
CONVEX VMEbus Sabre 5 SMD Disk Drive Service Guide

10 pcs
DKD-284 C3220
1,23 GB Temp. range 21°C - 26.6°C
test dev-5130



W. Brydli

Order No. DHW-260

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March 1991

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CONVEX
VMEbus Sabre 5 SMD Disk Drive
Service Guide

Order No. DHW-260

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Service Guide**

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FCC Notice

Note

This equipment generates, uses, and can radiate radio frequency energy. And, if the equipment is not installed and used in strict accordance with the instruction manual, it may cause interference to radio communications.

This equipment has been tested and found to comply with limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when equipment is operated in a commercial environment.

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

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How To Use This Guide

Purpose and audience

The *CONVEX VMEbus Sabre 5 SMD Disk Drive Service Guide* provides a general overview of the VMEbus Sabre 5 Storage Module Device (SMD) disk drive and related equipment and how to:

- Install the Sabre 5 SMD disk drive tray, disk drive, and related hardware
- Integrate the Sabre 5 SMD disk drive into the CONVEX Operating System (ConvexOS)
- Remove and replace the Sabre 5 SMD disk drive and related hardware

Primary audience

This document is intended for:

- CONVEX customer support engineers and CONVEX manufacturing personnel
- CONVEX customers who need to install and maintain their own Sabre 5 SMD disk drives and related hardware

Scope

The information presented in this service guide applies exclusively to the CONVEX VMEbus Sabre 5 SMD disk drive and related hardware. The Sabre 5 SMD disk drive can be used with all CONVEX supercomputers that have a VMEbus chassis with a CONVEX SMD disk controller installed and have ConvexOS V8.1 or later installed.

Organization

This document consists of the following sections:

- **Chapter 1, Description and Specifications**—Describes the Sabre 5 SMD disk drive and related hardware. Gives descriptions of the front panel indicators and descriptions and settings for the front panel switches. Defines and lists the electromechanical and environmental specifications.
- **Chapter 2, Unpacking and Installation**—Provides guidelines on how to unpack and install the Sabre 5 SMD disk drive, disk drive tray, and related hardware.
- **Chapter 3, Integration and Test**—Explains how to integrate the Sabre 5 SMD disk drive system into the ConvexOS operating system. Explains how to test the Sabre 5 SMD system and related hardware.

- **Chapter 4, Maintenance and IPBs**—Provides removal and replacement instructions for the Sabre 5 SMD disk drive and related hardware. Provides an Illustrated Parts Breakdown (IPB) of the Sabre 5 SMD disk drive and a parts list of the related hardware.
- **Appendix A, Configurator Document**—Contains a copy of the *Seagate Model ST81236J (PA8N2A) Sabre SMD Disc Drive Configuration Document*.
- **Appendix B, Reporting Problems**—Provides an example of the CONVEX *contact* utility for reporting minor software and hardware problems.

Notational conventions

Notational conventions are those systems of characters, symbols, terminology, or abbreviated expressions used to express technical facts or quantities as established by this guide. The following notational conventions are used in this document:

- **Boldface** indicates user-entered information for a computer program and should be entered exactly as they appear.
- *Italic* is used for emphasis and also designates file names, program names, directory paths, release tape titles, and titles of publications.
- All CONVEX illustrations have an illustration file number at the bottom right-hand corner that is for CONVEX use only.

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

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Caution

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Notes

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Note

A note highlights information of a supplemental nature. The note immediately precedes or follows the highlighted information.

Associated documents

The following is a partial list of other manuals or books that may provide more detailed information on the topics presented in this manual:

- *CONVEX Managing ConvexOS: Configuration Guide*, DSW-004
- *CONVEX Processor Operations Guide (C100 Series, C200 Series)* DHW-15
- *CONVEX VME SMD Disk Controller Service Guide* DHW-52
- *Electrostatic Discharge Failures of Semiconductor Devices*. Uger, B.A. 1981. Bell Laboratories
- *Seagate Sabre Drive User's Guide (SMD Interface)* CONVEX part number 900-000421-001

Ordering documents

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Include the order number with the request. The order number is on the title page of the manual and begins with the letters "DHW."

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Hardware, software, and documentation support can be obtained through the CONVEX Technical Assistance Center (TAC):

- From all locations in the continental United States, call 1(800)952-0379.
- From locations in Alaska, Hawaii, and Canada, call 1(214)497-4379.
- From all other locations, contact the nearest CONVEX office.

Reader's forum

If you wish to mail your comments to us, please use the form at the end of this manual and list the document page number with your questions and comments. Thank you.



1.1 Overview

This chapter discusses the CONVEX VMEbus Sabre 5 Storage Module Device (SMD) Disk Drive features, lists front panel functions, and gives electromechanical and physical specifications. The VMEbus Sabre 5 SMD Disk Drive is designed to be used with the CONVEX VMEbus SMD Disk Controller installed in a VMEbus chassis.

1.2 Features

The CONVEX VMEbus Sabre 5 SMD Disk Drive is a ^{1,230}1.2 Gbyte disk drive with a data transfer rate of 3 Mbytes/sec from a single head. The formatted capacity of the Sabre 5 SMD is 970 Mbytes. The average seek time is 15 millisecond with an average latency time of 8.33 millisecond at 3,600 rpm.

Other features include:

Two disk drives with power supplies will install in a EIA-standard 19-inch rack mount

1.3 Front panel Indicators and switches

The disk drive front panel is used to indicate and set the logical address of, select or not select, start or stop, show a fault condition on, and the write protect or unprotect the disk drive. Table 1-1 lists and describes the front panel indicators and switches:

Table 1-1 Front panel indicators and switches

Item	Indicators	Description
Address	Indicators	Indicates the binary logical address (0-7) of drive
	Switch	Used to set the logical address of a drive ¹ Press for 2 to 3 seconds to advance the logical address
Selected	Indicators	ON=Drive selected by controller
		OFF=Drive not selected by controller
Start	Indicators	ON=Drive is ready
		OFF=Drive is not ready
		FLASHING=Drive is in a START or STOP cycle
	Switch	Used to start or stop a drive Press and release to begin start cycle Press and release again to begin stop cycle
Fault	Indicators	ON=Drive fault condition exists
		OFF ² =Drive fault condition does not exist
	Switch	Used to turn off FAULT indicator Press and release to turn off FAULT indicator when a fault condition no longer exists
Write Protect	Indicators	ON=Drive write operations disabled
		OFF=Drive write operations enabled
	Switch ³	Used to enable or disable drive write operations Press and release to disable drive write operations Press and release again to enable drive write operations

¹The logical address is stored in memory when the power supply ON/Standby switch on the front of the power supply is switched to the Standby (0) position, the AC power switch on the rear of the disk drive is switched to the OFF position, or when there is a loss of site AC power.

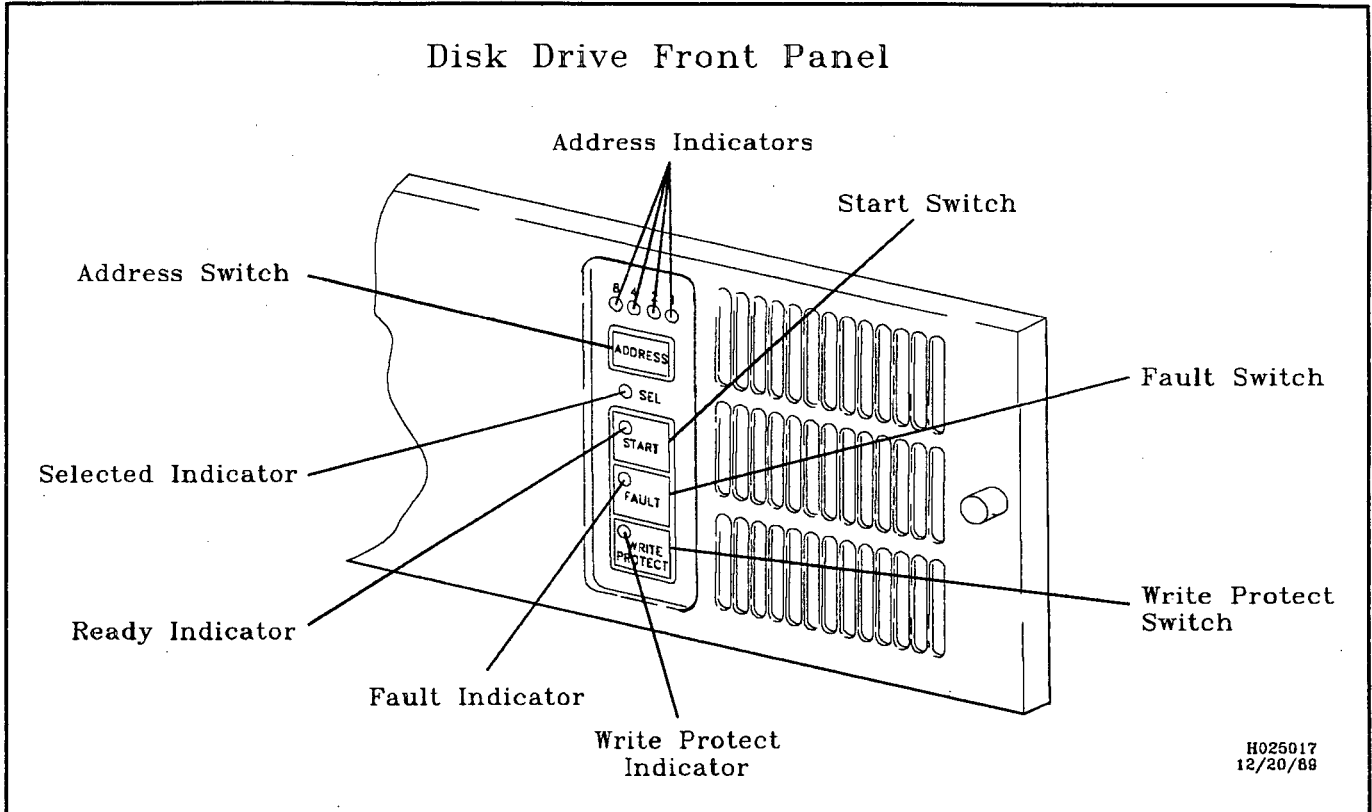
²The indicator is turned OFF by any of the following, if the fault condition no longer exists:

- a. pressing the FAULT switch
- b. A drive start
- c. A Fault Clear command from the controller

³The WRITE PROTECT switch cannot enable drive write operations if the WP/N switch on the drive control board is set to WP (Write Protect).

Figure 1-1 shows the drive front panel indicators and switches:

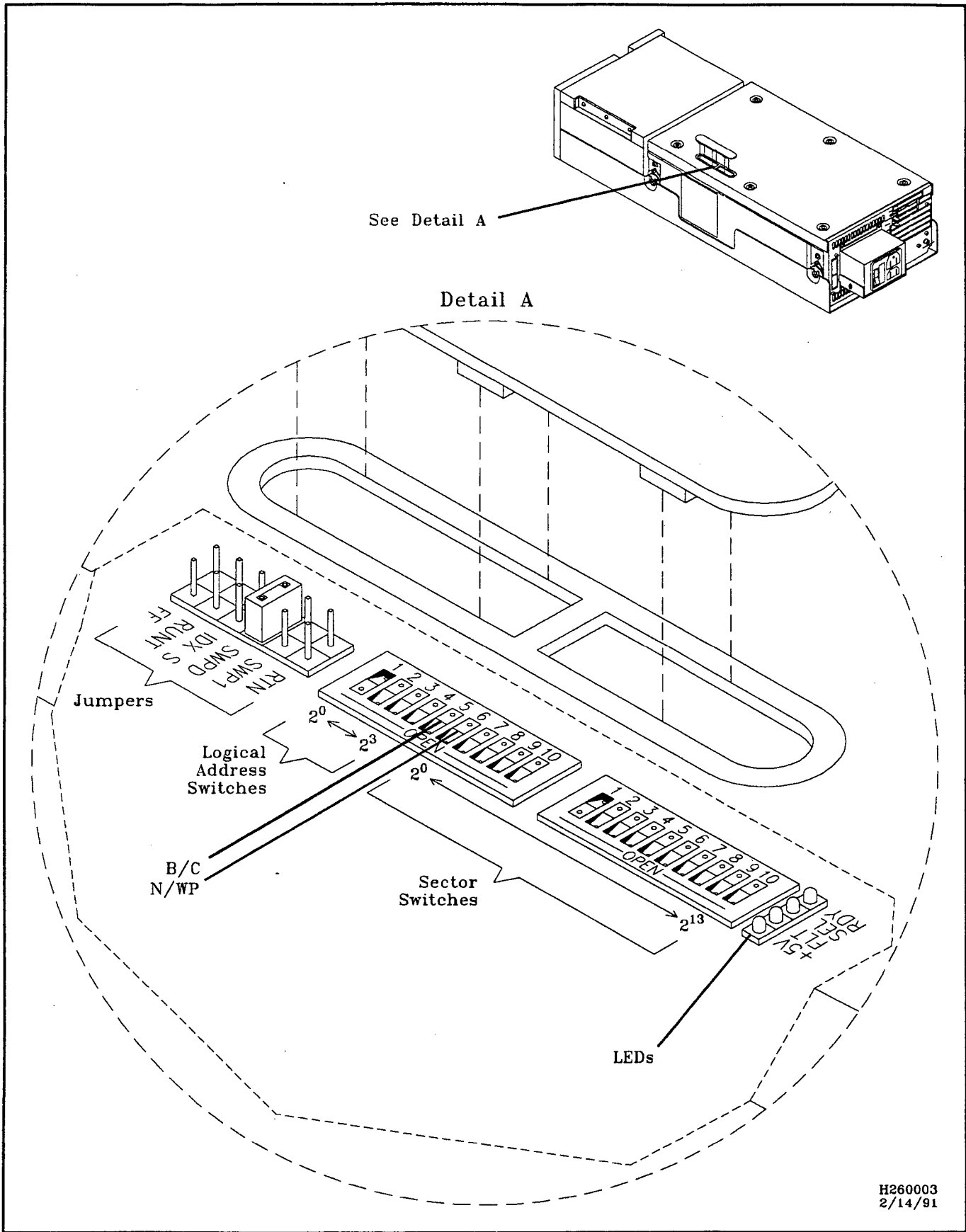
Figure 1-1 Disk drive front panel



1.4 Control board jumpers and switches

The control board has 2 dip switches, 6 pairs of jumper pins, and 5 indicator LEDs. This section gives descriptions of the LED indicators, settings and descriptions for the switches and jumpers. Figure 1-2 shows the location of the control board LEDs, jumpers, and dip switches:

Figure 1-2 Control board LEDs, jumpers, and switches



1.4.1 Control board LED indicators

The LED indicators on the control board are maintenance indicators. The LEDs provide indications of the disk drive's status when no operator panel or status/control panel is available. Table 1-2 lists the descriptions of the LED indicators on the control board:

Table 1-2 Control board LED indicators

Indicator	Description
+5V	Indicates the presence of +5 VDC
SEL	Indicates that the disk drive is selected by a controller
RDY	Indicates that the disk drive is ready (spindle power on is complete, heads are loaded, and no fault exists)
FLT	Indicates that a fault exists within the disk drive

1.4.2 Control board jumpers

The control board jumpers control certain disk drive functions. Table 1-3 lists the jumpers and the disk drive functions they control:

Note

The jumpers are set in either the ON or OFF positions. ON indicates the pins are jumpered and OFF indicates the pins are unjumpered.

Table 1-3 Drive control board jumpers and switches

Item	Setting ¹	Description
RTN	ON	Enables option to return heads to original position following sweep segment if drive was selected during last 12 minutes, otherwise; heads stay on last track of sweep segment.
	OFF ²	Disables option to return heads to original position following sweep segment
SWP1	ON	Disables option for sweep cycle operation only on seeks
	OFF ²	Enables option for sweep cycle on seeks
SWPD	ON ²	Disables sweep cycle operation
	OFF	Enables sweep cycle operation
IDX S	OFF ²	Factory set and must not be changed.
RUNT	ON	Runt sector pulses are suppressed.
	OFF ²	Runt sector pulses may appear.
FF	n/a	Reserved for future use

The switch setting ON = Jumpered and setting OFF = Unjumpered.
¹These are the CONVEX default settings.

1.4.3 Control board dip switches

The dip switches on the control board set the logical address if an operator panel is not used and other disk drive functions. Table 1-4 list the settings of the control board dip switches:

Note

The dip switches are set in either the *OPEN* or *CLOSED* positions. The *OPEN* position is the OFF condition and *CLOSED* is the ON position

Table 1-4 Control board dip switch settings

Switch ¹	Setting ³	Description
Sector switches ²	2 ⁰ -OPEN 2 ¹ -OPEN 2 ² -OPEN 2 ³ -OPEN 2 ⁴ -CLOSED 2 ⁵ -CLOSED 2 ⁶ -CLOSED 2 ⁷ -OPEN 2 ⁸ -OPEN 2 ⁹ -CLOSED 2 ¹⁰ -CLOSED 2 ¹¹ -CLOSED 2 ¹² -CLOSED 2 ¹³ -CLOSED	Determines the number of sectors per track.
N/WP	WP (OPEN)	Write protect
	N (CLOSED) ²	Normal
B/C	C (OPEN) ²	1.83 MHz clock frequency
	B (CLOSED)	Byte frequency selector clock
Logical address switches	n/a	Ignored if a front panel is used

¹Refer to the *Seagate Sabre Drive User's Manual*, Chapter 3, "Installation and Checkout," for more information on switch settings.

²These are the CONVEX default settings.

³The switch setting OPEN= ON and setting CLOSED = OFF.

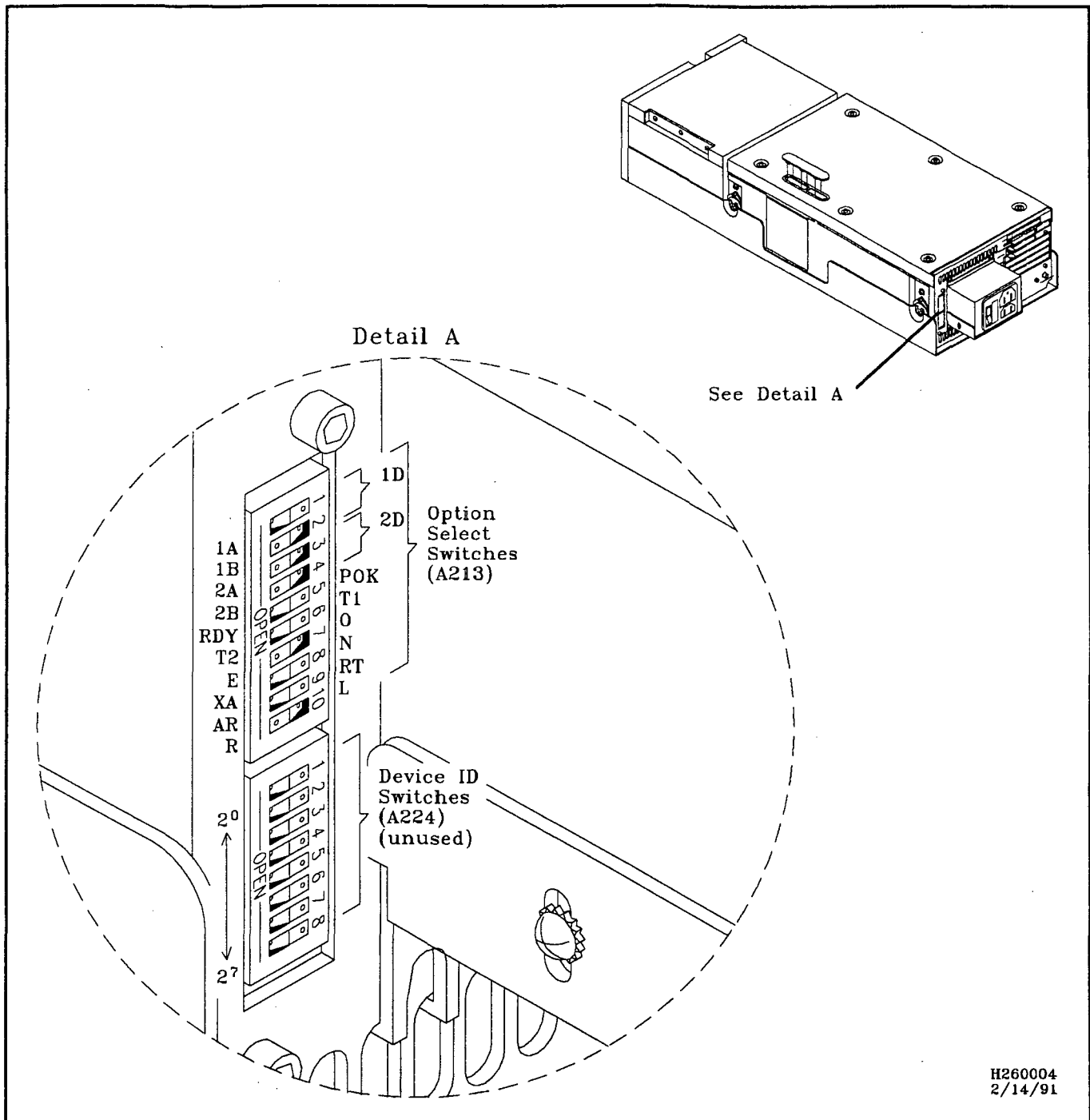
1.5 I/O board switches

The I/O board switches, located on the rear of the disk drive, must be set correctly for normal operation of the drive. The A224 dip switch is reserved for the device ID setting and is not used. The following table and figure contain information about switch settings. Figure 1-3 shows the location of the I/O board dip switches:

Note

The A224 dip switch is reserved for the device ID setting and is not used.

