RadiSys®

Service Manual

MP3600D Series Chassis

29086-004
July 2000

Limited Warranty

A. RadiSys Corporation warrants that the item sold by it hereunder will be free from defects in materials or workmanship, under normal use and service, for a period of 2 years from date of shipment. Said item will meet the specifications in effect at the time of manufacture. RadiSys's sole obligation under this warranty shall be, at its option, to repair or replace, without charge, any defective component of said item, within a reasonable period of time.

B. RadiSys Corporation shall not be liable under this warranty for (i) the item that the Buyer alleges to be defective and was repaired or altered by someone other than RadiSys's designated personnel or authorized representative, unless such repair or alteration was effected pursuant to prior written approval of RadiSys, or (ii) where the Buyer fails to notify RadiSys of any alleged defect within the period of warranty, or (iii) where the Buyer fails to return the allegedly defective item to RadiSys Corporation, in Houston, Texas, USA, freight prepaid, or (iv) where the item was altered or damaged in a way which RadiSys reasonably determines to affect the performance and reliability of the item, or (v) where the item was subject to misuse, neglect, or accident. The rights and remedies granted to the Buyer under this paragraph constitute the Buyer's sole and exclusive remedy against RadiSys Corporation, its officers, agents, and employees, for negligence, inexcusable delay, breach of warranty, express or implied, or any other default relating to the item or RadiSys's duties to eliminate any errors.

This warranty supersedes any other warranty, whether expressed, implied, or statutory, including but not limited to any warranty for fitness of purpose, merchantability, or freedom from infringement or the like, and any warranty otherwise arising out of any proposal, specifications, or sample. Furthermore, RadiSys Corporation neither assumes nor authorizes any person to assume for it any other liability.

The software included with this equipment is warranted only in accordance with the terms of its license agreement. Except as warranted in that license agreement, the manufacturer of the software disclaims all warranties and conditions with regard to the software, including all implied warranties and conditions of merchantability, fitness for a particular purpose, title, and non-infringement.

Every effort has been made to ensure that the information provided in this manual is complete and accurate. However, technical inaccuracies or typographical errors may be inadvertently included. RadiSys assumes no responsibility for any errors that may be contained in this document. RadiSys makes no promise to update or keep current the information contained in this document. Information in this document, including product specifications, is subject to change without notice.

Important

Always use caution when handling or operating the system. Only qualified and experienced electronics service personnel should access the unit's interior. Use extreme caution when installing or removing components. If you have any questions, please contact RadiSys Technical Support at (800) 438-4769 or (713) 541-8200 Monday through Friday between 7:00 a.m. and 6:00 p.m., Central Time, Continental USA.

A Lire Imperativement

Quand vous manipulez ou utilisez la système, faites preuve en toutes circonstances de la plus grande prudence. Seuls des techniciens électroniciens qualifiés et expérimentés peuvent avoir accès à l'intérieur de la système. Si vous désirez poser des questions complémentaires, n'hésitez pas à prendre contact avec le Département d'assistance technique de RadiSys au (USA) 1-713-541-8200.

Bitte Zuerst Lesen

Seien Sie immer vorsichtig, wenn Sie mit Ihrem System umgehen oder es bedienen. Nur qualifiziertes, erfahrenes Personal fär Elektronik sollte am Inneren des Gerätes arbeiten. Für Ihre Sicherheit sind Hinweise zur Vorsicht, Win Sie irgenwelche Fragen haben, setzen Sie sich bitte nit der Abteilung fr technische Unterstützung von RadiSys unter der Rufnummer (USA) 1-713-541-8200 in Verbindung.

Changes or modifications not expressly approved by RadiSys Corporation could void the product warranty and the user's authority to operate the

Notice

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

This equipment generates, uses, and can emit radio frequency energy and, if not installed and used in accordance with this instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case, the user will be required to correct the interference at the user's expense.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following conditions:

- This device may not cause harmful interference
- This device must accept any interference received, including interference that may cause undesired operation

Any change or modification not expressly approved by the manufacturer is prohibited and could void the user's authority to operate the equipment.

