

B213A Expander Addenda to Customer Hardware Information

Order Number EK-248AA-AD-001

This document provides information for operating a MicroVAX system expanded with the B213A.

Information on operating an expanded MicroVAX 3500 system is provided in the section titled Addendum to MicroVAX 3500 Operation. Information on operating an expanded MicroVAX 3600 system is provided in the section titled Addendum to MicroVAX 3600 Operation.

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December 1988

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Contents

B213A Expander Addendum for MicroVAX 3500

1	Overview	3
2	Turning On the System	3
3	Controls and Indicators for Expanded MicroVAX 3500 Systems	3
4	Attaching the Front Panels	9

Figures

1	Expanded MicroVAX 3500 Controls and Indicators	4
2	Controlled Power Switch (886A 120 Vac)	7
3	Controlled Power Switch (886B 240 Vac)	8
4	Attaching the Front Panel	9

B213A Expander Addendum for MicroVAX 3600

1	Overview	3
2	Turning On the System	3
3	Removing and Attaching the Front Panel of the B213A	4
4	Controls and Indicators for Expanded MicroVAX 3600 Systems	6

Figures

1	Removing the Front Panel	4
2	Attaching the Front Panel	5
3	Expanded MicroVAX 3600 Controls and Indicators	7



B213A Expander Addendum for MicroVAX 3500

This addendum describes how to operate a MicroVAX 3500 system with the B213A expander. The information in this addendum is supplementary to the existing *MicroVAX 3500 VAXserver 3500 Operation* manual.



1 Overview

The B213A expander allows you to expand the Q-bus of a host MicroVAX 3500 system to 22 usable Q-bus slots. The B213A can also expand mass storage capacity by providing for up to two additional RA70 fixed-disk drives for a combined (MicroVAX 3500 and B213A) total of up to four RA70 fixed-disk drives.

This addendum describes switch settings specific to the expanded MicroVAX 3500, as well as the controls and indicators that are duplicated. Discussion of all other controls, including operating instructions for mass storage devices, is contained in *MicroVAX 3500 VAXserver 3500 Operation*.

2 Turning On the System

The on/off switch on the MicroVAX 3500 turns both the host MicroVAX 3500 and the B213A expander on and off. As installed by your DIGITAL service representative, both units are plugged into a controlled power switch (CPS). The CPS senses when the host MicroVAX 3500 is turned on and supplies power to both units.

Set the on/off switch on the expander to on (1).

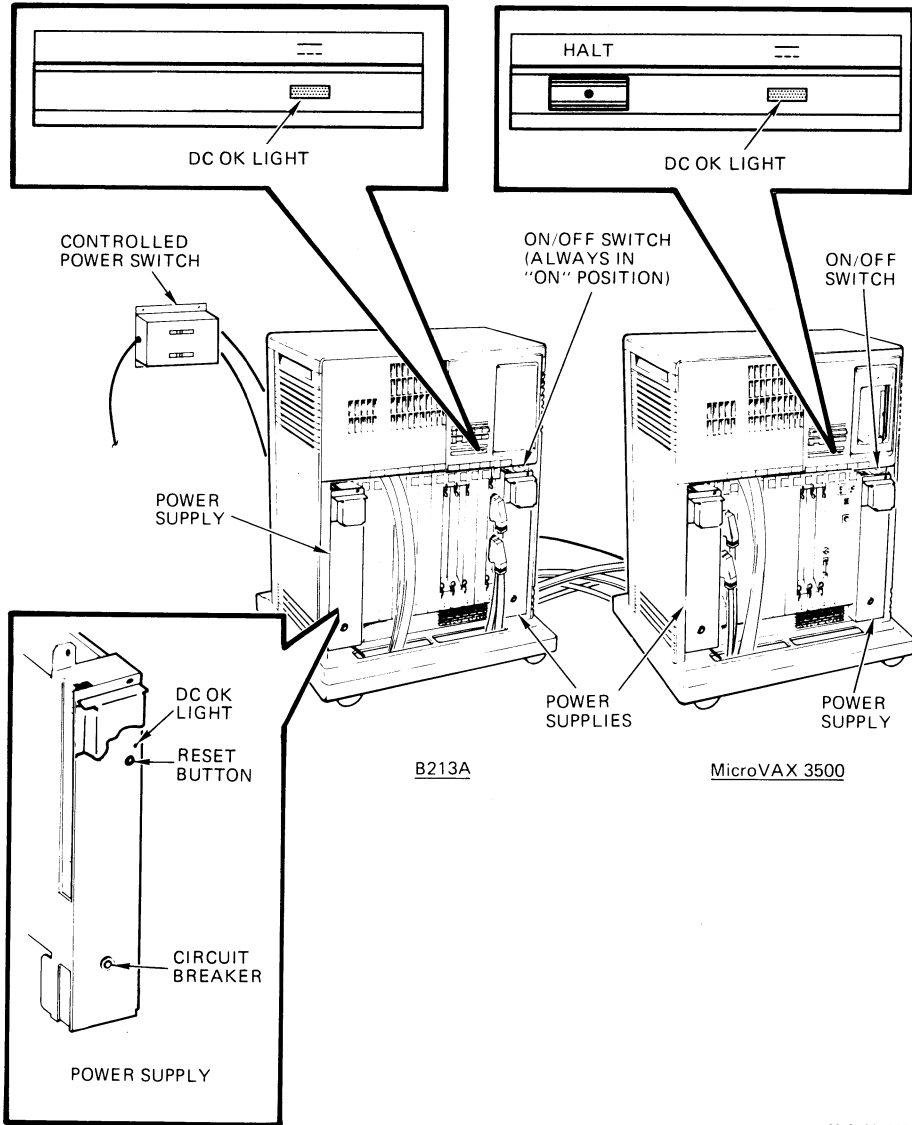
Turn on your expanded MicroVAX system by setting the on/off switch on the host MicroVAX 3500 to on (1). The on/off switches on both the host MicroVAX 3500 and the B213A expander should glow orange.

NOTE: *The on/off switch on the B213A should always remain in the on position (1). The controlled power switch supplies power to both the host MicroVAX 3500 and B213A expander when you turn on your MicroVAX 3500.*

3 Controls and Indicators for Expanded MicroVAX 3500 Systems

Refer to Figure 1 to locate the following controls and indicators. Use the instructions provided in *MicroVAX 3500 VAXserver 3500 Operation* to remove the front panel from either unit.

Figure 1: Expanded MicroVAX 3500 Controls and Indicators



MLO-001806

- On/off switch — The on/off switch on the B213A remains in the on position (1). The on/off switch on the MicroVAX 3500 turns both the host MicroVAX 3500 and the B213A expander on and off. Both units are plugged into the controlled power switch, which senses when the host MicroVAX 3500 is turned on and supplies power to both units.

Do not turn off your system unless it requires maintenance or you know of a planned power outage.

CAUTION: *Turning off your system without following the shutdown procedure described in your operating system manuals may result in loss of data. The operating systems available for MicroVAX systems are VMS, ULTRIX-32, and VAXELN.*

Once you have completed the recommended procedure, you can turn off your system by setting the on/off switch on the host MicroVAX 3500 to off (0).

- Halt switch — The Halt switch on the host MicroVAX 3500 allows you to interrupt all processes and return to the console program. See *MicroVAX 3500 VAXserver 3500 Operation* for instructions on the use of the Halt switch.
- Reset button — A recessed Reset button on each of the four power supplies enables you to reset the system to the power-on state without turning it off. You must remove the front panel to access the Reset buttons.

CAUTION: *Resetting your system without following the shutdown procedure described in your operating system software manuals may result in loss of data.*

To reset the expanded MicroVAX 3500 system, press any of the four Reset buttons.

- Circuit breakers — Each of the four power supplies has its own circuit breaker. The circuit breaker trips to protect the system from power surges. When tripped, the circuit breaker is in the out position.

To reset a breaker, press the circuit breaker to the in position.

- DC OK light — The DC OK light indicates that all voltages are within the correct operating range. When unlit, there is a problem with one of the power supplies. Each power supply also has its own DC OK light.

Controlled Power Switch

CAUTION: *You must use the controlled power switch (CPS) with an expanded MicroVAX 3500 system. The CPS ensures that the system performs the proper sequence of events at power-up, and that both units, the MicroVAX 3500 and the B213A, are properly grounded.*

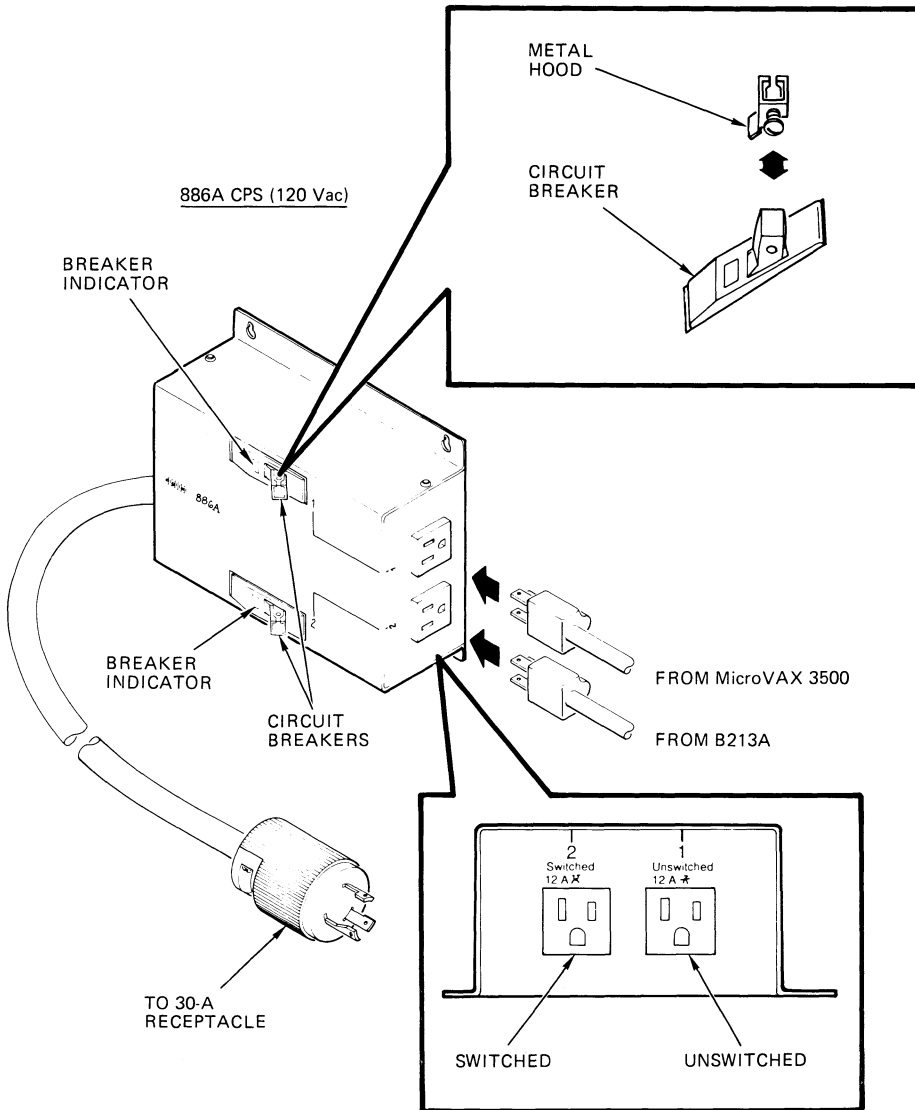
- Circuit breakers — The CPS has two circuit breakers to protect the expanded MicroVAX 3500 system from power surges.
 - For 120 V systems: A red indicator is displayed when a breaker has tripped. See Figure 2.
 - For 240 V systems: The circuit breaker button pops up when the breaker has tripped. See Figure 3.