Figure 1-3 I/O board dip switches (A213 and A224)



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Note

The dip switches are set in either the *OPEN* or *CLOSED* positions. The *OPEN* position is the *OFF* condition and *CLOSED* is the *ON* position

Table 1-5 lists the settings for I/O board switch A213 and gives a description of each:

Table 1-5 Switch A213 I/O board dip switch settings

Switch (OPEN/CLOSED)	Setting ¹		Description
1—1A/1D 2—1B/1D	Switch 1 1A (OPEN) ² 1D (CLOSED) 1A (OPEN) 1D (CLOSED)	Switch 2 1D (CLOSED) ² 1B (OPEN) 1B (OPEN) 1D (CLOSED)	Enable/Disable CH 1 and select an option for sending index and sector to CH 1. Enables CH 1 and sends index and sector on A cable only. Enables CH 1 and sends index and sector on B cable only. Enables CH 1 and sends index and sector on A and B cables. Disables CH 1.
3—2A/2D 4—2B/2D	Switch 3 2A (OPEN) 2D (CLOSED) 2A (OPEN) 2D (CLOSED) ²	Switch 4 2D (CLOSED) 2B (OPEN) 2B (OPEN) 2D (CLOSED) ²	Enable/Disable CH 2 and select an option for sending index and sector to CH 2. Enables CH 2 and sends index and sector on A cable only. Enables CH 2 and sends index and sector on B cable only. Enables CH 2 and sends index and sector on A and B cables. Disables CH 2.
5—RDY/POK	RDY (OPEN) ²		Normal I/O ready status (Up to speed, heads loaded, and no fault exists)
	POK (CLOSED)		Ready status with power check. Ready status indicates normal ready status with AC input voltage check from power supply.
6—T2/T1			Selects type of extended cylinder address, provided that the XA/N switch is set in XA position.
	T2 (OPEN) ²		Enables extended cylinder address bits 2 ¹⁰ and 2 ¹¹ , via Tag 2. Can be selected in either SMD-0 or SMD-E mode.
	T1 (CLOSED)		Enables extended Cylinder Address Bit 2 ¹⁰ , via Tag 1 (cylinder select). Can be selected in either SMD-0 or SMD-E mode, but Tag 4 and Tag 6 are unusable with this selection.
7—E/0	E (OPEN)		SMD-E mode (Tags 1 through 6)
	0 (CLOSED) ²		SMD-0 mode (Tags 1 through 3)
8—XA/N	XA (OPEN) ²		Extended Cylinder Address enabled. Method set by T2/T1
	N (CLOSED)		Normal Cylinder Address enabled. T2/T1 has no effect.
9—AR/RT	AR (OPEN) ²		Absolute Reserve (Dual Channel)
	RT (CLOSED)		Reserve Timer (Dual Channel)

1.6 Specifications

Table 1-6 lists the physical and operational specifications for the VMEbus Sabre 5 SMD Disk Drive:

Table 1-6 Disk drive specifications

Parameter	Value/Comment
Width	19.0 in (48.1 cm) ¹
Height	28.0 in (71.1 cm) ¹
Depth	5.25 in (13.3 cm)
Weight One disk drive and tray One disk drive only	60.0 lbs (27.2 kg) 46.0 lbs (20.9 kg)
Voltage range $\pm 10\%$ with voltage switch at 110V with voltage switch at 208/240V	85 VAC-132 VAC 177 VAC-264 VAC
Current Amps kV/a	1.22 A-1.51 A
Temperature range	70.0°F (21.0°C) to 80.0°F (26.6°C)
Temperature change	9.0°F (5°C) per hour
Humidity range	40% to 60% with no condensation
Humidity change	2% per hour
Watts	147
Btu/hr	502
Kcals/hr	126
Refrigeration (tons)	0.04

¹Includes one drive or two drives in tray.

2.1 Overview

This chapter discusses unpacking and inspection, identifies major components of the VMEbus Sabre 5 SMD disk drive, and provides installation procedures.

2.2 Unpacking and inspection

This section gives general guidelines for unpacking and inspecting the VMEbus Sabre 5 SMD disk drive. Also, this section gives safety and equipment damage precaution information.

2.2.1 Electrostatic Discharge Damage

Typically, Electrostatic Discharge (ESD) damage occurs to electronic circuit boards during handling. Static charges take place when various objects are separated or rubbed together, often creating a high voltage-level charge. If a high voltage-level charge is discharged into electronic computer circuits, the charge damages the electronic components. The main factors that determine a voltage level charge are:

- Types of material
- Relative humidity
- Rate of change or separation

Table 2-1 lists an approximation of electrostatic charge levels based on various personnel activities and humidity levels:

Table 2-1 Static charge levels and relative humidity

Personnel activity ¹	Humidity ² and charge levels (volts ³)			
	26%	32%	40%	50%
Person walking across linoleum floor	6,150 V	5,750 V	4,625 V	3,700 V
Person walking across carpet	18,450 V	17,250 V	13,875 V	11,100 V
Person getting up from a plastic chair	24,600 V	23,000 V	18,500 V	14,800 V

¹Source: B.A.Unger, *Electrostatic Discharge Failures of Semiconductor Devices* (Bell Laboratories, 1981).

²A high rate of airflow produces higher static charges than a low airflow rate, for the same relative humidity level.

³Some data in this table has been extrapolated.

2.2.2 Inspection for damage

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

2.2.3 Unpacking

The customer's bill of material lists all equipment shipped from CONVEX. It should be used as a checklist to ensure that all equipment has arrived.

The procedure for unpacking the shipping container is :

1. Unpack each item of equipment from its shipping container.
2. Inspect each item of equipment for any signs of shipping damage as it is unpacked.
3. If equipment damage is found, document the damage, and proceed to the next section.

Note

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

2.2.4 Damage claims

If the VMEbus Sabre 5 SMD disk drive or related hardware is damaged, a damage claim form 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.

2.3 Preinstallation procedures

This section provides steps to be completed before installing the VMEbus Sabre 5 SMD disk drive into an existing expansion cabinet or a VMEbus Sabre 5 SMD disk drive into an existing Sabre 5 disk tray.

Caution

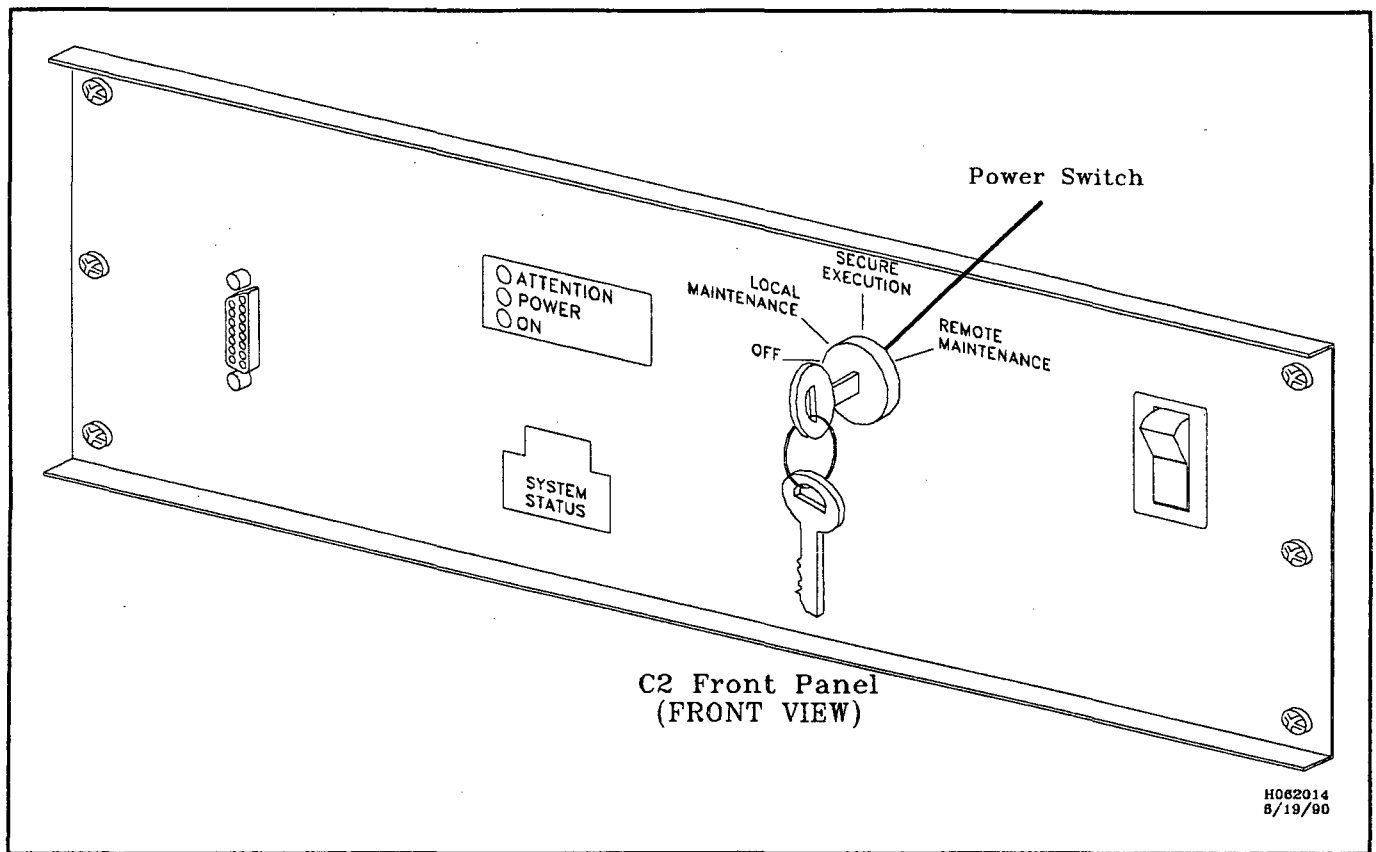
Shut down the system before removing power to the existing expansion cabinet. Failure to do so will cause a system crash and possible loss of data. Refer to the *CONVEX Processor Operation Guide (C100 Series, C200 Series)* for power-down procedures on a CONVEX supercomputer.

Note

The maximum length of the CONVEX VMEbus SMD disk controller cables is 50.0 feet (15.2 meters).

1. Turn the processor's front panel key switch to the OFF position. Figure 1-1 shows the processor's front panel key switch:

Figure 2-1 Front panel key switch

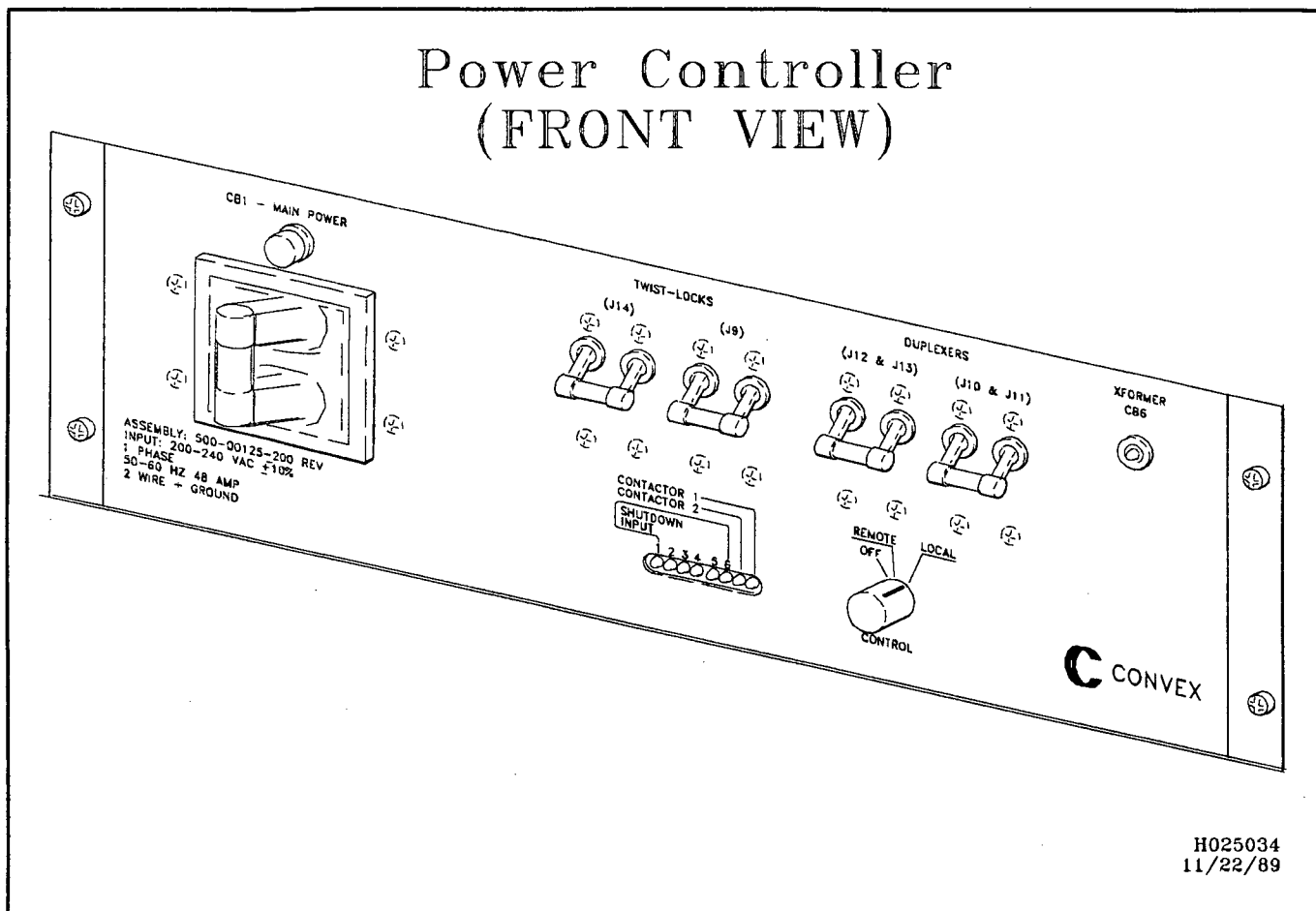


Caution

Remove power to the expansion cabinet before installing or removing equipment. Failure to do so will damage electronic equipment components.

2. Remove power to the expansion cabinet.
 - a. To remove power from a CONVEX EXP-101 or EXP-102 expansion cabinet, disconnect the cabinet's AC power cord.
 - b. To remove power from a CONVEX EXP-105 or EXP-106 high-performance expansion cabinet, set the main power control switch to the OFF position. Figure 2-2 shows the location of the main power control switch of an EXP-105 or EXP-106 expansion cabinet:

Figure 2-2 EXP-105 main power controller switch

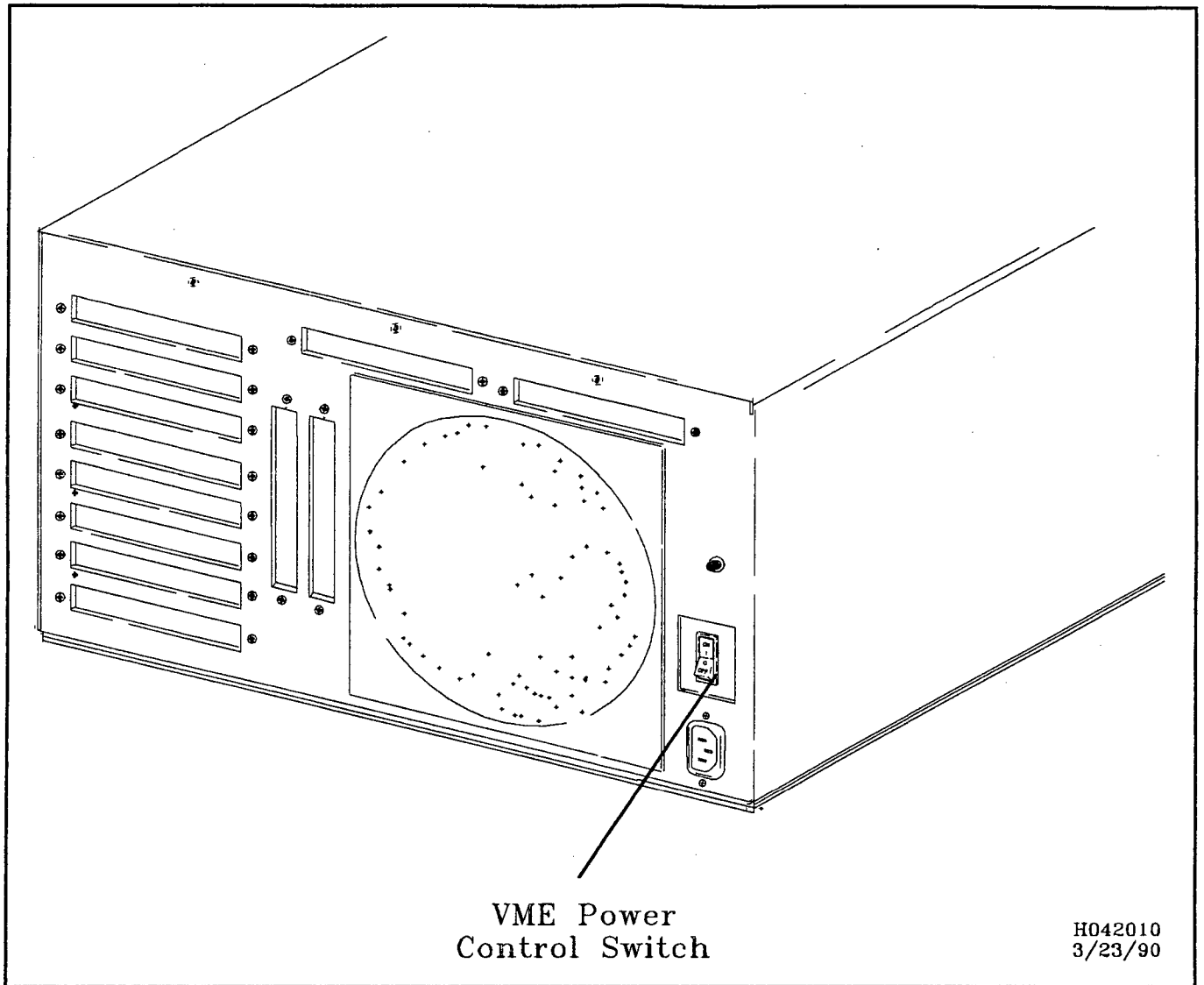


Warning

Expansion cabinet stabilizer bars must be extended before installing a Sabre 5 disk drive tray or before extending the Sabre 5 disk drive tray from the expansion cabinet for service. Failure to do so will make the expansion cabinet unstable, increase the possibility of it falling forward, can cause injury to personnel, and will cause damage to equipment.

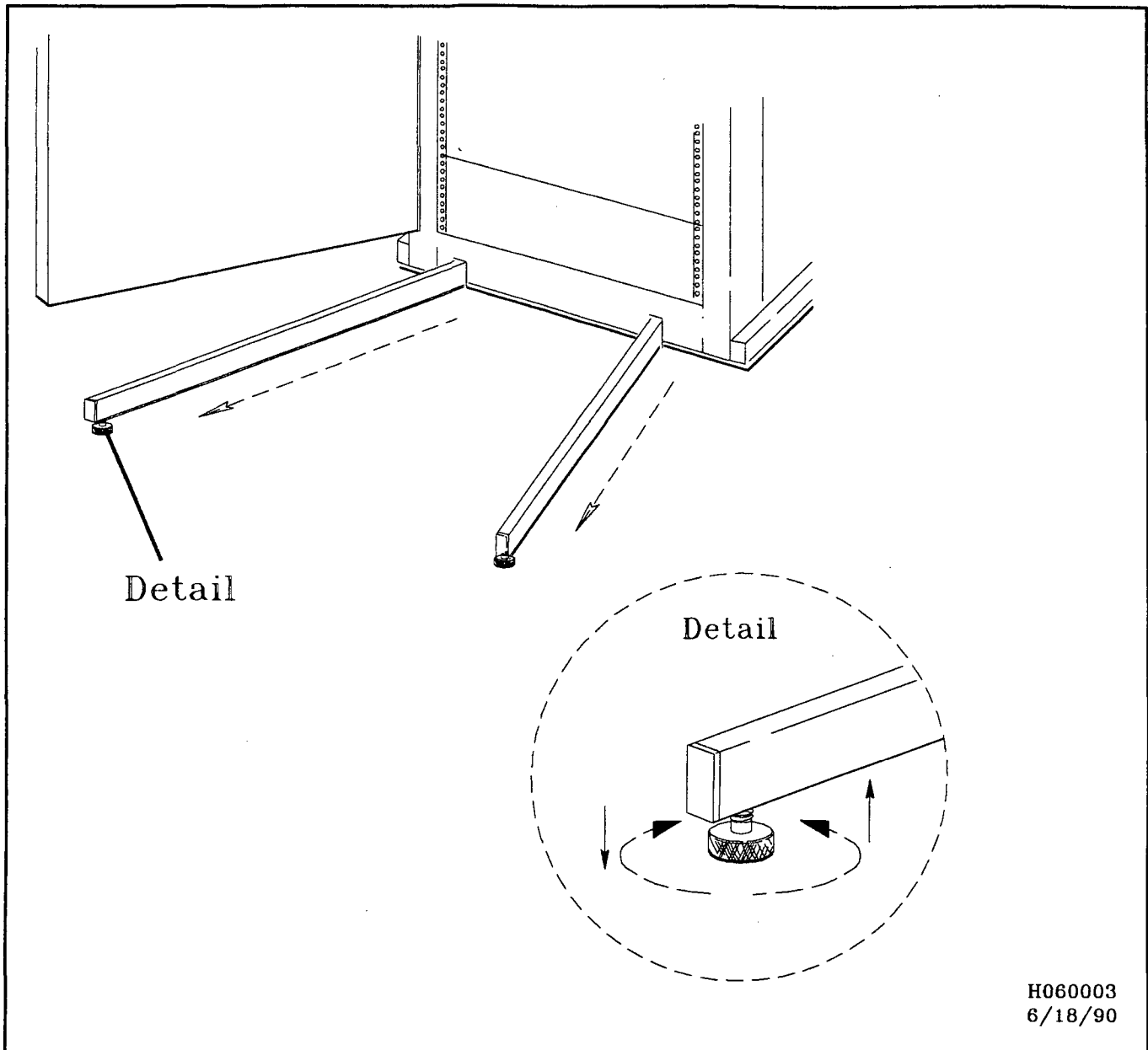
3. Set the VMEbus chassis power controller switch to the OFF position. Figure 2-3 shows the location of the VMEbus chassis power switch:

Figure 2-3 VMEbus chassis power control switch



4. Extend the expansion cabinet stabilizer bars and adjust the feet until they are in firm contact with the floor. Figure 2-4 show the cabinet stabilizer bars and adjustable feet:

Figure 2-4 Expansion cabinet stabilizer bars



2.4 Installation

The following sections give the procedures for installing a Sabre 5 disk drive tray, a Sabre 5 SMD disk drive into a Sabre 5 tray, cabling a VMEbus SMD disk controller to a Sabre 5 SMD disk drive, and daisy-chain cabling Two Sabre 5 SMD disk drives to the VMEbus SMD disk controller.

2.4.1 Power supply voltage switch

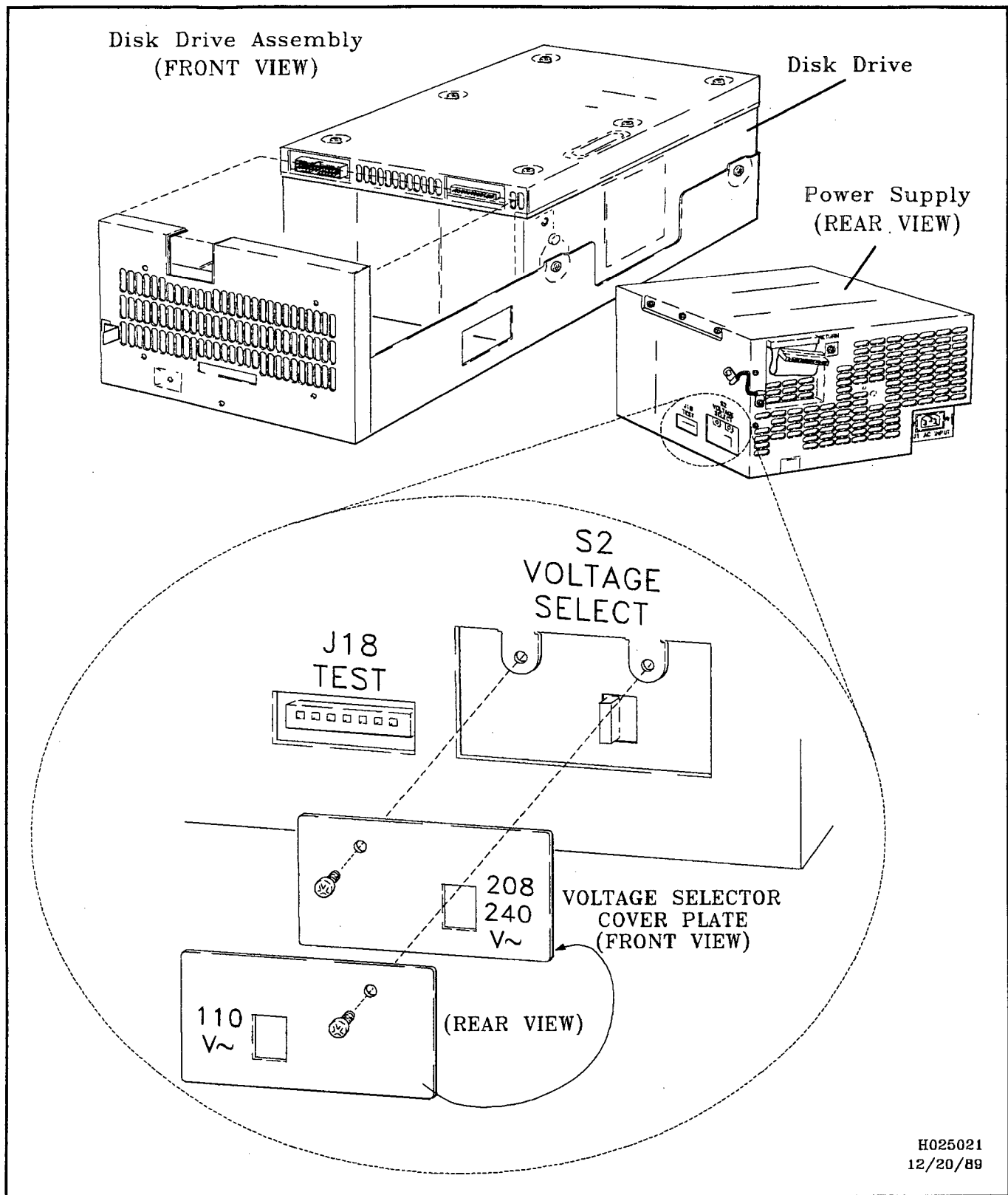
The following section gives the procedure for checking and setting the power supply voltage switch. Before installing any VMEbus Sabre 5 SMD disk drive, check the power supply voltage switch to ensure a proper voltage setting.

