CONVEX Removable Disk System Operation Guide

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CONVEX Computer Corporation
Richardson, Texas USA

CONVEX Removable Disk System
Operation Guide
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Revision Sheet

CONVEX Removable Disk System
Operation Guide

Edition	Document No.	Date	Description
Second	081-000330-201	February 1990	Added information on DKD-284 780-Mbyte disk drive.
First	081-000330-200	April 1988	First release.

FCC NOTICE

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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 provides operating instructions on the Removable Disk System (RDS) and is intended for the use of CONVEX customers and field engineers.

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 *io5130.*
- The operation of the DKC-203 controller is verified by using diagnostic program *io5130.*
- The SPU disk is formatted by the using diagnostic program *spu2000.*

Organization

- **Chapter 1. Introduction and Specifications**—Overview of the major components that make up the CONVEX Removable Disk System (RDS). This chapter contains descriptions, specifications, and CONVEX product numbers for major RDS components.
- **Chapter 2. Operations**—Describes controls and indicators, and identifies major components of the RDS. Provides operational procedures for using the RDS, such as installing storage modules, removing and storing storage modules, software configuration, and disk formatting.
- **Chapter 3. User Maintenance Procedures**—Describes user-allowed maintenance procedures for the RDS.
- **Appendix A. Reporting Problems**—Contains instructions on using the CONVEX *contact* utility program. This utility program is for reporting minor hardware or software 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 System Manager's Guide,* Order No. DSW-004
- *CONVEX Removable Disk System Maintenance Guide,* Order No. DHW-041
- Appropriate vendor disk drive documentation

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Chapter 1
Introduction and Specifications

1.1 Overview

This chapter is an overview of the major components that make up the CONVEX Removable Disk System (RDS). This chapter contains descriptions and specifications of the RDS and its major components. This information is presented in the following sequence:

- RDS Overview
- Base Unit
- Storage Modules
- Disk Controllers
- VMEbus Chassis
- RDS Specifications
- Base Unit Physical Specifications
- Storage Module Physical Specifications
- RDS Product Numbers

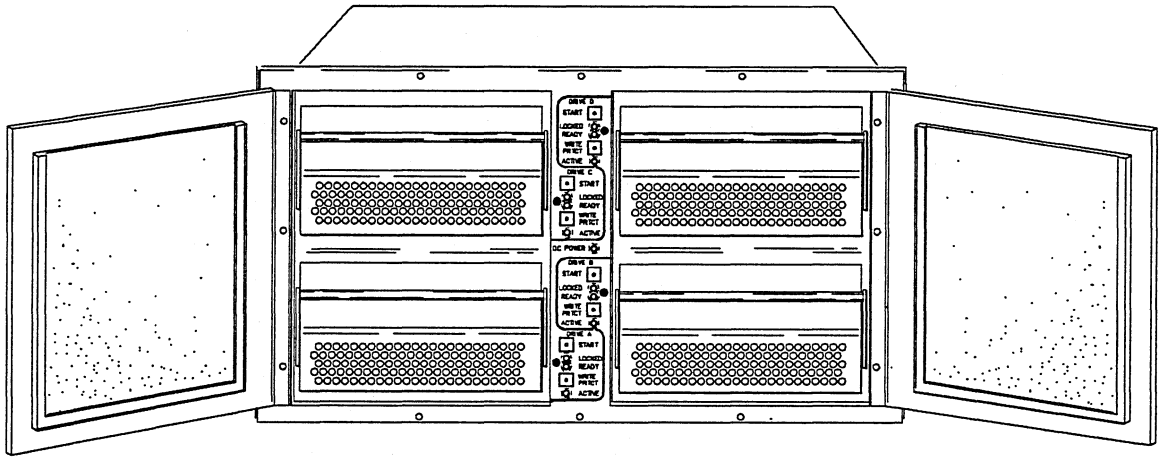
1.2 RDS Overview

The RDS is a CONVEX-designed disk storage system that consists of a base unit and four removable storage modules (see the following figure). Each storage module contains a shock mounted 5.25-inch Winchester disk drive. These storage modules plug into sleeves in the base unit; the sleeves contain cable connections for an RDS disk controller. The base unit provides cooling, DC power, and operational controls for each storage module.

The Removable Disk System is designed for secure applications or wherever removable, high-density media is a requirement. As a result of its high-density, 5.25-inch media, the RDS is a lightweight disk system that provides much higher storage densities for a given footprint than other removable disk systems.

The Removable Disk System consists of a base unit, storage modules, disk controller, and connecting cables. Figure 1–1 shows the RDS base unit and storage modules:

Figure 1–1, Front View of RDS Base Unit and Storage Modules



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1.3 Base Unit

The base unit is a 10.5-inch high, 19-inch wide rack-mountable chassis that can accept up to four storage modules. There are two types of base units available, the RDS-001 and RDS-002. The RDS-001 contains a single Service Processor Unit (SPU)-disk storage module and up to three system-disk storage modules. The RDS-002 contains only system-disk storage modules, and up to four may be installed.

A single base unit power supply provides power to all storage modules and RDS circuits. Switches and indicators, used to control the operation of storage modules, are built into a center panel on the front of the base unit. A forced air convection cooling system cools the base unit and storage modules. Air enters through the front of the base unit and is exhausted at the left rear.

1.4 Storage Modules

Each RDS storage module contains a 5.25-inch Winchester disk drive enclosed in a CONVEX-designed protective housing (see the following figure). A storage module plugs into one of the four module sleeves in the front of the base unit. Low-insertion force, floating connectors, with gold-plated contacts, ensure high reliability and extended service life for the storage modules and base unit.

A two-position handle is attached to the front of each storage module and is used to insert or remove the storage module, or to carry it. The handle is designed to control the final segment of travel during module insertion. This ensures that the storage module and sleeve connectors are properly seated.

When the module is installed in the base unit, and power is applied, the handle is secured in the "run" position by an electromechanical interlock. The interlock prevents inadvertent removal of a storage module while the disk platters are spinning. When power is removed, a time delay prevents the electromechanical interlock from releasing until the platters have stopped.

System-disk storage modules are interfaced to a CONVEX computer through an Enhanced Small Device Interface (ESDI) disk controller. The SPU-disk storage module is interfaced directly to the CONVEX SPUs Small Computer System Interface (SCSI) bus.

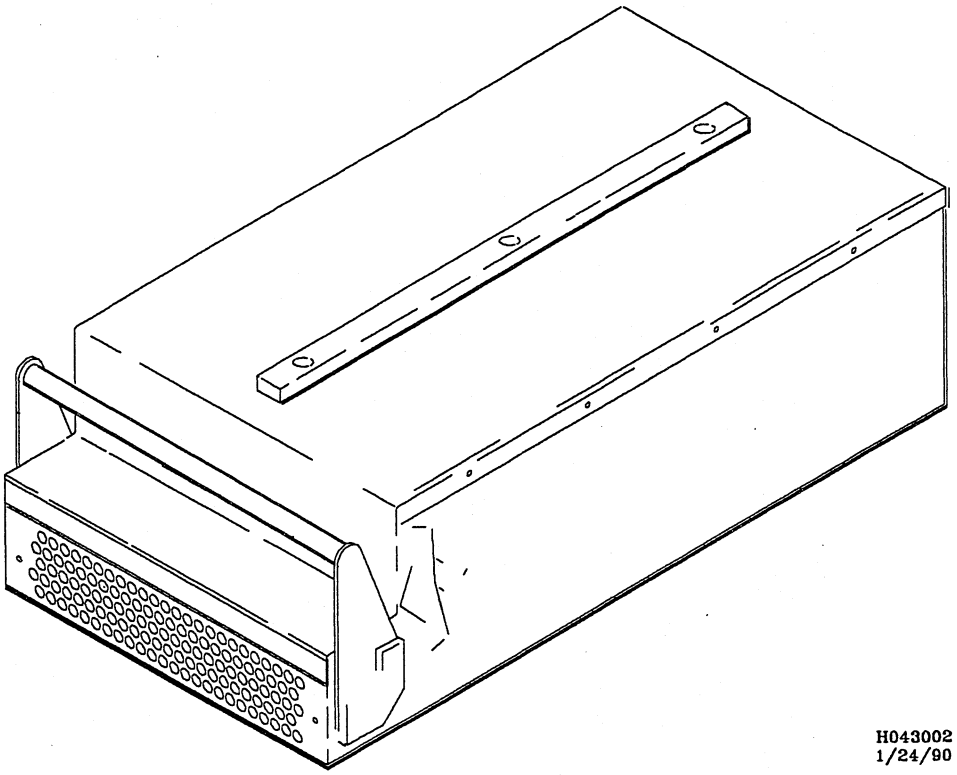
The lower left hand sleeve position (**A**) on an RDS-001 base unit is keyed for a SPU-disk storage module. All other sleeve positions on the RDS-001 and RDS-002 are keyed for system-disk storage modules. The SPU and system-disk storage modules are keyed for the corresponding type of sleeve.