If a circuit breaker on the CPS trips, turn the on/off switch on the MicroVAX 3500 to off (0). Reset the circuit breaker as described below, wait five minutes, and turn on the system by setting the on/off switch on the MicroVAX 3500 to on (1). If the circuit breaker trips again, contact your DIGITAL service representative.

Reset a circuit breaker on the CPS as follows:

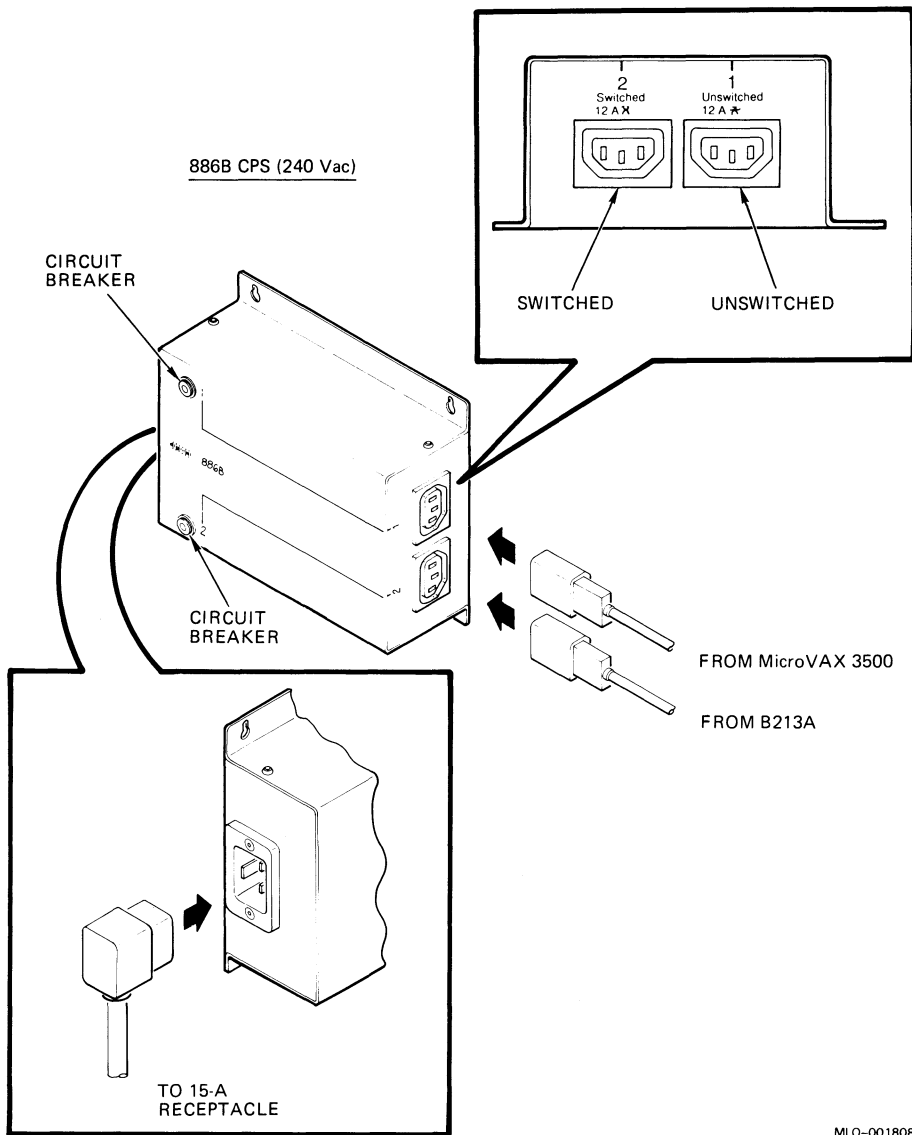
- For 120 V systems (see Figure 2):
 1. Loosen the screw on the metal hood that covers the circuit breaker.
 2. Remove the metal hood.
 3. Push the circuit breaker to off and then back to the on position.
 4. Replace the metal hood and tighten its screw.
- For 240 V systems (see Figure 3):
 1. Press the button to reset the circuit breaker.

Figure 2: Controlled Power Switch (886A 120 Vac)



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Figure 3: Controlled Power Switch (886B 240 Vac)



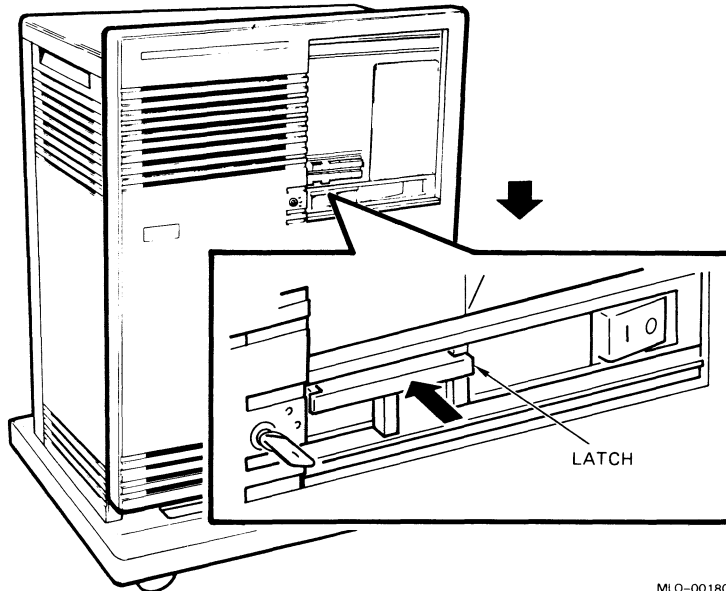
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4 Attaching the Front Panel

The window on the front panel must be open to attach the front panel. Instructions for removing the front panel and operating the window are provided in *MicroVAX 3500 VAXserver 3500 Operation*.

1. Pull the latch on the front panel to the out position. See Figure 4.
2. Holding the panel with two hands, place it flush against the front of the MicroVAX 3500 or B213A, about an inch above the bottom.
3. Slide the panel down until it locks into place.
4. Secure the panel by pushing in the latch.

Figure 4: Attaching the Front Panel



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B213A Expander Addendum for MicroVAX 3600

This addendum describes how to operate a MicroVAX 3600 system with the B213A expander. The information in this addendum is supplementary to the existing *MicroVAX 3600 VAXserver 3600 Operation* manual.



1 Overview

The B213A expander allows you to expand the Q-bus of a host MicroVAX 3600 system to 22 usable Q-bus slots. The B213A can also expand mass storage capacity by providing for up to two additional RA70 fixed-disk drives for a combined (MicroVAX 3600 and B213A) total of up to three RA70 fixed-disk drives and one RA82 fixed-disk drive.

This addendum describes switch settings specific to the expanded MicroVAX 3600, as well as the controls and indicators that are duplicated. Discussion of all other controls, including operating instructions for mass storage devices, is contained in *MicroVAX 3600 VAXserver 3600 Operation*.

2 Turning On the System

The on/off switch on the B213A expander turns both the expander and the host MicroVAX 3600 on and off. A power control bus cable provides a signal to the power controller in the MicroVAX 3600 whenever you operate the on/off switch on the expander.

Set the on/off switch on the MicroVAX 3600 to on (1).

NOTE: *The on/off switch on the MicroVAX 3600 should always remain in the on position (1). A signal from the expander causes the MicroVAX 3600 to power up when you turn on the expander.*

Turn on your expanded system by setting the on/off switch on the B213A expander to on (1). The on/off switches on both the host MicroVAX 3600 and the B213A expander should glow orange.

3 Removing and Attaching the Front Panel of the B213A

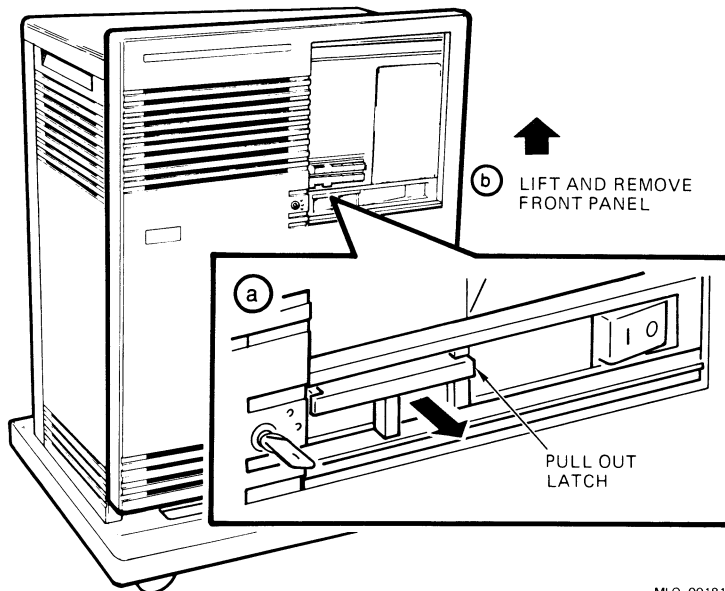
The window on the front panel must be open to remove and attach the front panel. Instructions for operating the window are provided in *MicroVAX 3600 VAXserver 3600 Operation*.

