StorageWorks™

Getting Started

RAID Array 410 for IBM AIX 3.2.5

Installation Guide

Order Number: EK–SMRA4–IG. B01

Second Edition, April 1995

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Revision Record

This Revision Record provides a concise publication history of this manual. It lists the manual revision levels, release dates, and reasons for the revisions. It also describes how the changes to affected pages are marked in the manual.

The following revision history lists all revisions of this publication and their effective dates. The publication part number is included in the Revision Level column, with the last entry denoting the latest revision. This publication supports the StorageWorks RAID Array 410 Subsystem.

Revision Level	Date	Summary of Changes
EK–SMRA4–IG. A01	January 1995	Original release. This release supports StorageWorks RAID Array 410 for the IBM AIX 3.2.5 operating system.
EK–SMRA4–IG. B01	April 1995	Updated to support RAID Array 410 Firmware Release 2.5

About This Guide

This section identifies the audience of this guide and describes the contents (chapter by chapter) and structure. In addition, this section includes a list of associated documents and the conventions used in this guide.

This guide provides the following:

- Description of how to unpack and assemble the RAID Array 410 Subsystem
- Using the Command Line Interface (CLI)
- How to install the Micro Channel Adapter Card into the IBM system
- Software installation and configuration of the Array using CLI

Intended Audience

This guide is intended for administrators of StorageWorks RAID Array 410 Subsystems. Installing the StorageWorks RAID Array 410 Subsystem requires a general understanding of UNIX system administration and Micro Channel products installation procedures.

Document Structure

This guide contains the following chapters:

Chapter 1: Unpacking the RAID Array 410 Subsystem

Unpacking describes how to unpack and place the SWXRA-Yx Office Expansion RAID Enclosure.

Chapter 2: Command Line Interface (CLI)

Using the specific Command Line Interface commands to set up a RAID environment on the SWXCR-04 RAID Array Controller.

Chapter 3: Installing the RAID Array 410 Hardware

Installing describes the steps required to install the host adapter in the host computer.

Chapter 4: Installing StorageWorks RAID Array 410 Software on the IBM AIX 3.2.5 Operating System

Installing describes the StorageWorks RAID Array 410 software for IBM and the procedure for installing it and the associated device drivers onto the IBM system.

Appendix A: Sample Tables

Sample Tables contains additional copies of the two tables used in Chapter 2 to record the configuration of your system.

Associated Documents

In addition to this guide, the following documentation is useful to the reader:

Table 1 Associated Documents

Document Title	Order Number
SWXSC-AA Office Expansion RAID Enclosure User's Guide	EK-SMCPD-UG. A01
StorageWorks RAID Array Controller User's Guide	EK-SMCS1-UG. B01

Conventions

This guide uses the following documentation conventions:

Table 2 Style Conventions

Style	Meaning
boldface monospace type	To be input by the user.
italic type	For emphasis, manual titles, utilities, menus, screens, and filenames
plain monospace type	Screen text.
#	Represents the IBM AIX system prompt. Do not type it as part of information given here as to be input by the user.

Getting Started

This section provides an overview for preparing and installing RAID Array 410 for AIX. Detailed information is contained in Chapters 1 through 4.

Thank you for purchasing a StorageWorks RAID Array 410 Subsystem. You received the following:

- StorageWorks SWXRA-Yx RAID Array 410 Subsystem: a RAID controller, disk drives, a StorageWorks storage expansion enclosure, the SWXRC-04 RAID Controller User's Guide, and the SWXSC-AA Office Expansion RAID Enclosure User's Guide

- StorageWorks SWBK-CB RAID Array 410 Software for IBM platform kit: an IBM FC2416 Fast Wide Differential SCSI-2 Host Adapter, host cable, a cable for connecting the maintenance port of the controller to the serial port of a personal computer (RJ12 to 9-pin serial), and the StorageWorks RAID Array 410 software distribution media

The major steps for installing all of the components of the StorageWorks RAID Array 410 Subsystem, include the following:

1. Configuring the RAID Controller using the Command Line Interface (Chapter 2 of this guide).

2. Installing the IBM-FC2416 SCSI-2 differential/wide adapter (Chapter 3 of this guide).

3. Performing the software installation process that allows the operating system to configure the RAID Array 410 (Chapter 4 of this guide).

> **Note**
>
> Installing the StorageWorks RAID Array 410 Subsystem and RAID Array 410 software for AIX 3.2.5 requires a general understanding of the following:
> - IBM RS6000 Computer Systems
> - AIX 3.2.5
> - Basic hardware installation procedures
> - Or, contact your service representative for installation assistance.

Before starting your installation, follow these steps:

- Verify the availability of user-supplied hardware and software.
- Inventory the contents of the StorageWorks RAID Array 410 Subsystem platform kit.
- Inventory the contents of the StorageWorks RAID Array 410 Subsystem.
- Follow your normal procedures to back up your system files.

Verifying User Supplied Hardware and Software (System Requirements)

The StorageWorks RAID Array 410 Subsystem requires the following user-supplied hardware and software:

- RS 6000 Series Computer System
  - A 3.5-inch (1.44 MB) floppy drive
  - Any available Micro Channel adapter slot
  - 1 MB of disk space for installation and regular use
  - The associated system hardware manual
- Appropriate tools to service your computer
- The IBM AIX operating system, version 3.2.5 and patch IX42624.

Verifying The StorageWorks RAID Array 410 Platform Kit and Subsystem Components

The Storage Works RAID Array 410 Platform SWBK-CB Kit provides the following components:

- This guide

- The QB-3CMAA-SC Media Kit

- An IBM-FC2416 SCSI-2 differential/wide Adapter

- A BN31R-03 SCSI cable, three meters long, with a right-angle high-density 68-pin connector on one end and a straight high-density 68-pin Centronics connector on the other

- StorageWorks RAID Array 410 software for IBM distribution media, on one 3.5-inch (1.44-MB) diskette

The StorageWorks RAID Array 410 Subsystem SWXRA-Yx provides the following components:

- The SWXSC-AA Office Expansion RAID Enclosure User's Guide
- The SWXRC-04 RAID Controller User's Guide
- The StorageWorks RAID Array 410 Subsystem
- A cable for connecting the maintenance port of the controller to the serial port of a personal computer
- 9-pin to 25-pin adapter
- Power Cable
- Keys
- RAID Array 410 Controller Firmware License Keys.

NOTE

Retain the Firmware License Keys information in a safe place. It may be required to reintialize the RAID Array Controller.

Backing up Your System

Follow your normal procedures to back up your system before installing the subsystem.

1

Unpacking The SWXRA-Yx RAID Array 410 Subsystem

This chapter describes the site preparation and unpacking procedures for the SWXRA-Yx RAID Array 410 Subsystem.

1.1   Site Preparation

The SWXRA-Yx RAID Array 410 Subsystem is designed for installation in Federal Communications Commission (FCC) Class A environments. Before installing the SWXRA-Yx, make sure that adequate space is available in front of the enclosure for opening the front door (19 inches clearance) and around the enclosure for adequate airflow. See Figure 1–1 for specific space requirements.

Figure 1–1 Minimum Installation Clearance Measurements
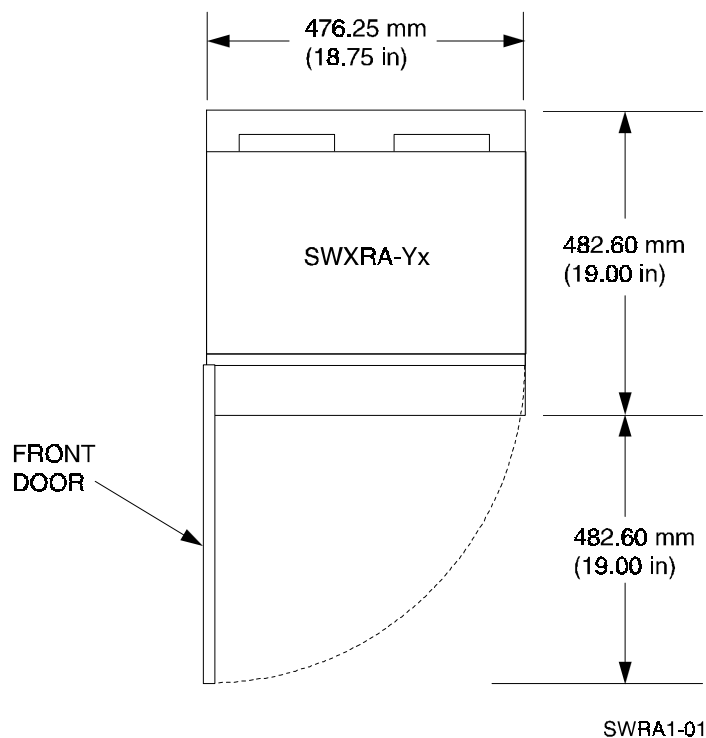
1.2 Unpacking the SWXRA-Yx

The SWXRA-Yx RAID Array 410 is packed in a corrugated carton attached to a wooden shipping pallet, as shown in Figure 1–2A. Unpack the SWXRA-Yx as follows:

NOTE

Before unpacking the equipment, inspect the shipping carton for signs of external damage. Report any damage to the local carrier and to your sales representative.

---

1. Remove the shipping straps (Figure 1–2A).

2. Remove the top cover (Figure 1–2B).

3. Remove the ramp from the top of the shipping carton (Figure 1–2B) and set it aside for subsequent use in moving the SWXRA-Yx off the pallet.

4. Remove the two foam cushions from the top of the SWXRA-Yx container (Figure 1–2B).

5. Remove the sealed cardboard box packed beside the subsystem unit. It contains cable and documentation.

6. Remove the cardboard carton surrounding the SWXRA-Yx(Figure 1–2B).

7. Remove the plastic barrier bag (Figure 1–2C).

8. Once the SWXRA-Yx is exposed (Figure 1–2D), examine the equipment for any apparent damage. Report any such problems immediately to your sales representative.

Figure 1–2 Unpacking the SWXRA-Yx RAID Array 410
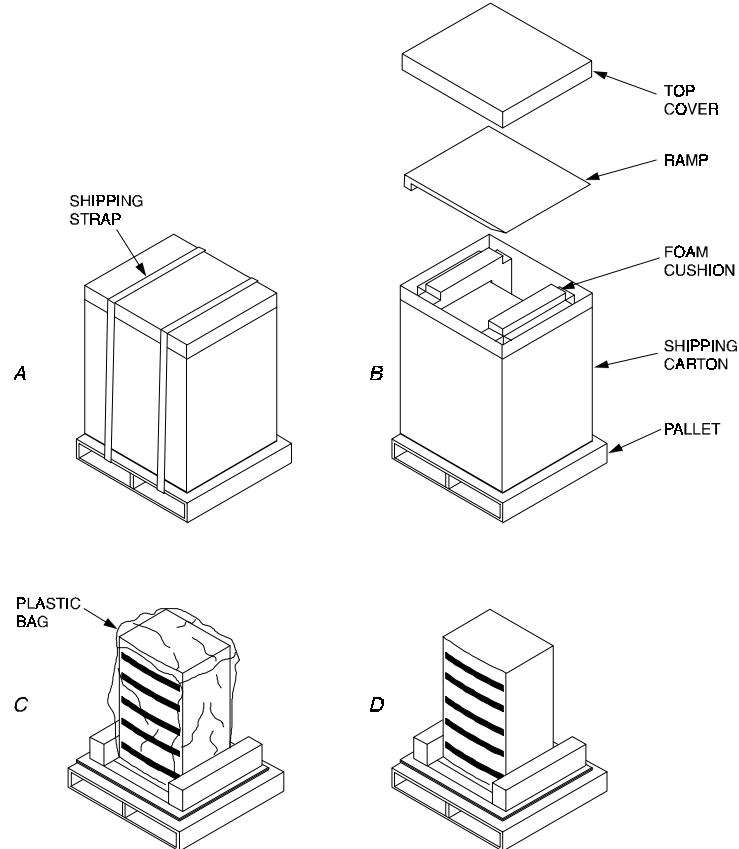
1.3 Removing the SWXRA-Yx from the Pallet

Use the following procedure to remove the SWXRA-Yx from the shipping pallet:

WARNING

Serious personnel injury may result if correct safety precautions are not taken during the removal procedure.