A system-disk storage module can be installed in any system-disk storage module sleeve positions, but the SPU-disk storage module can only be installed in position **A** of an RDS-001.

The base unit and storage modules have brackets for identification cards. Identification cards can be installed in the brackets to assist in matching a storage module with its appropriate base-unit sleeve.

All storage modules have identical external dimensions and are designed to be stacked in confined spaces, such as Mosler data safes or file drawers.

Figure 1–2, RDS Storage Module



1.5 Disk Controllers

The RDS system-disk storage modules are interfaced to a CONVEX computer via a DKC-203 VMEbus disk controller. A maximum of two system-disk storage modules can be connected to each controller.

The SPU-disk storage module contains a SCSI disk that has a built-in SCSI controller; therefore, no external controller is required. The SPU-disk storage module is connected directly to the SPUs SCSI bus.

1.6 VMEbus Chassis

VMEbus controllers contained in the VMEbus chassis are connected to a CONVEX computer through a VMEbus Control Unit (VBCU) and a VMEbus Input/Output Processor (VIOP). The VIOP controls data transfers between a CONVEX computer's main memory and the VBCU. The VBCU controls data transfers between the VIOP and all VMEbus controllers in its chassis.

Three types of VMEbus chassis are available: single, dual, and VMEbus/MBUS Combo. The single VMEbus chassis contains a single 9-slot VMEbus backplane and VBCU. The single chassis can contain up to seven controllers. The dual chassis contains two (5-slot) VMEbus backplanes

and two VBCUs. The dual chassis can contain eight DKC-203 controllers; four controllers may be installed in each of the VMEbus backplanes. The VMEbus/MBUS Combo chassis contains a 6-slot VMEbus backplane and a 5-slot Multibus backplane. The VMEbus can contain five VMEbus controllers, and the MBUS backplane can contain four MBUS controllers.

A VMEbus chassis is normally installed in a CONVEX expansion cabinet and contains its own power supply and cooling fan.

1.7 RDS Specifications

This section lists the physical and operational specifications for the RDS. Tables 1–1 and 1/(en2 list the operational and electromechanical specifications for the base unit, storage modules, and disk controllers:

Table 1–1, RDS Operational Specifications

Parameter	Recommended Operating Range	Rate of Change
Temperature	59 ° F to 90 ° F (15 ° C to 32 ° C)	18 ° F/hour (10 ° C/hour)
Humidity	40% to 60%, with no condensation	2% per hour
Altitude	9842.5 ft or lower (3000 m or lower)	NA

Table 1–2, RDS Electromechanical Specifications

Parameter	Device	Value
Power dissipation	Storage module Base unit	40.0 W (typical) 58.0 W (*approx*)
AC voltage	Base unit	U.S. voltage: 90 V to 132 V International voltage: 180 V to 264 V
Input frequency	Base unit	47 Hz to 63 Hz
Shock **Operating** **Nonoperating**	Storage module	 2 g or less 10 msec (½ sinusoidal) 20 g for 10 msec (½ sinusoidal)

1.8 Base Unit Physical Specifications

Table 1–3 lists the physical specifications for the RDS base unit:

Table 1–3, Base Unit, Physical Specifications

Parameter	Value
Width	17 in (43.18 cm)
Height	10.5 in (26.67 cm)
Length	24.75 in (62.86 cm)
Weight (with storage modules)	132 lbs (59.9 kg)
Weight (without storage modules)	76 lbs (34.4 kg)

1.9 Storage Module Physical Specifications

Table 1–4 lists the physical specifications for the storage modules:

Table 1–4, Storage Module, Physical Specifications

Parameter	Value
Width	6.94 in (17.63 cm)
Height	4.25 in (10.8 cm)
Length	12.25 in (31.1 cm) with handle in *run* position 14 in (35.6 cm) with handle in *carry* position
Weight	14 lbs (6.4 kg) (*approx*)

Table 1–5 lists the recommended specifications for storing storage modules:

Table 1–5, Storage Module, Storage Specifications

Parameter	Range	Rate of Change
Temperature	-40 ° F to 140 ° F (-40 ° C to 60 ° C)	18 ° F/hour (10 ° C/hour)
Humidity	8% to 80%, with no condensation	NA
Altitude	40,000 ft or less (12,192 m)	NA

1.10 RDS Product Numbers

Table 1–6 lists CONVEX RDS product numbers and descriptions:

Table 1–6, 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 VME 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

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Chapter 2
Operations

2.1 Overview

This chapter identifies major RDS components, controls and indicators. Operational procedures for the storage modules also are presented. Information contained in this chapter includes:

- Major Components, Controls, and Indicators
- Storage Module Safety Precautions
- RDS Hardware Configurations
- Software Considerations
- Storage Module Insertion
- Storage Module Removal
- Disk Formatting

2.2 Major Components, Controls, and Indicators

Figure 2–1 shows all the major RDS components:

Figure 2–1, Major RDS Components

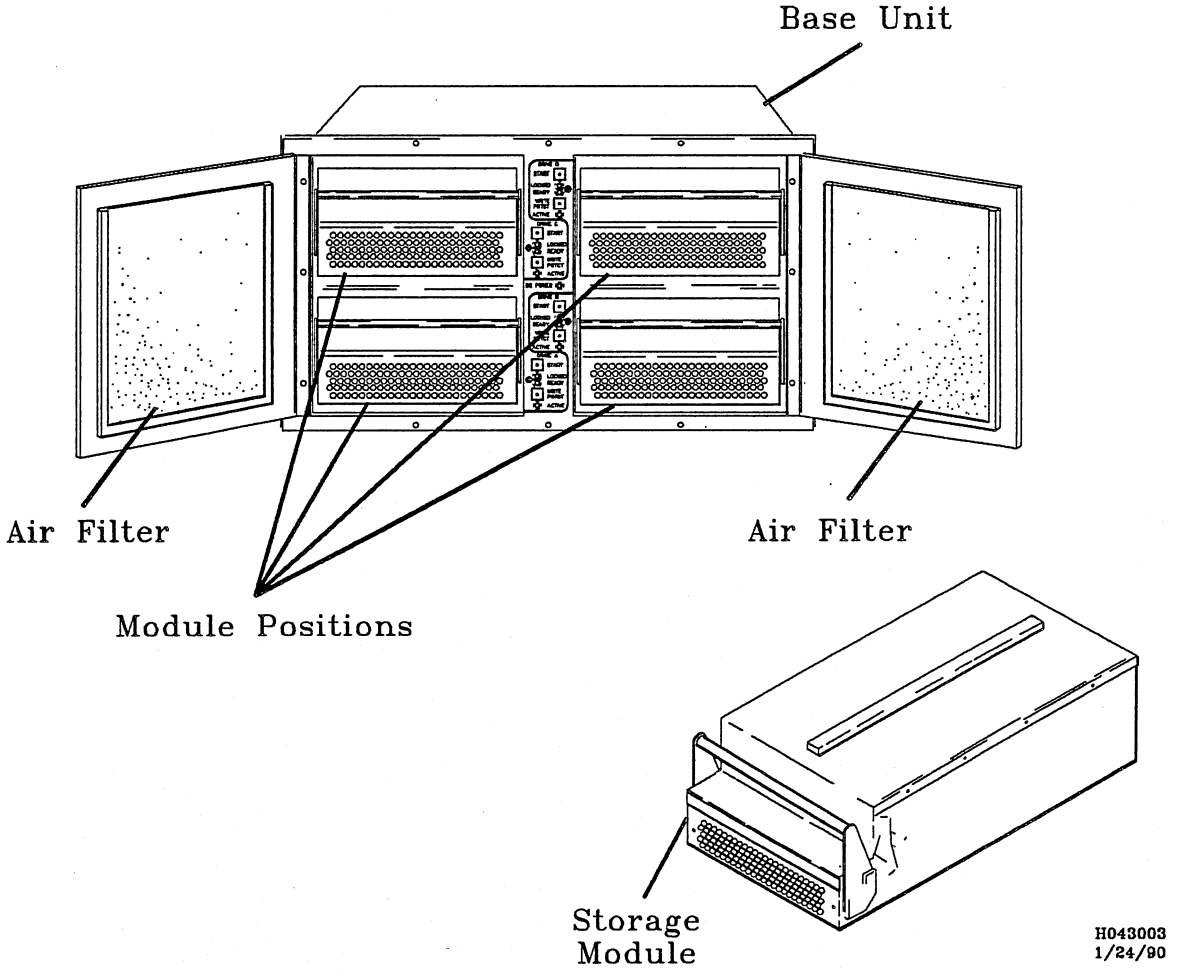

Figure shows various RDS items that are used later on in the RDS operation sections:

Figure 2–2, Base Unit, Front and Rear View

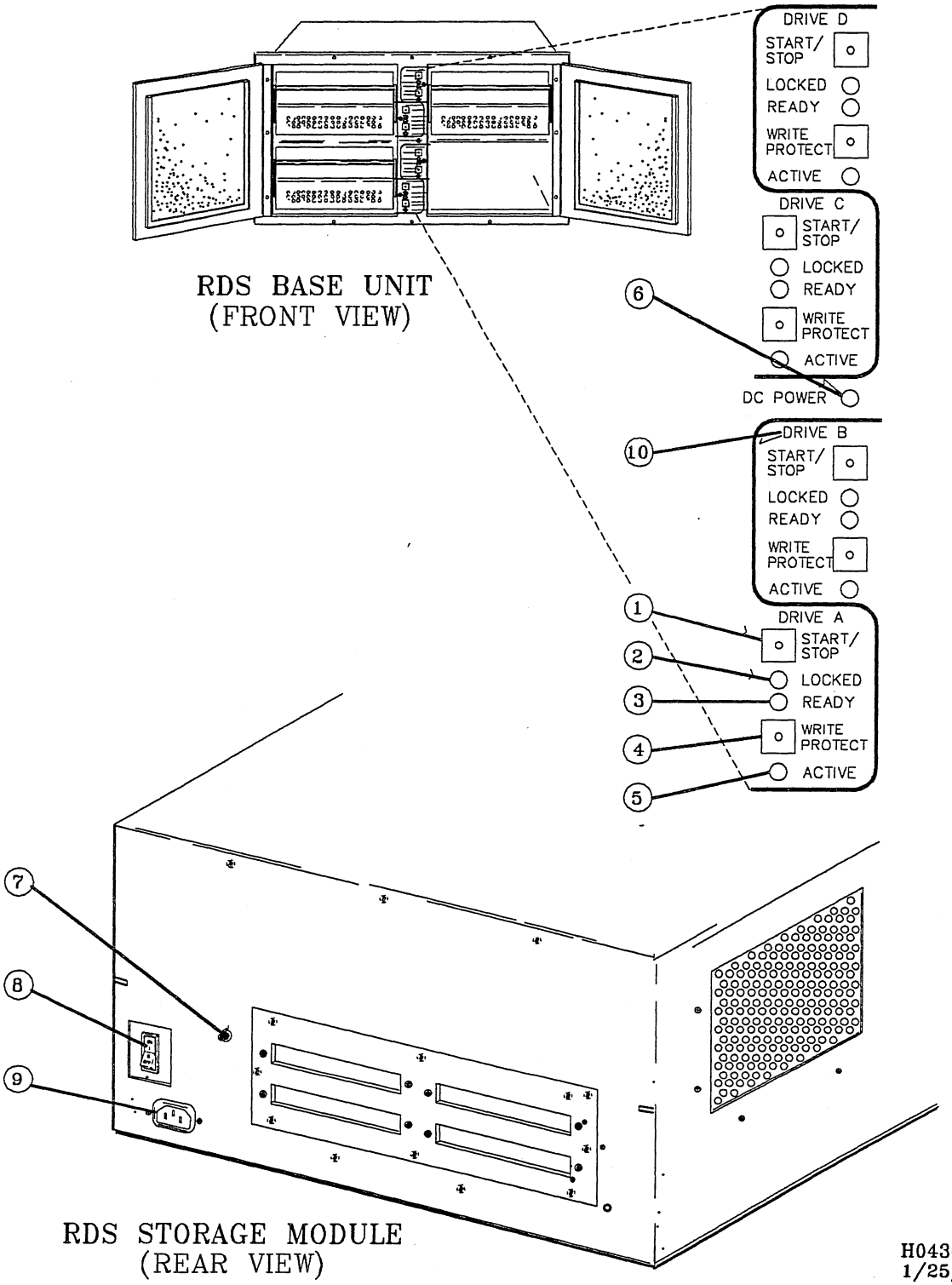

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Table lists various RDS items that are used later on in the RDS operation sections:

Table 2–1, RDS Controls, Indicators, Connectors, and Labels

No.	Item	Description	Purpose
1	**START/STOP**	2-position switch and indicator	Start stop control and status **START/STOP** switch in = Start drive Indicator illuminated = Drive running **START/STOP** switch out = Stop drive Indicator flashing = Spin down drive sequence in progress Indicator extinguished = Drive not running
2	**LOCKED**	Indicator	Status of storage module handle **LOCKED** indicator illuminated = Storage module locked in base unit sleeve **LOCKED** indicator extinguished = Safe to remove storage module from sleeve **LOCKED** indicator flashing = Lock solenoid failed to engage or disengage
3	**READY**	Indicator	Storage module operational status **READY** indicator illuminated = Drive ready for use **READY** indicator extinguished = Drive not ready for use
4	**WRITE PROTECT**	2-position switch and indicator	Write protect control and status **WRITE PROTECT** switch in = Disk write operations disabled **WRITE PROTECT** indicator illuminated = Disk write operations disabled **WRITE PROTECT** switch out = Disk write operations enabled **WRITE PROTECT** indicator extinguished = Disk write operations enabled
5	**ACTIVE**	Indicator	Data transfer activity **ACTIVE** indicator illuminated = Data transfer is occurring **ACTIVE** indicator extinguished = No data is being transferred
6	**DC POWER**	Indicator	Base unit DC power status **DC POWER** indicator illuminated = Base unit DC power is available **DC POWER** indicator extinguished = Base unit DC power is unavailable
7	**Circuit breaker**	2-position switch	Main AC power control and protection Circuit breaker **ON** = AC power applied to RDS power supply Circuit breaker **OFF** = AC power removed from RDS power supply
8	**Circuit breaker**	2-position switch	Low airflow protection Circuit breaker in = Normal airflow condition (DC power to base unit is enabled) Circuit breaker out = Low airflow fault condition (DC power to base disabled)
9	**Power connector**	Main AC input	AC power connector for base units
10	**DRIVE B**	Sleeve label	Sleeve label for drive **B**

2.3 Storage Module Safety Precautions

The disk drives contained in the storage modules can be damaged by improper handling, operational practices, or storage conditions. Therefore, it is important that the proper precautions be observed at all times.