Removing the Front Panel

You must remove the front panel to use controls on the power supplies. Remove the front panel as follows:

1. Insert the key into the lock on the front cover. Turn the key to the bottom position. See Figure 1.
2. Slide the window down.
3. Pull the latch to the out position.
4. Lift the front panel up and out.

Figure 1: Removing the Front Panel



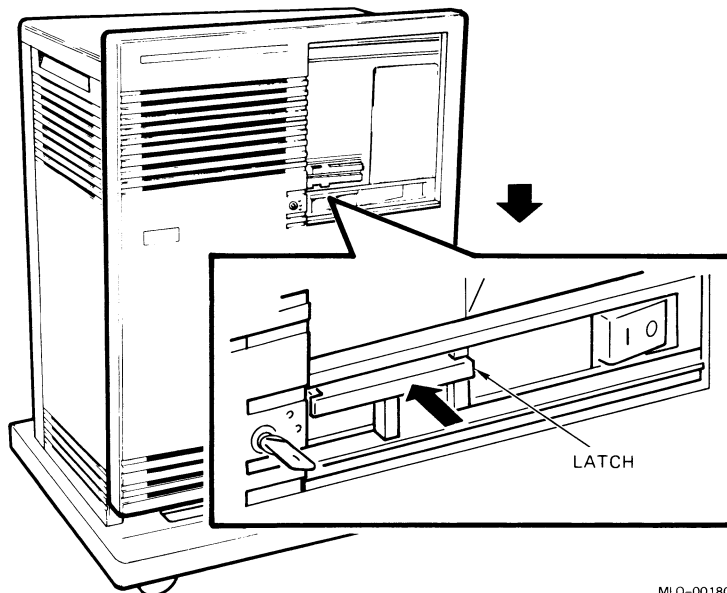
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Attaching the Front Panel

NOTE: *The window on the front panel must be open to attach the front panel.*

1. Pull the latch on the front panel to the out position. See Figure 2.
2. Holding the panel with two hands, place it flush against the front of the B213A, about an inch above the bottom.
3. Slide the panel down until it locks into place.
4. Secure the panel by pushing in the latch.

Figure 2: Attaching the Front Panel



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4 Controls and Indicators for Expanded MicroVAX 3600 Systems

Refer to Figure 3 to locate the following controls and indicators. Use the instructions provided in this addendum to remove the front panel on the B213A; use the instructions in *MicroVAX 3600 VAXserver 3600 Operation* to open the front door of the MicroVAX 3600.

- On/off switch — The on/off switch on the MicroVAX 3600 remains in the on position (1). The on/off switch on the B213A expander turns both the expander and the host MicroVAX 3600 on and off. A power control bus cable provides a signal to the power controller in the MicroVAX 3600 whenever you operate the on/off switch on the expander.

Do not turn off your system unless it requires maintenance or you know of a planned power outage.

CAUTION: *Turning off your system without following the shutdown procedure described in your operating system manuals may result in loss of data. The operating systems available for MicroVAX systems are VMS, ULTRIX-32, and VAXELN.*

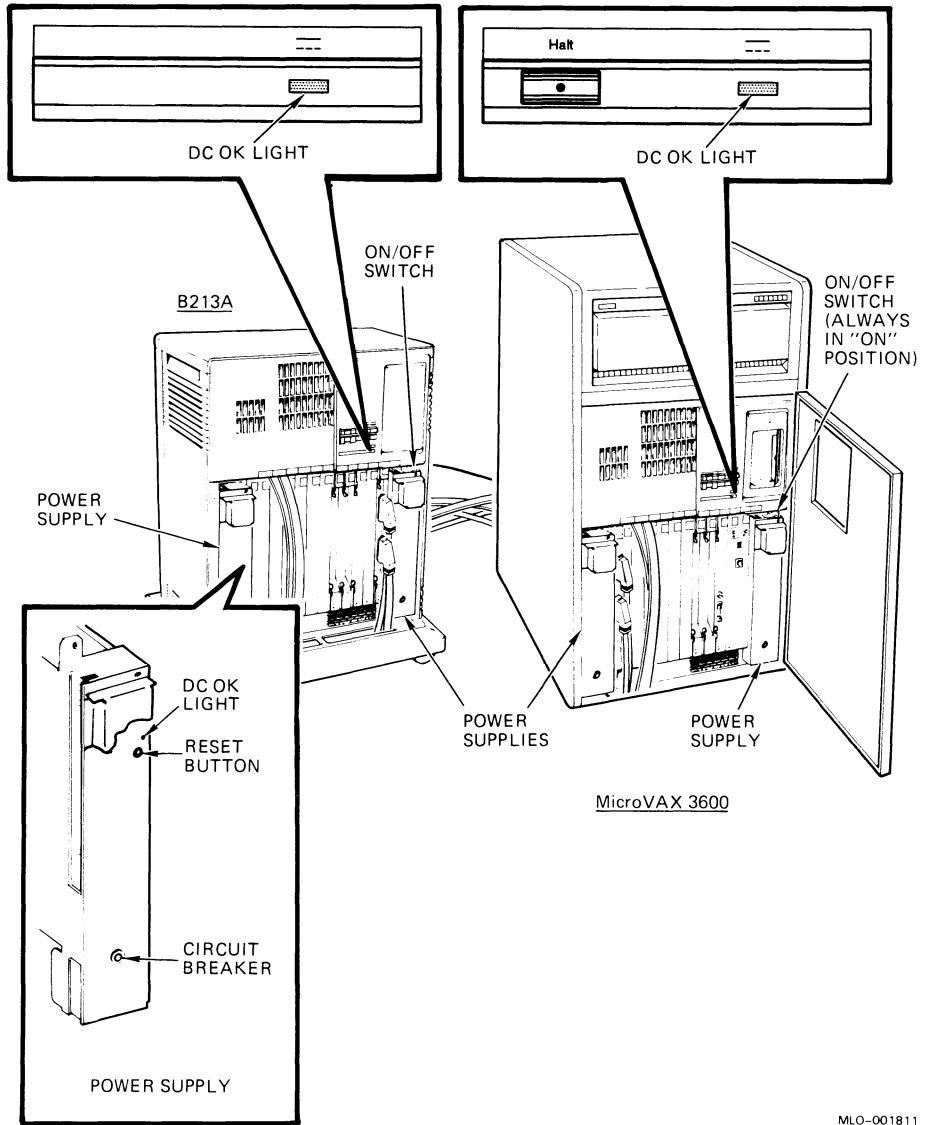
Once you have completed the recommended procedure, you can turn off your system by setting the on/off switch on the B213A expander to off (0).

- Halt switch — The Halt switch on the host MicroVAX 3600 allows you to interrupt all processes and return to the console program. See *MicroVAX 3600 VAXserver 3600 Operation* for instructions on the use of the Halt switch.
- Reset button — A recessed Reset button on each of the four power supplies enables you to reset the system to the power-on state without turning it off. You must remove the front panel on the B213A or open the front door of the MicroVAX 3600 to access the Reset buttons.

CAUTION: *Resetting your system without following the shutdown procedure described in your operating system software manuals may result in loss of data.*

To reset the expanded MicroVAX 3600 system, press any of the four Reset buttons.

Figure 3: Expanded MicroVAX 3600 Controls and Indicators



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- **Circuit breakers** — Each of the four power supplies has its own circuit breaker. The circuit breaker trips to protect the system from power surges. When tripped, the circuit breaker is in the out position.

To reset a breaker, press the circuit breaker to the in position.

- **DC OK light** — The DC OK light indicates that all voltages are within the correct operating range. When unlit, there is a problem with one of the power supplies. Each power supply also has its own DC OK light.

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**MicroVAX
Site Preparation**

Order Number EK-239AB-SP-002

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July 1988
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Contents

Preface	vii
---------	-----

Chapter 1 Physical Requirements

1.1 Noise Levels: Accommodating the MicroVAX System	1-1
1.2 System Space Requirements	1-1
1.3 Additional Equipment: Space Requirements and Cabling . . .	1-2

Chapter 2 Operating Environment

2.1 Static Electricity	2-1
2.2 Temperature and Humidity Ranges and Heat Dissipation . . .	2-2

Chapter 3 Electrical Requirements

Chapter 4 System Specifications

4.1 BA23 Enclosure Specifications	4-1
4.1.1 System Dimensions for the BA23 Enclosure	4-1
4.1.2 Temperature and Humidity Ranges for the BA23 Enclosure	4-3
4.1.3 Electrical Requirements for the BA23 Enclosure	4-3
4.2 BA123 Enclosure Specifications	4-4
4.2.1 System Dimensions for the BA123 Enclosure	4-4
4.2.2 Temperature and Humidity Ranges for the BA123 Enclosure	4-5
4.2.3 Electrical Requirements for the BA123 Enclosure	4-6
4.3 BA213 Enclosure and B213A Expander Specifications	4-7
4.3.1 System Dimensions for the BA213 Enclosure and B213A Expander	4-7