---

1. Attach the ramp to the shipping pallet by fitting the lip of the ramp into the groove on the pallet, as shown in Figure 1–3.

2. Lift the lock lever on each front caster to its *up* position so that the SWXRA-Yx enclosure can be moved.

Figure 1–3 Installation of Ramp on Shipping Pallet
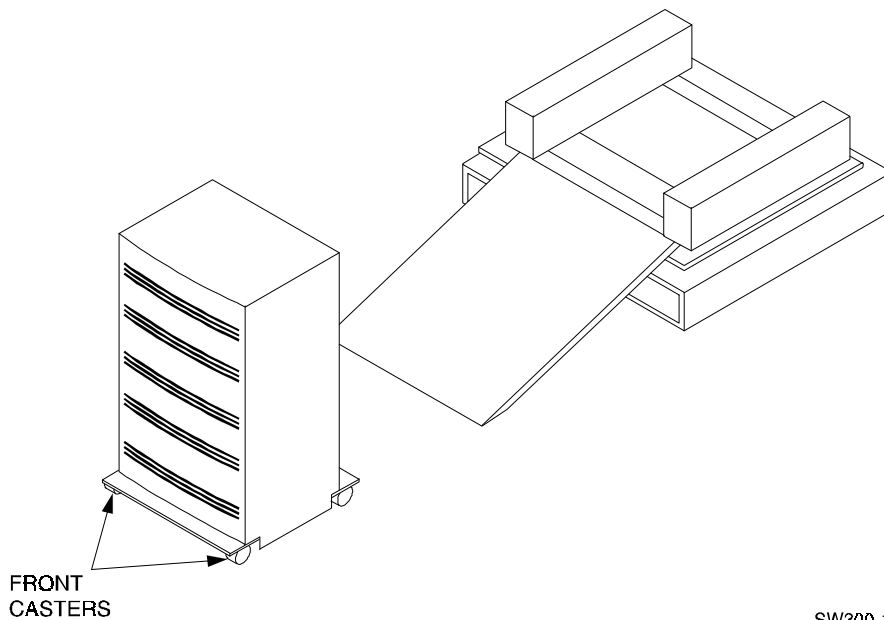
WARNING

We recommend that three people be assigned to the task of unloading the SWXRA-Yx array from its shipping pallet. Failure to use sufficient personnel may result in personnel injury and equipment damage.

CAUTION

Do not drop the SWXRA-Yx array from a height of more than two inches, as serious structural damage can result.

---

3. Grasping the sheet metal base assembly, carefully lift the rear of the SWXRA-Yx enclosure over the "hump" in the center of the pallet and then roll the SWXRA-Yx enclosure off the pallet and down the ramp to the floor. If any further lifting of the SWXRA-Yx is required, grasp the sheet metal base assembly on the side and lift it carefully.

4. Retain the shipping container and all packing materials.

1.4   Placing the SWXRA-Yx RAID Array 410

Use the following procedure to move the SWXRA-Yx to its designated site:

WARNING

To prevent damage to the SWXRA-Yx and injury to personnel, make sure to provide a clear path for the casters.

1. Roll the SWXRA-Yx enclosure to the desired location.
2. If required, engage the lock on each front caster to prevent the enclosure from moving.

2

Creating an Initial Controller Configuration

This chapter contains instructions for creating an initial configuration for your RAID Array Controller. It also briefly describes the CLI (Command Line Interpreter) and how to access it. The configuration steps include verifying the default configuration, adding drives, creating and initializing RAIDsets, STRIPEsets, MIRRORsets, and STRIPE MIRRORsets, identifying the storageset as a unit to the host, and verifying and recording your final configuration.

2.1 What is the CLI?

The Command Line Interpreter (CLI) is the user interface to the SWXRC–04 RAID Array Controller. Using a connection between the controller's maintenance port and a PC's serial output port, the CLI can be used to view and modify the controller's configuration. The CLI can also be used to access reports and diagnostic tools. This chapter specifies the CLI commands required to create an initial configuration for the controller.

See "*Command Line Interpreter*" in the *SWXRC-04 RAID Array Controller User's Guide* for detailed descriptions of all CLI commands.

2.2 Accessing the CLI

Access the CLI using a PC with a terminal emulation program, such as the Microsoft Windows Terminal program. You can also use most commercially-available communications programs.

2.2.1 Connect the PC to the Controller

Follow the steps below to connect the controller to a serial port on a PC.

1. Locate the connecting cable that came with the RAID subsystem. It has an RJ12 connector on one end and a 9-pin serial connector on the other end.

2. Plug the RJ12 connector into the jack on the controller.

3. Plug the serial connector into an available 9-pin serial port on the PC. If your PC does not have a 9-pin serial port, use the 9-pin to 25-pin adapter supplied with your StorageWorks RAID Array 410 Subsystem. Note which serial port you used, since you will need that information in the communications program.

2.2.2 Start the Communications Program

1. Start the communications program on your PC.

2. Set the communications program to use the serial port that is connected to the controller.

3. Set the communications parameters to:

   - 9600 baud

   - 8 bits

   - 1 stop bit

   - No parity

2.2.3 Establish the Connection with the Controller

From your communication program, issue a connect command to establish a connection with the controller, and then press the Enter key. You should see the CLI prompt, which looks similar to

```
SWXRC>
```

2.3   Show Initial Configuration

The RAID Array 410 Subsystem has been preconfigured with a controller at ID0 (SCSI target 0) and a single drive logical unit D0.

Enter the following command to verify the controller's parameters:

```
SWXRC> SHOW THIS_CONTROLLER FULL
```

The controller responds with a display similar to that shown below:

```
CONTROLLER:
    SWXRC-04 CX44332211 FIRMWARE V25Z-0, HARDWARE A02
    SCSI ADDRESS 7
    TIME: NOT SET
HOST PORT:
⊇  SCSI TARGET(S) (0)
CACHE:
    32 MEGABYTE WRITE CACHE, VERSION 2
⊄  CACHE IS GOOD
⊂  BATTERY IS GOOD
    NO UNFLUSHED DATA IN CACHE
    CACHE_FLUSH_TIMER = DEFAULT (10 SECONDS)
    CACHE_POLICY=B
LICENSING INFORMATION:
⊆  RAID (RAID OPTION) IS ENABLED, LICENSE KEY IS VALID
∈  WBCA (WRITEBACK CACHE OPTION) IS ENABLED, LICENSE KEY IS VALID
∉  MIRR (DISK MIRRORING OPTION) IS ENABLED, LICENSE KEY IS VALID
EXTENDED INFORMATION:
     TERMINAL SPEED 9600 BAUD,EIGHT BIT,NO PARITY,1 STOP BIT
     OPERATION CONTROL:0000004  SECURITY STATE CODE:85780
```

Examine the display to verify the following information:

⊃ Controller SCSI target number should be 0

   If the target number is not 0, use the following commands to set a SCSI target ID for the controller:

   SWXRC> **SET THIS_CONTROLLER ID=0**

   SWXRC> **RESTART THIS_CONTROLLER**

⊄ Cache condition should be GOOD

   If the Cache condition is BAD then call your sales person for unit service or replacement of the Cache module.

⊂ Battery condition should be GOOD

   If the Battery condition is LOW then allow the battery to charge with the subsystem power on for at least 6 hours. The battery must be fully charged to protect the data in the Write Back Cache. If the Battery condition is LOW after 6 hours of charging then call your sales person for unit service or replacement of the Batteries.

NOTE

The subsystem can be configured with the Battery condition LOW however the Write Back Cache cannot be initialized.

⊆∈∉ License key should be VALID

   If the License key is INVALID then enter the following:

   SWXRC> **RUN FLS**

   and follow the menu driven program to enable the license. You will need the WRITE-BACK CACHE, RAID5, and MIRROR License Key page that is provided in the subsystem documentation package.

2.4 Dual–Redundant Controller Configuration

An optional controller and cache can be added to the SWXRC-04 RAID Array on the same host SCSI bus. This is called a dual-redundant controller configuration.

Dual redundant controllers offer automatic, intelligent failover of attached storage devices in the event of a controller failure. Up to four SCSI targets and 36 SCSI devices can be supported by the two controllers in a dual-redundant configuration

In a dual-redundant configuration, one terminal can set both controller configurations. Installation procedures for the second controller can be found in Chapter 9 of *the SWXRC-04 RAID Controller User's Guide* (EK-SMCS1-UG). After installation of both controllers, use the CLI to define the controllers' parameters in the following order from a terminal connected to one controller:

Check the cache and battery conditions of the other controller using the following command:

   SWXRC> **SHOW OTHER_CONTROLLER FULL**

- Cache condition should be GOOD

  If the Cache condition is BAD then call your sales person for unit service or replacement of the Cache module.

- Battery condition should be GOOD

  If the battery condition is LOW, allow the battery to charge with the subsystem power on for at least 6 hours. The battery must be fully charged to protect the data in the Write Back Cache. If the battery condition is still listed as LOW after 6 hours of charging, call your sales person for unit service or replacement of the batteries.

Set the controller SCSI target number:

```
SWXRC> SET THIS_CONTROLLER ID=0

SWXRC> SET THIS_CONTROLLER PERFERRED_ID=0
```

Enter the following command to copy parameters to the other controller – the one the terminal is not connected to:

```
SWXRC> SET FAILOVER COPY=THIS_CONTROLLER

SWXRC> RESTART OTHER_CONTROLLER

SWXRC> RESTART THIS CONTROLLER
```

Enter the following commands to verify the preceding parameters were set:

```
SWXRC> SHOW THIS_CONTROLLER FULL

SWXRC> SHOW OTHER_CONTROLLER FULL
```

2.5   Remove Default Logical Unit

The subsystem was configured at the factory with a single drive (DISK100) as a logical unit (D0) available to the host. In order to configure the array, it is necessary to remove the logical unit. Use the following CLI command to do so.

```
SWXRC> DELETE D0
```

NOTE

The last character in the command is a zero, not the letter "oh".