2.3.1 Handling

The read-write heads rest on the disk surface when the storage module is powered down. Because the disk platters are mounted in a horizontal plane, surface or head damage is more likely to occur if the storage module is dropped or bumped in its normal operating position. To prevent damage use the following precautions:

- Do not subject the storage module to sudden accelerations or de-accelerations.
- Do not drop or bump the storage module against a solid object.
- Exercise care when placing the storage module on a flat surface, such as a table or storage shelf.
- Do not carry the storage module by the handle for long distances and never swing the storage module by its handle. When the storage module must be carried, use both hands, one hand on each end.
- If the storage module must be moved over a long distance, place it in a shock-resistant device. The storage module shipping container and packing material can be used.

2.3.2 Operational Practices

Exceeding the recommended operating temperature range or rate of temperature change will lead to component failure and the possible loss of data. The following must be observed at all times:

- The computer room must be maintained within the recommended temperature range.
- Do not operate the base unit or storage modules without proper cooling airflow. Do not operate the RDS base unit with any panel or cover removed.
- Do not block the airflow through the RDS base unit, and keep the base unit air filters clean at all times.

CAUTIONS

The maximum operating temperature of the RDS system is 140 °F (60 °C). Failure to operate the RDS system within its recommended temperature range may cause damage to equipment and loss of data.

- Never subject the storage module to a temperature change of more than 18 °F (10 °C) per hour. Exceeding this may cause condensation to occur inside of the disk drive.

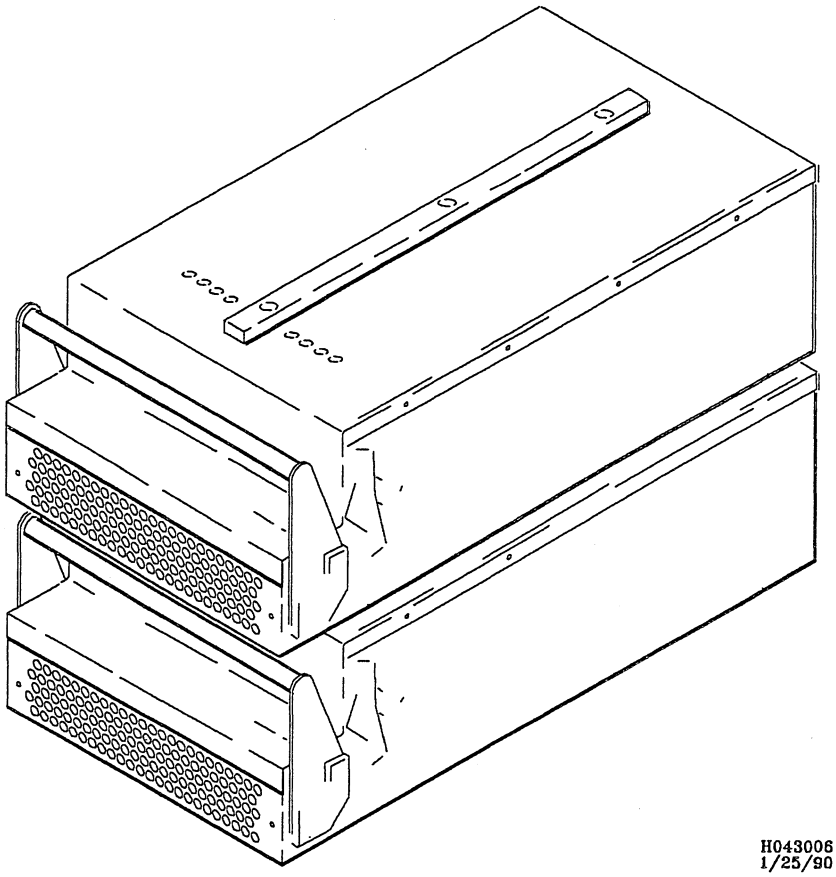
- Allow sufficient time for the storage module to adjust to the ambient room temperature before installing it. Do not exceed the 18 °F (10 °C) per hour rate of temperature change.
- If the storage module is moved from one computer room to another, ensure that the temperature changes en route do not exceed the specified rate of temperature change. When temperature extremes exist, and the storage module must be used immediately, the storage module should be moved in a temperature-controlled shipping container.

> **CAUTION**
>
> Do not power up the RDS system with condensation inside the disk drive. Failure to do so may cause damage to equipment and loss of data.

2.3.3 Storage Conditions

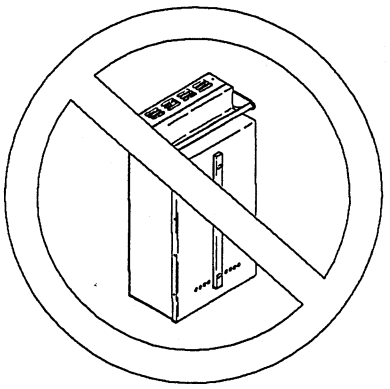
- Do not stack the modules higher than two modules per stack. Stacking the RDS modules higher than two units increases the possibility of shock damage. See the following figure:

Figure 2–3, Stacking Storage Modules



- Ensure that the ambient temperature in storage area is the same as the computer room ambient temperature.
- Do not stand the storage module on its end as shown in the following figure, because it can be more easily knocked over:

Figure 2–4, Handling Storage Modules



2.4 RDS Hardware Configurations

Each RDS base unit can contain up to four storage modules. These are designated **A**, **B**, **C**, and **D** (see Figure 2–1, Major RDS Components, and Figure 2–2, Base Unit, Front and Rear View). Typically, the first base unit to be configured in a system contains one SPU storage module and up to three system-disk storage modules. In this type of base unit, sleeve **A** is always configured as the sleeve for the SPU-disk storage module (see Figure 2–2, Base Unit, Front and Rear View). Sleeves **B**, **C**, and **D** are configured for system-disk storage modules. Additional base units installed on a system are configured for system-disk storage modules in all sleeve positions.

The CONVEX VMEbus/ESDI disk controller, DKC-203, will support two system-disk storage modules. However, maximum performance is obtained by using a single controller per storage module.

2.5 Software Considerations

The RDS storage modules and related hardware must be integrated into the C1 operating system before it can be used. How it is integrated depends on the type of performance or features required.

2.5.1 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.

2.5.2 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 *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 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, refer to the *Removable Disk System Installation Guide* for a sample */ioconfig* file.

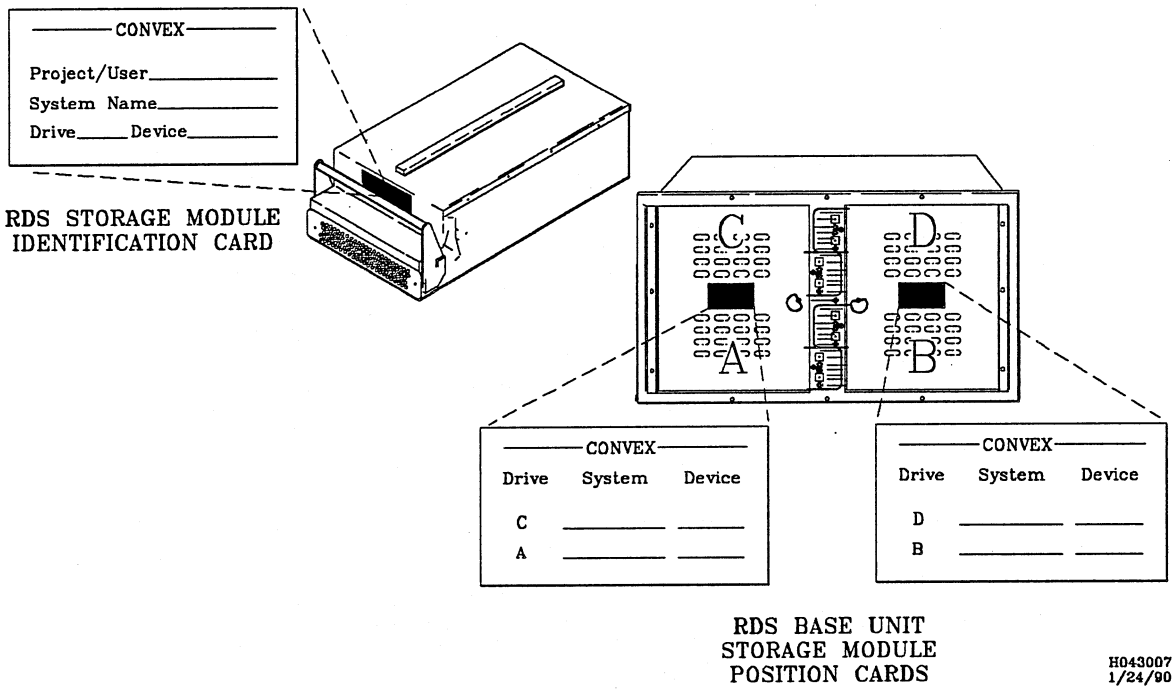
2.5.3 Storage Module Installation Guidelines

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 new base-unit sleeve location. Refer to the *CONVEX System Manager's Guide* and the "man pages" for more information on the *mount* command.