Caution

Ensure that the power supply voltage switch is set to the proper position. Failure to do so will cause damage to equipment.

1. Check the power supply voltage switch plate. Figure 2-5 shows the power supply and the voltage switch, and the voltage switch plate:

Figure 2-5 Power supply voltage switch and plate



2. If the voltage switch plate is not in the desired position, remove the screw securing the plate.
3. Set the power supply voltage switch to the desired position.

4. Reverse the voltage switch plate and install the plate on the power supply to lock the power supply voltage switch in the desired position.

2.4.2 Installing a disk drive tray

The following section gives the procedure for installing a Sabre 5 disk drive tray into an existing CONVEX expansion cabinet.

1. Do the preinstallation procedures listed in Section 2.3, "Preinstallation procedures," of this chapter.

Notes

Refer to the *CONVEX VME SMD Disk Controller Service Guide* for more information on installing the VMEbus SMD disk controller.

The maximum cable length allowed between the VMEbus SMD disk controller and the initial VMEbus Sabre 5 SMD disk drive is approximately 50 feet (15.2 meters).

2. Install the SMD disk controller in the VMEbus chassis.

Note

Refer to the *Sabre Drive User's Manual (SMD Interface)*, section, "Mounting 2X Drawer in Rack," for more detailed procedures on installation of a Sabre 5 disk tray.

3. Select a position in the expansion cabinet and remove the blank panels to open space for the tray installation.
4. Loosely attach the slide adjusting brackets to each side with the supplied bracket clamp and screw.
5. Loosely attach screws and nut plates provided (for each slide) to the cabinet as follows:
 - a. For the cabinet front, screws go in the top and third holes.
 - b. For the cabinet rear, screws go in the top and bottom holes.
6. Set the slide adjusting brackets as required for rack depth. Mount the right and left slides to the RETMA rails in the cabinet. Orient slides so that the drawer rests on the flat edge of the slides.
7. Secure adjusting brackets to slides and slides to the RETMA rails.

Warning

The drive assembly with 2 disk drives installed weighs 60.0 lbs (27.2 kg). Two people are required to install a drive assembly. Failure to do so may cause injury to personnel and equipment damage.

8. Lift the disk drawer and guide it into the slide assemblies. Continue pushing until drawer is in the cabinet.
9. Do the postinstallatio procedures listed in Section 2.5, "Postinstallation procedures," of this chapter.

2.4.3 Installing a disk drive into a disk drive tray

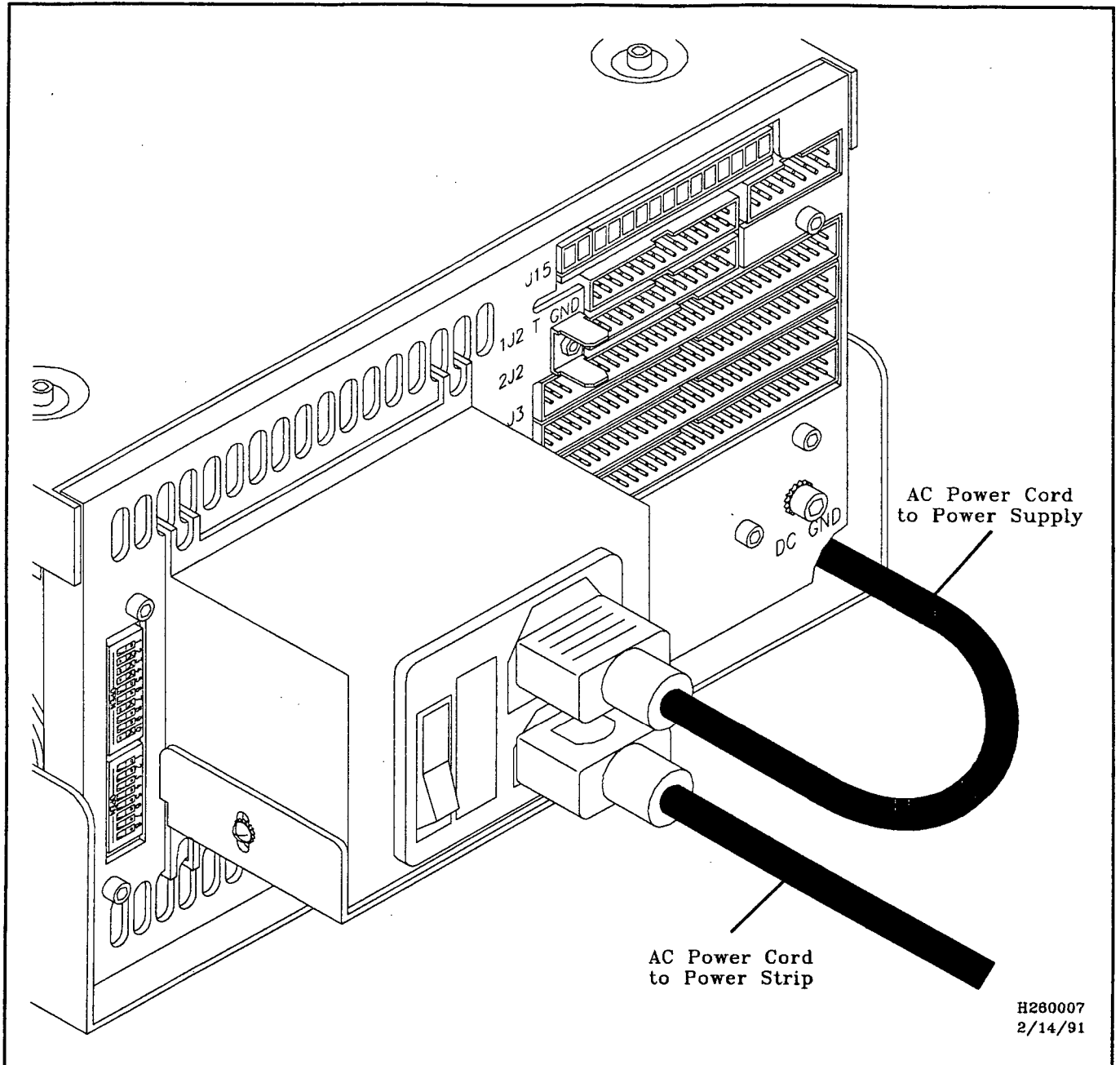
The following section gives the procedure for installing a Sabre 5 disk drive into a Sabre 5 disk drive tray.

Note

Refer to the *Sabre Drive User's Manual (SMD Interface)*, chapter 3, "Repair and Replacement," section "Mounting Drive and Power Supply in 2X Drawer," for more detailed information on installing a disk drive into a disk drive rack.

1. Do the preinstallation procedures listed in Section 2.3, "reinstallation procedures," of this chapter.
2. Slide inner drawer containing the disk drive and the power supply in the disk drive rack.
3. Secure the inner drawer with the locking screws.
4. Slide the disk drive rack into the expansion cabinet.
5. Connect one end of the AC power cable to the AC power connector on the rear of the disk drive and the end to the expansion cabinet AC power strip or AC power controller. Figure 2-6 shows the AC power cords and the AC power connector on the rear of the disk drive:

Figure 2-6 AC power cord and AC power switch



6. Do the postinstallation procedures listed in Section 2.5, "Postinstallation procedures," of this chapter.

2.4.4 Cabling one disk drive

The following section gives the procedure for cabling one Sabre 5 SMD disk drive to the VMEbus SMD disk controller.

Notes

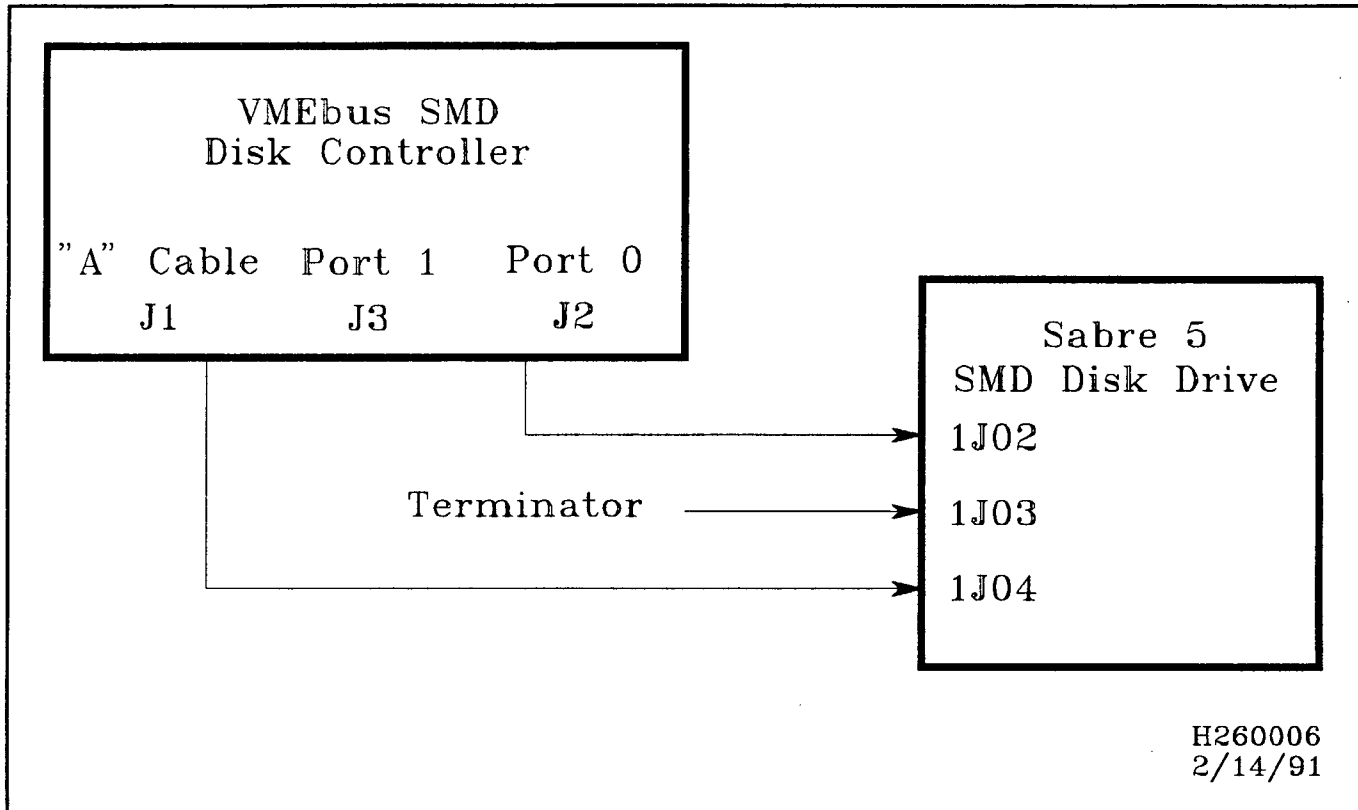
Refer to the *CONVEX VME SMD Disk Controller Service Guide* for more information on installing the VMEbus SMD disk controller.

The maximum cable length allowed between the VMEbus SMD disk controller and the initial VMEbus Sabre 5 SMD disk drive is approximately 50 feet (15.2 meters).

Refer to the *Sabre Drive User's Manual (SMD Interface)*, section "System I/O Cabling," for more detailed information on cabling a disk drive to the VMEbus SMD controller.

Figure 2-7 shows a block diagram of the cabling from the SMD disk controller to one Sabre 5 SMD disk drive:

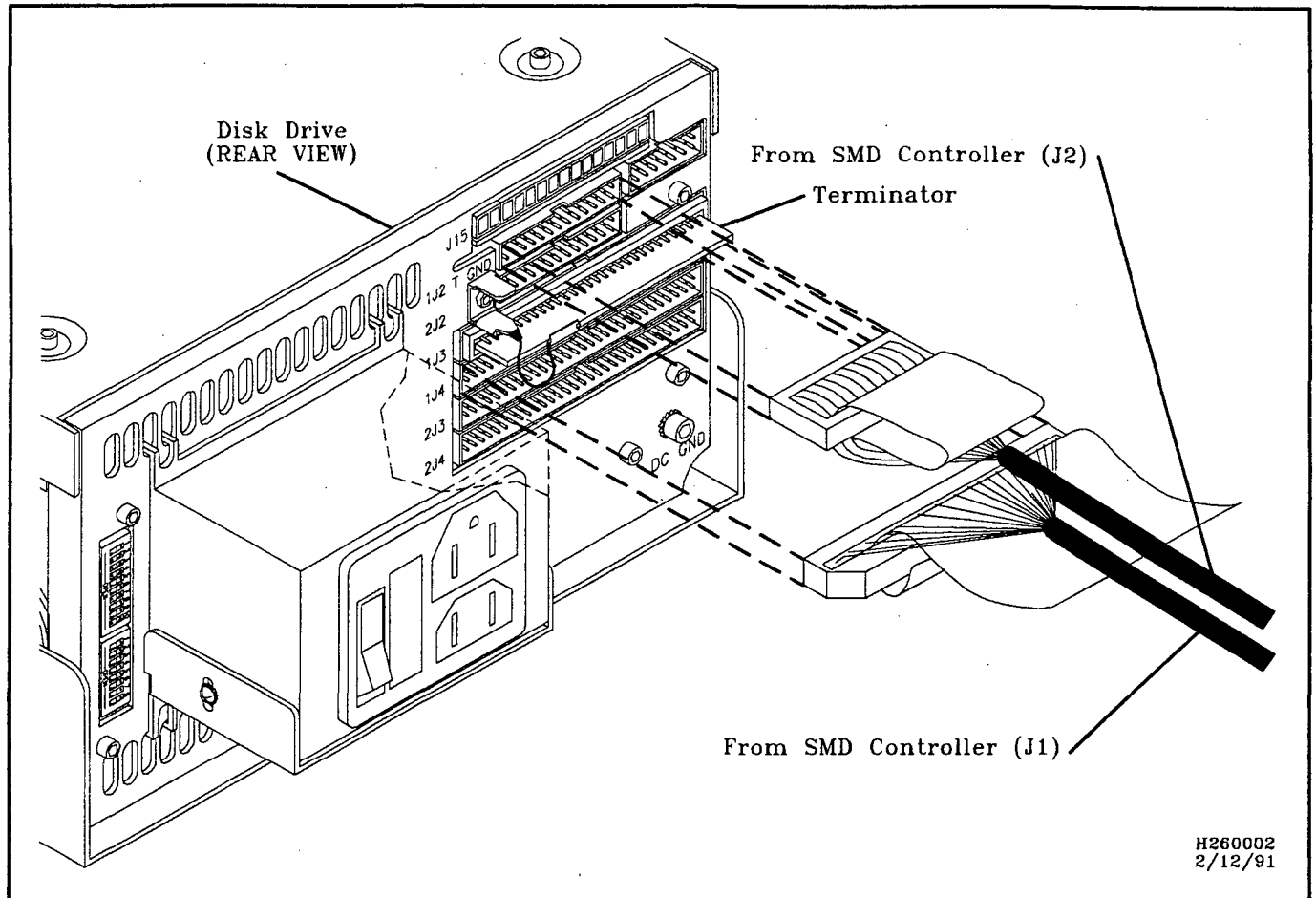
Figure 2-7 One disk drive cabling block diagram



1. Connect the terminator in connector 1J03 of disk drive 0. Figure 2-8 shows the terminator and the cable connections on disk drive 0.
2. Connect the P1 end of the A cable to the J1 ("A" Cable) connector on the SMD disk controller.
3. Connect the P2 end of A cable to the 1J04 connection on disk drive 0. Figure 2-8 shows cable A and the cable connection on disk drive 0.
4. Connect the P1 end of the B cable to the J2 (Port 0) connector on the SMD disk controller.
5. Connect the P2 end of the B cable to the 1J02 connection on disk drive 0. Figure 2-8 shows the B cable and the cable connection on disk drive 0.

6. Connect the terminator ground connection to the tab located on the disk drive. Figure 2-8 shows the terminator, the terminator ground connection, the ground tab, and the cable connections on disk drive 0.

Figure 2-8 Cabling one disk drive



2.4.5 Daisy-chain cabling two disk drives

The following section gives the procedure for daisy-chain cabling two Sabre 5 SMD disk drive to the VMEbus SMD disk controller.

Notes

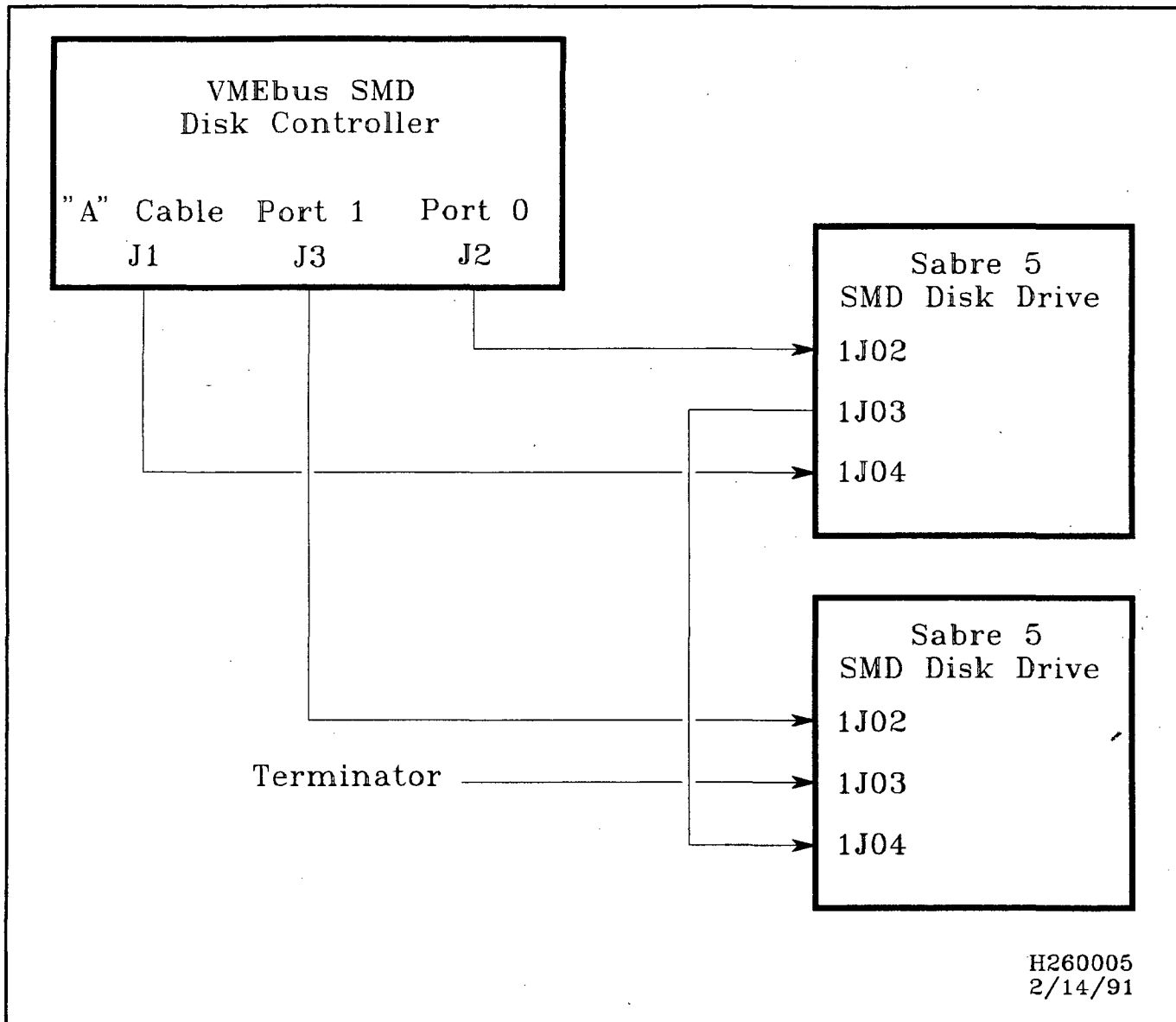
Refer to the *CONVEX VME SMD Disk Controller Service Guide* for more information on installing the VMEbus SMD disk controller.

The maximum cable length allowed between the VMEbus SMD disk controller and the initial VMEbus Sabre 5 SMD disk drive is approximately 50 feet (15.2 meters).

Refer to the *Sabre Drive User's Manual (SMD Interface)*, section "Daisy Chain I/O Cabling Procedure," for more detailed information on cabling a disk drive to the VMEbus SMD controller.