2.6   Add Disks to the Configuration

The CONFIG utility locates and adds disks to the controller. Run the CONFIG utility whenever you add new disks to the controller. Enter the following command to start the configuration utility. The disk numbers will correspond to the disk locations for your subsystem.

```
SWXRC> RUN CONFIG
```

The controller responds with a display similar to that shown below:

```
CONFIG LOCAL PROGRAM INVOKED

CONFIG IS BUILDING ITS TABLES AND DETERMINING WHAT DEVICES EXIST ON
THE SUBSYSTEM. PLEASE BE PATIENT.

ADD DISK110 1 1 0
ADD DISK200 2 0 0
ADD DISK210 2 1 0
ADD DISK300 3 0 0
ADD DISK310 3 1 0
ADD DISK400 4 0 0
ADD DISK410 4 1 0
ADD DISK420 4 2 0
ADD DISK430 4 3 0
ADD DISK500 5 0 0
ADD DISK510 5 1 0
ADD DISK520 5 2 0
ADD DISK530 5 3 0
ADD DISK600 6 0 0
ADD DISK610 6 1 0
ADD DISK620 6 2 0
ADD DISK630 6 3 0

CONFIG - NORMAL TERMINATION
```

In this example, the controller has located 17 new disks. Note that CONFIG did not list DISK100 because the controller was already aware of that disk. The 3 digit number associated with each disk corresponds to Channel Number, Target Number and Controller Logical Unit Number. The Controller Logical Unit Number will always be 0. DISK400, in this example, corresponds to the disk located on Channel 4, on controller Target 0, and Controller Logical Unit 0. DISK510 corresponds to the disk located on Channel 5, controller Target 1, and Controller Logical Unit 0. The following diagram shows the mapping of Channels and Targets for the Office Expansion RAID Enclosure:
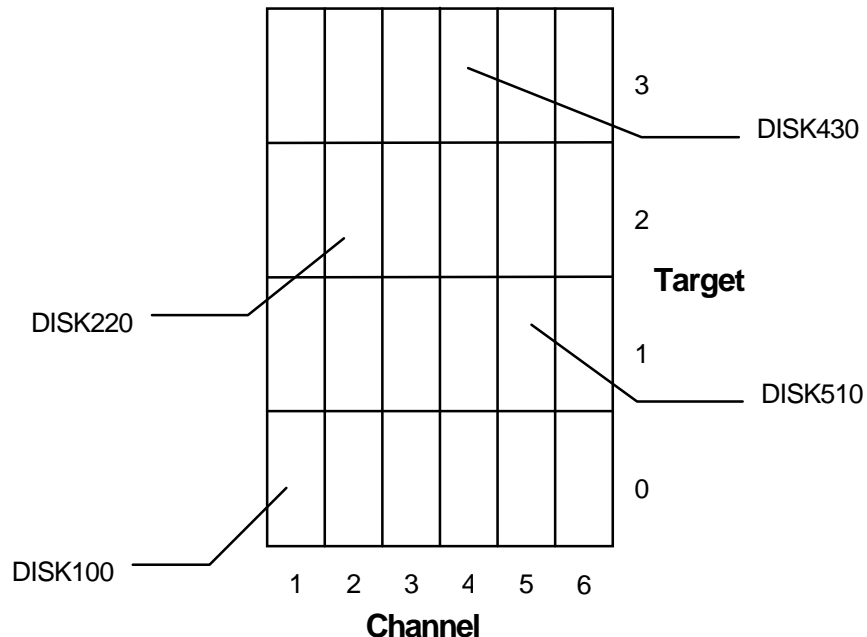
2.7   Create a RAIDset

If you require RAIDsets to be available to the host as Logical Units, you must now combine disks into a RAIDset. RAIDsets must have at least three members, and can have as many as fourteen. This example creates two three member RAIDsets using the ADD RAIDSET command.

> SWXRC> **ADD RAIDSET RAID_SET_1 DISK100 DISK200 DISK300**
>
> SWXRC> **ADD RAIDSET RAID_SET_2 DISK400 DISK500 DISK600**

In this example, "RAID_SET_1" and "RAID_SET_2" are the names of the RAIDset, and they are followed by a list of disks to be included in each RAIDset. The names of the RAID sets are user selectable. Performance of your RAIDsets will be optimized if each RAIDset includes disks from different channels as shown in the example.

2.7.1 Initialize the RAIDset

Before you can put the RAIDset(s) into service, they must be initialized.

When you initialize a RAIDset, a chunksize must be specified. A chunksize is the number of blocks of data that is transferred at one time. By using the default chunksize, the controller will optimize the chunksize by selecting a number equal to the number of blocks in one track of disk data. We recommend using the default chunksize.

> SWXRC> **INITIALIZE RAID_SET_1 CHUNKSIZE=DEFAULT**
>
> SWXRC> **INITIALIZE RAID_SET_2 CHUNKSIZE=DEFAULT**

> **NOTE**
>
> Valid chunksizes are 16 – 682 blocks. You should use a larger chunksize for applications that make a lot of I/O requests. Use a smaller chunksize for applications that make relatively few I/O requests, but need to move large amounts of data with each request.

2.7.2 Add the RAIDset as a Logical Unit

To make a RAIDset available to the host computer, you must identify it as a host logical unit. The unit number is a one or three digit number preceded by "D". The unit number identifies the controller's target number and the RAIDset as the Logical Unit (LUN) connected to the target. Units identified with controller target number 0 have a single digit number which corresponds to LUN number. For example, D5 would be target 0, LUN 5. Units identified with controller targets 1, 2 and 3 use a 3 digit number. The first digit corresponds to the controller target number, the second digit is always 0 and the third digit to the LUN number. For example, D205 would be target 2, LUN 5. You must now identify the RAIDsets as Host Logical Units by using the ADD UNIT command.

> SWXRC> **ADD UNIT D0 RAID_SET_1**
>
> SWXRC> **ADD UNIT D1 RAID_SET_2**

This example uses the controller target of 0 (specified earlier with the SET_THIS_CONTROLLER command) and LUN 0 and 1 as the digits in D0 and D1, since the two RAIDsets are the first and second units identified on the controller.

NOTE

For the AIX operating systems, Logical Units must be sequential. They must begin with D0 and be followed by D1, D2, D3, ... etc.

2.7.3 Set Writeback Cache

The final step in creating the RAIDset is to enable the writeback cache. A single CLI command enables that feature for the entire RAIDset:

SWXRC> **SET D0 WRITEBACK_CACHE**

SWXRC> **SET D1 WRITEBACK_CACHE**

Where: D0 and D1 represent the host logical units of the RAIDsets described above.

2.8   Create a STRIPEset

If you require STRIPE sets to be available to the host as Logical Units, you must now combine disks into a STRIPEset. STRIPEsets must have at least two members, and can have as many as fourteen. This example creates a three member STRIPEset using the ADD STRIPESET command.

SWXRC> **ADD STRIPESET STRIPE_SET_1 DISK110 DISK210 DISK310**

In this example, "STRIPE_SET_1" is the name of the STRIPEset, and it is followed by a list of the disks to be included in the STRIPEset. The names of the STRIPEsets are user selectable. Performance of your STRIPEsets will be optimized if each STRIPEset includes disks from different channels as shown in the example on page 2-5.

2.8.1 Initialize the STRIPEset

Before you can put the STRIPEset into service, it must be initialized.

When you initialize a STRIPEset, a chunksize must be specified. A chunksize is the number of blocks of data that are transferred at one time. By using the default chunksize, the controller will optimize the chunksize by selecting a number equal to the number of blocks in one track of disk data. We recommend using the default chunksize.

SWXRC> **INITIALIZE STRIPE_SET_1 CHUNKSIZE=DEFAULT**

NOTE

Valid chunksizes are 16 – 32768 blocks. You should use a larger chunksize for applications that make a lot of I/O requests. Use a smaller chunksize for applications that make relatively few I/O requests, but need to move large amounts of data with each request.

2.8.2 Add the STRIPEset as a Logical Unit

To make a STRIPEset available to the host computer, you must identify it as a host logical unit. The unit number is a one or three digit number preceded by "D". The unit number identifies the controller's target number and the STRIPEset as the Logical Unit (LUN) connected to the target. Units identified with controller target number 0 have a single digit

number which corresponds to LUN number. For example, D5 would be target 0, LUN 5. Units identified with controller targets 1, 2 and 3 use a 3 digit number. The first digit corresponds to the controller target number, the second digit is always 0 and the third digit to the LUN number. For example, D205 would be target 2, LUN 5. You must now identify the STRIPEsets as Host Logical Units by using the ADD UNIT command.

> SWXRC> **ADD UNIT D2 STRIPE_SET_1**

This example uses the controller target of 0 (specified earlier with the SET_THIS_CONTROLLER command) and LUN 2 as the digit in D2, since the STRIPEset is the third unit identified on the controller.

NOTE

For the AIX operating system, Logical Units must be sequential. They must begin with D0 and be followed by D1, D2, D3, ... etc.

The final step in creating the STRIPEset is to enable the writeback cache. A single CLI command enables that feature for the entire STRIPEset:

> SWXRC> **SET D2 WRITEBACK_CACHE**

> Where: D2 represents the host logical unit of the STRIPEset described above.

2.9   Add Individual Disks as Logical Units

Before you can put an individual disk into service, it must be initialized:

> SWXRC> **INITIALIZE DISK410**

> SWXRC> **INITIALIZE DISK510**

If you require individual Disks to be available to the host as Logical Units, you must now identify the Disks as Host Logical Units by using the ADD UNIT command.

> SWXRC> **ADD UNIT D3 DISK410**

> SWXRC> **ADD UNIT D4 DISK510**

In this example, disks DISK410 and DISK510 were identified to the host as units D3 (Target 0, LUN 3) and D4 (Target 0, LUN 4) respectively.

NOTE

For the AIX operating system, Logical Units must be sequential. They must begin with D0 and be followed by D1, D2, D3, ... etc.

If a disk in a RAIDset goes bad, the controller will replace it with a disk from the Spareset, if one exists. If there is no Spareset, the RAIDset will run "reduced," and you should replace the disabled disk as soon as possible. We recommend allocating one drive as a spareset.

If you chose to leave one or more drives as a Spareset for the RAIDset, you must now configure that in the controller. To create the Spareset, identify the drive(s) using the ADD SPARESET command.

> SWXRC> **ADD SPARESET DISK610**

In this example, DISK610 was identified to the controller as a Spareset.

2.10   Create a MIRRORset

If you require MIRRORsets to be available to the host as Logical Units, you must now combine disks into a MIRRORset. MIRRORsets must have at least two members, and can have as many as six. This example creates a two member MIRRORset using the ADD MIRRORSET command.

> SWXRC> **ADD MIRRORSET MIRROR_SET_1 DISK120 DISK220**

In this example, "MIRROR_SET_1" is the name of the MIRRORset, and it is followed by a list of the disks to be included in the MIRRORset. The names of the MIRROR sets are user selectable. Performance of your MIRROR sets will be optimized if each MIRRORset includes disks from different channels as shown in the example.

2.10.1 Initialize the MIRRORset

Before you can put the MIRRORset into service, it must be initialized.

> SWXRC> **INITIALIZE MIRROR_SET_1**

2.10.2 Add the MIRRORset as a Logical Unit

To make a MIRRORset available to the host computer, you must identify it as a host logical unit. The unit number is a one or three digit number preceded by "D". The unit number identifies the controller's target number and the MIRRORset as the Logical Unit (LUN) connected to the target. Units identified with controller target number 0 have a single digit number which corresponds to LUN number. For example, D5 would be target 0, LUN 5. Units identified with controller targets 1, 2 and 3 use a 3 digit number. The first digit corresponds to the controller target number, the second digit is always 0 and the third digit to the LUN number. For example, D400 would be target 4, LUN 0. You must now identify the STRIPEsets as Host Logical Units by using the ADD UNIT command.

> SWXRC> **ADD UNIT D400 MIRROR_SET_1**

This example uses the controller target of 4 and LUN 0.

NOTE

For the AIX operating system, Logical Units must be sequential. They must begin with D0 and be followed by D1, D2, D3, ... etc.

The final step in creating the MIRRORset is to enable the writeback cache. A single CLI command enables that feature for the entire MIRRORset:

> SWXRC> **SET D400 WRITEBACK_CACHE**

> Where: D400 represents the host logical unit of the MIRRORset described above.

2.11 Create a STRIPE MIRRORset

If you require STRIPE MIRROR sets to be available to the host as Logical Units, you must now combine MIRRORsets into a STRIPEset. STRIPEsets must have at least two members, and can have as many as fourteen. These examples create 2, two member MIRRORsets using the ADD MIRRORSET command.

> SWXRC> **ADD MIRRORSET MIRROR_SET_3 DISK320 DISK420**

> SWXRC> **ADD MIRRORSET MIRROR_SET_4 DISK520 DISK620**

In these examples, "MIRROR_SET_3" and , "MIRROR_SET_4" are the names of the MIRRORsets, and it is followed by a list of the disks to be included in the MIRRORsets.

2.11.1 Initialize the MIRRORsets

Before you can put the MIRRORsets into a STRIPE MIRRORset, they must be initialized.

> SWXRC> **INITIALIZE MIRROR_SET_3**

> SWXRC> **INITIALIZE MIRROR_SET_4**

2.11.2 Create a STRIPE MIRRORset

To create the STRIPEset from the two MIRROR sets you must combine them into a STRIPEset. STRIPE MIRRORsets must have at least two members, and can have as many as fourteen. This example creates a two member STRIPEset using the ADD STRIPESET command.