A striped-disk storage module must be used in the same base unit sleeve, because the operating system uses the sleeve address for accessing the data.

Identification cards, contained in brackets on the base unit and disk storage modules, are used to identify where a storage module should be installed. The storage module identification card defines the base unit number, and base-unit sleeve position. Each base unit has two identification cards that list the storage module number for each base-unit sleeve position. Figure 2–5 shows the locations of the base-unit and storage-module identification cards.

Figure 2–5, Module and Base Unit Identification Cards



2.6 Storage Module Insertion

CAUTION

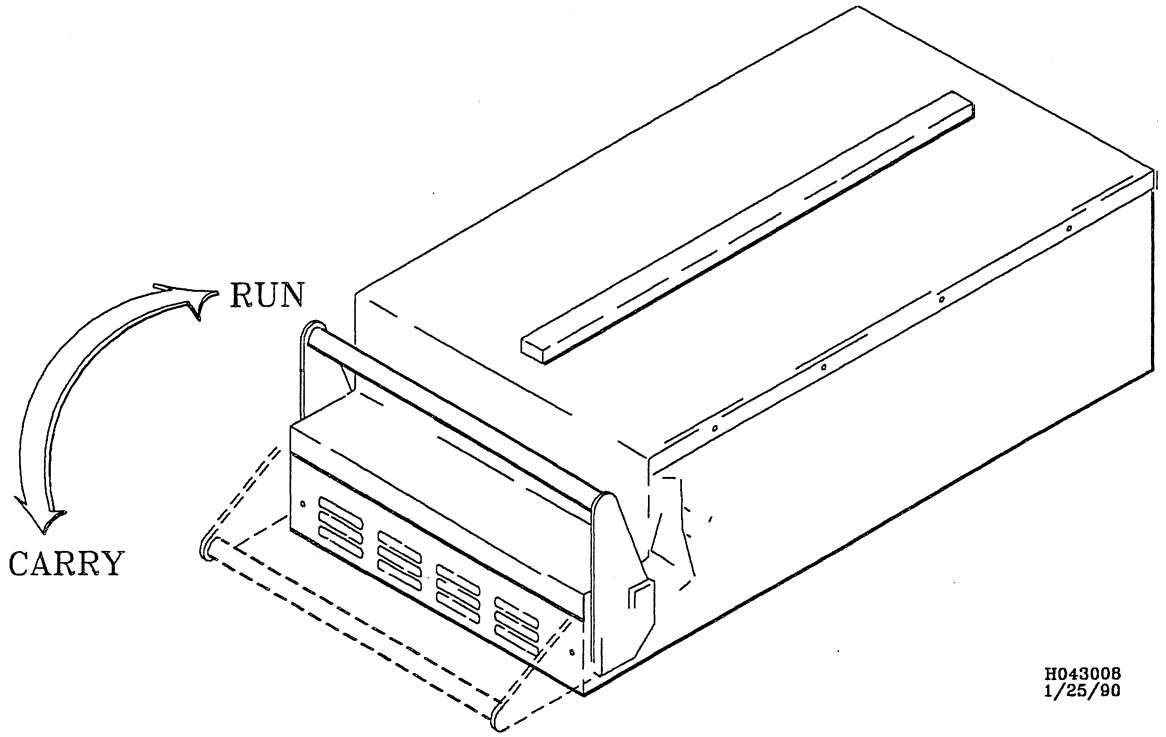
Do not subject the storage module to excessive g forces by dropping, bumping, or rough handling. Failure to handle with care may result in damage to the disk drives and loss of data.

Ensure that the module's position identification card matches the base unit position identification card before installing drive. Failure to do so may cause loss of data.

The following procedure must be used when inserting storage modules:

1. Ensure that the module's handle is in the "carry" position as shown in Figure 2–6:

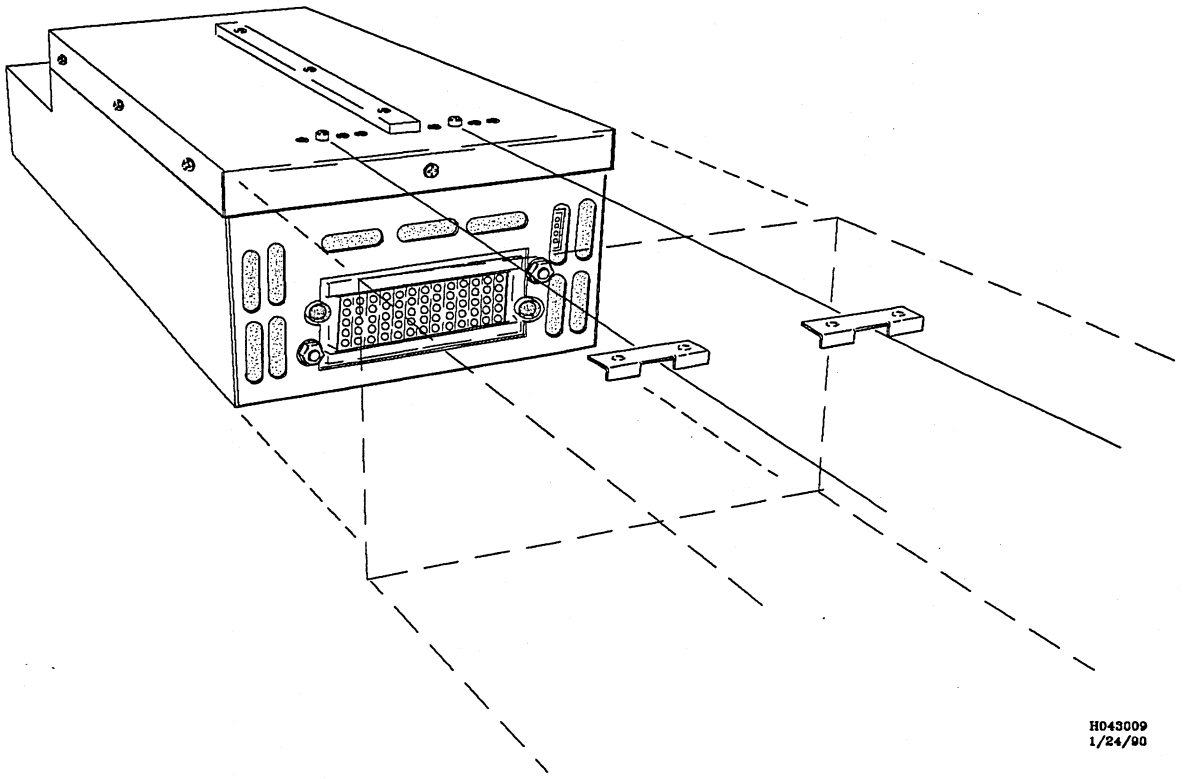
Figure 2–6, Storage Module Handle



2. Inspect the storage module and base unit sleeve identification cards and ensure that they match.

3. Inspect the sleeve and storage module key configuration and ensure that they match. Figure 2–7 shows the sleeve key configuration:

Figure 2–7, Sleeve Key Configurations



4. Grasp the storage module by the handle with one hand, and support the bottom of the storage module with the other hand.
5. Slide the storage module into the base unit sleeve until the locking pins on the side of the sleeve are in contact with the handle mechanism.
6. Move the storage module handle upward to the "run" position as shown in Figure 2–6, Storage Module Handle:
7. Depress the appropriate **START/STOP** switch on the base unit center control panel (See Figure 2–2, Base Unit, Front and Rear View). Power is applied to the module's interlock solenoid. The solenoid will engage the storage module handle and prevent inadvertent removal of the storage module. As soon as the interlock solenoid engages the handle, the **LOCKED** indicator will be illuminated, and DC power will be applied to the storage module. The drive will spin up in approximately 20 seconds.