Figure 2-9 shows a block diagram of the cabling from the SMD disk controller to two Sabre 5 SMD disk drives:

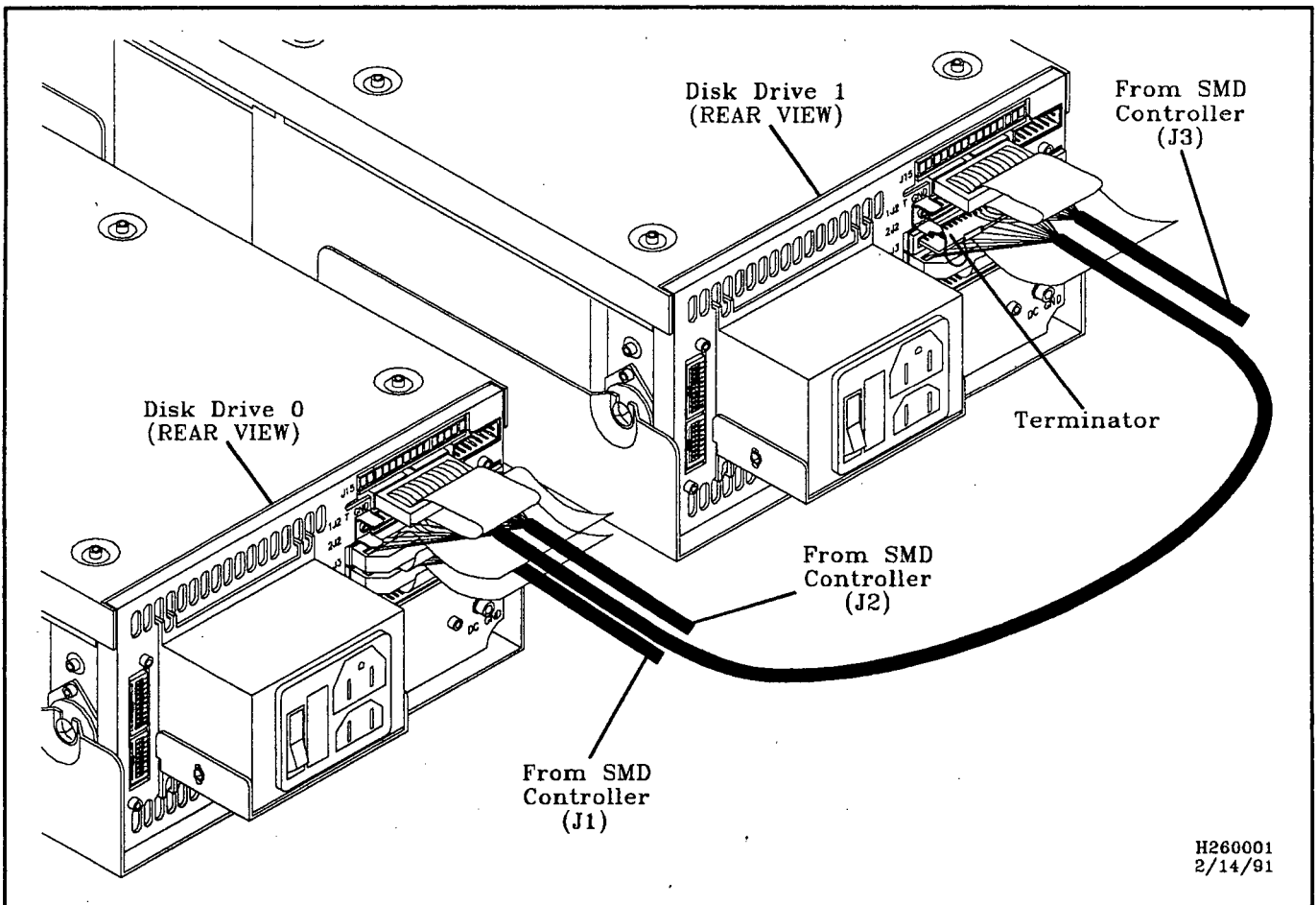
Figure 2-9 Two disk drive cabling block diagram



1. Connect the P1 end of the A cable to the J1 ("A" Cable) connector on the SMD disk controller.
2. Connect the P2 end of the A cable to the 1J04 connection on disk drive 0. Figure 2-10 shows cable A and the cable connection on disk drive 0.
3. Connect the P1 end of the B cable to the J2 (Port 0) connector on the SMD disk controller.
4. Connect the P2 end of the B cable to the 1J02 connection on disk drive 0. Figure 2-10 shows the B cable and the cable connection on disk drive 0.
5. Connect the P1 end of cable of a second B cable to the J3 (Port 1) connector on the SMD disk controller.

6. Connect the P2 end of the second B cable to the 1J02 connection on disk drive 1. Figure 2-10 shows the second B cable and the cable connection on disk drive 1.
7. Connect the P1 end of a second A cable in the 1J03 connector of disk drive 0. Figure 2-10 shows the second A cable and the cable connection on disk drive 0.
8. Connect the P2 end of the second A cable in the 1J04 connector of disk drive 1. Figure 2-10 shows the second A cable and the cable connection on disk drive 1.
9. Connect the terminator in connector 1J03 of disk drive 1. Figure 2-10 shows the terminator and the cable connection on disk drive 1.
10. Connect the terminator ground connection to the tab located on the disk drive. Figure 2-10 shows the terminator, the terminator ground connection, the ground tab, and the cable connections on disk drive 1.

Figure 2-10 Daisy-chain cabling two disk drives



2.4.6 Cable Clamping

Refer to the *Sabre Drive User's Manual (SMD Interface)*, section "Cable Clamping Procedure," for the procedure to install the cables into the cable clamps on the Sabre 5 SMD disk drive.

2.5 Postinstallation procedures

This section gives steps to be done after installing the VMEbus Sabre 5 SMD disk drive into an existing expansion cabinet or a VMEbus Sabre 5 SMD disk drive into an existing Sabre 5 disk tray.

1. Return the expansion cabinet stabilizer bars to their retracted positions. Figure 2-4 shows the expansion cabinet stabilizer bars.
2. Set the VMEbus chassis power controller switch to the ON position. Figure 2-3 shows the location of the VMEbus chassis power switch.
3. Return power to the expansion cabinet.
 - a. To return power to an EXP-101 or EXP-102 expansion cabinet, connect the cabinet's AC power cord to the AC power source.
 - b. To return power to an EXP-105 or EXP-106 expansion cabinet, set the main power control switch to the ON position. Figure 2-2 shows the main power control switch of an EXP-105 or EXP-106 expansion cabinet.
4. Turn the processor's front panel key switch to the ON position. Figure 1-1 shows the processor's front panel key switch.

3.1 Overview

The CONVEX VMEbus Sabre 5 SMD disk drive must be integrated into the CONVEX Operating System (ConvexOS) before it can be used. This chapter contains guidelines for integrating a Sabre 5 SMD disk drive into ConvexOS as well as information on the CONVEX diagnostic tests.

Notes

ConvexOS V8.1 or later is required to operate a CONVEX VMEbus Sabre 5 SMD disk drive.

The CONVEX VMEbus SMD disk controller must have firmware V5.0 or later to operate a VMEbus Sabre 5 SMD disk drive.

3.2 Software Integration

ConvexOS V8.1 or later contains all of the software drivers needed to operate a Sabre 5 SMD disk drive. This means a system generation (*sysgen*) is not required when the disk drive(s) is installed.

System-level hardware is identified to the ConvexOS via a configuration file (*/ioconfig*) located on the Service Processor Unit (SPU) disk. The */ioconfig* file describes, in hierarchical fashion, the connections between VMEbus I/O Processor (VIOPs), VMEbus controllers, and peripheral devices. ConvexOS uses this information to assign a physical device number to a device of a given type.

Each type of device controller is identified to ConvexOS by a mnemonic device code. The device codes for the VMEbus SMD disk controller and the Sabre 5 SMD disk drives are listed below:

- DKD-281—Sabre 5 SMD disk drive
- DKC-204—VMEbus SMD disk controller

The marketing codes for the VMEbus SMD disk controller and the Sabre 5 SMD disk drives are listed below:

- DKD-209—Sabre 5 SMD disk drive
- DKC-204—VMEbus SMD disk controller

3.3 Example */ioconfig* file

The device 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 VIOP number, VMEbus chassis number, controller type, address and interrupt number, and peripheral device type. ConvexOS uses this information during *sysgen* to assign a physical device number to a device of a given type. This

enables ConvexOS to associate a given physical device number with a specific base-unit sleeve. Figure 3-1 shows a typical */ioconfig* file with the VMEbus SMD disk controller and the Sabre 5 SMD disk-drive-specific items in bold type:

Figure 3-1 Example */ioconfig* file

```
viop 4
vme 0
  ctrl LAN-202 csr 0x7740 int 1
    unit 0 type unet
  ctrl MTC-202 csr 0xee00 int 4
    unit 0 subunit 0 type MTD-208
    unit 1 subunit 0 type MTD-208
vme 1
  ctrlr DKC-204 csr 0x200400 int 32
    unit 0 type DKD-281
    unit 1 type DKD-281
  ctrlr DKC-204 csr 0x400600 int 43
    unit 0 type DKD-281
  ctrlr DKC-203 csr 0x800 int 5
    unit 0 DKD-214
    unit 1 DKD-214
```

3.4 Testing the disk drive

The CONVEX VMEbus Sabre 5 SMD disk drive is tested by the *dev5130* diagnostic program. This program verifies the operation of the Sabre 5 SMD disk drive. The *dev5130* diagnostic program:

- Verifies the functional ability of the CONVEX SMD disk controller to operate in the CONVEX VMEbus I/O environment
- Formats disk drives
- Verifies previously formatted disk drives
- Performs disk maintenance such as slipping of bad sectors and mapping bad tracks to alternate tracks. All maintenance operations can be performed nondestructively so user data can be retained

Caution

Some subtests in *dev5130* are data destructive.

The *dev5130* diagnostic program is an offline program that must be executed on the SPU while the CPU is halted. The procedures for executing this test are beyond the scope of this manual. This information is contained in the *CONVEX PBUS I/O System Diagnostics Manual*; consult that manual before running CONVEX diagnostics.

4.1 Overview

This chapter gives preservice procedures, removal and replacement procedures, postservice procedures, an Illustrated Parts Breakdown (IPB), and CONVEX part numbers for the CONVEX VMEbus Sabre 5 SMD disk drive.

4.2 Preservice procedures

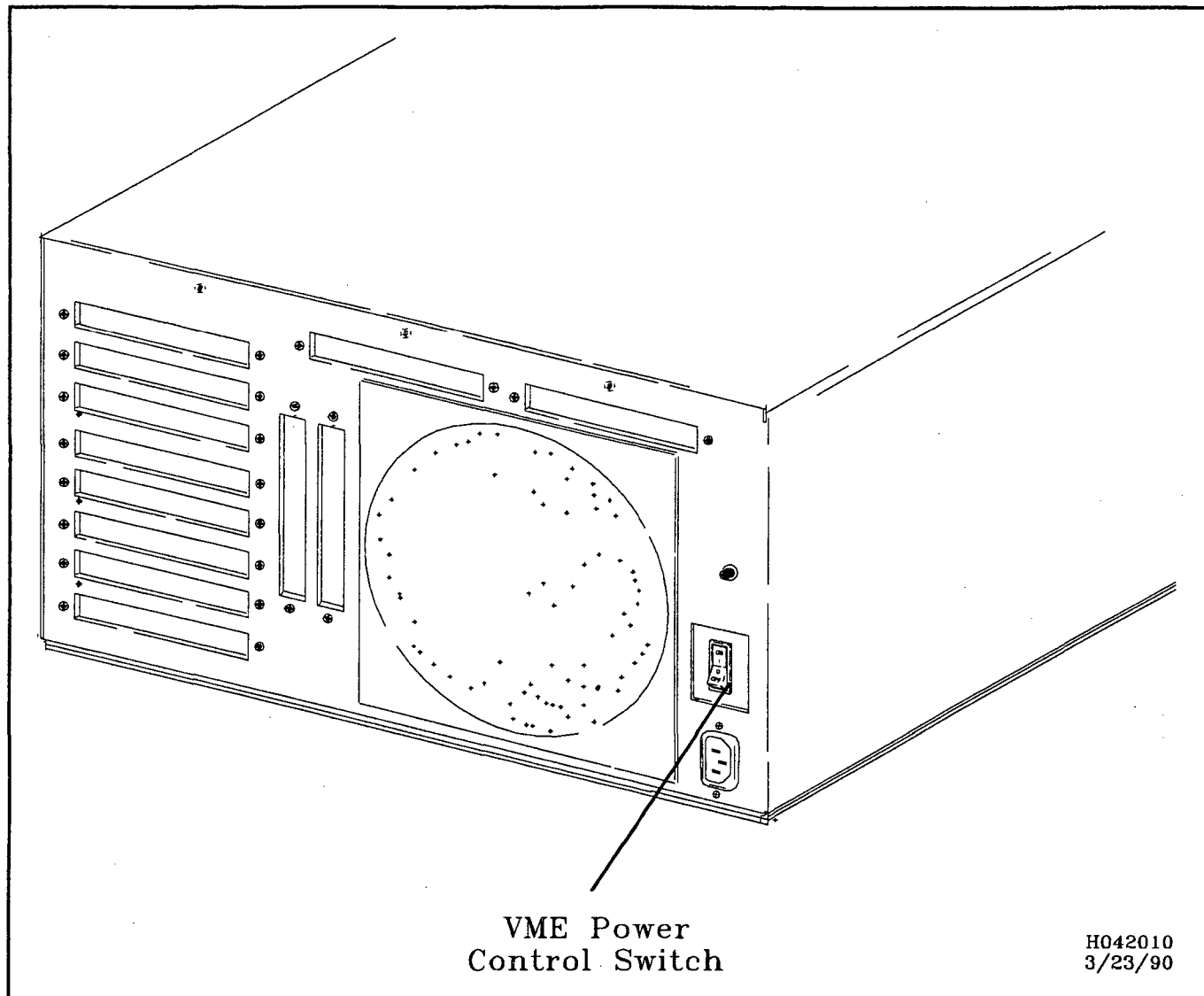
Preservice procedures for the CONVEX VMEbus Sabre 5 SMD disk drive apply to most servicing operations. For example, the expansion cabinet stabilizer bars must be extended during most servicing operations. These safety procedures must be used during all the removal and replacement procedures described in this chapter.

Caution

Power *must* be removed from the VMEbus chassis before disconnecting and connecting the CONVEX SMD disk controller. Failure to do so will cause damage to equipment.

1. Set the VMEbus chassis power control switch to the **OFF** position.
Figure 4-1 shows the VMEbus chassis and the power control switch:

Figure 4-1 VMEbus chassis power control switch

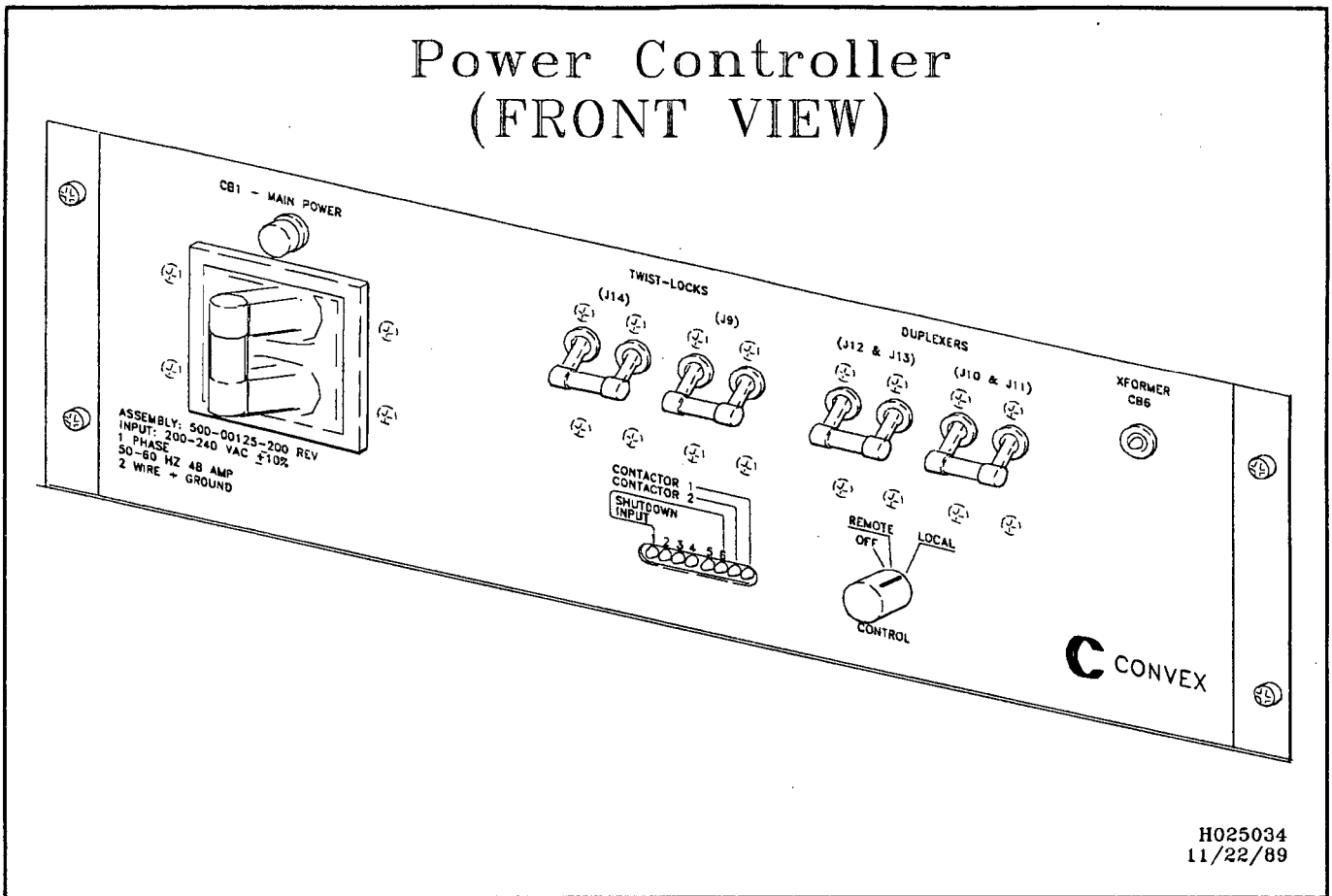


Caution

Remove power to the expansion cabinet before removing or servicing any equipment. Failure to do so will cause damage to electronic equipment components.

2. Remove power to the expansion cabinet.
 - To remove power from a CONVEX EXP-101 or EXP-102 expansion cabinet, disconnect the AC power cord from the AC power source.
 - To remove power from a CONVEX EXP-105 or EXP-106 expansion cabinet, set the main power control switch to the OFF position. Figure 4-2 shows the main power control switch:

Figure 4-2 Power controller main power switch

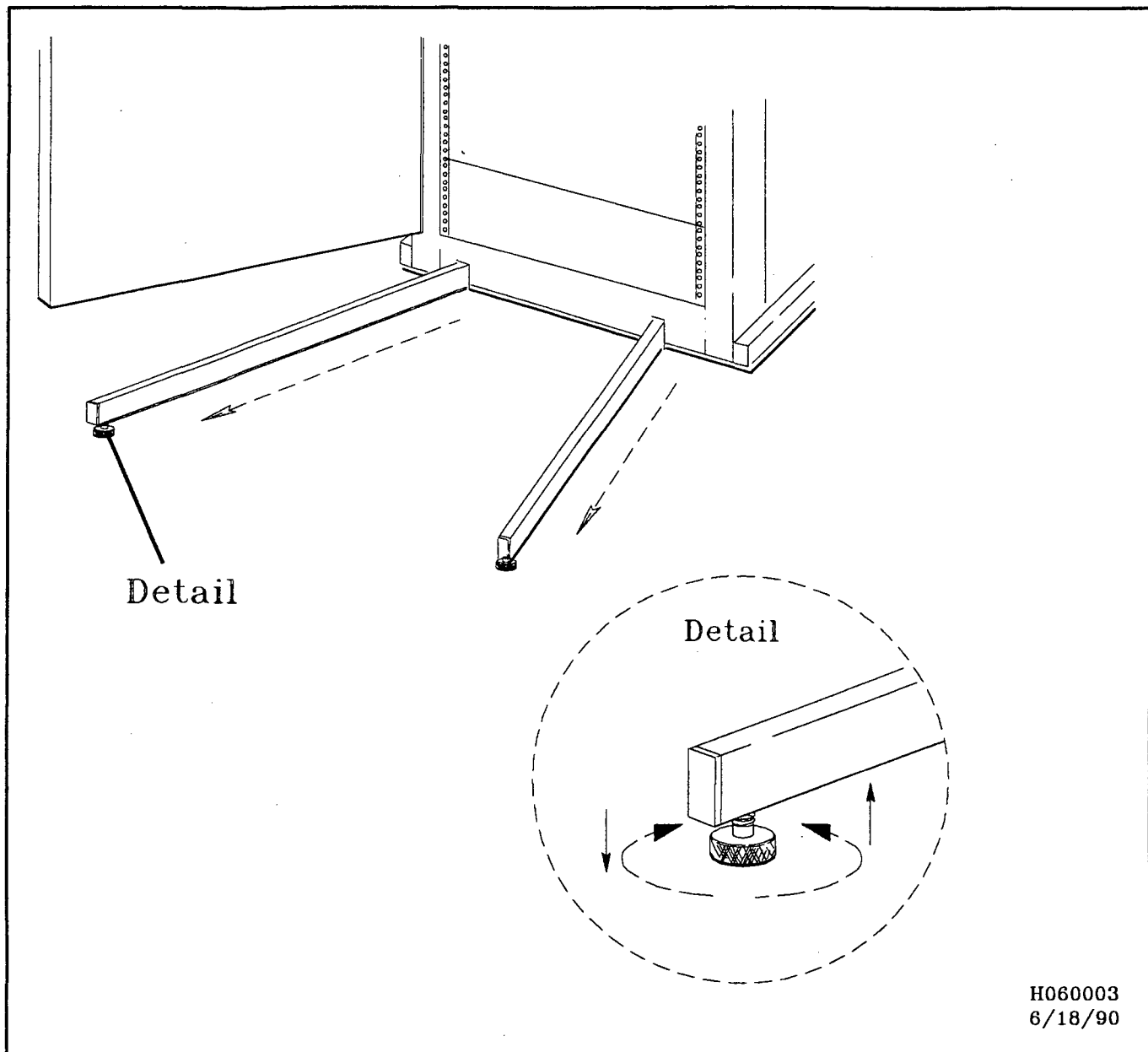


Warning

Expansion cabinet stabilizer bars *must* be extended prior to extending any component installed in the expansion cabinet. Failure to do so will make the expansion cabinet unstable, increase the possibility of it falling forward, can cause injury to personnel, and will cause damage to equipment.