Document Conventions

Symbols

	**Notice:** This symbol indicates an item for special consideration.
	**Warning:** This symbol indicates the presence of a potential hazard that can cause personal injury. Only qualified and trained electronics service personnel should access the equipment.

Customer Support

Calling Technical Support

Have the RadiSys product model and serial number available.

- In the continental USA, Monday — Friday, 7:00 a.m. — 6:00 p.m., Central Time, dial 1-800-438-4769 in the USA.
- Outside the USA, dial 1-713-541-8200 (add long distance/international access codes).
- In Europe, Monday — Friday, 8:30 a.m. — 5:00 p.m., dial +31-36-5365595.

Returning Products

When you are assigned a Returned Material Authorization (RMA) number from a Technical Support Representative, place it, along with the product serial number, on the packaging materials and correspondence. The factory will be unable to accept delivery without these numbers.

Note: The factory does not accept RMAs sent freight collect.

Inspection of Contents/ Packaging of Product

This product has been tested to assure reliable packaging that will withstand responsible handling by the carrier.

Caution: Inspect contents immediately and file a claim with the delivering carrier for any damage.Save the shipping box and packaging material. It should be used for any further shipment of this equipment. If packaging is damaged and is not suitable for shipping, call RadiSys Tech Support to obtain new packaging. The warranty may be void if the product is returned using unapproved or damaged original packaging.

Accessing the Website

http://www.radisys.com

Table of Contents

List of Figures

1 Operations

This chapter discusses functions and features of the equipment that can be accessed by *all* users, regardless of training or skill level. The material contained in this chapter discusses *only* user-accessible parts and/or operations.

This chapter discusses the primary features of the MP3600D chassis.

If you are familiar with the primary components and functions of the MP3600D, go to Chapter 2, “Service,” page 7. Then read this chapter later at your convenience.

User-Accessible Features

Overview

The MP3600D provides features that permit great flexibility where rugged, reliable equipment is required. This chassis presents a low-cost, highly configurable solution with demonstrative performance and expansion options.

Models

The MP3600D is available in two models (Figure 1):

- Rack-Mount
- Tower

Features

The following user-accessible features (Figure 2) are incorporated into the MP3600D:

- Rocker-style power switch
- Reset button
- IDE/SCSI activity LED
- System power LED
- AT-style keyboard connector
- Fourteen (14) expansion slots
- Drive bays accessible from the front panel:
  - Two 5¼” drives
  - One 3½” drive
- Air filter

More...

For more information on the front panel, see the Front Panel Addendum.

Figure 1 Rack-Mount and Tower Models

Note: These illustrations show the DK36D Front Panel.