> **NOTE**
>
> Refer to the maintenance procedures contained in Chapter 3, "User Maintenance Procedures," section 3.4, "**LOCKED** Indicator Flashing," if **LOCKED** indicator fail to be illuminated or if the **LOCKED** indicator flashes.

2.7 Storage Module Removal

> **CAUTION**
>
> Do not subject the storage module to excessive g forces by dropping, bumping, or rough handling. Failure to handle with care may result in damage to the disk drives and loss of data.

Use the following procedure when removing storage modules. Refer to the maintenance procedures contained in Chapter 3 if conditions are other than what are described below.

1. Ensure that the **ACTIVE** indicator is extinguished for the drive to be removed.
2. Depress and release **START/STOP** switch (see Figure 2–1, Major RDS Components). This will remove DC power from the storage module. The drive **READY** indicator will be extinguished, the **START/STOP** indicator will flash, and the disk platters will spin down. Approximately 40 seconds later, the interlock solenoid will disengage and the **LOCKED** indicator will be extinguished. The storage module may then be removed.

> **CAUTION**
>
> Never stand a storage module on its end. This places the module in an unstable position from which it can be easily knocked over. Failure to do so may cause damage to equipment and loss of data.

3. Grasp the storage module handle with one hand and move the handle to the "carry" position.
4. Pull storage module from the base unit sleeve; support the bottom of the storage module with the other hand as it clears the sleeve.

2.8 Disk Formatting

All RDS storage modules are formatted by CONVEX prior to shipment. However, if it becomes necessary to reformat a storage module, consult the *CONVEX PBUS I/O System Diagnostics Manual.*

2.8.1 System Disk

System-disk storage modules interfaced through the DKC-203 disk controller are formatted by diagnostic program *io5130.* This is an offline program that must be executed on the SPU while the CPU is halted. Consult the *CONVEX PBUS I/O System Diagnostics Manual* for details.

2.8.2 SPU Disk

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 System Diagnostics Manual* for details.

Chapter 3
User Maintenance Procedures

3.1 Overview

This chapter presents basic fault isolation as well as user and operator maintenance procedures for the RDS.

Detailed maintenance procedures are contained in the *Removable Disk System Maintenance Manual.*

3.2 Technical Assistance

CONVEX offers two sources of help if problems arise:

3.2.1 CONVEX Technical Assistance Center

Contact the CONVEX Technical Assistance Center (TAC) for real time support on urgent hardware and software problems. The TAC can be reached in the continental U.S. by dialing 1(800)952-0379, in Alaska, Hawaii, and Canada by dialing 1(214)497-4379, or from all other locations by contacting the nearest CONVEX office.

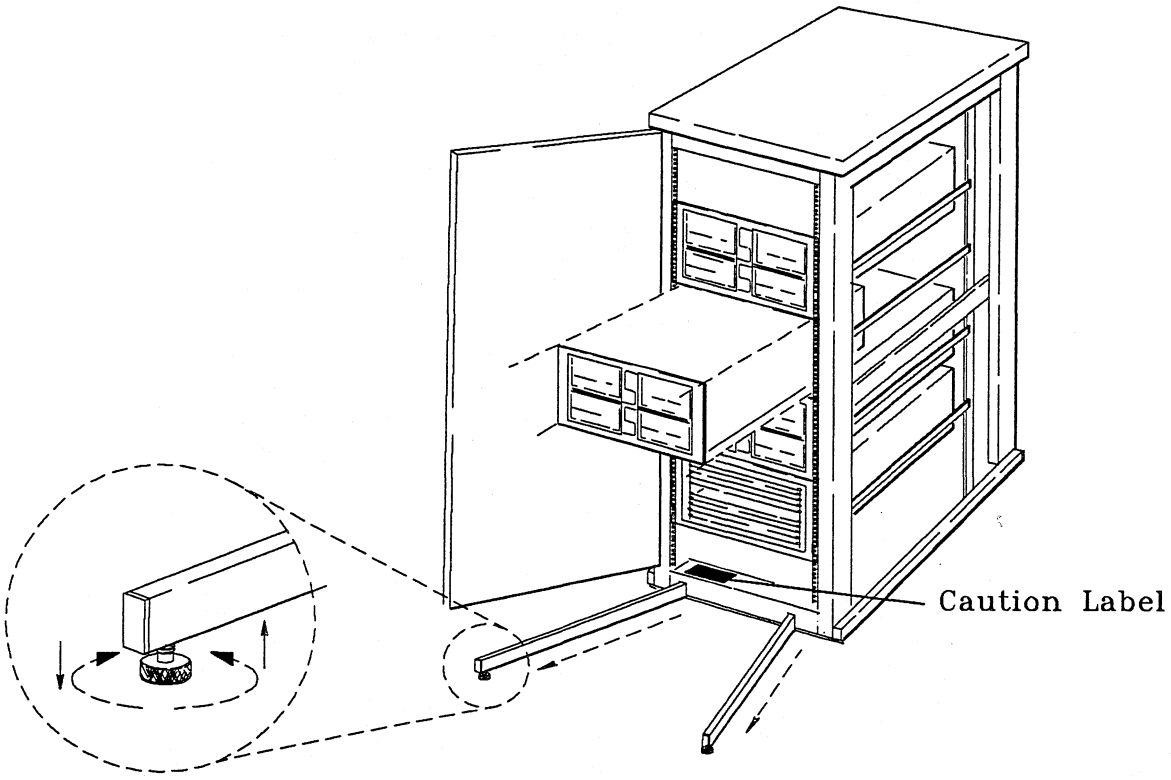
3.2.2 CONVEX *contact* Utility

Use the CONVEX *contact* utility for reporting minor hardware and software problems. Refer to Appendix A for an example of the CONVEX *contact* utility.

3.3 Safety Considerations

Extend the expansion cabinet stabilizer bars before extending the RDS for servicing. Injury to personnel or damage to equipment may occur if the cabinet tips over.

Figure 3–1, Expansion Cabinet Stabilizer Bars and Caution Labels



CAUTION LABEL

ENGLISH/FRENCH

CAUTION	ATTENTION
TO REDUCE RISK OF POSSIBLE INJURY DUE TO UNSTABLE UNIT, ACTUATE STABILIZER BEFORE ANY PERIPHERAL IS EXTENDED. 1. TO ACTUATE STABILIZER, FULLY EXTEND ANTITILT CHANNELS AND LOWER CHANNEL SUPPORT FEET FIRMLY TO THE FLOOR. 2. INSURE THAT LOCKING MECHANISMS ARE INSTALLED IN ALL OTHER EXTENDABLE UNITS. 3. NEVER EXTEND MORE THAN ONE UNIT AT A TIME.	POUR REDUIRE LE RISQUE D'ACCIDENT ATTRIBUABLE A L'INSTABILITE DE L'UNITE, DEPLOYER LES STABILISATEURS AVANT DE SORTIR LES PERIPHERIQUES. 1. POUR DEPLOYER LES STABILISATEURS, TIRER COMPLETEMENT LES BRAS ANTI-BASCULEMENT ET ABAISER LES PATTES DE FAÇON QU'ELLES REPOSENT SOLIDEMENT SUR LE SOL. 2. S'ASSURER QUE TOUS LES PERIPHERIQUES SON MUNIS DE WS DE BLOCAGE. 3. NE JAMAIS SORTIR PLUS D'UN PERIPHERIQUE A UN MOMENT DONNE.

