

**CONVEX Removable Disk System**  
**Installation Guide**  
Document No. 081-000230-201

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Second Edition  
February 1990

**CONVEX Computer Corporation**  
Richardson, Texas USA

*CONVEX Removable Disk System*  
*Installation Guide*  
Product Number DHW-042  
Second Edition

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**Revision Sheet**  
*CONVEX Removable Disk System*  
*Installation Guide*

<b>Edition</b>	<b>Document No.</b>	<b>Date</b>	<b>Description</b>
Second	081-000230-201	February 1990	Added information on DKD-284 780-Mbyte disk drive.
First	081-000230-200	April 1988	First release.

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Do not connect external equipment to the utility outlets in CONVEX equipment cabinets. Unauthorized connection voids all agencies' emissions certifications.

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# Preface

## Purpose and Intended Audience

This manual contains installation procedures for the Removable Disk System (RDS). It is intended for those who have been trained to install or maintain RDS equipment. This manual must be used with the CONVEX *Removable Disk System Operation Guide*.

## Hardware and Software Requirements

The Removable Disk System can be used with all CONVEX computers.

- The RDS system disk are formatted by using diagnostic program *dev5130*.
- The operation of the DKC-203 controller is verified by using diagnostic program *dev5130*.
- The SPU disk is formatted by the using diagnostic program *spu2000*.

## Organization

The list below outlines the material discussed in this manual:

- **Chapter 1. Unpacking and Inspection**—Instructions for unpacking the RDS and identification of major RDS components.
- **Chapter 2. Installation Guidelines**—Configuration and installation guidelines for the RDS base unit and DKC-203 controllers.
- **Chapter 3. Integration and Checkout**—Instructions on how to set up the */ioconfig* file. Diagnostic program names are listed for the VMEbus controller, system-disk storage modules and SPU-disk storage modules.
- **Appendix A. Reporting Problems**—Contains information about using the *contact* facility to report problems.

## Notational Conventions

The following are examples of warnings, cautions, and notes and their typical content and locations as used in CONVEX documents:

**WARNING**

Warnings highlight procedures or information necessary to avoid injury to personnel. Warnings immediately precede the critical information and include a description of the hazard.

**CAUTION**

Cautions highlight procedures or information necessary to avoid damage to equipment, loss of data, or invalid test results. Cautions immediately precede the critical information and include a description of the possible damage.

**NOTE**

Notes highlight useful information that is supplemental in nature. Notes may immediately precede or follow the information that is being highlighted.

## Associated Documentation

- *CONVEX Removable Disk System Operation Guide*, Order No. DHW-043
- *CONVEX VIOP/VBCU Service Guide*, Order No. DHW-051
- *CONVEX System Manager's Guide*, Order No. DSW-004
- *CONVEX Processor Operation Guide*, Order No. DHW-015
- *Interphase V/ESDI 4201 Panther User's Guide*, Interphase No. UG-0740-000-XOF

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# Chapter 1

## Unpacking and Inspection

### 1.1 Overview

This chapter identifies the major components of the CONVEX Removable Disk System (RDS). Guidelines are also provided for inspecting the RDS components for shipping damage.

### 1.2 RDS Components

A typical RDS shipping configuration consists of some combination of the items listed in the following table. Throughout the RDS documentation, the items described in the product descriptions below are referred to by the product numbers as listed in Table 1-1.

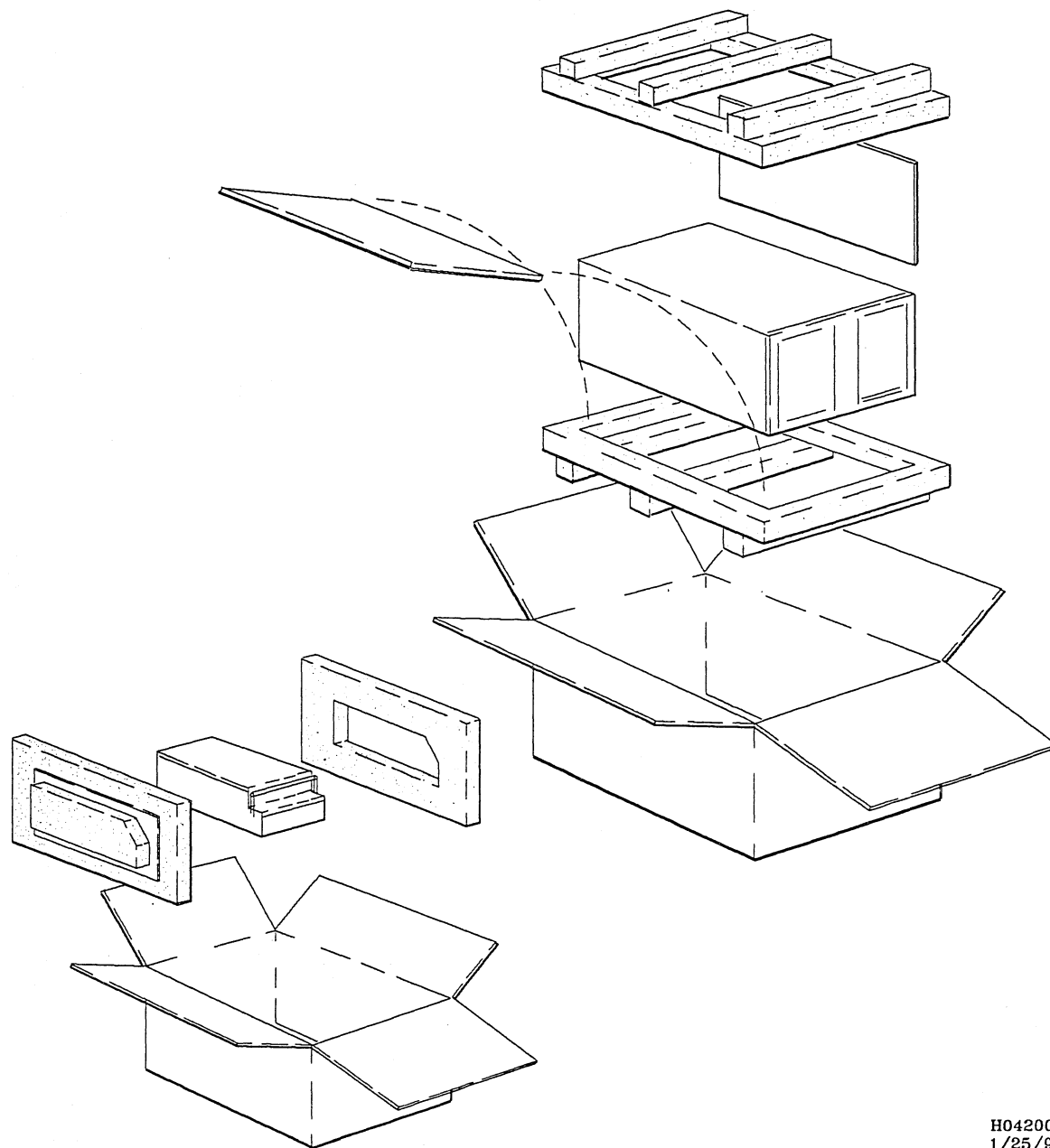
**Table 1-1, CONVEX RDS Product Numbers**

Product Number	Product Description
DKC-203	VMEbus ESDI controller with cables for one system disk-storage module
DKD-214	RDS 320-Mbyte ESDI add-on system disk-storage module and daisy-chained cables (for adding a second system-disk storage module on an ESDI disk controller)
DKD-314	RDS 320-Mbyte ESDI system disk-storage module with cables and VMEbus ESDI controller
DKD-214r	RDS 320-Mbyte ESDI system replacement disk only
DKD-214s	RDS 320-Mbyte ESDI system disk-storage module without cables
DKD-215	RDS 140-Mbyte SCSI SPU disk-storage module and cables
DKD-215r	RDS 140-Mbyte SCSI SPU replacement disk only
DKD-215s	RDS 140-Mbyte SCSI SPU disk-storage module without cables
DKD-284	RDS 780-Mbyte ESDI add-on system disk-storage module and daisy-chained cables (for adding a second system-disk storage module on an ESDI disk controller)
DKD-384	RDS 780-Mbyte ESDI system disk-storage module with cables and VMEbus ESDI controller
DKD-284r	RDS 780-Mbyte ESDI system replacement disk only
DKD-284s	RDS 780-Mbyte ESDI system disk-storage module without cables
RDS-001	Base unit configured for 1 SPU-disk and 3 system-disk storage modules
RDS-002	Base unit configured for 4 system-disk storage modules

### 1.3 RDS Shipping Configuration

Figure 1-1 shows the typical shipping configuration for the RDS:

**Figure 1-1, RDS Shipping Cartons**



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## 1.4 Inspection for Damage

All shipping containers have been specially designed to protect their contents under normal shipping conditions. Carefully inspect each carton for signs of shipping damage as it is unpacked. If damage is found after visual inspection, document the damage with photographs and contact the transport carrier immediately. Unpack the equipment as described below.

## 1.5 Unpacking

The customer's bill of material will list all RDS equipment shipped from CONVEX. It should be used as a checklist to ensure that all equipment has arrived. Table 1-2 shows a typical bill of material for the RDS:

**Table 1-2, Typical RDS Bill of Material**

Part Number	Description	Quantity
RDS-001	Base unit	1
RDS-002	Base unit	1
DKC-203	VMEbus ESDI controller with cables	7

**NOTE**

The shipping container for the RDS storage module protects the disk drive from sudden shocks. This container should be retained if there is a requirement to move storage modules from one facility to another.

Unpack each item of equipment from its shipping container. Inspect each item of equipment for any sign of shipping damage as it is unpacked. Document damage if found and proceed to the following section.

**NOTE**

Save all packing material until after operational checkout of the equipment. This enables equipment to be returned safely to CONVEX, if required.

## 1.6 Damage Claims

If the RDS equipment is damaged, a damage claim must be completed. Damage claims should be completed by the customer and given to the shipping representative. Claim forms are normally obtained from the shipping representative.

# Chapter 2

## Installation Guidelines

### 2.1 Overview

This chapter contains general guidelines for installing and configuring an RDS system. Because there are several possible RDS configurations, the installation procedures and guidelines are of a general nature. The procedures presented should be ordered and interpreted in the context of the specific installation. Enough information has been supplied to make this possible.

#### NOTES

Refer to Chapter 3 for more information about the advantages and disadvantages of striped and non-striped system-disk storage modules.

Refer to the *CONVEX Removable Disk System Operation Guide* for a functional description of the RDS, VersaModule European (VMEbus) chassis, and related hardware, as well as for all RDS operational instructions and procedures.

Refer to the *CONVEX VIOP/VBCU Service Guide* for the installation procedures for the VMEbus chassis, VIOP, and VBCU.

### 2.2 RDS Installation Considerations

The best location to install the RDS base unit can vary from machine to machine because of hardware installed in the system. The installed hardware, in some cases, limits available space for the RDS base unit. This in turn affects cabling distances from the RDS base unit to the VMEbus chassis, and cabling distances from the VMEbus chassis to the VMEbus Input/Output Processor (VIOP). Table 2-1 lists the cabling distances; these specifications must be used when installing the RDS base unit or related hardware:

**Table 2-1, Configuration Guidelines**

Parameter	Maximum Value	Recommended Value
DKD-214 disks per DKC-203 controller	2 <sup>1</sup>	1 <sup>2</sup>
DKD-284 disks per DKC-203 controller	2 <sup>1</sup>	1 <sup>2</sup>
DKC-203 controllers per each dual (10-slot) VMEbus backplane with DKD-214 disks	4	≤ 3 <sup>3</sup>
DKC-203 controllers for a single (9-slot) VMEbus chassis with DKD-214 disks	7	≤ 3 <sup>3</sup>
RDS base units per CONVEX expansion cabinet	3	≤ 3
Cable length, DKC-203 controller to DKD-214 disk	10 ft (3.05 m)	10 ft (3.05 m)
Cable length, DKC-203 controller to DKD-284 disk	10 ft (3.05 m)	10 ft (3.05 m)
Cable length, SPU module to DKD-215 SCSI disk	19.7 ft (6.0 m)	10 ft (3.05 m)

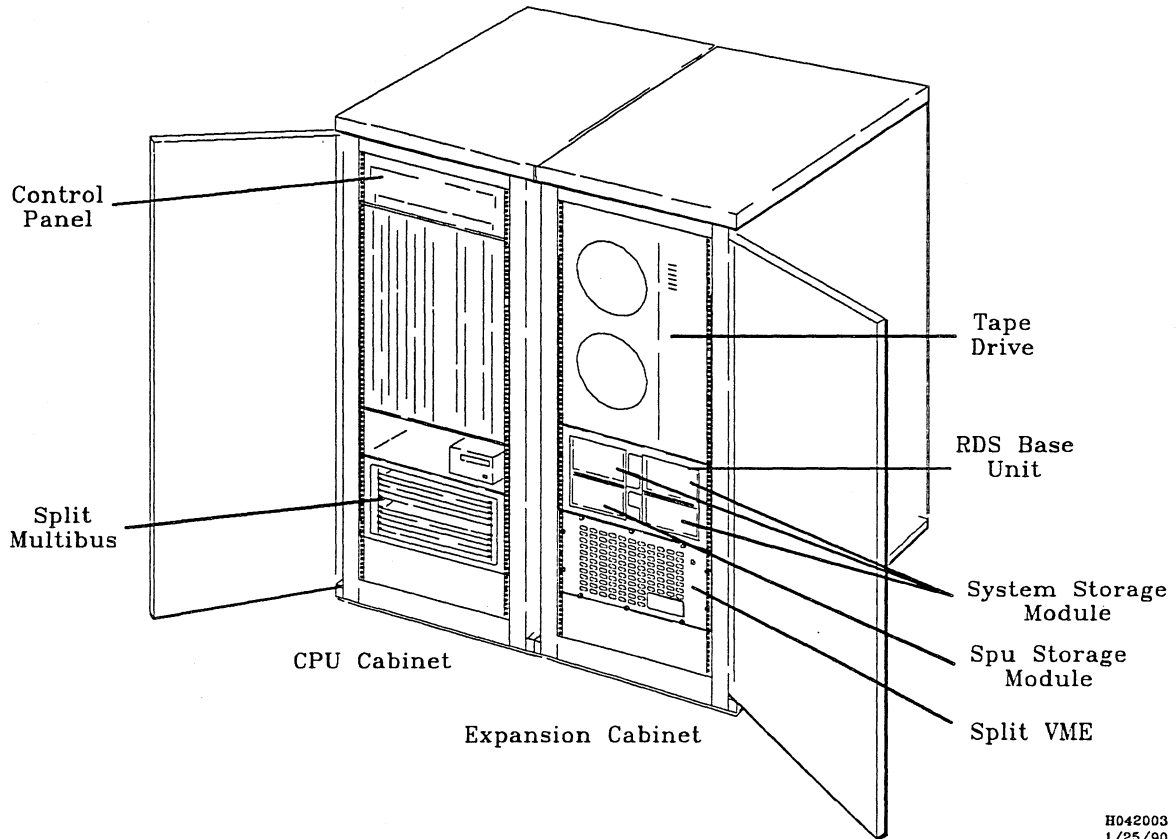
- <sup>1</sup> Both disk-storage modules must be in the same RDS base unit.  
<sup>2</sup> Maximum performance is obtained with one disk per controller.  
<sup>3</sup> Maximum performance is obtained with this configuration.

**NOTE**

System performance is decreased as the number of VMEbus controllers (per VMEbus) is increased. This applies to all VMEbus controllers, not just the DKC-203 controller.

Operational factors must also be considered in the placement of the RDS base unit. For example, the RDS base unit should not be installed near the bottom of an expansion cabinet because this makes it difficult to install or remove the disk-storage modules.

Figure 2-1 illustrates a common type of RDS installation:

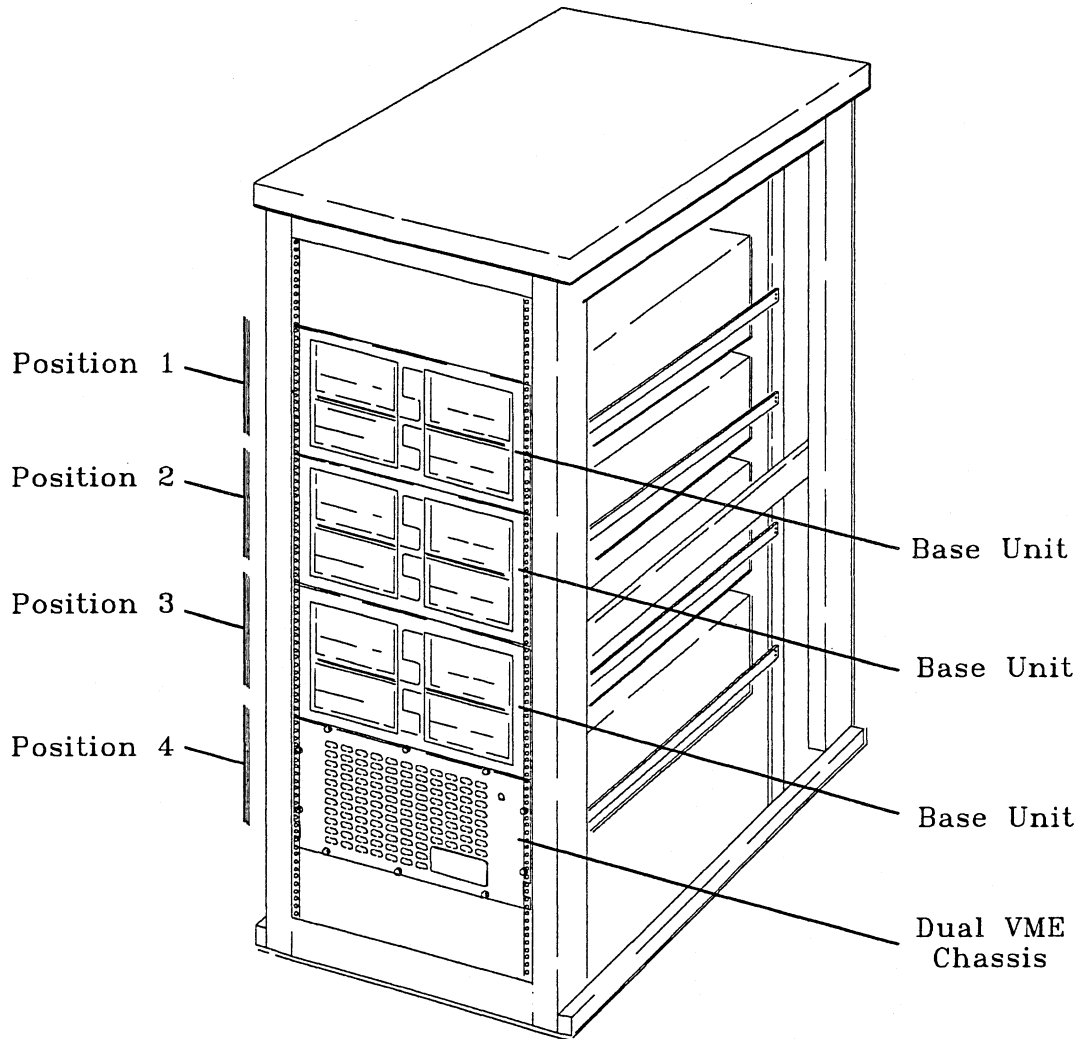
**Figure 2-1, Single Multibus, VMEbus, and RDS Base Unit Configuration**

In the above case, a Multibus chassis is located in the processor cabinet and the VMEbus chassis and RDS base unit are placed in the immediately adjacent expansion cabinet. The RDS base unit is installed above the VMEbus chassis to make storage module insertion or removal more convenient.