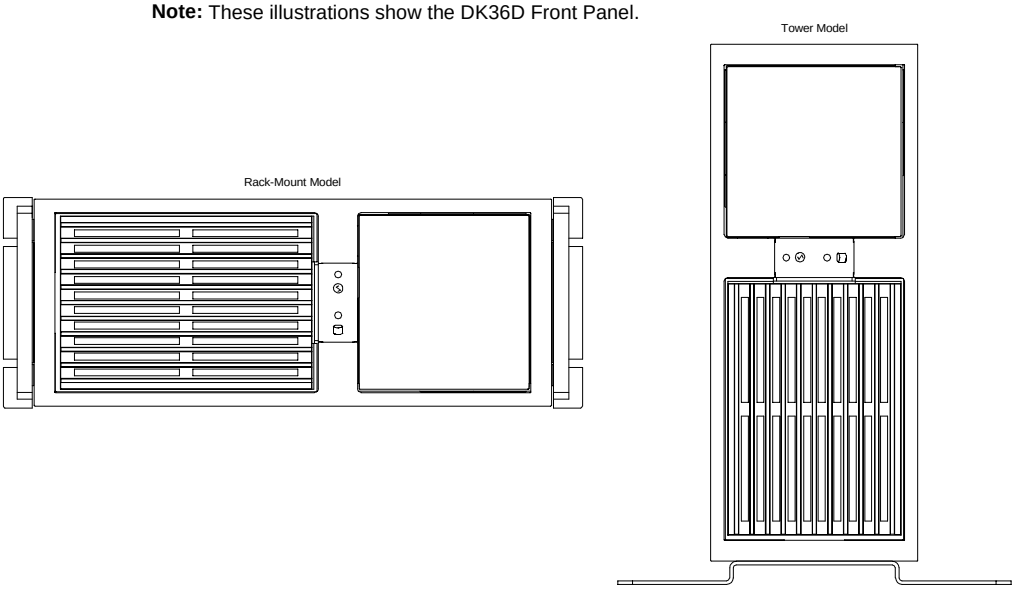
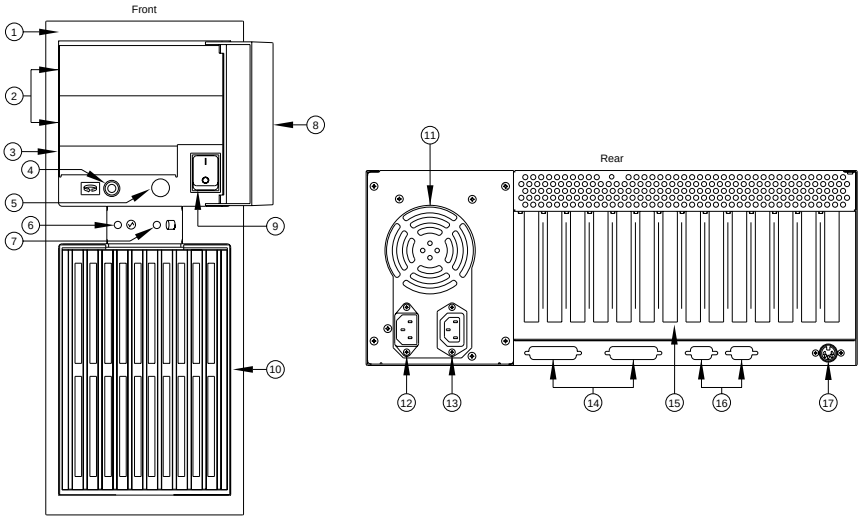


Figure 2 External Components and Functions

Note: This illustration shows the front panel door open.



1. Front Bezel
2. 5¼" Drive Bays
3. 3½" Drive Bay
4. Reset Button
5. Optional Keyboard Connector
6. System Power LED
7. IDE/SCSI Activity LED
8. Front Panel Door
9. Power Switch
10. Filter Cover
11. Power Supply
12. AC Power Input
13. AC Accessory Outlet
14. DB25 Knockouts
15. Expansion Slots
16. DB9 Knockouts
17. Keyboard Connector

Specifications

Overview

Listed in the table below are the specifications for the MP3600D.
Note: These specifications are subject to change without notice.

Environmental

Environmental tolerances are listed in the following table:

Temperature **Note:** See page 5.	Operating:0 to +50 °C (32 to 122 °F) Non-Operating:-40 to +70 °C (-40 to 158 °F)
Humidity	Operating:5 — 95% @ 40 °C, non-condensing Non-Operating:0 — 95% @ 40 °C, non-condensing
Shock	Operating:5 G @ 10 ms Non-Operating:25 G @ 10 ms
Vibration	Operating:1.5 G @ 5 — 150 Hz Non-Operating:5 G @ 5 — 150 Hz
Altitude	Operating:15,000 ft (4,572 m) Non-Operating:50,000 ft (15,240 m)

System

System specifications are listed in the following table:

Dimensions	• Tower:7” W x 17.5” H x 20” D (17.78 x 44.45 x 50.80 cm) • Rack-Mount:19” W x 7” H x 20” D (48.26 x 17.78 x 50.80 cm)
Construction	Corrosive-resistant finished steel; plastic front bezel
Indicators / Controls	• Rocker-style power switch • System reset button • System power LED • IDE/SCSI Activity LED
Keyboard	AT-style connector on rear panel
Cooling	Two 45/90 CFM variable-speed fans
Media	• Two 5¼” drives (user-accessible) • One 3½” drive (user-accessible) • Three 3½” drives (auxiliary) • Two 2½” drives (auxiliary)
Expansion	Fourteen slots

Figure 3 The MP3600D Chassis

Note: This illustration shows the DK36D Front Panel.