> SWXRC> **ADD STRIPESET STRIPE_MIRROR MIRROR_SET_3**
> **MIRROR_SET_4**

In this example, "STRIPE_MIRROR" is the name of the STRIPE MIRRORset, and it is followed by a list of MIRRORsets to include in the STRIPEset. The name of the STRIPEset is user selectable. Performance of your STRIPE MIRRORset will be optimized if each MIRRORset includes disks from different channels.

2.11.3 Initialize the STRIPE MIRRORset

Before you can put the STRIPE MIRRORset into service, it must be initialized.

When you initialize a STRIPEset, a chunksize must be specified. A chunksize is the number of blocks of data that are transferred at one time. By using the default chunksize, the controller will optimize the chunksize by selecting a number equal to the number of blocks in one track of disk data. We recommend using the default chunksize.

> SWXRC> **INITIALIZE STRIPE_MIRROR CHUNKSIZE=DEFAULT**

NOTE

Valid chunksizes are 16 – 32768 blocks. You should use a larger chunksize for applications that make a lot of I/O requests. Use a smaller chunksize for applications that make relatively few I/O requests, but need to move large amounts of data with each request.

2.11.4 Add the STRIPE MIRRORset as a Logical Unit

To make a STRIPE MIRRORset available to the host computer, you must identify it as a host logical unit. The unit number is a one or three digit number preceded by "D". The unit number identifies the controller's target number and the MIRRORset as the Logical Unit (LUN) connected to the target. Units identified with controller target number 0 have a single digit number which corresponds to LUN number. For example, D500 would be target 5, LUN 0. Units identified with controller targets 1, 2 and 3 use a 3 digit number. The first digit corresponds to the controller target number, the second digit is always 0 and the third digit to the LUN number. For example, D205 would be target 2, LUN 5. You must now identify the STRIPEsets as Host Logical Units by using the ADD UNIT command.

> SWXRC> **ADD UNIT D500 STRIPE_MIRROR**

NOTE

For the AIX operating system, Logical Units must be sequential. They must begin with D0 and be followed by D1, D2, D3, ... etc.

The final step in creating the MIRRORset is to enable the writeback cache. A single CLI command enables that feature for the entire MIRRORset:

> SWXRC> **SET D500 WRITEBACK_CACHE**

> Where: D500 represents the host logical unit of the STRIPE MIRRORset described above.

You have now completed all the steps required to create an initial configuration for your controller. In the following steps, you should verify and record your configuration for future reference. Additional worksheets are provided in Appendix A for recording future new or modified configurations.

First, verify the Logical Units you have configured:

> SWXRC> **SHOW UNITS**

The controller responds with a display similar to that shown below:

```
LUN                 USES
----------------------------------
D0                  RAID_SET_1

D1                  RAID_SET_2

D2                  STRIPE_SET_1

D3                  DISK410

D4                  DISK510

D400                MIRROR_SET_1

D500                STRIPE_MIRROR

----------------------------------
```

Record the information in the following table:

Date_____	
LUN	Uses

Next, verify the StorageSets you have configured:

SWXRC> **SHOW STORAGESETS**

The controller responds with a display similar to that shown below:

```
Name                StorageSet    Uses                Used by
------------------------------------------------------------------
STRIPE_MIRROR       stripeset     MIRROR_SET_3        D500
                                  MIRROR_SET_4

STRIPE_SET_1        stripeset     DISK110             D2
                                  DISK210
                                  DISK310

MIRROR_SET_1        mirrorset     DISK120             D400
                                  DISK220

MIRROR_SET_3        mirrorset     DISK320             STRIPE_MIRROR
                                  DISK420

MIRROR_SET_4        mirrorset     DISK520             STRIPE_MIRROR
                                  DISK620

RAID_SET-1          raidset       DISK100             D0
                                  DISK200
                                  DISK300

RAID_SET_2          raidset       DISK400             D1
                                  DISK500
                                  DISK600

SPARESET            spareset      DISK610

FAILEDSET           failedset


------------------------------------------------------------------
```

Record the information in the following table. In the event of a controller failure, the information that is recorder here will assist you in reconstruction of the storagesets on your RAID Array 410.

JBOD devices are not displayed in this report. To display JBOD devices, enter the following:

SWXRC> **SHOW DEVICES**

Date_____			
Name	StorageSet	Uses	Used by

3

Installing the RAID Array 410 Hardware

In preparing your array for first time use, you need to connect your workstation and subsystem through the host adapter board. This chapter, along with your workstation and the associated StorageWorks RAID Array 410 Subsystem manuals, provides instructions for preparing and installing the host adapter and the subsystem enclosure.

3.1 Preparing and Installing the IBM Micro Channel SCSI-2 Host Adapter

The Micro Channel SCSI-2 host adapter is a Micro Channel-to-SCSI-2, 16-bit differential host adapter. You connect your computer to the StorageWorks RAID Array 410 Subsystem through the host adapter and a connecting cable.

You need the following before you begin:

- The Micro Channel SCSI-2 host adapter board (use precautions to protect the board from static discharge)
- Your computer system hardware manual
- Appropriate tools to service your computer
- The BN31R-03 SCSI cable, three meters long, with a right angle high density 68-pin connector on one end and a straight high density 68-pin Centronics connector on the other

Refer to your system manual for additional reference information on installing a host adapter.

3.1.1 Preparing to Install the Host Adapter

Before performing the installation of the host adapter into your IBM RS6000 series system, take precautions to protect the board from electrostatic discharge. Then perform the following steps:

> **NOTE**
>
> The installation procedure for the host adapter varies depending upon which model of RS6000 system you are using. This guide describes the installation of the host adapter into the following system models of the RS6000 series:
>
> - RS6000, 500 Series (Deskside, Floor Mounted)
> - RS6000, 36T (Desktop, Workstation)
> - RS6000, C10 (Desktop, Mini-Tower)

CAUTION

To protect the board from static discharge, wear an electrostatic discharge (ESD) wrist strap. If a wrist strap is unavailable, ground yourself by touching a bare metal surface on the computer chassis. Do not remove the board from its anti-static protective cover until instructed to do so in the following procedures.

---

1. Shutdown the operating system with the following commmand and press RETURN:

   # shutdown now

2. When the "Halt Completed" message is displayed, power down your model of the RS6000 and attached peripherals.

3. Open your system. Refer to your system manual for assistance in completing this procedure.

3.1.2   Installing the Host Adapter in the RS6000, 500 Series Deskside System

1. Set the keylock switch to the "service" position.

Figure 3–1 Setting Keylock to "Service" Position
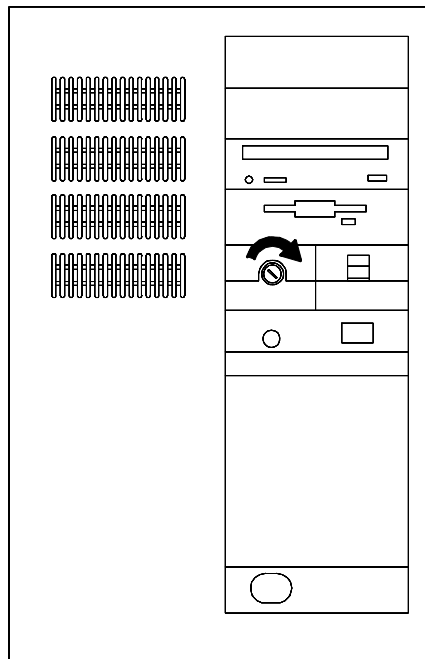
59H-01

2. Unlock the rear cover by turning the rear cover keylock to the "open" position.

3. Pull the rear cover out at the top, rotate it down as shown in Figure 3–2, and lift it up and clear of the system.

4. Locate the lock shaft handle at the rear of the system, and turn it counter-clockwise as shown in Figure 3–3 to unlatch the front cover. Remove the cover as in step 3.

Figure 3–2 Removing Rear Cover
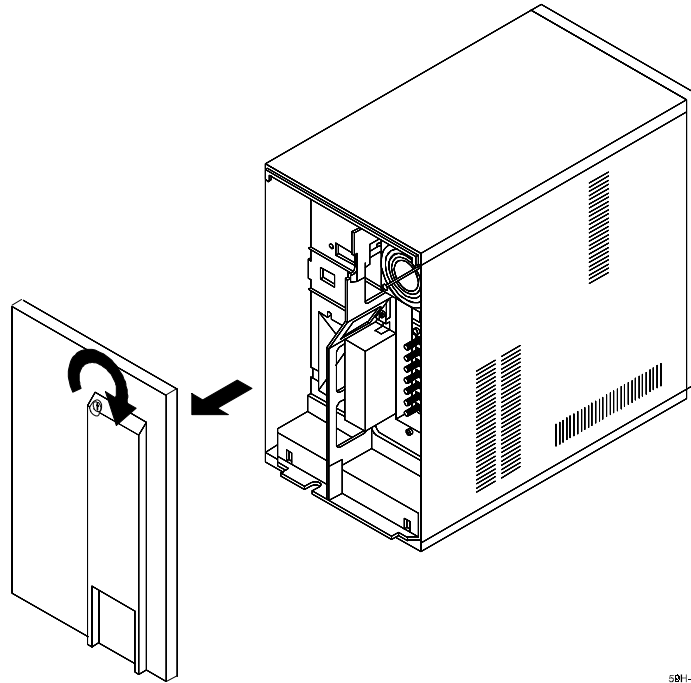
Figure 3–3 Removing Front Cover
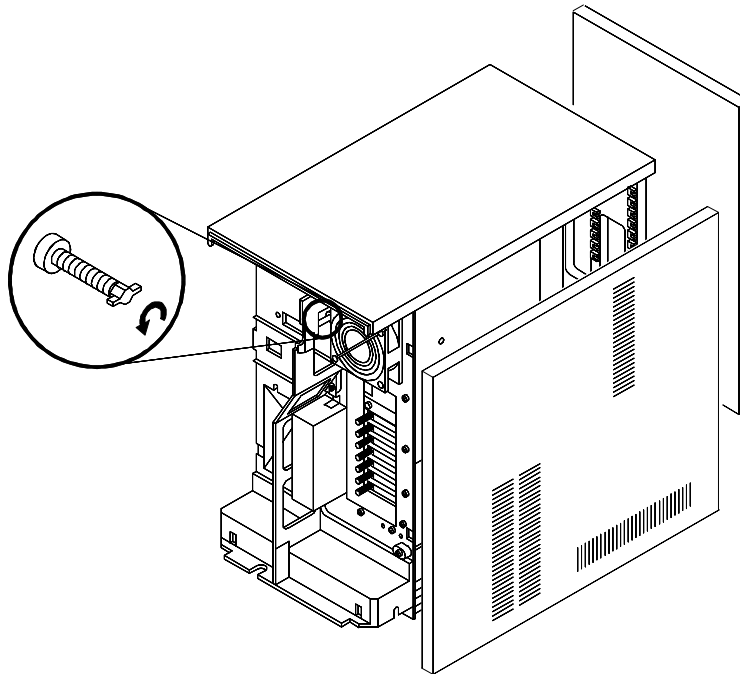
5. Remove the cover on the left side of the system (as viewed from the front) to gain access to the Micro Channel slot locations.

6. Select an empty circuit board slot and loosen the knurl screw securing the blank filler panel of the selected board slot as shown in Figure 3–4. Remove filler panel.

