BA213 Enclosure Maintenance

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Preface

This guide provides reference, installation, and maintenance information for the BA213 enclosure. This enclosure is intended for MicroPDP–11 and MicroVAX systems.

Intended Audience

This document is intended only for DIGITAL Field Service personnel and qualified self-maintenance customers.

Organization

This guide has three chapters and one appendix.

Chapter 1 provides an overview of the system enclosure, describing controls, mass storage area and capacity, backplane, signal distribution, power distribution, I/O connections, and configuration guidelines.

Chapter 2 lists site preparation considerations, and shows how to install the BA213 office pedestal configuration.

Chapter 3 describes how to remove and replace field replaceable units (FRUs). The beginning of the chapter contains a list of these FRUs.

Appendix A contains a list of related documentation.

Warnings, Cautions, and Notes

Warnings, cautions, and notes appear throughout this guide. They have the following meanings:

WARNING	Provides information to prevent personal injury.
CAUTION	Provides information to prevent damage to equipment or software.
NOTE	Provides general information about the current topic.

Chapter 1

BA213 Enclosure Description

1.1 Introduction

The BA213 enclosure (Figure 1–1) is available in the following configurations:

- in an EIA (Electronic Industries Association) rack (formerly RETMA)
- in a NEMA (National Electronics Manufacturing Association) enclosure (wall mount)
- in a pedestal, for office use (Figure 1–2)
- in an H9644 40-inch cabinet (Figure 1–3)
- in a dual-cabinet system (Figure 1–4)

Figure 1–1: BA213 Enclosure

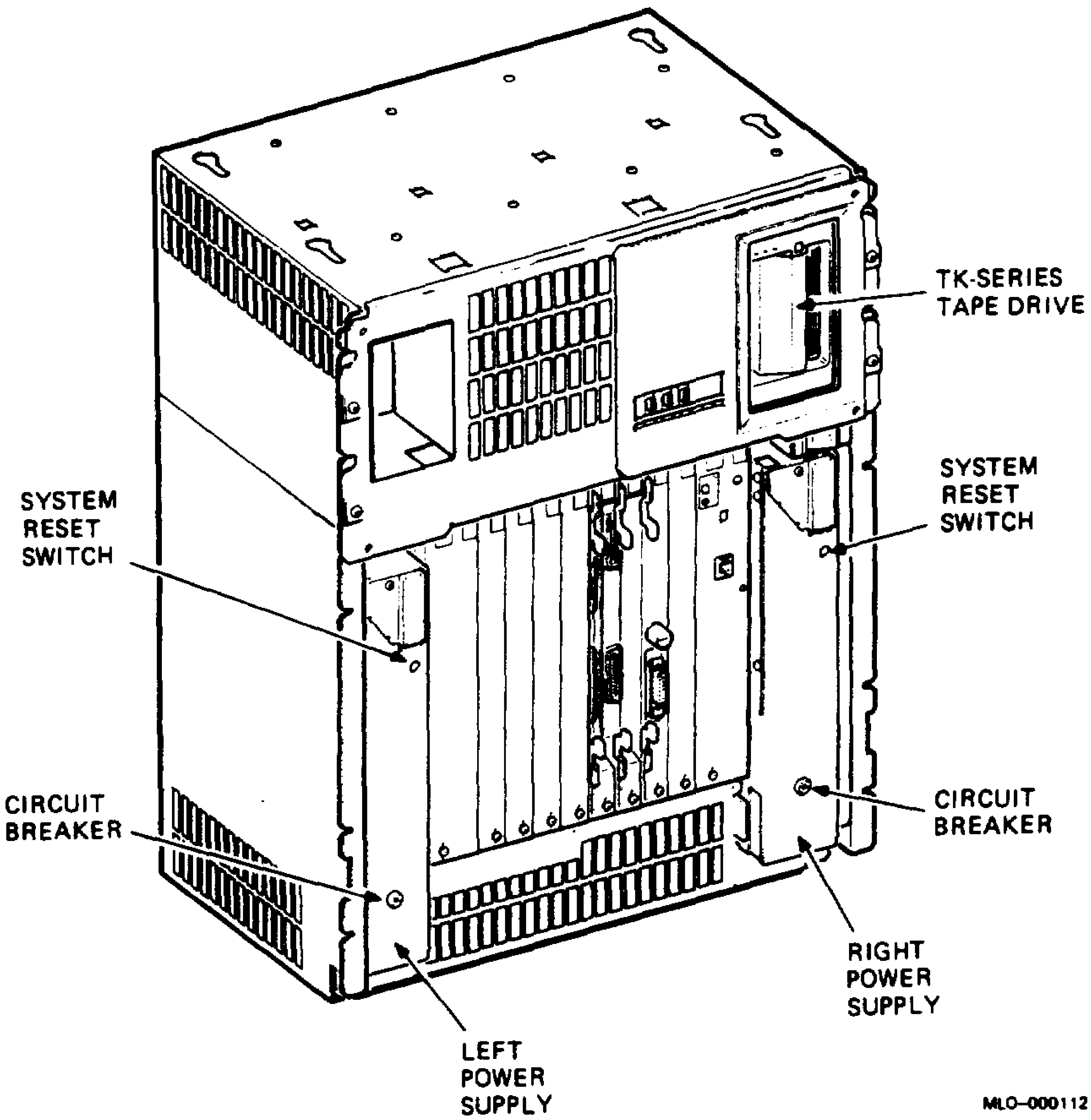


Figure 1–2: BA213 in Pedestal

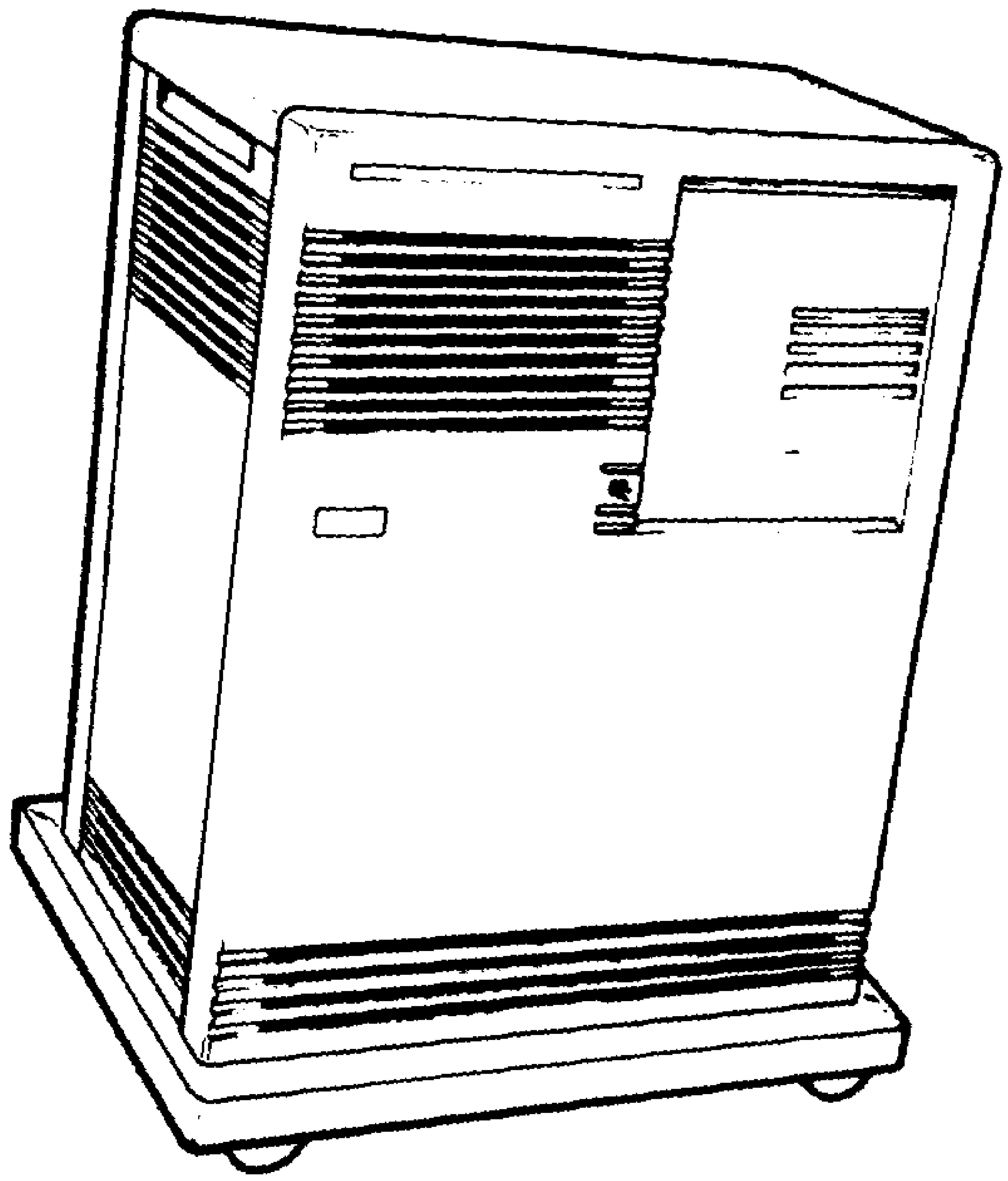


Figure 1–3: BA213 in H9644 Cabinet

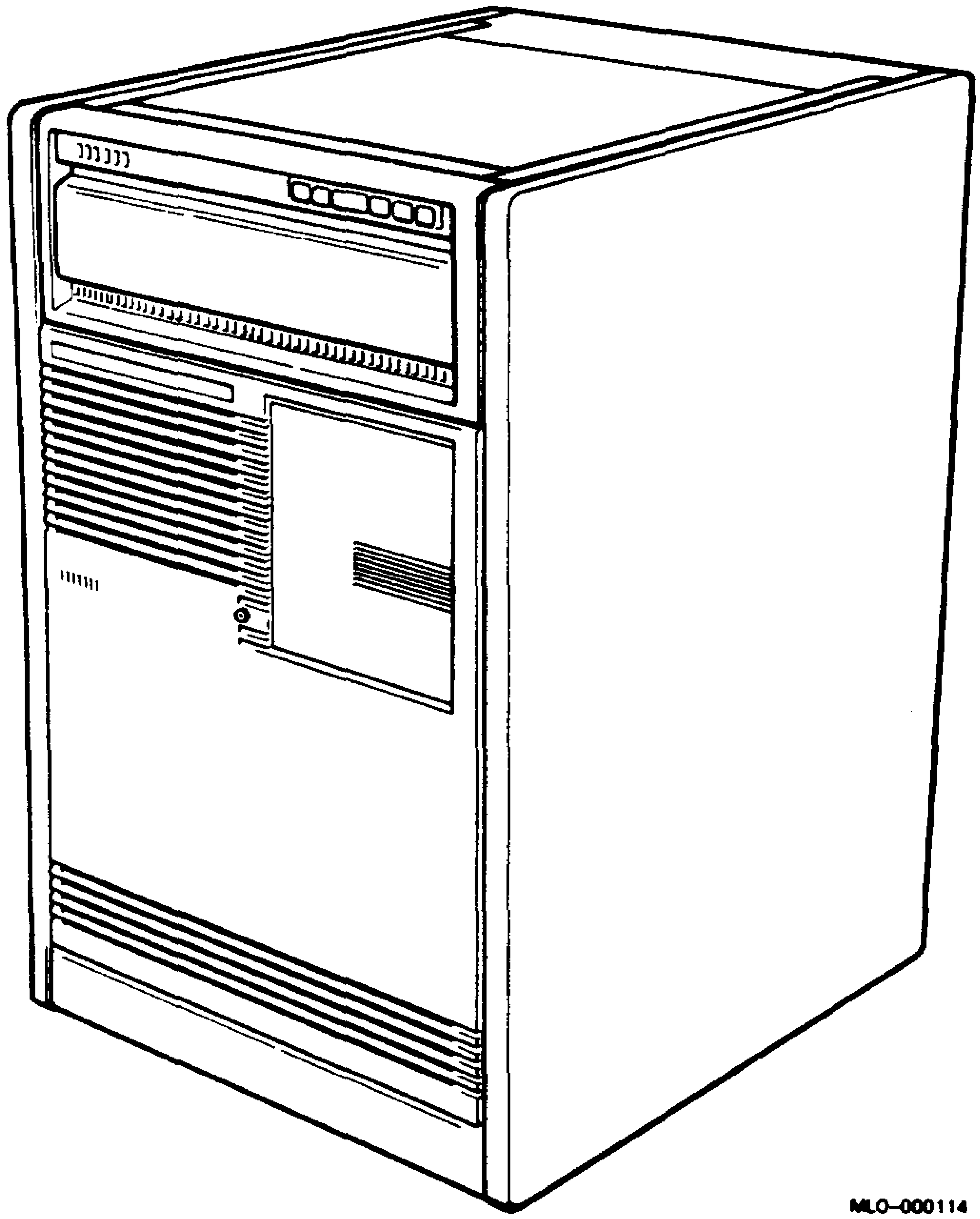
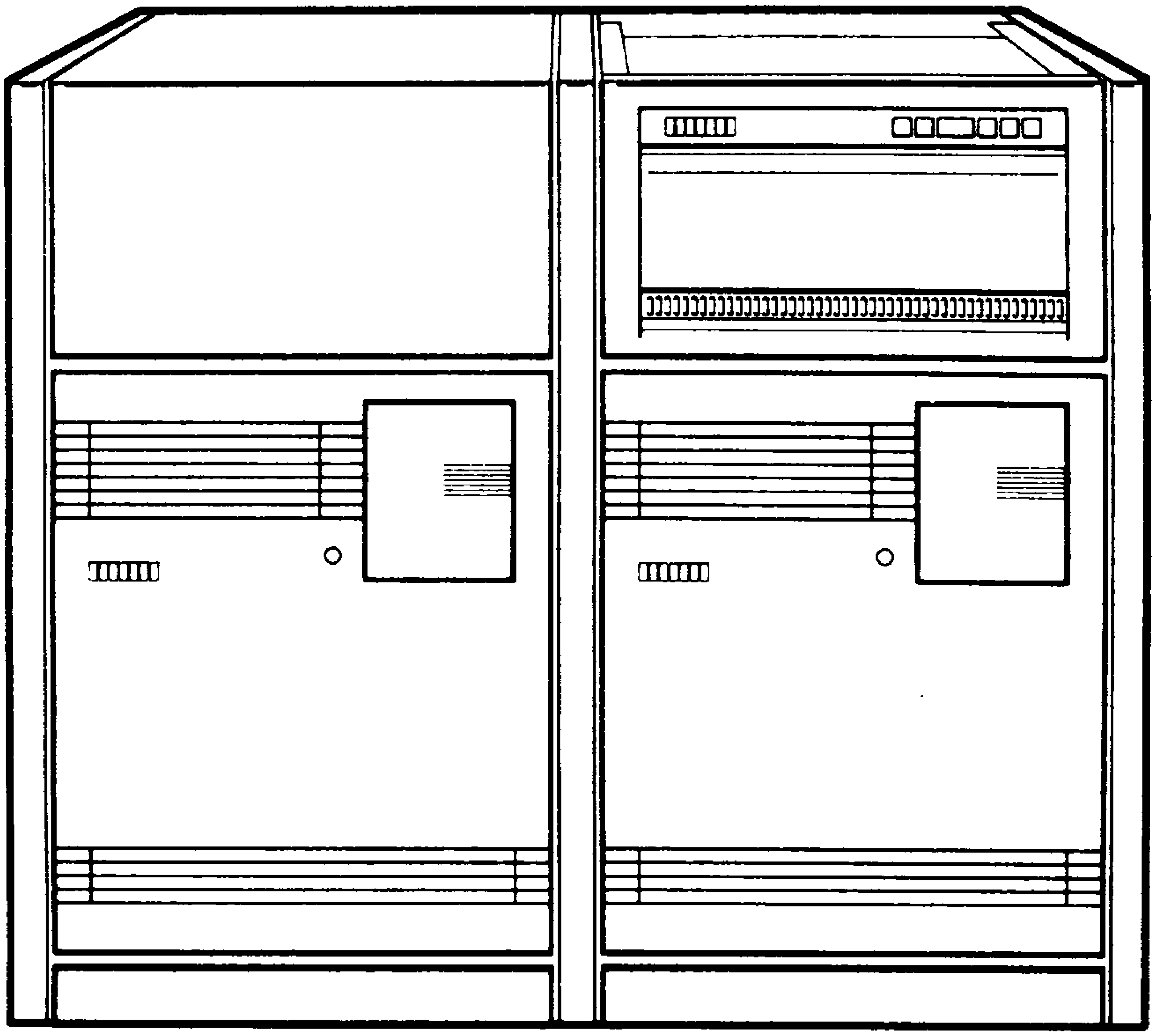


Figure 1–4: BA213 in Dual-Cabinet System



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1.2 Module Handles

There are two main differences between modules used in a BA200-series enclosure and those used in other system enclosures:

- Modules that connect to external devices have bulkhead handles with the I/O connector on the handle. The handles replace the insert panels and internal cabling found in BA23 and BA123 enclosures. This design is easier to maintain since it eliminates problems caused by faulty internal cabling.
- Modules that do not have external I/O connections (such as memory modules) have blank bulkhead covers.

The module handles and blank covers form an electrical noise seal that complies with requirements for electromagnetic interference (EMI) by (1) keeping radio frequency interference generated by the system in the enclosure, and (2) keeping external radio frequencies from entering the enclosure. The module handles and blank covers also help guarantee proper airflow.

Each handle or cover has two captive quarter-turn Phillips screws to hold the module in the card cage. Module handles also have release levers to help install or remove the module from the card cage.

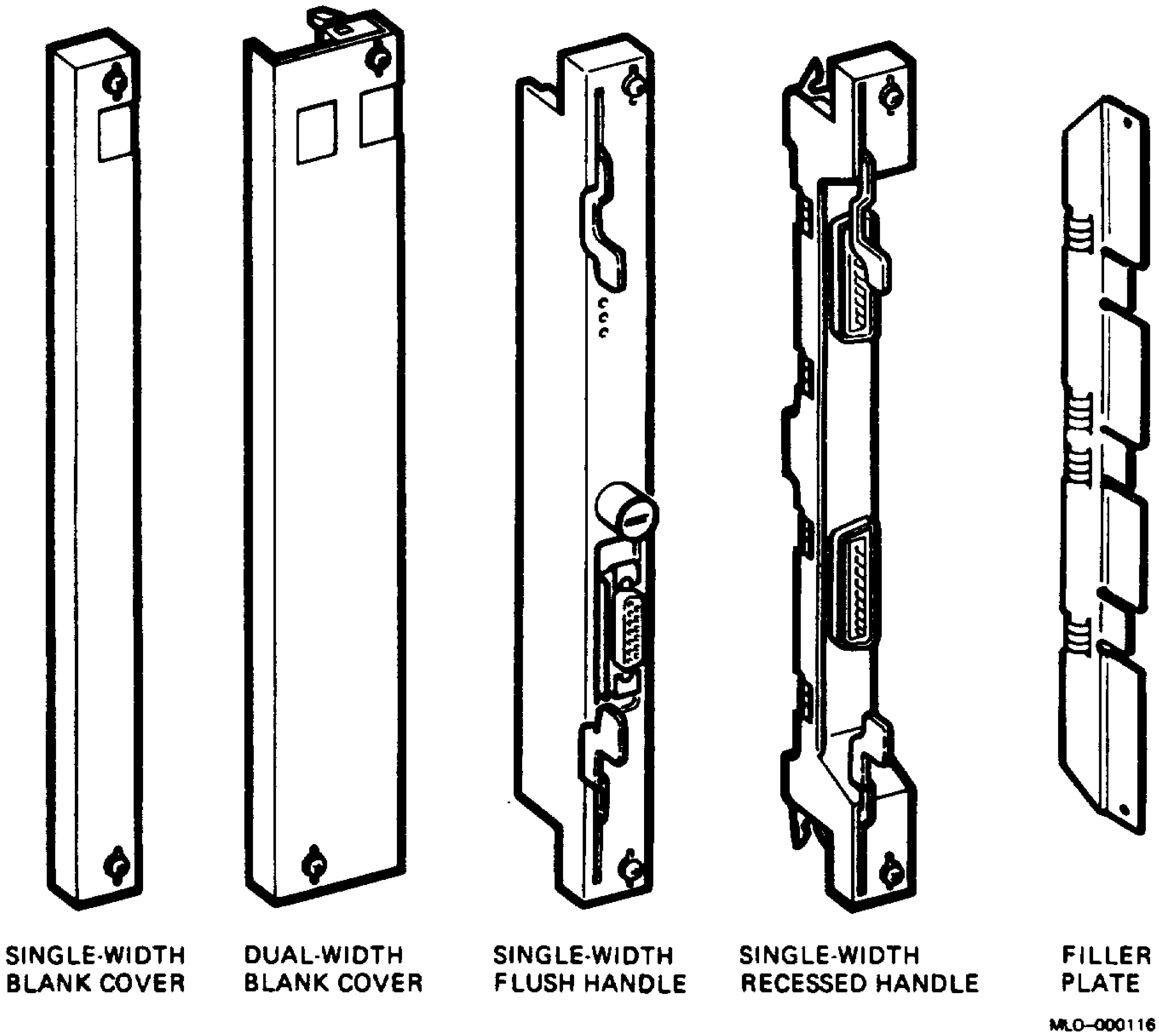
There are four basic types of handles and covers used for BA200-series compatible modules (Figure 1–5):

single-width flush handle
single-width recessed handle
single-width blank covers
dual-width blank covers

Filler Plate Between Flush and Recessed Handles

When you use a flush-handle module next to a recessed-handle module, you must install a metal filler plate (Figure 1–5) between the modules. Without the filler plate, circuitry on a flush-handle module adjacent to the recessed-handle module is exposed. The filler plate (part number 70–24505–01) has four sets of finger stock that provide an effective chassis ground between the handles. Flush handles and covers have screw holes at the top and bottom of each side for the installation of this filler plate.

Figure 1–5: BA200-Series Module Handles and Covers



Some modules have special configurations, such as the dual-width panel with I/O connector for the KA630 and KA640 CPUs. Table 1–1 describes common variations.

Table 1–1: BA200-Series Module Handle and Cover Types

Part	Number	Description
Single-width blank cover	70–23981–01	Covers one backplane slot in the following cases: • Covers a standard Q22-bus module that does not have external I/O connectors (for example, a TQK50). • Covers an unused slot (slots 2 through 10). If you install this type of cover next to a module with a recessed handle, you must add a metal filler plate to maintain FCC compliance. See Section 1.2.
Dual-width blank cover	70–23982–02	Covers backplane slots 11 and 12. The cover has a cutout at the top for routing cables from (1) an RQDX3 in slot 12, and (2) a TQK50 module to the mass storage devices mounted above the card cage.
Single-width recessed handle	–	Used on modules designed for a BA200-series enclosure. The handle is riveted to the module. This style is the preferred handle for all BA213 modules with external I/O connectors. The CXA16 and CXY08 communication modules use this type of handle.
Single-width flush handle	–	Used when a recessed handle would interfere with the module circuitry or I/O connector. The flush handle is also riveted to the module. The KDJ11-S (a MicroPDP-11 processor) and DEQNA-S Ethernet controller have flush handles.
Dual-width cover with I/O	H3600–SA	For the KA630 and KA650 CPU modules. The cover is not attached to the CPU.
Dual-width cover with I/O	H3601–SA	For the KDJ11-BF CPU module. The cover is not attached to the CPU.
Dual-width cover with I/O	H3602–SA	For the KA640 CPU module. The cover is not attached to the CPU.

1.3 Mass Storage Device Area

The BA213 enclosure has a mass storage area above the card cage (Figure 1–6), which can contain a combination of standard 13.3-cm (5.25-in) mass storage devices. For example, one RF30 and two RF71s can be installed, for a total disk capacity of 950M bytes. Table 1–2 lists the maximum number of each type of supported mass storage device.

Figure 1-6: BA213 Chassis and Mass-Storage Area

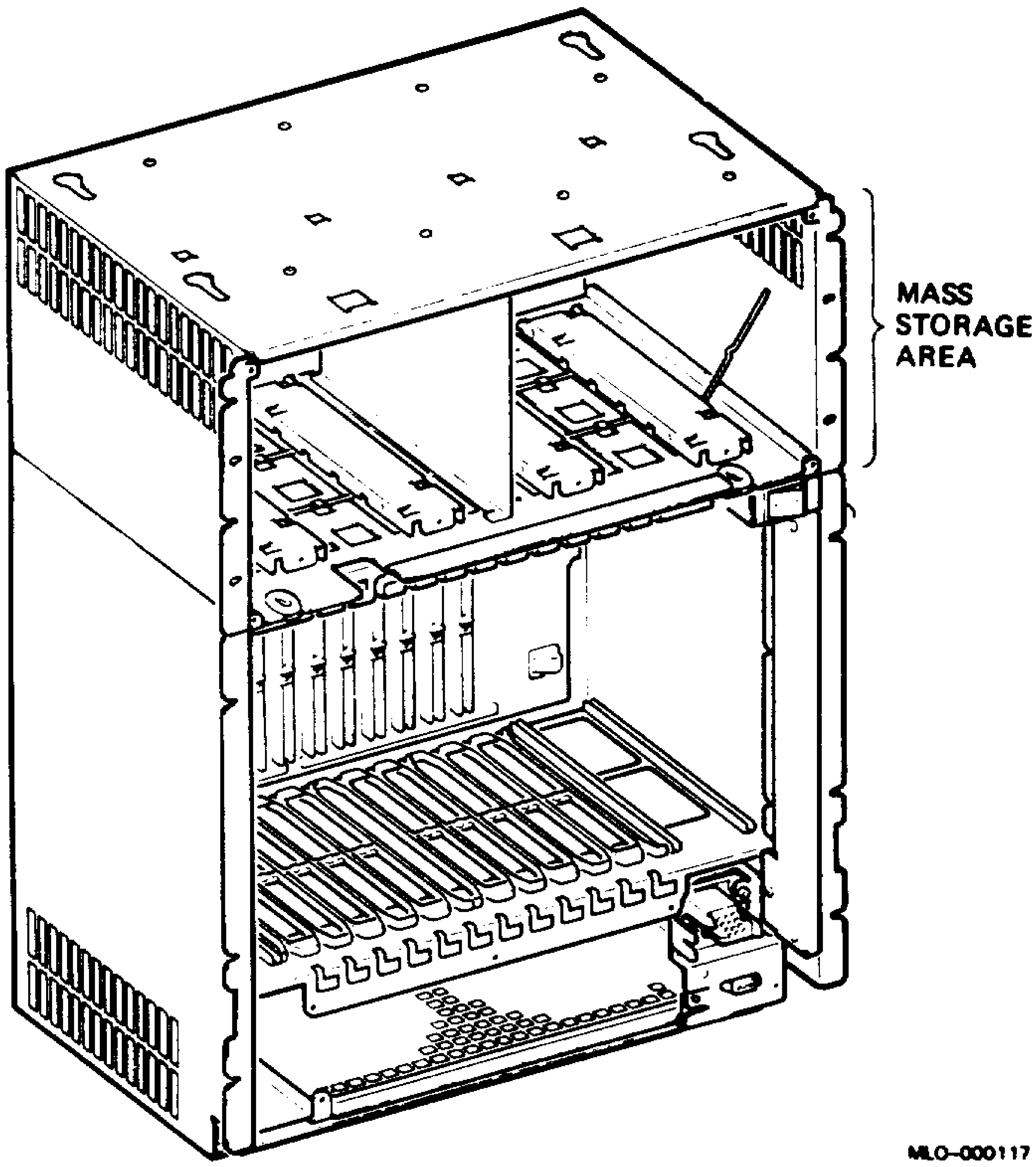


Table 1-2: BA213 Enclosure Mass Storage

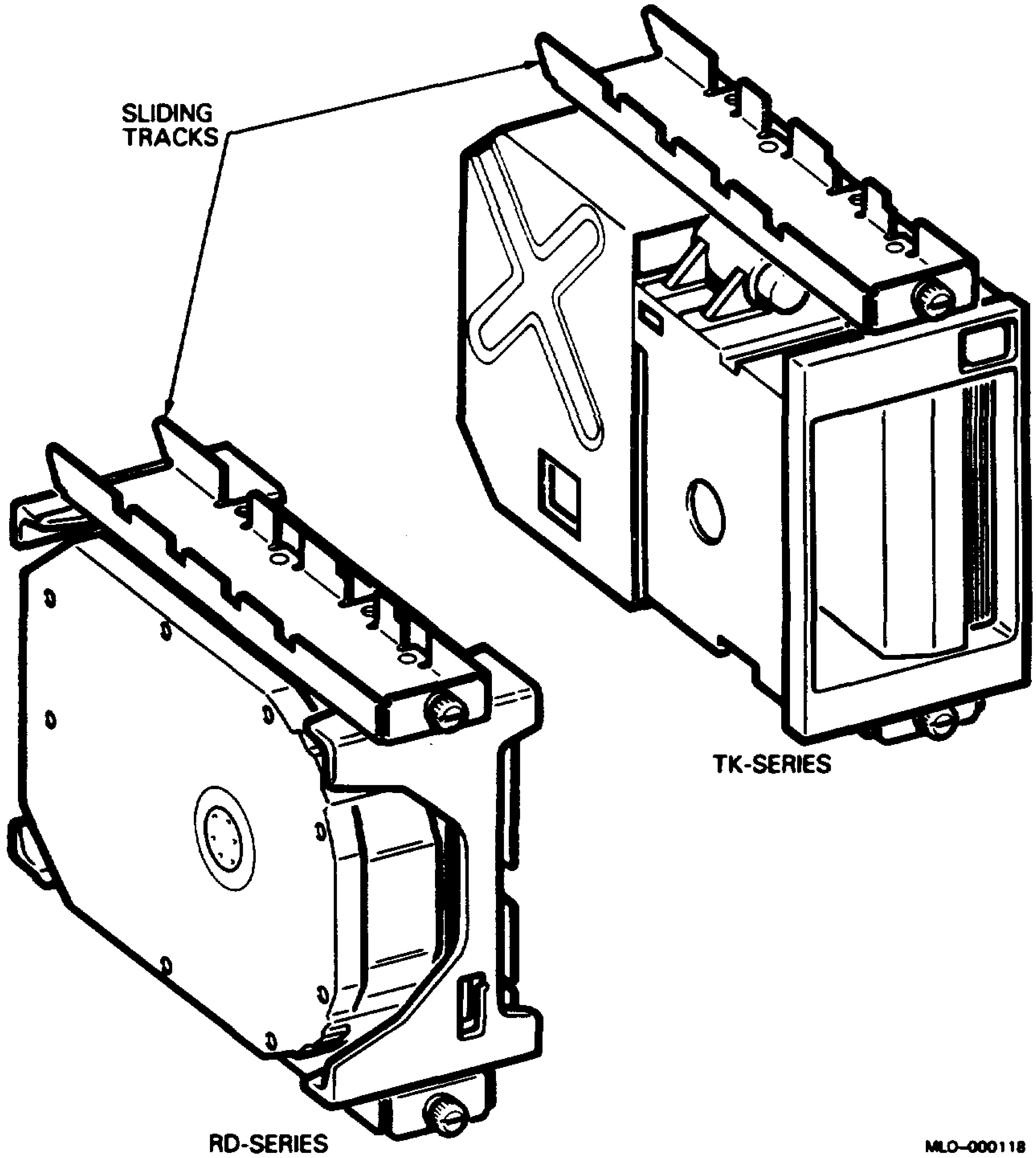
Drive Type	Number of Supported Drives (Max.)	Formatted Data Capacity (MB)
RA70 fixed-disk	2	560
RD53 fixed-disk	3	213
RD54 fixed-disk	3	477
RF30 fixed-disk	3	450
RF71 fixed-disk	3	1200
TK50 tape	1	95
TK70 tape	1	296

Mass storage devices are mounted sideways on shock-mounting hardware. A sliding track is attached to the each side of the mass storage device. One shock-resistant support attaches to the upper part of the mass storage area, and one attaches to the bottom of the mass storage area. The supports are attached by two screws enclosed in rubber shock bushings. This shock-mounting hardware is different, depending on the type of device. See Table 3–3 for the part numbers of the sliding tracks and shock-resistant supports.