ENGLISH/GERMAN

CAUTION	ACHTUNG
TO REDUCE RISK OF POSSIBLE INJURY DUE TO UNSTABLE UNIT, ACTUATE STABILIZER BEFORE ANY PERIPHERAL IS EXTENDED. 1. TO ACTUATE STABILIZER, FULLY EXTEND ANTITILT CHANNELS AND LOWER CHANNEL SUPPORT FEET FIRMLY TO THE FLOOR. 2. INSURE THAT LOCKING MECHANISMS ARE INSTALLED IN ALL OTHER EXTENDABLE UNITS. 3. NEVER EXTEND MORE THAN ONE UNIT AT A TIME.	ZUR VERMEIDUNG VON GEFAHRDUNG DURCH EIN INSTABILES GERAT SIND VOR DER HERAUSNAHME VON PERIPHERALS DER STABILISIERUNGSMECHANISMUS BETATIGT WERDEN. 1. UM DIE STABILISIERUNGSEINRICHTUNG ZU BETATIGEN, SIND DER "ANTITILT KANAL" GANZ HERAUS ZU ZIEHEN UND DER UNTERE STUTZFUSS AUF DEN BODEN ZU FUHREN. 2. OBERPRUFEN SIE, OB IN ALLEN ANDEREN VERSCHIEBBAREN GERATEN DER SICHERUNGSMECHANISMUS BETATIGT IST. 3. ZIEHEN SIE NIE MEHR ALS EIN GERAT HERAUS.

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> **CAUTION**
>
> Do not operate the RDS base unit with the top cover removed; thermal damage to the RDS base unit may result will result.

3.4 LOCKED Indicator Flashing

When the **LOCKED** indicator is extinguished, it is safe to remove the storage module. When the **LOCKED** indicator is on, it means that the storage module is locked in the base unit. When the **LOCKED** indicator is flashing, it means that one of the following conditions is true:

- The **START/STOP** switch is depressed and storage module is installed, but the interlock solenoid plunger is not engaged
- The drive is powered down and has stopped, but the interlock solenoid plunger has not disengaged

3.4.1 Failure During Start Sequence

The interlock solenoid plunger may not engage if it is damaged or binds against the alignment hole in the handle. Gently rock the handle, and execute a restart sequence (refer to Section 2–6, Storage Module Insertion), to see if this clears the problem. If the **LOCKED** indicator continues to flash, then contact CONVEX TAC for assistance (refer to "Technical Assistance" in the Preface).

3.4.2 Failure During Stop Sequence

The interlock solenoid plunger may not disengage if it is damaged or binds against the alignment hole in the handle. Gently rock the handle, while executing a stop sequence (refer to Section 2–7, Storage Module Removal), to see if this clears the problem. If this does not clear the problem, the interlock solenoid plunger must be released manually.

The following procedure lists the tools required, and provides guidelines, for manually releasing the interlock solenoid plunger.

The following tools are required:

- #2 Phillips screwdriver
- Four-inch needle-nose pliers

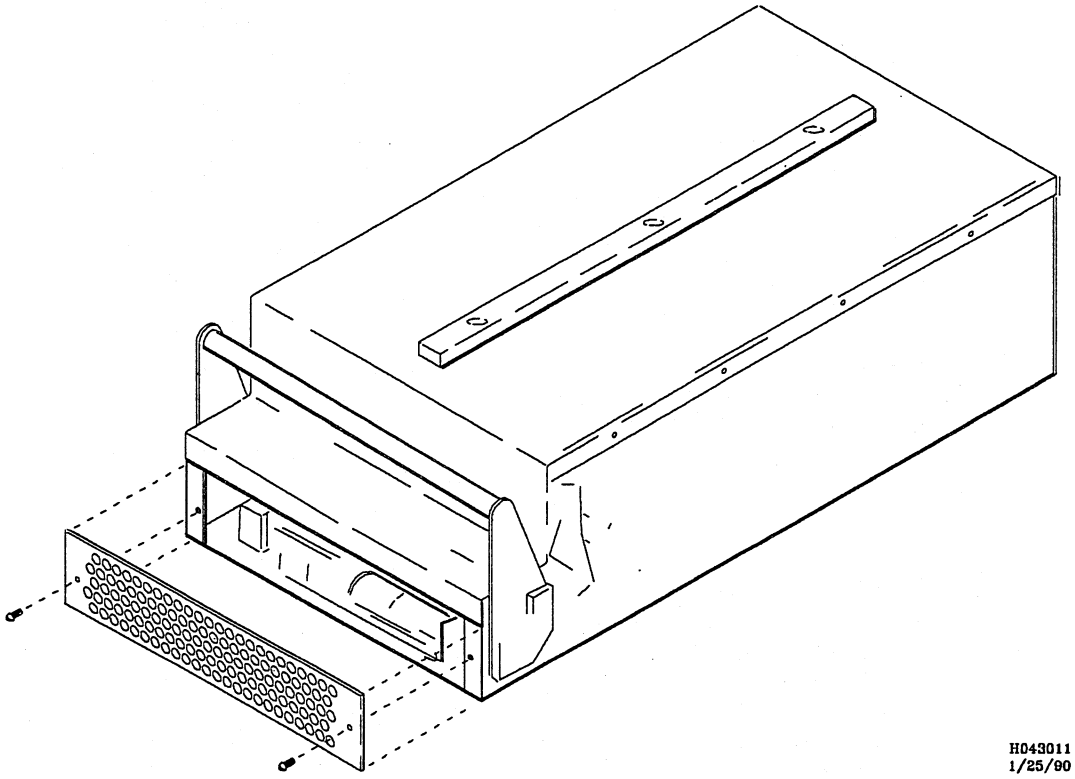
WARNING

Remove power to the disk-storage module before removing the solenoid access panel.

The solenoid is normally hot when power is applied. Do not touch it when releasing the plunger.

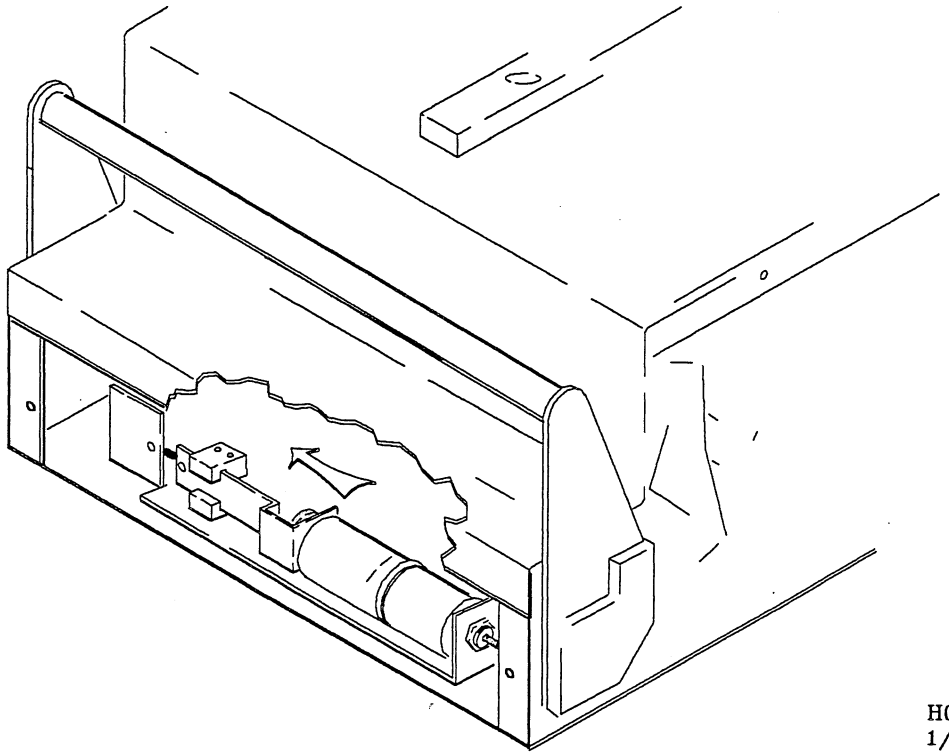
1. Remove 2 screws to the solenoid access panel with the Phillips screwdriver. Figure 3–2 shows the solenoid access panel and screws:

Figure 3–2, Solenoid Access Panel



2. Using the needle-nose pliers, gently move the *left side* of the solenoid plunger to the left to release it. Figure 3–3 shows the interlock solenoid plunger, the interlock solenoid, and the solenoid access panel:

Figure 3–3, Interlock Solenoid and Solenoid Plunger



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3. Release the module handle and remove storage module from the base unit.
4. Replace the solenoid access panel and 2 mounting screws.