Figure 3–4 Remove Blank Filler Panel

59H-04
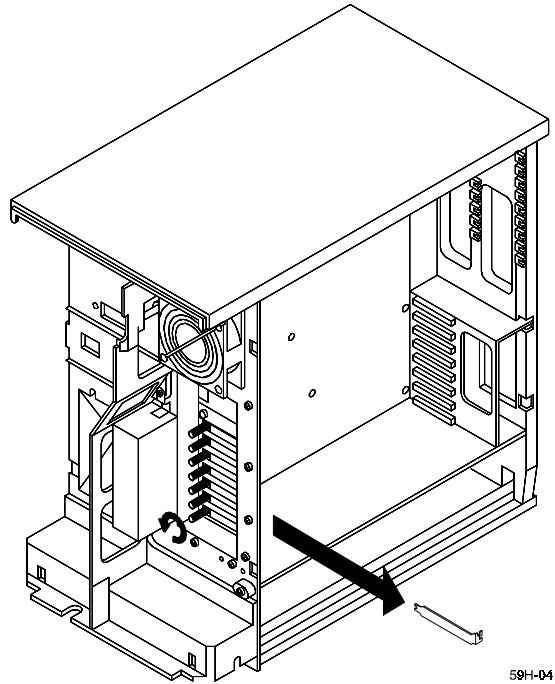
7. Install the plastic card extender into the selected slot as shown in Figure 3–5.

Figure 3–5 Install Card Extender

59H-05

8. Align the host adapter board with the Micro Channel slot, slide one end of the base of the board into the board extender and continue to slide the board into the slot until it is firmly seated into the backplane connector (see Figure 3–6).

Figure 3–6 Install the Host Adapter Board
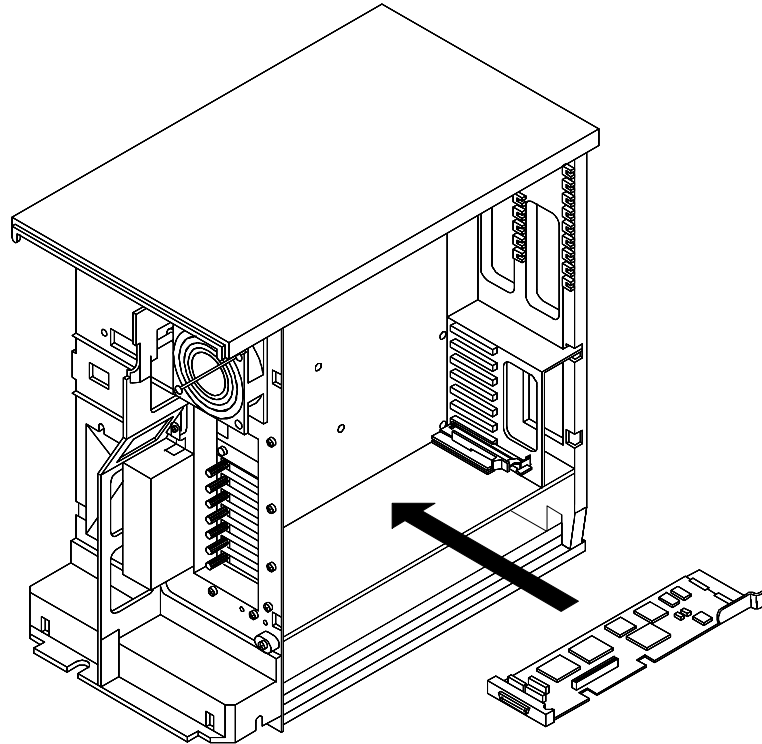
9. Tighten the knurl screw to connector-end of the board to the system.

10. Connect the SCSI-2 cable to the adapter as shown in Figure 3–7.

Figure 3–7 Connect SCSI-2 Cable
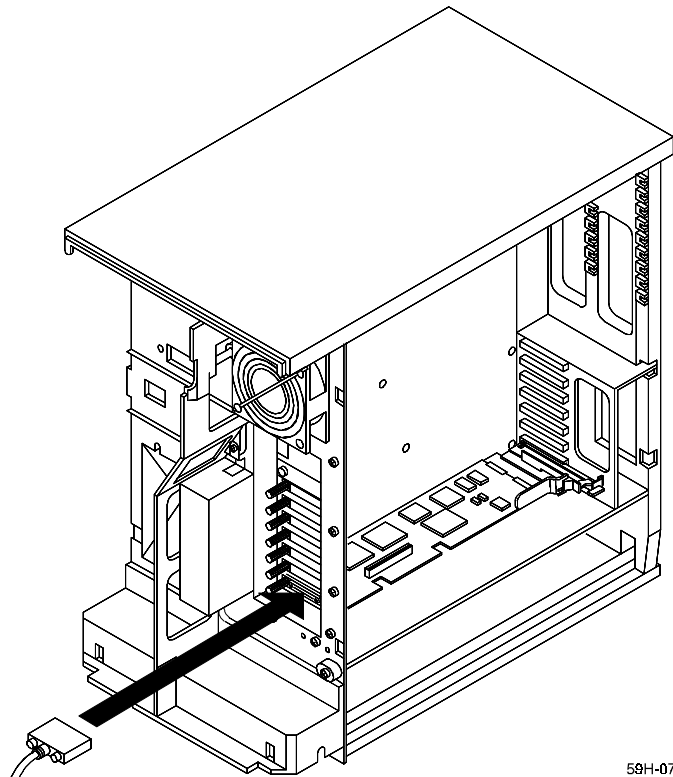
59H-07

11. Replace the side, front, and rear covers on your system.

12. Secure the front cover by turning the lock shaft handle clockwise.

13. Return the rear cover keylock to the "locked" position.

14. Return the front cover keylock switch to the "normal" position.

3.1.3 Installing the Host Adapter in the RS6000, 36T Desktop System

1. Unlock the system cover by setting the keylock switch to the "service" position.

Figure 3–8 Unlocking System Cover
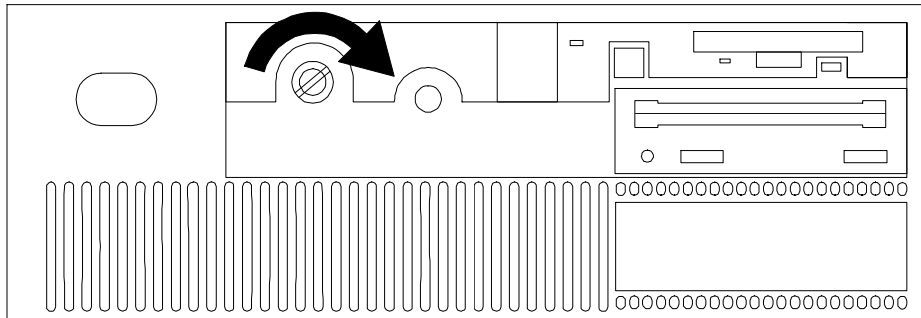
2. Loosen the two captive screws that secure the cover (Figure 3–9).
3. Remove the cover by lifting it slightly and sliding it toward the rear as shown in Figure 3–10.

Figure 3–9 Loosen Cover Screws
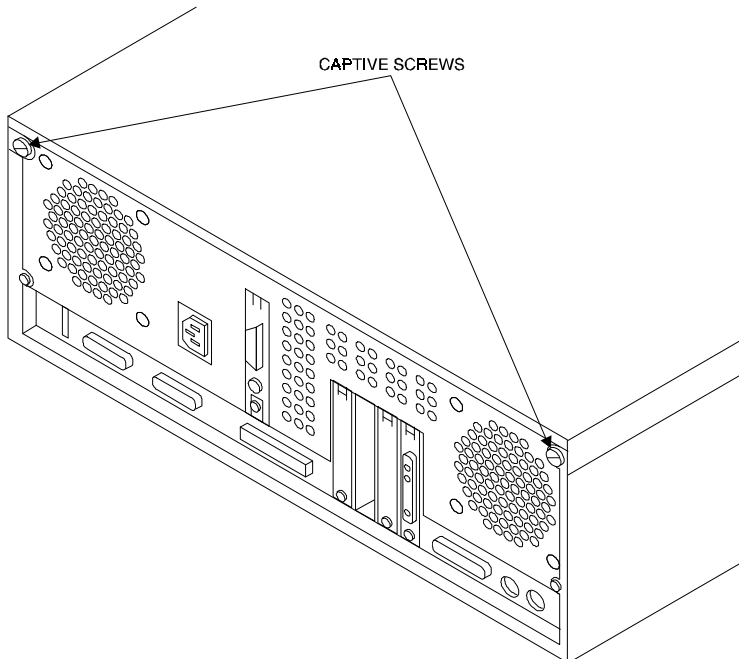
Figure 3–10 Remove Cover
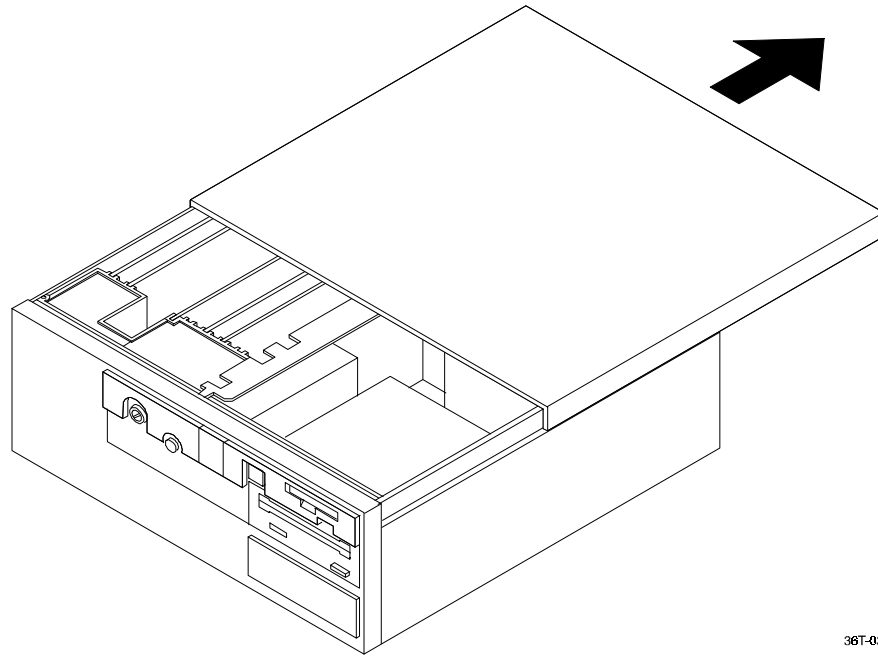
4. Select an empty circuit board slot and loosen the knurl screw securing the blank filler panel of the selected board slot as shown in Figure 3–11. Remove filler panel.

Figure 3–11 Remove Blank Filler Panel
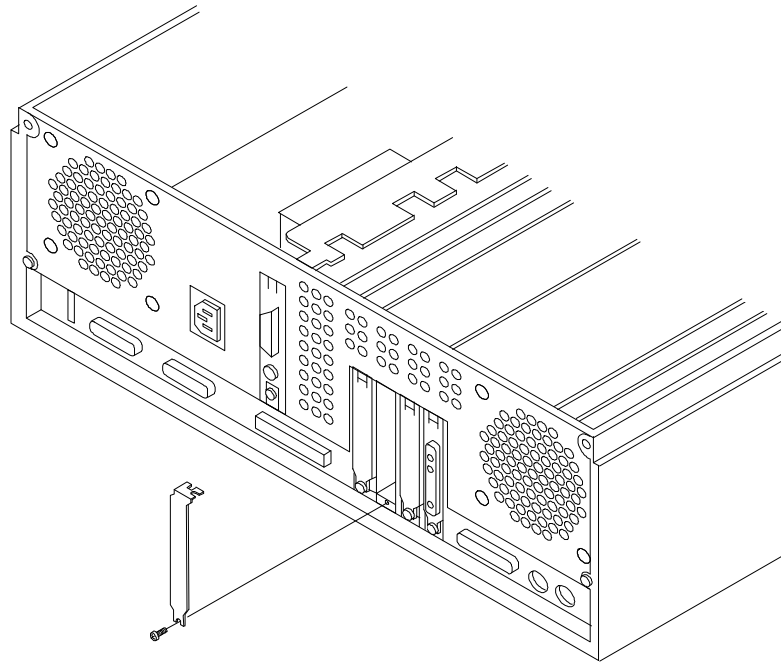
5. Install the plastic card extender into the selected slot as shown in Figure 3–12.