Fixed-disk drives face the rear of the BA213, providing easy access to the drive signal and power cables. TK-series tape drives face the front of the BA213.

If you install a replacement drive, you must first remove the skid plate that is shipped on the drive, then install the correct shock-mounting hardware. Figure 1–7 shows RD and TK drives with BA200-series sliding tracks.

Figure 1–7: Sliding Tracks, RD and TK50 Drives



1.4 Backplane

The BA213 has a 12-slot, quad-height backplane (Figure 1–8). The backplane is a 26.3 x 40.7-cm (11.9 x 16-in) assembly with 24 press-pin connector blocks. The space between each backplane slot is 2.4-cm (0.95-in). The backplane's printed circuit board is a one-layer, two-sided etch board.

All 12 backplane slots are Q/CD slots. That is, the AB rows of all 12 slots contain the Q22-bus, and the CD rows of all slots contain the CD interconnect.

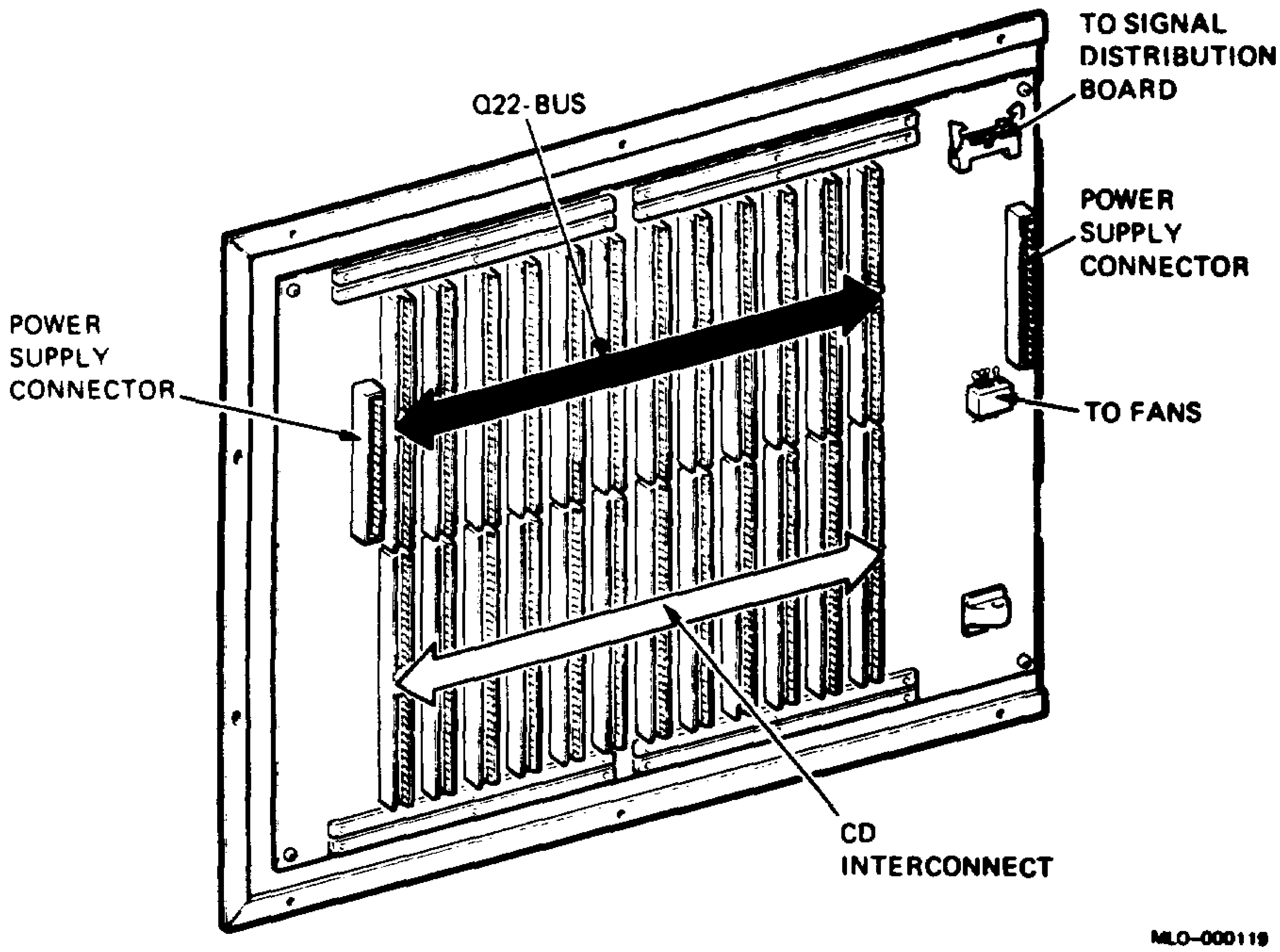
The backplane is bounded and cannot be expanded. It supports 32 equivalent ac loads and 20 dc loads from all the modules installed in the backplane. An *ac load* is the amount of capacitance a module presents to a bus signal line. One ac load equals 9.35 picofarads (pf). A *dc load* is the amount of dc leakage a module presents to a bus signal line. One dc load is approximately 105 microamperes (μA). The backplane presents 5.6 ac loads to the Q22-bus.

A ribbon cable connects the backplane to the signal distribution board. This cable carries the DCOK, POK, +5 Vdc, and signal ground lines for the DC OK LED and disk activity lights on the front of the system. The 10-pin cable connector is on the upper right of the backplane.

The backplane has two 56-pin edge board connectors. The connector near slot 1 supplies power to backplane slots 1 to 6. The connector near slot 12 supplies power to backplane slots 7 to 12.

The backplane also has a 4-pin power connector on the right side for a cable to the two dc fans below the card cage.

Figure 1–8: BA213 Backplane



Load Module

The BA213 enclosure may contain a quad-height load module (M9060–YA). You must install a load module in one of backplane slots 7 through 12 if the continuous minimum current drawn on the second power supply is less than 5 amperes. If the minimum current of 5 amperes is not reached, the power supply enters an error mode and shuts down the system. See Table 1–7 and the configuration worksheet (Figure 1–21).

1.5 System Controls and Indicators

The BA213 enclosure has the following controls and indicators on the front panel:

- On/off power switch with ac power LED
- DC OK LED
- CPU halt button
- Disk drive controls and indicators (system dependent, described below)

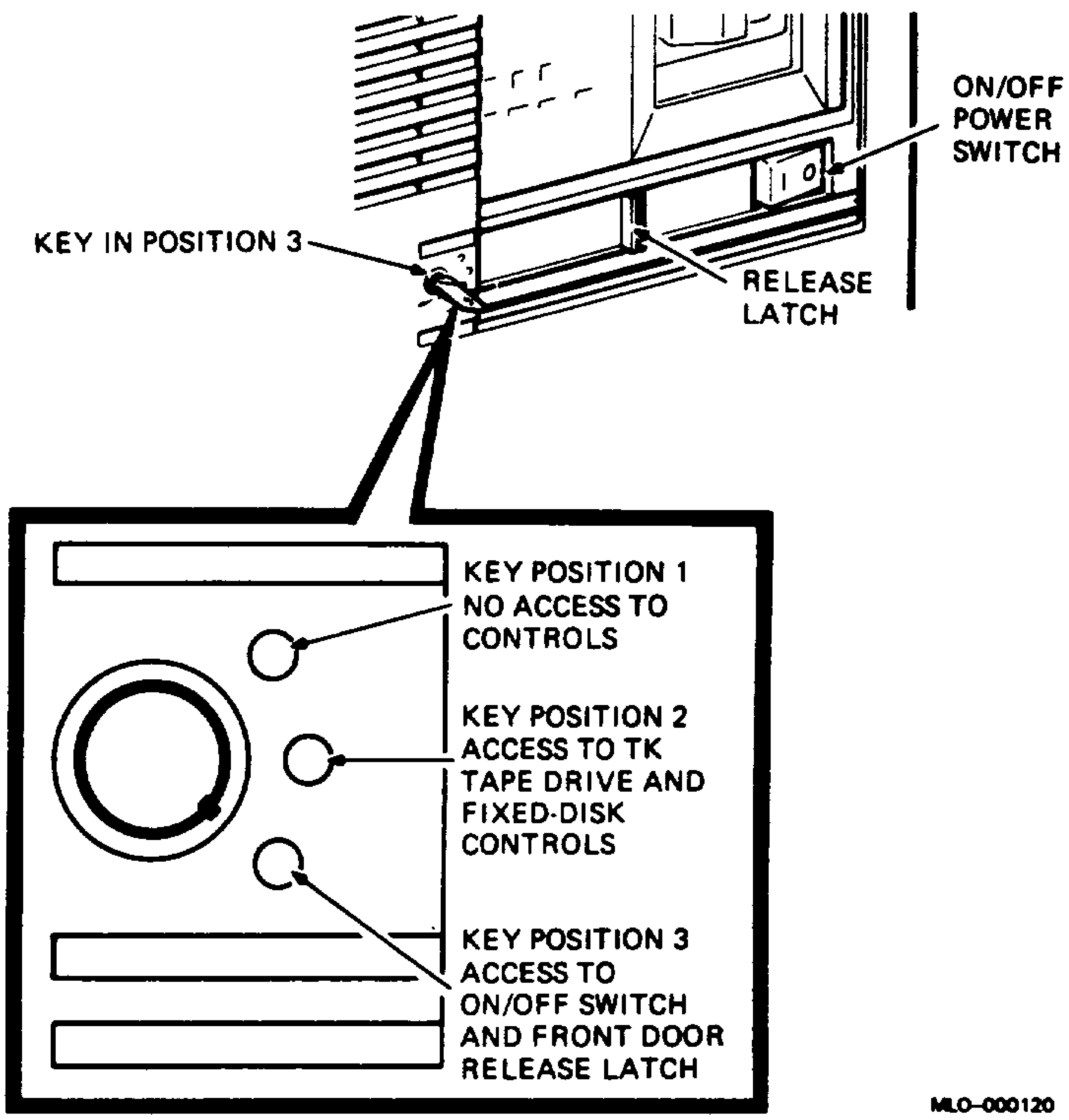
The BA213 also has two system reset buttons, one on each power supply. See Figure 1–1.

NOTE: *BA213 enclosures containing RD-series drives, and some BA213 enclosures containing RA-series drives do not have a halt button. To halt a MicroVAX CPU in such a system, set the enable/disable switch on the H3600–SA CPU I/O panel to enable, and use the break key on the console keyboard.*

Some of these system controls and indicators are mounted on the front panel, behind a smoked plastic window. The panel has a 3-position lock that determines which controls you can access. You can lower the window by turning the lock's universal key to position 2 or 3 (Figure 1–9). The level of access is as follows:

1. No access to controls. Disk, tape drive, and DC OK LEDs are visible.
2. Access to disk drive and tape drive controls.
3. Access to on/off power switch and latch to remove or open front door.

Figure 1–9: Lock and Key Positions



Disk drive and tape drive controls are different, depending on the type of drive installed. The differences are described in the following sections.

Additional controls, such as console baud rate select and power-up mode, are on the CPU I/O panel. These controls are accessible only by removing the front door, and vary depending on the CPU. Refer to the applicable CPU maintenance manual for a description of the controls on the CPU I/O panel.

Each power supply has indicators, described in Table 1–6.

1.5.1 Controls and Indicators, RD-Series Drives

In addition to the controls and indicators listed in Section 1.5, a BA213 containing RD-series drives contains controls and indicators on its front panel (Figure 1–10). Their functions are described in Table 1–3.

Figure 1–10: Controls and Indicators, RD Drives

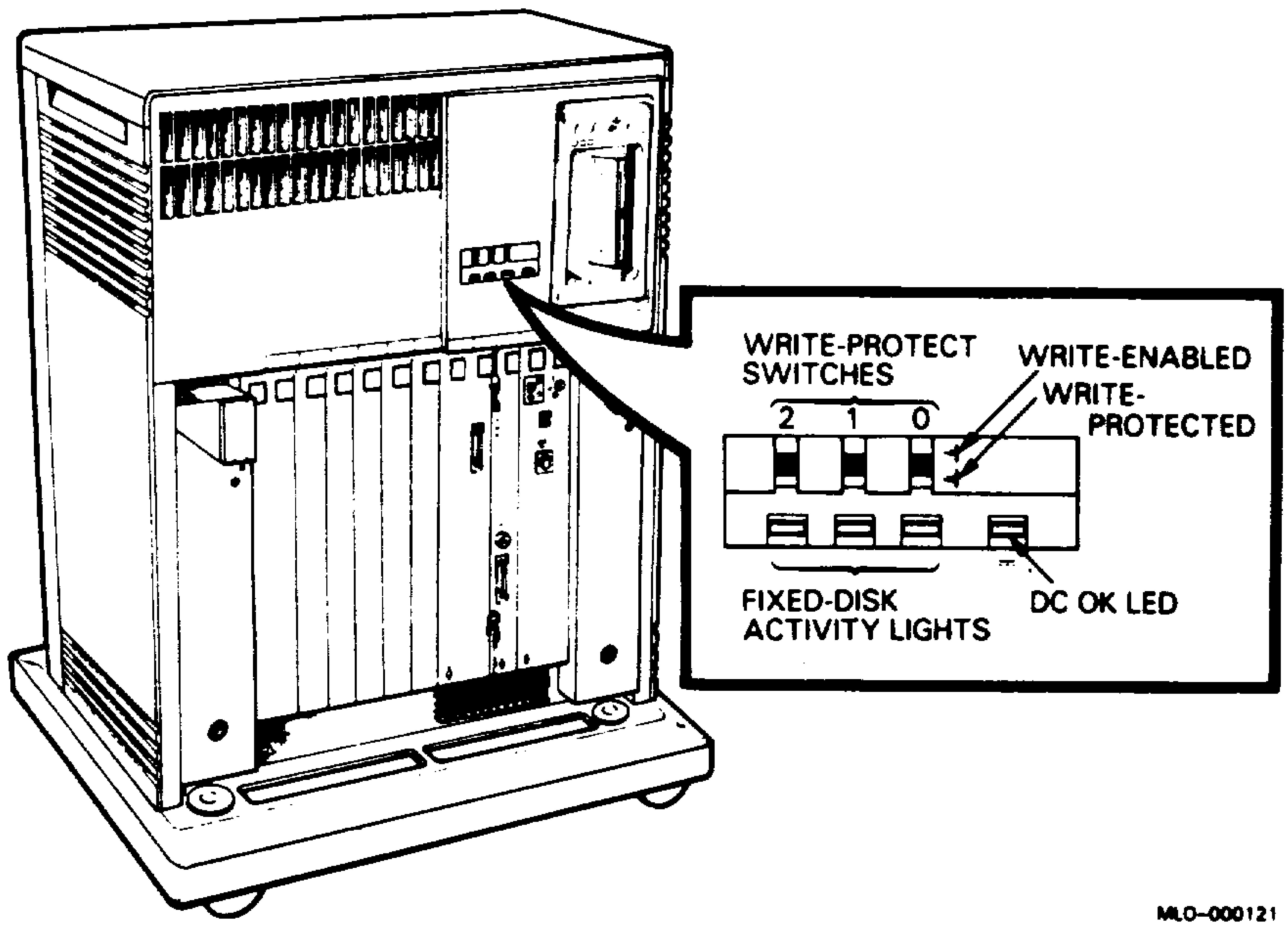


Table 1–3: RD-Series Controls and Indicators

Control/ Indicator	Setting	Function
System DC OK (green LED)	On	DC power is within regulation.
	Off	DC power not present or not within regulation.
Write-Protect (switches)	Up	The system can read from and write to the disk (normal operating condition).
	Down	The system cannot write to the disk. The system can still read from the disk.
Activity lights	On	The system is reading from or writing to the disk.
	Off	The system is not accessing the disk.

A 50-conductor cable connects the RD-series signal distribution board to an RQDX3 controller module in the card cage. Figure 1–11 shows the signal distribution board, and Figure 1–12 shows the connectors on the inside of the board.

Figure 1–11: RD Signal Distribution Assembly (Outside)

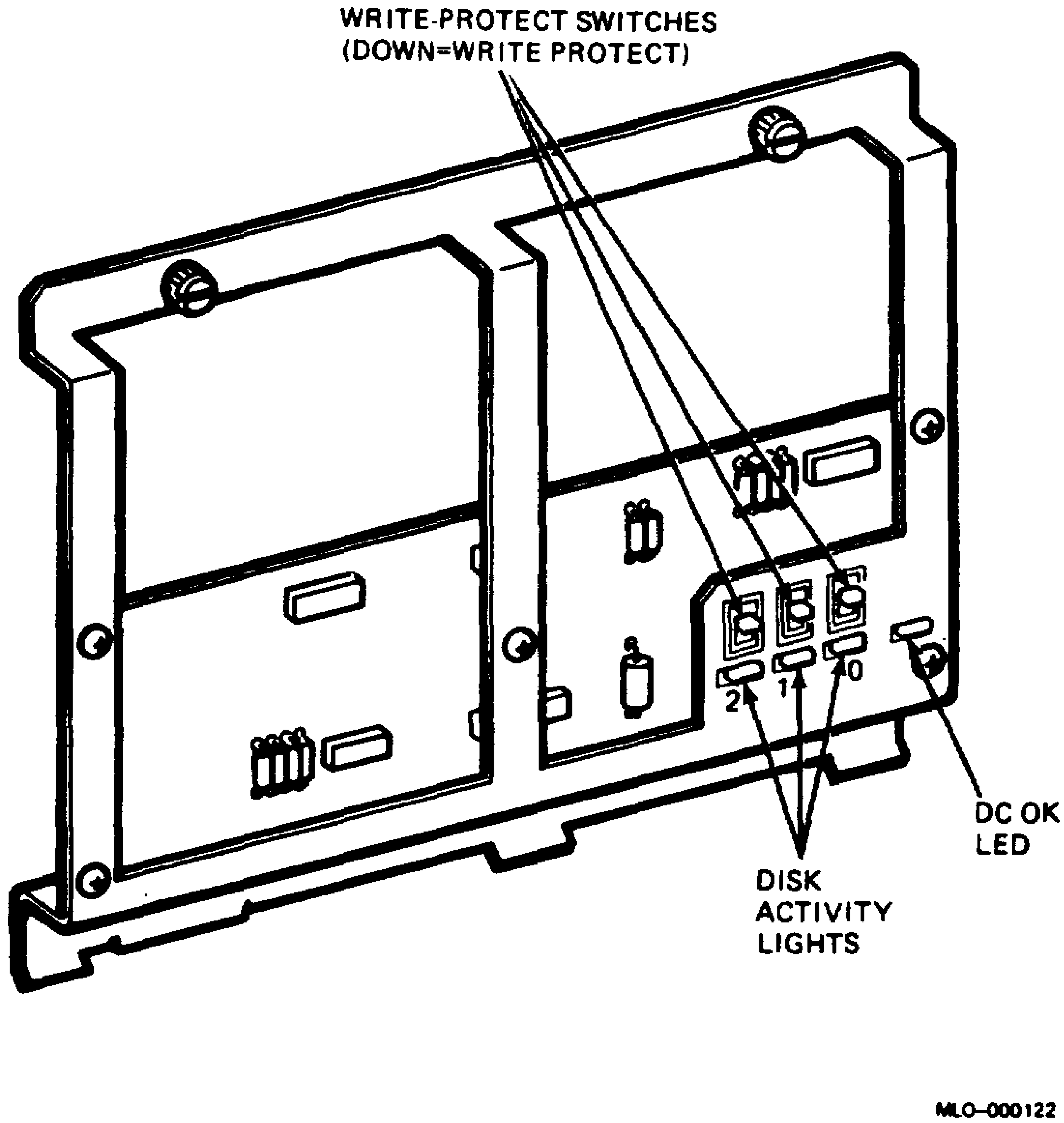
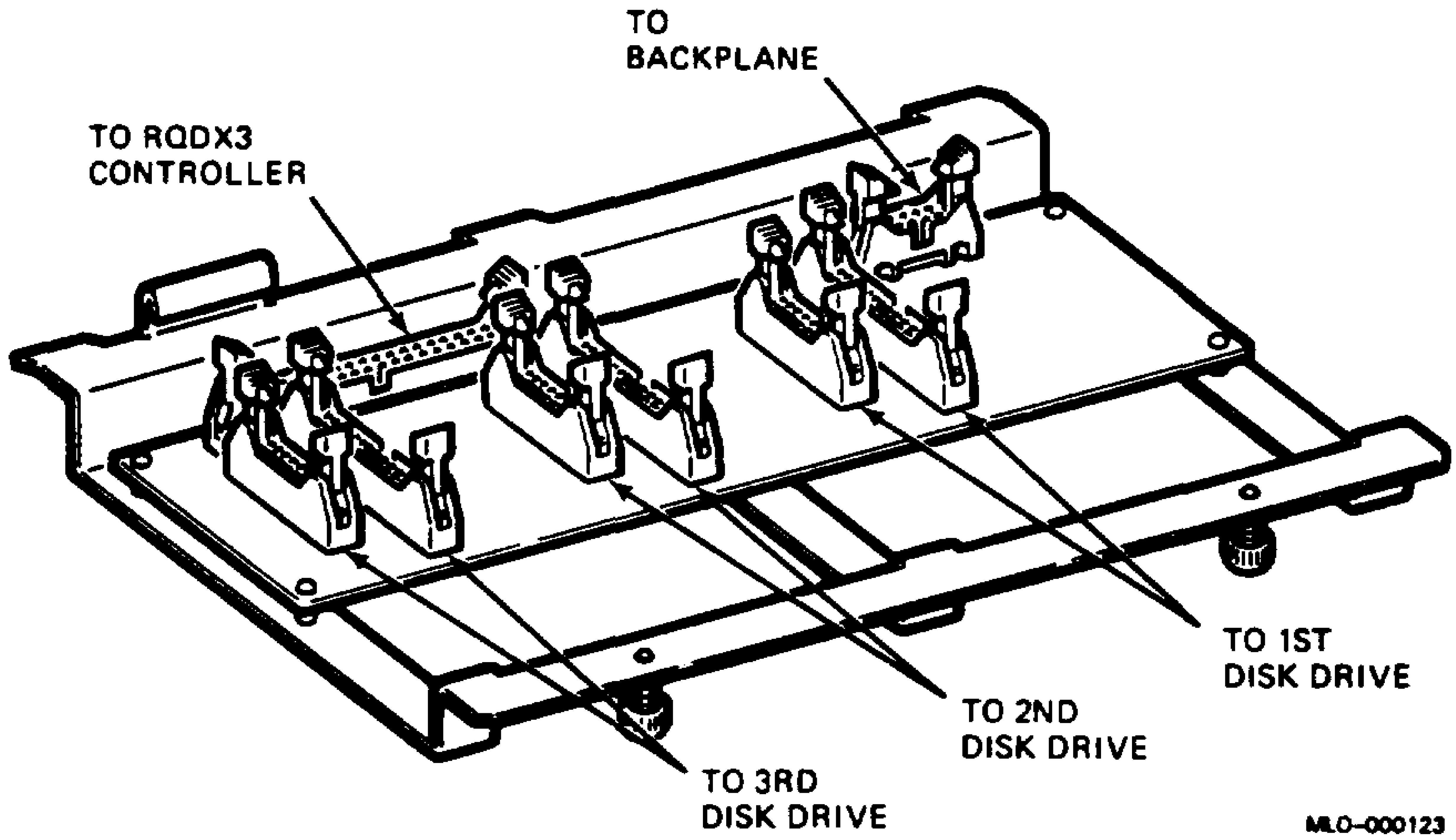


Figure 1–12: RD Signal Distribution Board (Inside)



1.5.2 Controls and Indicators, RA70 Drives

In addition to the controls and indicators listed in Section 1.5, a BA213 containing RA70 drives has controls and indicators on its front panel (called an operator console panel, or OCP) (Figure 1–13). Their functions are described in Table 1–4.

Figure 1–13: RA70 Controls

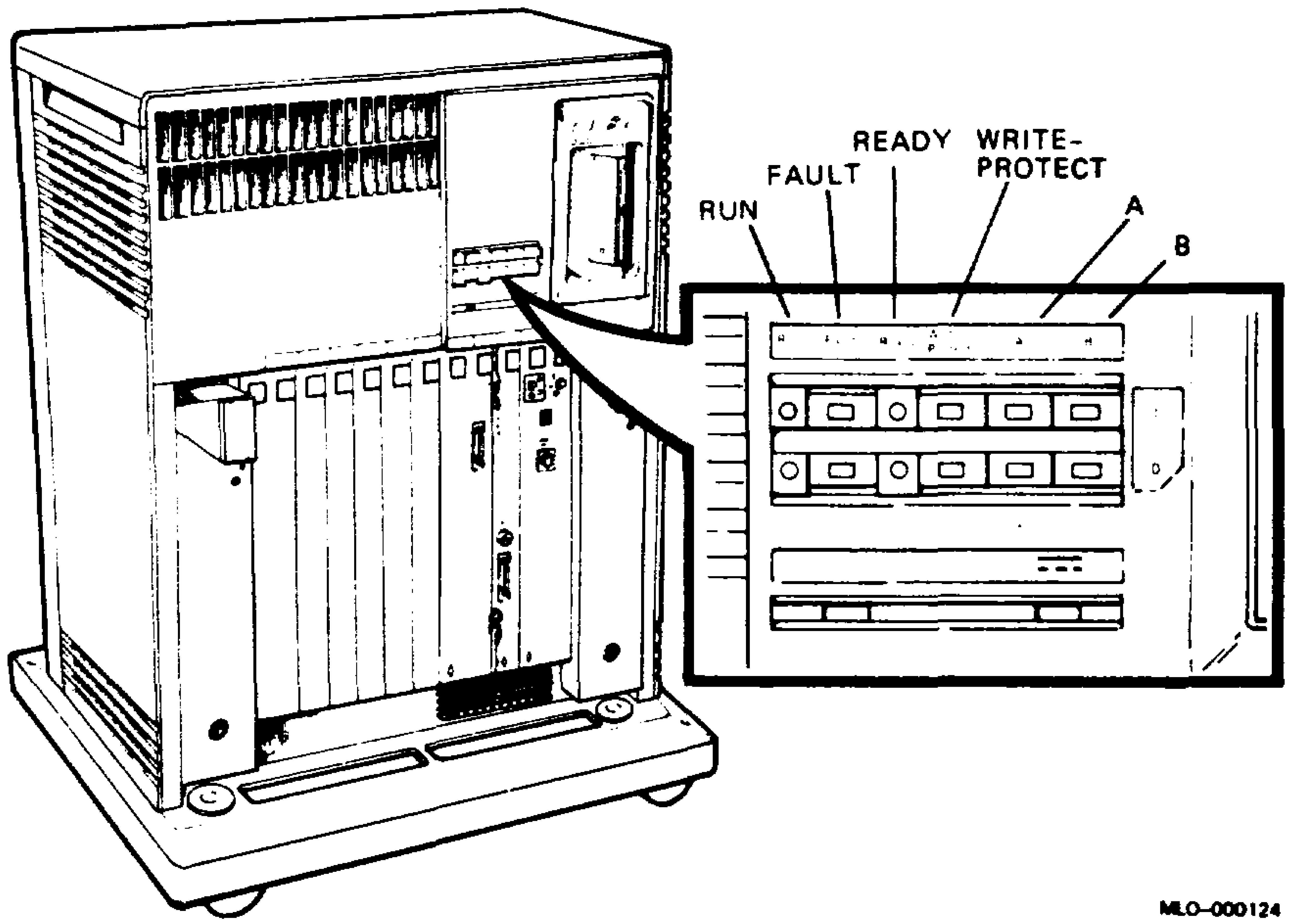
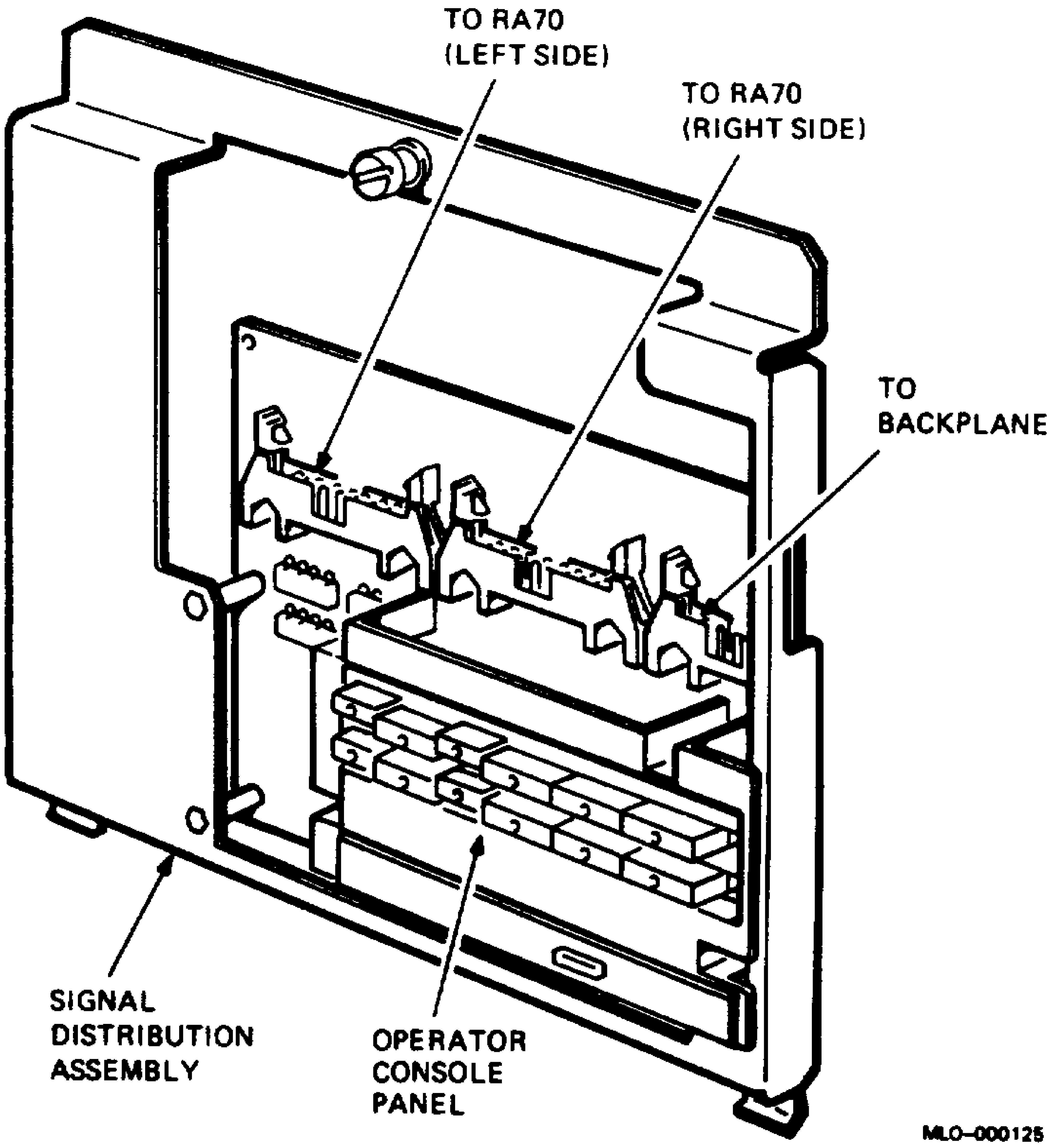


Table 1–4: RA70 Drive Front Panel Controls and Indicators

Control	Position	Function
Run	Lit	When this button and the Ready button lights, the disk drive is ready to use.
	Not Lit	Data on the disk is not available.
Fault	Lit	Indicates an error condition within the disk drive.
	Not Lit	Indicates normal operating condition.
Ready	Lit	The disk drive is ready to read or write information on the disk if the Run/Stop button is also lit.
	Not Lit	Indicates the drive is not ready to use.
	Blinking	Seek activity is occurring on the drive.
Write-Protect	In (lit)	Disk is write-protected. Prevents system software from writing on the disk.
	Out (not lit)	Disk is not write-protected. Normal position for software operation. System software is free to read or write information on the disk.
A	In (lit)	Normal operating position. The system can communicate with the disk drive through port A.
	Out (not lit)	The system cannot communicate with the disk drive through port A.
B	In (lit)	The system can communicate with the disk drive through port B.
	Out (not lit)	Normal operating position. The system cannot communicate with the disk drive through port B.