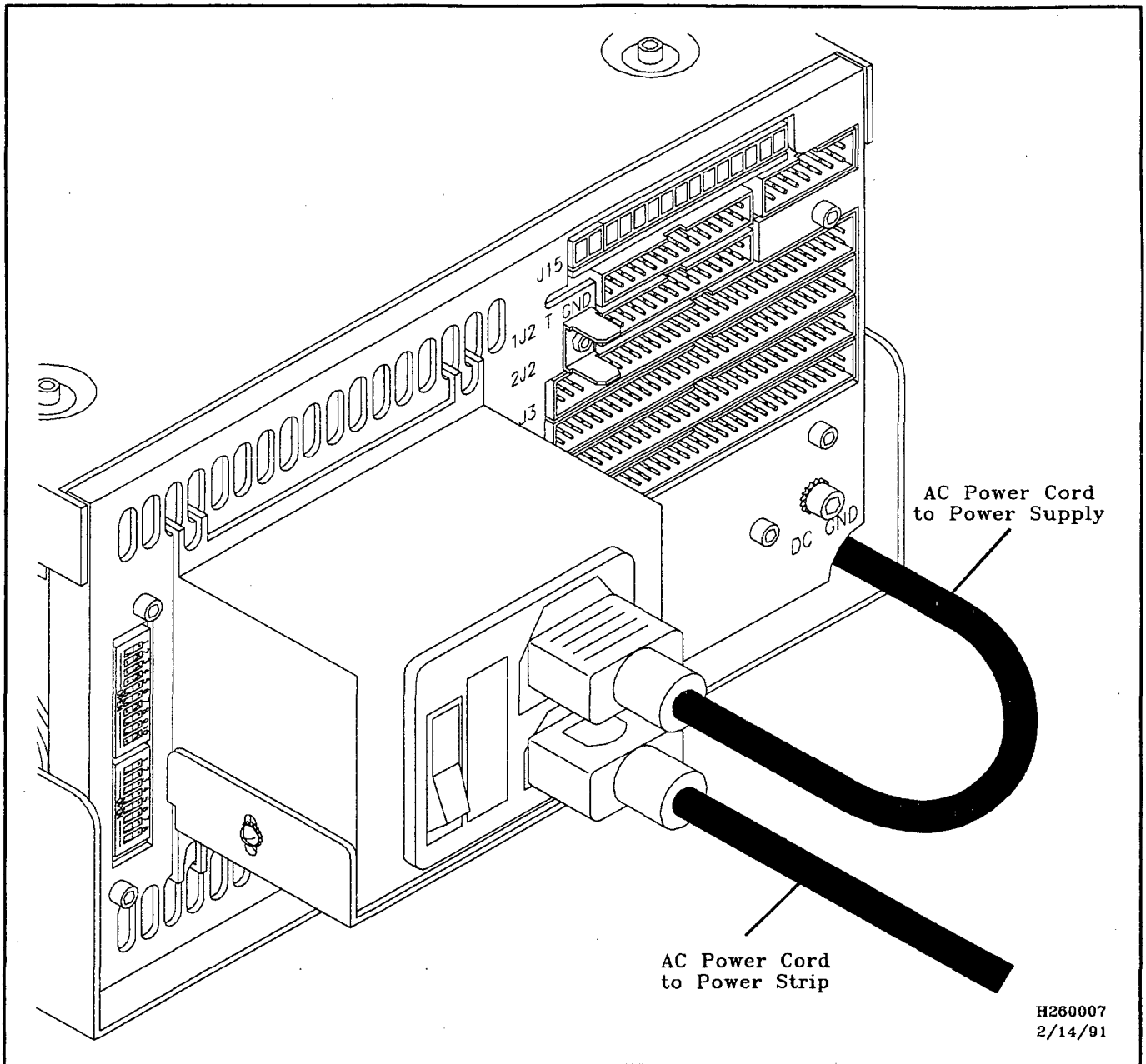
3. Extend the expansion cabinet stabilizer bars and adjust the feet until they are in firm contact with the floor. Figure 4-4 shows the expansion cabinet stabilizer bars:

Figure 4-3 Expansion cabinet stabilizer bars



4. Remove the expansion cabinet rear panel.
5. Turn the AC power switches on the rear of both disk drives in the tray to the OFF position and disconnect each AC power cord from the AC power cord connectors. Figure 4-4 shows the AC power switch, AC power cord, and the AC power cord connector:

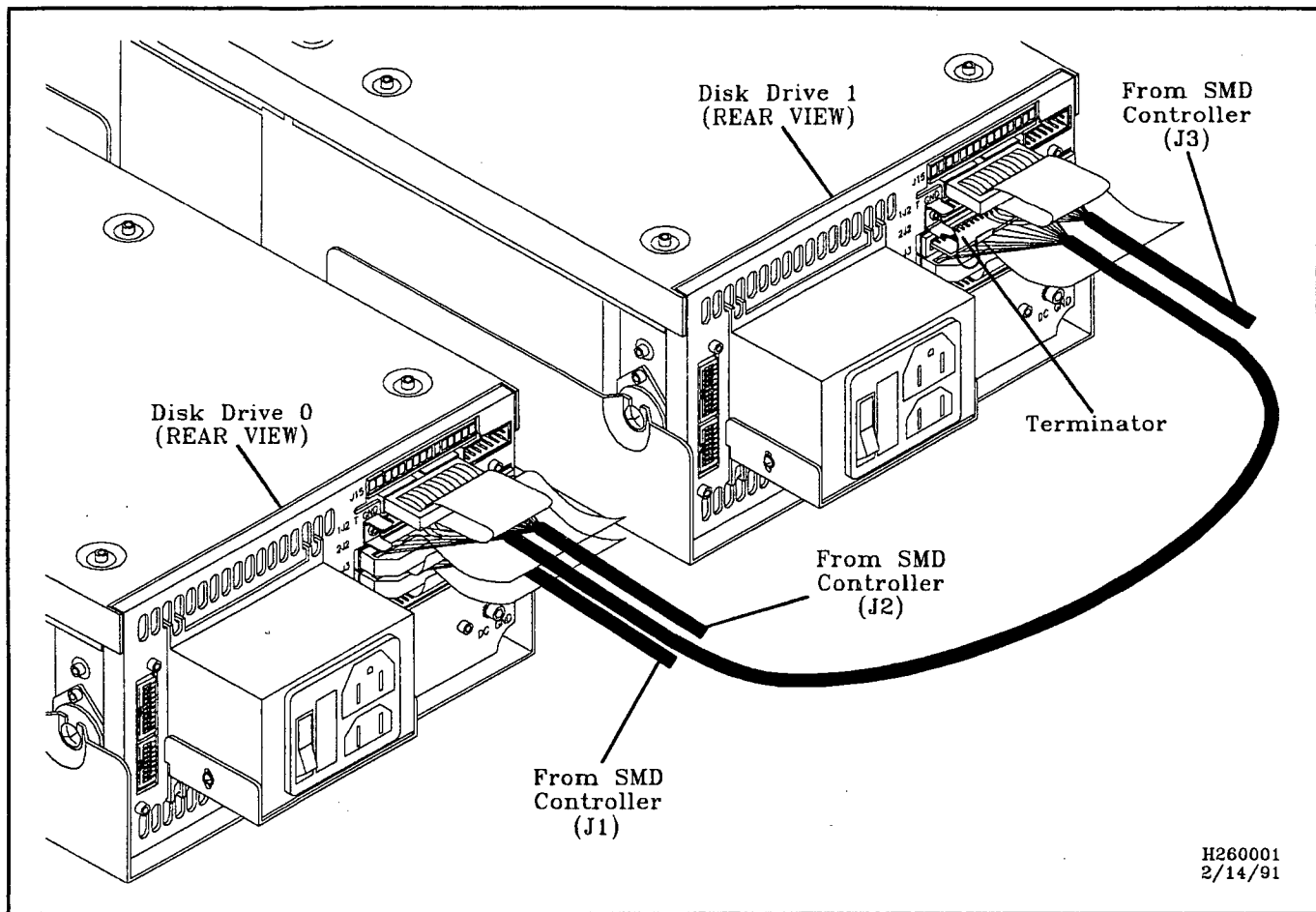
Figure 4-4 AC power cord and AC power switch



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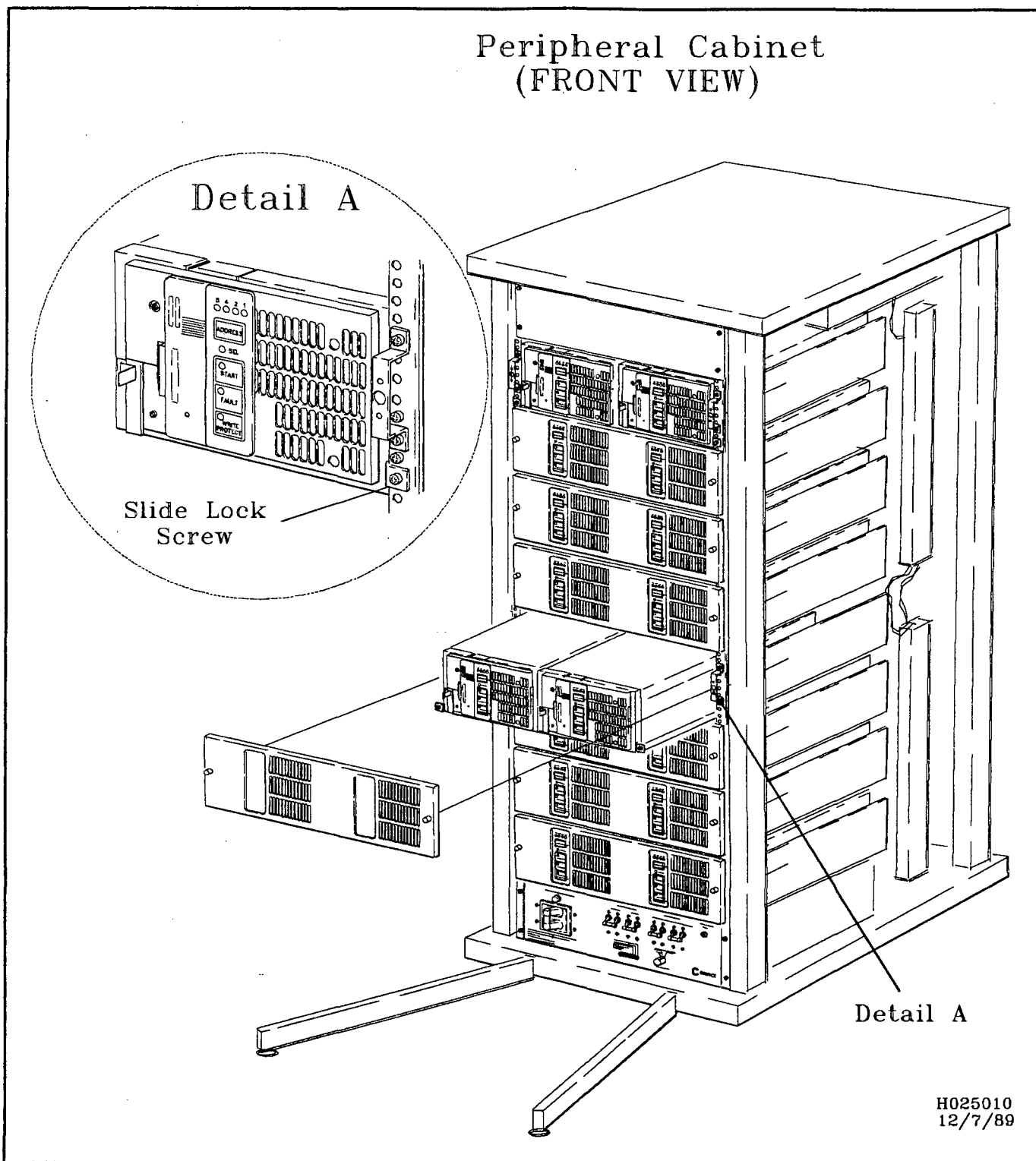
6. Mark and disconnect the cables connected to the 1J02, the 1J04, and (if necessary) the 1J03 connector on the rear or both disk drives in the disk drive tray. Figure 4-5 shows the disk drives and their cables:

Figure 4-5 Disk drive cable connections



7. Release the two front cover captive-lock screws and remove the front panel. Figure 4-6 shows the front panel.
8. Release the two front chassis captive-lock screws and extend the disk drive tray on its slides. Figure 4-6 shows the captive-lock screws:

Figure 4-6 Front cover and slide lock screws



4.3 Removal and replacement procedures

This section gives removal and replacement procedures for the Field Replaceable Units (FRUs) of the CONVEX VMEbus Sabre 5 SMD disk drive.

4.3.1 Disk drive module

This section gives removal and replacement procedures for the Sabre 5 SMD disk drive module

4.3.1.1 Removal

1. Complete the steps listed in Section 4.2, "Preservice procedures," of this chapter.

Caution

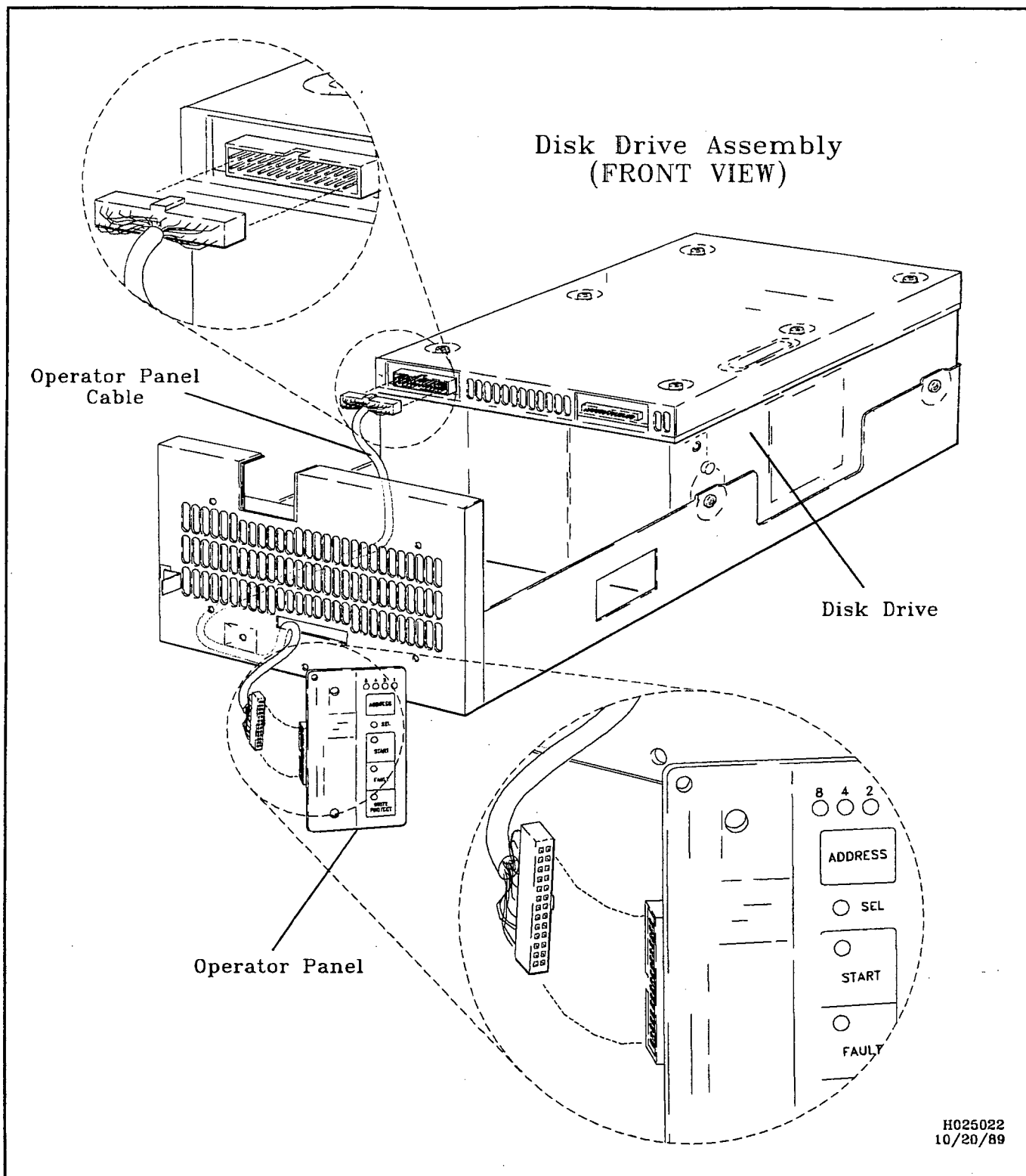
The operator panel can be damaged by Electrostatic Discharge (ESD). A ground wrist strap (or other grounding method) must be used when handling the operator panel. Failure to do so could cause electronic damage to the operator panel.

Note

To remove the drive assembly locking screw located behind the bottom edge of the operator panel, the operator panel must be removed.

2. Remove the two screws in the operator panel and disconnect the operator panel cable from the operator panel. Figure 4-7 shows the operator panel and the operator panel cable:

Figure 4-7 Operator panel and operator panel cable



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3. Remove the drive assembly locking screw located on the front of the disk drive tray.

Warning

The drive assembly with 2 disk drives weighs 60.0 lbs (27.2 kg). Two people are required to install or remove a drive assembly. Failure to do so may cause injury to personnel and equipment damage.

4. Press the drive assembly tray lock to the right, then lift the drive assembly tray free of the disk drive tray.
5. Disconnect the AC power cord from the assembly AC jack at the rear of the disk drive.
6. Remove the two locking screws on the connection cover plate and remove the plate.
7. Loosen the four disk drive module mounting screws and remove the ground strap locking screw located above the disk drive module mounting screw.

Caution

The DC power and operator panel cables must be disconnected from the disk module while removing the disk drive module from the drive assembly tray. Failure to do so may cause damage to the cables or cable connections if the disk drive module is moved too far away from the power supply.

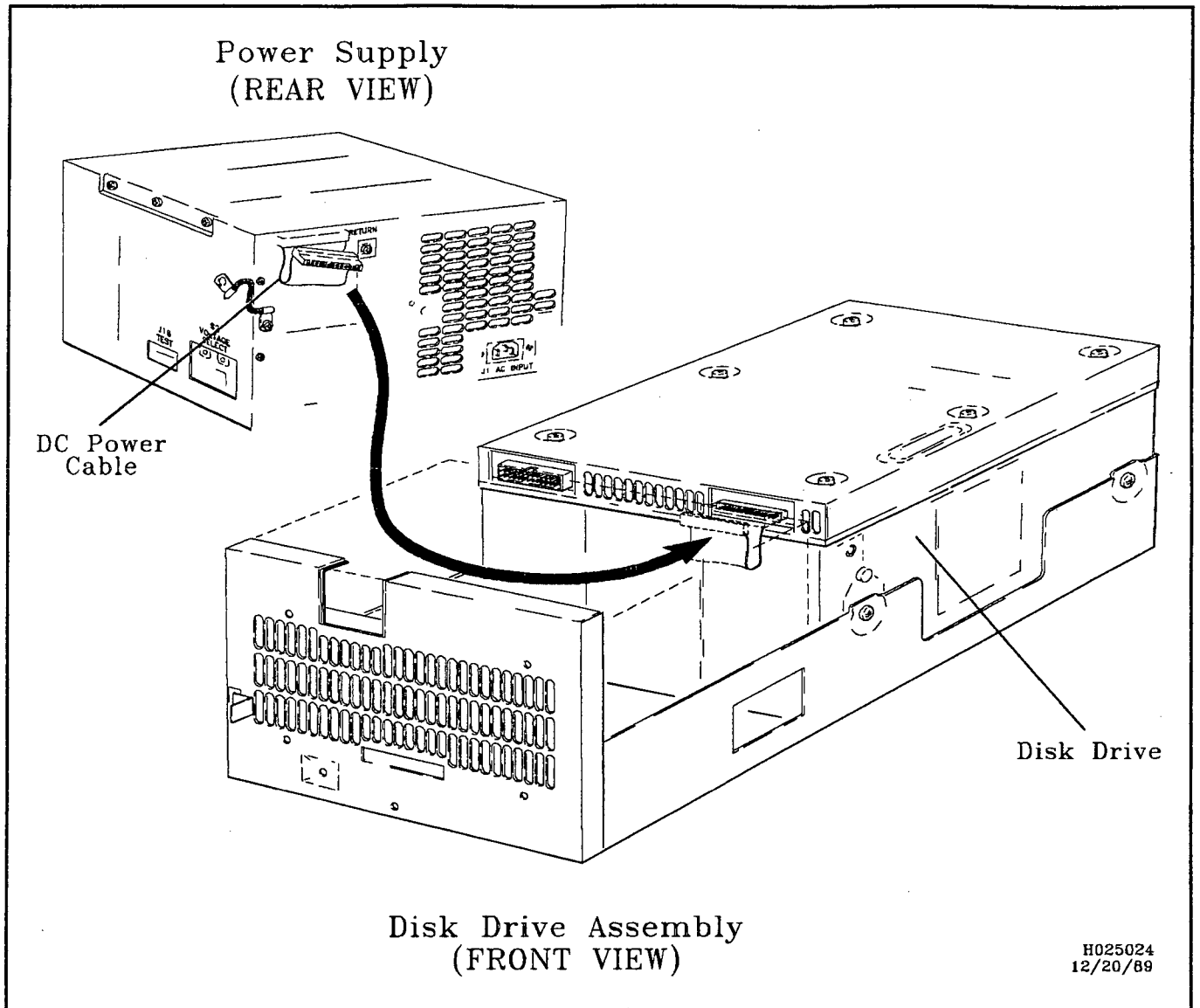
8. Lift the disk drive module until the disk drive module mounting screws are above the sides of the drive assembly tray. Then move the disk drive module to the rear of the disk assembly tray to allow access to the DC power and the operator panel cable connectors.

Note

Lower the disk drive module into the drive assembly tray and place the disk drive module to the rear of the disk assembly tray to allow access to the DC power and the operator panel cable connectors.

