 0 1
26	1 1 0 1 0
27	1 1 0 1 1
28	1 1 1 0 0
29	1 1 1 0 1
30	1 1 1 1 0
31	1 1 1 1 1

Note:
Use these values in the above tables as guidelines; values other than those in the Select Code table may be used. Also, numbers below 10 can be used for client node addresses (except for 0) if there are less than 10 servers.

Connecting the SRM Coax Cable
This section describes how the coax cable should be connected to form the SRM coax connection. It does not discuss the installation and configuration of the workstations and peripherals. For that information refer to the installation and operating manuals that were shipped with the device.

The RG 58C/U cable connects the servers and client workstations in bus fashion, as shown in the figure below. Place BNC T-connectors at points along the cable, that is, at both ends of each segment, where you plan to connect a server or a client workstation.
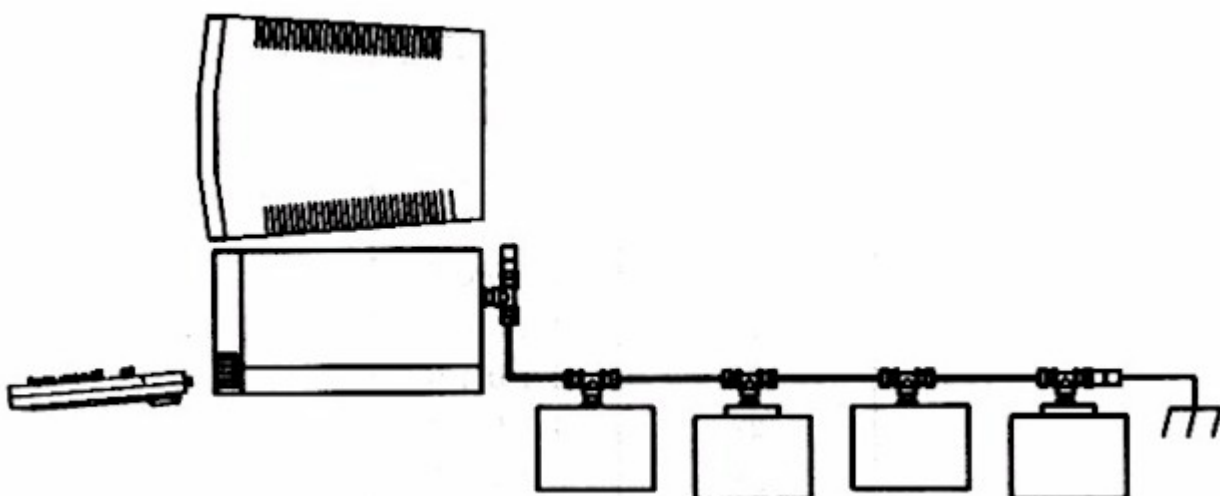

Figure 3-4 SRM Coax Connection example

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The SRM coax connection configuration consists of the following components: coaxial cable, with or without connectors attached (HP offers precut lengths with attached connectors, or uncut lengths to which you attach the connectors), end connectors, barrel connectors, T-connectors, terminators, grounding wire, and plastic insulators.

There are no special power requirements for the SRM coax connection configuration.

Correct and Incorrect Coax Connections

The following figure shows the correct SRM coax connections: the T-connectors are attached to the coax interface or the coax adapter; the cables are attached to the ends of the T-connectors; and both ends of the coax connection are correctly terminated, one at ground and the other with a 50-ohm terminator.
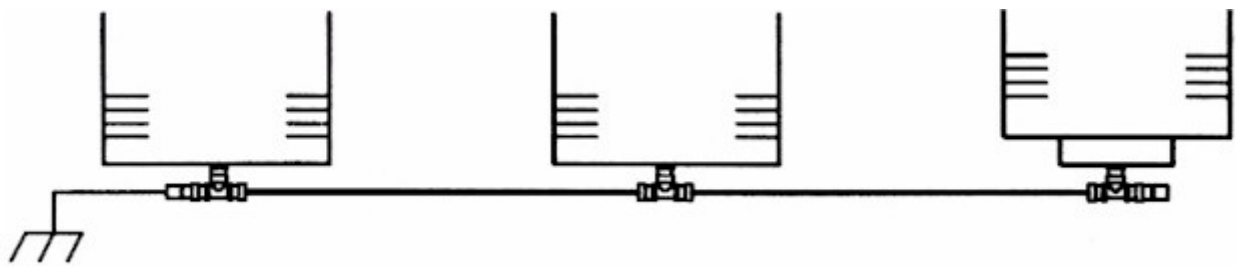