One 20-conductor cable connects the OCP to each RA-series drive. Figure 1–14 shows the internal connectors.

Figure 1–14: RA-Series OCP



1.5.3 Controls and Indicators, RF-Series Drives

In addition to the controls and indicators listed in Section 1.5, a BA213 containing RF-series drives has controls and indicators on its front panel (called an operator console panel, or OCP) (Figure 1–15). Their functions are described in Table 1–5.

Figure 1–15: RF-Series Controls

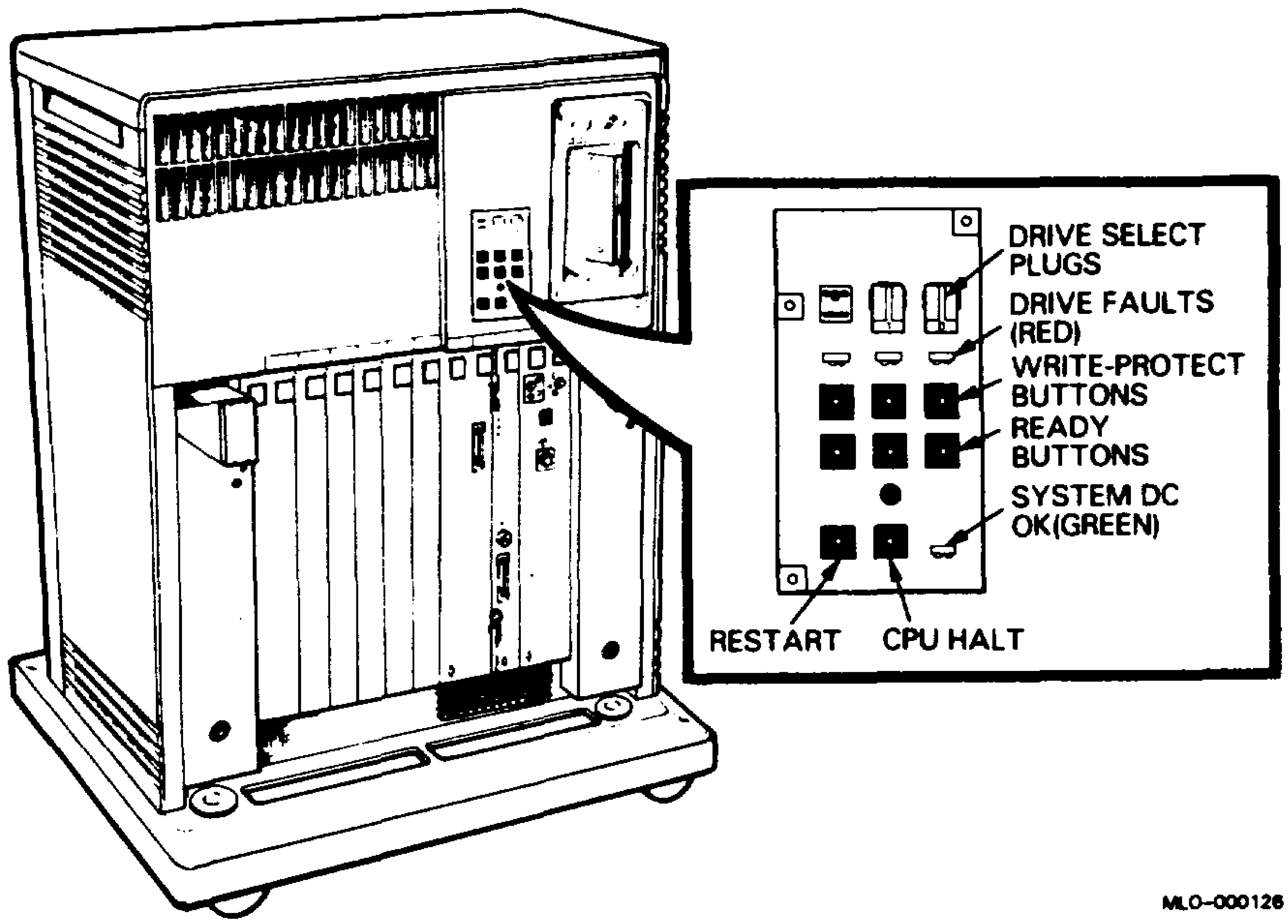


Table 1–5: RF-Series Controls and Indicators

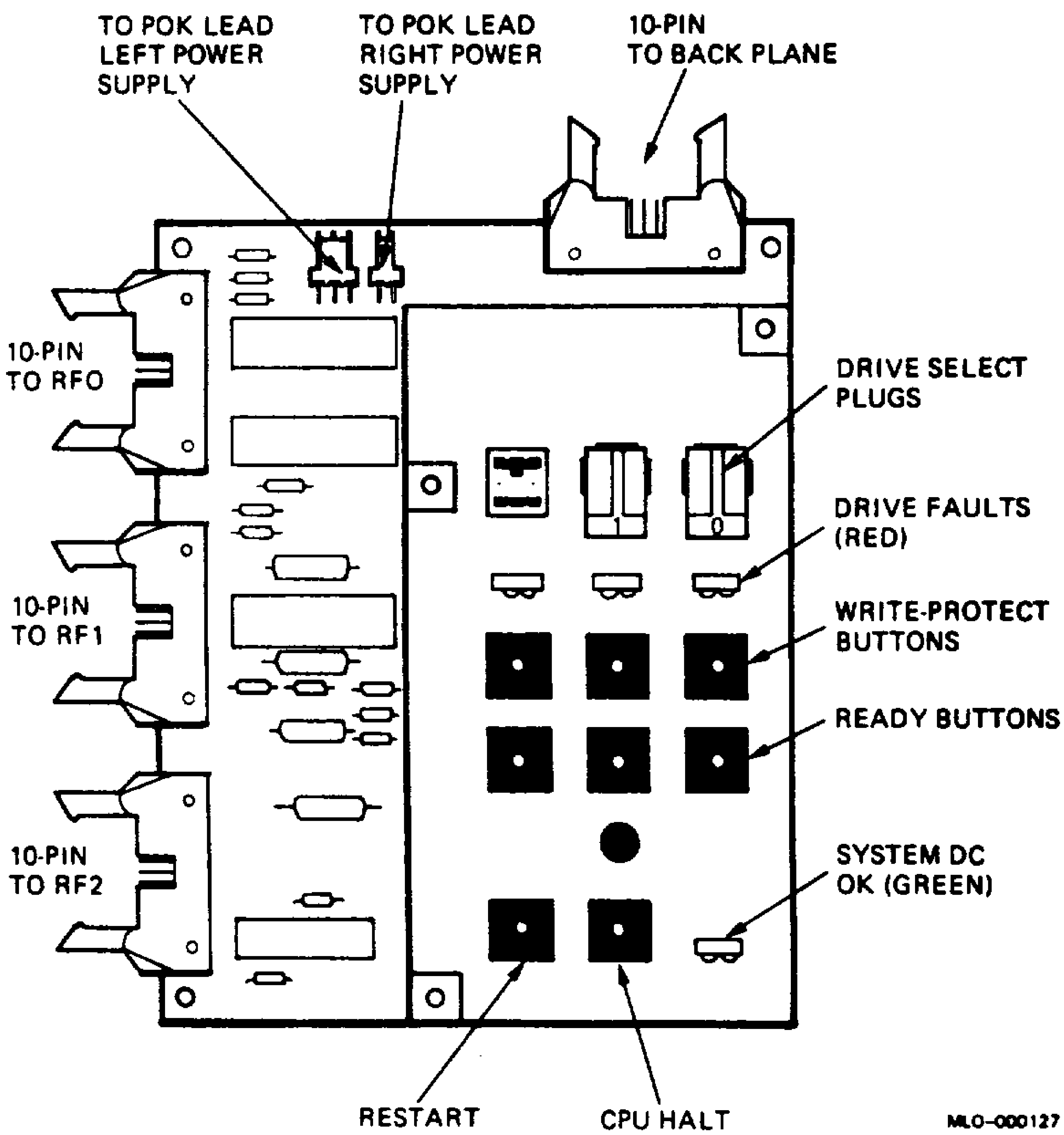
Control/ Indicator	Setting	Function
System DC OK (green LED)	On	DC power is within regulation.
	Off	DC power not present or not within regulation.
Drive Select Plug (one for each drive)	Installed	Sets DSSI address to number specified on plug (normal operating position). Plug must be installed if drive is present.
	Removed	DSSI address undefined. If drive is present, Drive Fault LED will light.
Drive Fault (red LED)	On	Drive fault.
	Off	No fault (normal operation condition).
Write-Protect (one for each drive)	Out LED off	The system can read from and write to the disk (normal operating position).
	In LED on	The system cannot write to the disk. The system can still read from the disk.
Ready (one for each drive)	Out LED on	Disk is on-line (normal operation position). The system can read from and write to the disk.
	In LED off	Disk if off-line. The system cannot read from or write to the disk.
CPU Halt	In LED on	The CPU is in console I/O mode. The console emulation program is running.
	Out LED off	The CPU can run system software. Normal operating position.
Restart (momentary contact)		Re-initializes system state. Reruns self tests. Work in progress is lost.

Standard system configurations use the right-side drive buttons for drive 0, the center buttons for drive 1, and the left-side buttons for drive 2. Drive select plugs are **not** interchangeable.

One 10-conductor cable connects the OCP to each RF-series drive (Figure 1–16).

The OCP also contains two two-pin connectors for POK lines from the power supply. The POK signal is on all four lines, and is used to prevent excessive current draw by the disk drives at power-up.

Figure 1–16: RF-Series OCP



1.6 Power Supply

The BA213 contains two modular power supplies (Figure 1–17). Each power supply plugs directly into the backplane via a 56-pin connector. Each power supply delivers the following maximum current.

7.0 amperes at +12 Vdc
33.0 amperes at +5 Vdc

Each power supply has an LED, and is also connected to an LED on the front panel and in the on/off switch. The functions of these LEDs are described in Table 1–6.

Figure 1–17: BA213 Power Supply

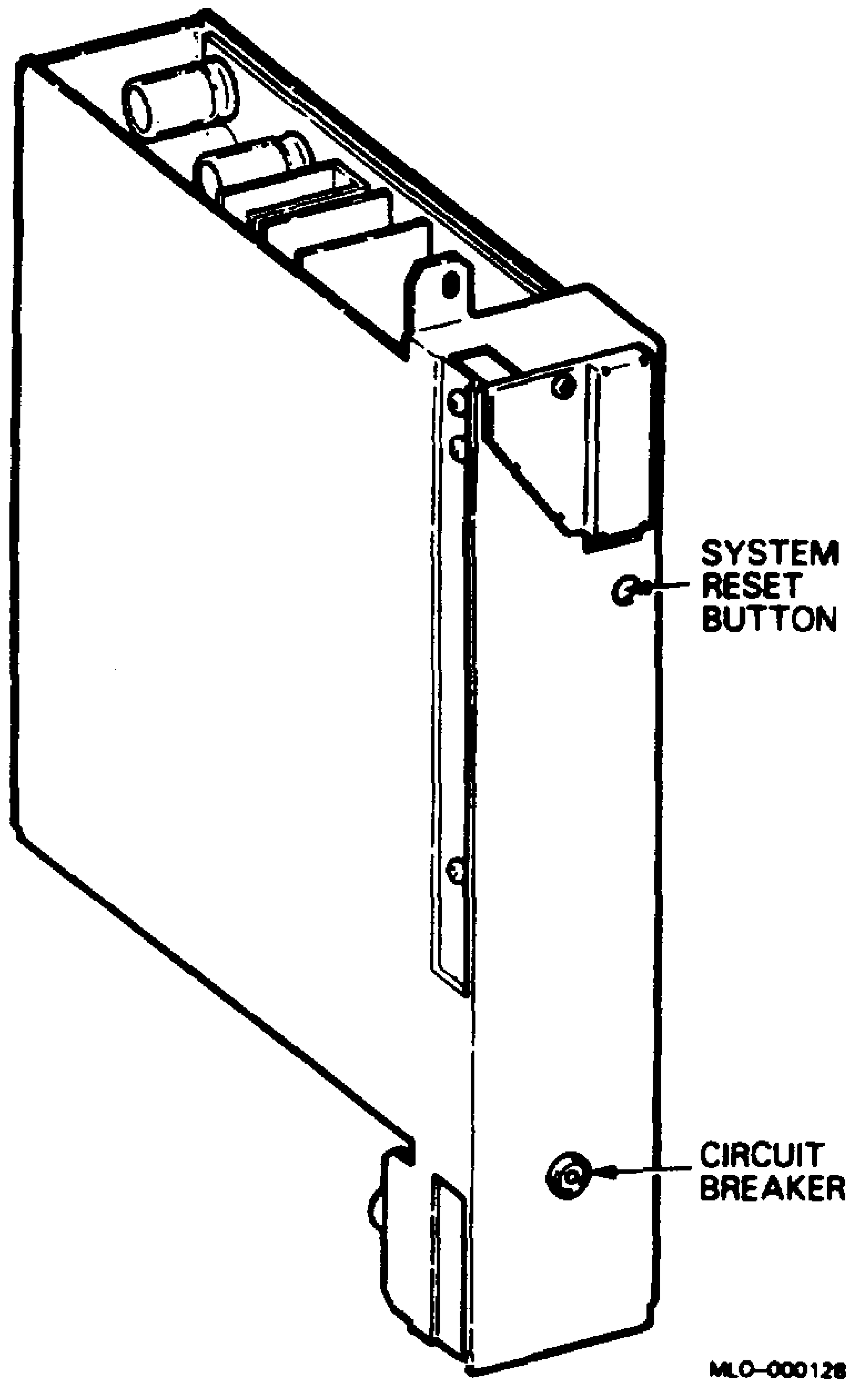


Table 1–6: Power Supply Indicators

Indicator	Location	Function
AC power	On/off power switch	Turns on when ac voltage is present at the input of the power supply.
DC OK	Front panel	Turns on when the dc power from the power supplies is within regulation. If this LED turns off, check the dc power supply LED on each power supply to determine which supply failed.
Power supply	Front of power supply	Turns on when the dc output from the power supply is within regulation.

The combined maximum current at +12 Vdc and +5 Vdc must not consume more than 230 watts of power for each supply.

The two power supplies provide power to the following areas:

Right power supply	Backplane slots 1 through 6, two right-side mass storage devices, and two dc fans under the card cage
Left power supply	Backplane slots 7 through 12, two left-side mass storage devices

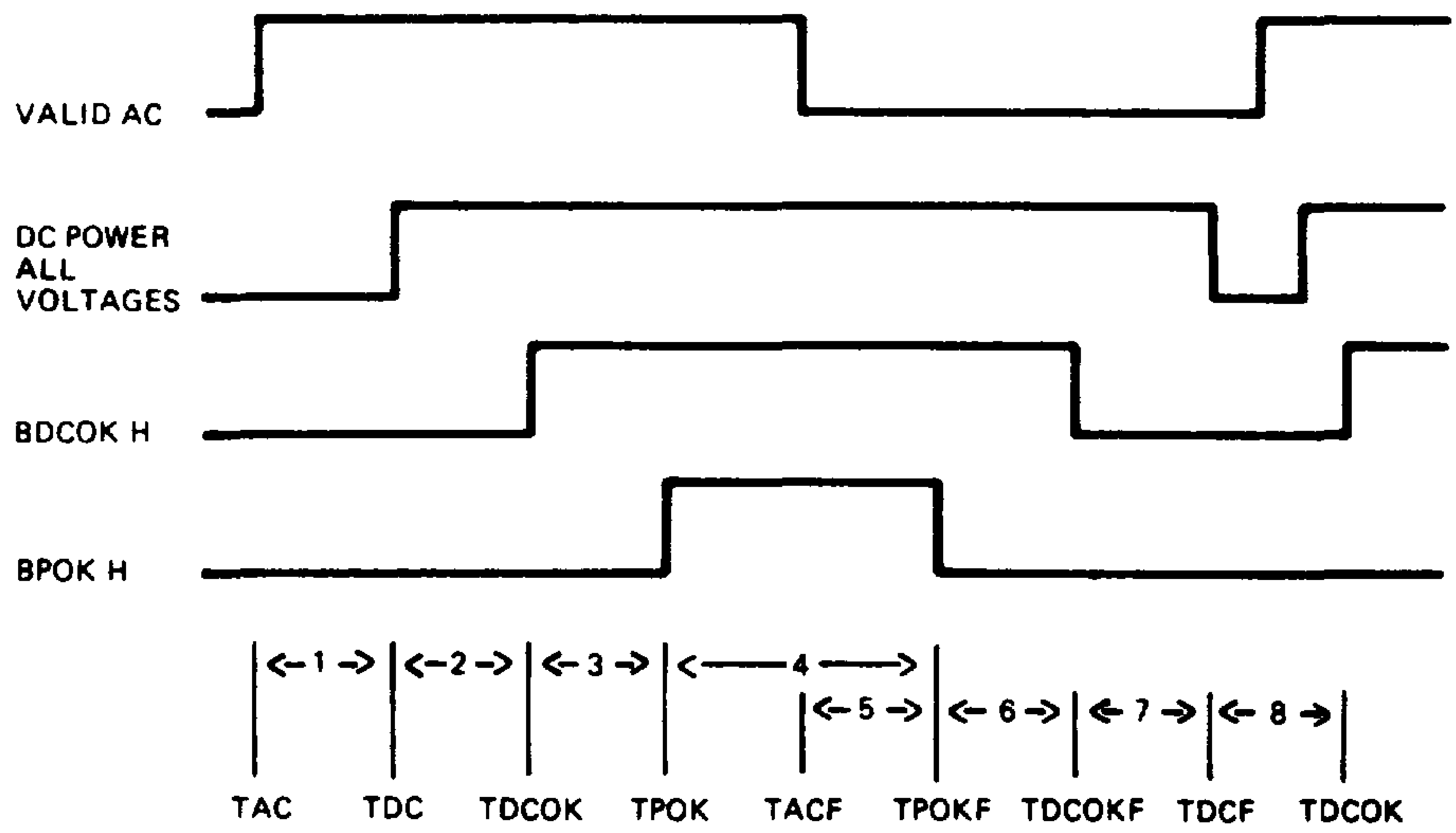
Mass storage devices receive power through a 9-pin MTA connector on the top front of each power supply. Each power supply also has a power indicator, system reset switch, and circuit breaker on the front.

The power supply enters and completes a shutdown sequence (Figure 1–18) whenever the BPOK H signal is negated. When BPOK H is asserted high on the Q22-bus, the power system is in a state to allow normal system operation. The following conditions negate BPOK H:

Temperature sensor triggered, possibly caused by fan failure
An overcurrent condition
Input voltage greater than 132 Vrms or less than 88 Vrms

BPOK H and BDCOK H are parallel. If one power supply starts to shut down and the other supply is still operating, BPOK H and BDCOK H are negated through a signal low from the power supply that is shutting down.

Figure 1–18: BA213 Power Supply Shutdown Sequence



1. 3 seconds maximum
2. 3 milliseconds (msec) minimum
3. 70 msec minimum
4. 3 msec minimum
5. 20 msec ride-through time
6. 4 msec minimum hold up
7. 5 msec minimum
8. 3 msec minimum

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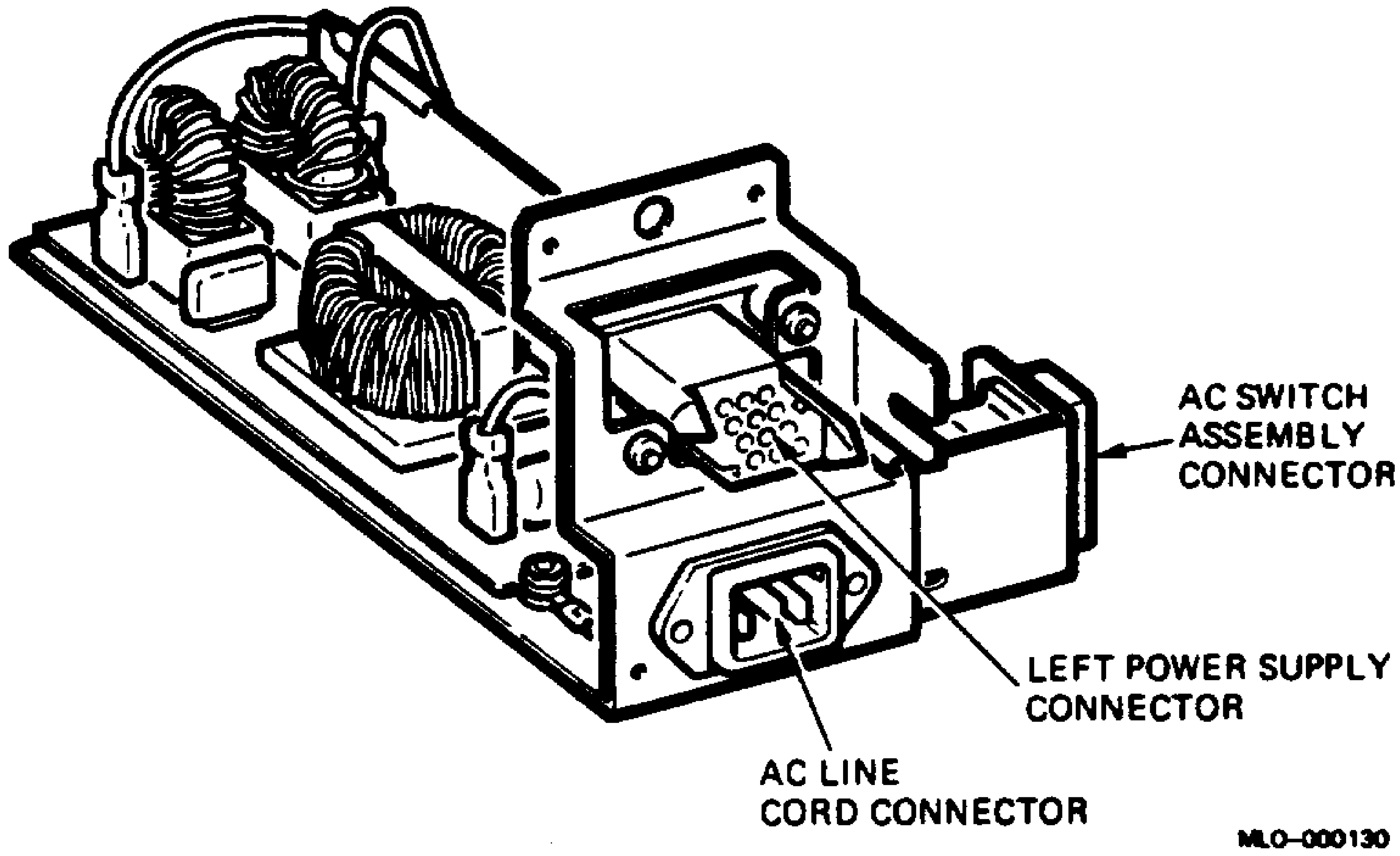
The RF-series OCP contains two two-pin connectors for POK lines from the power supply. The POK signal is on all four lines, and is used to prevent excessive current draw by the disk drives at power-up.

An ac line filter distributes ac input power to the two power supplies. The filter (Figure 1–19) is under the left power supply area. Each power supply has a 12-hole (6-pin) ac input power connector at its base.

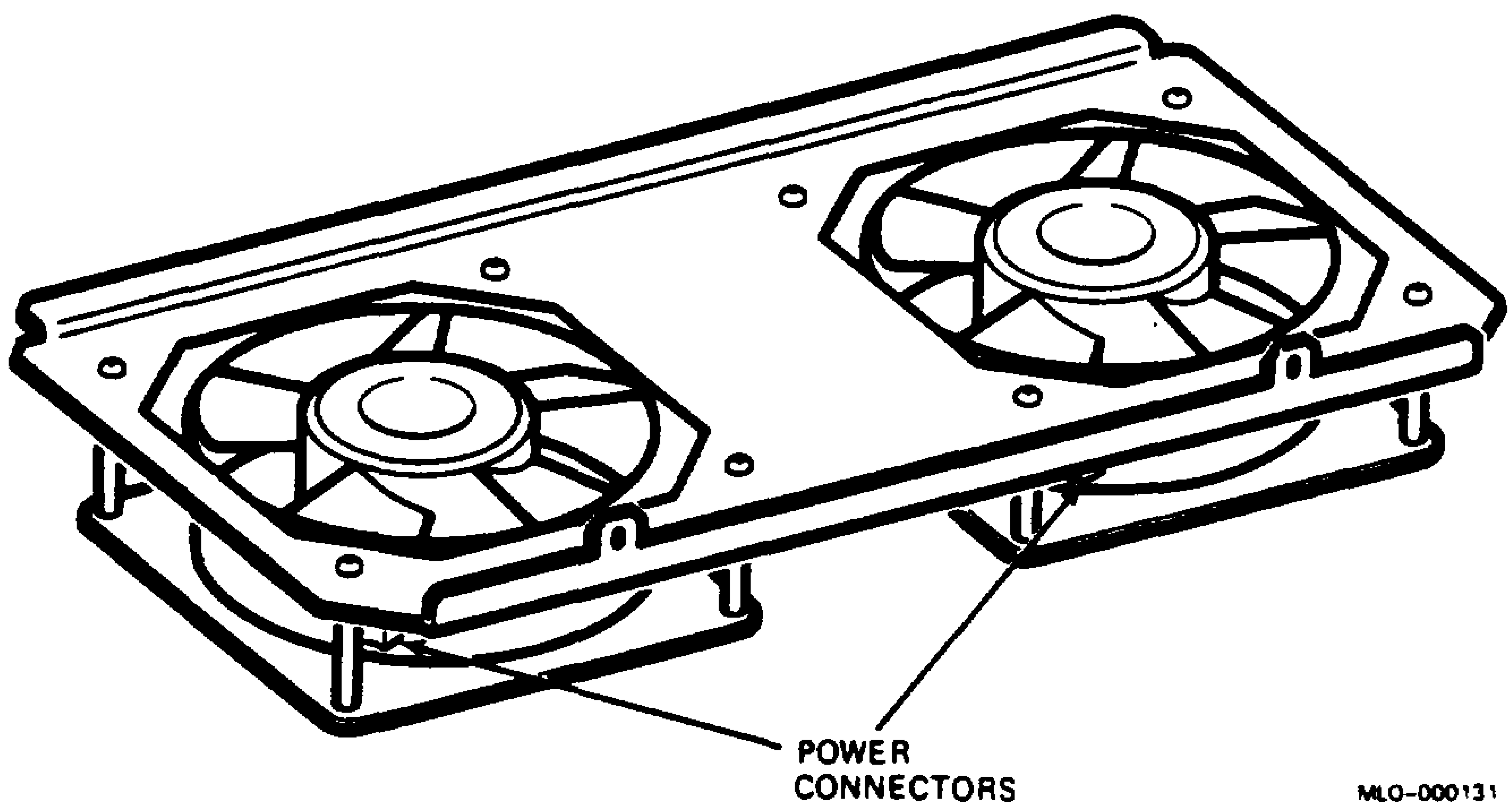
Figure 1–19: BA213 AC Line Filter



1.7 Fans

The BA213 has two 11.4-cm (4.5-in) dc fans (Figure 1–20) below the card cage, which draw air into the top of the enclosure, through the mass storage area and card cage, and out the bottom of the enclosure. A temperature sensor in the power supply adjusts fan speed by varying the fan's input voltage based on the room temperature. The sensor adjusts input voltage to provide sufficient cooling, at minimum speed, for all combinations of load. The maximum output is –12 Vdc at 45°C. The minimum is –6 Vdc at 28°C.

Figure 1–20: BA213 Fans



1.8 Configuration Guidelines

Before changing a configuration in the BA213 enclosure, you must consider the following factors:

Module order in the backplane
Module configuration
Mass storage device configuration

When adding a device to a system, you must know the capacity of the system enclosure in these areas:

Number of backplane slots
Power limitation
Mass storage device space

1.8.1 Module Order and Configuration

Module order in the backplane is system specific, depending on the CPU. Refer to the applicable CPU maintenance manual for the preferred module order of a given system.

For information on how to configure modules, refer to *Microsystems Options (EK-192AA-MG)*, which includes a complete listing of all supported options along with the following information for each module and device:

Ordering information
Operating system support
Diagnostic support
Option description
CSR addresses and interrupt vectors
LEDs
Loopback connectors
Self-tests
FRUs (if applicable)
Related documentation

1.8.2 Configuration Worksheet

Use Figure 1–21 to be sure a configuration does not exceed system limits for expansion space, power, and bus loads. If you use standard DIGITAL modules, you will not exceed the limits for bus loads.

When changing a configuration, use the worksheet as follows:

1. On the worksheet, list all the devices already installed in the system.
2. List all the devices you plan to install in the system.

3. Fill in the information for each device, using the data listed in Table 1–7.
4. Add up the columns. Make sure the totals are within the limits for the enclosure.