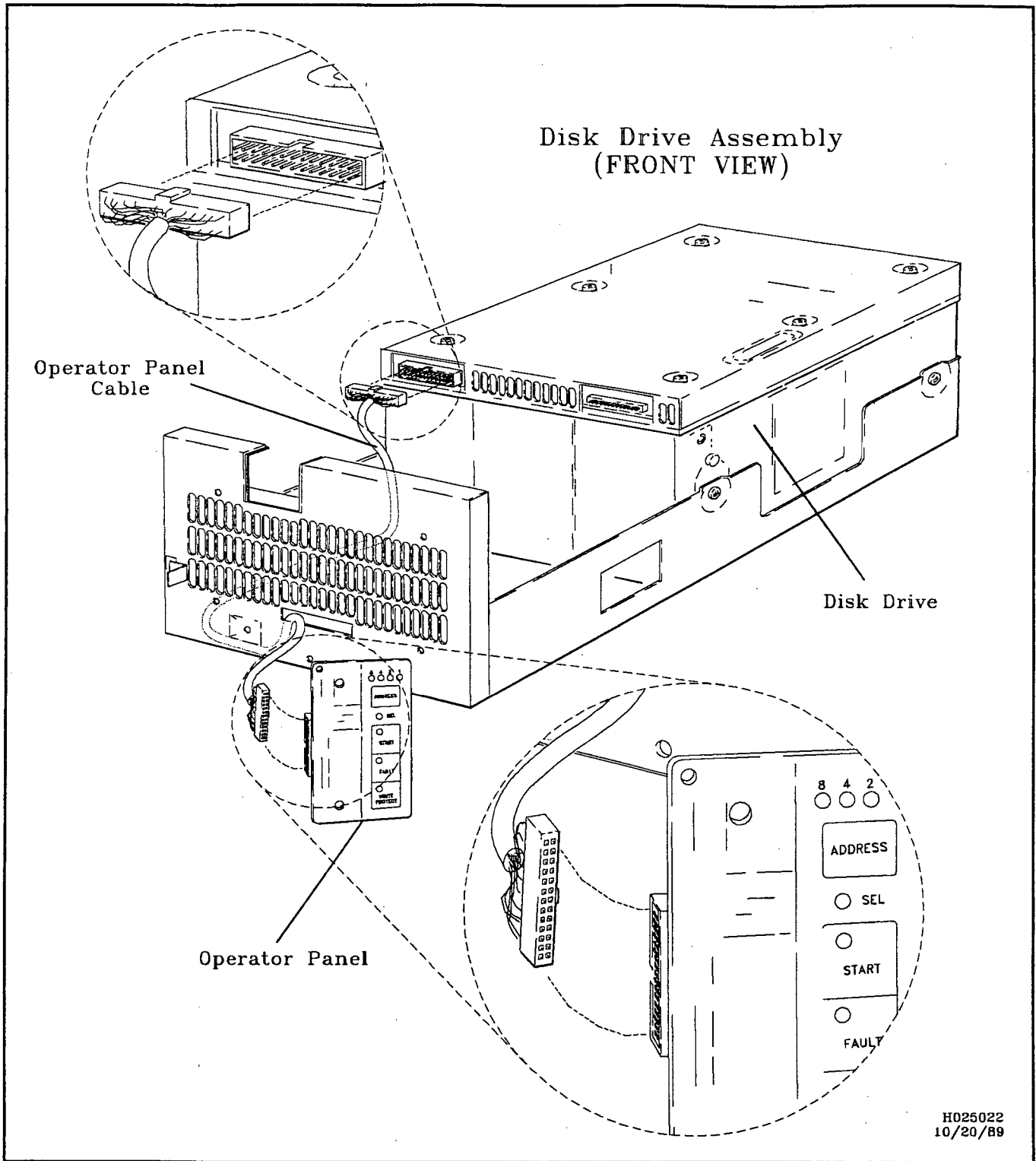
9. Disconnect the DC power cable from the disk drive module. Figure 4-8 shows the DC power cable:

Figure 4-8 DC power cable



10. Disconnect the operator panel cable from the disk drive module. Figure 4-9 shows the operator panel and the operator cable:

Figure 4-9 Operator panel and cable



11. Remove the disk drive module from the drive assembly tray.

4.3.1.2 Replacement

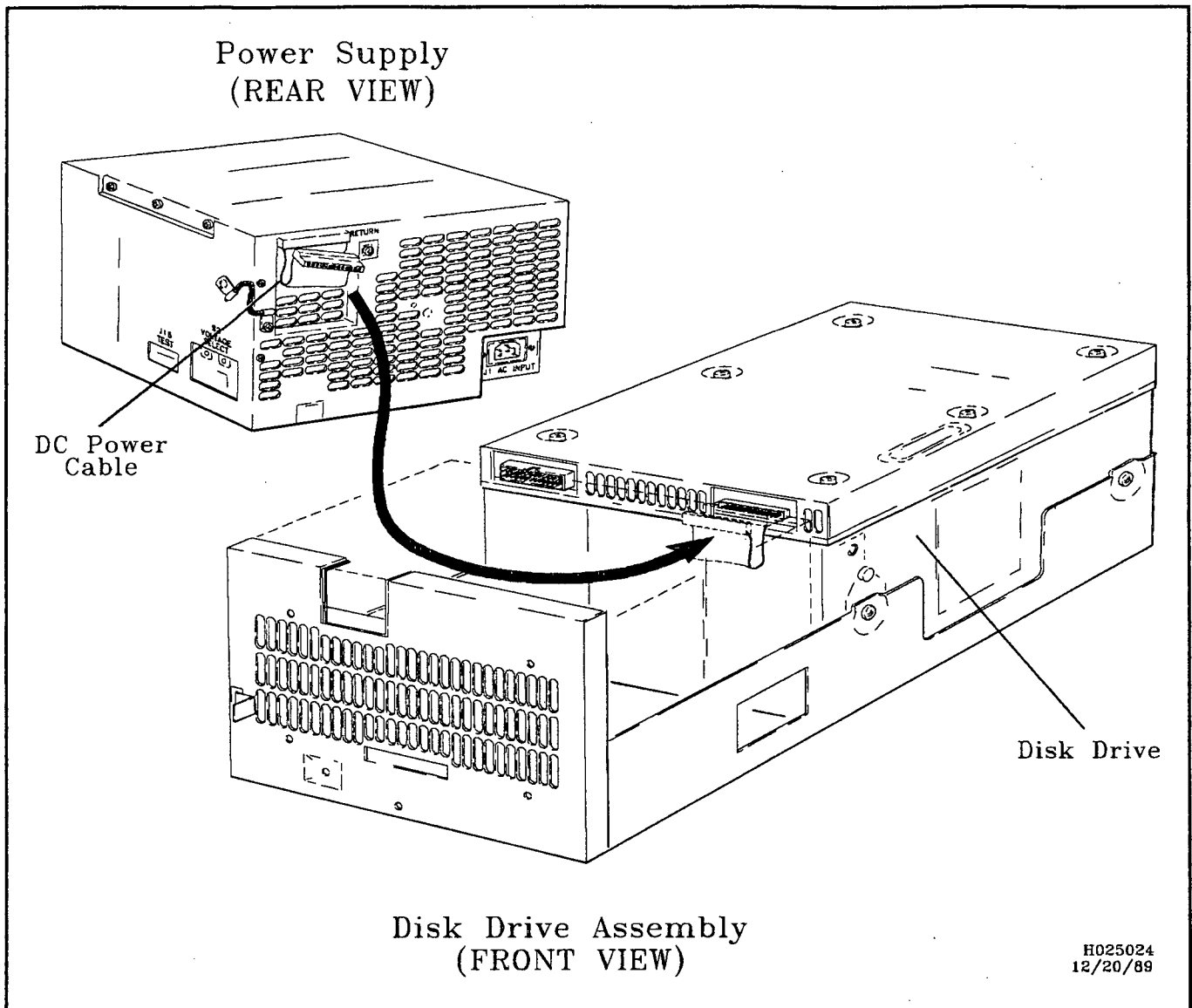
1. Ensure the steps listed in Section 4.2, "Preservice procedures," of this chapter are completed.

Note

When lowering the disk drive module into the drive assembly tray, place the disk drive module to the rear of the disk assembly tray to allow access to the DC power and the operator panel cable connectors.

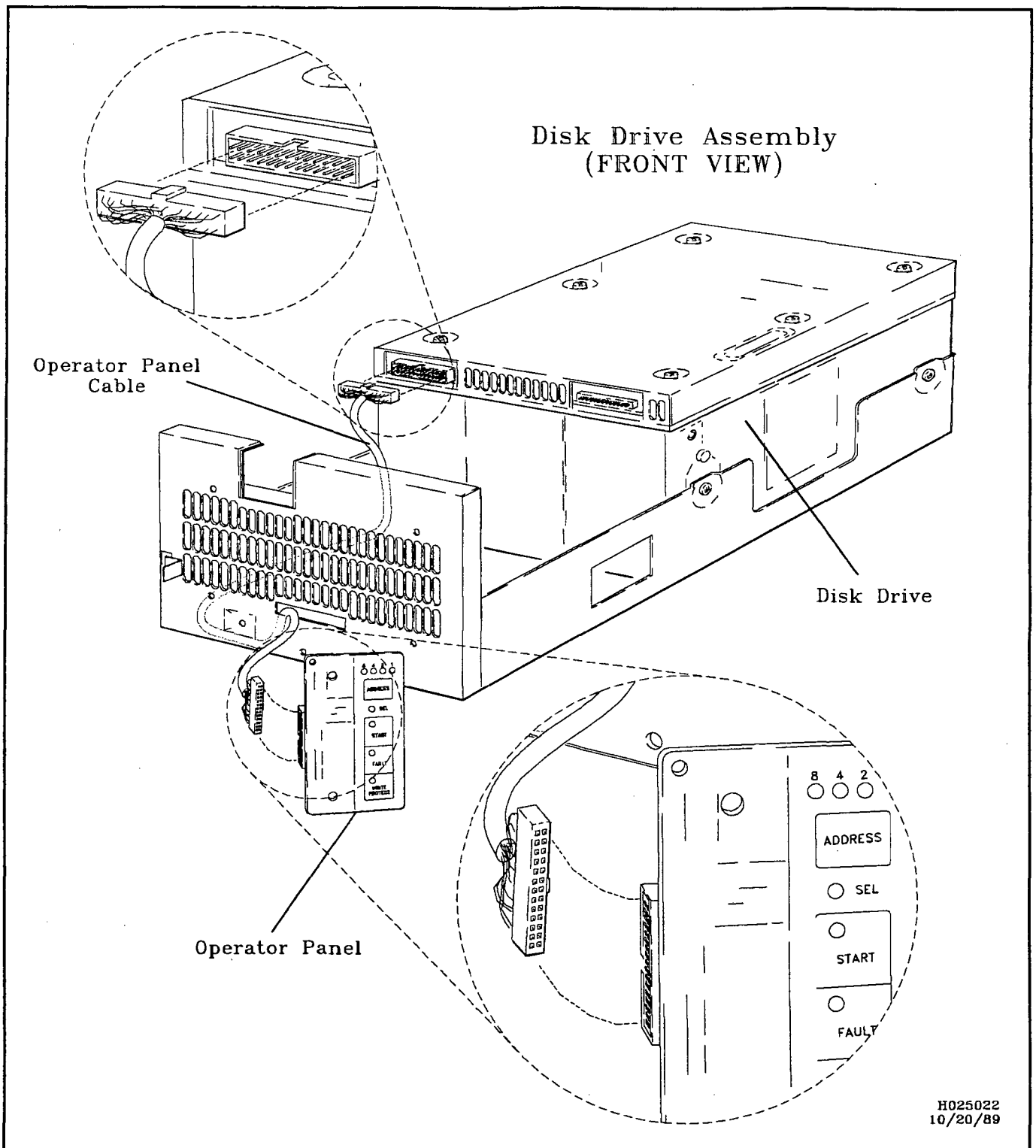
2. Lower the disk drive module into the drive assembly tray until the disk drive module mounting screws are supported by the sides of the drive assembly tray.
3. Connect the DC power cable to the disk drive module. Figure 4-10 shows the DC power cable:

Figure 4-10 DC power cable



4. Connect the operator panel cable to the disk drive module. Figure 4-11 shows the operator panel and the operator panel cable:

Figure 4-11 Operator panel and cable



5. Move the disk drive module forward in the drive assembly tray until the disk drive module mounting screws are aligned with the slots in the sides of the drive assembly tray.
6. Lower the disk drive module and secure the disk drive module with the four disk drive module mounting screws.

7. Secure the ground strap located above the disk drive module screw with the locking screw.
8. Install the connection cover plate and secure with the two locking screws.

Warning

The drive assembly with 2 disk drives weighs 60.0 lbs (27.2 kg). Two people are required to install or remove a drive assembly. Failure to do so may cause injury to personnel and equipment damage.

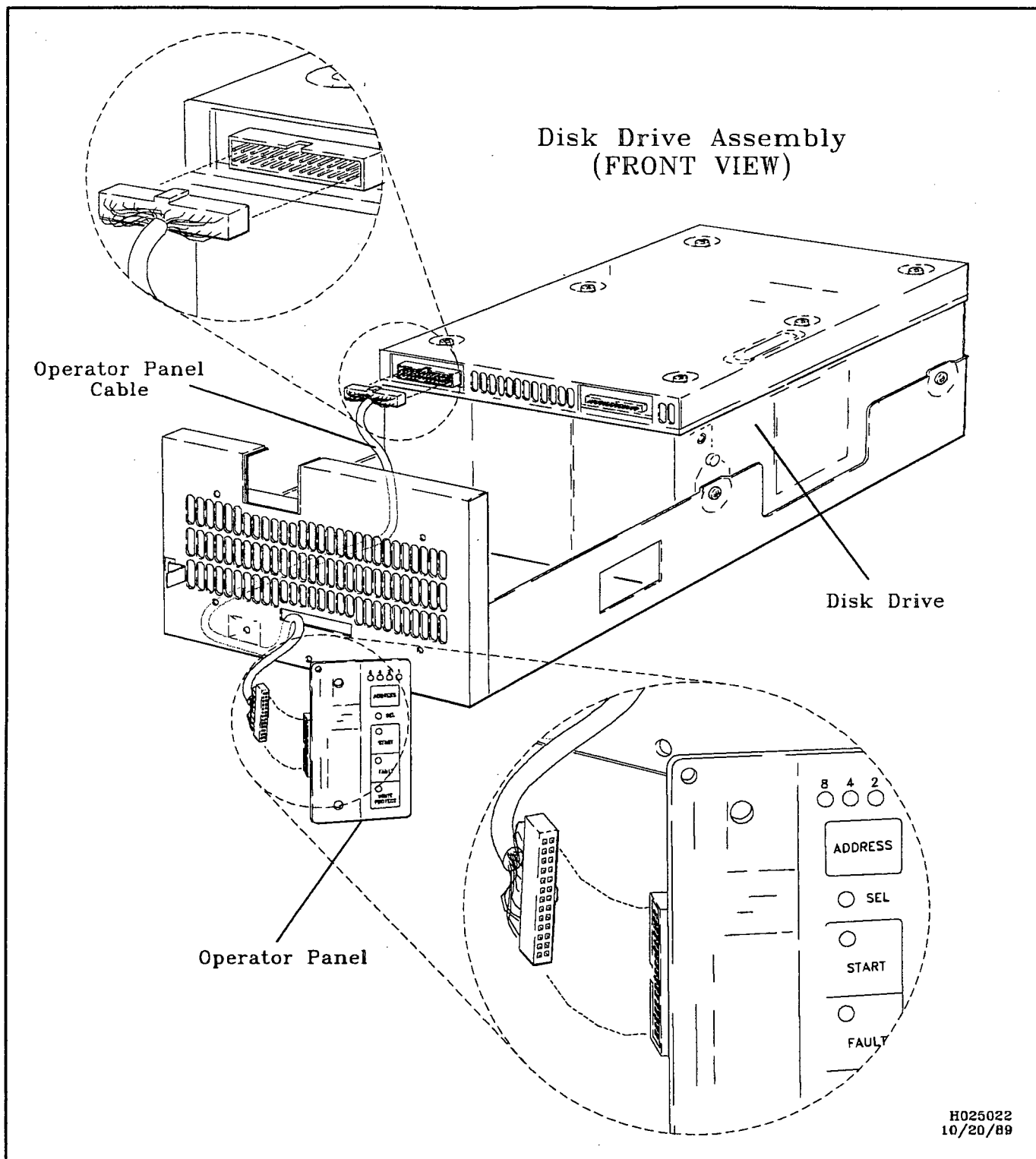
9. Press the drive assembly tray lock to the right, then lower the drive assembly tray into the disk drive tray.
10. Install the drive assembly locking screw located on the front of the disk drive tray.

Caution

The operator panel can be damaged by Electrostatic Discharge (ESD). A ground wrist strap (or other grounding method) must be used when handling the operator panel. Failure to do so could cause electronic damage to the operator panel.

11. Connect the operator panel cable to the operator panel. Figure 4-12 shows the operator panel and the operator panel cable:

Figure 4-12 Operator panel and cable



12. Install the two screws in the operator panel.
13. Complete the steps listed in Section 4.4, "Postservice procedures," of this chapter.

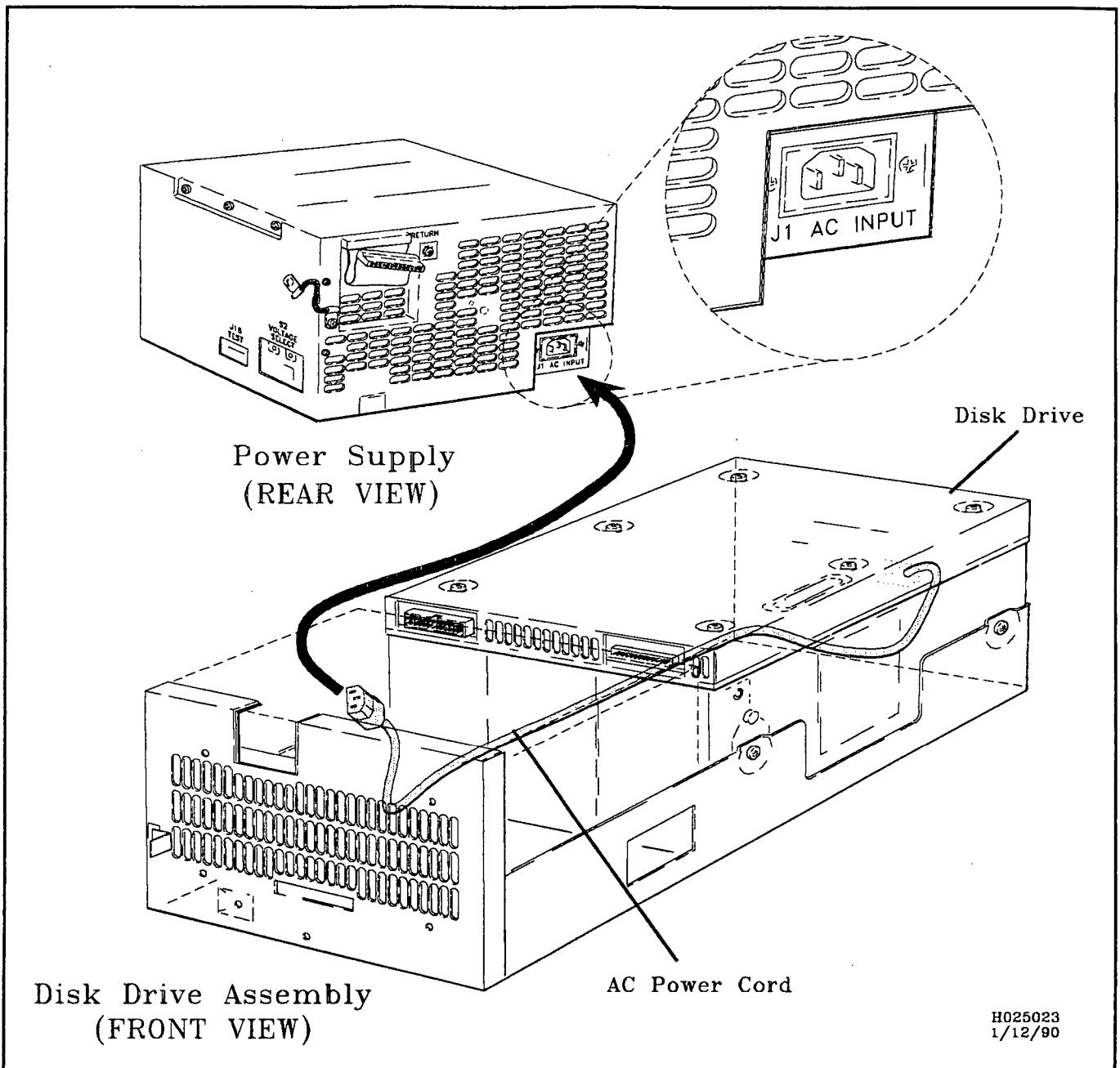
4.3.2 Power supply

This section gives removal and replacement procedures for the Sabre 5 SMD disk drive power supply.

4.3.2.1 Removal

1. Complete the steps listed in Section 4.2, "Preservice procedures," of this chapter.
2. Remove the disk drive module from the drive assembly tray. Refer to Section 4.3.1, "Disk drive module," Subsection 4.3.1.1, "Removal," of this chapter for the procedure to remove the disk drive module.
3. Disconnect the AC power cord from the power supply. Figure 4-13 shows the power supply and the power supply AC power cord:

Figure 4-13 Power supply AC power cord



Note

The drive assembly tray should be turned on its side to allow access to the power supply mounting screws.

4. Turn the drive assembly tray on its side.
5. Remove the four power supply mounting screws and remove the power supply from the drive assembly.
6. Disconnect the DC power cable from the power supply.

7. If the replacement power supply does not have a ground strap, remove the ground strap located below the DC power cable connection on the power supply.

4.3.2.2 Replacement

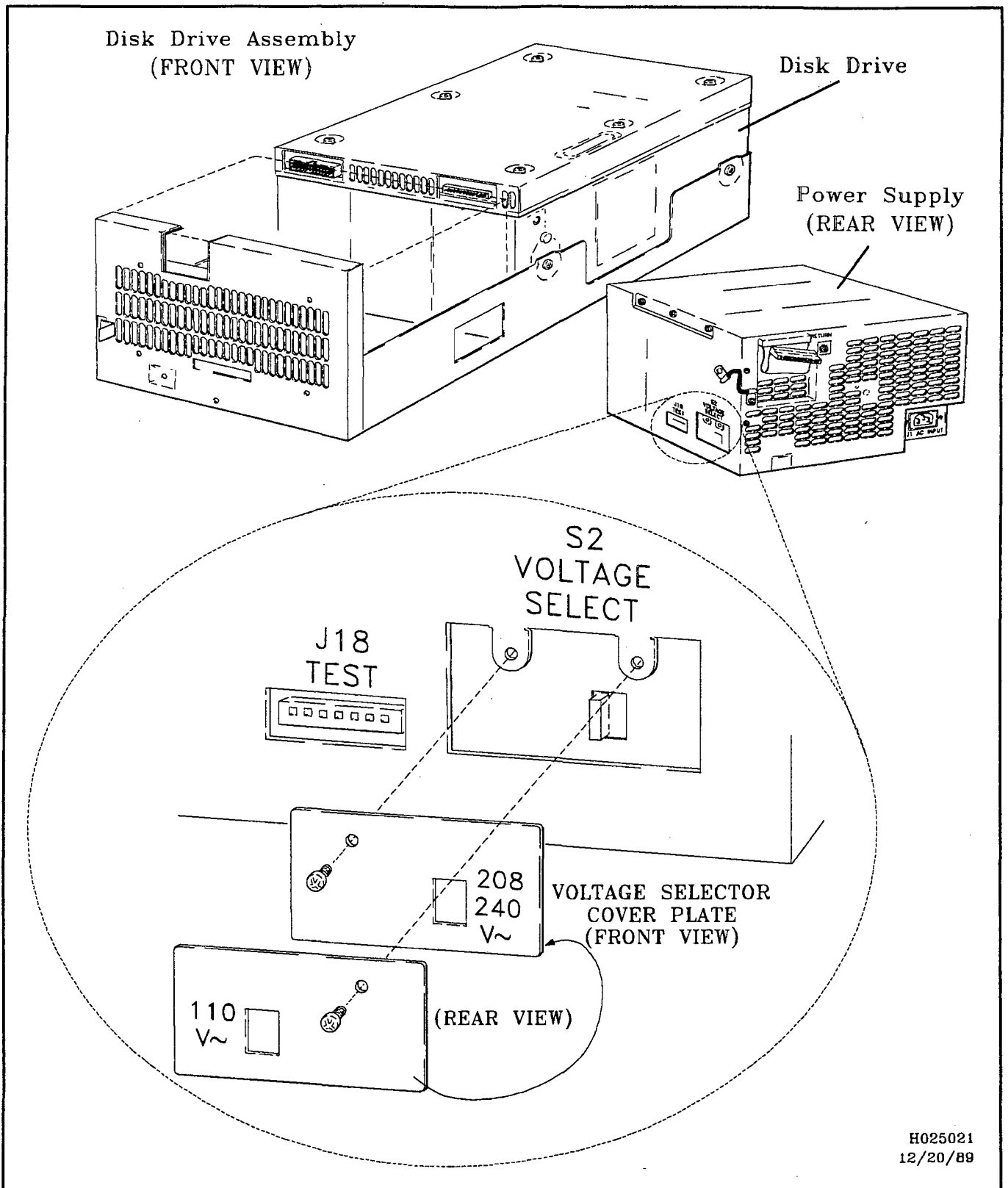
1. Ensure steps listed in Section 4.2, "Preservice procedures," of this chapter are completed.

Caution

Ensure that the power supply voltage switch is set to the proper position. Failure to do so will cause damage to equipment.