### 2.2.1 Requirements for Expansion Cabinet

In most cases, if two or more RDS base units are to be installed, a dedicated expansion cabinet is required for the RDS base unit and VMEbus chassis. Figure 2-2 illustrates the recommended positions for the VMEbus chassis and three RDS base units in an expansion cabinet:

**Figure 2-2, Expansion Cabinet with Three RDS Base Units**



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### 2.2.2 RDS Cabling Guidelines

Cable connections between the DKC-203 controllers and the storage modules are dependent on the disk configuration, striped (non-daisy chained) or non-striped (daisy chained). Figure 2-3 illustrates the recommended connections for an expansion cabinet with a daisy-chained RDS system:





## 2.3 RDS Base Unit Installation

The RDS base unit is shipped with all hardware necessary for mounting and securing it in an expansion cabinet. The hardware consists of screws, retaining plates, slides, and slide guides.

The slides are mounted to the RDS base unit before shipment, therefore, no installation steps are required. The slide guides, however, must be installed in the expansion cabinet.

The base unit has two screws on the front panel for securing the chassis in its retracted position in the cabinet.

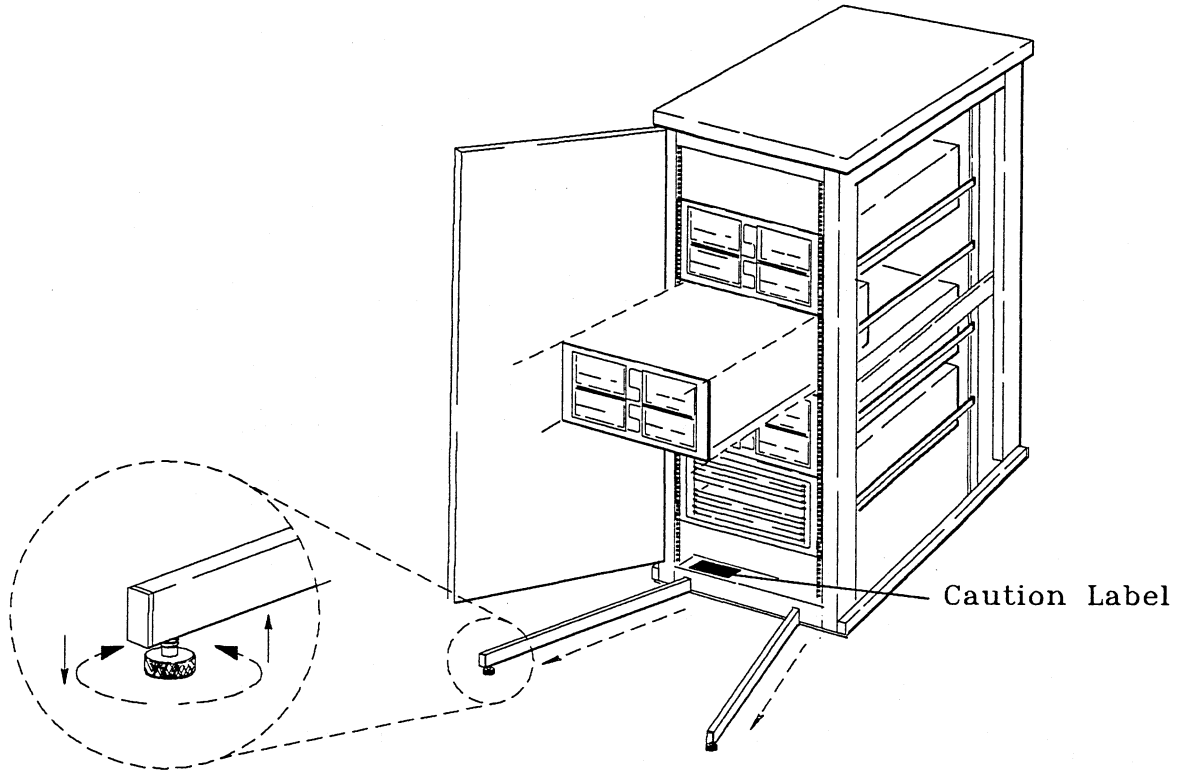
Use the following procedures for installing the RDS base unit:

### WARNING

Expansion cabinet stabilizer bars must be extended prior to installing an RDS base unit, or before extending either the RDS base unit or VMEbus chassis forward on their slide rails for service. Failure to do so will make the expansion cabinet unstable, increasing the possibility of it falling forward. This may cause injury to personnel and will cause damage to equipment.

1. Extend the expansion cabinet stabilizer bars and adjust feet until they are in firm contact with the floor. Figure 2-5 shows the expansion cabinet stabilizer bars and adjustable feet:

Figure 2-5, Expansion Cabinet Stabilizer Bars

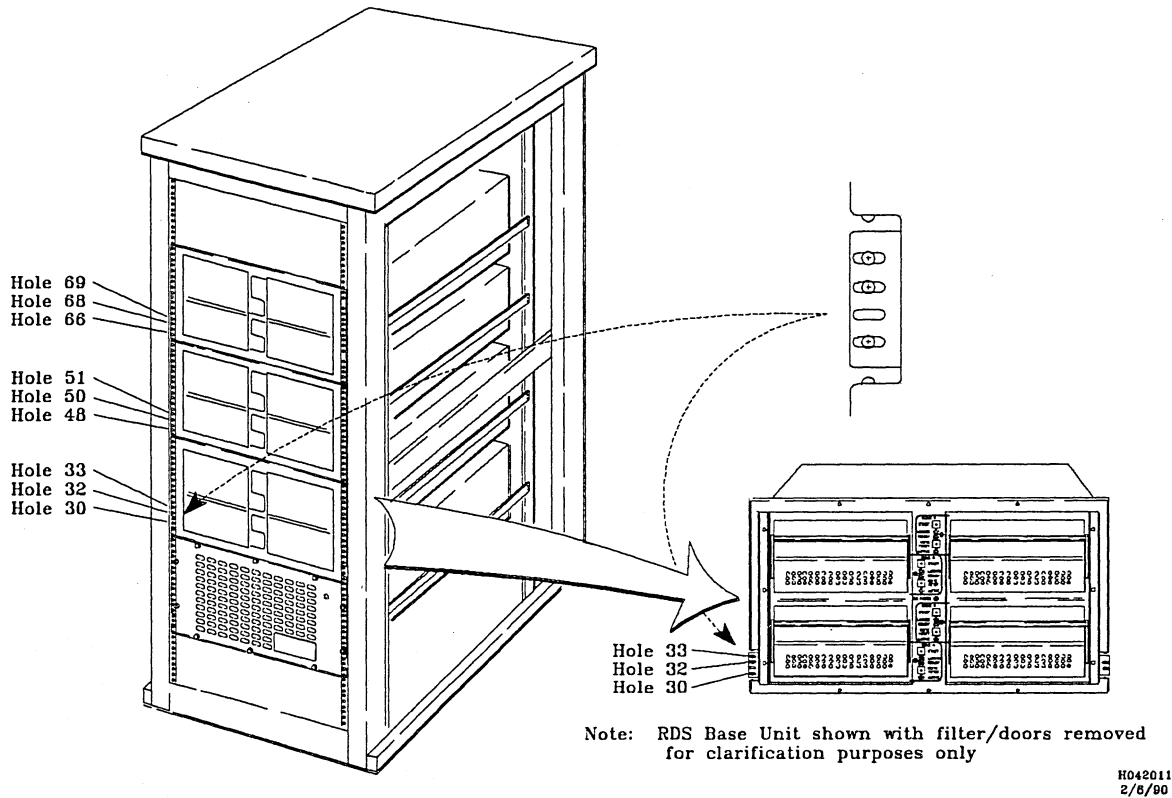


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<b>CAUTION</b>	<b>ATTENTION</b>	<b>CAUTION</b>	<b>ACHTUNG</b>
<p>TO REDUCE RISK OF POSSIBLE INJURY DUE TO UNSTABLE UNIT, ACTUATE STABILIZER BEFORE ANY PERIPHERAL IS EXTENDED.</p> <ol style="list-style-type: none"> <li>1. TO ACTIVATE STABILIZER, FULLY EXTEND ANITILT CHANNELS AND LOWER CHANNEL SUPPORT FEET FIRMLY TO THE FLOOR.</li> <li>2. INSURE THAT LOCKING MECHANISMS ARE INSTALLED IN ALL OTHER EXTENDABLE UNITS.</li> <li>3. NEVER EXTEND MORE THAN ONE UNIT AT A TIME.</li> </ol>	<p>POUR REDUIRE LE RISQUE D'ACCIDENT ATTRIBUABLE A L'INSTABILITE DE L'UNITE, DEPLOYER LES STABILISATEURS AVANT DE SORTIR LES PERIPHERIQUES.</p> <ol style="list-style-type: none"> <li>1. POUR DEPLOYER LES STABILISATEURS, TIRER COMPLETEMENT LES BRAS ANTI-BASCULEMENT ET ABAISER LES PATTES DE FACON QUE ELLES REPOSENT SOLIDEMENT SUR LE SOL.</li> <li>2. S'ASSURER QUE TOUTS LES PERIPHERIQUES SON MUNIS DE VIS DE BLOCAGE.</li> <li>3. NE JAMAIS SORTIR PLUS D'UN PERIPHERIQUE A UN MOMENT DONNE.</li> </ol>	<p>TO REDUCE RISK OF POSSIBLE INJURY DUE TO UNSTABLE UNIT, ACTUATE STABILIZER BEFORE ANY PERIPHERAL IS EXTENDED.</p> <ol style="list-style-type: none"> <li>1. TO ACTIVATE STABILIZER, FULLY EXTEND ANITILT CHANNELS AND LOWER CHANNEL SUPPORT FEET FIRMLY TO THE FLOOR.</li> <li>2. INSURE THAT LOCKING MECHANISMS ARE INSTALLED IN ALL OTHER EXTENDABLE UNITS.</li> <li>3. NEVER EXTEND MORE THAN ONE UNIT AT A TIME.</li> </ol>	<p>ZUR VERMEIDUNG VON GEFAHRDUNG DURCH EIN INSTABILES GERAT SIND VOR DER HERAUSNAHME VON PERIPHERALS DER STABILISIERUNGSMECHANISMUS BETATIGT WERDEN.</p> <ol style="list-style-type: none"> <li>1. UM DIE STABILISIERUNGSRICHTUNG ZU BETATIGEN, SIND DER "ANITILT KANAL" GANZ HERAUS ZU ZIEHEN UND DER UNTERE STUFTUSS AUF DEN BODEN ZU FUHREN.</li> <li>2. OBERPRUFEN SE, OB IN ALLEN ANDEREN VERSCHIEBBAREN GERATEN DER SICHERUNGSMECHANSISMUS BETATIGT IST.</li> <li>3. ZIEHEN SIE NE MEHR ALS EIN GERAT HERAUS.</li> </ol>

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2. Place the 4 retaining plates behind the expansion cabinet's vertical mounting rails at the positions shown in Figure 2-6:

**Figure 2-6, RDS Base Unit Chassis Slide Guide Mounting Holes**



3. Start, but do not tighten, the 2 retaining plate screws on all 4 plates.
4. Slide the slotted ends of the 2 slide guides between the 4 retaining plate screws and the expansion cabinet's vertical rails.

**NOTE**

Do not tighten the retaining plate screws completely, because the base unit will have to be aligned before the screws are tightened.

5. Tighten the retaining plate screws enough to prevent the slide guides from falling out when the base unit is installed.

**WARNING**

Because of the weight of the RDS base unit, and slide guides installation requirements, personnel injury or equipment damage may result unless two people are available to install it.

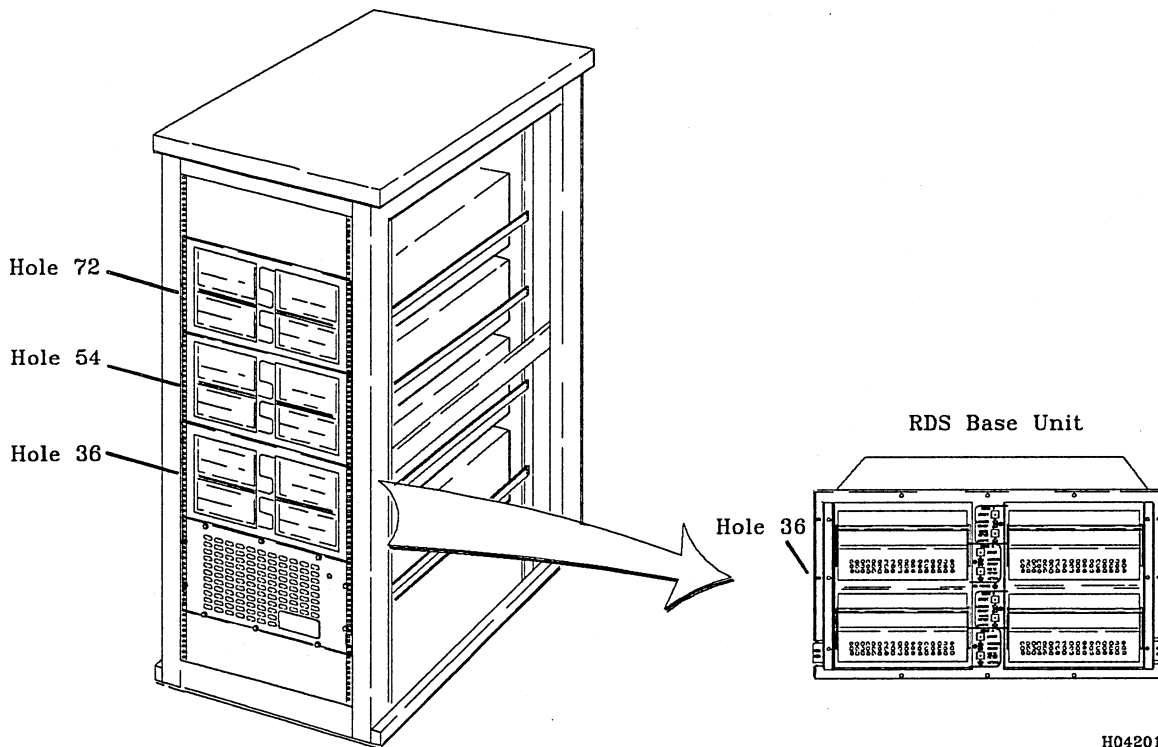
6. Install the RDS base unit into its slide guides.

**NOTE**

The base unit alignment is first checked by ensuring that the front panel locking screws line up with the holes in the retaining plates. The base unit should then be moved in and out on its slides to ensure that it does not bind.

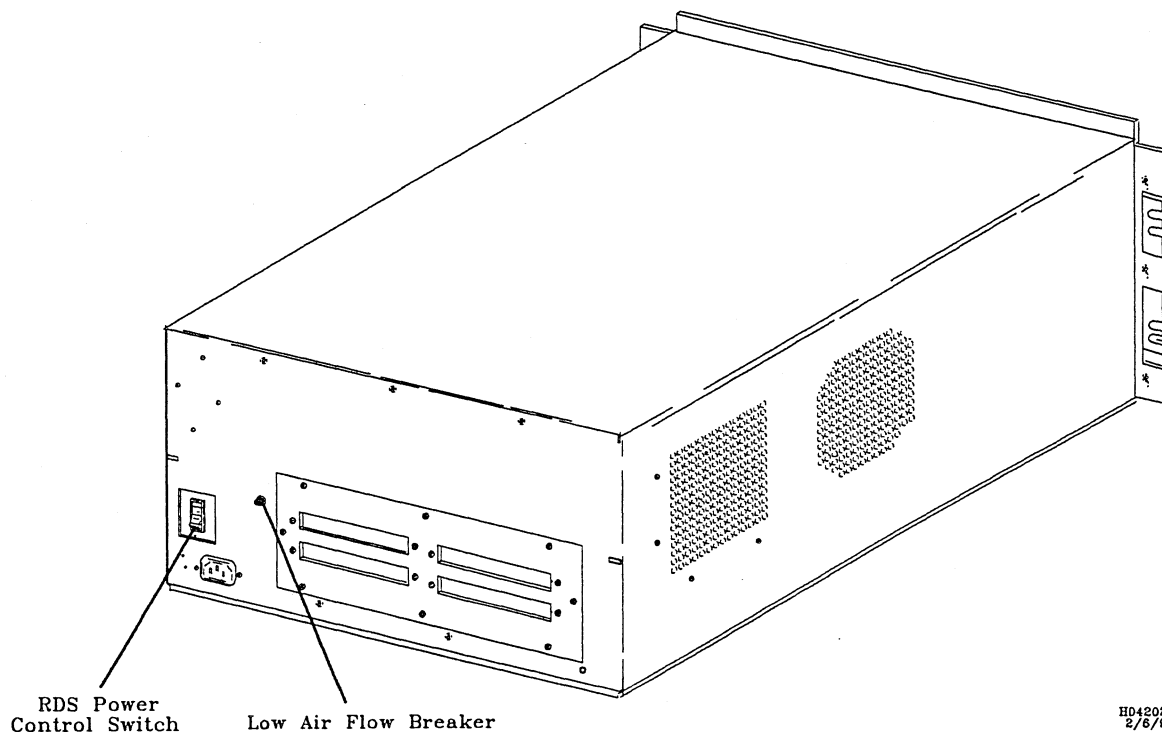
7. Slide the base unit in and out and check it for proper alignment.
8. Adjust slide guides until the base unit is properly aligned, then tighten all mounting screws.
9. Move the base unit to its retracted position, then secure it with the front panel locking screws. Figure 2-7 shows the locations of the screw holes:

**Figure 2-7, RDS Base Unit Lock Positions**



10. Ensure that the RDS base unit power control switch on the rear of the unit is set to OFF. Figure 2-8 shows the RDS power control switch:

**Figure 2-8, RDS Base Unit Power Control Switch**



**WARNING**

Personal injury may occur if the AC power cord is connected to an AC outlet with the RDS power switch set to the ON position.