NOTE: *Check the CPU documentation to determine which options are supported for a specific system.*

Table 1–7: Power and Bus Loads, BA200-Series

		Current (Amps)		Power	Bus Loads	
Option	**Module**	**+5 V**	**+12 V**	**Watts**	**AC**	**DC**
AAV11–SA	A1009–PA	1.8	0.0	9.0	2.1	0.5
ADV11–SA	A1008–PA	3.2	0.0	16.0	2.3	0.5
AXV11–SA	A026–PA	2.0	0.0	10.0	1.2	0.3
CXA16–M	M3118–YA	1.6	0.20	10.4	3.0	0.5
CXB16–M	M3118–YB	2.0	0.0	10.0	3.0	0.5
CXY08–M	M3119–YA	1.64	0.395	12.94	3.2	0.5
DELQA–SA	M7516–PA	2.7	0.5	19.5	2.2	0.5
DEQNA–SA	M7504	3.5	0.50	23.5	2.2	0.5
DFA01	M3121–PA	1.97	0.40	14.7	3.0	1.0
DPV11–SA	M8020–PA	1.2	0.30	9.6	1.0	1.0
DRQ3B–SA	M7658–PA	4.5	0.0	22.5	2.0	1.0
DRV1J–SA	M8049–PA	1.8	0.0	9.0	2.0	1.0
DRV1W–SA	M7651–PA	1.8	0.0	9.0	2.0	1.0
DZQ11–SA	M3106–PA	1.0	0.36	9.3	1.4	0.5
IBQ01–SA	M3125–PA	5.0	0.0	25.0	4.6	1.0
IEQ11–SA	M8634–PA	3.5	0.0	17.5	2.0	1.0
KA620–AA	M7478	6.2	0.14	32.7	2.7	1.0
KA630–AA	M7606	6.2	0.14	32.7	2.7	1.0
KA650–AA	M7620–A	6.0	0.14	31.7	2.7	1.0
KDA50–Q[1]	M7164	6.93	0.0	34.65	3.0	0.5
KDA50–Q	M7165[2] C or D rev	6.57	0.03	33.21	–	–

[1]KDA50–Q is a two-module set (M7164/M7165). AC and DC bus loads listed = total for both modules.

[2]The etch revision letter C, D, or E is part of the module part number near the handle. For example, a part number xxxxx–Ex–xx is a revision E module.

Table 1–7 (Cont.): Power and Bus Loads, BA200-Series

Option	Module	Current (Amps) +5 V	Current (Amps) +12 V	Power Watts	Bus Loads AC	Bus Loads DC
KDA50–Q	M7165[2] E rev	4.07	0.03	20.71	–	–
KDJ11–BC	M8190	5.5	0.1	28.7	2.3	1.1
KDJ11–BF	M8190	5.5	0.2	29.9	2.6	1.0
KLESI–SA	M7740–PA	3.0	0.0	15.0	2.3	1.0
KMV1A–SA	M7500–PA	2.6	0.2	15.4	3.0	1.0
KWV11–SA	M4002–PA	2.2	0.13	11.15	1.0	0.3
LPV11–SA	M8086–PA	1.6	0.0	8.0	1.8	0.5
M9060–YA	–	5.3	0.0	26.5	0.0	0.0
MS630–AA	M7607	1.0	0.0	5.0	0.0	0.0
MS630–BA	M7608	1.8	0.0	9.0	0.0	0.0
MS630–BB	M7608	1.8	0.0	9.0	0.0	0.0
MS630–CA	M7609	3.1	0.0	15.5	0.0	0.0
MS650–AA	M7621–A	2.7	0.0	13.5	0.0	0.0
MSV11–JD	M8637–D	3.74	0.0	18.7	2.7	0.5
MSV11–JE	M8637–E	4.1	0.0	20.5	2.7	0.5
MSV11–PK	M8067–K	3.45	0.0	17.25	2.0	1.0
MSV11–PL	M8067–L	3.6	0.0	17.5	2.0	1.0
MSV11–QA	M7551–AA	2.4	0.0	12.0	2.0	1.0
RA70	–	3.3	2.9	51.3	–	–
RD53A–EA	–	0.9	2.5	34.5	–	–
RD54A–EA	–	1.3	1.34	22.6	–	–
RQDX3	M7555	2.48	0.06	13.2	1.0	1.0
TK50E–EA	–	1.35	2.4	35.6	–	–
TK70E–EA	–	1.5	2.4	36.3	–	–
TQK50	M7546	2.9	0.0	14.5	2.8	0.5
TQK70–SA	M7559	3.5	0.0	17.5	4.3	0.5
TSV05–SA	M7196	6.5	0.0	32.5	3.0	1.0
VCB02	M7169	5.8	0.75	38.0	3.5	1.0
VCB02	M7168	3.4	0.0	17.0	0.0	0.0

[2]The etch revision letter C, D, or E is part of the module part number near the handle. For example, a part number xxxxx–Ex–xx is a revision E module.

Figure 1–21: BA213 Configuration Worksheet

RIGHT POWER SUPPLY

SLOT	MODULE	Current (Amps) +5 Vdc	+12 Vdc	Power (Watts)
1				
2				
3				
4				
5				
6				
MASS STORAGE:				
TK Drive				
FIXED DISK				
Total these columns:				
Must not exceed:		33.0 A	7.0 A	230.0 W

LEFT POWER SUPPLY

SLOT	MODULE	Current (Amps) +5 Vdc	+12 Vdc	Power (Watts)
7				
8				
9				
10				
11				
12				
MASS STORAGE:				
FIXED DISK(S)	1.			
	2.			
Total these columns:				
Must not exceed:		33.0 A	7.0 A	230.0 W

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Chapter 2
Installation

This chapter contains the procedure for installing the BA213 enclosure in a pedestal. Refer to the *H9644 Cabinet Maintenance (EK-221AA-MG)* for site preparation considerations for the BA213 in an H9644 cabinet.

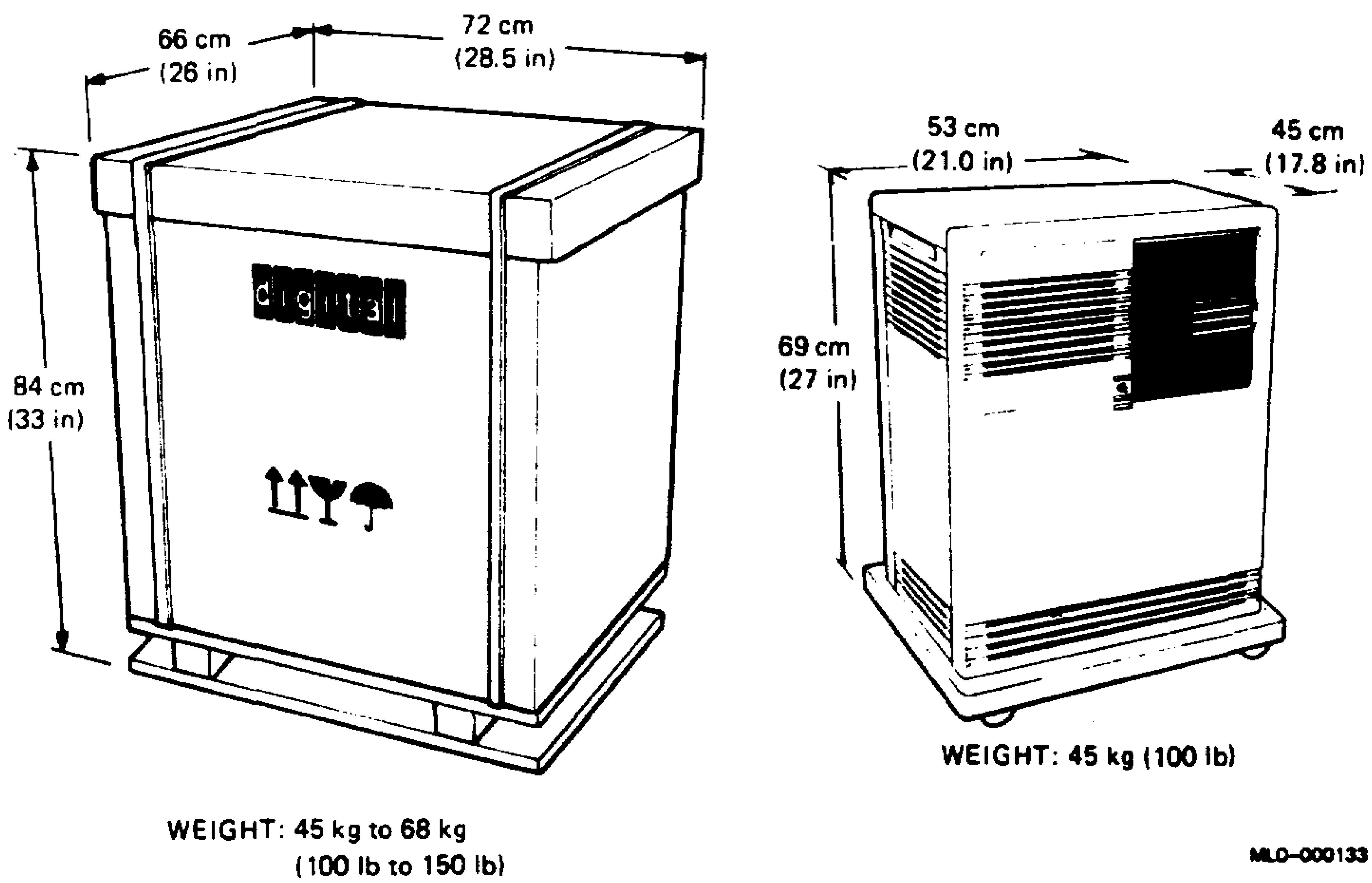
2.1 Site Preparation Considerations

2.1.1 Physical Dimensions, BA213 in Pedestal

Figure 2–1 shows the dimensions of the BA213 in a pedestal, and its shipping carton. You must leave at least 61 cm (24 in) of clearance in front of the system, for access to system controls. You must also leave at least 5 cm (2 in) of clearance at the sides and rear, for airflow. Since the base of the enclosure is 5 cm (2 in) wider than the cabinet in front and rear, you can place the rear of the system against a wall or table, and the system will have enough room for adequate airflow.

CAUTION: *Due to the weight of the equipment, DIGITAL recommends that at least two people handle the system and terminal boxes.*

Figure 2–1: System Dimensions, BA213 in Pedestal



2.1.2 Additional Equipment

Make sure there is enough space for terminals and other peripheral equipment. The temperature and humidity at which mass storage media are kept should be the same as that of the computer area.

When you plan the cable routing for multiple-terminal systems, consider factors such as safety, convenience, future expansion, and cost. Cabling should be in place and labeled before you install the system.

2.1.3 Static Electricity

Static electricity can cause system failure and loss of data. To minimize static buildup, follow these guidelines:

- Maintain relative humidity of at least 40%.
- Place the system away from busy office corridors.

- Avoid using carpeting in the computer area, if possible. If carpeting is to be installed, recommend antistatic carpeting. If carpeting is already in place, place an antistatic mat under the system.

2.1.4 Acoustics

The BA213 in a pedestal is designed for use in offices and other general working areas. The following are acoustic emission and heat dissipation levels for the BA213 in a pedestal. Levels may be lower, depending on the kind and number of mass storage devices in the system. Data is measured in accordance with ANSI S12.10–1985 (American National Standards Institute) and ISO/DIS 7779 (International Standards Organization).

- LNPE (B) is the noise power emission level (A-weighted sound power level) measured in bels re 1 pw (reference 1 picowatt). LNPE for the BA213 enclosure is 5.8.
- LPA is the sound pressure measured in decibels at 1.0 m from the front edge of the unit and 1.5 m above the floor. LPA for the BA213 enclosure is 43.

2.1.5 Heat Dissipation

Heat dissipation is measured in British Thermal Units (Btu). Heat dissipation in the BA213 enclosure is 2304 Btu.

2.1.6 Temperature and Humidity Values

Table 2–1 lists temperature and relative humidity values for the BA213 in a pedestal.

Table 2–1: Temperature and Relative Humidity Values

Parameter	Operating	Non-operating
Temperature[1]	10°C to 40°C 50°F to 104°F	–40°C to 66°C –40°F to 151°F
Temperature rate of change	11°C per hour maximum 19.8°F per hour maximum	–
Relative humidity	20% to 80% (noncondensing)	10% to 90%
Maximum altitude	2440 m (8000 ft)	4900 m (16,000 ft)

[1]For operation above sea level, decrease the operation temperature by 1.8°C per 1000 m (or 1°F per 1000 ft).

2.1.7 Electrical Requirements

The power source should be adequate to handle the original system and allow for system expansion. DIGITAL recommends a dedicated circuit from the power source to each microsystem. Additional power equipment may be required to avoid power disturbances.

Tables 2–2 and 2–3 list the electrical requirements for systems in a BA213 pedestal. Table 2–4 lists the power cords required for systems using 240 volt service.

Table 2–2: MicroVAX II, MicroPDP Electrical Requirements

Nominal AC Voltage ⟹	100 Vac	120 Vac	220–240 Vac
Voltage Range	90 to 110 Vac	104 to 128 Vac	191 to 256 Vac
Power source phase	Single	Single	Single
Nominal frequency	50 to 60 Hz	50 to 60 Hz	50 to 60 Hz
Frequency range	47 to 63 Hz		47 to 63 Hz
Maximum steady state current at nominal voltage	10.2 A	8.6 A	4.7 A
Maximum steady state current at minimum voltage	11.3 A	9.8 A	5.4 A
Startup current (30 seconds)	13.5 A	11.5 A	6.3 A
Maximum inrush current	100 A	100 A	100 A
Maximum power consumption	670 W	670 W	670 W

Table 2–3: MicroVAX 3500 Electrical Requirements

Nominal AC Voltage ⟹	101 Vac	120 Vac	220–240 Vac
Voltage range	88 to 110 Vac	104 to 132 Vac	176 to 264 Vac
Power source phase	Single	Single	Single
Nominal frequency	50 to 60 Hz	50 to 60 Hz	50 to 60 Hz
Frequency range	47 to 63 Hz	47 to 63 Hz	47 to 63 Hz
Maximum steady state current at nominal voltage	10.2 A	8.6 A	4.7 A
Maximum steady state current at minimum voltage	12 A	10 A	5.4 A
Startup current (30 seconds)	13.5 A	11.5 A	6.3 A
Maximum inrush current	100 A	100 A	100 A
Maximum power consumption	670 W	670 W	670 W

Table 2–4: 240-Volt Power Cords

Power Cord	Countries
BN02A–2E	United Kingdom and Ireland
BN03A–2E	Austria, Belgium, Czechoslovakia, Finland, France, Germany, Hungary, Netherlands, Norway, Poland, Portugal, Spain, and Sweden
BN04A–2E	Switzerland
BN05A–2E	Australia and New Zealand
BN06A–2E	Denmark
BN07A–2E	Italy

2.2 Unpacking the Shipment

The shipment may include several cartons:

- One contains the system unit (Figure 2–2).
- One contains cables for connecting additional devices to the system.
- Several contain components of the console terminal.
- Another, marked "software," contains software documentation, system software, diagnostic software, and a software license.

NOTE: *Save all packing materials if you plan to reship the system.*

Depending on the order, the shipment may also include additional terminals, printers, or modems.

When delivered, the system is packed in a cardboard container attached to a shipping skid or pallet.

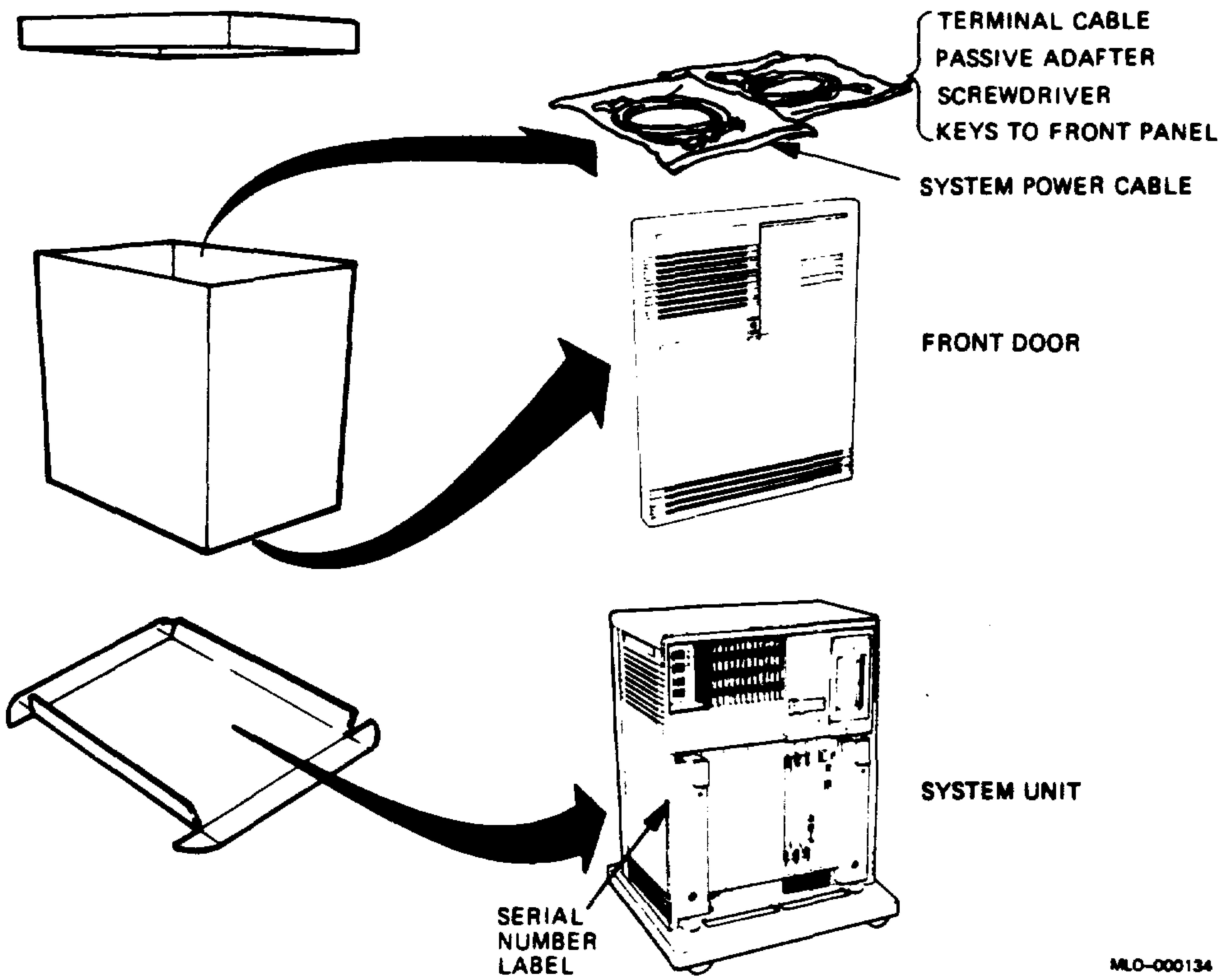
Before unpacking the equipment, check for external shipping damage. Report any damage to the customer's sales representative, and contact the customer's delivery agent. Keep all packing material and receipts when filing a damage claim.

When you unpack the cartons, check the contents against the shipping list to ensure the order is complete.

Unpack the system according to the instructions on the system shipping carton. Figure 2–2 shows the contents of the carton.

CAUTION: *Release the shipping brackets according to the instructions on the carton. Failure to do so may result in damage to the disk drives.*

Figure 2-2: System Shipping Carton Contents

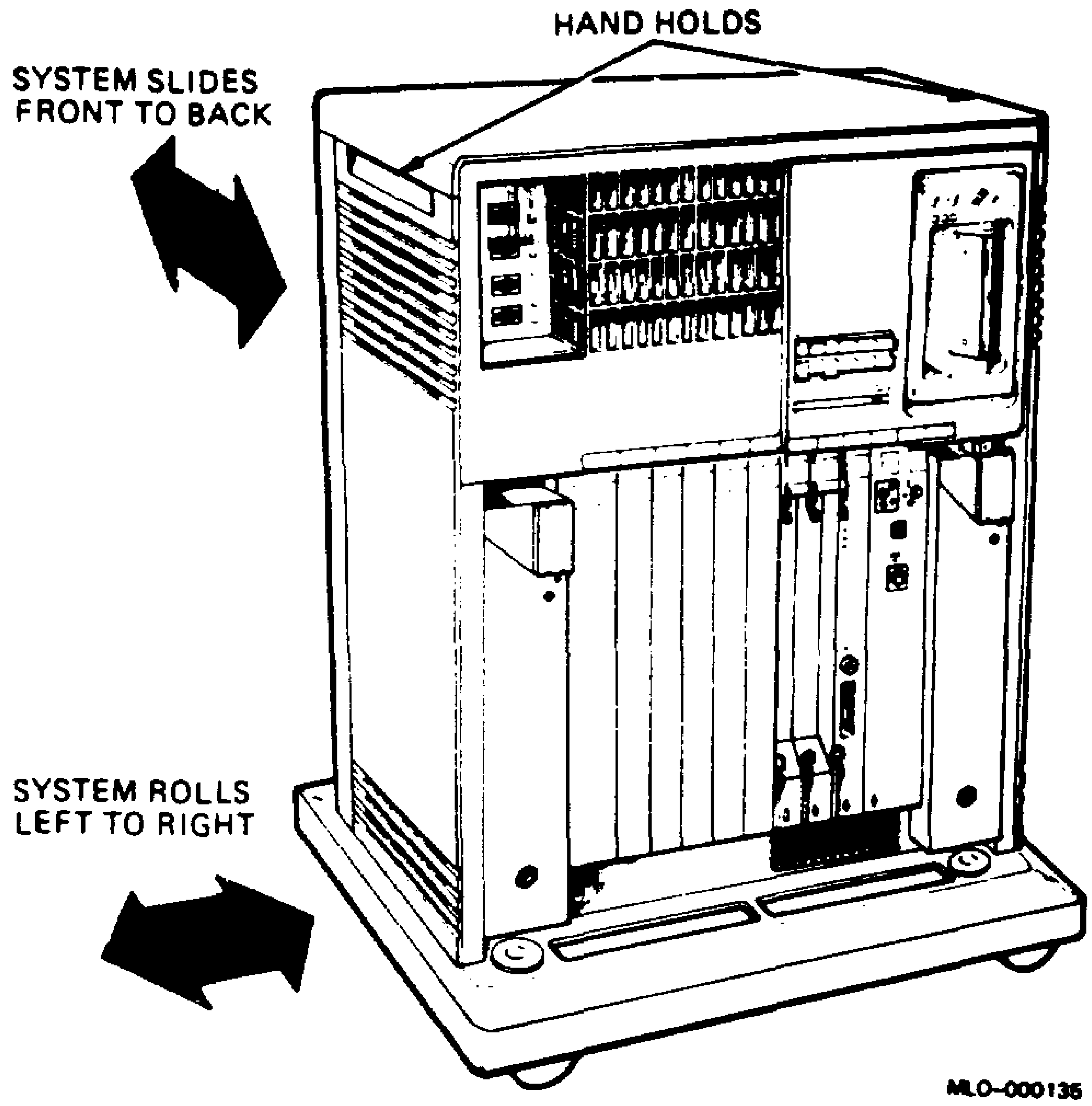


Verify that the system power requirements match the power source. The correct voltage for the system is listed on the serial number label next to the left power supply (Figure 2-2). If the voltage does not match the power source, do not continue. Contact the customer's sales representative.

After unpacking the system, move it by rolling it sideways, or by sliding or walking it backward while gripping the side handholds (Figure 2-3).

WARNING: *The system weighs between 50 kg (110 lb) and 64 kg (140 lb), depending on the options installed. Use two people to lift the system.*

Figure 2–3: Sliding the System Into Place

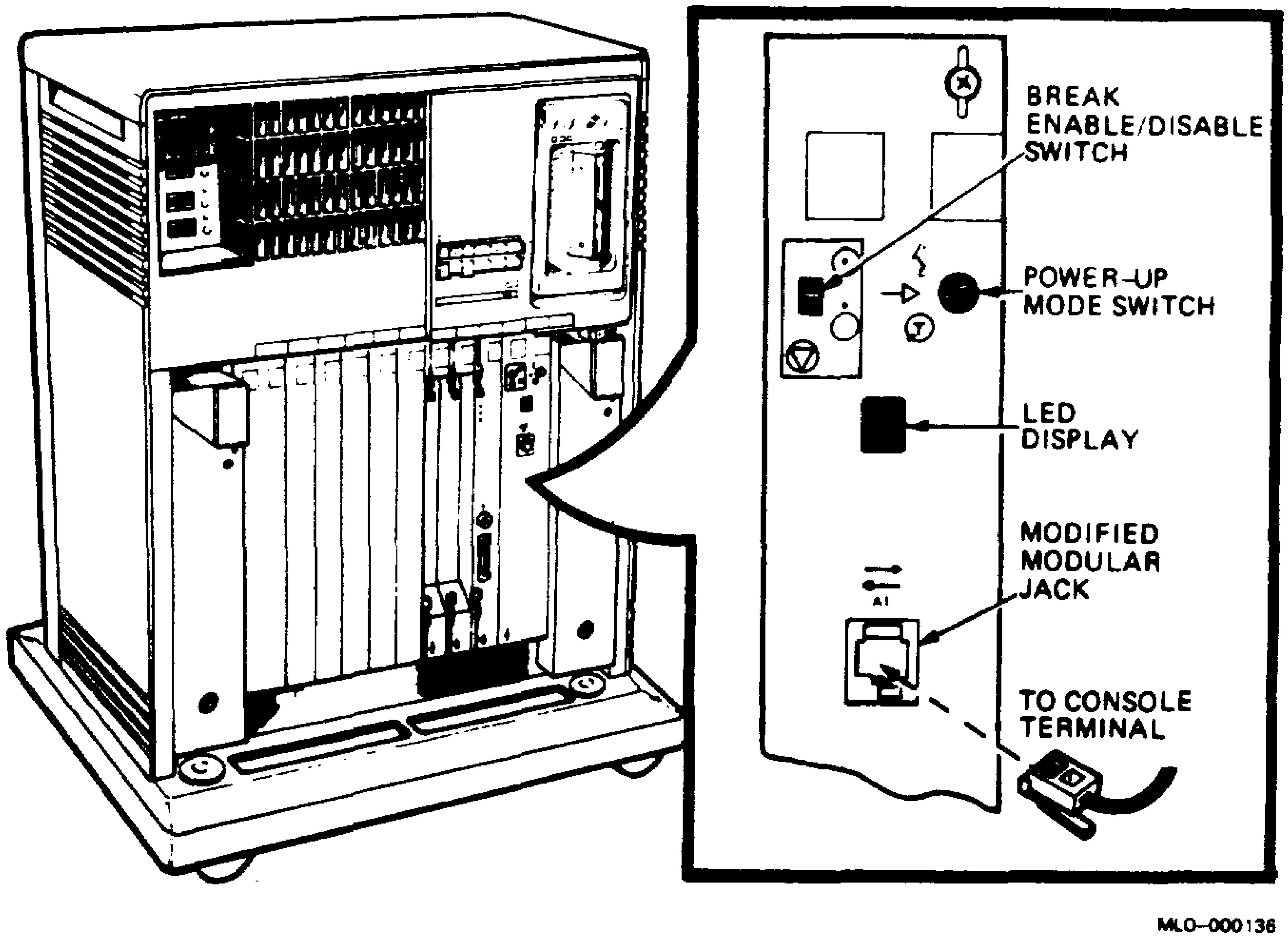


During installation, leave a few inches behind the system for routing cables underneath the system unit. Once installation is complete, you can place the system base directly against a wall.

2.3 Connecting the Console Terminal

Install the console terminal (Figure 2–4). Follow the instructions in the terminal's installation guide.

Figure 2–4: Connecting the Console Terminal (Example)



2.4 Completing the Installation

Connect additional devices at this time, or complete the installation and load system software before connecting other devices.

Make cable connections directly to the modules. Begin with the module on the far right, and continue towards the left.

Each module cover has a label at the top that contains the option number and module number. Table 2–5 lists the labels for modules requiring connections. Use the table to identify the modules as you connect additional devices to the system.

Table 2–5: Module Identification Labels

Module Number	Option Number	Cable
M7516	DELQA	Ethernet cable
M3118–YA	CXA16	BC16D, H3104 cable concentrator (RS–423–A, no modem support)
M3118–YB	CXB16	BC16D, H3104 cable concentrator (RS–422, noise immune)
M3119–YA	CXY08	BC19N–12 (full modem support)
M3121	DFA01	telephone line
M8020	DPV11	BC22E or BC22F
M8086–SA	LPV11	BC27L–30
M7546	TKQ70	none
M7164,M7165	KDA50	BC26V–6
M7500	KMV1A	BC22E or BC22F

2.4.1 Setting Controls on the System

The controls you must set to complete the installation vary, depending on the CPU and type of disks in the enclosure. Generally, you must set the baud rate of the console serial line to the same baud rate as the console terminal, and be sure the fixed disk drives are ready and not write-protected. In addition, if the system is a MicroVAX, you must set the enable/disable and power-up mode switches.

Refer to the system customer documentation for detailed instructions on setting these controls for the particular system you are installing.

2.4.2 Connecting the Power Cord

Feed the power cord under the system from the rear or the left, and attach it to the connector at the base of the left side power supply. Plug the power cord into the wall outlet when all additional cabling has been installed and the front door has been attached.

2.4.3 Attaching the Front Door to the System

The front door is packed separately in the system shipping carton. Attach the front door as follows:

1. Pull out the latch release on the front door.
2. Holding the door with two hands, place it flush against the front of the enclosure, about an inch above the bottom.
3. Slide the door down until you feel it lock into place. Secure the door by pushing in the release latch.

Chapter 3

BA213 FRU Removal and Replacement

This chapter describes how to remove and replace the field replaceable units (FRUs) in the BA213 enclosure.

The following sections describe the removal procedure for each FRU. Unless otherwise specified, you can install an FRU by reversing the steps in the removal procedure.

System-specific FRU procedures vary slightly. As a result, some illustrations of system-specific procedures show an *example* of a FRU removal. The variations are noted in the text and in the title of the illustration.

CAUTION:

- *Only qualified service personnel should remove or install FRUs.*
- *Before you remove or install FRUs, power down the system.*
- *Static electricity can damage integrated circuits. Always use a grounded wrist strap (part number 29–11762–00) and grounded work surface when working with the internal parts of a computer system.*

3.1 Field Replaceable Units (FRUs)

Table 3–1 lists the BA213 FRUs and their part numbers.

Table 3–1: BA213 FRUs

FRU	Part Number
AC filter	70–23769–01
AC switch assembly	70–23999–01
Backplane	70–23712–01
Cable, backplane to fans	17–01360–01
Cable, backplane to signal distribution board	17–00417–01
CD support panel (for dual-height modules)	74–33507–01
Dual-width blank cover (slots 11 and 12)	70–23982–02
DC fan (left or right)	12–23609–04
Sidewall gap filler (for blank cover)	74–34042–01
Single-width blank cover	70–23981–01
120 V power supply	H7868–A
240 V power supply	H7868–B

Several FRUs in the BA213 are system-specific (Table 3–2). That is, their presence depends on which CPU and mass storage devices are installed. Several different modules, disk drives and tape drives may be present. Refer to the applicable CPU maintenance manual for a complete list of options. All such devices are also FRUs.