2. Verify the power supply voltage switch setting is correct. If the voltage switch setting is incorrect, remove the screw holding the voltage selector cover plate, set the switch as needed, and replace the voltage selector cover plate. Figure 4-14 shows the power supply, the power supply voltage switch, and the voltage selector cover plate:

Figure 4-14 Power supply voltage switch



3. Set the ON/STANDBY switch on the front of the power supply to the ON position.

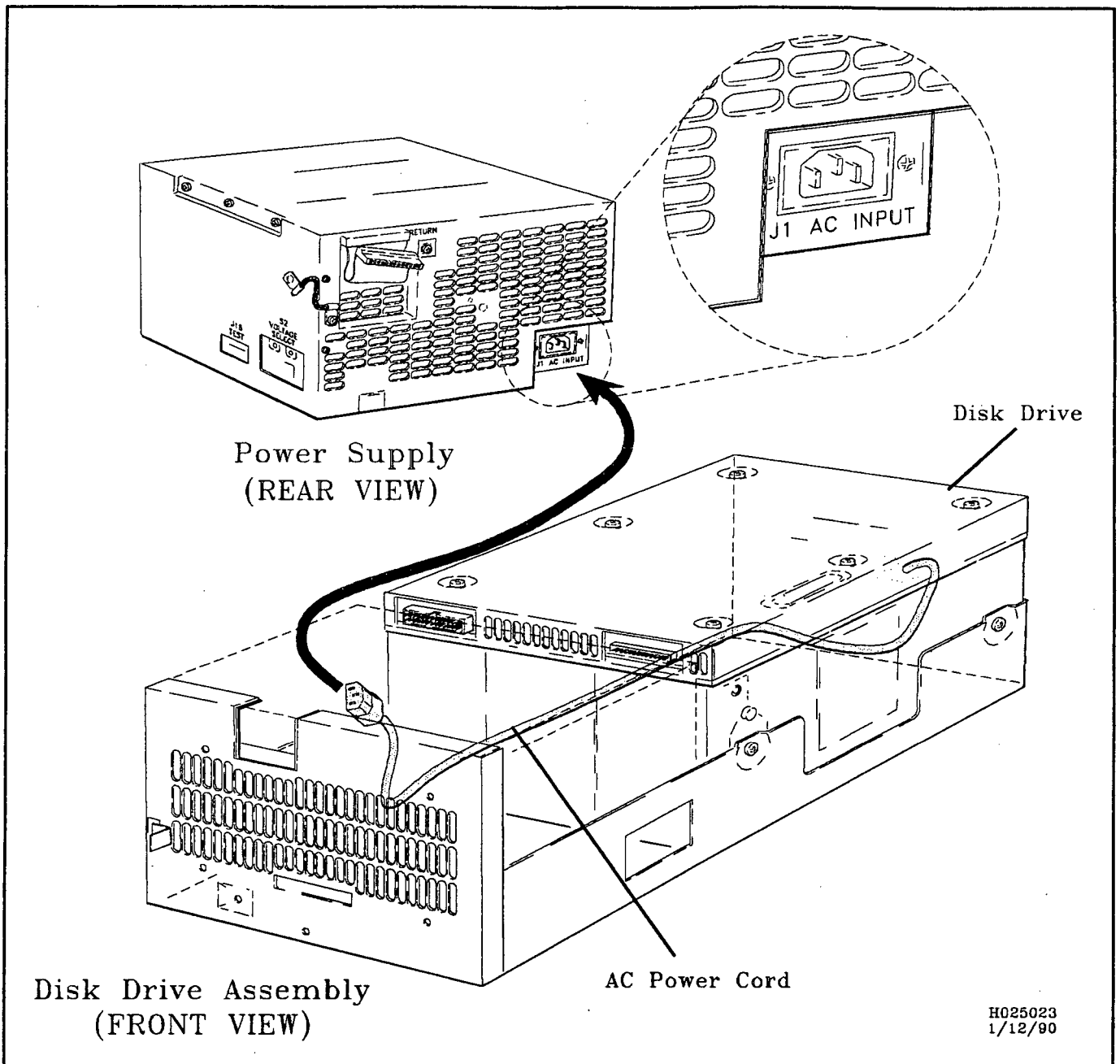
4. If the replacement power supply does not have a ground strap, install a ground strap below the DC power cable connection on the power supply.
5. Connect the DC power cable to the power supply.

Note

The drive assembly tray should be turned on its side to allow access to the power supply mounting screws.

6. Place the power supply in the drive assembly tray.
7. Move the power supply forward in the disk assembly tray until the mounting holes in the power supply are aligned with the holes in the disk assembly tray.
8. Secure the power supply with the four power supply mounting screws.
9. Return the drive assembly tray to an upright position.
10. Connect the AC power cord to the power supply. Figure 4-15 shows the power supply AC power cord:

Figure 4-15 Power supply AC power cord



11. Replace the disk drive module from the drive assembly tray. Refer to Section 4.3.1, "Disk drive module," Subsection 4.3.1.2, "Replacement," of this chapter for the procedure to replace the disk drive module.
12. Complete the steps listed in Section 4.4, "Postservice procedures," of this chapter.

4.3.3 I/O board

This section gives removal and replacement procedures for the Sabre 5 SMD disk drive I/O board.

4.3.3.1 Removal

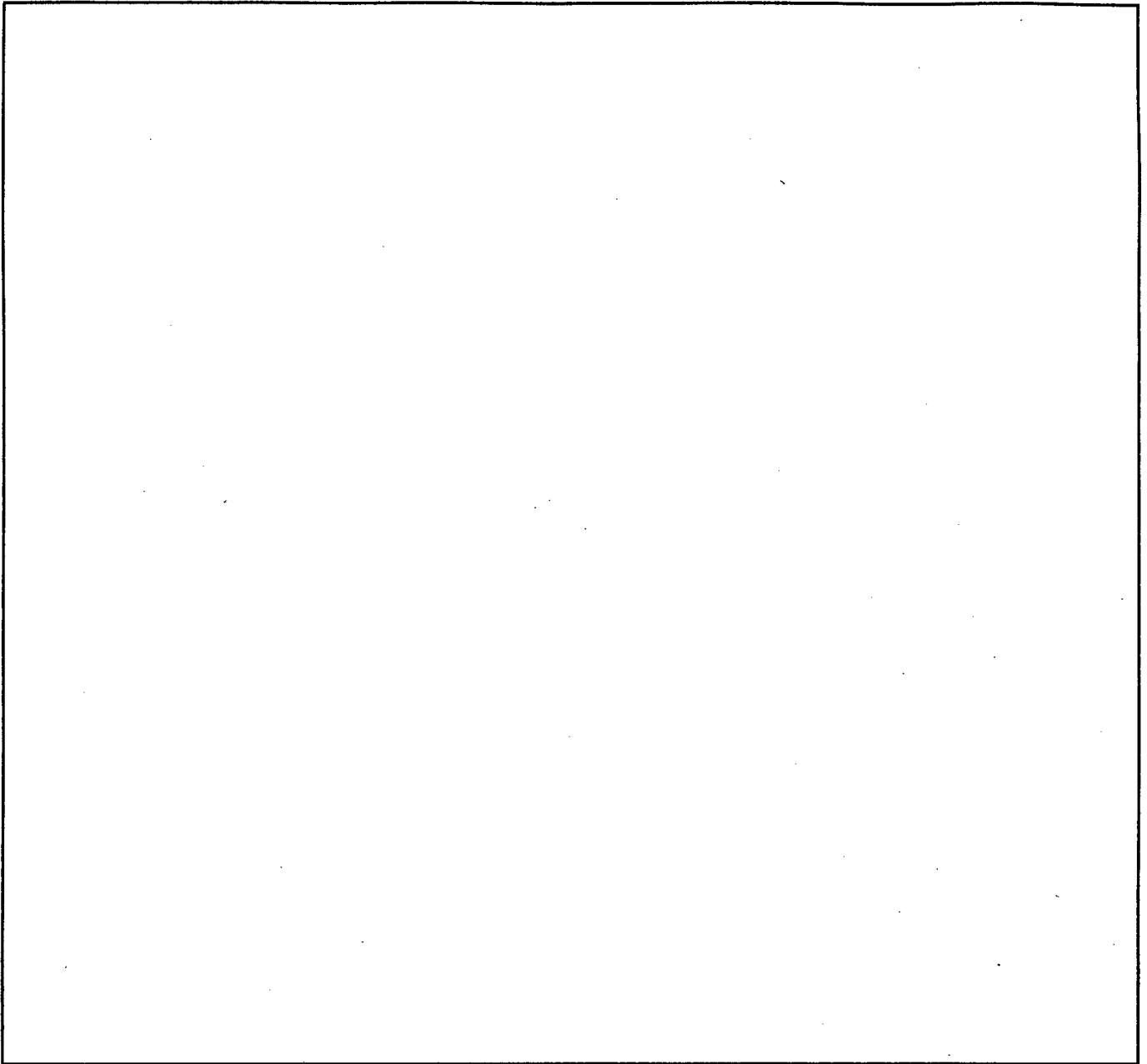
1. Complete the steps listed in Section 4.2, "Preservice procedures," of this chapter.
2. Remove the disk drive module from the drive assembly tray. Refer to Section 4.3.1, "Disk drive module," Subsection 4.3.1.1, "Removal," of this chapter for the procedure to remove the disk drive module.
3. Remove the screws securing the top cover to the drive.
4. Remove the I/O cover and cable clamps from the I/O cable bracket.

Caution

Remove terminators by hand. A pliers or other tools may damage equipment.

5. Disconnect the I/O cables and terminator from the disk drive.
6. Remove the screws securing the rear panel and the I/O board. Figure 4-16 shows the I/O board disassembly:

Figure 4-16 I/O board assembly



7. Remove the rear panel from the disk drive.
8. Remove the I/O board by disconnecting the J20 connector from the P20 connector on the control board.

4.3.3.2 Replacement

1. Ensure steps listed in Section 4.2, "Preservice procedures," of this chapter are completed.
2. Ensure all the circuit board switches are set to match the removed board.
3. Align the J20 connector on the I/O board with the P20 connector on the control board and push the two connectors together. Figure 4-16 shows the I/O board assembly:
4. Align the rear panel to the I/O board and secure rear panel with screws.

5. Connect I/O cables and terminator, if necessary, to disk drive connectors.
6. Replace the disk drive module from the drive assembly tray. Refer to Section 4.3.1, "Disk drive module," Subsection 4.3.1.2, "Replacement," of this chapter for the procedure to replace the disk drive module.
7. Complete the steps listed in Section 4.4, "Postservice procedures," of this chapter.

4.3.4 Control board

This section gives removal and replacement procedures for the Sabre 5 SMD disk drive control board.

4.3.4.1 Removal

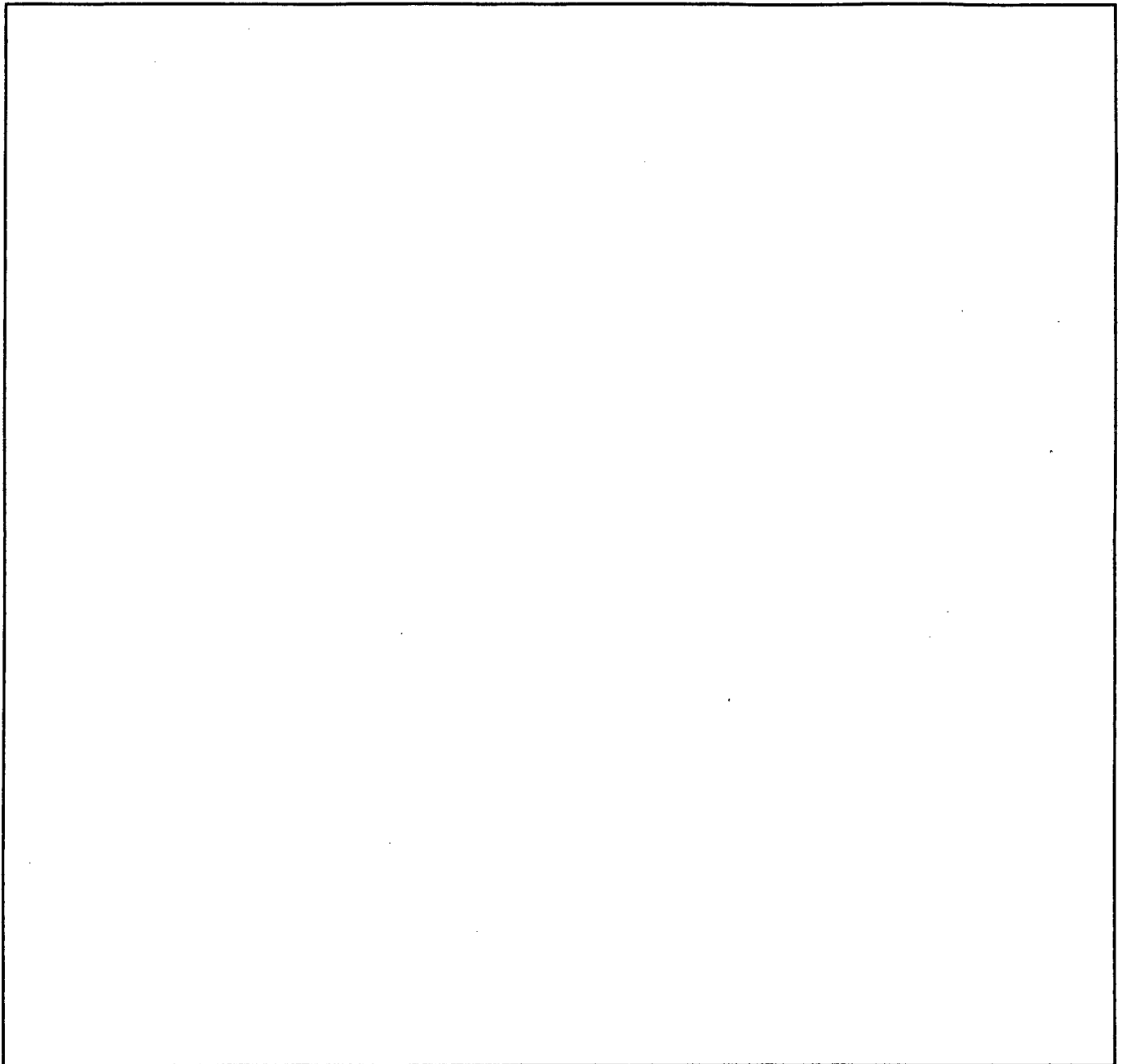
1. Complete the steps listed in Section 4.2, "Preservice procedures," of this chapter.
2. Remove the disk drive module from the drive assembly tray. Refer to Section 4.3.1, "Disk drive module," Subsection 4.3.1.1, "Removal," of this chapter for the procedure to remove the disk drive module.
3. Remove the I/O board. Refer to Section 4.3.3, "I/O board," Subsection 4.3.3.1, "Removal," of this chapter for the procedure to remove the I/O board.
4. Remove the hex standoffs securing the control board to the disk drive module.

Caution

Pins on P24 and P28 on the control board are not protected in a connector. Take precautions not to bend these pins after the control board is removed from the disk drive module. Failure to do so will cause the control board not to align properly with the disk drive module.

5. Disconnect P24 from the J24 and P28 from the J28 by carefully lifting up on the board to remove it from the disk drive module. Figure 4-17 shows the control board disassembly:

Figure 4-17 Control board assembly



4.3.4.2 Replacement

1. Ensure steps listed in Section 4.2, "Preservice procedures," of this chapter are completed.

Caution

Ensure there are no bent pins on P24 and P28 on the control board prior to attaching the board to the disk drive module. Failure to do so will cause the control board not to align properly with the disk drive module.

2. Ensure all the circuit board switches are set to match the removed board.

3. Place the control board on the disk drive module guide pins. Figure 4-17 shows the control board assembly:
4. Align P24 to J24 and P28 to J28 and push down to connect the control board to the disk drive module.
5. Secure the control board to the disk drive module with the hex standoffs.
6. Replace the I/O board. Refer to Section 4.3.3, "I/O board," Subsection 4.3.3.2, "Replacement," of this chapter for the procedure to remove the I/O board.
7. Replace the disk drive module from the drive assembly tray. Refer to Section 4.3.1, "Disk drive module," Subsection 4.3.1.2, "Replacement," of this chapter for the procedure to replace the disk drive module.
8. Complete the steps listed in Section 4.4, "Postservice procedures," of this chapter.

4.4 Postservice procedures

Postservice procedures for the CONVEX VMEbus Sabre 5 SMD disk drive apply to most servicing operations. These safety procedures must be used during all the removal and replacement procedures described in this chapter.

1. Slide the disk drive tray into its retracted position and tighten the two front chassis captive-lock screws. Figure 4-6 shows the captive-lock screws.
2. Install the front panel and tighten the two front cover captive-lock screws that secure it.
3. Connect the cables to the 1J02, the 1J04, and (if necessary) the 1J03 connectors on the rear of both disk drives in the disk drive tray. Figure 4-5 shows the disk drives and their cables.
4. Connect the AC power cord to each disk drive to the AC power cord connectors and switch the AC power switch to the ON position. Figure 4-4 shows the AC power switches, AC power cords, and the AC power cord connectors.
5. Replace the expansion cabinet rear panel.
6. Return the expansion cabinet stabilizer bars to their retracted positions. Figure 4-3 shows the expansion cabinet stabilizer bars.
7. Restore power to the expansion cabinet.
 - To restore power to a CONVEX EXP-101 or EXP-102 expansion cabinet, connect the AC power cord to the AC power source.
 - To restore power to a CONVEX EXP-105, EXP-106, or EXP-107 high-performance expansion cabinet, set the main power control switch to the ON position. Figure 4-2 shows the main power control switch.
8. Set the VMEbus chassis power control switch to the ON position. Figure 4-1 shows the VMEbus chassis and the power control switch.

4.5 Illustrated parts list

This section is the Illustrated Parts Breakdown (IPB) for the VMEbus Sabre 5 SMD disk drive.

Table 4-1 Disk drive assembly IPB

Item Number	Part number	Description
n/a	550-000406-220	Disk Drive, Subsystem Assembly, SMD
n/a	500-000483-201	Disk Drive Module, SMD (in inner tray)
1	204-000021-200	Disk Drive Subassembly
2	204-000016-009	Drawer, inner,
3	204-000016-010	Power Supply
4	204-000016-008	Cable, DC Power, 2.5 inch
5	204-000016-007	Cable, AC Power, 3 Conductor Shield
6	204-000016-004	Air Baffle
7	900-000340-001	Screw, 10-32 x 3/8, Shock Mount
	312-000318-001	Filter, Air, 8in Disk Drive
9	900-000343-001	Panel, Operator, Disk Drive

Figure 4-18 Disk drive assembly

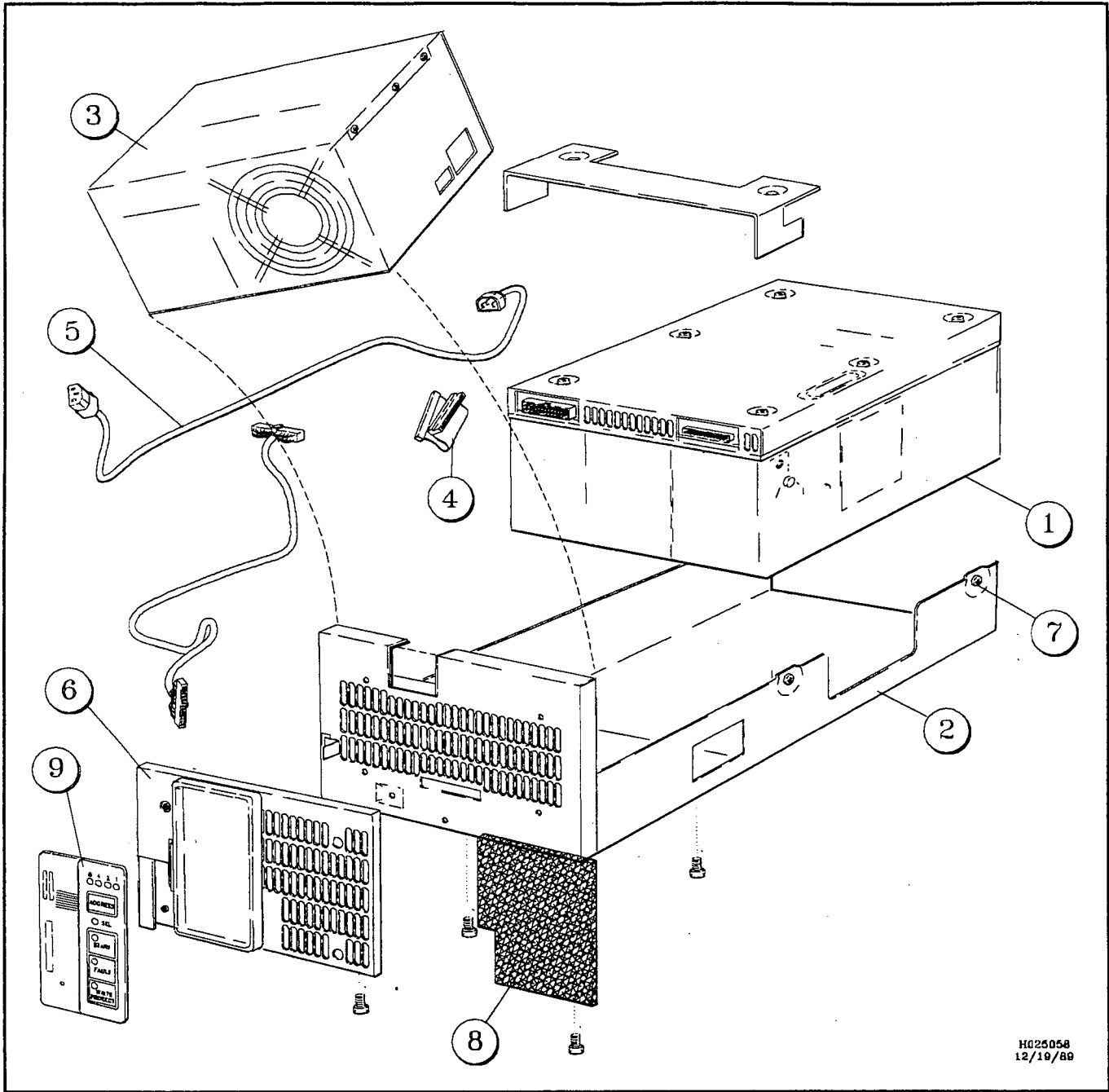


Table 4-2 lists part associated with the disk drive and disk drive assembly but not illustrated.