11. Connect the power cord to a switched outlet on a power distribution panel.

## 2.4 Configuring the DKC-203 Controller

System-disk storage modules are interfaced to a CONVEX computer through the VMEbus Enhanced Small Device Interface (V/ESDI) disk controller DKC-203. No more than three DKC-203 controllers should be installed in a CONVEX VMEbus for maximum performance.

The same controller switch configurations can be used for a single VMEbus, because each VMEbus is addressed by a different VIOP or VIOP port. Figures 2-9 through 2-14 illustrate the switch and jumper settings for controllers one through six:

**NOTES**

The controller(s) must be configured for the proper switch settings before installation.

The only switches that must be changed are the address switches **1**, **2**, and **3** on DIP switch block **S1** shown in Figures 2-9 through 2-14.

This address information is used when entering a controller address into the */ioconfig* file.

### 2.4.1 Jumper and Switch Descriptions

A brief description of the various jumper functions is provided. For a more detailed description, consult the *Interphase V/ESDI 4201 Panther User's Guide*.

#### 2.4.1.1 Switch Block S1

These switches are used to select the base address of the controller. Switches **1** through **7** correspond to VMEbus address lines A9-A15 respectively. An **OFF** switch has a value of *1* and an **ON** switch has a value of *0*.

Switch **8** is used to select the address modifiers for the V/ESDI 4201 Short I/O space. If switch **8** is **ON**, only supervisor accesses are permitted (address modifier 2D only). If switch **8** is **OFF**, then both 2D and 29 address modifiers are selected.

**CAUTION**

Only switch **1**, **2**, and **3** on DIP switch block **S1** should be moved. *All other switches and jumpers must be left in the positions shown in the illustrations.* For additional information, refer to Section 7 in the *Interphase V/ESDI 4201 Panther User's Guide*.

#### 2.4.1.2 JA5, JA6, and JA7 Jumpers

Jumpers **JA5**, **JA6**, and **JA7** are used to select the VMEbus request priority level from 0 (lowest) to 3 (highest). These jumpers must be configured for *3* (the highest priority level) on each controller.

**NOTE**

The **JA5**, **JA6**, and **JA7** jumper settings are illustrated in Figure 2-9 through Figure 2-11 and in the *Interphase V/ESDI 4201 Panther User's Guide*.

Jumpers **JA5**, **JA6**, and **JA7** do not define the controller's interrupt number in the CONVEX operating system.

Jumpers **JA5**, **JA6**, and **JA7** must be left as shown in the illustrations.

### 2.4.2 DKC-203 Interrupt Numbers

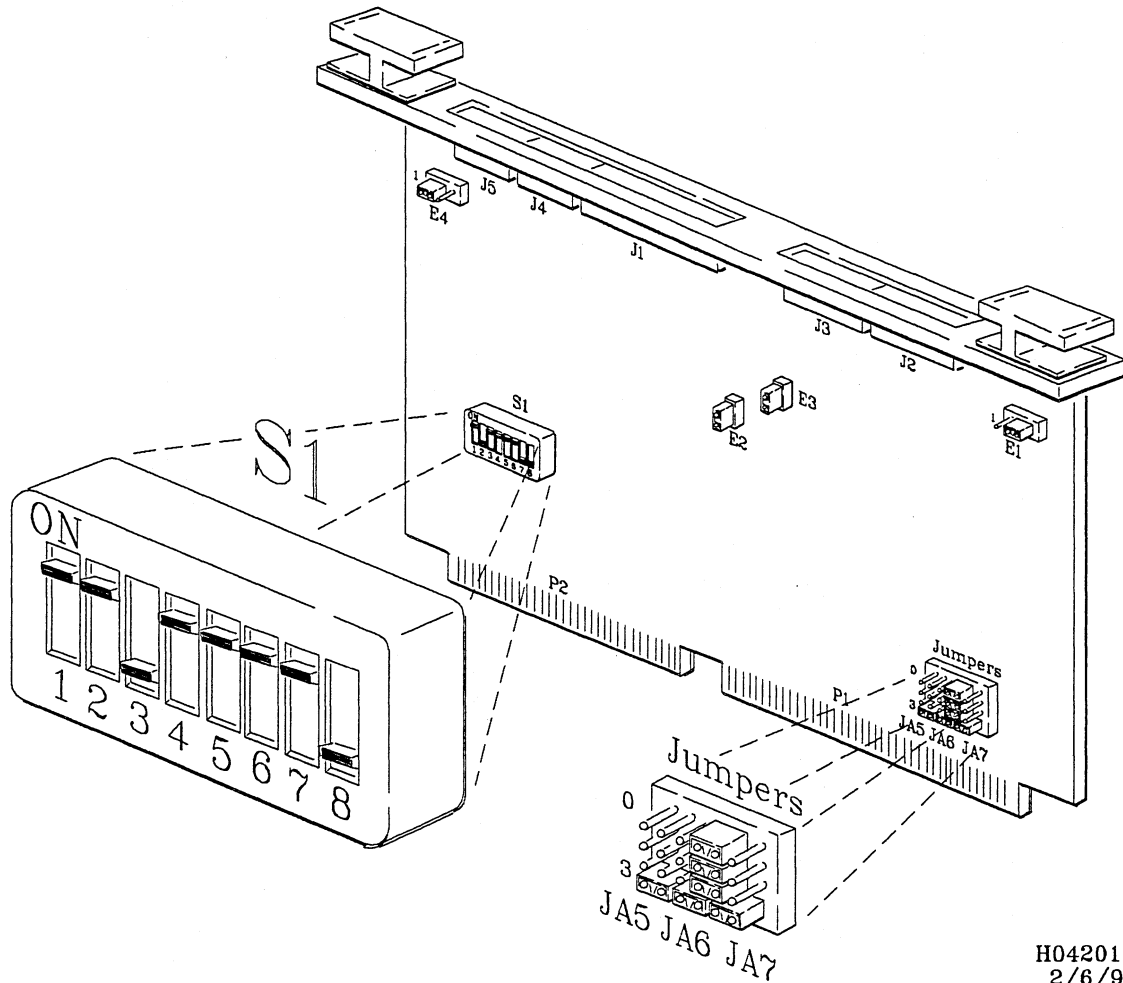
The controller's interrupt number is programmed into the CONVEX operating system by entering the interrupt number into the */ioconfig* file (refer to the example */ioconfig* file in Chapter 3). The CONVEX VMEbus chassis supports a maximum of seven interrupts. Therefore, numbers one through seven are used to define the CONVEX VMEbus interrupt number in the */ioconfig* file; zero is not a valid number.

### 2.4.3 Controller Number 1 through 6 Jumper and Switch Positions

Refer to the following six figures and set the controller switches to the appropriate positions:

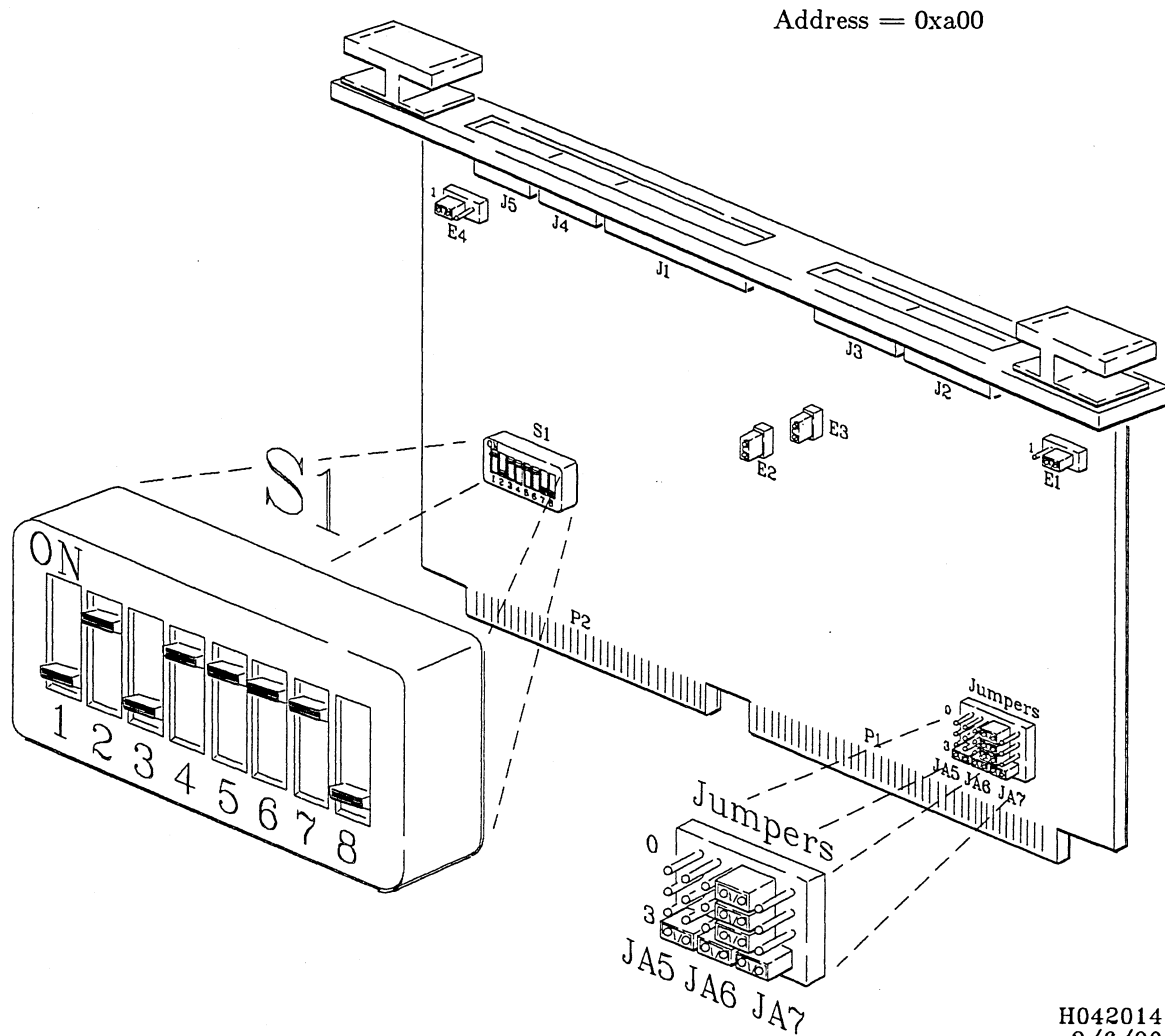
Figure 2-9, Controller Number 1, Jumper and Switch Positions

Address = 0x800



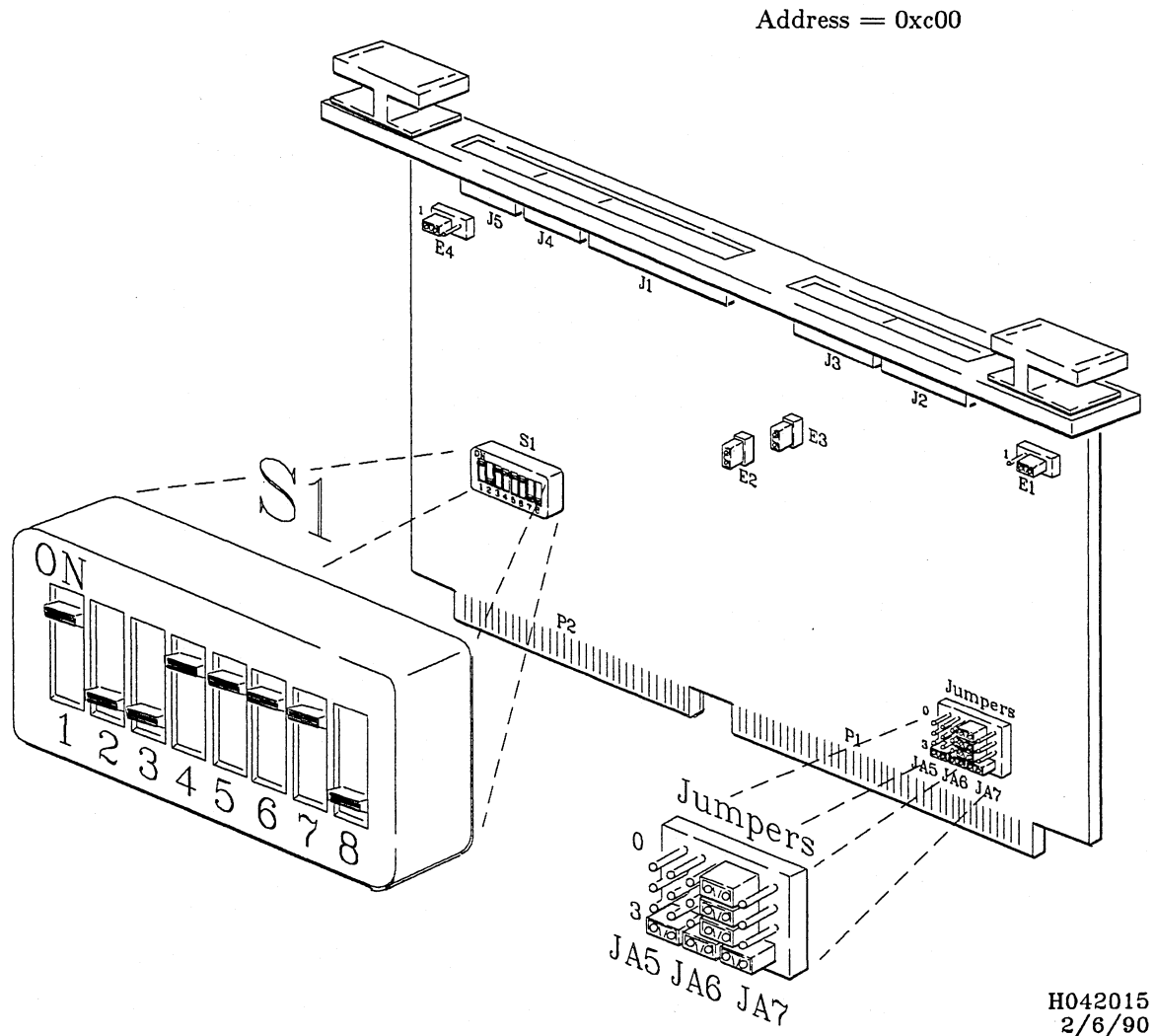
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**Figure 2-10, Controller Number 2, Jumper and Switch Positions**



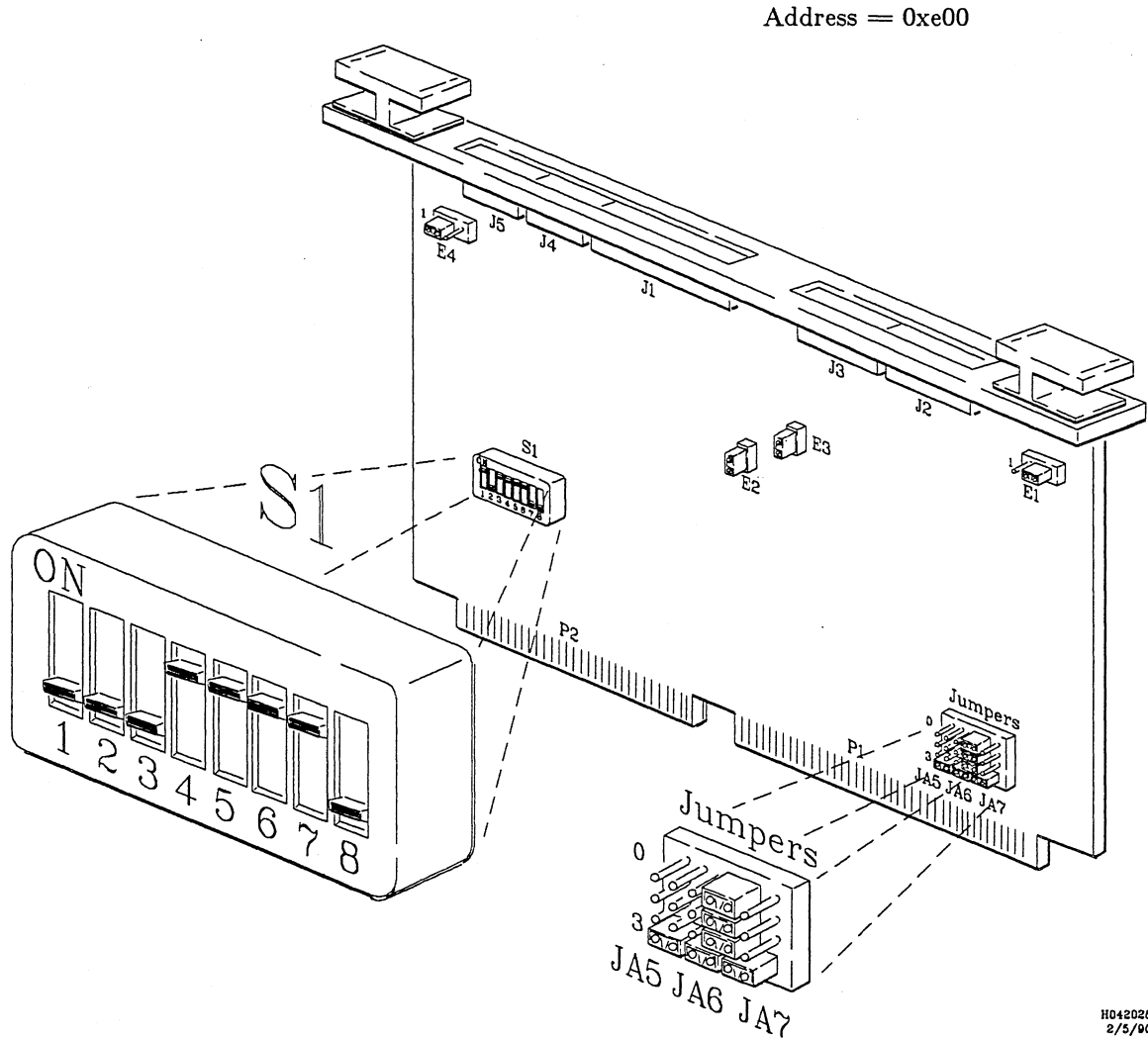
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**Figure 2-11, Controller Number 3, Jumper and Switch Positions**