Table 3–2: System-Specific BA213 FRUs

FRU	Part Number
CPU I/O cover for KA630 and KA650 CPUs	H3600–SA
CPU I/O cover for KDJ11 CPU	H3601–SA
CPU I/O cover for KA640 CPU	H3602–SA
Operator console panel (RA70 drives)	54–17232–01
Signal distribution board (RD-series drives)	54–16834–01
Operator console panel (RF30 drives)	54–17388–01
Cable, KA640 to DSSI connector	17–02059–01
Cable, power supply to mass storage, right side, RA/RD drives	17–01362–01
Cable, power supply to mass storage, left side, RA/RD drives	17–01362–02
Cable, power supply to mass storage, right side, RF30 drives	17–01990–01
Cable, power supply to mass storage, left side, RF30 drives	17–01989–01
Cable, RA70 to signal distribution board	17–00847–06
Cable, RF30 to signal distribution board	17–01936–01
Cable, RD to signal distribution board (20–conductor)	17–00286–03
Cable, RD to signal distribution board (34–conductor)	17–00282–03
Cable, RQDX3 to signal distribution board	17–01361–01
Cable, TK50 to TQK50 controller	17–01363–01

Table 3–3 lists the part numbers of the shock-mounting hardware required to install mass storage devices in the BA213 enclosure. Each device listed in the left column requires all the mounting hardware listed in the same row. One sliding track attaches to each side of the drive. One shock-resistant support attaches to the upper part of the mass storage area, and one attaches to the bottom of the mass storage area.

Table 3–3: Shock-Mounting Hardware, BA213 Enclosure

Device	Left of drive[1]	Right of drive	Top of Enclosure	Bottom of Enclosure
RA70	70–24559–01	70–24559–02	70–23997–05	70–23997–06
RD53	74–33573–01	74–33573–02	70–23997–01	70–23997–02
RD54	74–33573–01	74–33573–02	70–23997–03	70–23997–04
RF30	74–36498–01	74–36498–01	70–25452–01	70–25452–02
TK50	74–33573–01	74–33573–02	70–23997–01	70–23997–02
TK70	74–33573–01	74–33573–02	70–23997–01	70–23997–02

[1]Drive right side up and facing forward.

3.2 Removing the Front Door

You must remove the front door of a pedestal or open the front door of a cabinet system to access system FRUs. Note that the front door's release latch is different for pedestal and cabinet systems. Remove or open the front door as follows:

1. Unlock the window on the front door to reach the on/off switch and turn the on/off power switch off.
2. Pull out the release latch, located to the left of the on/off switch.

   In an H9644 system, move the release latch to the right.
3. Lift off the front door (Figure 3–1), using the release latch as a handle.

   In an H9644 cabinet system, swing the door open (Figure 3–2) while holding the release latch to the right.

Figure 3–1: **Removing the BA213 Front Door (Pedestal System)**

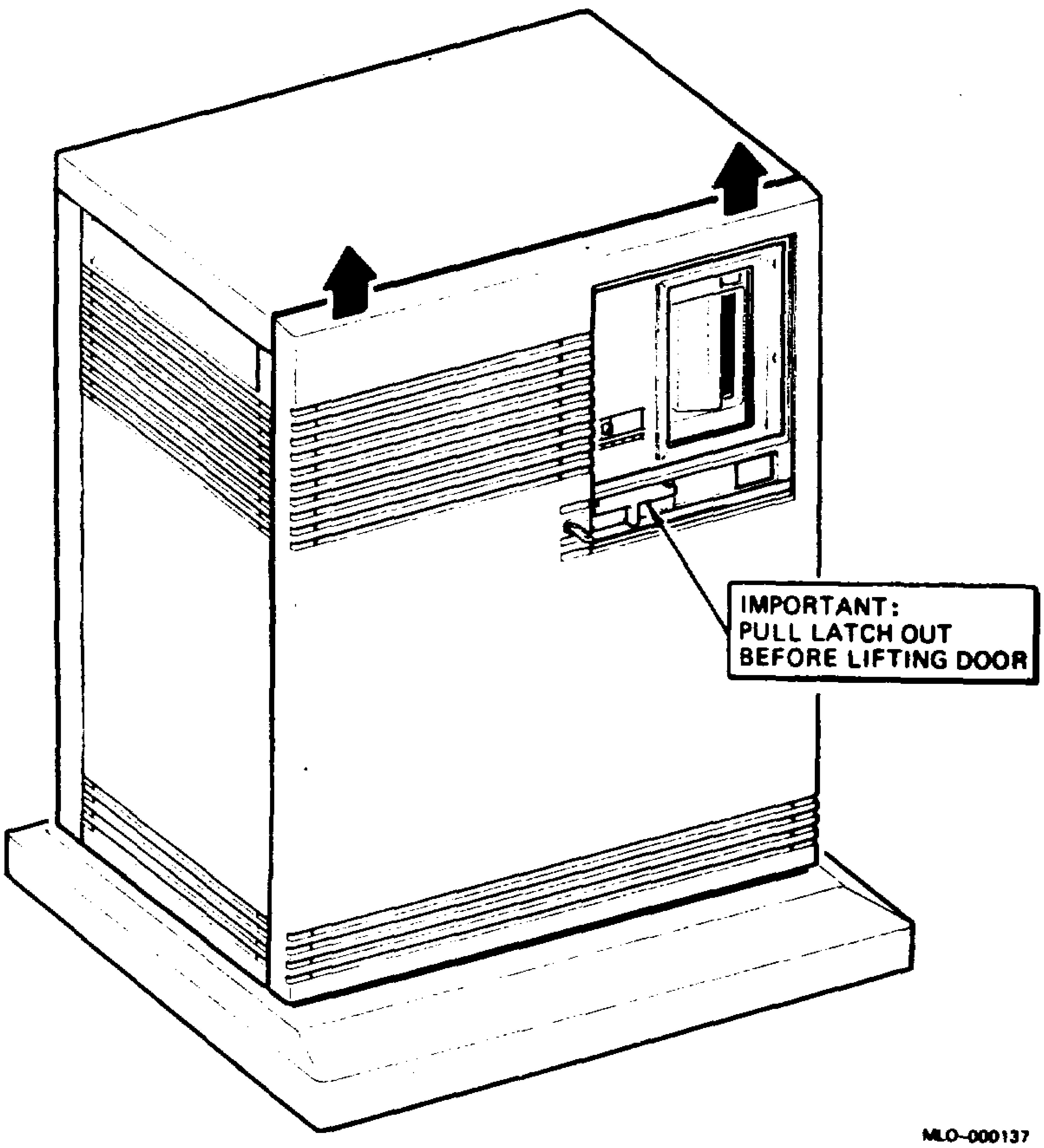
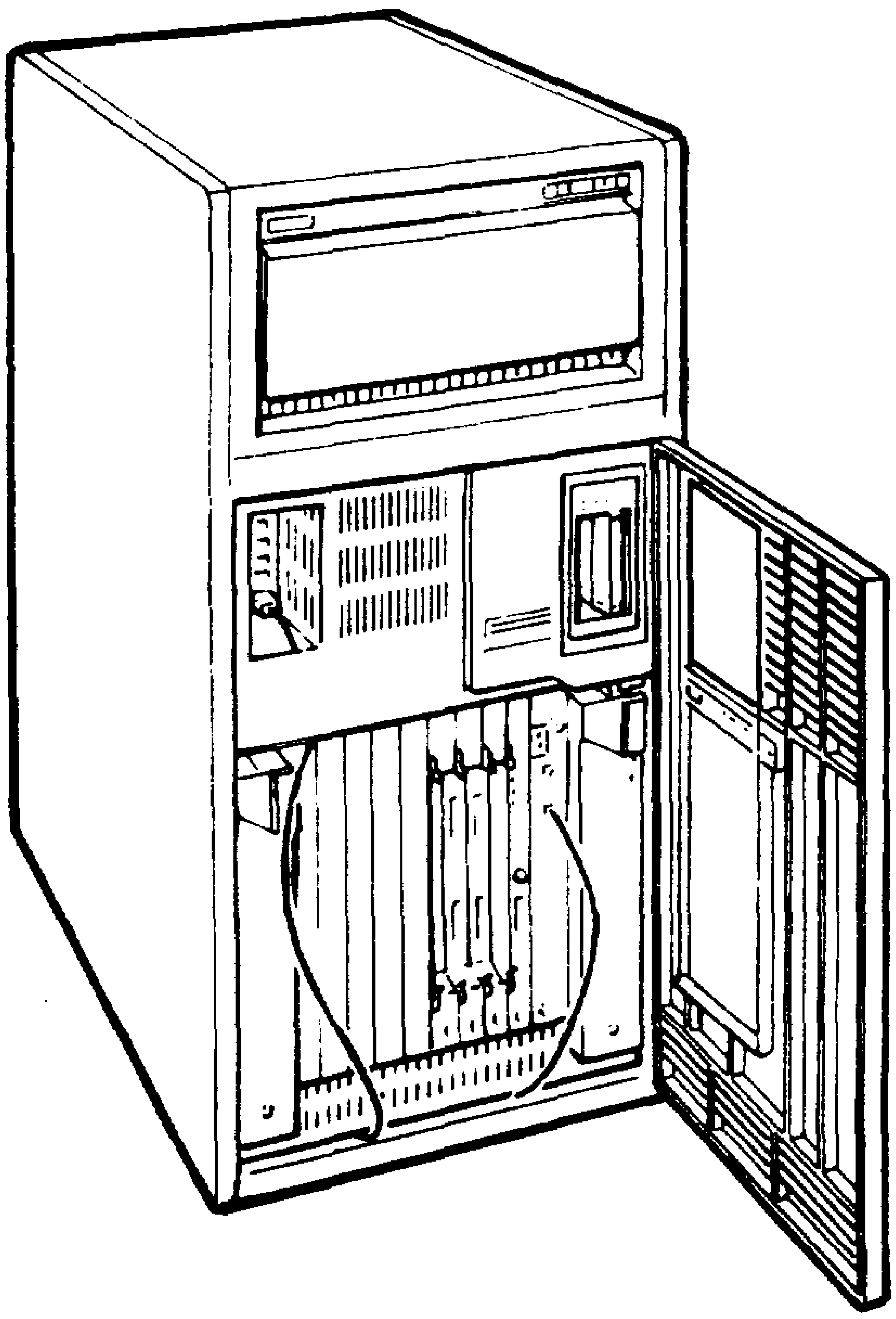


Figure 3–2: Opening the BA213 Front Door (H9644 Cabinet System)



3.3 Modules

The BA213 uses two types of modules, with or without BA200-series compatible handles (Section 1.2). Modules designed for BA200-series enclosures have wide handles that provide both external I/O connections and an electrical and environmental seal for the card cage. Standard Q22-bus modules that are also used in other enclosures, such as the RQDX3, use a blank cover instead of a handle. There is a different removal procedure for the two types of modules. Module numbers are on the handles or the blank covers.

Figure 3–1: Removing the BA213 Front Door (Pedestal System)

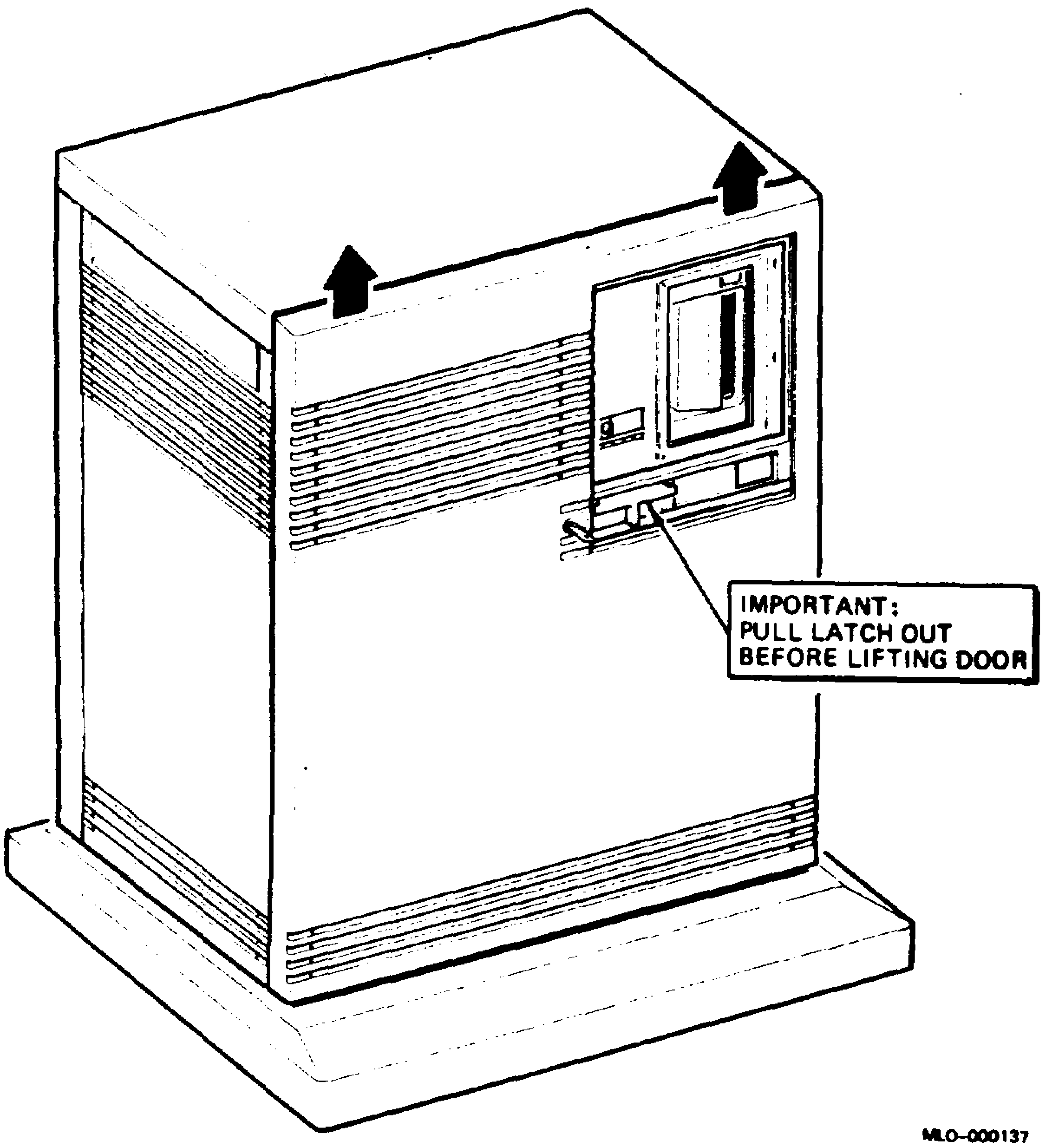
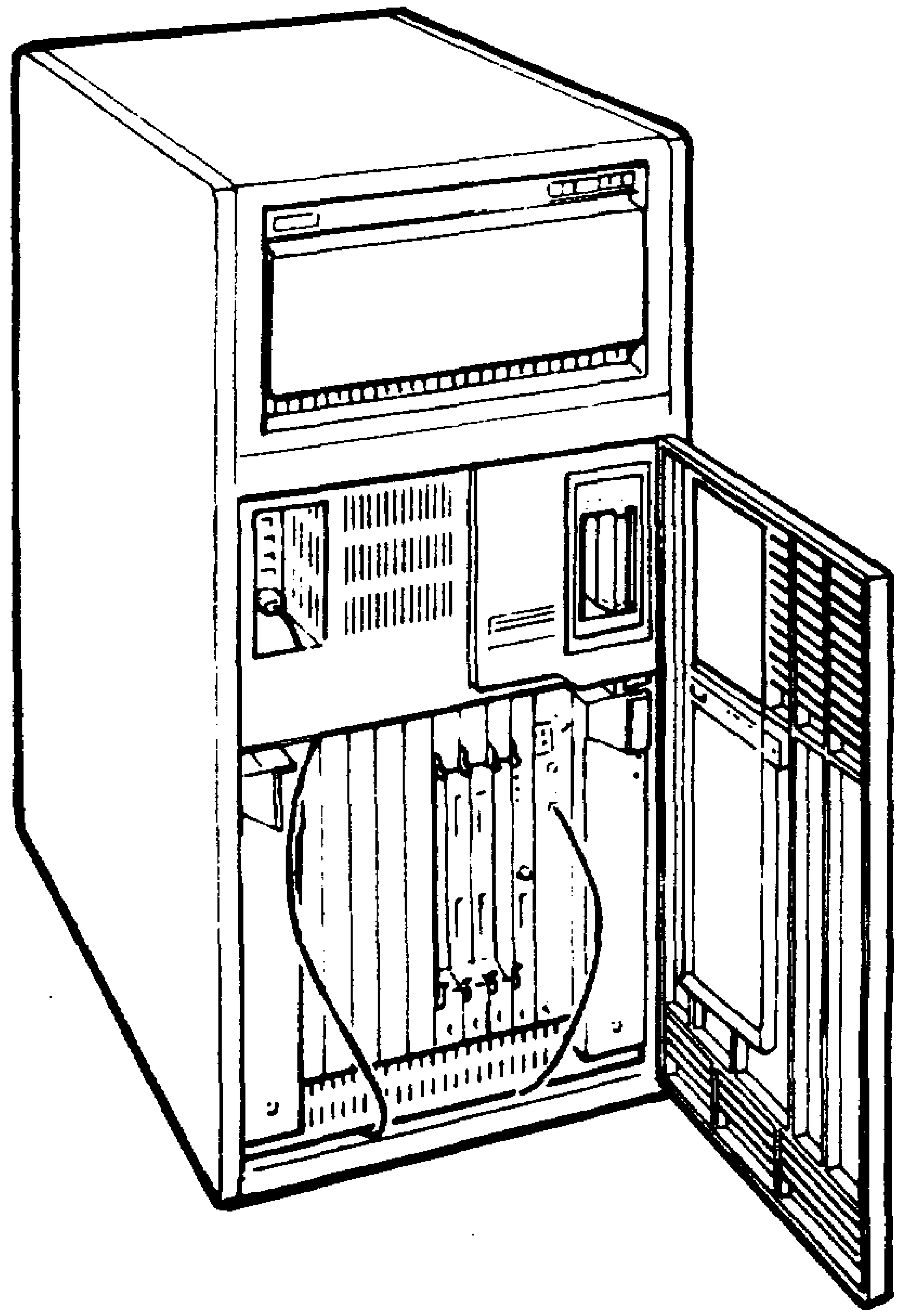


Figure 3–2: Opening the BA213 Front Door (H9644 Cabinet System)



3.3 Modules

The BA213 uses two types of modules, with or without BA200-series compatible handles (Section 1.2). Modules designed for BA200-series enclosures have wide handles that provide both external I/O connections and an electrical and environmental seal for the card cage. Standard Q22-bus modules that are also used in other enclosures, such as the RQDX3, use a blank cover instead of a handle. There is a different removal procedure for the two types of modules. Module numbers are on the handles or the blank covers.

3.3.1 Modules with BA200-Series Compatible Handles

CAUTION: *Use the static-protective field service kit (part number 29–26246) when working with modules.*

1. Put on the grounded wrist strap (part number 70–23981–01) and attach the alligator clip to the system chassis.
2. Note the orientation of external cables connected to the module. Label and disconnect the cables.
3. Release the quarter-turn captive screws that hold the module handle to the card cage (Figure 3–3).
4. Gently pull the release levers out and remove the module (Figure 3–4).

Figure 3–3: Releasing Quarter-Turn Captive Screws

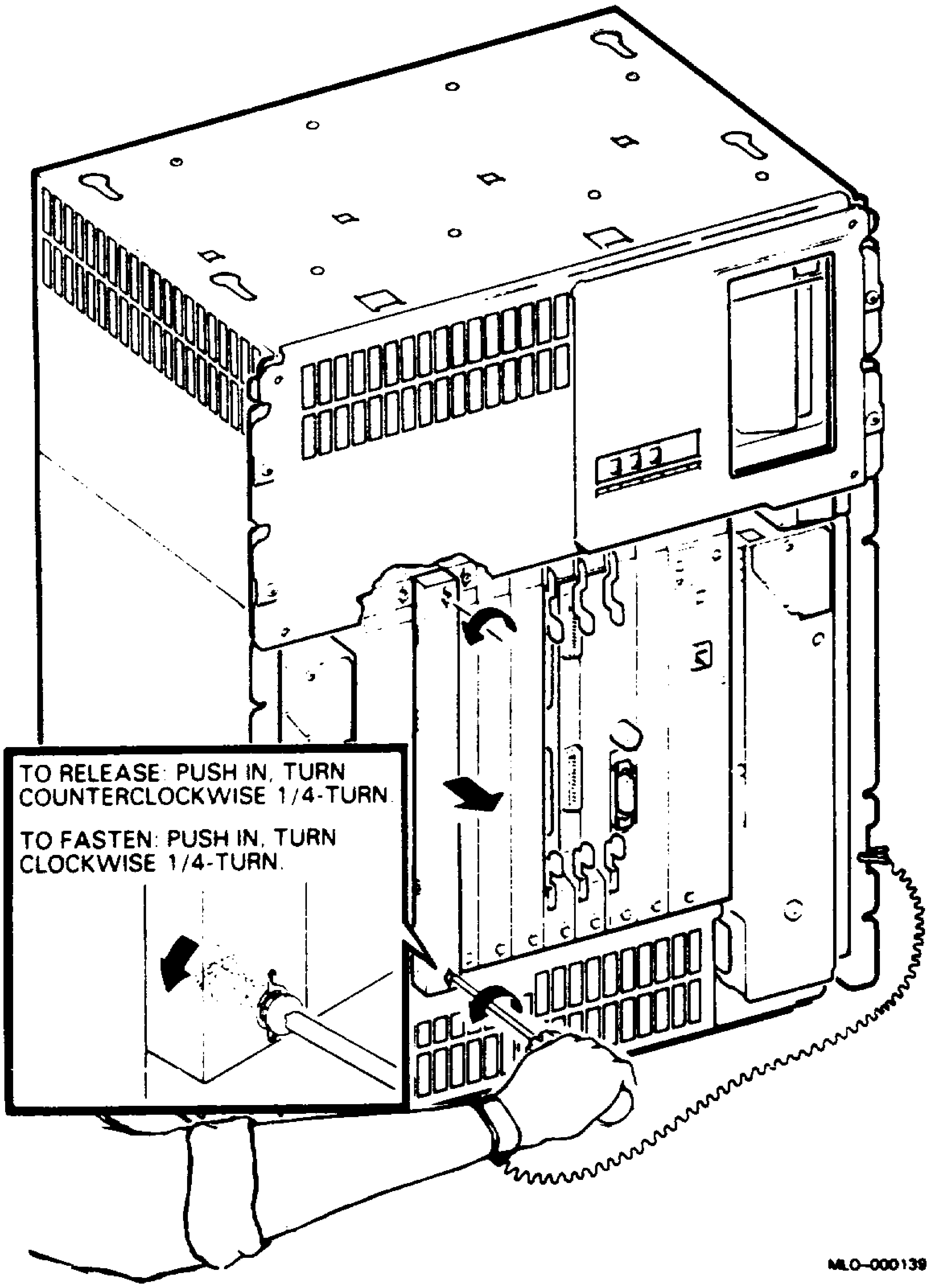
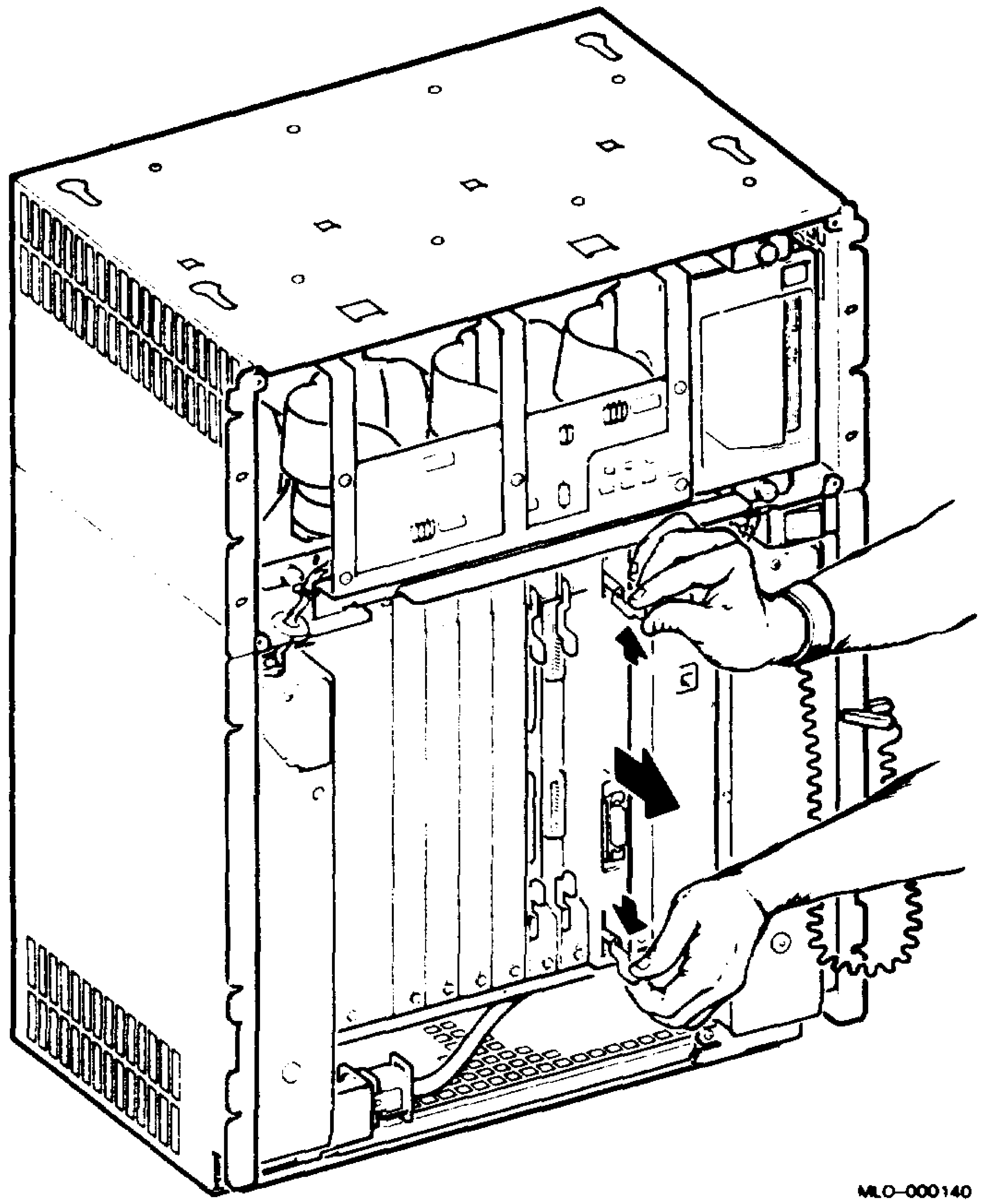


Figure 3–4: Removing a Module



3.3.2 Modules with Blank Covers

CAUTION: *Use the static-protective field service kit (part number 29–26246) when working with modules.*

1. Unlock the window on the front door to reach the on/off switch and turn the switch off.
2. Pull out the release latch, located to the left of the on/off switch.
3. Lift off (Figure 3–1) or remove (Figure 3–2) the front door.

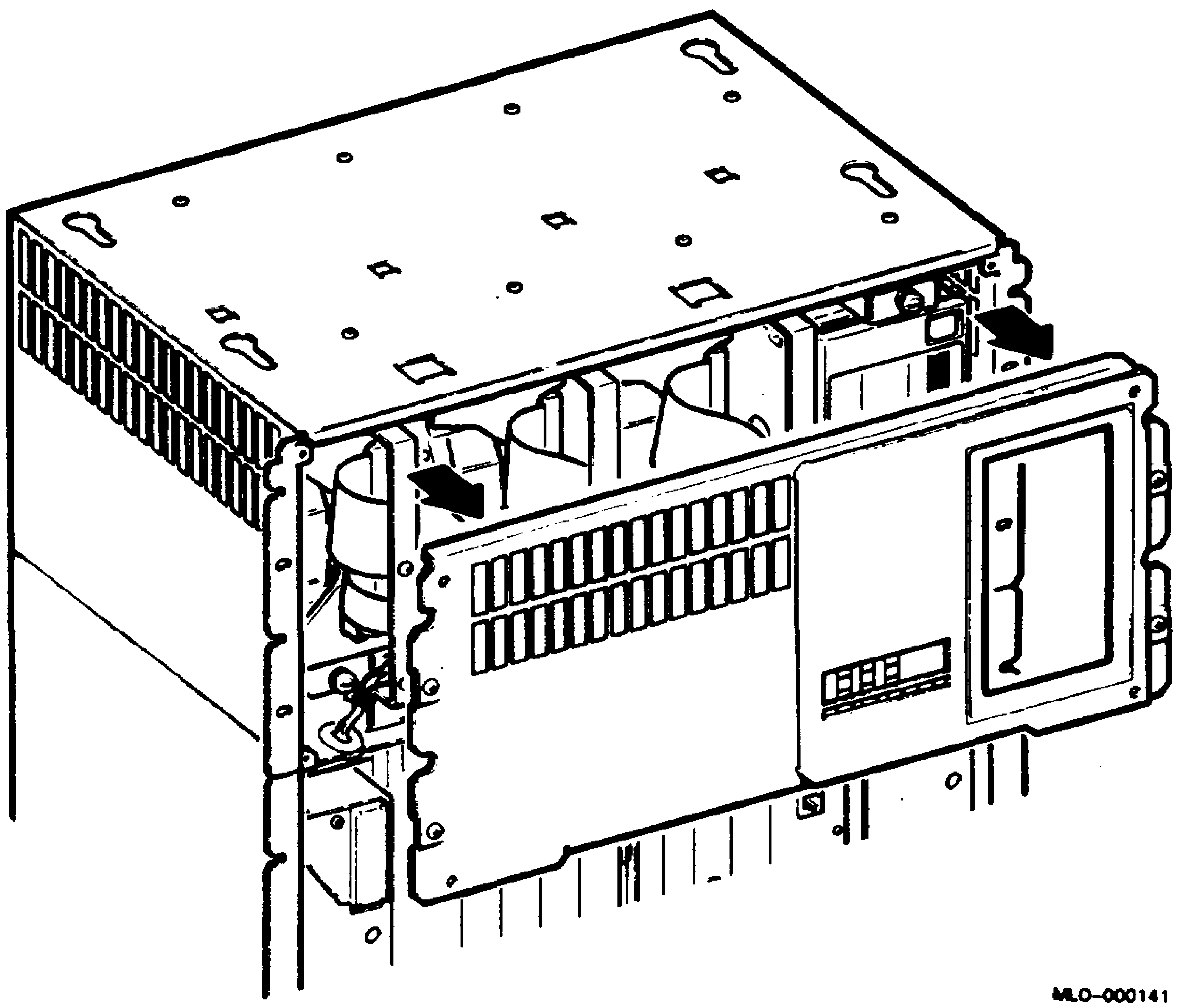
4. Put on the grounded wrist strap (part number 70–23981–01) and attach the alligator clip to the system chassis.
5. Note the orientation of external cables connected to the module. Label and disconnect the cables.
6. Release the quarter-turn captive screws that hold the blank cover to the card cage (Figure 3–3).
7. Pull the blank cover out of the connectors at the top and bottom.
8. Note the orientation of any internal cables connected to the module. Some connectors are not keyed. Carefully disconnect the internal cables.
9. Gently pull the release handles at the top and bottom of the module towards you, and slide the module out of the card cage.

3.4 Media Faceplate

You must remove the media face plate before you can remove a disk drive, tape drive, signal distribution board, or the ac switch assembly. The media faceplate varies in appearance depending on the disk drives installed, but the removal procedure is the same.

1. Turn the on/off power switch off and unplug the ac power cord from the wall outlet.
2. Remove the quarter-turn captive screws that hold the media face plate. Remove the plate (Figure 3–5).