3.5 Tripped Circuit Breakers

Circuit breakers are designed to protect the RDS from a potentially damaging condition and will trip before damage can occur. There are two circuit breakers, the AC circuit breaker, and the low airflow circuit breaker.

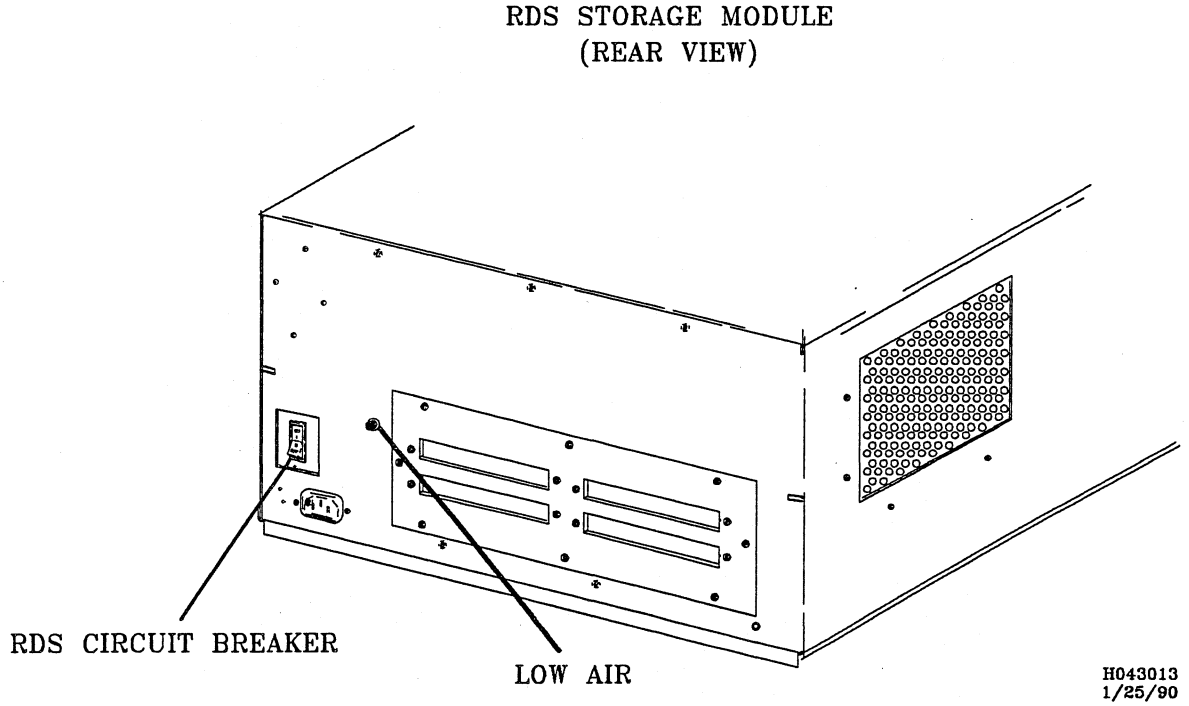
3.5.1 AC Circuit Breaker

The base unit's AC circuit breaker will trip if the AC input voltage is abnormal or if the RDS develops a short circuit. Contact the CONVEX Technical Assistance Center to resolve these types of problems.

3.5.2 Low Airflow Condition

If the airflow drops below approximately 100 cubic feet per minute, a sensor causes the low airflow circuit breaker to trip. When the low airflow circuit breaker trips, a DC power-down signal is sent to the base unit power supply. This signal causes *all* DC power to be removed from the base unit; AC power is still applied. The **DC POWER** indicator on the front control panel is extinguished. Figure 3–4 shows the location of the low airflow circuit breaker:

Figure 3–4, AC and Low Airflow Circuit Breakers



A low airflow condition is usually caused by dirty air filters in the front doors of RDS or by a defective fan(s). If the air filters are dirty they should be cleaned with a vacuum cleaner or replaced. The air filters are located in slots behind each base unit door. No tools are required to remove or replace the air filters. The filters and their locations are illustrated in Figure 3–5, Air Filters.

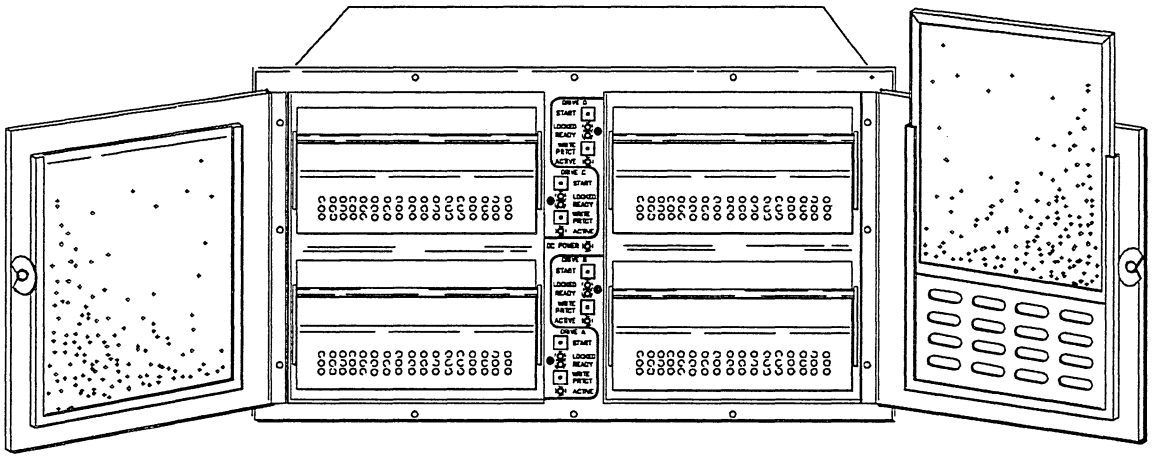
Once clean filters have been installed, reset the low airflow circuit breaker. If the circuit breaker still trips, contact the CONVEX Technical Assistance Center for assistance.

NOTE

To avoid low airflow conditions, the filters should be cleaned with a vacuum cleaner every 30 days. Replace filters if they appear damaged.

The foam side of the air filters must face to door and the wire side must face the storage modules. Figure 3–5 show the RDS air filter locations:

Figure 3–5, RDS Base Unit Air Filters



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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 *filename*	Read the contents of *filename* 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 a 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 *csh*.

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, *contact* 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 *contact* utility and returns you to the shell environment.
Abort	Save the text of your report in a file named *dead.report* in your home directory. This option exits the *contact* utility and returns you to the shell environment.

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Electronic Mail

Using Electronic Mail

The Hardware Documentation Group has an email address for documentation comments. Use this service to give us a quick response mechanism if you have special documentation questions that you would like addressed immediately. If you have a technical question, you should still contact the Technical Assistance Center, as described previously. To use email response service, just send mail addressed to:

```
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```

We will read your comments and give you a personal reply.

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- The chapter and page number in question
- The comment

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If you wish to mail your comments to us, please use the form on the next page and list the document page number with your questions and comments. Thank you.

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CONVEX Removable Disk System Operation Guide
Document No. 081-000330-201, Second Edition

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