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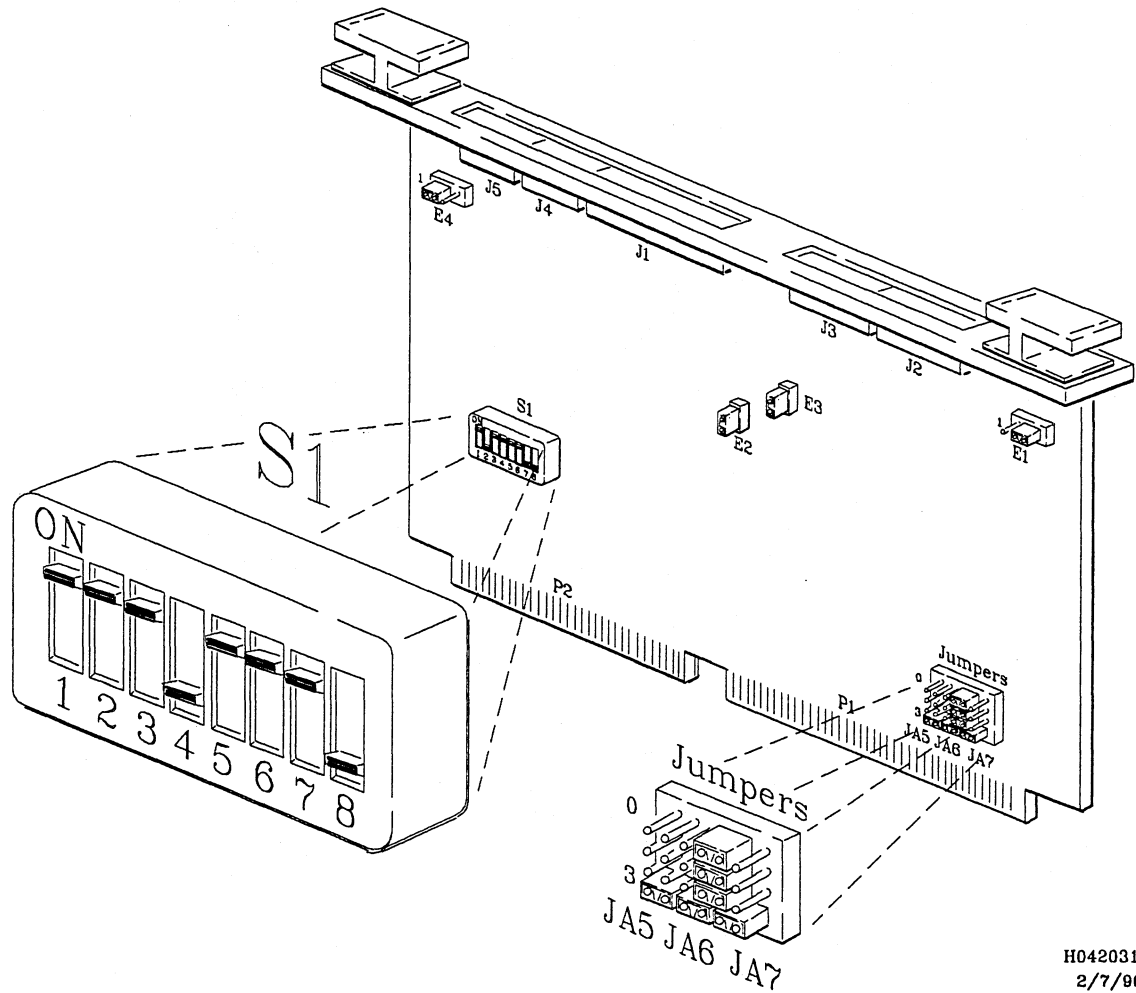
**Figure 2-12, Controller Number 4, Jumper and Switch Positions**



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**Figure 2-13, Controller Number 5, Jumper and Switch Positions**

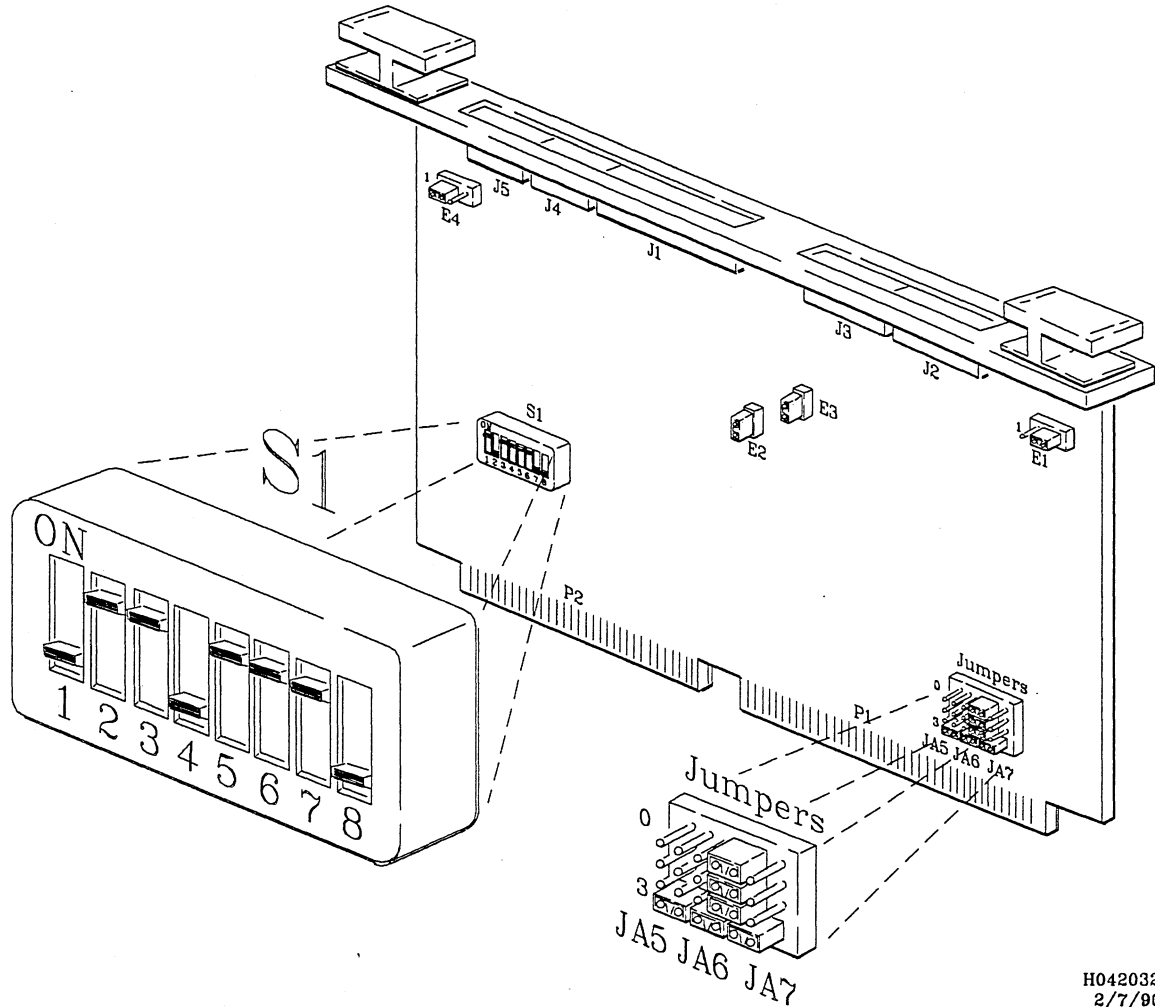
Address = 0x1000



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**Figure 2-14, Controller Number 6, Jumper and Switch Positions**

Address = 0x1200



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#### 2.4.4 Installing the DKC-203 Controller

**CAUTION**

Failure to use the proper power down procedures for the computer system may result in the permanent loss of data.

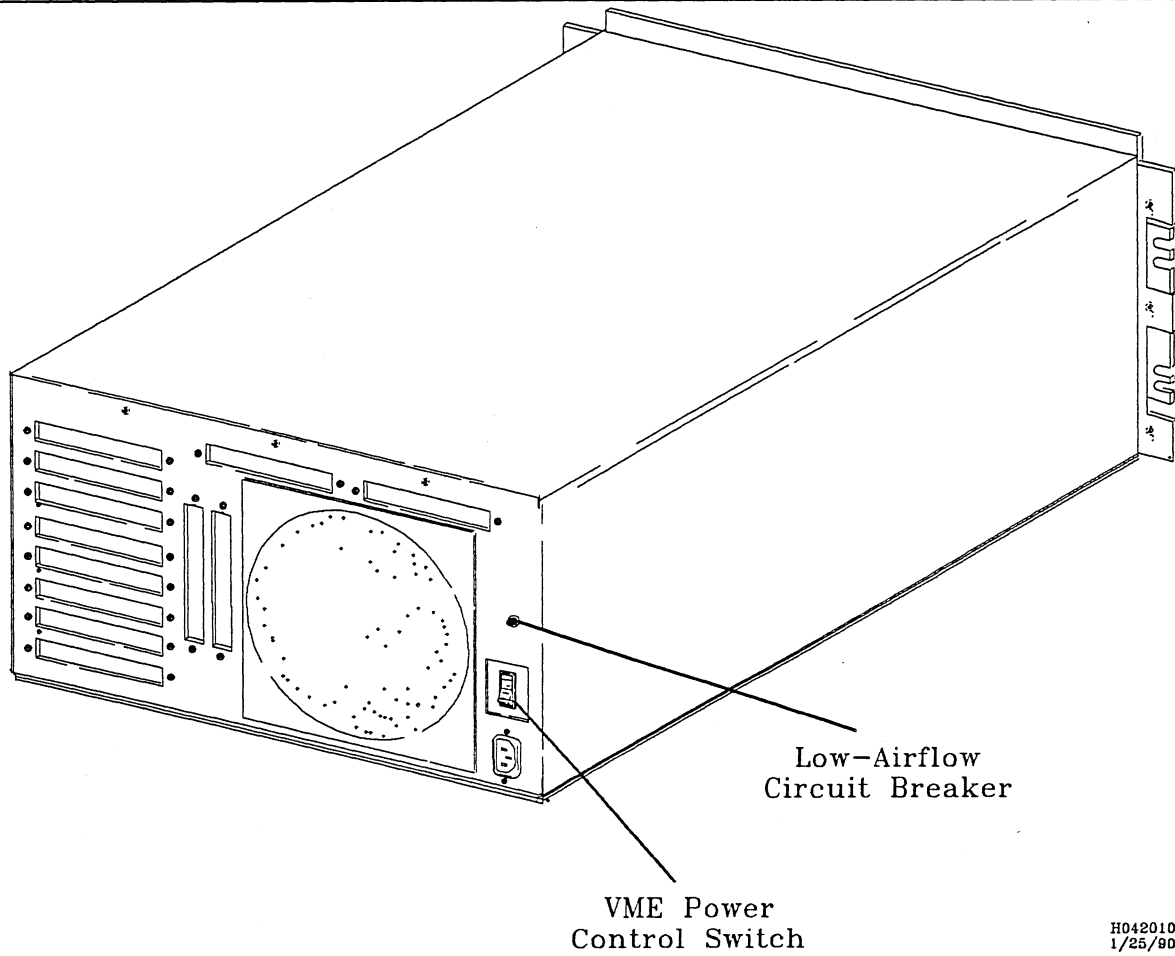
1. Remove all power to the computer and its peripheral devices. Refer to the power down procedures contained in the *CONVEX Processor Operation Guide*.

**CAUTION**

Failure to set the VMEbus chassis power control switch to **OFF** before removing or installing components in the VMEbus chassis may cause damage to the electronic circuits.

2. Ensure that all power to the VMEbus chassis is removed by setting the power control switch to the **OFF** position. Figure 2-15 shows the VMEbus chassis power control switch:

**Figure 2-15, VMEbus Chassis Power Control Switch**



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**WARNING**

Expansion cabinet stabilizer bars must be extended prior to installing an RDS base unit, or before extending either the RDS base unit or VMEbus chassis forward on their slide rails for service. Failure to do so will make the expansion cabinet unstable, increasing the possibility of it falling forward. This may cause injury to personnel and will cause damage to equipment.

3. Extend the expansion cabinet stabilizer bars and adjust feet until they are in firm contact with the floor (see Figure 2-5, Expansion Cabinet Stabilizer Bars).

**NOTE**

The VMEbus backplane slot positions are labeled on the front of each chassis. VMEbus controller cables exit the chassis at the rear through cable openings. Cable opening numbers are stamped on the outside rear panel on all CONVEX VMEbus chassis. Cables from a given controller should always exit the VMEbus chassis at the hole positions shown in Table 2-2:

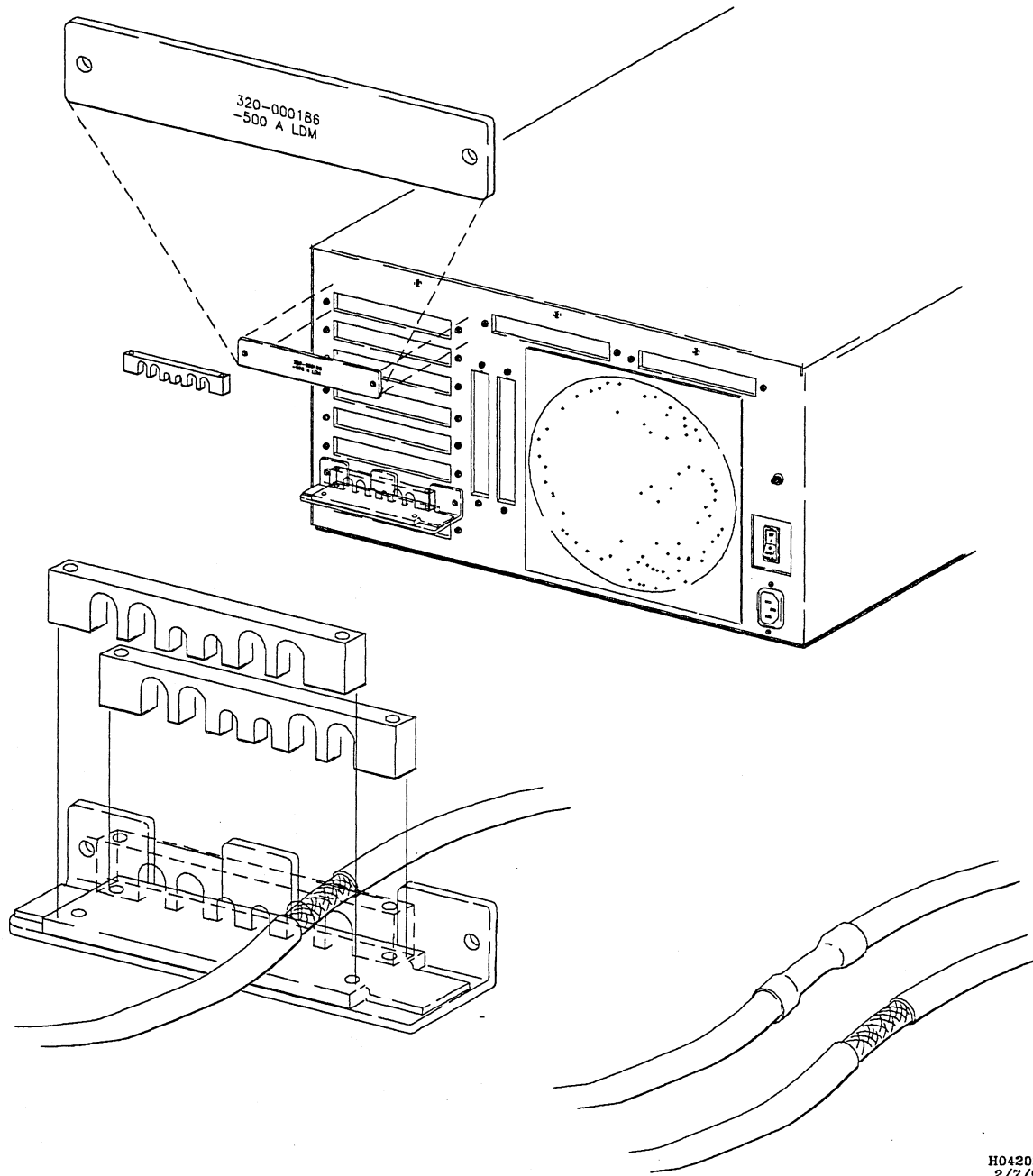
**Table 2-2, Cable Opening Numbers for VMEbus Chassis**

Cable Opening Number	Dual (10-slot) VMEbus	Single (9-slot) VMEbus	Combo VMEbus/Multibus
<b>J1</b>	VBCU-0	VBCU	VBCU
<b>J2</b>	VME-0 Ctlr 1	VME Ctlr 1	VME Ctlr 1
<b>J3</b>	VME-0 Ctlr 2	VME Ctlr 2	VME Ctlr 2
<b>J4</b>	VME-0 Ctlr 3	VME Ctlr 3	VME Ctlr 3
<b>J5</b>	VME-0 Ctlr 4	VME Ctlr 4	VME Ctlr 4
<b>J6</b>	VME-1 Ctlr 4	VME Ctlr 5	VME Ctlr 5
<b>J7</b>	VME-1 Ctlr 3	VME Ctlr 6	Multibus Ctlr 3
<b>J8</b>	VME-1 Ctlr 2	VME Ctlr 7	Multibus Ctlr 2
<b>J9</b>	VME-1 Ctlr 1	VME Ctlr 7 <sup>1</sup>	Multibus Ctlr 1
<b>J10</b>	unassigned	unassigned	Multibus Ctlr 0
<b>J11</b>	unassigned	unassigned	unassigned
<b>J12</b>	VBCU-1	unassigned	MBCU

<sup>1</sup> This controller can be the second board of a two board controller set when the first board is located in the previous VMEbus slot.