4.3.2	Temperature and Humidity Ranges for the BA213 Enclosure and B213A Expander	4-8
4.3.3	Electrical Requirements for the BA213 Enclosure and for the B213A Expander	4-8
4.3.3.1	Preparing a Site for the B213A Expander	4-9
4.4	BA215 Enclosure and R215F Expander Specifications	4-11
4.4.1	System Dimensions for the BA215 Enclosure and R215F Expander	4-11
4.4.2	Temperature and Humidity Ranges for the BA215 Enclosure and for the R215F Expander	4-12
4.4.3	Electrical Requirements for the BA215 Enclosure and for the R215F Expander	4-12
4.5	H9642 Cabinet Specifications	4-13
4.5.1	System Dimensions for the H9642 Cabinet	4-13
4.5.2	Temperature and Humidity Ranges for the H9642 Cabinet	4-17
4.5.3	Electrical Requirements for MicroVAX Systems in the H9642 Cabinet	4-18
4.6	H9644 Cabinet Specifications	4-19
4.6.1	System Dimensions for the H9644 Cabinet	4-19
4.6.2	Temperature and Humidity Ranges for the H9644 Cabinet	4-21
4.6.3	Electrical Requirements for MicroVAX Systems in the H9644 Cabinet	4-22

Appendix A Acoustic Emission Levels

Appendix B 240 Vac Power Cable Order Numbers

Tables

1-1	Placing the MicroVAX System or Expander	1-1
2-1	Heat Dissipation of MicroVAX Systems	2-2
4-1	Temperature and Humidity Ranges for MicroVAX Systems in the BA23 Enclosure	4-3
4-2	Electrical Requirements for MicroVAX Systems in the BA23 Enclosure	4-3
4-3	Temperature and Humidity Ranges for MicroVAX Systems in the BA123 Enclosure	4-5

4-4	Electrical Requirements for MicroVAX Systems in the BA123 Enclosure	4-6
4-5	Temperature and Humidity Ranges for MicroVAX Systems in the BA213 Enclosure and for the B213A Expander	4-8
4-6	Electrical Requirements for MicroVAX Systems in the BA213 Enclosure and for the B213A Expander	4-9
4-7	Power Cables and Components to Be Used With the B213A Expander and a MicroVAX 3500 System	4-10
4-8	Temperature and Humidity Ranges for MicroVAX Systems in the BA215 Enclosure and for the R215F Expander	4-12
4-9	Electrical Requirements for MicroVAX Systems in the BA215 Enclosure and for the R215F Expander	4-13
4-10	Temperature and Humidity Ranges for MicroVAX Systems in the H9642 Cabinet	4-17
4-11	Electrical Requirements for MicroVAX II Systems in the H9642 Cabinet	4-18
4-12	Temperature and Humidity Ranges for MicroVAX Systems in the H9644 Cabinet	4-22
4-13	Electrical Requirements for MicroVAX 3600 and VAXserver Systems in the H9644 Cabinet	4-23
4-14	Electrical Requirements for Auxiliary Cabinet Used with MicroVAX 3600 Systems	4-23
4-15	Electrical Requirements for Auxiliary Cabinet Used with VAXserver 3600/3602 Systems	4-24
A-1	Operating Acoustic Emission Levels	A-1
B-1	240 Vac Power Cables for MicroVAX Systems in the BA23 and BA123 Enclosures	B-1
B-2	240 Vac Power Cables for MicroVAX Systems in a BA213 Pedestal, and the B213A Expander When Used With a MicroVAX 3600 Host	B-2
B-3	240 Vac Power Cables for MicroVAX Systems in the BA215 Enclosure and for the R215F Expander	B-2
B-4	240 Vac Power Cables for MicroVAX Systems in the H9642 and H9644 Cabinet and for the 886-B Controlled Power Switch	B-3



Preface

This manual is a guide to preparing a site for a MicroVAX system. It describes the physical, environmental, and electrical requirements of each MicroVAX system and expander.

To ensure smooth operation and installation of a MicroVAX system or expander, your site should meet the requirements found in this document *before* the arrival of your system shipment. The following table lists each of the MicroVAX systems and expanders covered by this manual.

MicroVAX Systems and Expanders Covered by This Manual

System	Enclosure
MicroVAX II	BA23, BA123, BA213, H9644, H9642
MicroVAX 3300	BA215
VAXserver 3300	BA215
MicroVAX 3400	BA213
VAXserver 3400	BA213
MicroVAX 3500	BA213
VAXserver 3500	BA213
MicroVAX 3600	H9644
VAXserver 3600	H9644
VAXserver 3602	H9644
VAXstation II	BA23, BA123
VAXstation II/GPX	BA23, BA123, H9642
B213A	BA213
R215F	BA215

Intended Audience

This manual is intended for DIGITAL service personnel and DIGITAL customers who wish to install their MicroVAX systems and intend to perform self-maintenance.

NOTE: *DIGITAL recommends that a DIGITAL service representative install your system.*

If you are a customer preparing your site for a MicroVAX system, please be aware that DIGITAL provides a site preparation service. If you decide you would like a DIGITAL professional to prepare your site, contact your DIGITAL service representative.

Manual Structure

This manual contains four chapters and two appendixes. It is organized as follows:

- Chapter 1 contains information about the physical requirements of MicroVAX systems.
- Chapter 2 contains information about the appropriate environment for MicroVAX systems.
- Chapter 3 contains information about the electrical requirements of MicroVAX systems.
- Chapter 4 contains specific information about each MicroVAX system configuration. The following information is provided:
 1. System dimensions (both with and without the shipping carton)
 2. Acceptable temperature and humidity ranges (operating and nonoperating)
 3. Electrical requirements
- Appendix A lists the acoustic emission level of each MicroVAX system and expander.
- Appendix B lists the power cable order numbers for each MicroVAX system and expander when it is to be operated at 240 Vac.

To use this manual to prepare your site, refer to the chapters on physical, environmental, and electrical requirements. Then refer to Chapter 4, find the section on the appropriate MicroVAX system, and verify that your site meets the requirements of the system.

Conventions

The following conventions are used in this book:

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

When Your Shipment Arrives

Your MicroVAX system is shipped in one large box. Other boxes that arrive with the shipment may contain terminals, printers, software, and the Customer Hardware Information Kit. When the system arrives, you should inspect it with a DIGITAL service representative to ensure that the system and all ordered options have arrived undamaged. When you are ready to begin installation, find the Customer Hardware Information Kit and begin using the *Installation* manual to install your MicroVAX system.



Physical Requirements

A MicroVAX system's physical requirements are determined by system dimensions (both before and after the shipping carton has been removed), space for cabinet doors to swing open, space for peripheral computer equipment such as printers and terminals, and allowances for the noise level of the system.

1.1 Noise Levels: Accommodating the MicroVAX System

Computer systems generate noise. Higher than acceptable noise levels can adversely affect a work environment. MicroVAX systems using the H9642 or H9644 cabinet generate more noise than is acceptable for office use and should be installed in a computer room. Table 1-1 lists the suggested placement of each MicroVAX and expander enclosure.

Table 1-1: Placing the MicroVAX System or Expander

Placement	Enclosure
Designed for use in an open office environment	BA23 ¹ , BA123, BA213, BA215, B213A, R215F
Designed for use in a computer room	H9642, H9644

¹The BA23 enclosure can also be rack-mounted in the H9642 cabinet or can be tabletop mounted.

For the acoustic emission level of each MicroVAX system or expander, refer to Appendix A.

1.2 System Space Requirements

Before unpacking any system, make sure you have enough space to remove the system from its shipping container. Also make sure you leave enough space around the system so it can be serviced. Use information in Chapter 4 to determine your system's dimensions.

1.3 Additional Equipment: Space Requirements and Cabling

In addition to the space required for the MicroVAX system or expander, you should ensure there is enough space for terminals, a printer, mass storage media, printer paper, and other necessary supplies.

If you plan to connect your system to peripheral devices such as printers, terminals, or modems, you will need additional cabling. Cables that connect the system to peripheral devices must be ordered separately.

When planning cable routing for multiple-terminal systems, you should consider factors such as safety, convenience, future expansion, and cost. The system installer has other special factors to consider when cabling a multiple-terminal system on more than one floor in the same building, or in more than one building. DIGITAL offers several cable types for these applications, and DIGITAL service personnel are available to help you plan your installation. Your sales representative can provide more information.

NOTE: *Cabling from peripheral devices should already be in place and labeled before the system is installed.*

Chapter 2

Operating Environment

Computer systems are subject to discharge of static electricity, temperature changes, and humidity. These conditions can affect the operation and overall dependability of the computer system.

Your system should be installed in a well-ventilated area, where the temperature and humidity ranges listed for your system are maintained throughout the year. Rapid temperature changes may affect system performance. Therefore, do not operate systems near heating or cooling devices, large windows, or doors that open to the outside. Air should contain a minimum of dust and other abrasive contaminants.

Mass storage media should be kept at the same temperature and humidity as that of the computer area.

2.1 Static Electricity

Static electricity is a common problem for microcomputer systems. It can cause system failure and loss of data. The most common source of static buildup is contact between people and carpeting or clothing. Low humidity allows the greatest buildup of static charges.

To minimize static buildup, follow these guidelines.

- Maintain relative humidity of at least 40 percent.
- Locate your system away from busy office corridors.
- If possible, avoid using carpeting in the computer area. If you install carpeting, use antistatic carpeting. If carpeting is already in place, place an antistatic mat under the system.
- If your site has antistatic floors, carpeting, or mats, make sure you maintain their antistatic properties by following the manufacturer's recommendations for cleaning.

2.2 Temperature and Humidity Ranges and Heat Dissipation

To function properly, each MicroVAX system and expander must operate in an environment with acceptable temperature and humidity ranges. To determine the appropriate temperature and humidity ranges for your system, refer to Chapter 4 and the specifications for your particular system.

When calculating the operating temperature in your computer environment, also consider the heat that the system generates. Refer to Table 2-1 for a list of the amount of heat dissipated by each MicroVAX system and expander enclosure.

Table 2-1: Heat Dissipation of MicroVAX Systems

Enclosure	Heat Dissipation (BTU/h)
BA23	1177.4
BA123	2355
BA213, B213A	2304
BA215, R215F	1178
H9642	5872 at 120 Vac, 6022 at 240 Vac
H9644 with no RA82	2408
H9644 with RA82	4605

Chapter 3

Electrical Requirements

Determining the electrical requirements of a MicroVAX system configuration should take into account whether 100 Vac, 120 Vac, or 240 Vac is used, the country the system is located in, the voltage range, power source phase, nominal frequency, frequency range, the steady-state current, and the power consumption.