Figure 3–5: Removing the Media Faceplate (Example)



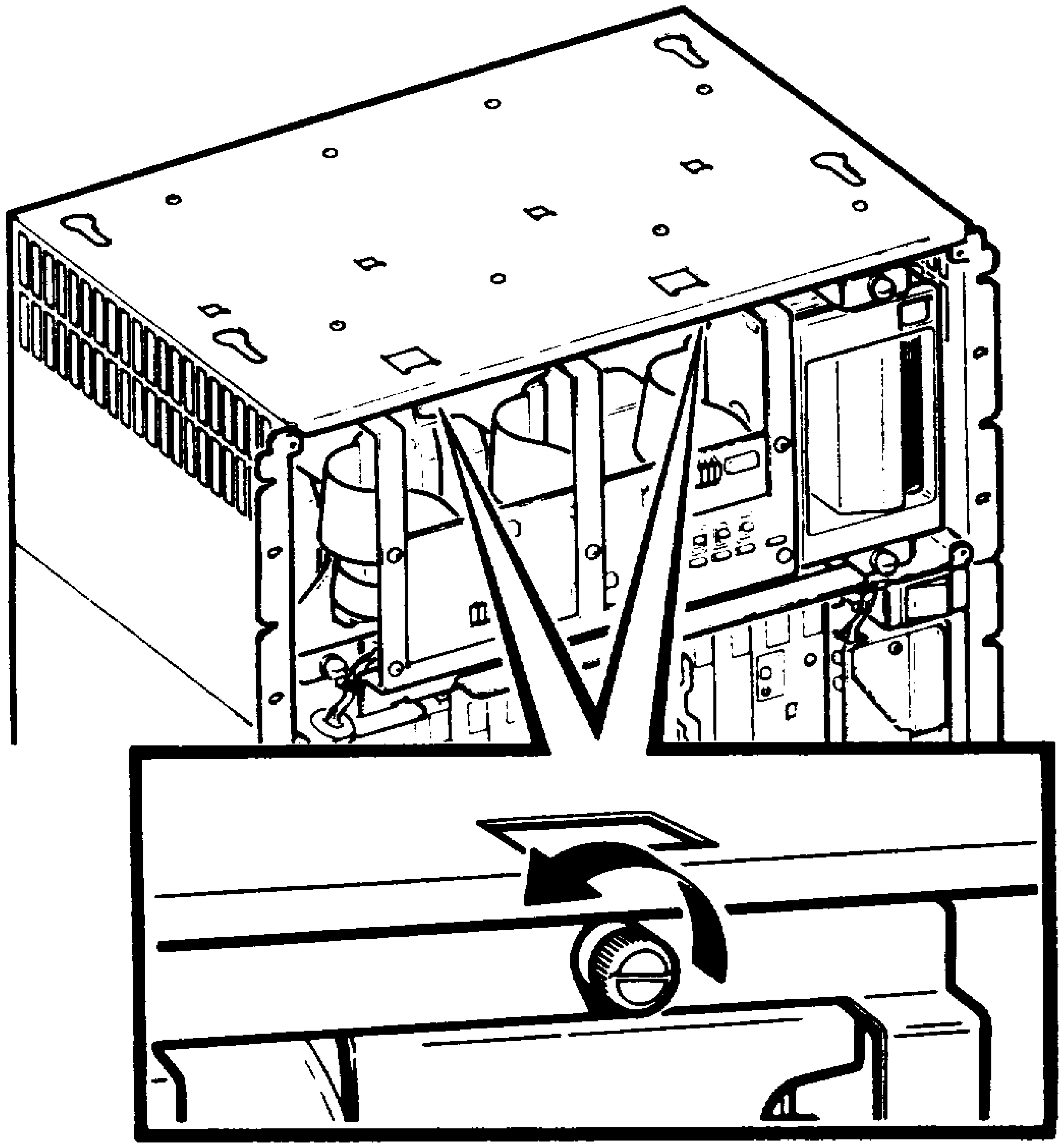
3.5 Fixed-Disk Drives

Remove a fixed-disk drive as follows.

NOTE: *The term "signal distribution board" in this procedure includes the OCP (operator console panel).*

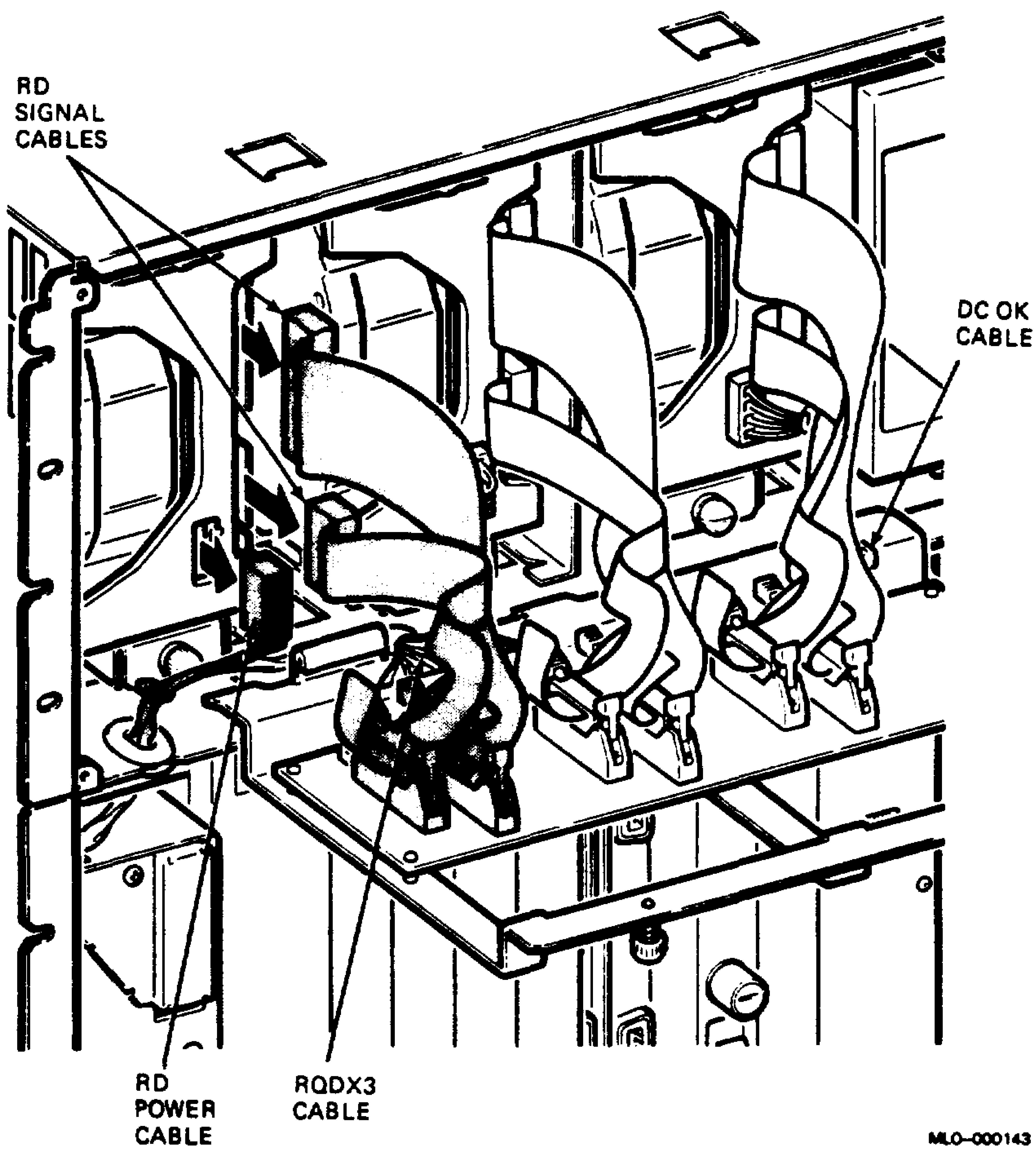
1. Remove the media faceplate (Section 3.4).
2. Release the captive screws that hold the signal distribution assembly to the BA213 (Figure 3–6). The signal distribution assembly varies depending on the disk drives installed. The number of captive screws is different, but the removal procedure is the same.

Figure 3–6: Releasing Captive Screws (Example)


MLO-000142

3. Lower but do not disconnect the signal distribution assembly.
4. Find the power and signal cables that connect the signal distribution board to the drive. Disconnect the cables from the drive (Figure 3–7).

Figure 3–7: Disconnecting RD-Series Drive Cables (Example)



For RD-series drives, the RQDX3 and 10-pin DC OK cables are behind the signal cables on the signal distribution board. Note the orientation of the RQDX3 and DC OK cables, then disconnect the two cables from the board.

For RA-series drives, disconnect:

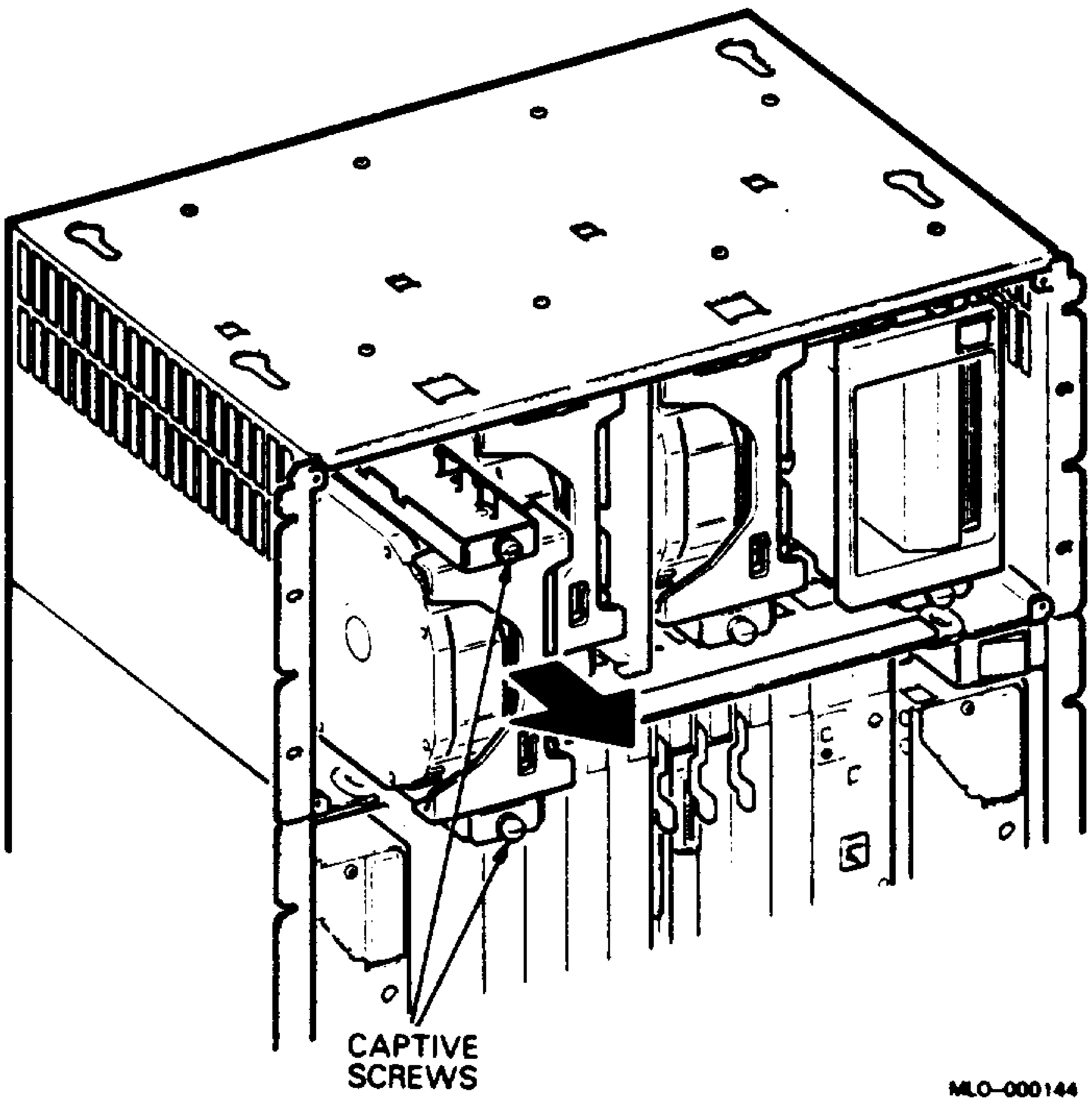
a. The signal cable between the RA drive and the OCP.

b. One or two heavy black Standard Disk Interconnect (SDI) cables. These may be routed directly to a controller in the card cage, or to the back of a bulkhead panel above the left power supply.

5. Disconnect the signal distribution assembly from the chassis by lifting the assembly up and forward to release the tabs along the bottom edge.
6. Disconnect the power cable from the drive.
7. Release the drive from the shock-resistant supports by loosening the captive screws above and below the drive.
8. Slide the drive out of the BA213 (Figure 3–8).
9. Remove the sliding tracks and install them on the new drive.

NOTE: *The RA70 itself is not an FRU. It comprises two FRUs, the electronic control module (ECM) and the head disk assembly (HDA). The RD-series drives also contain FRUs. Refer to Microsystems Options (EK–192AA–MG) for the procedures to remove these FRUs.*

Figure 3–8: Removing an RD-Series Drive (Example)

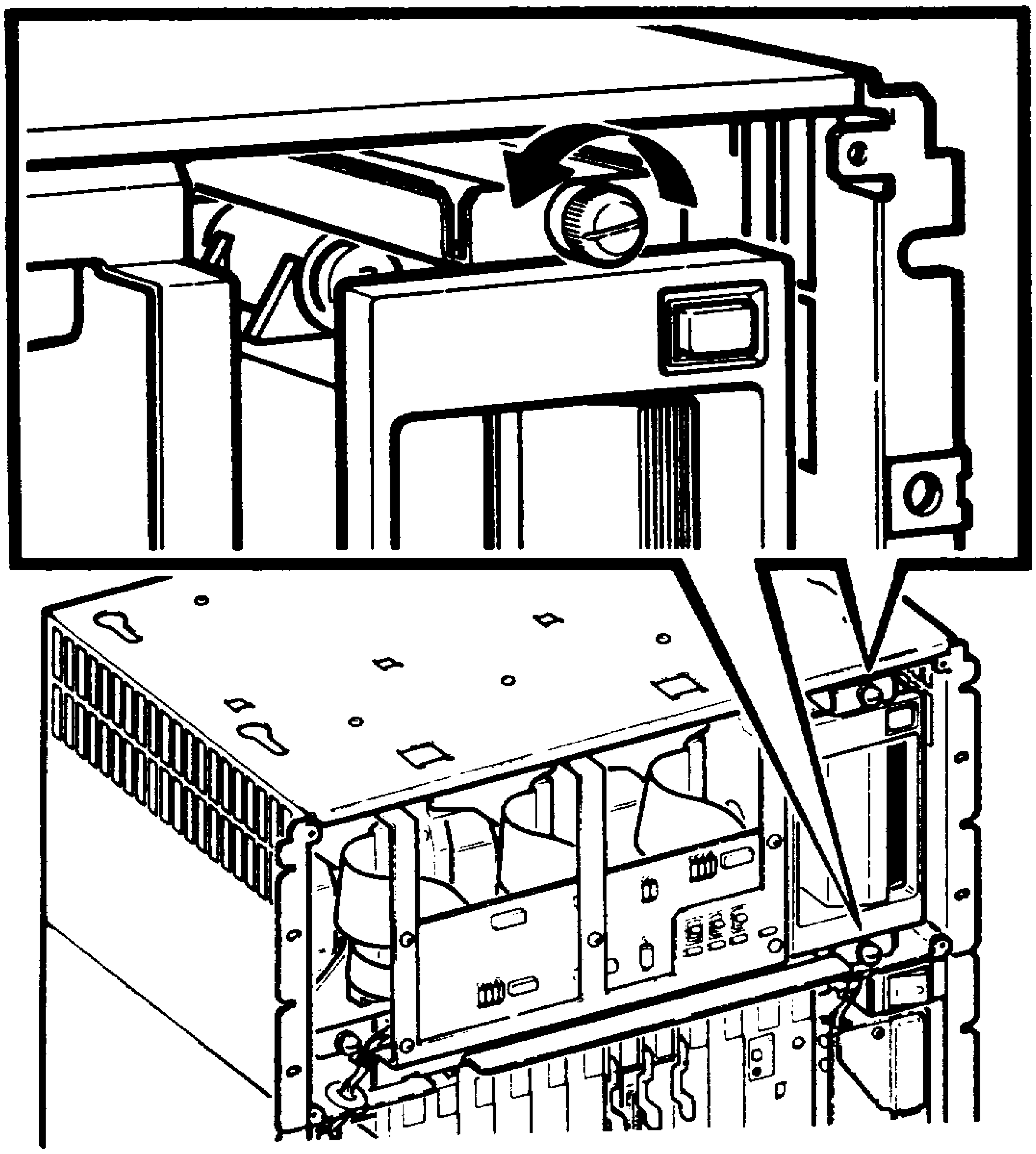


3.6 TK-Series Tape Drive

Remove a TK-series tape drive as follows:

1. Remove the media faceplate (Section 3.4).
2. Release the TK-series drive from its shock-resistant supports by loosening the captive screws above and below the drive (Figure 3–9).

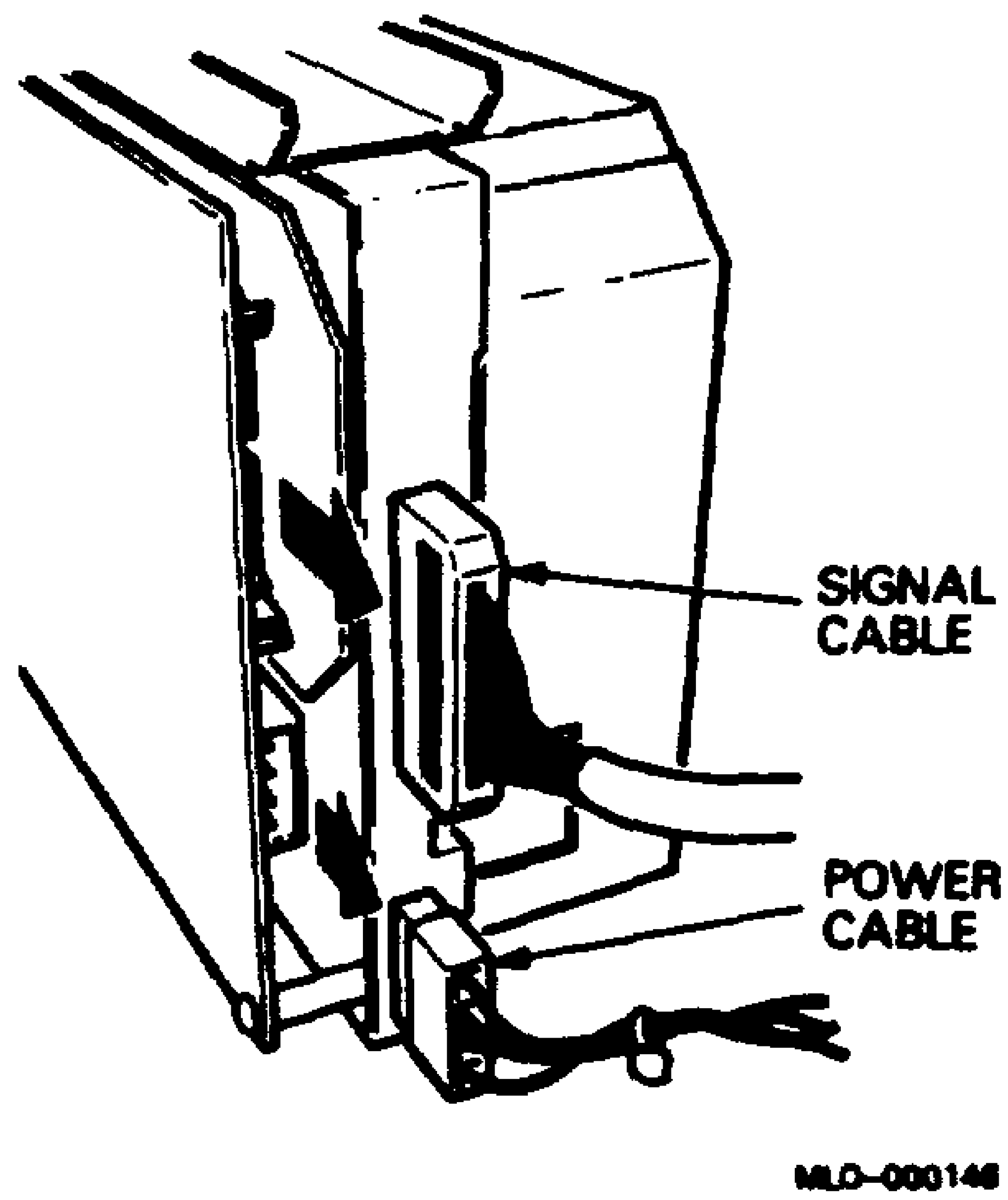
Figure 3–9: Releasing TK-Series Captive Screws (Example)



3. Slowly slide the TK-series drive part way out of the BA213, until you can remove the signal and power cables from the rear of the drive (Figure 3–10).
4. Disconnect the power cable from the drive.

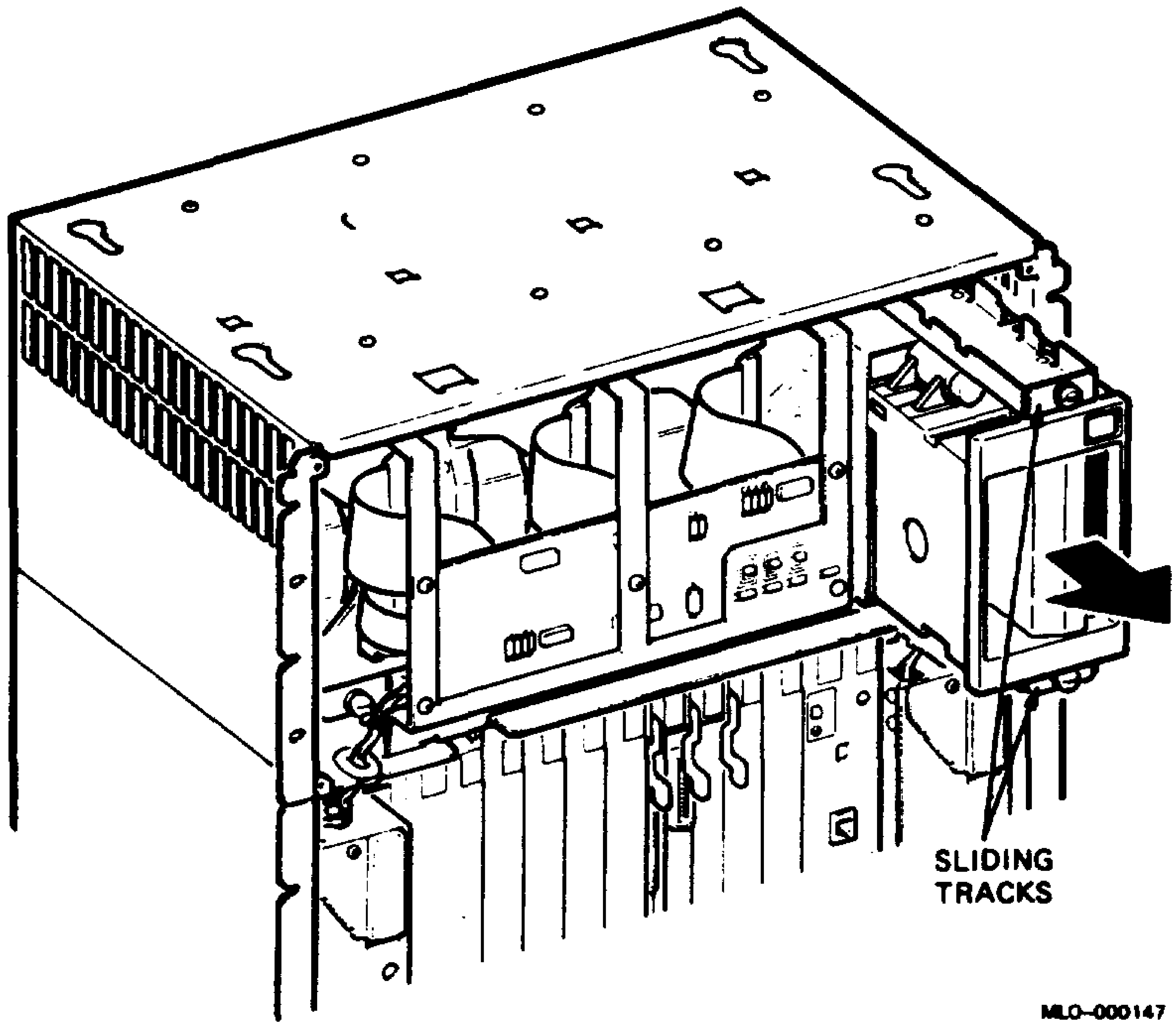
5. Note the orientation of the signal cable. Disconnect the signal cable from the drive.

Figure 3–10: Removing TK-Series Cabling



6. Slide the drive out of the BA213 (Figure 3–11).
7. Remove the sliding tracks and install them on the new drive.

Figure 3-11: Removing a TK-Series Drive (Example)



Installation Notes

If the new TK-series drive is attached to a skid plate, you must (1) remove the skid plate from the new drive, and (2) install the skid plate on the defective drive before returning the drive.

When installing a TK-series drive, make sure not to pinch any cabling at the rear of the drive. If you feel resistance when sliding the drive into the BA213, remove the drive and check that the cables are not in the way.

3.7 Signal Distribution Board/OCP Panel

The BA213 may contain an RD signal distribution board, or either of two operator console panels (OCPs). The removal procedure for each is similar. The differences are shown in the figures.

1. Remove the media faceplate (Section 3.4).
2. Release the captive screws that hold the signal distribution assembly in place. Lower the assembly, but do not disconnect it.
3. Note the orientation of all cables on the signal distribution board. Some are not keyed. Disconnect all cables from the board.
4. Remove the screws that hold the OCP or signal distribution board to its metal frame (Figures 3–12, 3–13, 3–14).
5. Remove the OCP or signal distribution board.