4. Remove the appropriate cable clamp cover plate(s) from the rear of the VME chassis. Figure 2-16 shows the VMEbus chassis cover plate, cable clamp, and shielded cables:

Figure 2-16, Cover Plate, Cable Clamp, and Shielded Cables



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**WARNING**

Expansion cabinet stabilizer bars must be extended prior to installing an RDS base unit, or before extending either the RDS base unit or VMEbus chassis forward on their slide rails for service. Failure to do so will make the expansion cabinet unstable, increasing the possibility of it falling forward. This may cause injury to personnel and will cause damage to equipment.

5. Ensure that the expansion cabinet stabilizer bars are extended and the feet are in firm contact with the floor (see Figure 2-5, Expansion Cabinet Stabilizer Bars).
6. Unlock the 2 VMEbus chassis lock screws and pull the VMEbus chassis to its extended position.
7. Release the 12 top cover locking screws from the VMEbus chassis and remove the top cover.

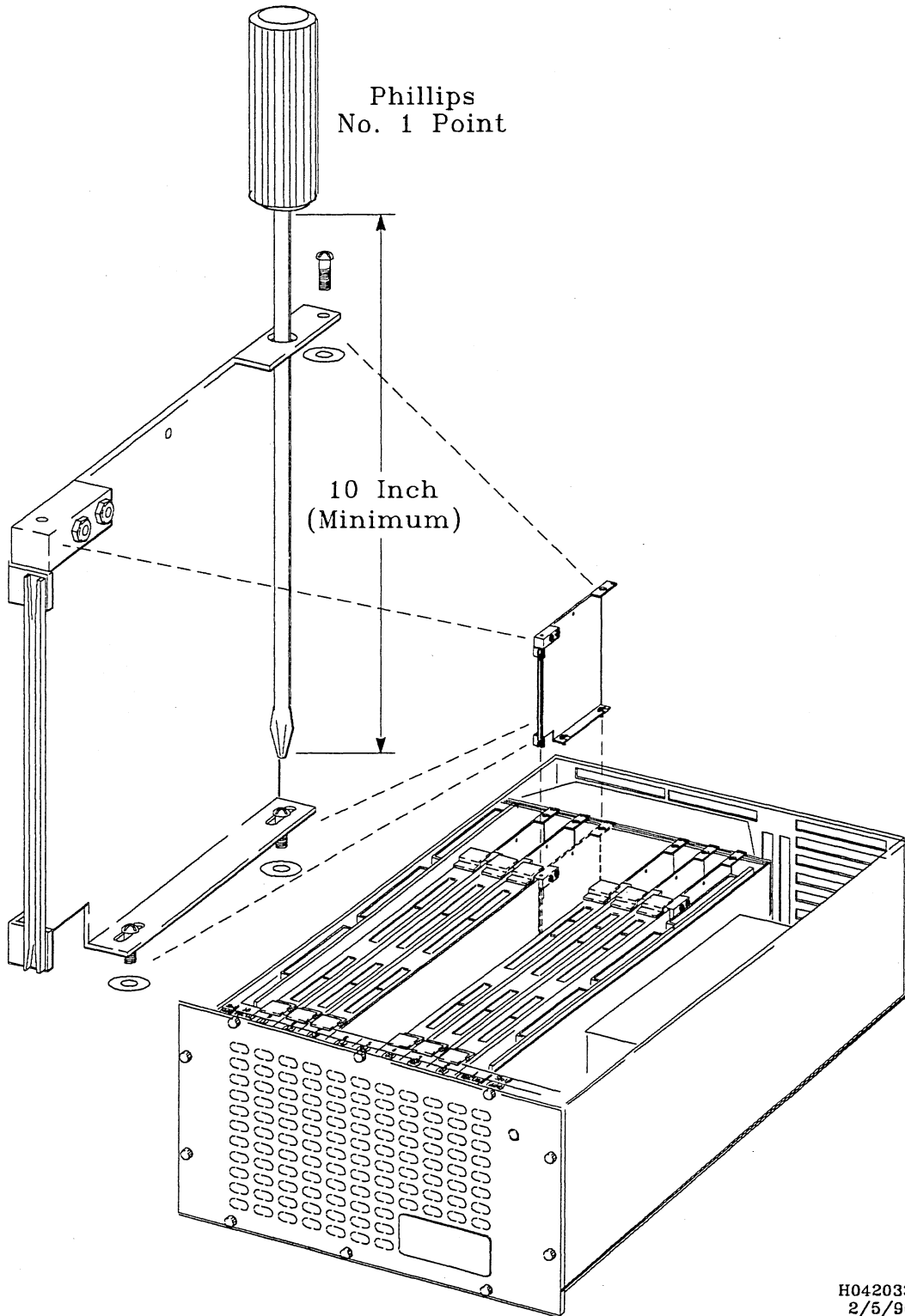
**NOTES**

A Phillips screw driver (approximately 10-inches long) with a No. 1 point is required to install the 2 bottom screws in the single (6U)VMEbus Printed Circuit Board (PCB) adapter.

The single top screw is 2.5 mm.

8. Attach the single (6U)VMEbus PCB adapter (with 2 screws) to the bottom of the chassis and (with 1 screw) to the top rear support rail. Figure 2-17 shows the VMEbus chassis printed circuit board adapter:

Figure 2-17, (6U)VMEbus Printed Circuit Board Adapter



**CAUTION**

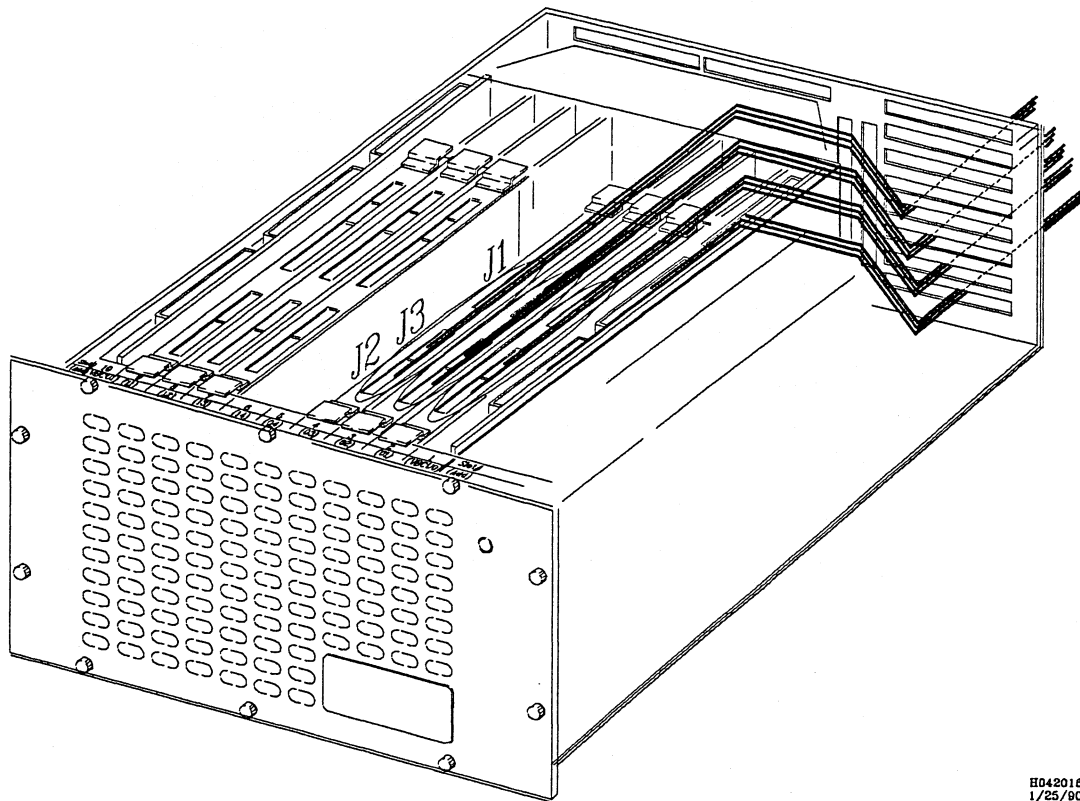
The DKC-203 controller can be damaged by an Electrostatic Discharge (ESD). To reduce the risk of ESD damage, use a grounded conductive wrist strap (or other grounding method) when handling the DKC-203 controller.

- Configure and install the DKC-203 controller in the appropriate VMEbus chassis slot (refer to previous section, Configuring the DKC-203 Controller).

**NOTE**

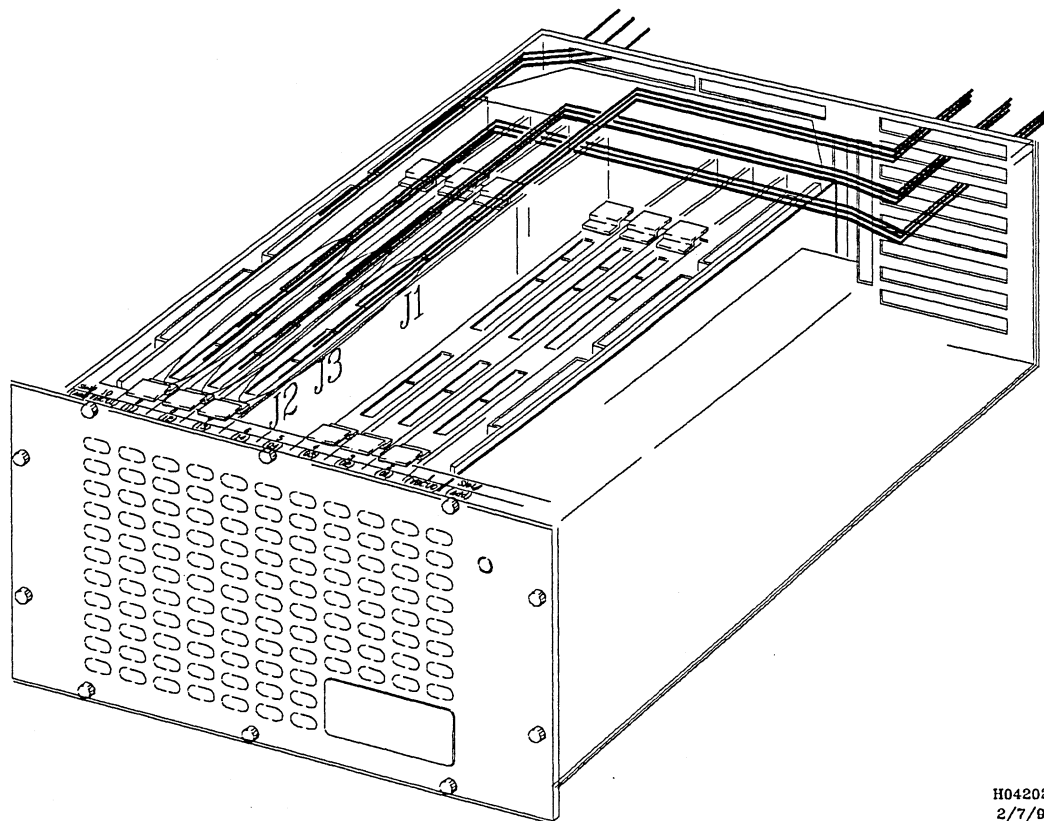
The DKC-203 controller locations and cable routings are illustrated in the following two figures for a *dual* VMEbus chassis:

**Figure 2-18, VBCU-0, DKC-203 (1-3) Positions and Cable Routing**



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**Figure 2-19, VBCU-1, DKC-203 (1-3) Positions and Cable Routing**



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**CAUTION**

The captive mounting screws on the DKC-203 are metric. If they are lost, do not use any other size, or thread type, as damage will occur to the chassis mounting fixture.

10. Once the DKC-203 controller is properly seated in its slot, tighten the 2 captive mounting screws on each end of the board.

**NOTE**

Do not install the top cover on the VMEbus chassis until all controllers have been installed and all cable connections have been completed.

**CAUTION**

Do not operate the VMEbus chassis with its cover removed. The cover must be installed to obtain proper airflow inside the VMEbus chassis.

## 2.5 Adding a Non-Daisy Chained Storage Module

Use the following procedures for adding a system storage module for a striped-disk configuration:

**WARNING**

Expansion cabinet stabilizer bars must be extended prior to installing an RDS base unit, or before extending either the RDS base unit or VMEbus chassis forward on their slide rails for service. Failure to do so will make the expansion cabinet unstable, increasing the possibility of it falling forward. This may cause injury to personnel and will cause damage to equipment.

1. Ensure that the expansion cabinet stabilizer bars are extended and the feet are in firm contact with the floor (see Figure 2-5, Expansion Cabinet Stabilizer Bars).

**CAUTION**

Failure to use the proper system power down procedures may result in the loss of data.

2. Ensure that all power to the computer and its peripheral devices is removed. Refer to the power down procedures contained in the *CONVEX Processor Operation Guide*.

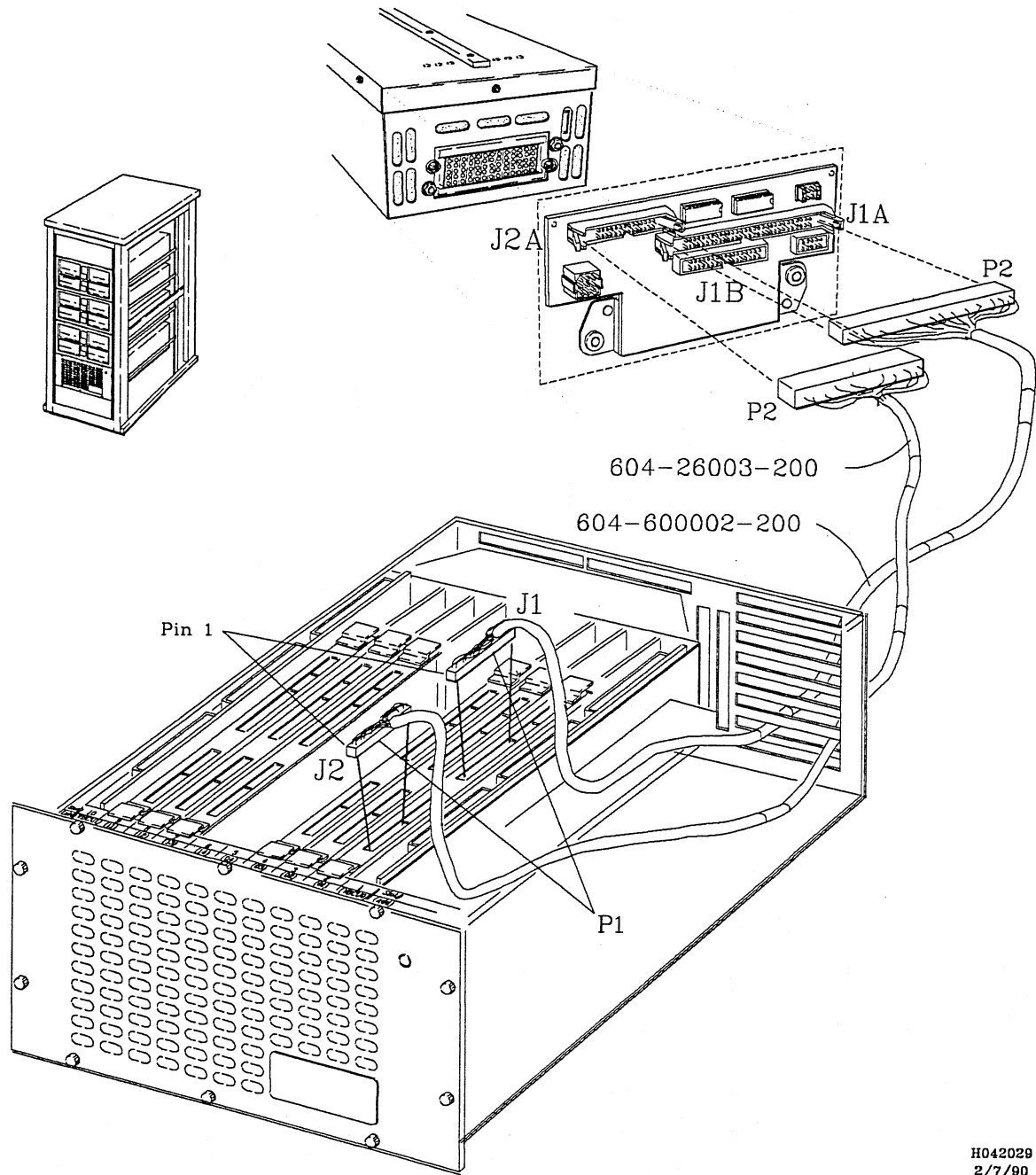
**CAUTION**

Failure to set the VMEbus chassis power control switch to **OFF** and to set the RDS power control switch to **OFF** before removing or installing equipment will damage electronic components.

3. Ensure that the VMEbus chassis power control switch is set to the **OFF** position (see Figure 2-15, VMEbus Chassis Power Control Switch).
4. Ensure that the power control switch on the rear of the RDS base unit is set to the **OFF** position (see Figure 2-8, RDS Base Unit Power Control Switch).

5. Remove the cable cover plate(s) on the rear of the VMEbus chassis where the DKC-203 controller(s) will be installed (see Figure 2-16, Cover Plate, Cable Clamp, and Shielded Cables).
6. Route the **P1** end of the cable 604-600002-200 through the appropriate rear opening in the VMEbus chassis (refer to Table 2-2, Cable Opening Numbers for VMEbus Chassis).
7. Route the **P1** end of the cable 604-260003-200 through the appropriate rear opening on the VMEbus chassis.
8. Configure and install the DKC-203 controller as outlined in “Installing the DKC-203 Controller” section.
9. Connect the **P1** end of the cable 604-260003-200 to **J2** on the DKC-203 controller. Figure 2-20 shows non-daisy-chained storage module cabling:

**Figure 2-20, Non-Daisy-Chained Storage Module Cabling**



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10. Connect the **P1** end of the cable 604-60002-200 to **J1** on the DKC-203 controller.
11. Route the **P2** end of the cable 604-26003-200 from **J2** on the DKC-203 controller to the rear of the RDS base unit.
12. Route the **P2** end of the cable 604-60002-200 from **J1** on the DKC-203 controller to the rear of the RDS base unit.

**NOTE**

In some installations, the base unit will have to be returned to the retracted position when operations on the VMEbus chassis are required.