When you are ready to use the above information, turn to Chapter 4 and find the electrical requirements for your system.

The power source should be able to handle the original system and allow for system expansion. DIGITAL recommends a dedicated circuit from the power source to each MicroVAX system configuration. A dedicated circuit provides electrical isolation from possible power surges or electrical noise caused by other appliances. For this reason, you should not connect appliances such as air conditioners, office copiers, or coffee pots to the same circuit as the MicroVAX system. The dedicated circuit should provide an isolated ground path between the system and the power source.

If you cannot avoid power disturbances, your system will need additional power-conditioning equipment. For more information, contact your DIGITAL sales representative.

NOTE: *MicroVAX system configurations operate at either 100, 120, or 240 Vac. To operate the MicroVAX system configuration at 240 Vac, obtain the appropriate power cable for use in your country. Refer to Appendix B for a list of the power cables used to operate each system at 240 Vac. To operate the MicroVAX system configuration at 100 or 120 Vac, use the power cable that is included with your system shipment.*



Chapter 4

System Specifications

This chapter identifies each system's dimensions, acceptable temperature and humidity ranges, and electrical requirements. Refer to the section on your system and use the information provided to properly prepare your site for the MicroVAX system configuration.

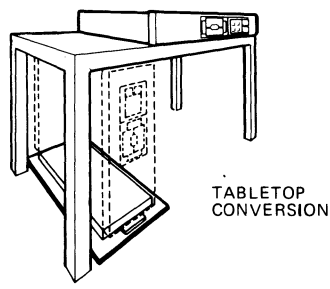
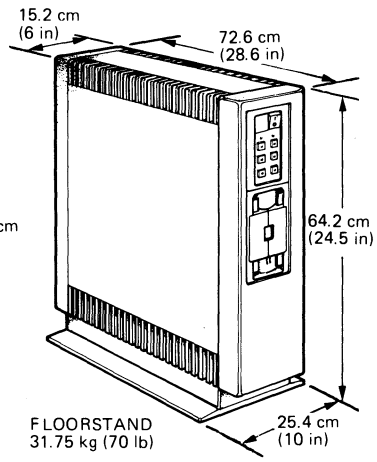
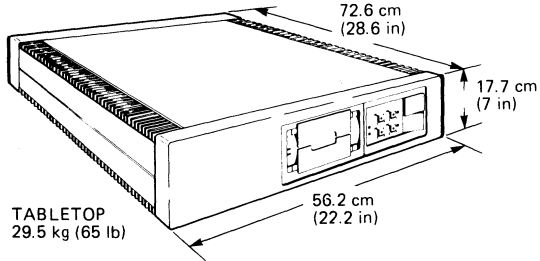
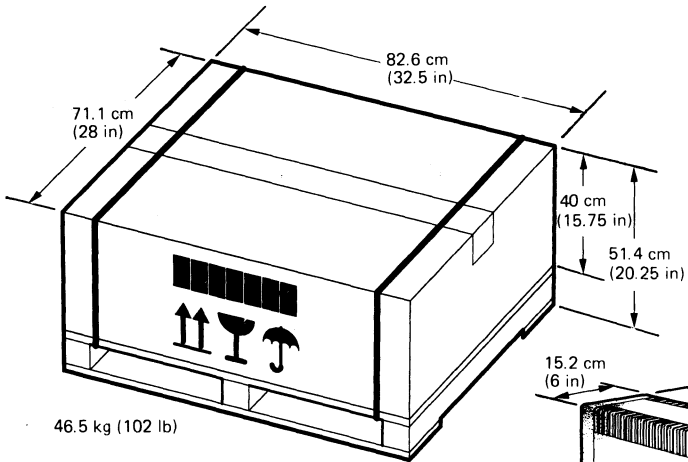
4.1 BA23 Enclosure Specifications

Use the information in this section to prepare your site for MicroVAX systems in the BA23 enclosure.

4.1.1 System Dimensions for the BA23 Enclosure

The following figure shows the dimensions of a MicroVAX system in the BA23 enclosure. The figure also shows the dimensions of the shipping container.

CAUTION: *Use at least two people to handle the system and terminal boxes.*



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4.1.2 Temperature and Humidity Ranges for the BA23 Enclosure

Table 4-1 lists the acceptable temperature and humidity ranges for MicroVAX systems in the BA23 enclosure.

Table 4-1: Temperature and Humidity Ranges for MicroVAX Systems in the BA23 Enclosure

Parameter		Range
Temperature	Operating: ¹	10°C to 40°C 50°F to 104°F
	Nonoperating:	-40°C to 60°C -40°F to 140°F
Temperature rate of change	Operating:	11°C per hour maximum 19.8°F per hour maximum
Relative humidity	Operating:	20% to 80% (noncondensing)
	Nonoperating:	10% to 95%
Maximum altitude	Operating:	2440 m (8000 ft)
	Nonoperating:	4900 m (16,000 ft)

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

4.1.3 Electrical Requirements for the BA23 Enclosure

Table 4-2 lists the electrical requirements for MicroVAX systems in the BA23 enclosure.

NOTE: *To operate the BA23 enclosure at 240 Vac, obtain the appropriate power cable for use in your country. Refer to Appendix B.*

Table 4-2: Electrical Requirements for MicroVAX Systems in the BA23 Enclosure

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

Table 4-2 (Cont.): Electrical Requirements for MicroVAX Systems in the BA23 Enclosure

Nominal AC Voltage ⇒	100 Vac	120 Vac	220-240 Vac
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	5.3 A	4.4 A	2.2 A
Maximum steady-state current at minimum voltage	6 A	5.5 A	2.7 A
Maximum inrush current	100 A	100 A	100 A
Maximum power consumption	345 W	345 W	345 W

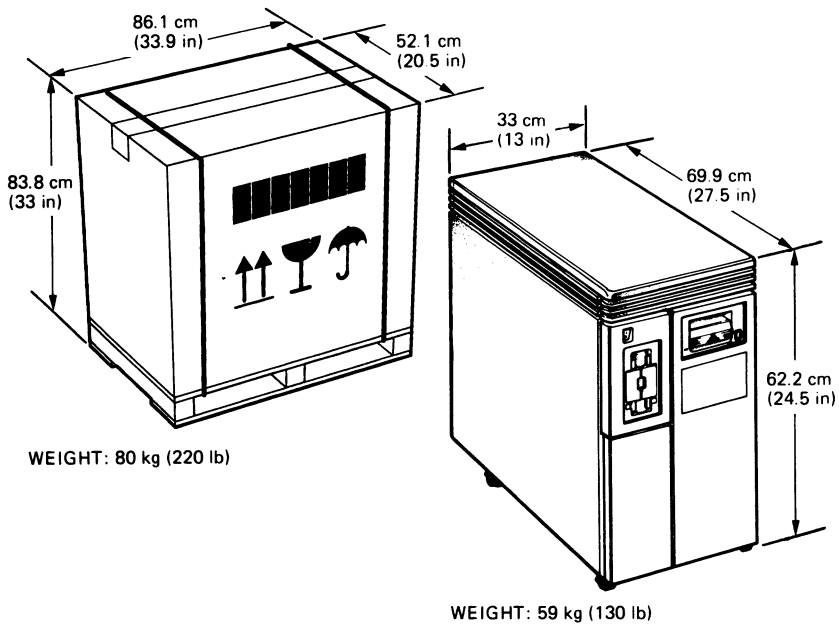
4.2 BA123 Enclosure Specifications

Use the information in this section to prepare your site for MicroVAX systems in the BA123 enclosure.

4.2.1 System Dimensions for the BA123 Enclosure

The following figure shows the dimensions of a MicroVAX system in the BA123 enclosure. The figure also shows the dimensions of the shipping container.

CAUTION: *Use at least two people to handle the system and terminal boxes.*



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4.2.2 Temperature and Humidity Ranges for the BA123 Enclosure

Table 4-3 lists the acceptable temperature and humidity ranges for MicroVAX systems in the BA123 enclosure.

Table 4-3: Temperature and Humidity Ranges for MicroVAX Systems in the BA123 Enclosure

Parameter		Range
Temperature	Operating: ¹	10°C to 40°C 50°F to 104°F
	Nonoperating:	-40°C to 60°C -40°F to 140°F

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

Table 4-3 (Cont.): Temperature and Humidity Ranges for MicroVAX Systems in the BA123 Enclosure

Parameter	Range	
Temperature rate of change	Operating:	11°C per hour maximum 19.8°F per hour maximum
Relative humidity	Operating:	20% to 80% (noncondensing)
	Nonoperating:	10% to 95%
Maximum altitude	Operating:	2440 m (8000 ft)
	Nonoperating:	4900 m (16,000 ft)

4.2.3 Electrical Requirements for the BA123 Enclosure

Table 4-4 provides electrical requirements for MicroVAX systems in the BA123 enclosure.