Figure 3–12 Install Card Extender
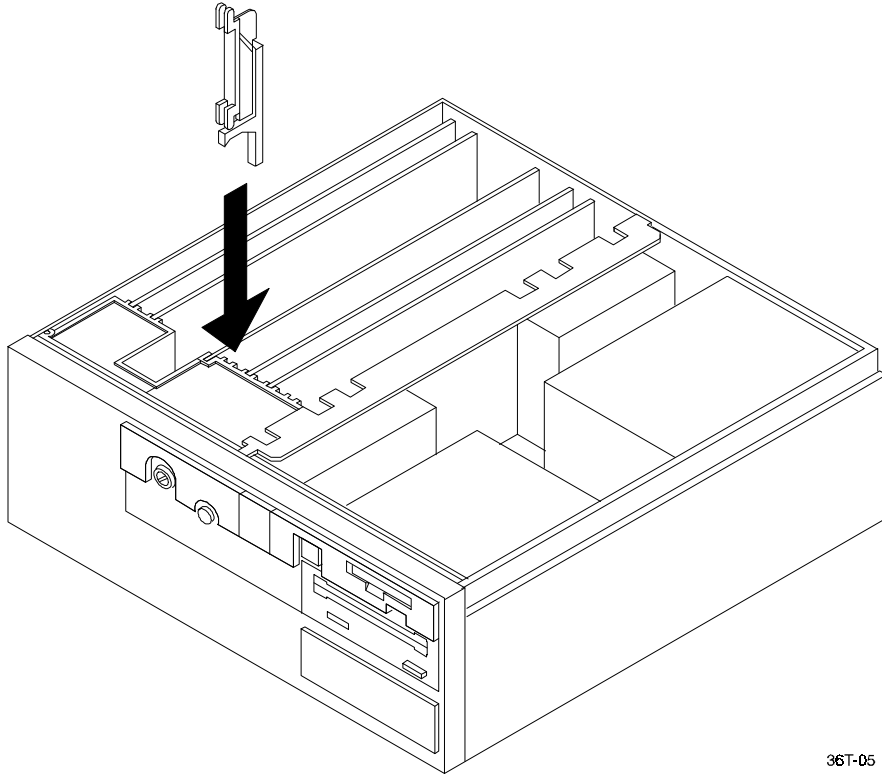
36T-05

6. Align the host adapter board with the Micro Channel slot, slide one end of the base of the board into the card extender and continue to slide the board into the slot until it is firmly seated into the backplane connector (see Figure 3–13)
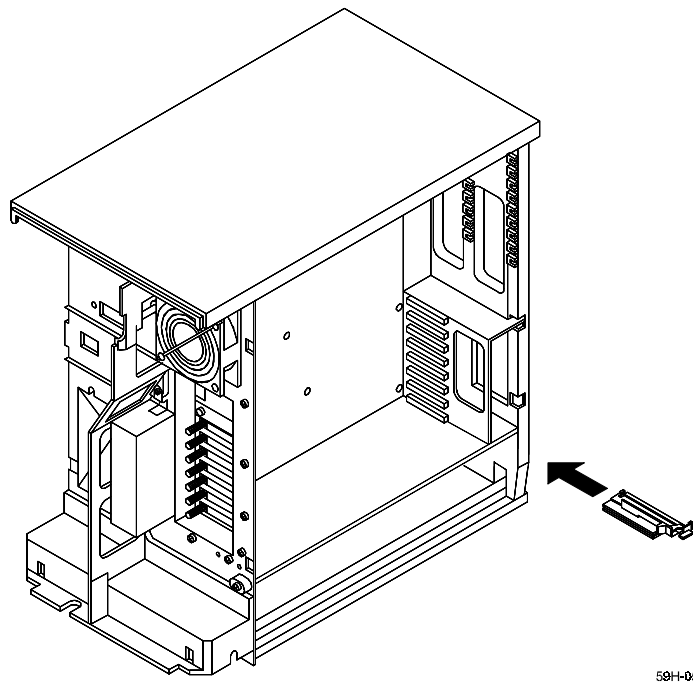
Figure 3–13 Install the Host Adapter Board
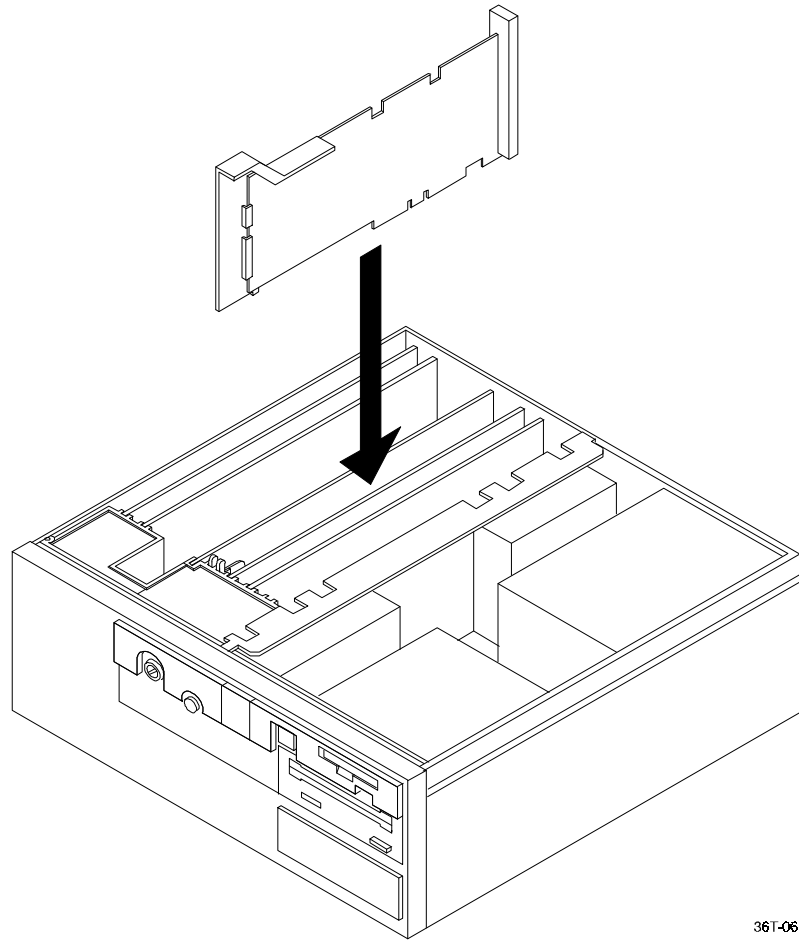
7. Tighten the knurl screw to connector-end of the board to the system.

8. Replace the cover on the system by sliding it forward until the edge of the cover is inserted fully under the edge of the front panel. Tighten the two captive screws to secure the cover of the system.

9. Connect the SCSI-2 cable to the adapter as shown in Figure 3–14 and tighten the knurl screws on the connector.

10. Return the keylock switch to the "normal" position.

Figure 3–14 Connect SCSI-2 Cable
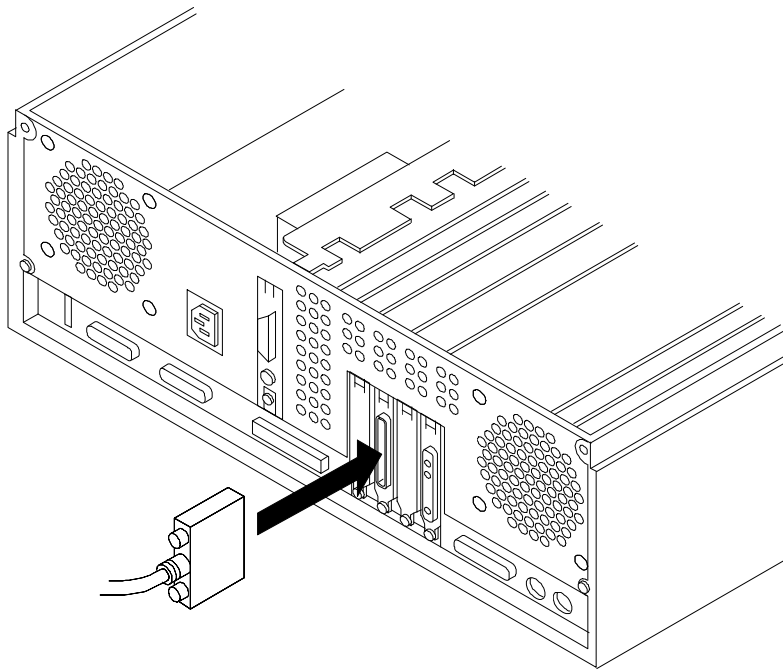
36T-07

3.1.4 Installing the Host Adapter in the RS6000, C10 Mini Tower System

1. Unlock the system cover by setting the keylock switch to the "service" position and remove the key.

Figure 3–15 Unlocking System Cover
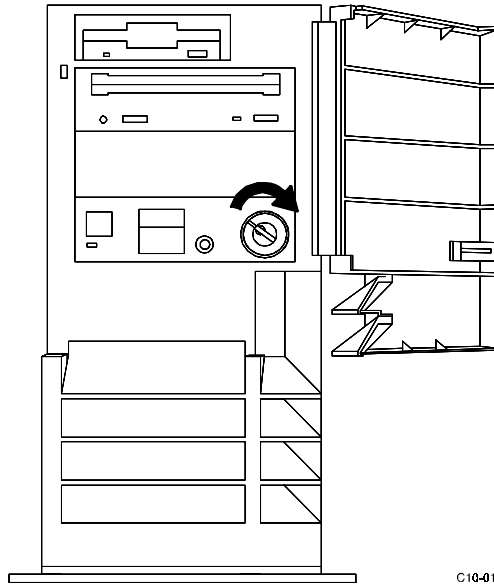
2. Remove the cover by holding the base of the system and sliding the cover toward the front as shown in Figure 3–16.

Figure 3–16 Remove Cover
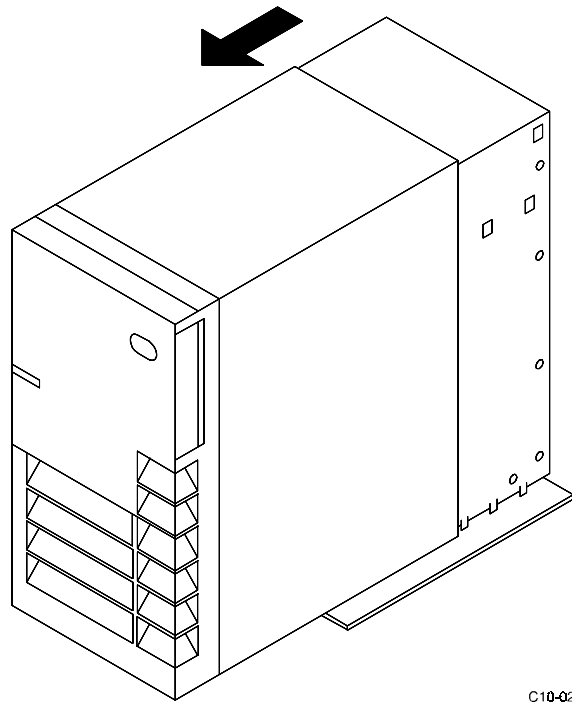
3. Select an empty circuit board slot and loosen the knurl screw securing the blank filler panel of the selected board slot as shown in Figure 3–17. Remove filler panel.