**CAUTION**

Do not operate the VMEbus chassis with its cover removed. The cover must be installed to obtain proper airflow inside the VMEbus chassis.

13. Install the top cover on the VMEbus chassis and secure it with the 12 screws.
14. Return the VMEbus chassis to its retracted position.
15. Select a point on each (VMEbus end) cable, as close as possible to the outside of the chassis, and remove the heat shrink sleeve (see Figure 2-16, Cover Plate, Cable Clamp, and Shielded Cables).

**CAUTION**

Failure to contact the exposed cable shield with the cable clamp will result in the loss of EMI shielding.

16. Install both cables (with exposed shields) in the inner cable clamp 72851232, then install the clamp on the mounting bracket. Install the outer clamp 72851233 (over the insulated cables area), then mount the complete assembly to the rear of the VMEbus chassis with the screws provided (see Figure 2-16, Cover Plate, Cable Clamp, and Shielded Cables).
17. Remove 2 screws and 1 cable cover plate on the *base unit* rear access cover where drive will be installed and insert both cables through the cable opening.

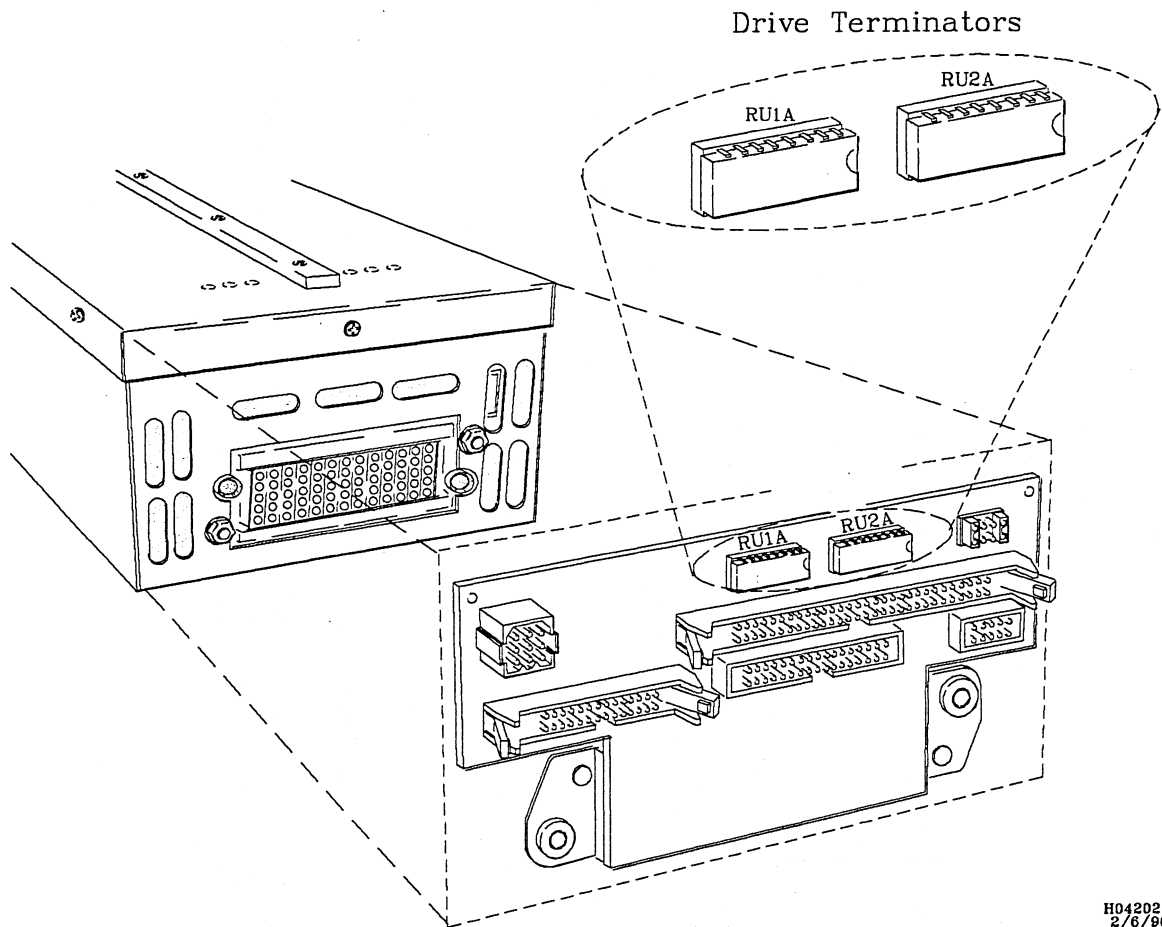
**WARNING**

Expansion cabinet stabilizer bars must be extended prior to installing an RDS base unit, or before extending either the RDS base unit or VMEbus chassis forward on their slide rails for service. Failure to do so will make the expansion cabinet unstable, increasing the possibility of it falling forward. This may cause injury to personnel and will cause damage to equipment.

18. Ensure that the expansion cabinet stabilizer bars are extended and the feet are in firm contact with the floor (see Figure 2-5, Expansion Cabinet Stabilizer Bars).

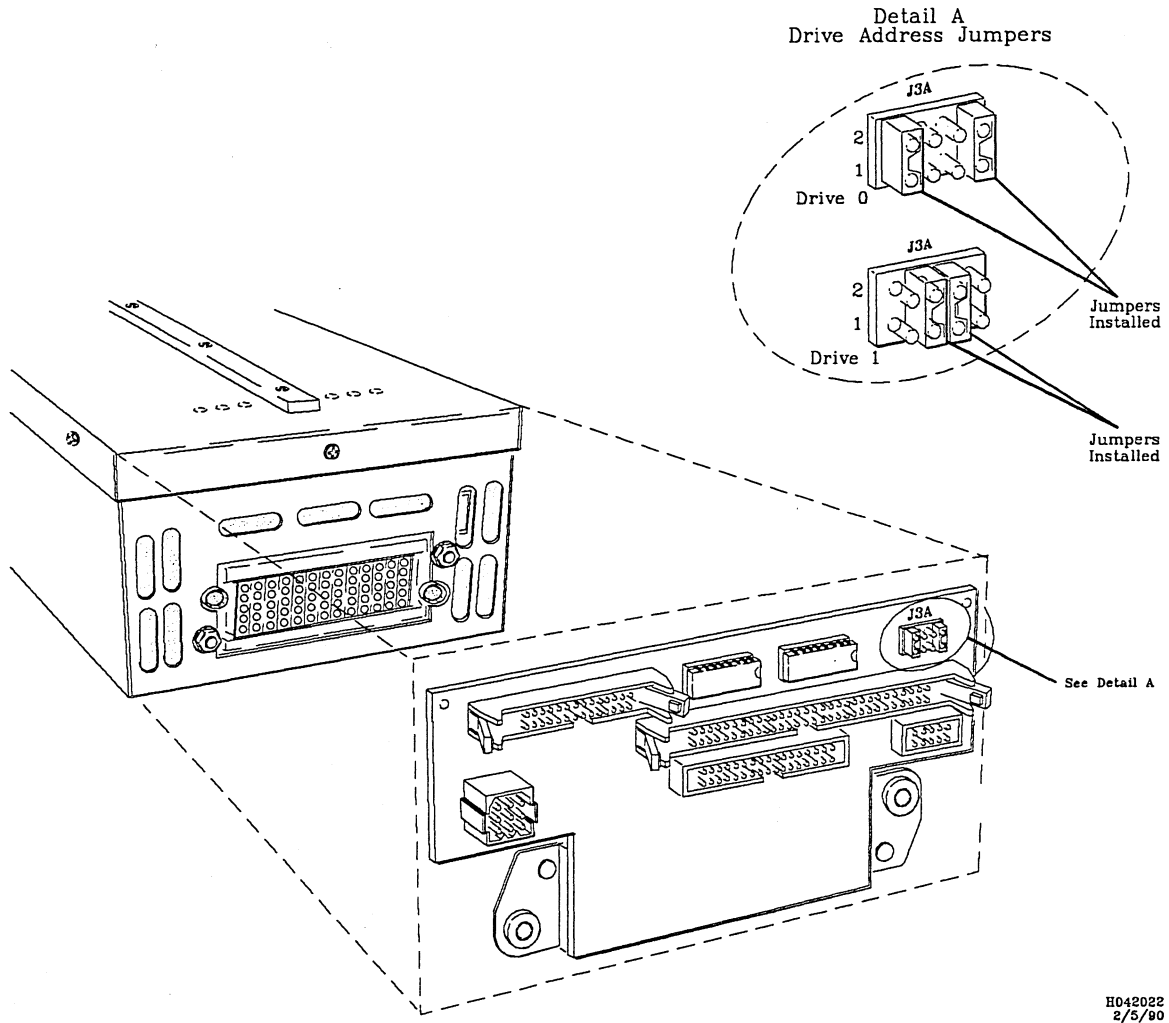
19. Loosen 2 RDS base unit locking screws and extend the RDS base unit.
20. Remove 14 screws from the RDS base unit top cover and remove the top cover.
21. Inspect the PCB at the rear of the module's sleeve and ensure that terminator networks are installed as shown in Figure 2-21:

**Figure 2-21, Cable Terminators**



22. Ensure that the drive address jumpers on J3A are set to the "drive 0" position as shown Figure 2-22:

**Figure 2-22, Drive Address Jumpers**



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23. Route the **P2** end of the cable 604-260003-200 from **J2** on DKC-203 controller to **J2A** on the PCB then connect it.
24. Route the **P2** end of the cable 604-600002-200 from **J1** on DKC-203 controller to **J1A** on the PCB then connect it.

**CAUTION**

Never operate the RDS base unit with covers removed. The disk drives operating temperature will be exceeded. All covers must be installed to obtain proper airflow through the storage modules and to the base unit PCBs.

25. Replace top cover on the RDS base unit and secure it with 14 screws.
26. Return the base unit to its retracted position.
27. Remove one section of the heat shrink sleeve from both cables as close as possible to the outside of the chassis. Ensure that there is slack in the cables before selecting these points.

**CAUTION**

Failure to contact the exposed cable shield with the cable clamp will result in the loss of EMI shielding.

28. Install both cables (with exposed shields) in the inner cable clamp 72851232, then install the clamp on the mounting bracket. Install the outer clamp 72851233 (over the insulated cable area), then mount the complete assembly to the rear of the VMEbus chassis with the screws provided (see Figure 2-16, Cover Plate, Cable Clamp, and Shielded Cables).
29. Return the RDS base unit to its retracted position and secure it with 2 locking screws.
30. Install storage module into RDS base unit (refer to the *CONVEX Removable Disk System Operation Guide*).
31. Return expansion cabinet stabilizer bars to their retracted position.
32. Apply power to the computer.
33. Apply power to RDS base unit and VMEbus chassis.

**NOTE**

Refer to the example in Chapter 3 for the procedures on how to set up the */ioconfig* file for an RDS disk. Chapter 3 also contains diagnostic test information for an RDS disk.

## 2.6 Adding Daisy-Chain Storage Modules (Non-striped Configuration)

A single DKC-203 controller can be used to control two storage modules. This is referred to as a daisy-chain configuration. The two drives are connected together via cables. Although any two system disk-storage modules (in the same base) unit can be daisy-chained, the recommended method is to daisy chain drive **A** with **B** and drive **C** with **D**. Daisy chaining between drives in different base units is not supported by CONVEX.

Use the following procedures to install two daisy-chained storage modules.

**WARNING**

Expansion cabinet stabilizer bars must be extended prior to installing an RDS base unit, or before extending either the RDS base unit or VMEbus chassis forward on their slide rails for service. Failure to do so will make the expansion cabinet unstable, increasing the possibility of it falling forward. This may cause injury to personnel and will cause damage to equipment.

1. Ensure that the expansion cabinet stabilizer bars are extended and the feet are in firm contact with the floor (see Figure 2-5, Expansion Cabinet Stabilizer Bars).

**CAUTION**

Failure to use the proper system power down procedures may result in the permanent loss of data.

2. Ensure that all power to the computer and its peripheral devices is removed. Refer to the power down procedures contained in the *CONVEX Processor Operation Guide*.

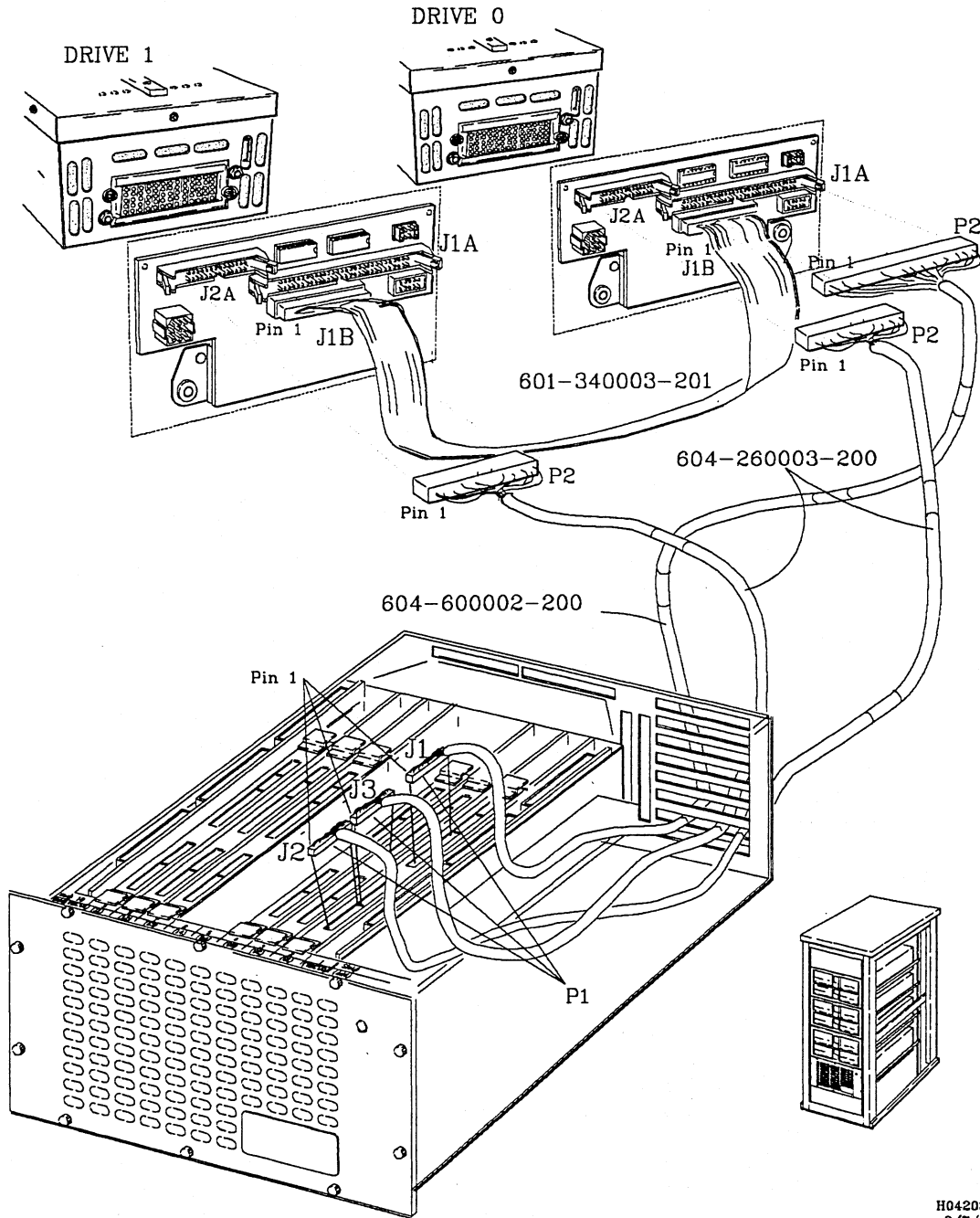
**CAUTION**

Failure to set the VMEbus chassis power control switch to **OFF** and to set the RDS power control switch to **OFF** before removing or installing equipment will damage electronic components.

3. Set the power control switch in the VMEbus chassis to the **OFF** position (see Figure 2-15, VMEbus Chassis Power Control Switch).
4. Set the power control switch on the rear of the RDS base unit to the **OFF** position (see Figure 2-8, RDS Base Unit Power Control Switch).
5. Refer to "Installing the DKC-203 Controller" section and follow the steps for installing a DKC-203 controller.
6. Remove the cable cover plate(s) on the rear of the VMEbus chassis where the DKC-203 controller(s) will be installed (see Figure 2-16, Cover Plate, Cable Clamp, and Shielded Cables).
7. Route the **P1** end of the cable 604-600002-200 through the appropriate rear opening in the VMEbus chassis (refer to Table 2-2, Cable Opening Numbers for VMEbus Chassis).
8. Route the **P1** end of the "drive 0" cable 604-260003-200 through the appropriate rear opening on the VMEbus chassis.
9. Route the **P1** end of the "drive 1" cable 604-260003-200 through the appropriate rear opening on the VMEbus chassis.

10. Loosen the 2 front panel locking screws on the VMEbus chassis and extend the chassis.
  11. Loosen the 12 top cover screws on the VMEbus chassis and remove the top cover.
  12. Connect the **P1** end of the cable 604-600002-200 to **J1** on the DKC-203 controller.
- Figure 2-23 shows DKC-203 controller and daisy-chained cabling:

**Figure 2-23, DKC-203 Controller and Daisy-Chained Cabling**



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13. Connect the **P1** end of the “drive 0” cable 604-260003-200 to **J2** on the DKC-203 controller.
14. Connect the **P1** end of the “drive 1” cable 604-260003-200 to **J3** on the DKC-203 controller.

**CAUTION**

Do not operate the VMEbus chassis with its cover removed. The cover must be installed to obtain proper airflow inside the VMEbus chassis.

15. Install the top cover on the VMEbus chassis and secure it with 12 screws.
16. Return the VMEbus chassis to its retracted position and secure it with the 2 front panel screws.
17. Select a point on each (VMEbus end) cable, as close as possible to the outside of the chassis, and remove the heat shrink sleeve (see Figure 2-16, Cover Plate, Cable Clamp, and Shielded Cables).

**CAUTION**

Failure to contact the exposed cable shield with the cable clamp will result in the loss of EMI shielding.