NOTE: *To operate the BA123 enclosure at 240 Vac, obtain the appropriate power cable for use in your country. Refer to Appendix B.*

Table 4-4: Electrical Requirements for MicroVAX Systems in the BA123 Enclosure

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	47 to 63 Hz
Maximum steady-state current at nominal voltage	10.5 A	8.8 A	4.4 A
Maximum steady-state current at minimum voltage	12 A	11.0 A	5.5 A
Maximum inrush current	100 A	100 A	100 A
Maximum power consumption	690 W	690 W	690 W

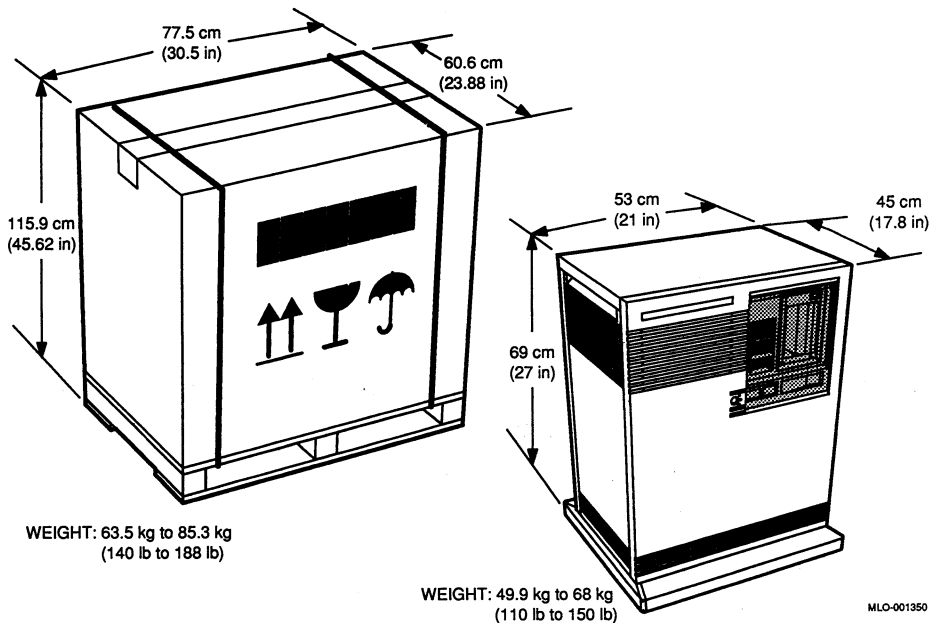
4.3 BA213 Enclosure and B213A Expander Specifications

Use the information in this section to prepare your site for MicroVAX systems in the BA213 enclosure and for the B213A expander.

4.3.1 System Dimensions for the BA213 Enclosure and B213A Expander

The following figure shows the dimensions of a MicroVAX system in the BA213 enclosure and for the B213A expander. The figure also shows the dimensions of the container used to ship the BA213 and the B213A.

CAUTION: Use at least two people to handle the system and terminal boxes.



You must leave at least 1 m (39 in) of clearance at the front of the system, for access to system controls. You also must 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.

4.3.2 Temperature and Humidity Ranges for the BA213 Enclosure and B213A Expander

Table 4-5 lists the acceptable temperature and humidity ranges for MicroVAX systems in the BA213 enclosure and for the B213A expander.

Table 4-5: Temperature and Humidity Ranges for MicroVAX Systems in the BA213 Enclosure and for the B213A Expander

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

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

4.3.3 Electrical Requirements for the BA213 Enclosure and for the B213A Expander

Table 4-6 shows electrical requirements for MicroVAX systems in the BA213 enclosure and for the B213A Expander.

NOTE: *To operate the BA213 enclosure at 240 Vac, obtain the appropriate power cable for use in your country. Refer to Appendix B, Table B-2.*

Table 4-6: Electrical Requirements for MicroVAX Systems in the BA213 Enclosure and for the B213A Expander

Nominal AC Voltage ⇒	101 Vac	120 Vac	220-240 Vac
Voltage range	90 to 110 Vac	104 to 128 Vac	190 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	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

4.3.3.1 Preparing a Site for the B213A Expander

If you are preparing a site for the B213A expander, several additional electrical requirements must be considered.

Use the following information to ensure you have all required power cables and components, which differ depending on whether the B213A is to be used with the MicroVAX 3500 system or the MicroVAX 3600 system.

MicroVAX 3500 System with the B213A Expander

To operate the B213A expander with the MicroVAX 3500 system, you will need a control power switch (886-A/B) and from one to three additional power cables.

CAUTION: *Depending on whether you are using 120 or 240 Vac, you will also need an electrical receptacle rated at the following amperage:*

- *For 120 Vac operation, MicroVAX 3500 systems expanded with the B213A must use a NEMA (National Electrical Manufacturers Association) L5-30R ac electrical receptacle rated at 30 A (U.S.).*
- *For 240 Vac operation, MicroVAX 3500 systems expanded with the B213A require a minimum service of 10 A with a country-specific electrical receptacle.*

Use Table 4-7 to determine which power cables and components you will require to operate the B213A with the MicroVAX 3500 system.

Table 4-7: Power Cables and Components to Be Used With the B213A Expander and a MicroVAX 3500 System

120 Vac	240 Vac
886-A (Controlled Power Switch)	886-B (Controlled Power Switch)
17-00083-43 (2) ¹	17-00365-06 (2)
	Country-specific power cable for the 886-B controlled power switch(1) ²

¹One 17-00083-43 power cable is included with the MicroVAX 3500 system shipment; a second one is included with the B213A expander shipment.

²This power cable is included with the B213A expander shipment, but must be specified in the customer order. Refer to Appendix B of this manual, Table B-4.

MicroVAX 3600 System with the B213A Expander

To operate the B213A expander with the MicroVAX 3600 system, you will need two separate power sources: one for the MicroVAX 3600, and another for the B213A expander. DIGITAL recommends that both power lines come from the same power panel to ensure the same ground potential for both units.

The power requirements for the MicroVAX 3600 are described in Section 4.6.3.; the power requirements for the B213A expander are described in Section 4.3.3. Use the appropriate country-specific power cable for each unit. The power cables are listed in Appendix B of this manual. (See Table

B-2 for power cables for the MicroVAX 3600 variant of the B213A, and Table B-4 for power cables for the MicroVAX 3600.)

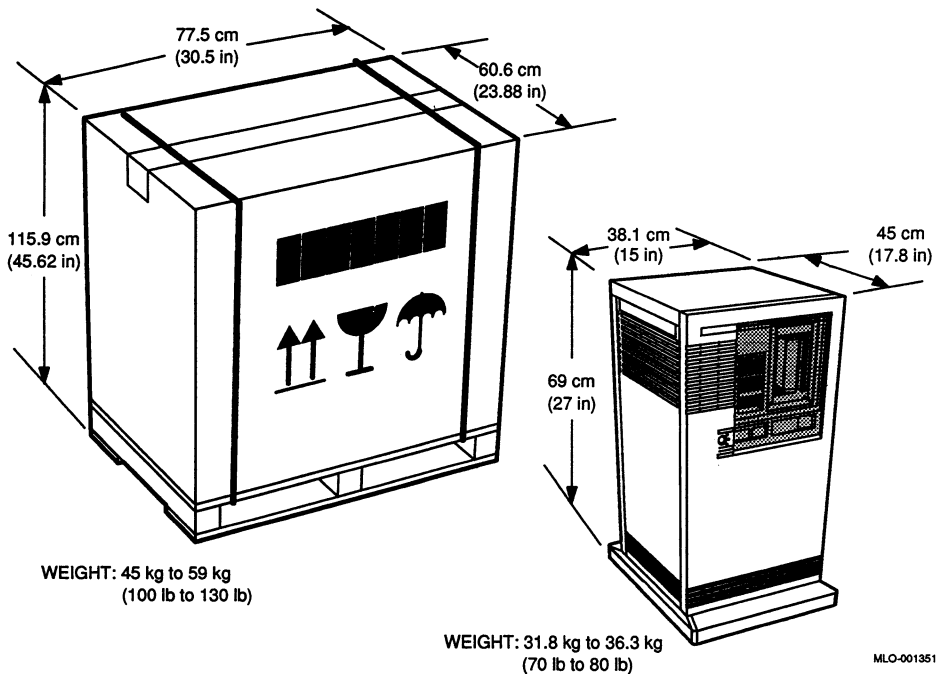
4.4 BA215 Enclosure and R215F Expander Specifications

Use the information in this section to prepare your site for MicroVAX systems in the BA215 enclosure and for the R215F expander.

4.4.1 System Dimensions for the BA215 Enclosure and R215F Expander

The following figure shows the dimensions of a MicroVAX system in the BA215 enclosure. The figure also shows the dimensions of the container used to ship the BA215 and the R215F.

CAUTION: *Use at least two people to handle the system and terminal boxes.*



You must leave at least 1 m (39 in) of clearance at the front of the system, for access to system controls. You also must 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.

4.4.2 Temperature and Humidity Ranges for the BA215 Enclosure and for the R215F Expander

Table 4-8 lists the acceptable temperature and humidity ranges for MicroVAX systems in the BA215 enclosure and for the R215F expander.

Table 4-8: Temperature and Humidity Ranges for MicroVAX Systems in the BA215 Enclosure and for the R215F Expander

Parameter		Range
Temperature	Operating: ¹	10°C to 40°C 50°F to 104°F
	Nonoperating:	-40°C to 66°C -40°F to 151°F
Temperature rate of change	Operating:	11°C per hour maximum 19.8°F per hour maximum
	Nonoperating:	10% to 90% (noncondensing)
Relative humidity	Operating:	10% to 90%
	Nonoperating:	2438 m (8000 ft)
Maximum altitude	Operating:	4900 m (16,000 ft)
	Nonoperating:	

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

4.4.3 Electrical Requirements for the BA215 Enclosure and for the R215F Expander

Table 4-9 lists the electrical requirements for MicroVAX systems in the BA215 enclosure and for the R215F expander.

NOTE: *To operate the BA215 enclosure or the R215F expander at 240 Vac, obtain the appropriate power cable for use in your country. Refer to Appendix B.*

Table 4–9: Electrical Requirements for MicroVAX Systems in the BA215 Enclosure and for the R215F Expander

Nominal AC Voltage ⇒	101 Vac	120 Vac	220–240 Vac
Voltage range	90 to 110 Vac	104 to 128 Vac	190 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	47 to 63 Hz
Maximum steady-state current at nominal voltage BA215 only :	5.2 A	4.4 A	2.4 A
Maximum steady-state current at minimum voltage			
BA215:	8.3 A	7.2 A	3.9 A
R215F:	3.75 A	3.1 A	1.8 A
Startup current (30 seconds) at nominal voltage			
BA215:	7.1 A	5.9 A	3.1 A
R215F:	3.0 A	2.6 A	1.4 A
Maximum inrush current	50 A	50 A	50 A
Maximum power consumption			
BA215:	340 W	340 W	340 W
R215F:	200 W	200 W	200 W

4.5 H9642 Cabinet Specifications

Use the information in this section to prepare your site for MicroVAX systems in the H9642 cabinet.