Figure 3–17 Remove Blank Filler Panel

C10-03
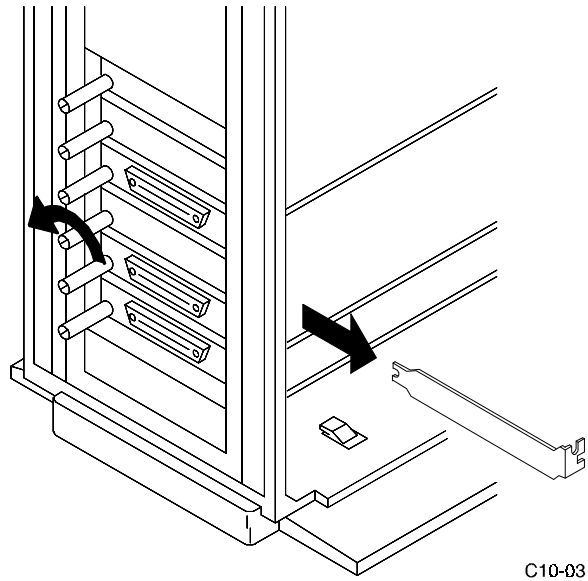
4. Install the plastic card extender into the selected slot as shown in Figure 3–18.

Figure 3–18 Install Card Extender

C10-04
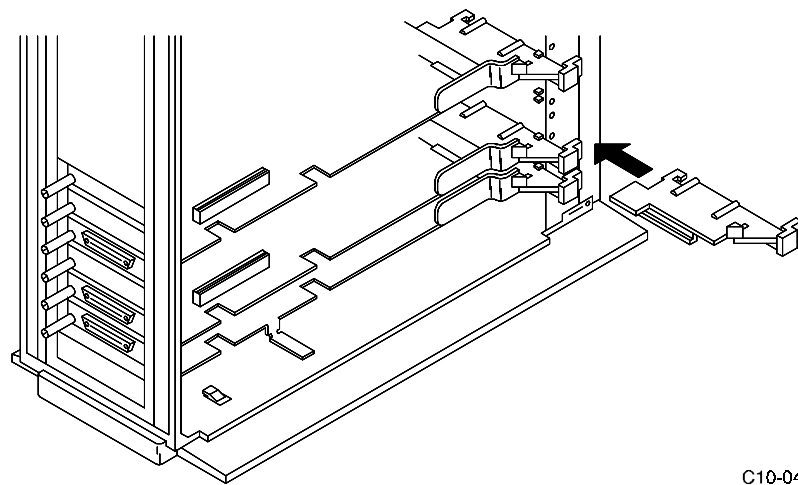
5. Align the host adapter board with the Micro Channel slot, slide one end of the base of the board into the card extender and continue to slide the board into the slot until it is firmly seated into the backplane connector (see Figure 3–19)

Figure 3–19 Install the Host Adapter Board
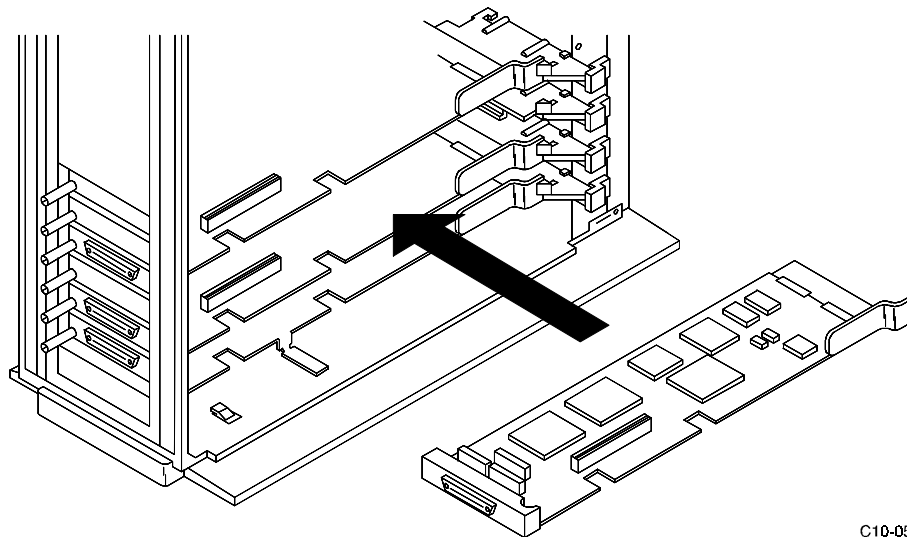
C10-05

6. Tighten the knurl screw to connector-end of the board to the system.

7. Replace the cover on the system by sliding it forward until the edge of the cover is against the edge of the front panel.

8. Connect the SCSI-2 cable to the adapter as shown in Figure 3–20 and tighten the knurl screws on the connector.

9. Insert the key into the keylock switch and turn it to the "OK" position.

Figure 3–20 Connect SCSI-2 Cable
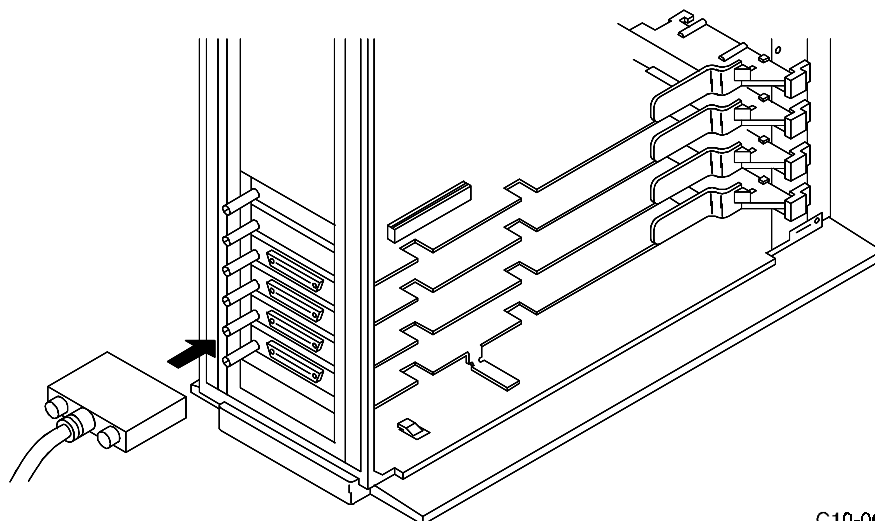
C10-06

3.2 Installing the Subsystem

1. Using the keys provided, unlock the RAID Array Enclosure.

2. Install any additional disk StorageWorks Building Blocks (SBBs) up to a maximum of 24 SBBs. Begin with the lowest uninstalled row and add SBBs from left to right. Holding the SBB in both hands, insert it into the guide slots and firmly push it into the shelf until the mounting tabs snap in place.

3. Install the power cable. Connect the female end of the power cable to the RAID Array power controller located at the lower right front corner of the array. Plug the power cable into a 110/220 VAC line voltage source (the power supply automatically senses the voltage level and will work with either voltage).

4. Prior to loading any software as described in Chapter 4, power on the RAID Array for a minimum of 6 hours. The Write-Back Cache Module contains a battery that may have discharged since the time it was factory-installed. If you attempt to initiate any RAID commands when the battery in not charged, unspecified results may occur. The battery will be fully recharged in the time specified.

4

Installing the StorageWorks RAID Array 410 Software for IBM on AIX 3.2.5

This chapter describes the StorageWorks RAID Array 410 Software for IBM and the steps for installing it onto IBM systems running AIX 3.2.5. The installation steps include organizing your system and existing files, loading the RAID software (diskette) onto your hard disk, and creating Logical Volume Groups and file systems.

> **NOTE**
>
> Prior to installing this software, ascertain that the RAID Controller Write-Back Cache battery is fully charged. This is accomplished by supplying power to the RAID Controller for a minimum of 6 hours.

4.1 Installing the RAID Software for IBM on AIX 3.2.5

The procedures for installing the RAID Software for IBM on AIX 3.2.5 require you to be familiar with the *System Management Interface Tool, SMIT*. See the "*System Management Interface Tool*" section in the *System Management Guide: Operating System and Devices* for more information on the use of *SMIT*.

Installing the RAID software on AIX 3.2.5 requires the following major steps:

* Organizing Your System (Section 4.1.1)

* Loading the RAID Array 410 Software onto the hard disk (Section 4.1.2)

* Rebooting Your System (Section 4.1.3)

4.1.1 Organizing Your System

Perform the following procedures prior to installing the RAID Array 410 software:

> **CAUTION**
>
> **DO NOT** plug the SCSI cable into the RAID Array 410 connector at this time.

1. Reboot the system without the SCSI cable connected to the SWXRC-04 RAID Array Controller. When the "console login" prompt appears, log into the system as root.

2. Ensure that the SCSI-2 Differential Fast/Wide Host Adapter, FC2416, has been installed in the system and configured by typing the following command and verifying the resulting display:

```
# lsparent -C -k scsi_scb -H && lsparent -C -k scsi
```

```
name     status      location  description

ascsi0 Available 00-05       Wide SCSI I/O Controller Adapter
ascsi1 Available 00-06       Wide SCSI I/O Controller Adapter
scsi1  Available 00-07       SCSI I/O Controller
scsi0  Available 00-00-0S    Standard SCSI I/O Controller
vscsi0 Available 00-05-00    SCSI I/O Controller Protocol
Device
vscsi1 Available 00-05-01    SCSI I/O Controller Protocol
Device
vscsi2 Available 00-06-00    SCSI I/O Controller Protocol
Device
vscsi3 Available 00-06-01    SCSI I/O Controller Protocol
Device
```

This command displays the SCSI adapters currently configured into the system. SCSI adapters with external SCSI expansion capability will have a -01 as the last field under the location column heading. If your system includes only one adapter with external expansion capability, then only one vscsi line will be displayed that contains a -01. If your system contains multiple adapters with external expansion capability, then multiple vscsi lines will be displayed as in the example above. If either no vscsi lines are displayed, or no vscsi line with a -01 location is displayed, then the operating system has not correctly configured the device. Recheck the hardware installation as described in Chapter 3 and retype this command.

Once you have determined that the vscsi device is configured correctly, check that the vscsi adapter with the -01 location is listed as "Available" in the status column. If the device is listed as "Defined" then the operating system has not correctly configured the device. In that case, recheck the hardware installation as described in Chapter 3 and retype this command.

3. Determine the following:

   – SCSI target address of your RAID Array 410 controller configured in Section 2.

   – Number of consecutive Logical Unit Numbers (LUN's) configured on the RAID Array 410 controller.

4. Check for previously installed RAID software by typing:

   # odmget -quniquetype=disk/scsi/SWXRC-04 PdDv

5. If you locate previously installed RAID software (previous command produces some output), delete the existing RAID software using the following commands:

   # odmdelete -o PdDv -q uniquetype=disk/scsi/SWXRC-04
   # odmdelete -o PdAt -q uniquetype=disk/scsi/SWXRC-04
   # odmdelete -o PDiagAtt -q DType=SWXRC-04
   # odmdelete -o PDiagDev -q Dtype=SWXRC-04
   # odmdelete -o errnotify -q en_rtype=SWXRC-04

6. Install the BN31R-03 three-meter cable between the host adapter and the array subsystem. Route the right angle end connector end of the cable under the SWXRA-Yx Subsystem enclosure and up through the front access hole nearest to the controller connector. Install the connector with the cable dressed to the right by firmly pushing it

onto the controller's mating connector. Tighten the two screws on the cable connector.

4.1.2   Loading the RAID Software onto the Hard Disk

You will need approximately one MByte of permanent space on your hard disk to install and use the RAID Array 410 software.

The RAID Array 410 software consists of:

- An installation script - `stgwks_ra410_software_v10_aix.inst`
- ODM database file - `SWXRC-04.add`
- ODM Catalog file - `SWXRC-04.cat`
- Read Me file - `SWXRC-04.read_me`

Loading the RAID Array 410 software requires the following major steps:

- Copying the file archive from floppy diskette to a temporary storage area
- Extracting the distribution files from the file archive
- Executing the installation script
- Rebooting your computer

Proceed to Section 4.1.2.1 below for the media-specific instructions required to copy the distribution files from diskette.

4.1.2.1 Copying the File Archive from Floppy Diskette to Temporary Storage

Before the installation script can be run, the file archive that contains the RAID Array 410 software will need to be copied from the floppy diskette to a temporary directory. The installation script can then be extracted from the file archive and executed.