18. Install the cables (with exposed shields) in the inner cable clamp 72851232, then install the clamp on the mounting bracket. Install the outer clamp 72851233 (over the insulated cable area), then mount the complete assembly to the rear of the VMEbus chassis with the screws provided (see Figure 2-16, Cover Plate, Cable Clamp, and Shielded Cables).
19. Remove 2 screws and cable cover plate on base unit rear access cover where the first drive will be installed (“drive 0”).
20. Route the **P2** end of the “drive 0” cable 604-260003-200 from **J2** to the rear of the RDS base unit and to the first drive in the daisy chain.
21. Route the **P2** end of the “drive 0” cable 604-600002-200 from **J1** to the first drive in the daisy chain.
22. Remove 2 screws and cable cover plate on rear base unit access cover where the second drive will be installed (“drive 1”).
23. Route the **P2** end of the “drive 1” cable 604-260003-200 from **J3** to the rear of the RDS base unit to the second drive in the daisy chain.
24. Loosen 2 RDS base unit locking screws, and pull out the RDS base unit to its extended position.
25. Remove 14 screws from the RDS base unit top cover and remove the top cover.
26. Connect the **P2** end of the “drive 0” cable 604-260003-200 from **J2** to **J2A** on the first drive in the daisy chain.

27. Connect the **P2** end of the “drive 0” cable 604-600002-200 from **J1** to **J1A** on the first drive in the daisy chain.
28. Connect the **P2** end of the “drive 1” cable 604-260003-200 from **J3** to **J2A** on the second drive in the daisy chain.
29. Connect the cable 604-340003-201 from **J1B** on the first drive (“drive 0”) to **J1B** on the second drive (“drive 1”).
30. Ensure that the drive address jumpers on **J3A** of the first storage module are set to the “drive 0” position (see Figure 2-23, Drive Address Jumpers).
31. Remove terminator networks from **RU1A** and **RU2A** on the PCB of the first storage module (“drive 0”) (see Figure 2-22, Cable Terminators).
32. Ensure that the drive address jumpers on **J3A** of the second storage module are set to the “drive 1” position (see Figure 2-23, Drive Address Jumpers).
33. Inspect the PCB at the rear of the second storage module’s sleeve (“drive 1”) and ensure that terminator networks are installed in **RU1A** and **RU2A** (see Figure 2-22, Cable Terminators).

**NOTE**

Install additional disk drives before going to the next step in this procedure.

**CAUTION**

Never operate the RDS base unit with covers removed. The disk drives operating temperature will be exceeded. All covers must be installed to obtain proper airflow through the storage modules and to the base unit PCBs.

34. Replace top cover on RDS base unit and secure it with 14 screws.
35. Return RDS base unit to its retracted position and secure it with 2 locking screws.
36. Remove one section of the heat shrink sleeve from both cables as close as possible to the outside of the chassis. Ensure that there is slack in the cables before selecting these points (see Figure 2-16, Cover Plate, Cable Clamp, and Shielded Cables).

**CAUTION**

Failure to contact the exposed cable shield with the cable clamp will result in the loss of EMI shielding.

37. For “drive 0”, install cables (with exposed shields) in the inner cable clamp 72851232, then install the clamp on the mounting bracket. Install the outer clamp 72851233 (over the insulated cable area), then mount the complete assembly to the rear of the VMEbus chassis with the screws provided (see Figure 2-16, Cover Plate, Cable Clamp, and Shielded Cables).

38. For “drive 1”, install cables (with exposed shields) in the inner cable clamp 72851232, then install the clamp on the mounting bracket. Install the outer clamp 72851233 (over the insulated cable area), then mount the complete assembly to the rear of the VMEbus chassis with the screws provided (see Figure 2-16, Cover Plate, Cable Clamp, and Shielded Cables).

**CAUTION**

Do not operate the VMEbus chassis with its cover removed. The cover must be installed to obtain proper airflow inside the VMEbus chassis.

39. Install the top cover on the VMEbus chassis and secure it with 12 locking screws.
40. Return the VMEbus chassis to its retracted position and secure it with 2 locking screws.
41. Install storage modules into the RDS base unit (refer to the *CONVEX Removable Disk System Operation Guide*).
42. Return expansion cabinet stabilizer bars to their retracted position.
43. Apply power to the computer.
44. Apply power to the RDS base unit and VMEbus chassis.

**NOTE**

Refer to the example in Chapter 3 for the procedures on how to set up the */ioconfig* file for an RDS disk. Chapter 3 also contains diagnostic test information for an RDS disk.

## 2.7 SPU-Disk Storage Module Cable Connections

The SPU-disk storage module is interfaced directly to the CONVEX SPUs Small Computer System Interface (SCSI) bus when the disk storage module is the only device on the SCSI bus. When the half-height SCSI tape unit is connected to the SPU SCSI connector, the SPU-disk storage module is connected to **J2** on the rear of the SCSI tape unit. The procedures for connecting cables between the RDS SPU-disk storage module and the SPU SCSI port or to the half-height SCSI tape unit are detailed in the following sections.

### 2.7.1 Cable Connection to SPU SCSI Port

Use the following procedures when connecting the SPU-disk storage module directly to the SPU SCSI port:

**WARNING**

Expansion cabinet stabilizer bars must be extended prior to installing an RDS base unit, or before extending either the RDS base unit or VMEbus chassis forward on their slide rails for service. Failure to do so will make the expansion cabinet unstable, increasing the possibility of it falling forward. This may cause injury to personnel and will cause damage to equipment.

1. Extend the expansion cabinet stabilizer bars and adjust feet until they are in firm contact with the floor (see Figure 2-5, Expansion Cabinet Stabilizer Bars).

**CAUTION**

Failure to remove power from the system before removing or installing equipment will damage electronic components.

2. Remove all power to the computer and its peripheral devices. Refer to the power down procedures contained in the *CONVEX Processor Operation Guide*.
3. Set the power control switch on the rear of the RDS base unit to the **OFF** position (see Figure 2-8, RDS Base Unit Power Control Switch).

**NOTE**

The cable from the SPU storage module must be connected directly to the backplane on the computer. This connection point is identified as 1A722J4YCBA. The following list explains this identification scheme.

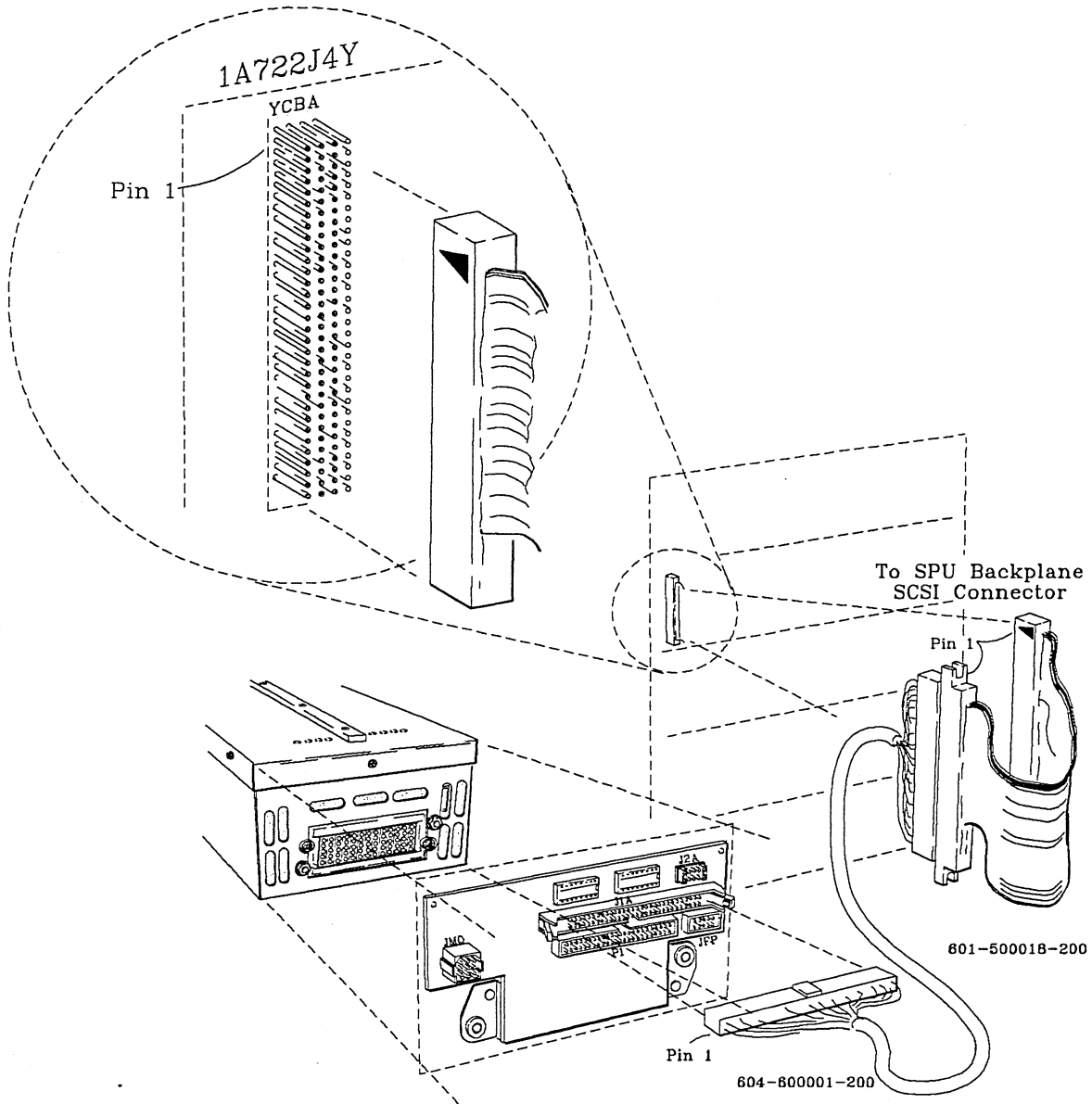
- **1** — Specifies cabinet number 1 (the processor)
- **A7** — Refers to the back plane area
- **22** — Specifies slot number 22
- **J4** — Specifies the J4 jack position on slot 22
- **YCBA** — Specifies the four column of pins on jack J4

**NOTE**

A flashlight may be required to locate the proper connection point on the backplane.

4. Open the rear door of the processor cabinet, and remove the ribbon cable from 1A722J4YCB if it is installed. Figure 2-24 shows the cable connections from the storage module to the SPU backplane:

**Figure 2-24, Cable Connections from Module to SPU Backplane**

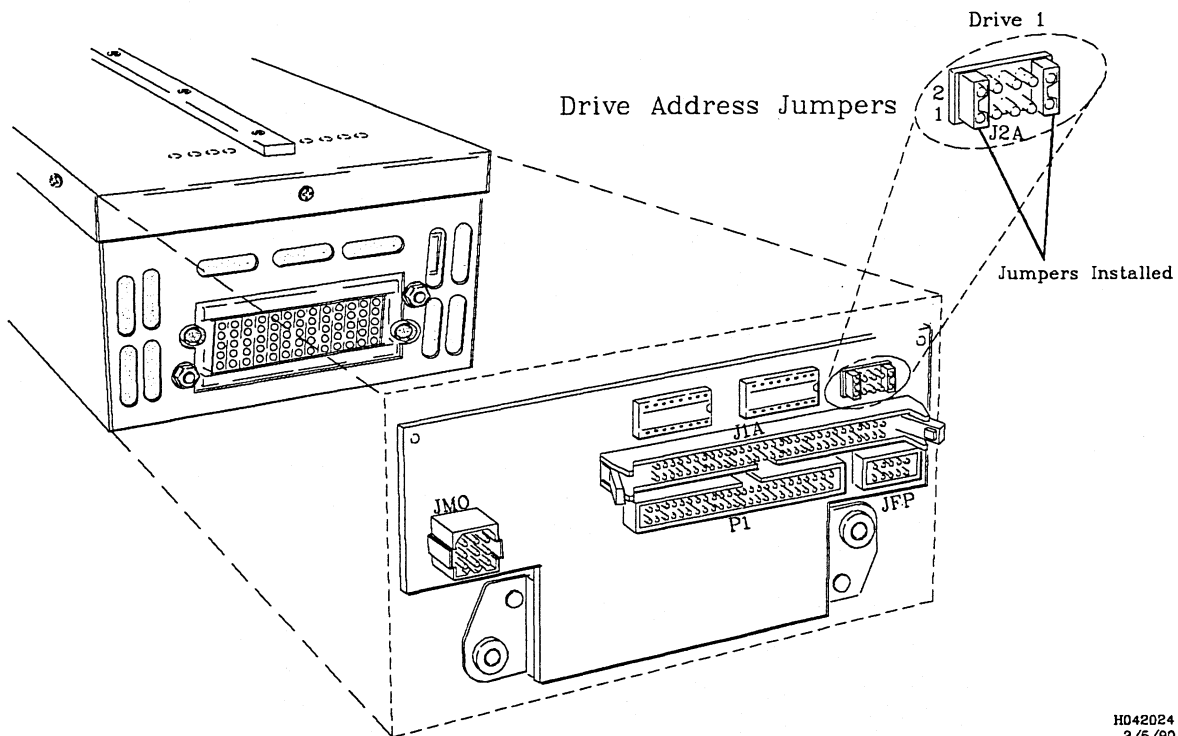


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5. Connect the ribbon cable 601-500018-200 to pins YCB (left 3 columns) on 1A722J4.
6. Connect the P2 end of the cable 604-600001-200 to the other end of the ribbon cable 601-500018-200.

7. Route the **P1** end of the cable 604-600001-200 to position **A** on the rear of the RDS base unit (bottom right, as seen from the rear).
8. Remove 2 screws and cable cover plate from position **A** on the rear of the base unit and insert the cable into the cable opening.
9. Loosen the 2 base unit locking screws on the front panel, and extend the base unit on its slides.
10. Remove 14 screws from the base unit top cover, and remove top cover.
11. Ensure that the drive address jumper on **J2A** is set to the "drive 1" position. Figure 2-25 shows the SPU jumpers and terminators:

**Figure 2-25, SPU Jumpers and Terminators**



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12. Inspect the PCB on the rear of sleeve position **A**, and ensure that the terminator networks in **RU1A** and **RU2A** are removed.
13. Connect the **P1** end of the cable 604-600001-200 to **J1A** on the PCB.
14. Replace the top cover on the base unit and secure it with 14 screws.
15. Return the base unit to its retracted position and secure it with the 2 locking screws.
16. Remove one section of the heat shrink sleeve from the cable as close as possible to the outside of the chassis. Ensure that there is slack in the cable before selecting this point (see Figure 2-16, Cover Plate, Cable Clamp, and Shielded Cables).

**CAUTION**

Failure to contact the exposed cable shield with the cable clamp will result in the loss of EMI shielding.

17. Install cable(s) (with exposed shields) in the inner cable clamp 72851232, then install the clamp on the mounting bracket. Install the outer clamp 72851233 (over the insulated cable area), then mount the complete assembly to the rear of the VMEbus chassis with the screws provided (see Figure 2-16, Cover Plate, Cable Clamp, and Shielded Cables).
18. Refer to the *CONVEX Removable Disk System Operation Guide* and install the SPU-storage module into base unit position A.
19. Apply power to the SPU and base unit.
20. Return the expansion cabinet stabilizer bars to their retracted positions.

**NOTE**

Refer to Chapter 3 for formatting and diagnostic test information on the SPU-storage module.

### 2.7.2 SPU Module to Half-Height Tape Cabling

Use the following procedures when connecting the SPU-disk storage module directly to the half-height tape drive:

**WARNING**

Expansion cabinet stabilizer bars must be extended prior to installing an RDS base unit, or before extending either the RDS base unit or VMEbus chassis forward on their slide rails for service. Failure to do so will make the expansion cabinet unstable, increasing the possibility of it falling forward. This may cause injury to personnel and will cause damage to equipment.

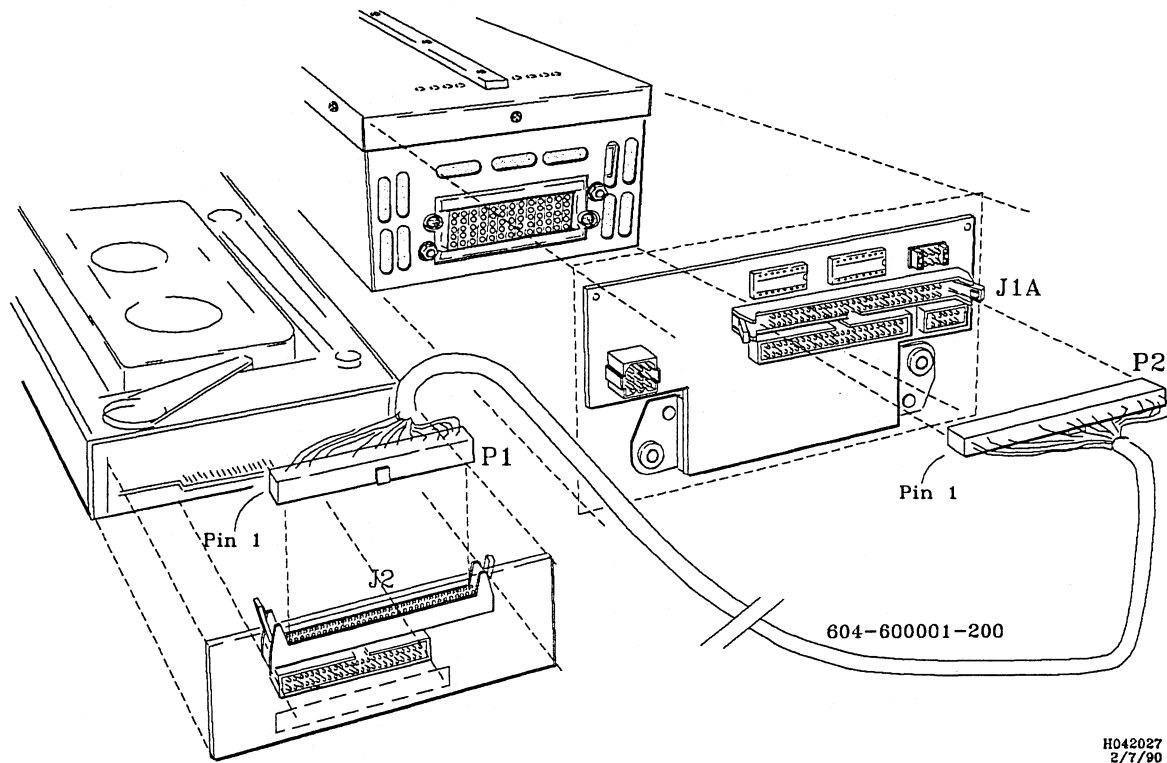
1. Extend the expansion cabinet stabilizer bars and adjust feet until they are in firm contact with the floor (see Figure 2-5, Expansion Cabinet Stabilizer Bars).