4.5.1 System Dimensions for the H9642 Cabinet

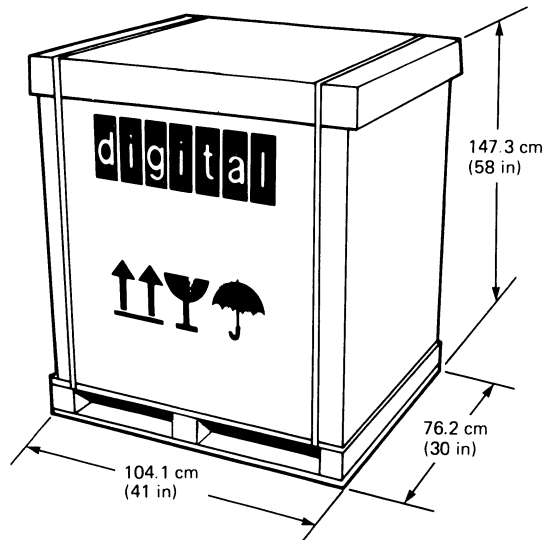
Systems that use the H9642 cabinet are shipped in large containers secured to wooden pallets by four metal hold-down brackets. Other containers arriving with your shipment may contain terminals, printers, software, and other options. Plan to use about 3 m (10 ft) of floor space for removing each cabinet from its pallet.

WARNING: *You need a forklift to move this system and some options (those mounted on pallets). Do not try to move or lift this equipment without a forklift.*

The cabinet is mounted on four wheels and has four adjustable leveling feet for stability.

The weight of systems using the H9642 cabinet varies from 168 kg to 311 kg (358 lb to 685 lb), depending on the mass storage subsystems contained in the cabinet. Plan your installation accordingly. A fully loaded system with RA60 and RA81 disk drives weighs 311 kg (685 lb).

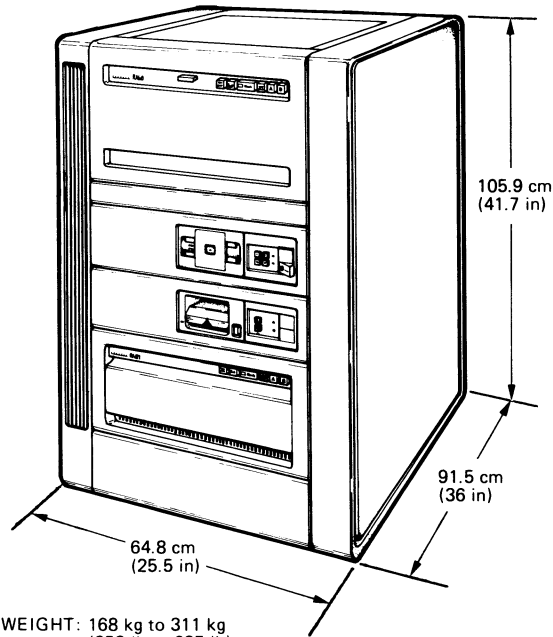
The following figure shows the shipping dimensions of a MicroVAX system in the H9642 cabinet.



WEIGHT: 168 kg to 311 kg
(358 lb to 685 lb)

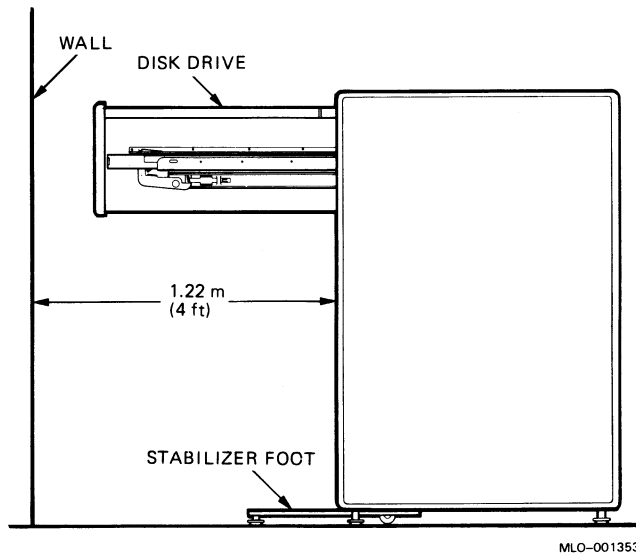
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The following figure shows the dimensions of a MicroVAX system in the H9642 cabinet when shipping materials have been removed.



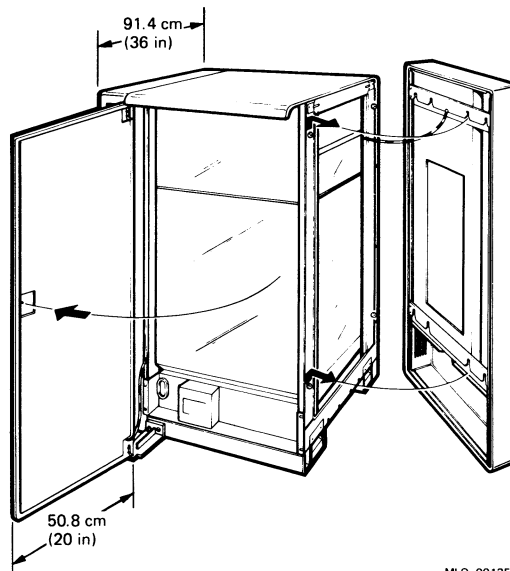
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Leave a minimum of 1.2 m (4 ft) from the front of the system to the nearest stationary object so the disk drives can be extended. The drives are approximately 86.5 cm (33.75 in) deep.



Leave a minimum of 1.2 m (4 ft) from the rear of the system to the nearest stationary object, so the rear door can be opened or removed. The rear door is approximately 51.3 cm (20.0 in) wide.

Leave space on each side of the system to remove the side panels.



4.5.2 Temperature and Humidity Ranges for the H9642 Cabinet

Table 4-10 lists the acceptable temperature and humidity ranges for MicroVAX systems in the H9642 cabinet.

Table 4-10: Temperature and Humidity Ranges for MicroVAX Systems in the H9642 Cabinet

Parameter		Range
Temperature	Operating: ¹	15°C to 32°C 59°F to 90°F
	Nonoperating:	-40°C to 66°C -40°F to 151°F
Temperature rate of change	Operating:	11°C per hour maximum 19.8°F per hour maximum

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

Table 4-10 (Cont.): Temperature and Humidity Ranges for MicroVAX Systems in the H9642 Cabinet

Parameter	Range	
Relative humidity	Operating:	20% to 80% (noncondensing)
	Nonoperating:	10% to 90% (H9642)
Maximum altitude	Operating:	2440 m (8000 ft)
	Nonoperating:	4900 m (16,000 ft)

4.5.3 Electrical Requirements for MicroVAX Systems in the H9642 Cabinet

CAUTION:

- *For 120 Vac operation, MicroVAX systems in the H9642 cabinet must use a NEMA (National Electrical Manufacturers Association) L5-30R ac electrical receptacle rated at 30 A (U.S.).*
- *For 240 Vac operation, most MicroVAX systems in the H9642 cabinet do not use the NEMA connector. Those 240 Vac systems that do use the NEMA connector operate on 60 Hz. Contact your DIGITAL sales representative for information on any restrictions that may apply to 240 Vac, 60 Hz systems.*

Table 4-11 shows the electrical requirements for fully configured systems in the H9642 cabinet.

Maximum current and power values represent systems with two RA81 disk drives installed.

NOTE: *To operate the H9642 cabinet at 240 Vac, obtain the appropriate power cable for use in your country. Refer to Appendix B.*

Table 4-11: Electrical Requirements for MicroVAX II Systems in the H9642 Cabinet

Nominal AC Voltage ⇒	120 Vac	240 Vac
Voltage range	90 to 128 Vac	184 to 256 Vac
Power source phase	Single	Single

Table 4–11 (Cont.): Electrical Requirements for MicroVAX II Systems in the H9642 Cabinet

Nominal AC Voltage ⇒		120 Vac	240 Vac
Nominal frequency		60 Hz	50 Hz
Frequency range		59 to 61 Hz	49 to 51 Hz
Steady-state current	Typical:	16.4 A	8.6 A
	Maximum:	24.0 A	12.0 A
Power consumption	Typical:	1722 W	1766 W
	Maximum:	3132 W	3216 W

4.6 H9644 Cabinet Specifications

Use the information in this section to prepare your site for MicroVAX systems in the H9644 cabinet.

4.6.1 System Dimensions for the H9644 Cabinet

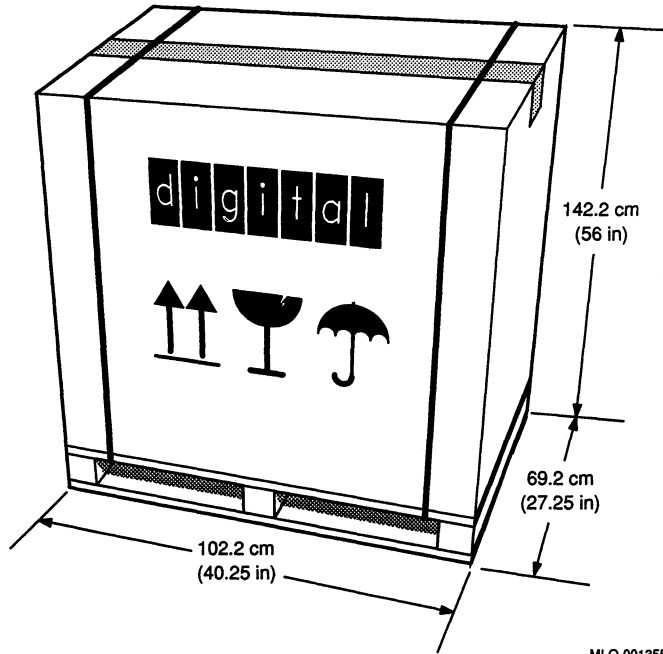
Systems that use H9644 cabinets are shipped in large containers secured to wooden pallets by metal hold-down brackets. Other containers arriving with your shipment may contain terminals, printers, software, and other options. Plan to use about 3 m (10 ft) of floor space for removing each cabinet from its pallet.