Table 4-2 Associated parts list

Part number	Description
900-000345-001	Fan, 24 VDC, Disk Drive
204-000016-005	Clamp, Power Cable
204-000016-002	Screw, 6-32x 1/4, Hex
204-000016-003	Screw, 8-32x 1/2, Hex
204-000016-006	Washer, Lock #6
204-000016-001	Cable, DC Ground
204-000016-014	Ground Straps Kit, Shock Mount
250-000011-001	Switch, Power Connector
900-	I/O Board, Disk Drive
900-	Control Board, Disk Drive
900-000421-001	Manual, Seagate User's
204-000014-009	Tray Assembly, Rack Mount, Double
204-000014-001	Tray, double, Seagate
204-000014-002	Slide, Guide, Right
204-000014-003	Slide, Guide, Left
204-000014-004	Bracket, Slide Mounting, Right Rear
204-000014-005	Bracket, Slide Mounting, Left Rear
204-000014-006	Nut Plate, Seagate
204-000014-007	Bracket, Clamp, Seagate
204-000014-008	Screw, 10-32 x 1/2 Hex, Socket
310-150301-001	Nut, 6-32, Keep
310-002301-002	Screw, 6-32 x 1/4

Table 4-3 Cable part number list

Part number	Description
604-260001-200	Cable, Data, Ctlr to Drive, 10.0 ft (3.0 m)
604-260001-201	Cable, Data, Ctlr to Drive, 15.0 ft (4.6 m)
604-260001-202	Cable, Data, Ctlr to Drive, 20.0 ft (6.1 m)
604-260001-203	Cable, Data, Ctlr to Drive, 25.0 ft (7.6 m)
604-260001-204	Cable, Data, Ctlr to Drive, 30.0 ft (9.1 m)
604-260001-205	Cable, Data, Ctlr to Drive, 35.0 ft (10.7 m)
604-260001-206	Cable, Data, Ctlr to Drive, 40.0 ft (12.2 m)
604-260001-207	Cable, Data, Ctlr to Drive, 45.0 ft (13.7 m)
604-260001-208	Cable, Data, Ctlr to Drive, 50.0 ft (15.2 m)
604-600001-220	Cable, Control, Drive to Drive, 33.0 in (83.8 cm)
604-600001-222	Cable, Control, Drive to Drive, 40.0 in (101.6 cm)
604-600001-223	Cable, Control, Drive to Drive, 60.0 in (152.4 cm)
604-600001-221	Cable, Control, Drive to Drive, 8.0 ft (2.5 m)
604-600001-200	Cable, Control, Drive to Drive, 10.0 ft (3.0 m)
604-600001-201	Cable, Control, Drive to Drive, 15.0 ft (4.6 m)
604-600001-202	Cable, Control, Drive to Drive, 20.0 ft (6.1 m)
604-600001-203	Cable, Control, Drive to Drive, 25.0 ft (7.6 m)
604-600001-204	Cable, Control, Drive to Drive, 30.0 ft (9.1 m)
604-600001-205	Cable, Control, Drive to Drive, 35.0 ft (10.7 m)
604-600001-206	Cable, Control, Drive to Drive, 40.0 ft (12.2 m)
604-600001-207	Cable, Control, Drive to Drive, 45.0 ft (13.7 m)
604-600001-208	Cable, Control, Drive to Drive, 50.0 ft (15.2 m)
604-600001-213	Cable, Control, Drive to Drive, 100.0 ft (30.5 m)
605-030004-202	Cable, Jumper, 3 Conductor

A.1 Overview

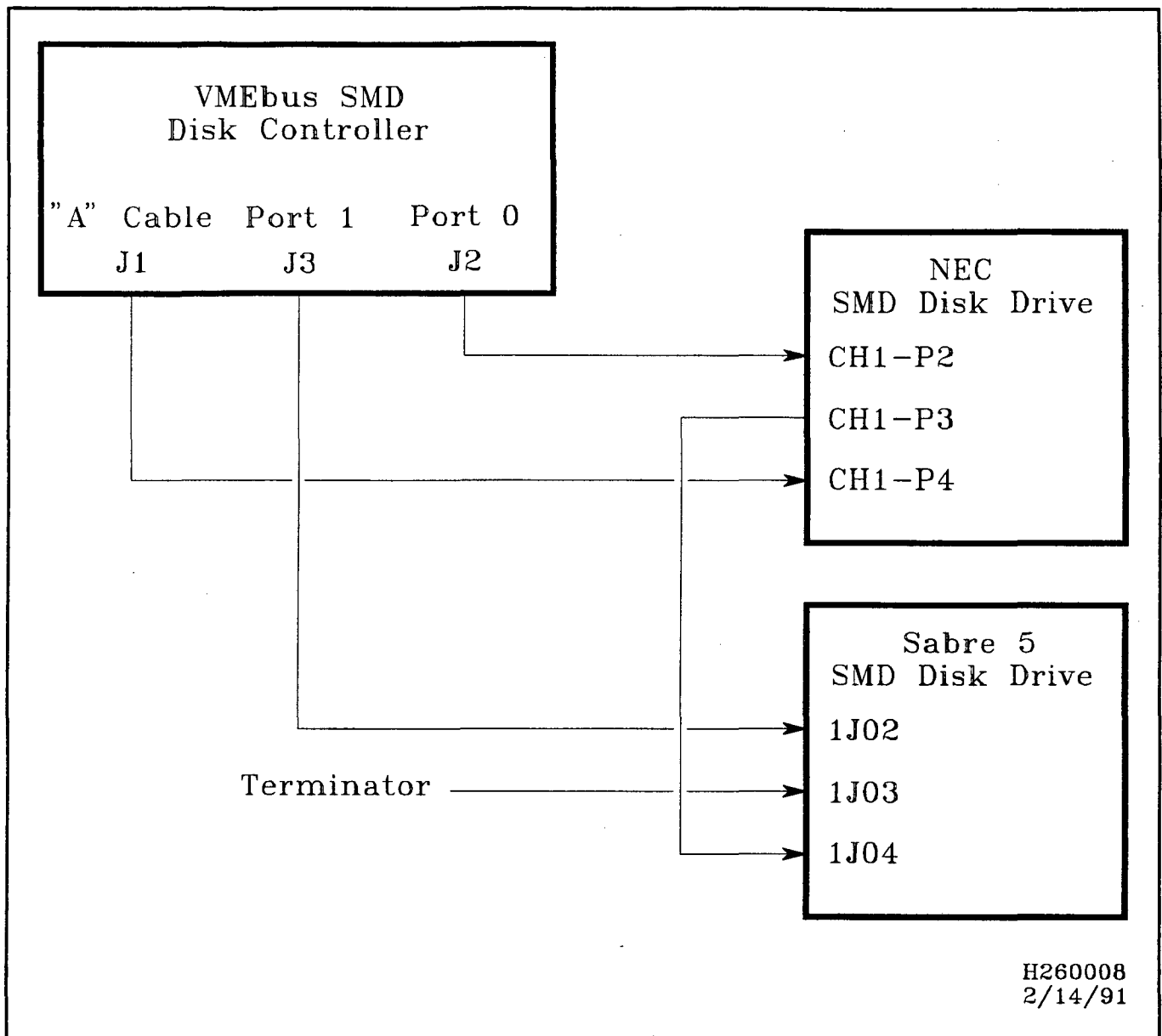
This chapter provides the procedures to install a CONVEX VMEbus Sabre 5 SMD disk drive into a slot designed for a NEC SMD disk drive.

A.2 Installation

TBD

Figure A-19 show the cabling connections between the SMD controller, an NEC SMD disk drive as drive 0, and a Sabre 5 SMD disk drive as drive 1:

Figure A-19 NEC to Sabre 5 cabling block diagram



B.1 Configurator

This appendix contains a copy of the *Seagate Model ST81236J (PA8N2A) Sabre SMD Disc Drive Configurator* document.

Note

The *Seagate Model ST81236J (PA8N2A) Sabre SMD Disc Drive Configurator* document contains basic information for the CONVEX VMEbus Sabre 5 SMD disk drive. In the event of changes regarding the controller configuration, an updated version will be made available. Configurator document updates should be inserted into this appendix.

Seagate Model ST81236J (PA8N2A) Sabre SMD Disc Drive Configuration Document

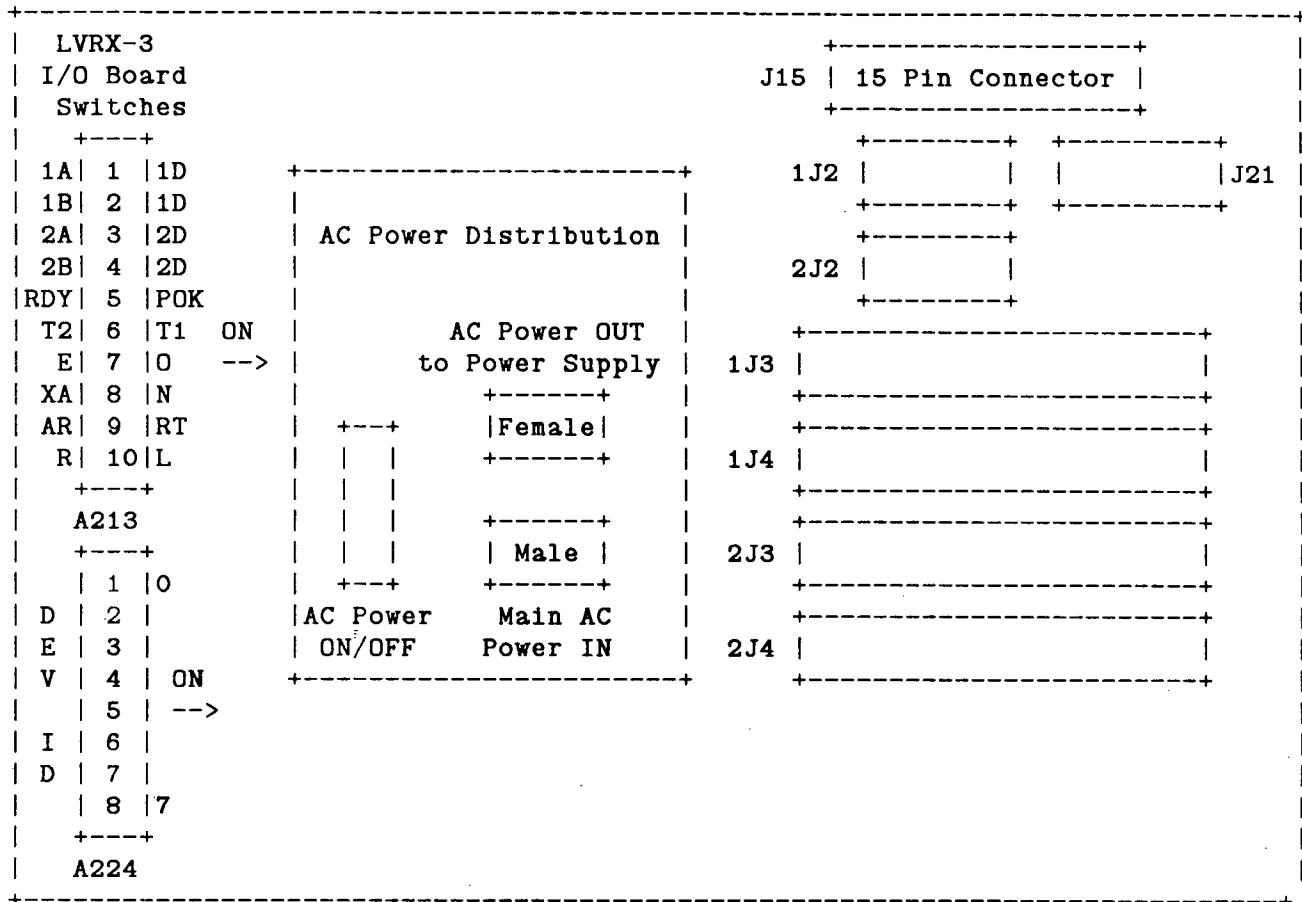
1.1 Scope

The purpose of this document is to provide configuration information for the Seagate Model ST81236J (PA8N2A) Sabre SMD Disc Drive (CONVEX Part Number 204-000021-200, Seagate Part Number 968001-042).

1.2 Configuration Information

(Warning: Do not apply AC Power to the unit until the setting of the Power Supply's AC Input Voltage Selection Switch has been verified.)

Rear View of Disc Drive



Rear View of Disc Drive

Note: Switch Settings and other information are on the following pages.

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METHOD #: 204-000021-600

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1.2 Configuration Information (continued)

A. LVRX-3 I/O Board Switch Settings

The LVRX-3 I/O Board Switch setting options are shown below (reference illustration on Page 1 for switch locations).

Note: A switch is ON (Closed) when thrown to the right.

• Location A213

Switch Number	Normal Setting	Switch I.D.	Switch Function
1	OFF	1A/1D	Switches SW-1 through SW-4 are combined to enable/disable Channels 1 and/or 2 and to define which cable(s) ("A" and/or "B") carry Index/Sector. The normal settings shown define Channel 2 disabled and Index and Sector on the "A" Cable.
2	ON	1B/1D	
3	ON	2A/2D	
4	ON	2B/2D	
5	OFF	RDY/PK	OFF enables normal I/O Ready status; ON will enable I/O Ready status only with "Power OK".
6	OFF	T2/T1	OFF enables Extended Cylinder Addressing via Tag 2; ON enables via Tag 1.
7	ON	E/O	OFF for SMD-E Mode; ON for SMD-O Mode.
8	OFF	XA/N	OFF for Extended Cylinder Addressing (>1023); ON for Standard Cylinder Addressing (<1024).
9	OFF	AR/RT	OFF for Dual Channel Absolute Reserve; ON for Dual Channel Reserve Timer.
10	ON	R/L	OFF for Remote Power On; ON for Local On.

• Location A224

Switch Number	Normal Setting	Switch I.D.	Switch Function
1	OFF		Switches SW-1 through SW-8 are reserved for Device I.D. coding. Settings for SW-1 through SW-8 are "Don't Care" (not used).
2	OFF		
3	OFF		
4	OFF		
5	OFF		
6	OFF		
7	OFF		
8	OFF		

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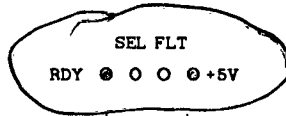
PAGE: 2

Seagate Model ST81236J (PA8N2A) Sabre SMD Disc Drive Configuration Document

1.2 Configuration Information (continued)

B. AXYX Control Board Switch Settings and Jumper Options

↑ Rear Of Unit ↑



		+-----+	
		S10	2 ¹³
(S2)		S9	2 ¹²
K003		S8	2 ¹¹
		S7	2 ¹⁰
ON		S6	2 ⁹
←		S5	2 ⁸
		S4	2 ⁷
		S3	2 ⁶
		S2	2 ⁵
		S1	2 ⁴
		+-----+	

		+-----+	
		S10	2 ³
(S1)		S9	2 ²
L003		S8	2 ¹
		S7	2 ⁰
ON	N	S6	WP
←	B	S5	C
		S4	2 ³
		S3	2 ²
		S2	2 ¹
		S1	2 ⁰
		+-----+	

- RTN
- SWPI
- SWPD
- IDXS
- RUNT
- FF

Note: Switch Settings and Strapping Options are on pages 4 and 5.

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1.2 Configuration Information (continued)

B. AXYX Control Board Switch Settings and Jumper Options (continued)

The AXYX Control Board switch settings are shown below (reference illustration on Page 3 for switch locations).

• Location K003 (S2)

Switch Number	Normal Setting	Switch I.D.	Switch Function
10	ON	2 ¹³	DIP Switches SW-1 through SW-10 of S2 (Location K003) are used in conjunction with SW-7 through SW-10 of DIP Switch S1 (Location L003) to select the number of physical sectors per track. With the settings shown, there will be 84 physical sectors per track.
9	ON	2 ¹²	
8	ON	2 ¹¹	
7	ON	2 ¹⁰	
6	ON	2 ⁹	
5	OFF	2 ⁸	
4	OFF	2 ⁷	
3	ON	2 ⁶	
2	ON	2 ⁵	
1	ON	2 ⁴	

• Location L003 (S1)

Switch Number	Normal Setting	Switch I.D.	Switch Function
10	OFF	2 ³	See information for S2 (Location K003), above, for SW-7 through SW-10.
9	OFF	2 ²	
8	OFF	2 ¹	
7	OFF	2 ⁰	
6	ON	N/WP	OFF for Write Protect; ON for normal operation (write enabled).
5	OFF	B/C	OFF for 2.016 MHz sector clock frequency; ON for byte frequency sector clock.
4	ON	2 ³	DIP Switches SW-1 through SW-4 are used to define the device address (x'0'-'F') of the disc drive. All ON will define device address x'0'. 2 ⁰ is Least Significant. Therefore, SW-2 through SW-4 ON and SW-1 OFF defines device address x'1'; SW-3 and SW-4 ON and SW-1 and SW-2 OFF defines device address x'3'; etc. These switch settings will be overridden by the Operator Panel selection, if used.
3	ON	2 ²	
2	ON	2 ¹	
1	ON	2 ⁰	

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1.2 Configuration Information (continued)

B. AXYX Control Board Switch Settings and Jumper Options (continued)

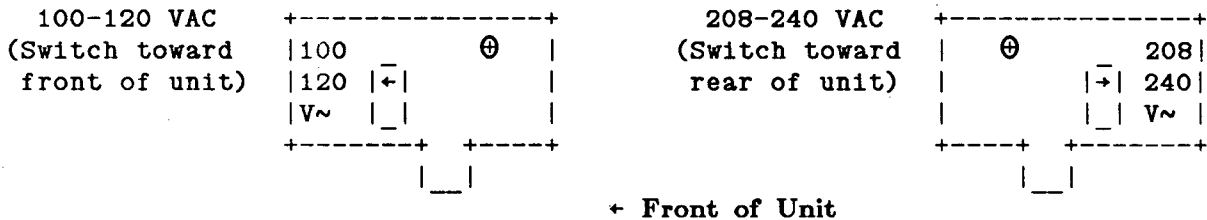
The AXYX Control Board jumper options are shown below (reference illustration on Page 3 for jumper locations).

Jumper	Normal	Function
RTN	OUT	OUT to disable heads returning to starting point after a sweep cycle; IN to enable return to original.
SWP1	OUT	OUT to enable sweep only on seeks; IN to disable.
SWPD	IN	OUT to enable sweep cycles; IN to disable.
IDXS	OUT	Always OUT (factory set).
RUNT	OUT	OUT to enable Runt sector pulse; IN to suppress Runt sector pulse.
FF	OUT	Always OUT (not used and reserved for future use).

C. Input AC Power Selection

A switch is located on the right side (as viewed from the front of the unit) of the Power Supply Assembly which allows for usage of the following AC inputs: 100-120 VAC or 208-240 VAC (50 or 60 Hz in both cases). For use in the CONVEX High Performance Peripheral (HPPC) Cabinet, the switch must be set to the 208-240 VAC position. For use in the CONVEX Standard I/O Expansion chassis, the switch setting will be 100-120 VAC (domestic cabinets) or 208-240 (international cabinets). Failure to set the switch to the correct position can result in equipment damage.

Verify the switch is correctly set per the following illustrations.



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1.3 Miscellaneous Information

A. AC Power On/Off

There are two (2) AC Power Switches on the unit; one at the front and one at the rear. The front switch should be left in the On (1) position and the rear switch should be used to power the unit on and off.

The *Start* switch on the Operator Panel will cause the disc drive to spin up when both the front and rear AC Power switches are in the On (1) position.

B. Device Address

The unit's Device Address is selected by depressing the *Address* Switch on the Operator Panel while observing the incrementing LEDs which are identified with Binary weights of 1, 2, 4, and 8 (i.e., x'0' through x'F'). When none of the LEDs is on, the unit's Device Address is x'0'; when LED 1 is illuminated, the unit's Device Address is x'1'; when all of the LEDs are on, the unit's Device Address is x'F', etc. Once set, the selected Device Address will remain unchanged, even during power Off/On cycles.

C. Cable Connections

The SMD "A" Cable (CONVEX P/N 604-600001-2XX) will come to the drive from the controller or, if this is a daisy-chained unit, from the previous disc drive and will be connected to 1J4 (reference Page 1 illustration). If this is the only or last unit on the controller port, an SMD Interface Terminator (CONVEX P/N 204-000021-002) must be installed at 1J3 (reference Page 1 illustration). Otherwise, an SMD Daisy Chain "A" cable (CONVEX P/N 604-600001-2XX) will be connected to 1J3 and goes to 1J4 of the next disc drive in the daisy chain.

The SMD "B" cable (CONVEX P/N 604-260001-2XX) will come to the drive from the controller and will be connected to 1J2 (reference Page 1 illustration).

Connectors J15, J21, 2J2, 2J3, and 2J4 (reference Page 1 illustration) are not normally used.

D. File "DB_diskfmt" Contents

The SPU File `"/mnt/bin/lib/DB_diskfmt"` must contain the correct parameters under the section titled, `"INTERPHASE 4200 SMD CONTROLLER (VME)"`. This section will also have parameters for the DKD-206 and DKD-208 disc drives. The CONVEX parameters for the Seagate Model ST81236J SMD Disc Drive are:

```
DKD-281 0 1635 15 84 83 4800 50400 9 9 1 14 14 smd 2-7 n
```

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DOCUMENT REVISION HISTORY

REVISION	ECN NO.	DESCRIPTION	DATE	APPROVED
1.0	-None-	Preliminary Release.	01/22/91	
A	107354	Initial Manufacturing Release.	02/15/91	

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C.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. Enter **contact** at the system prompt and then answer the questions as they appear on the screen.

This appendix describes:

- Prerequisites for using *contact*
- Tips for using *contact*
- The step-by-step process *contact* takes you through

C.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.

C.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 program that helps the TAC track reports and route them to the CONVEX personnel most qualified to fix a problem.

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

To use *contact* requires:

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

C.3.1 UUCP connection

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

C.3.2 Finding the program path name

To determine the full path name of the program or utility in question, use the *which* command. Figure C-20 illustrates use of the *which* command to find the full path name of the loader (*ld*) utility:

Figure C-20 Using the *which* command

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

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

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.

For more information on the *which* command, refer to the *which(1)* man page. You can also use the *info* online information system by entering *info which* at the system prompt.

C.3.3 Finding the program version number

To determine the version number of the program or utility in question, use the *vers* command. Figure C-21 illustrates use of the *vers* command to find the version number of the loader (*ld*) utility. Enter *vers*, then the path name of the program or utility:

Figure C-21 Using the *vers* command

```
> 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 by entering *info vers* at the system prompt.

C.4 Using *contact*

The *contact* utility prompts for the following information:

- Your name, title, phone number, and corporate name
- Name and version of the product
- One-line summary of the problem
- Detailed description of the problem
- 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.

C.4.1 Step 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. Figure C-22 illustrates the *contact* command and the resulting system response:

Figure C-22 Beginning a *contact* session

```
> contact
Welcome to contact version 0.11 ()

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

C.4.2 Step 1b

If there is a *.contact* file in your home directory, *contact* skips the first prompt. Figure C-23 illustrates the *contact* command and the system response when a *.contact* file is in your home directory:

Figure C-23 Starting session with *.contact*

```
> contact
Welcome to contact version 0.11 ()

Enter the name of the product involved
>
```

C.4.3 Step 2

The *contact* utility prompts for the version number of the product. If you do not know the version number, press **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; enter the version number in the form *XX* or *XX.XX*.

C.4.4 Step 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.

C.4.5 Step 4

The *contact* utility prompts for a detailed description of the problem. Please 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.

C.4.6 Step 5

The *contact* utility prompts for the priority of the problem. Figure C-24 illustrates this prompt and the priority levels from which to choose; enter a priority number:

Figure C-24 Specifying the priority of a problem

```
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.
>
```

C.4.7 Step 6

The *contact* utility prompts for an explanation of how to reproduce the problem. Please include the command syntax and options you used and anything else you did to make the program run.

C.4.8 Step 7

The *contact* utility prompts for any other pertinent comments. Please include all relevant information.

C.4.9 Step 8

The *contact* utility prompts for suggestions regarding documentation supporting the product. Indicate whether the documentation could be revised to address the question.

C.4.10 Step 9

The *contact* utility asks for the names of files necessary to reproduce the problem. Figure C-25 illustrates the *contact* prompt and sample user response:

Figure C-25 Including files in *contact* reports

```
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.

C.4.11 Step 10

The *contact* utility prompts you to review, edit, submit, or abort the report. Figure C-26 illustrates this prompt:

Figure C-26 Prompt to review, edit, submit, or abort

```
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. The TAC notifies you within 48 hours that your report has been received. Choosing 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*. This option exits the *contact* utility and returns you to the shell environment.

C.5 Tips for Using *contact*

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 within *contact* from one prompt to another
- Use tilde-escape sequences in the *contact* utility

C.5.1 Using a *.contact* file

When you invoke *contact*, it 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 to create a *.contact* file:

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.

C.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*.

C.5.3 Submitting the *dead.report* file

After you abort a *contact* session, the *contact* utility saves the report in a file named *~/dead.report*. 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 and merges it into the *contact* report. You can then edit the report. When you end the editing session, *contact* resumes at the final prompt, which asks you to review, edit, submit, or abort the report.

C.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, press **fg**. Using **CTRL-Z** and the *fg* (foreground) command, you can toggle 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*).

C.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**.

C.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 than one-line response.
- **~~**—Insert a single tilde as the first character in the line.