Figure 3-5 Correct SRM coax connection configuration

Caution
An unterminated cable can cause permanent damage to HP 50961 or 50962A coax interface cards. Make sure that both ends of your SRM coax connection cable are properly terminated, and that one end is grounded. Do NOT ground both ends of the SRM coax cable.

To properly ground one end of the SRM coax connection, attach a coax terminator with a coated wire one meter long that has a flat, U-shaped end (i.e., a spade lug) to a grounded source, such as an AC wall-outlet or a water pipe. A section of coax cable can be used between the last T connector and a convenient grounding source. The cable should then be fitted with a grounded terminator and the grounding wire attached to the ground source.

The following two figures show incorrect SRM coax connections. The first configuration is incorrect because you cannot connect the cable directly to a coax adapter, and the second because you cannot place a length of cable between the coax interface and the T-connector or between the coax adapter and the T-connector.
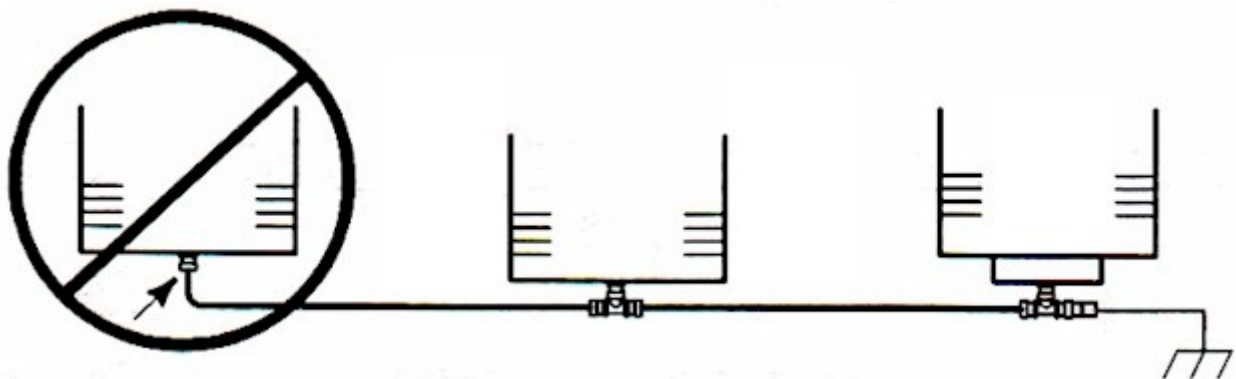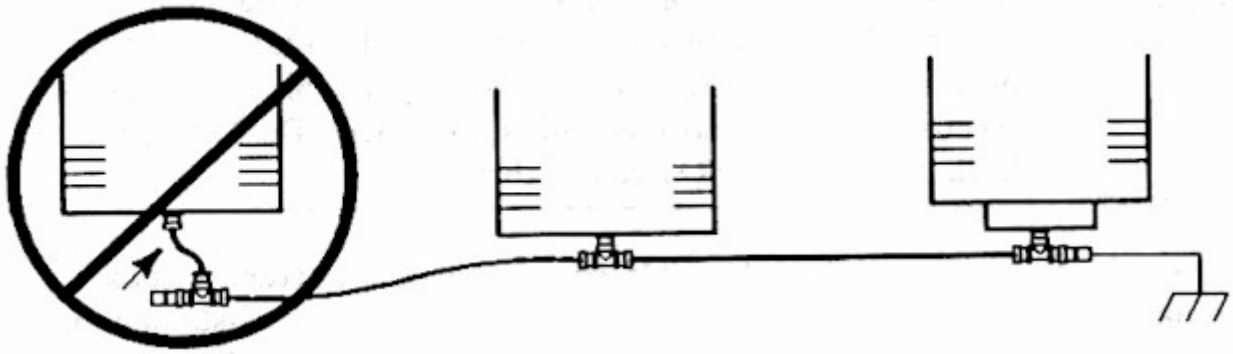