You will need approximately one MByte of temporary space to load from floppy disk.

1. Insert the RAID Array 410 software distribution diskette into the floppy drive.

2. Change the directory to a temporary storage area (/tmp). For example, type:

    # **cd /tmp**

3. Create a directory into which the file archive can be loaded:

    # **mkdir swxrc**

4. Change to that directory:

    # **cd swxrc**

5. Extract the file archive from the diskette by entering the following command:
    (Note: the name of `/dev/fd0` *may be different on your system.)*

    # **tar xvf /dev/fd0**

6. All of the files necessary to complete the RAID Array 410 Software installation have now been copied to this directory.

4.1.2.2 Executing the Installation Script

Perform the following procedure to install the RAID Array 410 software onto your system:

1. Enter the following command and press RETURN.

   ```
   # ./stgwks_ra410_software_v10_aix.inst
   ```

2. The Copyright Notice and the following information should be displayed as follows:

```
Checking User...OK
Checking AIX Revision Level...OK
Checking for AIX patch for FC 2416 SCSI-2 Adapter...OK
Checking that SCSI-2 Adapter is installed and correctly configured
...OK
Checking for previous SWXRC software installation...OK
Checking for ODM add file...OK
Checking for ODM catalog file...OK
```

Once all of the checks have been successfully completed, the user will be asked about the RAID Array 410 configuration. In order for the system to recognize the devices attached to the RAID Array 410, the Target ID (TID) and at least one Logical Unit Number (LUN) must have been created on the 410 via the Command Line Interface (CLI). The system can correctly configure the RAID Array 410 with multiple TID's and multiple LUN's per TID subject to the following restrictions:

- LUN's created for each TID must be consecutive with no gaps starting with LUN 0

- When multiple TID's have been created, the same number of LUN's per TID must also have been created

- If your computer system is equipped with two RAID Array 410 storage subsystems, the number of LUNs configured on each subsystem must be the same

- If your computer system is equipped with multiple FC2416 Adapters, all of the restrictions above apply to each RAID Array 410 subsystem attached to each adapter

The following examples are allowable RAID Array 410 configurations as they *will* be correctly recognized and configured by the RS6000:

- TID 4 and LUN 0

- TID 4 and LUN 0 and LUN 1

- TID 6 and LUN 0 and LUN 1 and LUN 2

- TID 4 and LUN 0, TID 6 and LUN 0

The following examples are illegal RAID Array 410 configurations as they *will not* be correctly recognized and configured by the RS/6000:

- TID 4 and LUN 5

- TID 4 and LUN 5 and LUN 6

- TID 6 and LUN 1 and LUN 4 and LUN 6

- TID 4 and LUN 5, TID 6 and LUN 5

- TID 4 and LUN 0, TID 6 and LUN 0 and LUN 1

3. Answer the following prompt with the correct number of LUNs configured in your system and press RETURN.

```
Please enter the number of consecutive LUN's, 1..8, that have been
configured on the RAID Array 410:
```

For the correct examples listed above, the answers to this question would be:

- 1

- 2

- 3

- 1

4. After the correct number of LUNs is entered, the installation script verifies that the answer is within the range of 1 through 8 and continues execution until the following information is displayed (*Note: Processing time approximately 2 minutes)*:

```
Maximum LUNS configured = 1      ...OK
Editing RAID Array 410 ODM Database file...OK
Adding SWXRC-04 to ODM Database...OK
Moving ODM Catalog into place...OK
Configuring SWXRC-04 into system...OK
Saving base configuration...OK
Issuing bosboot command, please standby...OK
Copying installation files to SWXRC directory...OK
RAID Array 410 Configuration Information
name        status location           description
hdisk3      Available    00-06-01-00  DEC SWXRC-04 RAID Array 410
```

This display lists the RAID Array 410 devices that have been configured into the system and recognized by the operating system.

Now that the RAID 410 is configured and the devices recognized by the operating system, the user is asked a series of questions regarding the use of those devices. Specifically, the user is asked whether to allow the script to create a default set of Logical Volume Group(s).

The installation script determines the maximum amount of storage provided by the current set of devices attached to the RAID Array 410. The script creates a number of AIX file systems based on that size. The number of file systems created depends upon the amount of storage available. Each file system is created with the largest size possible under AIX version 3.2.5 which is approximately 2.0 GBytes. The last file system created contains the remaining amount of storage, consequently, that file system will be smaller than the others.

Once these file systems have been created, all of the usuable capacity currently installed in the RAID Array 410 will have been allocated. Therefore, it will not be possible to extend these file systems without adding additional devices to the RAID Array 410. If you wish

to have the ability to extend the file systems without adding additional devices, you should answer N (No) to this question. That choice will allow you to create the Logical Volumes and file systems with sizes smaller that those created by this script, thus allowing for future files-system extensions.

NOTE

Answering "Y" in the following step, will allow the installation script to create a default set of Logical Volume Groups, Logical Volumes, file systems, and mount points for the devices attached to the RAID Array 410. This option is useful for users that are not familiar with the Logical Volume Manager and creation of a file system organization.

Answering "N" will cause the installation script to perform a small amount of cleanup and complete the installation, without creating any of the filesystem components necessary to utilize the RAID Array 410 devices. This option is desirable for the user who understands how to utilize the Logical Volume Manager to tailor the file systems to their requirements.

---

5. Enter the answer to the following prompt and press RETURN:

```
Please answer Y/N (Yes or No) to the following question.
Would you now like to create the Logical Volume Group(s)
that will contain the RAID Array 410 devices ?
```

The following messages are displayed only if the user answered "Y" to allow the installation script to create the default set of Logical Volume Group(s).

NOTE

Answering "1" in the following step will result in all of the devices listed under the "RAID Array 410 Configuration Information" display to be included in one Logical Volume Group.

Answering "2" will result in the creation of one Logical Volume Group for each device listed under the "RAID Array 410 Configuration Information" display.

```
Beginning Logical Volume Group Creation...
This installation script can create two different types of Logical
Volume Groups. The script can:
1. Create a Logical Volume Group which contains all of the RAID Array
410 devices currently configured, or

2. Create one Logical Volume Group for each individual RAID Array 410
device that is currently configured.

Please specify 1 or 2:
```

---

6. Enter 1 or 2 depending how your RAID array is configured and how you would like your storage organized and press RETURN.

7. If "1" is entered, all of the devices listed will be included in one Logical Volume Group as shown below. If "2" is entered, one new Logical Volume Group will be created for each device configured on the RAID Array 410 as shown on the next page.

All Devices Included in One Logical Volume Group

```
A new Logical Volume Group will be created and all of the configured
RAID Array 410 devices will be added to that group.
Creating Logical Volume Group - raidlvg0 ...OK
Activating Logical Volume Group - raidlvg0 ...OK
File system - lv00 ...Created OK...Mounted OK
File system - lv01 ...Created OK...Mounted OK
File system - lv02 ...Created OK...Mounted OK
File system - lv03 ...Created OK...Mounted OK
File system - lv04 ...Created OK...Mounted OK
File system - lv05 ...Created OK...Mounted OK
New SWXRC-04 RAID Array 410 Filesystem Information
Filesystem   Total KB  free   %used  iused %iused Mounted on
/dev/lv00    2097152 2031288   3%  16     0%     /lv00
/dev/lv01    2097152 2031288   3%  16     0%     /lv01
/dev/lv02    2097152 2031288   3%  16     0%     /lv02
/dev/lv03    2097152 2031288   3%  16     0%     /lv03
/dev/lv04    2097152 2031288   3%  16     0%     /lv04
/dev/lv05    1835008 1777376   3%  16     0%     /lv05
New Logical Volumes by Volume Group
-------------------------------------------------
raidlvg0:
LV NAME     TYPE    LPs   PPs  PVs  LV STATE     MOUNT POINT
loglv00     jfslog  1     1    1    open/syncd   N/A
lv00        jfs     512   512  1    open/syncd   /lv00
lv01        jfs     512   512  1    open/syncd   /lv01
lv02        jfs     512   512  1    open/syncd   /lv02
lv03        jfs     512   512  1    open/syncd   /lv03
lv04        jfs     512   512  1    open/syncd   /lv04
lv05        jfs     448   448  1    open/syncd   /lv05


SWXRC-04 Installation Complete
```

One New Logical Volume Group for Each Device Configured on the RAID Array 410

```
Creating Logical Volume Group - raidlvg0 with device hdisk3 ...OK
Activating Logical Volume Group - raidlvg0 ...OK
Creating Logical Volume Group - raidlvg1 with device hdisk4 ...OK
Activating Logical Volume Group - raidlvg1 ...OK
File system - lv00 ...Created OK...Mounted OK
File system - lv01 ...Created OK...Mounted OK
File system - lv02 ...Created OK...Mounted OK
File system - lv03 ...Created OK...Mounted OK
File system - lv04 ...Created OK...Mounted OK
File system - lv05 ...Created OK...Mounted OK
File system - lv06 ...Created OK...Mounted OK
File system - lv07 ...Created OK...Mounted OK
File system - lv08 ...Created OK...Mounted OK
File system - lv09 ...Created OK...Mounted OK


New SWXRC-04 RAID Aray 410 Filesystem Information
--------------------------------------------------
Filesystem     Total KB    free %used    iused %iused Mounted on
/dev/lv00     2097152 2031288    3%      16      0%    /lv00
/dev/lv01     2097152 2031288    3%      16      0%    /lv01
/dev/lv02     2097152 2031288    3%      16      0%    /lv02
/dev/lv03     2097152 2031288    3%      16      0%    /lv03
/dev/lv04     1875968 1817048    3%      16      0%    /lv04
/dev/lv05     2097152 2031288    3%      16      0%    /lv05
/dev/lv06     2097152 2031288    3%      16      0%    /lv06
/dev/lv07     2097152 2031288    3%      16      0%    /lv07
/dev/lv08     2097152 2031288    3%      16      0%    /lv08
/dev/lv09     1875968 1817048    3%      16      0%    /lv09


New Logical Volumes by Volume Group
--------------------------------------------------
raidlvg0:
LV NAME     TYPE     LPs   PPs   PVs   LV STATE        MOUNT POINT
loglv00     jfslog   1     1     1     open/syncd      N/A
lv00        jfs      512   512   1     open/syncd      /lv00
lv01        jfs      512   512   1     open/syncd      /lv01
lv02        jfs      512   512   1     open/syncd      /lv02
lv03        jfs      512   512   1     open/syncd      /lv03
lv04        jfs      458   458   1     open/syncd      /lv04
raidlvg1:
LV NAME     TYPE     LPs      PPs   PVs   LV  STATE        MOUNT POINT
loglv01              jfslog   1     1     1   open/syncd   N/A
lv05                 jfs      512   512   1   open/syncd   /lv05
lv06                 jfs      512   512   1   open/syncd   /lv06
lv07                 jfs      512   512   1   open/syncd   /lv07
lv08                 jfs      512   512   1   open/syncd   /lv08
lv09                 jfs      458   458   1    open/syncd   /lv09
SWXRC-04 Installation Complete
```

4.1.3   Rebooting Your System

After running the installation script to install the RAID Array 410 Software you should reboot the system. To reboot, enter the following:

> **# cd**
> **# reboot**

Then wait for the *Console Login* prompt.

Congratulations

You have completed the installation of your

RAID ARRAY 410

A

Configuration Records – Blank Forms

This contains copies of the two tables used in Section 2 to record the configuration of your system. If additional copies are required, these tables can be reproduced as necessary.

Date_____	
LUN	Uses

Date_____

Name	StorageSet	Uses	Used by

Date_____	
LUN	Uses

Date_____

Name	StorageSet	Uses	Used by

Date_____	
LUN	Uses

Date_____

Name	StorageSet	Uses	Used by

Date_____

LUN	Uses

Date_____

Name	StorageSet	Uses	Used by