Figure 3–12: Removing the OCP, RA Drives

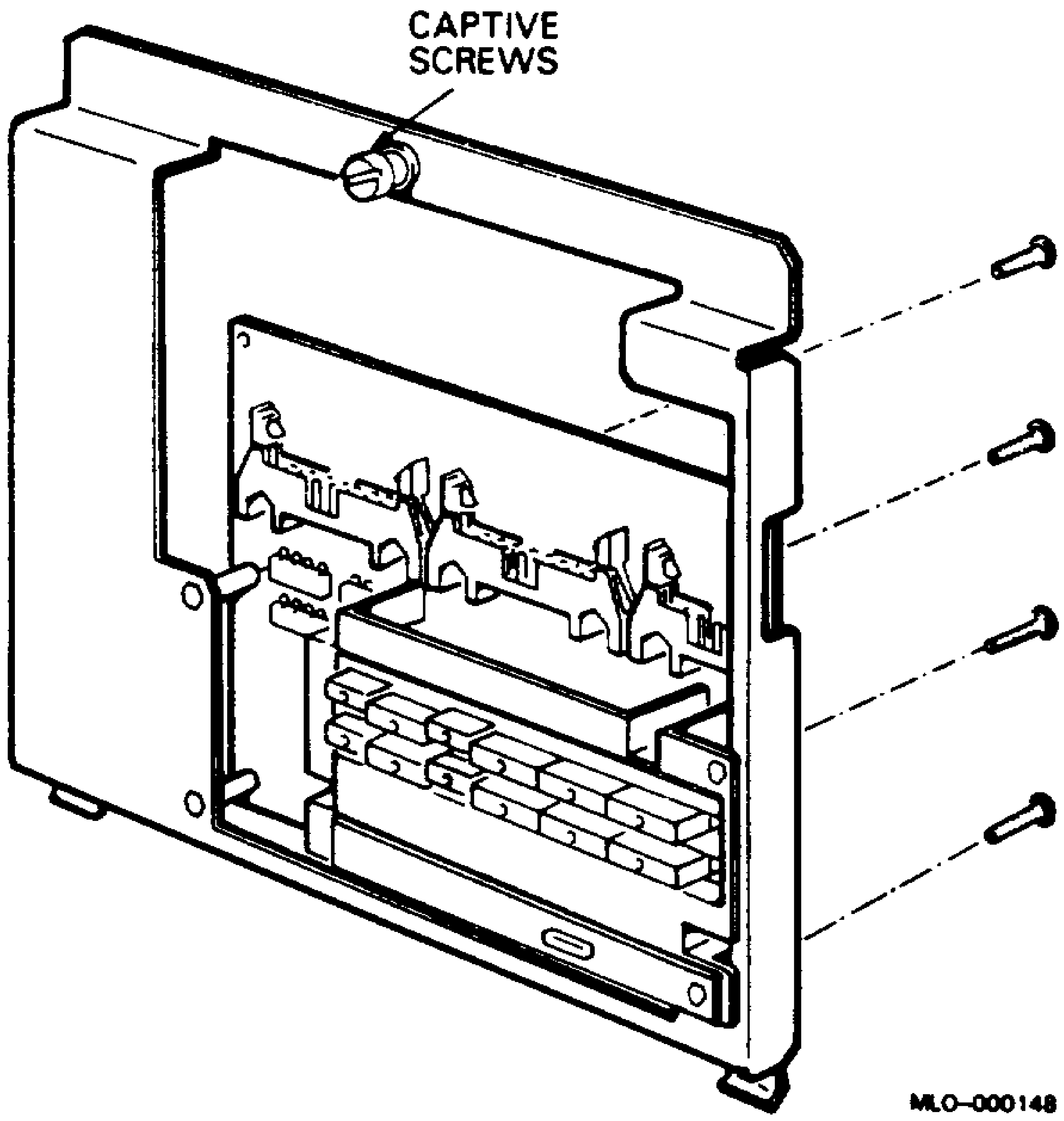


Figure 3–13: Removing the Signal Distribution Board, RD Drives

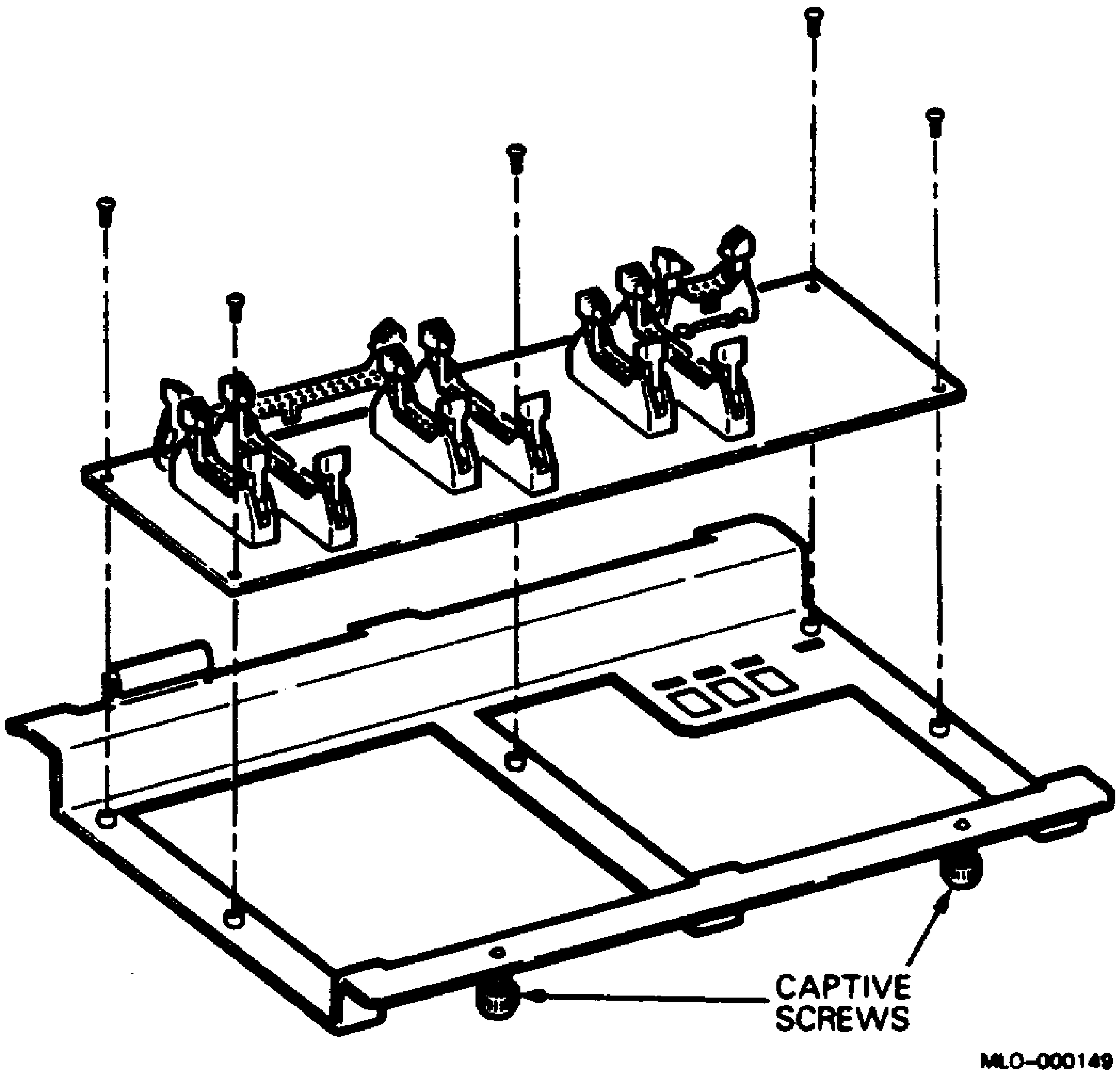
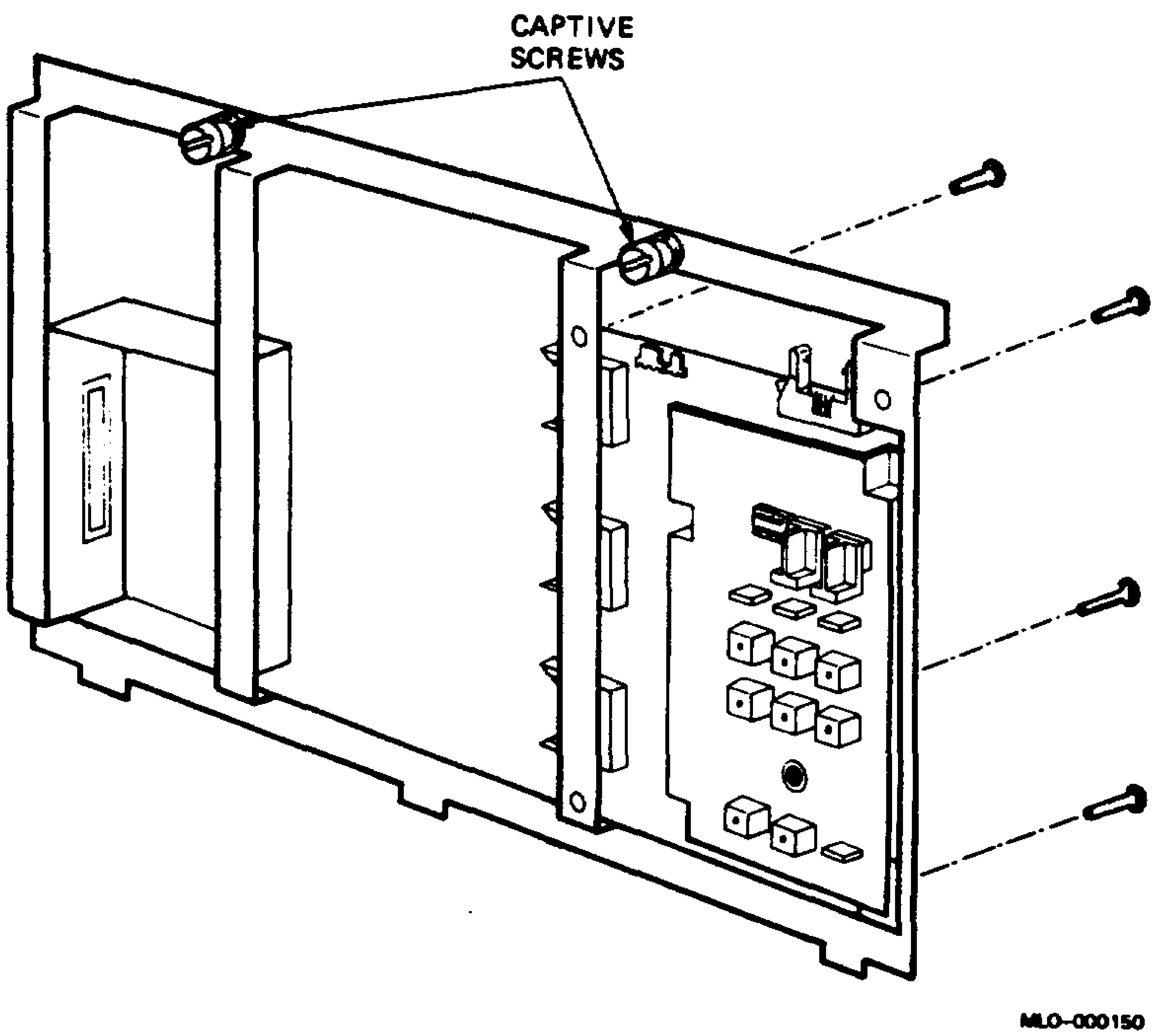


Figure 3–14: Removing the OCP, RF Drives



Installation Note

When reconnecting the metal assembly, make sure not to pinch any cables.

3.8 Power Supplies

The BA213 has two power supplies. Remove either power supply as follows:

1. Turn the on/off power switch off and unplug the ac power cord from the wall outlet. Refer to Figure 3–15 for the next steps.
2. At the top of the power supply, remove the screw that holds the cover for the mass storage power cable. Remove the cover.
3. Disconnect the mass storage power cable from the power supply.
4. Remove the seven screws on the metal grill under the front of the card cage. Remove the grill (Figure 3–16).
5. Loosen the two captive screws that hold the power supply in place.

Figure 3–15: Removing the Power Supply Cabling and Screws

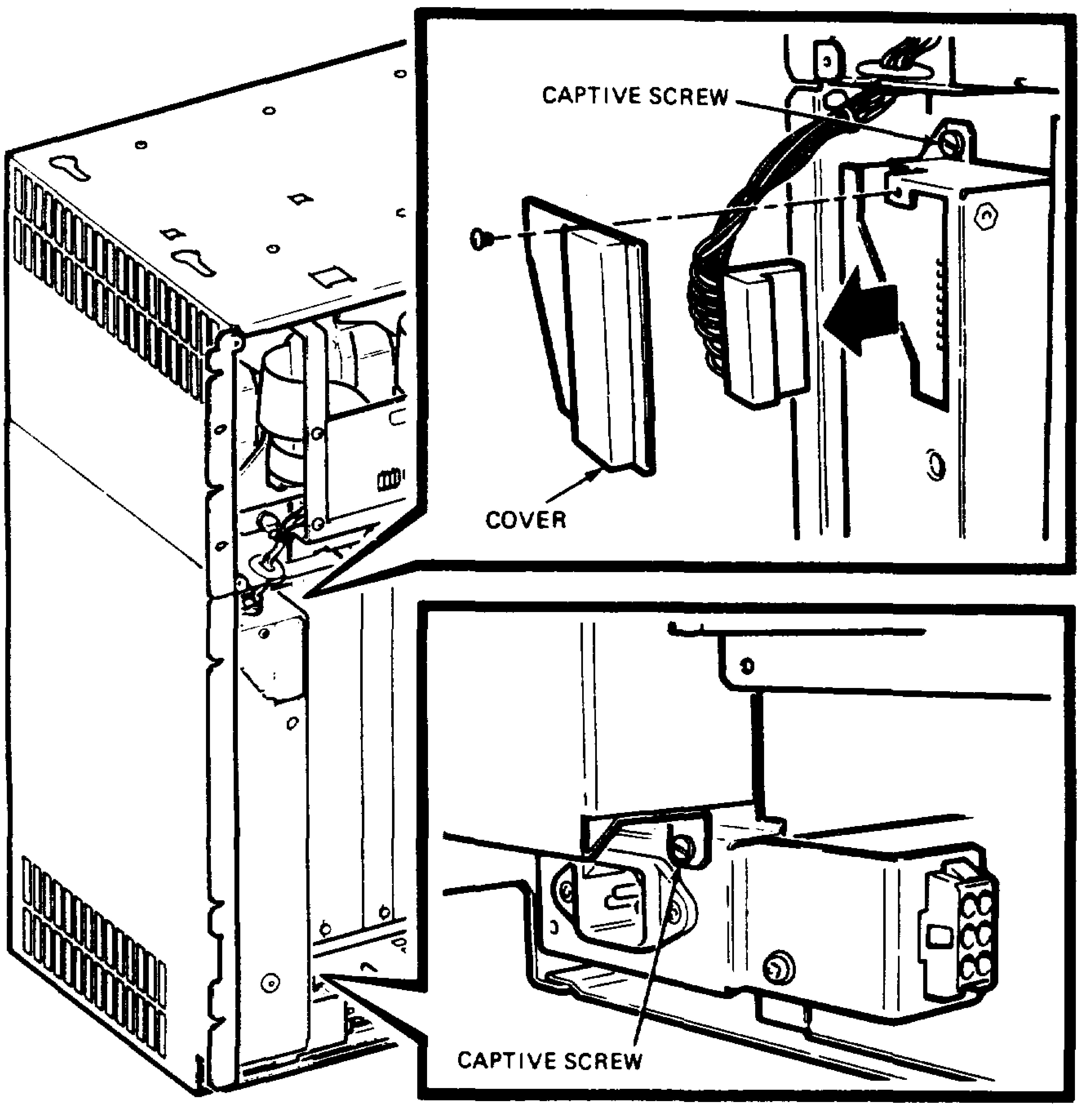
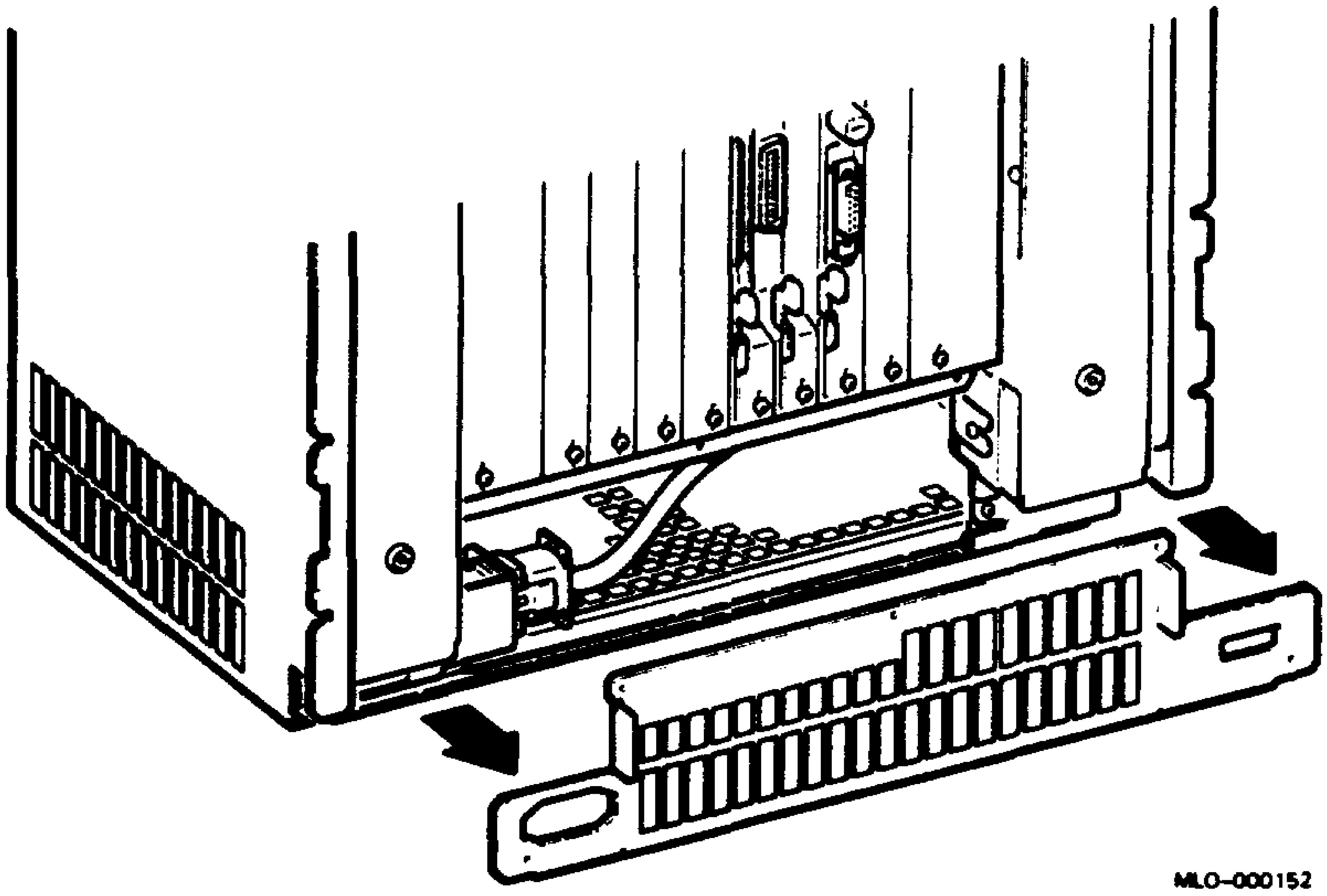
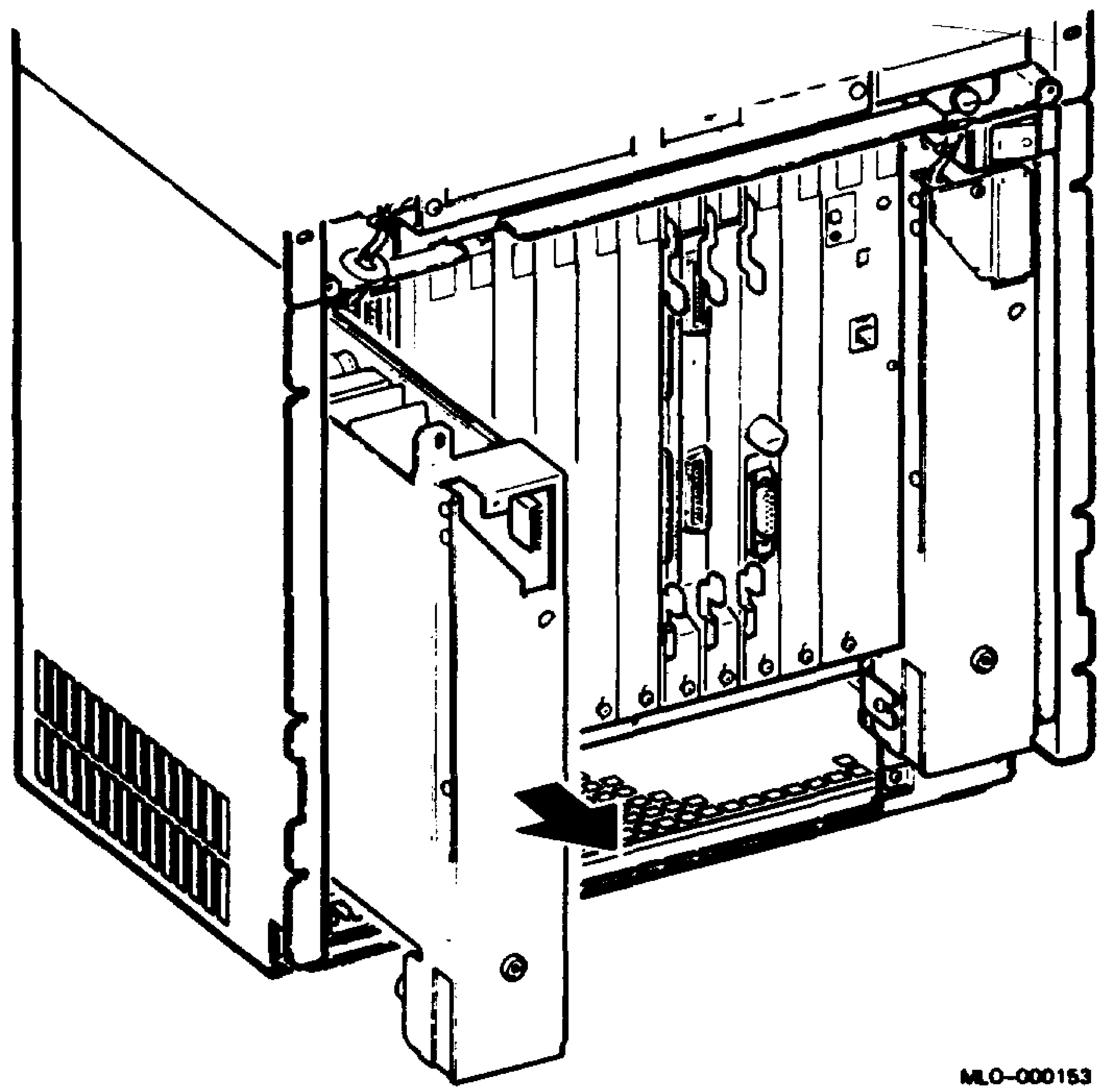


Figure 3–16: Removing the Metal Grill



6. The power supply connects directly to the backplane. Remove the power supply slowly, to avoid damage to the backplane connector (Figure 3–17).

Figure 3–17: Removing the Power Supply



Installation Notes

When installing the power supply, make sure the top and bottom edges of the supply are mounted in the plastic guides in the card cage.

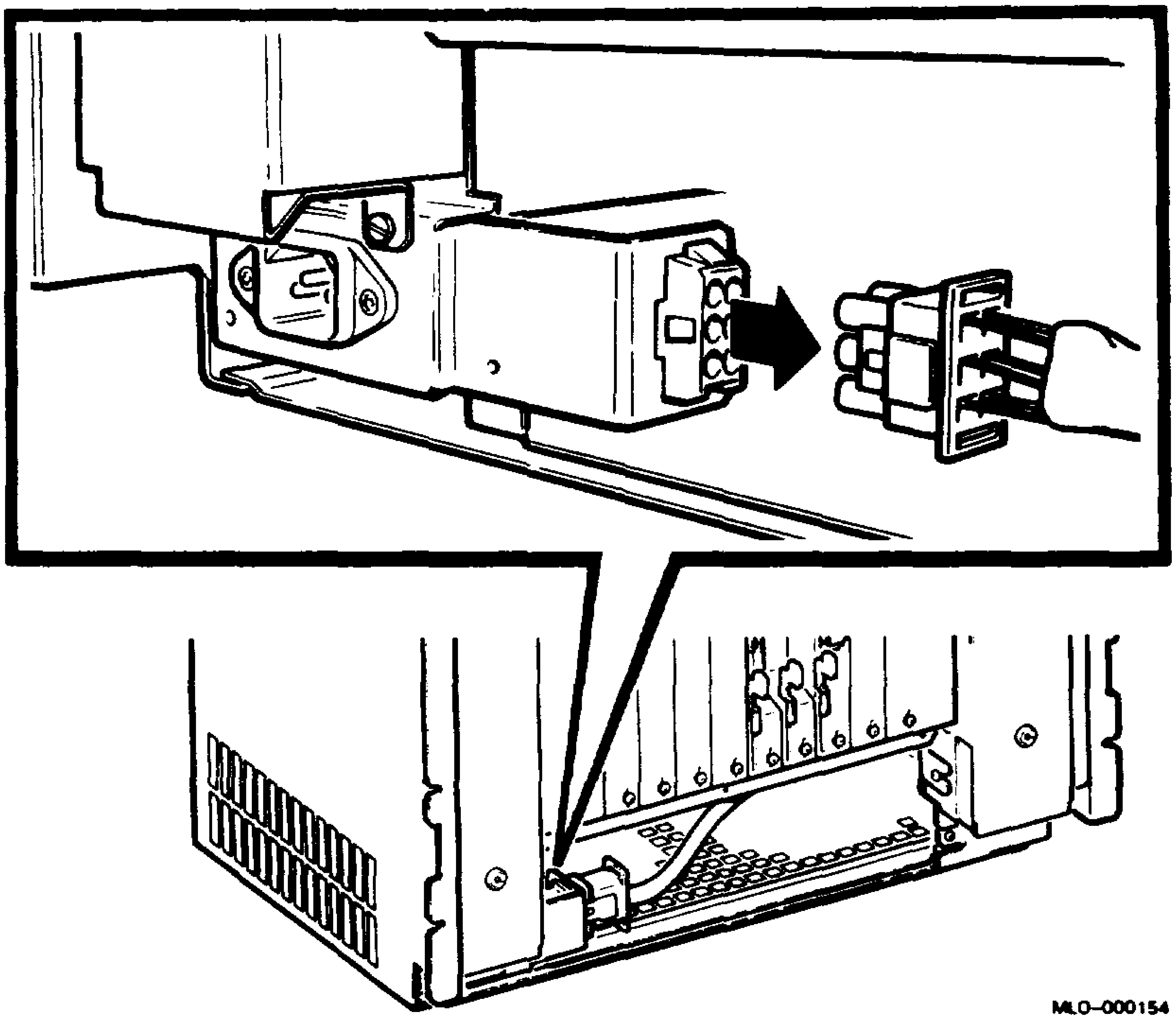
Make sure not to pinch any of the cabling between the rear of the supply and the chassis. If you feel resistance, remove the supply and check that the cabling is not in the way.

3.9 AC Filter

Remove the ac filter as follows:

1. Turn the on/off power switch off and unplug the ac power cord from the wall outlet.
2. Unplug the ac power cord from the system.
3. Remove the seven screws on the metal grill under the front of the card cage. Remove the grill (Figure 3–16).
4. Find the ac input cable that runs across the front of the fan area. Disconnect the cable from the ac filter under the left power supply (Figure 3–18).

Figure 3–18: Disconnecting AC Input Cable from Fan Area



5. Remove the left power supply (Section 3.8).
6. Remove the three screws that hold the ac filter to the BA213 (Figure 3–19). The screws are under the left power supply.
7. Remove the ac filter (Figure 3–20).

Figure 3–19: Removing AC Filter Screws

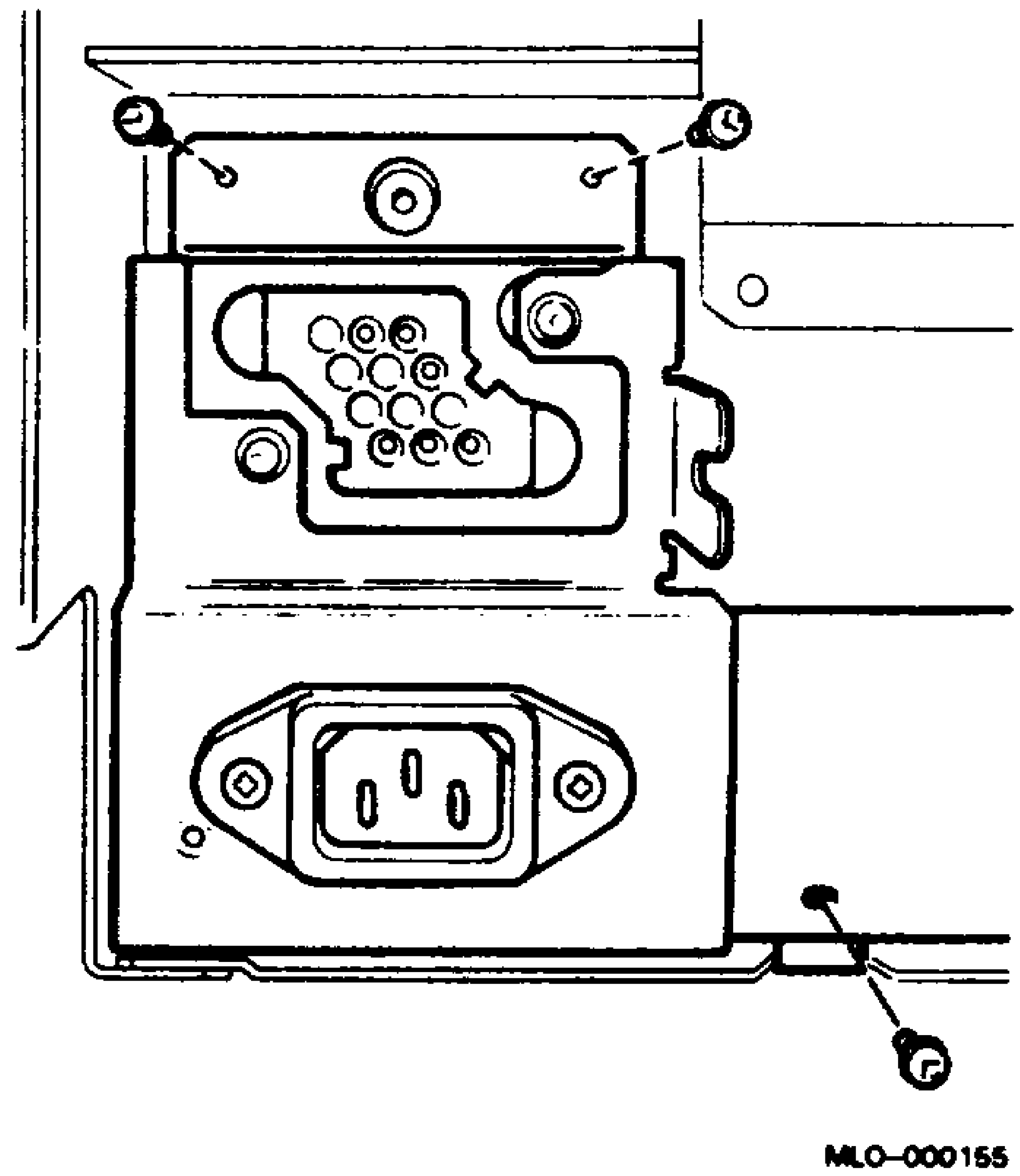
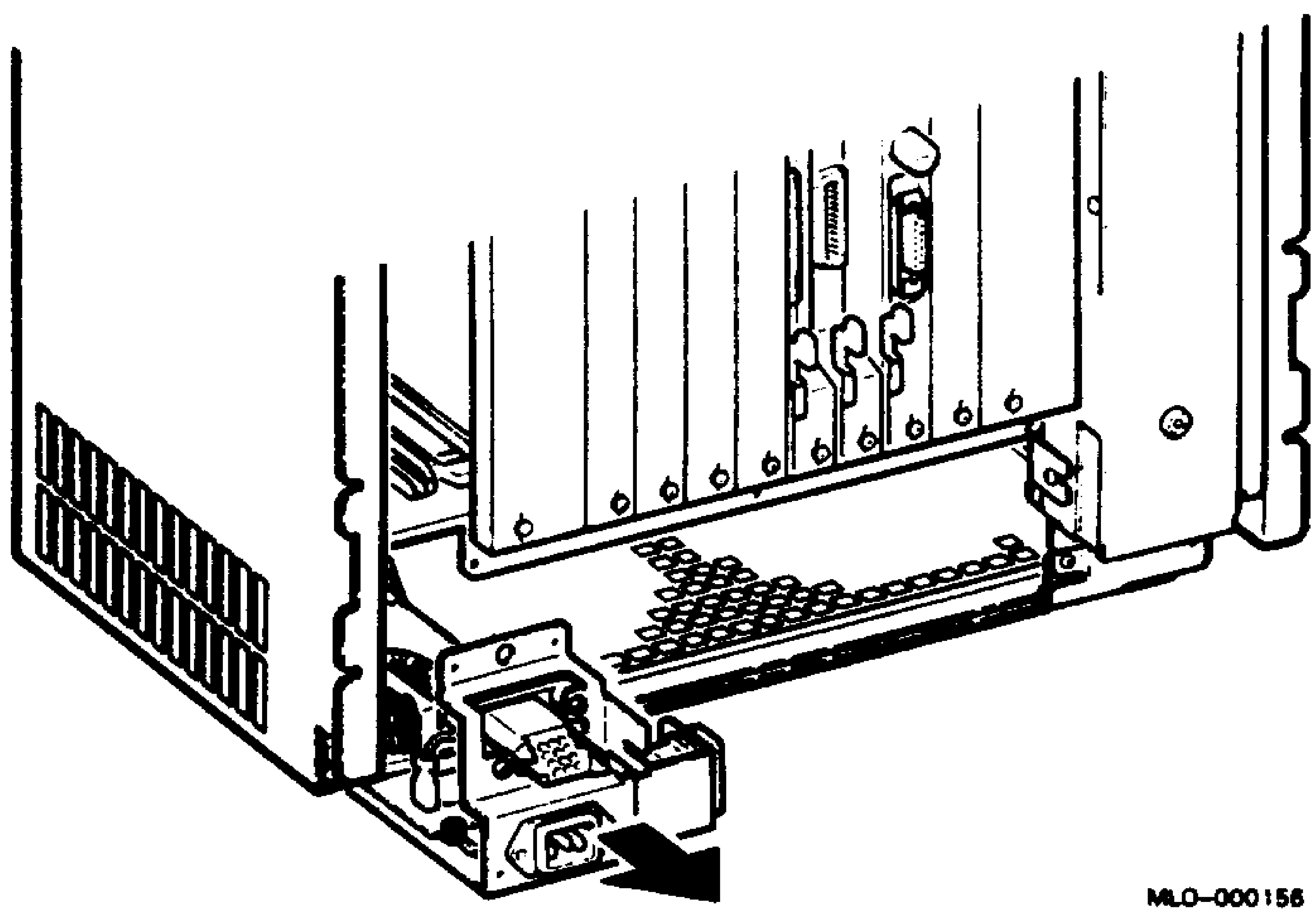


Figure 3–20: Removing the AC Filter



3.10 AC Switch Assembly

This assembly includes the on/off power switch and the cable to the ac filter. Remove the ac switch assembly as follows:

1. Remove the power supply on the right (Section 3.8). This power supply connects directly to the ac switch assembly.
2. Remove the media faceplate (Section 3.4).
3. Remove the three screws on the front of the ac switch connector (Figure 3–21).
4. Remove the three nuts that hold the ac switch assembly to the right panel of the BA213 (Figure 3–22).
5. Remove the ac switch assembly.