**Figure 3-6 Incorrect SRM coax connection configuration - Example 1**

Figure 3-7. Incorrect SRM coax connection configuration - Example 2

To assure product and personnel safety, cover any exposed connectors, T-connectors, barrel connectors, or terminators, on the SRM coax connection. Use the covers that come with the devices.

The following figure shows a close-up view of how the interface card or adapter, T-connector, and coax cable are assembled.

Caution
To assure personnel and product safety, an insulating "boot" must be used to cover the T-connector.
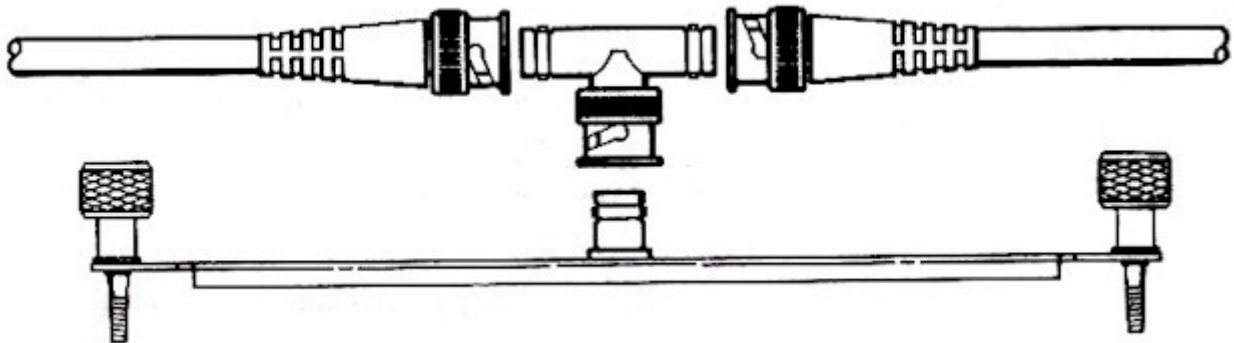
Figure 3-8. Close-up of SRM coax connection at the interface

If it becomes necessary to physically disconnect either a server or client workstation from the SRM coax connection, do so by unplugging the T-connector from the interface card. Leave the cables, or cable and terminator, connected to the T to preserve the SRM coax connection's continuity for other servers and clients.

Assigning Node Addresses (LAN Connection)
Individual client workstations are identified to a server by the workstation's unique node address. This address is emulated in the SRM/UX software for the LAN connection. See chapter 4 of this manual for details on how this is done.

See chapter 2 of this manual for an overview of the SRM/UX system and the details on system planning and assigning node addresses.

Connecting the LAN Coax Cable
See the "Inter-system Communication" chapter of the *HP9000 Workstations Configuration Guide* for details on how to correctly install your LAN interface cards and the LAN cabling.

Installing the Peripherals

The installation of peripheral hardware on the server is done entirely by the HP-UX system administrator and is not in the province of the SRM/UX system administrator.

If you are not only the SRM/UX system administrator but the HP-UX system administrator as well, see the "Series 300, 400, and 800 Interfacing and Accessories" chapters of the *HP 9000 Workstations Configuration Guide* for instructions on how to install the SRM/UX system peripherals.