**CAUTION**

Failure to remove power from the system before removing or installing equipment will damage electronic components.

2. Remove all power to the computer and its peripheral devices. Refer to the power down procedures contained in the *CONVEX Processor Operation Guide*.
3. Set the power control switch on the rear of the RDS base unit to the **OFF** position (see Figure 2-8, RDS Base Unit Power Control Switch).
4. Open the front door of the processor cabinet and locate **J2** on the rear of the half-height SCSI tape drive. Figure 2-26 shows the SPU module to half-height tape cabling:

**Figure 2-26, SPU Module to Half-Height Tape Cabling**



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5. Connect the **P1** end of the cable 604-600001-200 to **J2** on the half-height SCSI tape drive.
6. Route the **P2** end of the cable 604-600001-200 to the rear of the RDS base unit at position **A** (bottom right position, as seen from the rear of the RDS base unit).
7. Remove 2 screws and cable cover plate on rear base unit access cover for the drive **A** position and insert cable into opening.
8. Loosen 2 front panel base unit locking screws and extend the RDS base unit on its slide rails.
9. Remove 14 screws from the RDS base unit top cover and remove the top cover.
10. Ensure that the drive address jumpers on **J2A** are set to the "drive 1" position (see Figure 2-25, SPU Jumpers and Terminators).
11. Inspect the PCB at the rear of sleeve position **A**, and ensure that terminator networks are removed in **RU1A** and **RU2A** (see Figure 2-25, SPU Jumpers and Terminators).

12. Connect the **P2** end of the cable 604-600001-200 from **J2** to **J1A** on the PCB.

**CAUTION**

Never operate the RDS base unit with covers removed. The disk drives operating temperature will be exceeded. All covers must be installed to obtain proper airflow through the storage modules and to the base unit PCBs.

13. Replace top cover on RDS base unit and secure it with 14 screws.
14. Return base unit to its retracted position and secure it with 2 locking screws.
15. Remove one section of the heat shrink sleeve from the cable as close as possible to the outside of the chassis. Ensure that there is slack in the cable before selecting this point.

**CAUTION**

Failure to contact the exposed cable shield with the cable clamp will result in the loss of EMI shielding.

16. Install cable(s) (with exposed shields) in the inner cable clamp 72851232, then install the clamp on the mounting bracket. Install the outer clamp 72851233 (over the insulated cable area), then mount the complete assembly to the rear of the VMEbus chassis with the screws provided (see Figure 2-16, Cover Plate, Cable Clamp, and Shielded Cables).
17. Refer to the *CONVEX Removable Disk System Operation Guide* and install the SPU-storage module into base unit position **A**.
18. Apply power to the RDS base unit and SPU.
19. Return expansion cabinet stabilizer bars to their retracted positions.

**NOTE**

Refer to Chapter 3 for formatting and diagnostic test information on the SPU disk.

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# Chapter 3

## Integration and Checkout

### 3.1 Overview

This chapter provides guidelines for integrating RDS storage modules into the CONVEX operating system. Information is also provided on diagnostic tests for the RDS.

**NOTE**

Refer to *CONVEX Removable Disk System Operation Guide* for the storage module operational procedures.

### 3.2 Software Considerations

The RDS storage modules and related hardware must be integrated into the operating system before it can be used. How it is integrated depends on the type of performance or features required.

#### 3.2.1 Striped and Non-Striped Partitioning

System-disk storage modules can be integrated into the CONVEX operating system in either of two ways, single-disk partitioning or striped-disk partitioning. In single-disk partitioning, a complete partition is located on a single physical storage module. In striped-disk partitioning, a single partition is located on *two* or more physical storage modules.

There are two primary advantages for the use of striped-disk partitioning. The most important one is the potential to increase performance on the disk subsystem (two or more drives transferring their part of the partitioned file at the same time). Although a performance increase is not guaranteed in every type of system configuration, it is possible in most cases.

The second advantage is the flexibility in defining the size of a file. By combining two or more physical disk partitions, a single striped-file partition can contain the sum of the sizes of a conventional disk partition. The *CONVEX System Manager's Guide* should be consulted for guidelines on the use of disk striping.

#### 3.2.2 Software Integration

The CONVEX operating systems contains all software drivers for the hardware supported by CONVEX. This means that a system generation is not required when the RDS is installed in a system.

System-disk storage modules and the controllers are identified to the CONVEX operating system by a mnemonic device code that is entered into a configuration file (*/ioconfig*) located on the SPU disk (refer to the *CONVEX Removable Disk System Installation Guide* for a sample */ioconfig* file). Once the software identification process is completed, the operating system will be able to use the system-disk storage modules. The device codes for RDS system storage modules and the ESDI controller are listed below:

- DKD-214—320-Mbyte RDS System disk drive
- DKD-284—780-Mbyte RDS System disk drive
- DKC-203—RDS V/ESDI disk controller

These codes, and other information, are entered into the */ioconfig* file that is contained on the SPU disk. The I/O configuration file contains entries, such as VMEbus I/O Processor (VIOP) number, VMEbus chassis number, controller type, CSR address, interrupt number, and peripheral device type and number. This file describes, in hierarchical fashion, the connections between the VIOP, VMEbus controller boards, and peripheral devices. The operating system uses this information for accessing a device; the operating system associates a given physical device number with a specific base-unit sleeve.

Whenever a DKC-203 controller is added or removed, the information in the hardware section of the configuration file (*/ioconfig*) must be changed, otherwise system operation problems will occur. The *CONVEX System Manager's Guide* should be consulted when making these changes. Also, the following section has an example of the */ioconfig* file.

### 3.3 Example */ioconfig* File

Figure 3-1 shows an example of a typical */ioconfig* file that includes entries for two RDS disks and two controllers:

Figure 3-1, Example */ioconfig* File

---

```

iop 7
  mbus 0
    ctrl DKC-001 csr 0x3f0 int 2
      unit 0 type DKD-005
    ctrl MTC-001 csr 0x0c0 int 4
      unit 0 type MTC-001
    ctrl ACM-001 csr 0x3c0 int 7
      unit 0 type TTY
      unit 1 type TTY
      unit 2 type TTY
      unit 3 type TTY
      unit 4 type TTY
viop 6
  vme 0
    ctrl DKC-203 csr 0x800 int 1
      unit 0 type DKD-214
    ctrl DKC-203 csr 0xa00 int 2
      unit 0 type DKD-214
    ctrl DKC-203 csr 0xc00 int 3
      unit 0 type DKD-284
    ctrl DKC-203 csr 0xe00 int 4
      unit 0 type DKD-214
  vme 1
    ctrl DKC-203 csr 0x800 int 1
      unit 0 type DKD-284
      unit 1 type DKD-284
    ctrl DKC-203 csr 0xa00 int 2
      unit 0 type DKD-284
      unit 1 type DKD-284

```

---

### 3.3.1 Storage Module Installation Guidelines

A storage module is normally installed in a specific base-unit sleeve. But, storage modules that contain non-striped file systems can be mounted in different sleeves if the operating system is notified of the change. The *mount* command is used to notify the operating system that a storage module has been moved to a new base-unit sleeve location. See the *CONVEX System Manager's Guide* and the "man pages" for more information on the *mount* command.

## 3.4 Disk Formatting

**CAUTION**

Reformatting RDS disk drives results in the loss of all data.

All RDS storage modules are formatted by CONVEX prior to shipment. However, if it becomes necessary to re-format a storage module, follow the information below:

### 3.4.1 System Disk-Storage Module

System-disk storage modules interfaced through the DKC-203 disk controller are formatted by diagnostic program *dev5190*. This is an offline program that must be executed on the SPU while the CPU is halted. Consult the *CONVEX PBUS I/O Diagnostics Manual* for a description of how to use *dev5190*.

### 3.4.2 SPU Disk-Storage Module

The SPU-disk storage module is formatted by diagnostic program *spu2000*. This is an offline program that must be executed on the SPU while CPU is halted. Consult the *CONVEX PBUS I/O Diagnostics Manual* for a description of how to use the disk formatter.

## 3.5 System Verification

This section provides reference information for the verification of all RDS storage modules and system disk-controllers.

### 3.5.1 System Disk-Storage Module Checkout

Operation of the system disk-storage module and the DKC-203 controller is verified by the *dev5190* diagnostic program. Consult the *CONVEX PBUS I/O Diagnostics Manual* for a description of how to use this program.

### 3.5.2 SPU Disk-Storage Module Checkout

Operation of the SPU disk-storage module is verified by the *spu2000* diagnostic program. Consult the *CONVEX PBUS I/O Diagnostics Manual* for a description of how to use this program.

# Appendix A

## Reporting Problems

### A.1 Overview

This appendix introduces the CONVEX Technical Assistance Center (TAC) and the *contact* utility. The *contact* utility is an online system for reporting problems to the TAC. To learn *contact* by using it, enter **contact** at the system prompt and then answer the questions as they appear on the screen. To find out more about using *contact*, read through this appendix. It describes prerequisites and tips for using *contact* and the step-by-step process *contact* takes you through.

### A.2 Technical Assistance Center

The CONVEX Technical Assistance Center (TAC) is staffed by technical specialists who can address the diverse questions and problems that arise in a supercomputing environment. If you have a hardware, software, or documentation problem, contact the TAC. This group stands ready to solve such problems.

### A.3 The *contact* Utility

The TAC recommends using the *contact* utility to report a hardware, software, or documentation problem. The *contact* utility is an interactive utility that helps the TAC track reports and route them to the the CONVEX personnel most qualified to fix them.

After invoking *contact*, it prompts for information about the problem. When you finish your report, *contact* electronically mails it to the TAC. You are notified within 48 hours that the TAC has received your report.

### A.4 Prerequisites

To use *contact* requires

- a UNIX-to-UNIX Communication Protocol (UUCP) connection to the TAC
- the full path name of the program or utility in question
- the version number of the program or utility in question

#### A.4.1 UUCP Connection

Before using *contact*, check with your system administrator to be sure there is a UUCP connection to the TAC. A UUCP connection allows files to be copied from one UNIX system to another. The *uucp* (UNIX-to-UNIX copy) command relies on either a dial-up or hard-wired UUCP communication line.

### A.4.2 Finding the Program Path Name

To determine the full path name of the program or utility in question, use the *which* command. The following screen illustrates using the *which* command to find the full path name of the loader (*ld*) utility:

```
>which ld
/bin/ld
>
```

In this example, the full path name of the loader is */bin/ld*.

For more information on the *which* command, refer to the *which(1)* man page. You can also use the *info* online information system. Enter **info which** at the system prompt. If you use the C shell (*csh*), you can also use the *whence* command to find the program path name. The *whence* command works like *which*, only faster.

### A.4.3 Finding the Program Version Number

To determine the version number of the program or utility in question, use the *vers* command. The following screen illustrates using the *vers* command (enter **vers**, then the path name of the program or utility) to find the version number of the loader (*ld*) utility.

```
>vers /bin/ld
/bin/ld: 7.0
>
```

In this example, the loader utility version number is 7.0.

For more information on the *vers* command, refer to the *vers(1)* man page. You can also use the *info* online information system. To do so, enter **info vers** at the system prompt.

## A.5 Tips on Using the *contact* Utility

The *contact* utility is interactive and easy to use. This section lists tips to help use it efficiently. In particular, this section tells how to

- use a *.contact* file
- abort a contact session
- resubmit an aborted report
- suspend a contact session
- move from one prompt to another
- use tilde-escape sequences in the *contact* utility

### A.5.1 Using a *.contact* File

When invoked, *contact* prompts for information regarding the problem. The first prompt is for your name, title, phone number, and company name. You can, however, create a *.contact* file to skip this first prompt. Follow these steps:

1. Create a *.contact* file in your home directory.
2. Enter your name, job title, phone number, and company name, each on a new line.

When you invoke *contact*, it automatically includes the *.contact* file as input for the first prompt and proceeds to the next prompt.

### A.5.2 Aborting the Report

To abort a contact report, either enter the interrupt key (usually **CTRL-C**) or choose the abort option when prompted by the *contact* utility. Using **CTRL-C** to abort does not save the contents of the report. Using the abort option saves the contents of the report in a file named *dead.report* in your home directory.

### A.5.3 Submitting the *dead.report* File

When aborting a contact session, the *contact* utility saves the report in a file named *dead.report* in your home directory. Using the *contact* command with the *-r* option automatically merges the contents of the *dead.report* file into the new contact session. Enter

```
contact -r
```

and *contact* finds the *dead.report* file in your home directory and merges it into the contact report. You can then edit the report. When you end the editing session, *contact* returns to the final prompt, which asks you to review, edit, submit, or abort the report.

### A.5.4 Suspending a Report

Sometimes it is necessary to stop in the middle of a contact report and return to the shell (for instance, to suspend the contact session to find the program path name or version number). To suspend the contact session, press **CTRL-Z**. To return to the contact session, enter *fg*. Using **CTRL-Z** and the *fg* (foreground) command lets you switch back and forth between the *contact* utility and the shell. You cannot, however, use **CTRL-Z** and *fg* to switch back and forth if you are using a Bourne shell (*sh*).

### A.5.5 Ending a Response

The *contact* utility prompts for information pertinent to your hardware, software, or documentation question. Some prompts require one-line responses; to move to the next prompt, press **RETURN**. Other prompts require more than a one-line response; to move to the next prompt, press **CTRL-D**.

### A.5.6 Tilde-Escape Sequences

The *contact* utility treats input beginning with a tilde (~) as a special sequence. The character following the tilde is considered a request for a special function. The following tilde sequences are recognized by *contact*:

~e	Start the text editor (defined in your EDITOR environment variable).
~h	Display a list of available tilde-escape sequences.
~p	Print the contact report to the terminal screen.
~r <i>filename</i>	Read the contents of <i>filename</i> as a response to the current prompt. Some prompts require only a one-line response. This tilde-escape sequence only works for prompts that allow more than one-line response.
~~	Insert a single tilde as the first character in the line.

## A.6 Using the *contact* Utility

The *contact* utility prompts for the following information:

- your name, title, phone number, and corporate name
- the name and version of the product involved
- a one-line summary of the problem
- a detailed description of the problem
- the priority of the problem
- instructions on how to reproduce the problem
- comments about the problem
- comments about the documentation supporting the problem
- files to include in the contact report

The following is a step-by-step discussion of these prompts:

- 1a. To invoke the *contact* utility, enter **contact** at the system prompt. The system responds with a welcome message and a series of questions regarding your hardware, software, or documentation question. The following screen illustrates the *contact* command and the system response:

```

>contact
Welcome to contact version 0.11 ()

Enter your name, title, phone number, and corporate name (^D to terminate)
>
```

- 1b. If there is a *.contact* file in your home directory, *contact* skips the first prompt. The following screen illustrates the *contact* command and the system response when a *.contact* file is in your home directory:

```

>contact
Welcome to contact version 0.11 ()

Enter the name of the product involved
>

```

2. The *contact* utility prompts for the version number of the product. If you do not know the version number, use `CTRL-Z` to suspend the session. Use the *which* (or *whence* if using *csh*) and *vers* commands to find the version number of the product. Use the *fg* command to return to the session and enter the version number in the form *X.X* or *X.X.X.X*.
3. The *contact* utility prompts for a one-line summary of the problem. This summary is the subject header in any further correspondence regarding the problem. Make this summary as descriptive as possible in one line.
4. The *contact* utility prompts for a detailed description of the problem. Make this description as complete as possible. Include source code and a stack backtrace whenever possible. (Refer to the *adb(1)* or *csd(1)* man page for information on obtaining a stack backtrace.) The more information provided, the quicker the TAC can isolate and solve the problem.
5. The *contact* utility prompts for the priority of the problem. The following screen illustrates this prompt and the priority levels from which to choose; you must enter a priority number.

```

Enter a problem priority, based on the following:
1) Critical    - work cannot proceed until the problem is resolved.
2) Serious     - work can proceed around the problem, with difficulty.
3) Necessary   - problem has to be fixed.
4) Annoying    - problem is bothersome.
5) Enhancement - requested enhancement.
6) Informative - for informational purposes only.
>

```

6. The *contact* utility prompts for an explanation of how to reproduce the problem. Include the command syntax and options you used and anything else you did to make your program run.
7. The *contact* utility prompts for any other pertinent comments. Include any relevant information.
8. The *contact* utility prompts for suggestions regarding the documentation supporting the product. Indicate if the documentation could be revised to address the question.
9. The *contact* utility asks for the names of files necessary to reproduce the problem. The following screen illustrates the *contact* prompt and sample user response:

```

Are there any files that should be included in this report (yes | no)?
>yes
Please enter the names of the files, one to a line (^D to terminate)
>test.f
>~/subroutines/sub.f
>

```

**NOTE**

Tilde-escape sequences are not recognized in responses to this prompt. Instead, *contact* treats a tilde in this section to mean your home directory. This convention is based on use of the tilde for expanding file names in *cs*.

If the files specified are small text files, they are automatically included in the contact report. If the files are too big to be included in this report, *contact* gives further instructions on how to submit these files.

To specify a directory, combine the directory files into a single file using the *tar* command (refer to the *tar(1)* man page for further information) or enter each file name in the directory on a single line in the contact report.

10. The *contact* utility prompts you to review, edit, submit, or abort the contact report. The following screen illustrates this prompt:

```
Please select one of the following options:
1) Review the problem report.
2) Edit the problem report.
3) Submit the problem report.
4) Abort the problem report.
>
```

Choose the number of the option you want to select. These options let you do the following:

- |        |  |
|--------|--|
| Review | Review the text of your contact report. You are then prompted again to select an option.   |
| Edit   | Edit the text of the contact report. If you choose to edit the report, <i>contact</i> puts you in your default text editor.  |
| Submit | Send the report to the CONVEX TAC. You are notified within 48 hours that the TAC has received the report. This option exits the <i>contact</i> utility and returns you to the shell environment. |
| Abort  | Save the text of your report in a file named <i>dead.report</i> in your home directory. This option exits the <i>contact</i> utility and returns you to the shell environment.                   |

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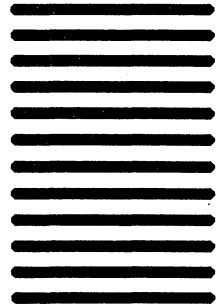
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