WARNING: *You need a forklift to move this system and any option mounted on a pallet. Do not try to move or lift this equipment without a forklift.*

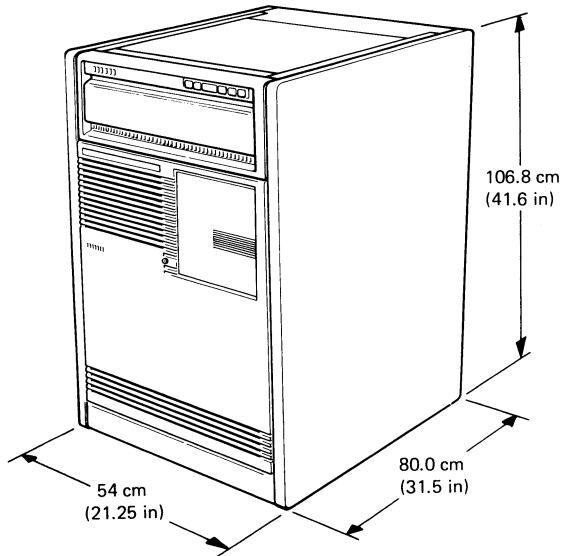
The cabinet is mounted on four wheels.

A fully loaded H9644 cabinet, with an RA81 or RA82 disk drive, two RA-series disk drives, and a TK70 tape drive, weighs 206.6 kg (455 lb). Plan your installation accordingly.

The following figure shows the shipping dimensions of a MicroVAX system in the H9644 cabinet.



The following figure shows the dimensions of an unpacked MicroVAX system in the H9644 cabinet.



WEIGHT: 124.9 kg to 206.6 kg
(275 lb to 455 lb)

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If your system includes an auxiliary cabinet with an RA82 drive in the bottom, leave a minimum of 1.2 m (4 ft) from the front of the cabinet to the nearest stationary object so the disk drives can be extended. The drive is approximately 86.5 cm (33.75 in) deep.

Leave approximately 1 m (3 ft) from the rear of the system to the nearest stationary object so the rear door can be removed.

For cabinets containing a TU81E tape deck, leave enough room above the cabinet to raise the cover of the tape deck.

4.6.2 Temperature and Humidity Ranges for the H9644 Cabinet

Table 4-12 lists the acceptable temperature and humidity ranges for MicroVAX systems in the H9644 cabinet.

Table 4-12: Temperature and Humidity Ranges for MicroVAX Systems in the H9644 Cabinet

Parameter		Range
Temperature	Operating: ¹	15°C to 32°C 59°F to 90°F
	Nonoperating:	-40°C to 66°C -40°F to 151°F
Temperature rate of change	Operating:	11°C per hour maximum 19.8°F per hour maximum
Relative humidity	Operating:	20% to 80% (noncondensing)
	Nonoperating:	10% to 90% (H9644)
Maximum altitude	Operating:	2440 m (8000 ft)
	Nonoperating:	4900 m (16,000 ft)

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

4.6.3 Electrical Requirements for MicroVAX Systems in the H9644 Cabinet

CAUTION:

For 120 Vac operation, MicroVAX systems in the H9644 cabinet must use a NEMA L5-30R ac electrical receptacle rated at 30 A (U.S.). These systems require a CSA 12-3 type power cable.

For 240 Vac operation, MicroVAX systems in the H9644 cabinet must use a NEMA L6-15R ac electrical receptacle rated at 15 A (U.S.). Contact your DIGITAL sales representative for information on any restrictions that may apply to 240 Vac, 60 Hz systems.

To operate the H9644 cabinet at 240 Vac outside the U.S., obtain the appropriate power cable for use in your country. Refer to Appendix B, Table B-4.

Table 4-13 lists the electrical requirements for MicroVAX 3600 and VAXserver 3600 systems that use one H9644 cabinet. Tables 4-14 and 4-15 list the electrical requirements for a second H9644 cabinet in a MicroVAX 3600 and VAXserver 3600/3602 system, respectively.

Table 4-13: Electrical Requirements for MicroVAX 3600 and VAXserver Systems in the H9644 Cabinet

Nominal AC Voltage ⇒	101 Vac	120 Vac	240 Vac
Voltage range	90 to 110 Vac	104 to 128 Vac	190 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	47 to 63 Hz
Maximum steady-state current			
At nominal voltage	28.5 A	24.0 A	12.0 A
Typical steady-state current	11.5 A	11.1 A	5.8 A
Startup current			
For 10 seconds	57 A	48 A	24 A
For 50 seconds	36 A	30 A	15 A
Typical power consumption	Not specified	1090 W	1140 W

Table 4-14: Electrical Requirements for Auxiliary Cabinet Used with MicroVAX 3600 Systems

Nominal AC Voltage ⇒	101 Vac	120 Vac	240 Vac
Voltage range	Not used	90 to 128 Vac	184 to 256 Vac
Power source phase	Not used	Single	Single
Nominal frequency	Not used	50 to 60 Hz	50 to 60 Hz
Frequency range	Not used	47 to 63 Hz	47 to 63 Hz
Maximum steady-state current			
At typical voltage	Not used	8.0 A	4.1 A
At maximum voltage	Not used	8.3 A	4.6 A
Startup current (150 milliseconds)	Not used	44.0 A	33.0 A
Power consumption			
Typical	Not used	620 W	620 W
Maximum	Not used	960 W	960 W

Table 4-15: Electrical Requirements for Auxiliary Cabinet Used with VAXserver 3600/3602 Systems

Nominal AC Voltage ⇒	101 Vac	120 Vac	240 Vac
Voltage range	90 to 110 Vac	90 to 128 Vac	184 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	47 to 63 Hz
Maximum steady-state current at typical voltage	10.2 A	8.6 A	4.7 A
Maximum available current for cabinet	28.5 A	24.0 A	12.0 A
Startup current (10 seconds)	57.0 A	48.0 A	24.0 A
Power consumption			
Typical	670 W	670 W	670 W
Maximum limit of the power controller	2880 W	2880 W	2880 W

Appendix A

Acoustic Emission Levels

Table A-1: Operating Acoustic Emission Levels

Enclosure	LNPE (B)	LPA (dB)
BA23	6.1	48
BA123	6.0	46
BA213, B213A	5.8	43
BA215, R215F	5.7	42
H9642 with no RA drives	6.0	45
H9642 with RA60 and RA81	7.6	64
H9644 with no RA drives	5.3	42
H9644 with RA82-AA (60 Hz)	7.3	62
H9644 with RA82-AD (50 Hz)	7.1	60

LNPE = Noise power emission level (A-weighted sound power level) measured in bels reference 1 picowatt.

LPA = Sound pressure measured in decibels at 1.0 m from the front edge of the unit and 1.5 m above the floor.

Levels may be lower than those shown, depending on the kind and number of mass storage devices in the system.

All data measured in accordance with ANSI S12.10-1985 (American National Standards Institute) and ISO/DIS 7779 (International Standards Organization).



Appendix B

240 Vac Power Cable Order Numbers

If you wish to operate the MicroVAX system at 240 Vac, refer to the table appropriate to your system and order the power cable listed for 240 Vac operation in your country. For more information on 240 Vac operation, check with your DIGITAL sales representative.

Table B-1 lists the power cables used to operate a MicroVAX system at 240 Vac in the BA23 and BA123 enclosures.

Table B-1: 240 Vac Power Cables for MicroVAX Systems in the BA23 and BA123 Enclosures

Power Cable Number	Country
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
BN18L-2E	Israel
BN18J-1K	U.S. and Japan

Table B-2 lists the 240 Vac power cables used for a MicroVAX system in a BA213 pedestal, and for a B213A expander when used with a MicroVAX 3600 host.

Table B-2: 240 Vac Power Cables for MicroVAX Systems in a BA213 Pedestal, and the B213A Expander When Used With a MicroVAX 3600 Host

Power Cable Number	Country
BN20B-2E	Japan
BN20C-2E	Australia and New Zealand
BN20D-2E	Austria, Belgium, Czechoslovakia, Finland, France, Germany, Hungary, Netherlands, Norway, Poland, Portugal, Spain, and Sweden
BN20E-2E	United Kingdom and Ireland
BN20F-2E	Switzerland
BN20H-2E	Denmark
BN20K-2E	India, South Africa
BN20L-2E	Israel
BN20J-2E	Italy
BN20A-2E	U.S.

Table B-3 lists the power cables used to operate a MicroVAX system at 240 Vac in the BA215 enclosure and to operate an R215F expander at 240 Vac.

Table B-3: 240 Vac Power Cables for MicroVAX Systems in the BA215 Enclosure and for the R215F Expander

Power Cable Number	Country
BN20N-2E	U.S. and Japan
BN19J-2E	Australia and New Zealand
BN03B-2E	Austria, Belgium, Czechoslovakia, Finland, France, Germany, Hungary, Netherlands, Norway, Poland, Portugal, Spain, and Sweden
BN19B-2E	United Kingdom and Ireland
BN19F-2E	Switzerland
BN19L-2E	Denmark
BN19T-2E	India, South Africa

Table B-3 (Cont.): 240 Vac Power Cables for MicroVAX Systems in the BA215 Enclosure and for the R215F Expander

Power Cable Number	Country
BN19Y-2E	Israel
BN19N-2E	Italy

Table B-4 lists the power cables used to operate a MicroVAX system at 240 Vac in the H9642 and H9644 cabinets and for the 886-B controlled power switch for 240 Vac expanded MicroVAX 3500 systems.

Table B-4: 240 Vac Power Cables for MicroVAX Systems in the H9642 and H9644 Cabinet and for the 886-B Controlled Power Switch

Power Cable Number	Country	Service
BN18B-4E	United Kingdom and Ireland	240 Vac
BN18C-4E	Austria, Belgium, Finland, France, Germany, Netherlands, Norway, Portugal, Spain, and Sweden, Switzerland	220 Vac
BN18D-4E	Australia and New Zealand	240/230 Vac
BN18E-4E	Italy and Switzerland	220 Vac
BN18F-4E	Israel	230 Vac
BN18H-4E	India	220 Vac
BN18P-4E	Denmark	
BN18T-4E	U.S. and Japan	208/200 Vac



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