Figure 3–21: Removing the AC Switch Connector Screws

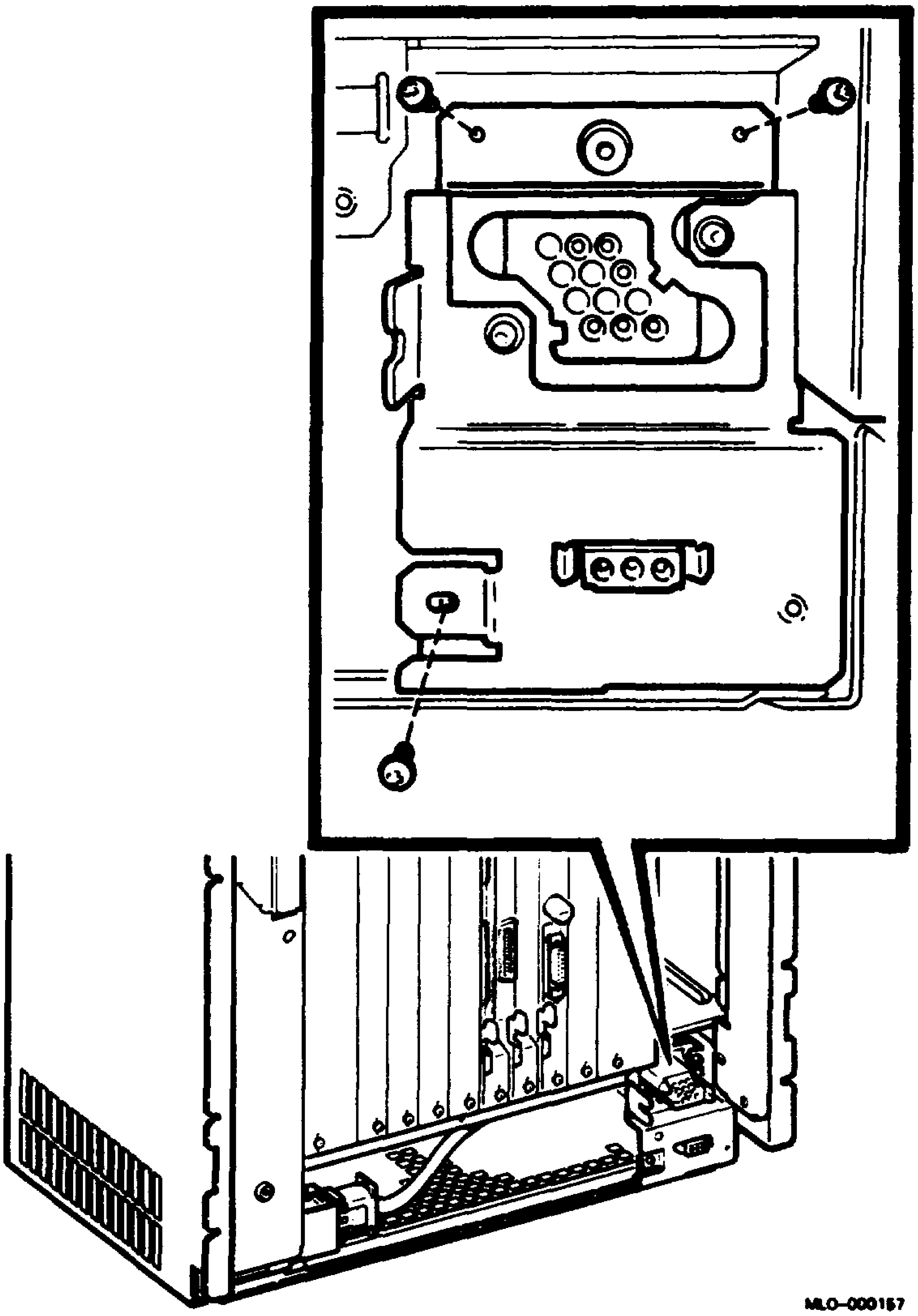
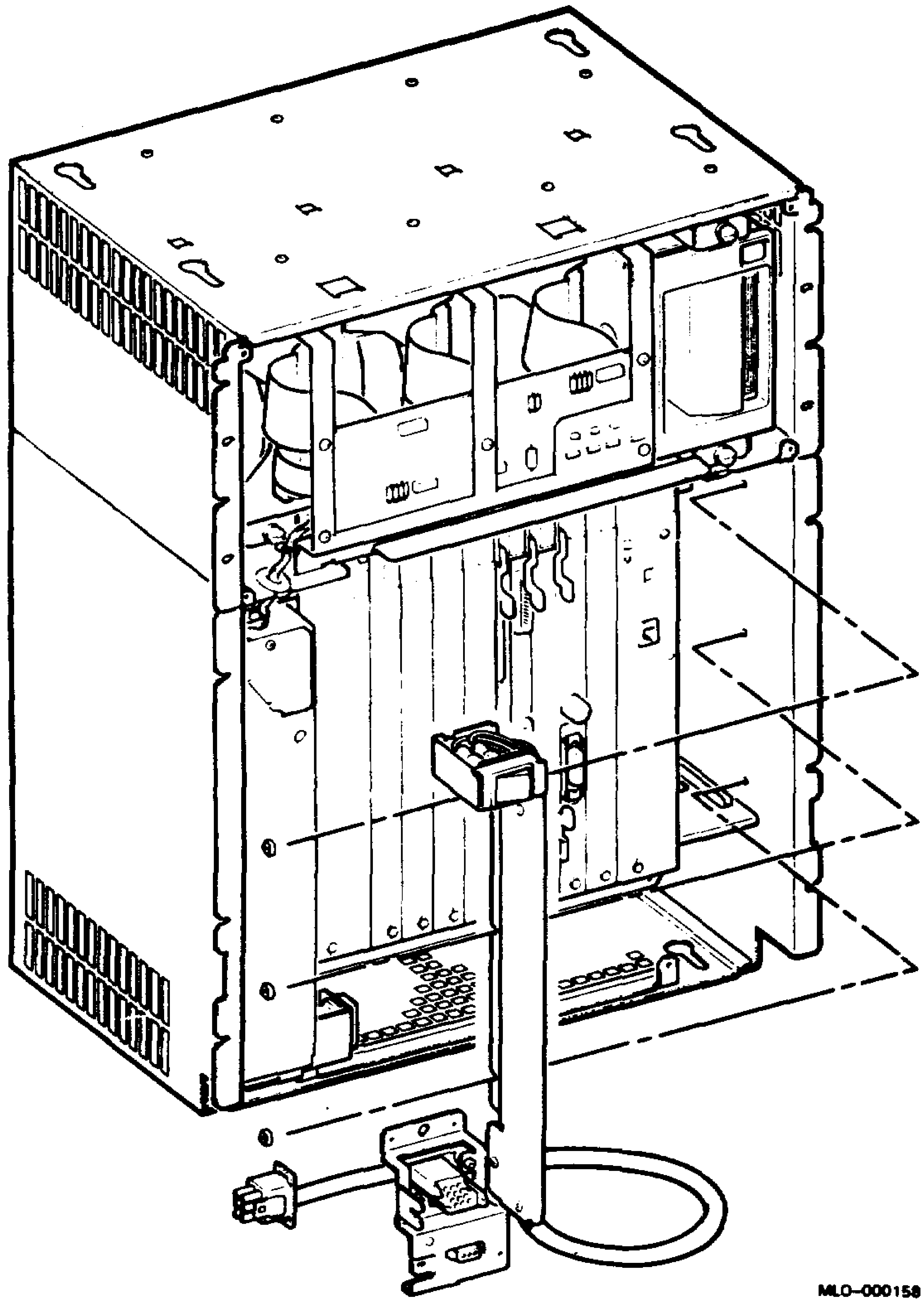


Figure 3–22: Removing the AC Switch Assembly Nuts

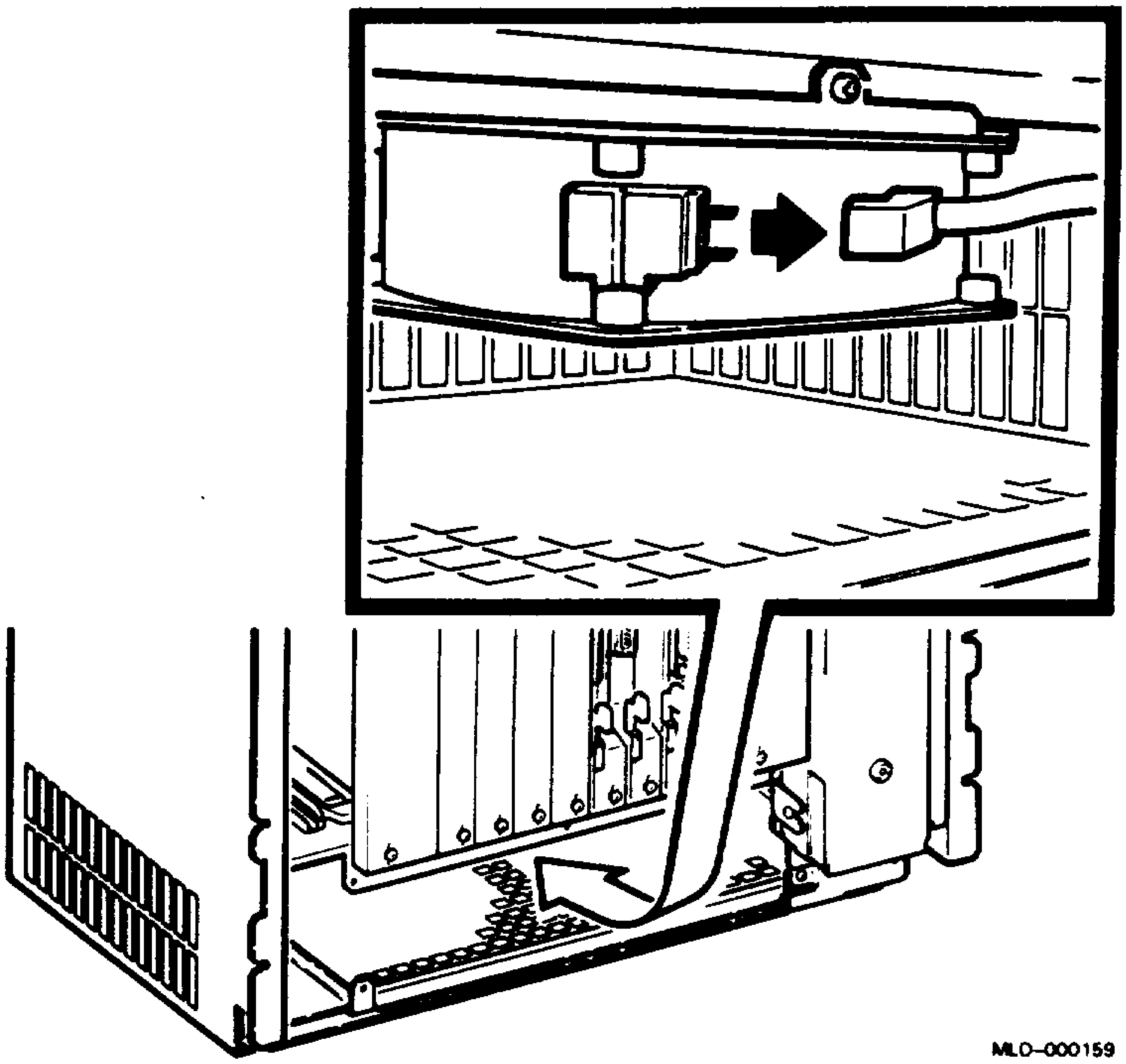


3.11 Fans

The two fans are attached to a metal plate bolted to the bottom of the card cage. Remove the fans as follows:

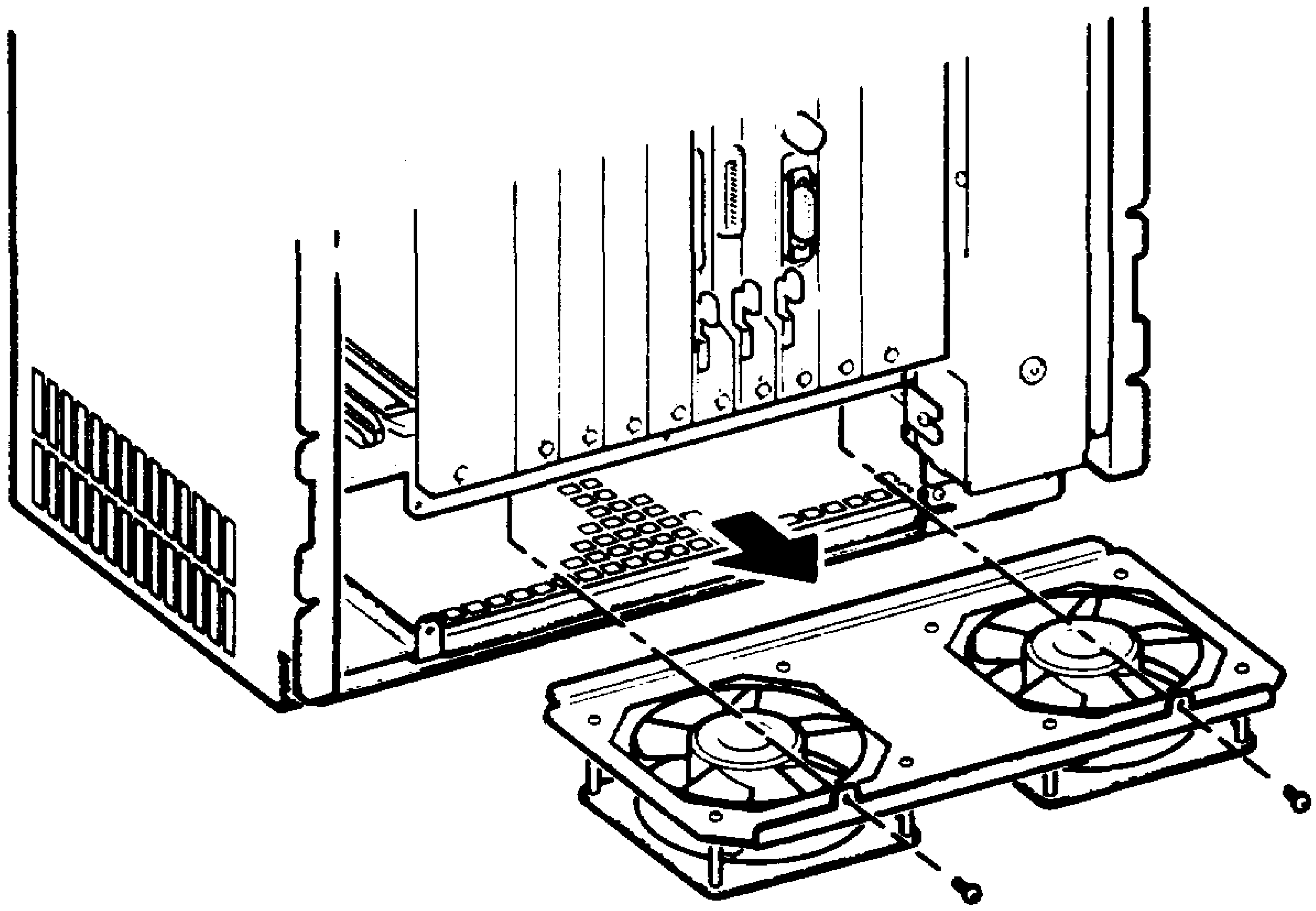
1. Remove the left power supply (Section 3.8) and the ac filter (Section 3.9).
2. The power cable for the fans is a Y-cable. Disconnect the cable from both fans (Figure 3–23).

Figure 3–23: Removing the Fan Cable



3. Remove the two screws that hold the fans' metal plate to the BA213. Remove the metal plate (Figure 3–24).
4. Remove the four screws that hold the fan to the metal plate. Remove the fan.

Figure 3–24: Removing the Fan Assembly



3.12 Backplane

The backplane is the only part of the BA213 that you remove from the rear of the enclosure. For wall mount or rack mount systems, you must remove the system from its mounting.

WARNING: *Use two people to perform this procedure.*

1. Turn the on/off power switch off and unplug the ac power cord from the wall outlet.

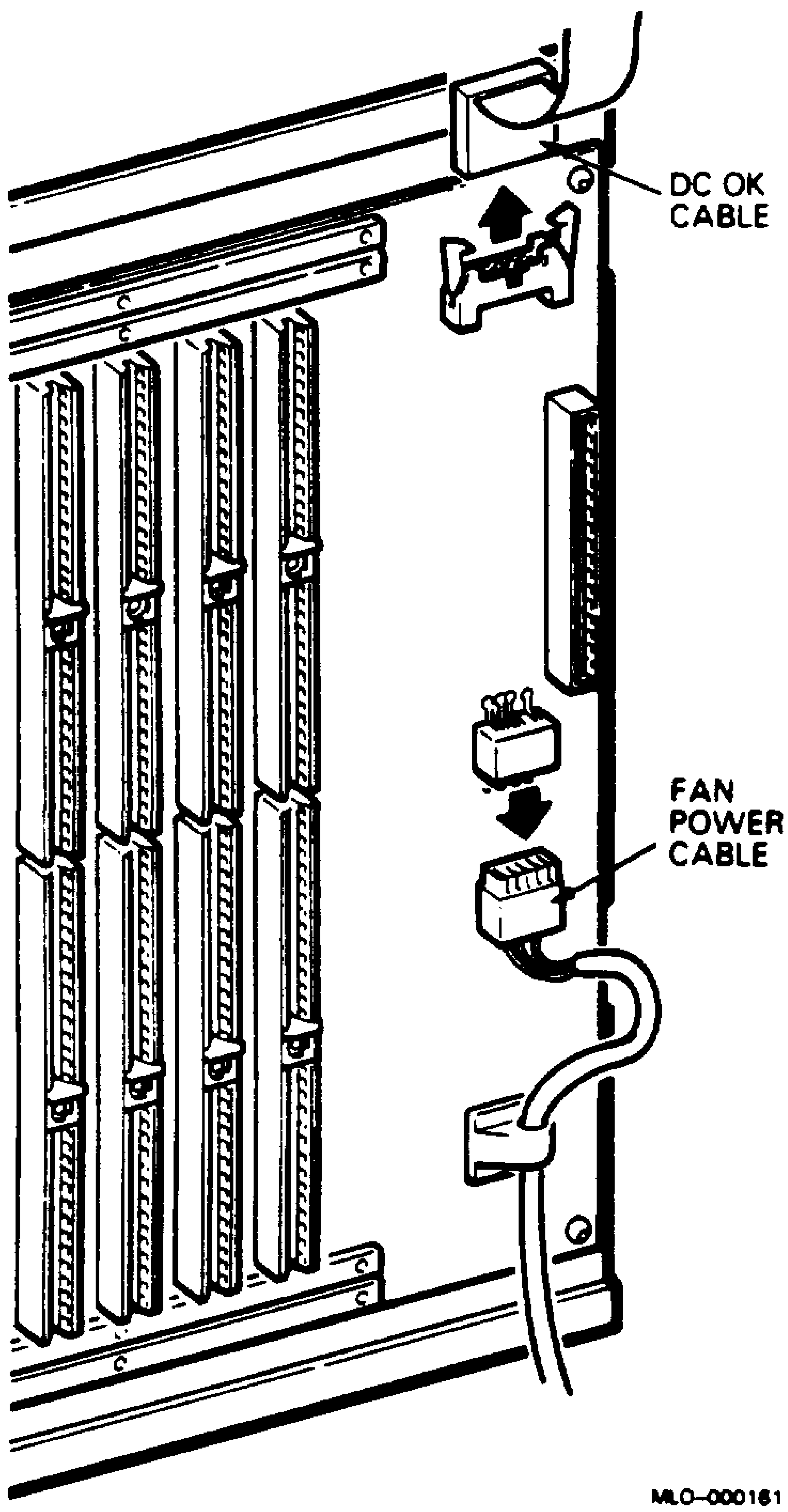
2. From the front of the BA213:

   a. Remove both power supplies (Section 3.8).

   b. Release all modules from the backplane. You do not have to remove the modules from the card cage, as long as you release them from the backplane.

   c. Disconnect the 10-pin DC OK ribbon cable and the fan cable from the right side of the backplane (Figure 3–25). You can reach these connectors only after removing the right power supply.

Figure 3–25: Removing the Backplane Cables



3. From the rear of the BA213:

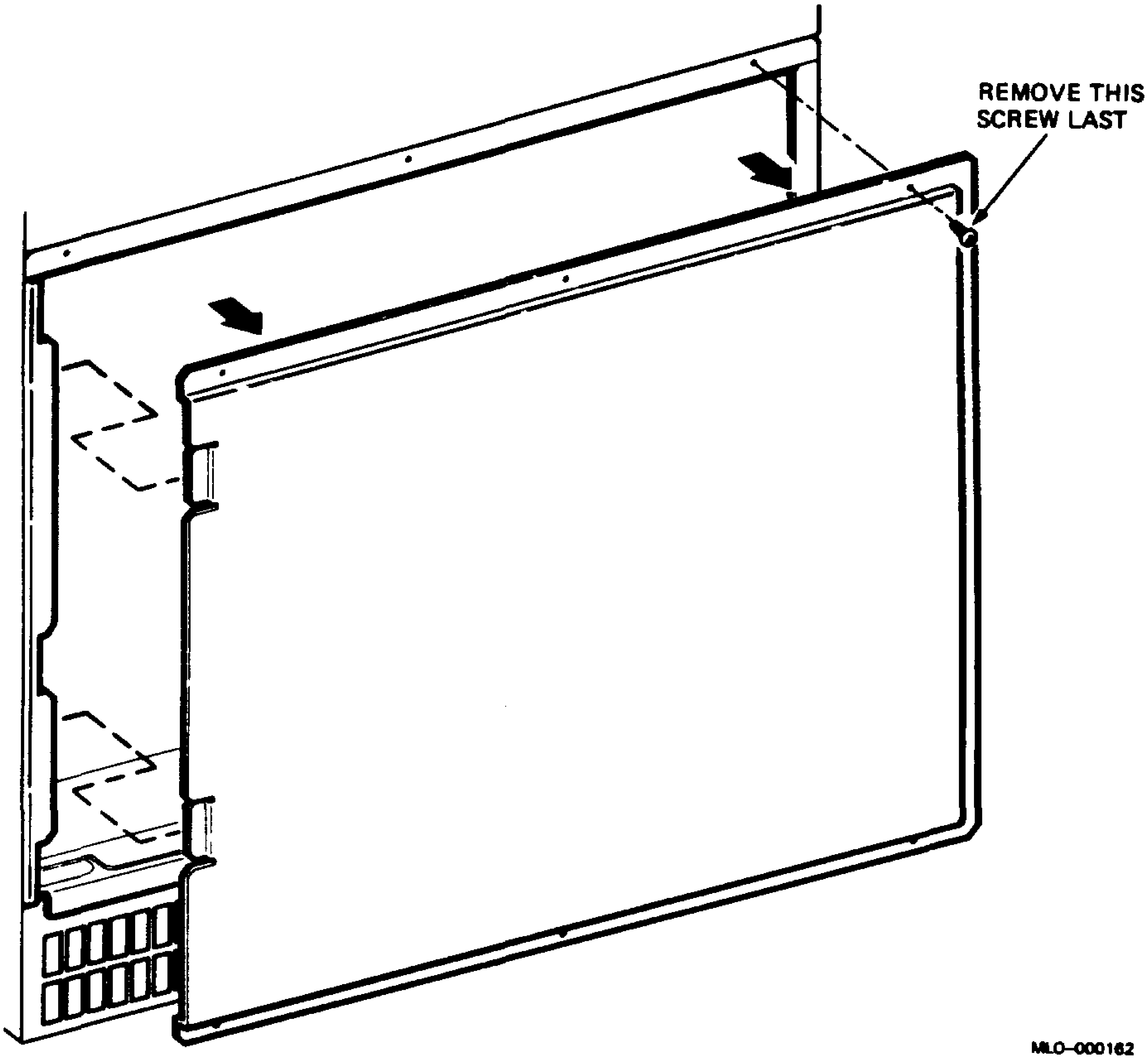
   a. Read the following Caution, then remove the eight screws that hold the metal plate on the rear of the BA213. The backplane is connected to the metal plate.

   CAUTION: *Remove the lower screws first and the upper-right screw last. Support the metal plate as you remove the last screw. Otherwise, the weight of the backplane will cause the assembly to drop when you remove the screw, which may damage the backplane.*

b. Slide the metal plate to the right, to release it from the two tabs on the left side of the BA213 (Figure 3–26).

NOTE: *The backplane and metal plate are one FRU. You do not have to remove the plate from the backplane.*

Figure 3–26: Removing the Backplane



Installation

1. Align the new backplane assembly with the rear of the BA213. Insert the eight screws, but do not tighten.
2. Insert one module in backplane slot 3, and one in backplane slot 10. This step aligns the backplane with the card cage guides.

3. Tighten the screws.
4. Reverse steps 1 through 3 of the removal procedure.

Appendix A
Related Documentation

The following documents contain information relating to MicroVAX or MicroPDP-11 systems.

Document Title	Order Number
Modules	
CXA16 Technical Manual	EK-CAB16-TM
CXY08 Technical Manual	EK-CXY08-TM
DEQNA Ethernet User's Guide	EK-DEQNA-UG
DHV11 Technical Manual	EK-DHV11-TM
DLV11-J User's Guide	EK-DLV1J-UG
DMV11 Synchronous Controller Technical Manual	EK-DMV11-TM
DMV11 Synchronous Controller User's Guide	EK-DMV11-UG
DPV11 Synchronous Controller Technical Manual	EK-DPV11-TM
DPV11 Synchronous Controller User's Guide	EK-DPV11-UG
DRV11-J Interface User's Manual	EK-DRV1J-UG
DRV11-WA General Purpose DMA User's Guide	EK-DRVWA-UG
DZQ11 Asynchronous Multiplexer Technical Manual	EK-DZQ11-TM
DZQ11 Asynchronous Multiplexer User's Guide	EK-DZQ11-UG
DZV11 Asynchronous Multiplexer Technical Manual	EK-DZV11-TM
DZV11 Asynchronous Multiplexer User's Guide	EK-DZV11-UG
IEU11-A/IEQ11-A User's Guide	EK-IEUQ1-UG
KA630-AA CPU Module User's Guide	EK-KA630-UG
KA640-AA CPU Module User's Guide	EK-KA640-UG
KA650-AA CPU Module User's Guide	EK-KA650-UG
KDA50-Q CPU Module User's Guide	EK-KDA5Q-UG
KDJ11-B CPU Module User's Guide	EK-KDJ1B-UG
KDJ11-D/S CPU Module User's Guide	EK-KDJ1D-UG
KDF11-BA CPU Module User's Guide	EK-KDFEB-UG
KMV11 Programmable Communications Controller User's Guide	EK-KMV11-UG
KMV11 Programmable Communications Controller Technical Manual	EK-KMV11-TM

Document Title	Order Number
Modules	
LSI–11 Analog System User's Guide	EK–AXV11–UG
Q-Bus DMA Analog System User's Guide	EK–AV11D–UG
RQDX2 Controller Module User's Guide	EK–RQDX2–UG
RQDX3 Controller Module User's Guide	EK–RQDX3–UG
Disk and Tape Drives	
RA60 Disk Drive Service Manual	EK–ORA60–SV
RA60 Disk Drive User's Guide	EK–ORA60–UG
RA81 Disk Drive Service Manual	EK–ORA81–SV
RA81 Disk Drive User's Guide	EK–ORA81–UG
SA482 Storage Array User's Guide (for RA82)	EK–SA482–UG
SA482 Storage Array Service Manual (for RA82)	EK–SA482–SV
RC25 Disk Subsystem User's Guide	EK–ORC25–UG
RC25 Disk Subsystem Pocket Service Guide	EK–ORC25–PS
RRD50 Subsystem Pocket Service Guide	EK–RRD50–PS
RRD50 Digital Disk Drive User's Guide	EK–RRD50–UG
RX33 Technical Description Manual	EK–RX33T–TM
RX50–D, –R Dual Flexible Disk Drive Subsystem Owner's Manual	EK–LEP01–OM
TK50 Tape Drive Subsystem User's Guide	EK–LEP05–UG
TS05 Tape Transport Pocket Service Guide	EK–TSV05–PS
TS05 Tape Transport Subsystem Technical Manual	EK–TSV05–TM
TS05 Tape Transport System User's Guide	EK–TSV05–UG

Document Title	Order Number
Systems	
MicroVAX Special Systems Maintenance	EK-181AA-MG
630QB Maintenance Print Set	MP-02071-01
630QE Maintenance Print Set	MP-02219-01
630QY Maintenance Print Set	MP-02065-01
630QZ Maintenance Print Set	MP-02068-01
BA23 Enclosure Maintenance	EK-186AA-MG
BA123 Enclosure Maintenance	EK-188AA-MG
BA213 Enclosure Maintenance	EK-189AA-MG
BA214 Enclosure Maintenance	EK-190AA-MG
BA215 Enclosure Maintenance	EK-191AA-MG
H9642-J Cabinet Maintenance	EK-187AA-MG
H9644 Cabinet Maintenance	EK-221AA-MG
KA630 CPU System Maintenance	EK-178AA-MG
KA640 CPU System Maintenance	EK-179AA-MG
KA650 CPU System Maintenance	EK-180AA-MG
KDF11-B CPU System Maintenance	EK-245AA-MG
KDJ11-D/S CPU System Maintenance	EK-246AA-MG
KDJ11-B CPU System Maintenance	EK-247AA-MG
MicroPDP-11 Hardware Information Kit (for BA23)	00-ZYAAA-GZ
MicroPDP-11 Hardware Information Kit (for BA123)	00-ZYAAB-GZ
MicroPDP-11 Hardware Information Kit (for H9642-J)	00-ZYAAE-GZ
MicroPDP-11 Hardware Information Kit (for BA213)	00-ZYAAS-GZ
Microsystems Options	EK-192AA-MG
Microsystems Site Preparation Guide	EK-O67AB-PG
MicroVAX II Hardware Information Kit (for BA23)	00-ZNAAA-GZ
MicroVAX II Hardware Information Kit (for BA123)	00-ZNAAB-GZ
MicroVAX II Hardware Information Kit (for H9642-J)	00-ZNAAE-GZ
MicroVAX 3500 Customer Hardware Information Kit	00-ZNAES-GZ
MicroVAX 3600 Customer Hardware Information Kit (for H9644)	00-ZNAEF-GZ
VAXstation 3200 Owner's Manual (BA23)	EK-154AA-OW
VAXstation 3500 Owner's Manual (BA213)	EK-171AA-OW
VAXstation II/GPX Owner's Manual (BA23)	EK-106AA-OW
VAXstation II/GPX Owner's Manual (BA123)	EK-105AA-OW

Document Title	Order Number
Diagnostics	
DEC/X11 Reference Card	AV-F145A-MC
DEC/X11 User's Manual	AC-FO53D-MC
XXDP User's Manual	AZ-GNJAA-MC
XXDP DEC/X11 Programming Card	EK-OXXDP-MC
MicroVAX Diagnostic Monitor Ethernet Server User's Guide	AA-FNTAC-DN
MicroVAX Diagnostic Monitor Reference Card	AV-FMXAA-DN
MicroVAX Diagnostic Monitor User's Guide	AA-FM7AB-DN
Networks	
Ethernet Transceiver Tester User's Manual	EK-ETHTT-UG
VAX/VMS Networking Manual	AA-Y512C-TE
VAX NI Exerciser User's Guide	AA-HI06A-TE

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