A Note on Thermal Specifications

The technology and power density of the microprocessor is rapidly increasing. The 80386 required less than a few hundred milliamps of current. The 80486DX4 peaked at less than 1.5 A and typically dissipated less than 5 watts of power. The 233 MHz Pentium® processor with MMX™ technology requires up to 6.5 A and dissipates as much as 17 W. Power levels have finally increased to a level that greatly affects the ability of the equipment to effectively dissipate energy.

RadiSys is continually working to ensure that its products will conform to thermal specifications. However, we can only work within known or anticipated hardware and software configurations. One peripheral device installed within a chassis can significantly alter operating temperature. Also, software applications can cause as much as 20 °C variation. Even the cable layout within the chassis can affect airflow and thereby performance.

RadiSys validates the operating specifications of its products by testing with the “hottest” possible hardware and software configuration, that will maximize the power supply draw and generate a worst-case scenario. However, despite these efforts, the specifications are only benchmarks and should be regarded as such.

Notes

2 Service

This chapter discusses functions and features of the equipment that can be accessed *only* by qualified and trained electronics service personnel. The material contained in this chapter does *not* discuss any user-accessible parts or operations. All tasks related to material in this chapter must be referred to qualified service personnel.

This chapter provides information on the following components:

- Internal features
- Expansion cards
- Drives and media

This chapter also covers the installation of components for each model of the MP3600D:

- Rack-mount handle brackets and slide rails
- Tower feet

Accessing the Interior

Safety

It is important to protect yourself and your equipment.

To avoid damage or injury, always power-off the system and disconnect all power cords from their source before handling the equipment.
To help prevent accidental damage caused by static discharge, use a grounding wrist strap or other static-dissipating device when handling the equipment.

Only qualified, experienced electronics service personnel should access and handle the equipment.

Rack-Mount Model

The procedure for removing the top cover of the rack-mount MP3600D (Figure 4) is outlined in the following table:

Step	Action
1	Remove the one screw on the rear panel of the chassis that fastens the top cover.
2	Loosen but do *not* remove the ten screws on the top panel of the chassis that fasten the top cover.
3	Slide the top cover approximately ¼" (.635 cm) toward the rear of the chassis.
4	Lift the top cover straight up, clearing the heads of the screws mounted to the chassis.

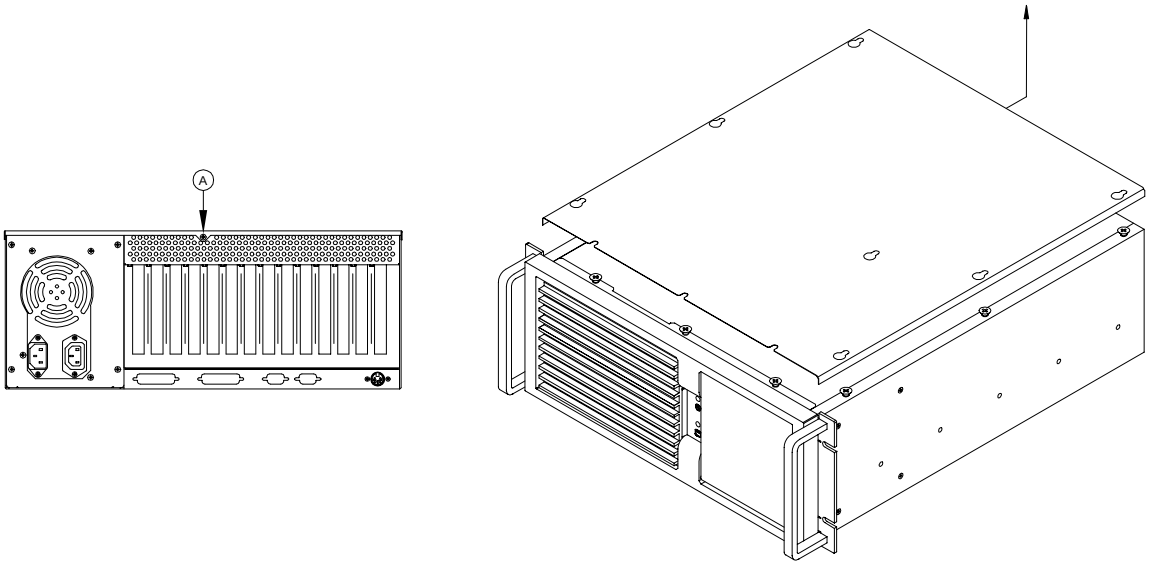
Tower Model

The procedure for removing the top cover of the tower MP3600D (Figure 5) is outlined in the following table:

Step	Action
1	Remove all fastening screws from the rear, left, and right panels: • Rear: 1 • Left: 5 • Right: 3 (identical placement as the bottom 3 on the left panel)
2	Pull the left and right panels away from the body of the chassis approximately five degrees (5°). **Note:** Pull the panels outward only far enough to allow the lips of the top cover to clear the bottom of the chassis.
3	Lift the top cover straight up, clearing the chassis.

Figure 4 Removing the Rack-Mount Top Cover

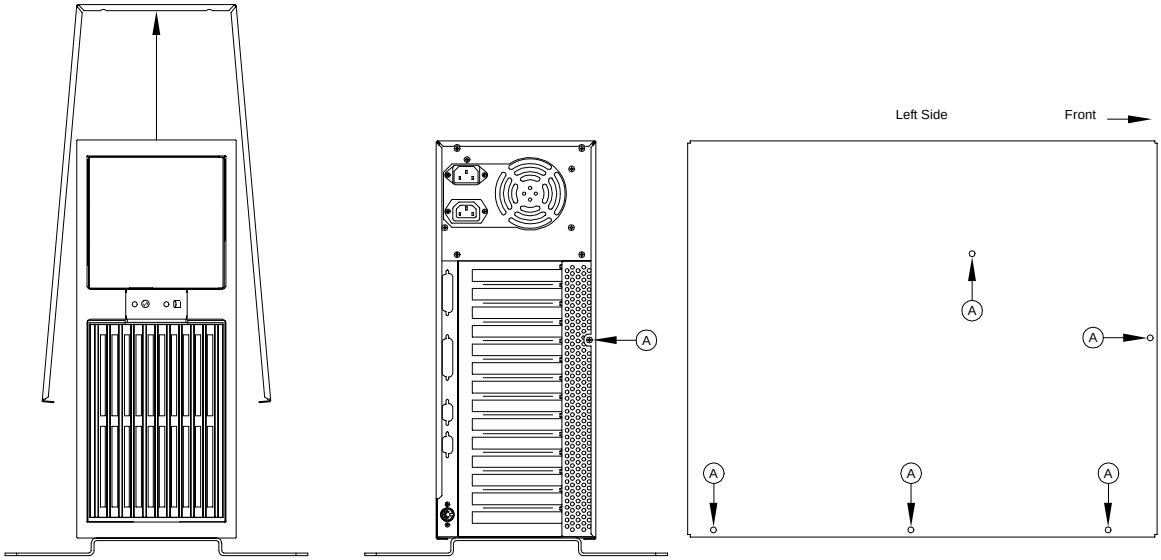
Note: These illustrations show the DK36D Front Panel.



A. Mounting Hole

Figure 5 Removing the Tower Top Cover

Note: These illustrations show the DK36D Front Panel.



A. Mounting Holes

Internal Features

Overview

The MP3600D is designed to be rugged yet practical. The interior of the chassis allows easy access to components and peripherals while being sturdy and reliable.

Features

The following internal features (Figure 7) are incorporated into the MP3600D:

- Up to fourteen expansion slots
- Expansion card retention bracket
- Two 45/90 CFM variable-speed cooling fans
- Mounts to accommodate various passive backplanes
- Interior drive bays:
  Note: For more information on drives and media, see page 14.
  - Three 3½” drives
  - Two 2½” drives

Passive Backplane

The MultiPro 3600 Series offers a variety of passive backplanes, presenting a broad assortment of ISA and PCI slot configurations.

See the Passive Backplane Addendum for more information.

Power Supply

The MultiPro 3600 Series also offers a variety of power supplies, supporting diverse input voltages. Each power supply is equipped with featues such as over voltage and over current protection, and a high-volume cooling fan.

See the Power Supply Addendum for more information.

Figure 6

Normal Airflow Inside the MP3600D

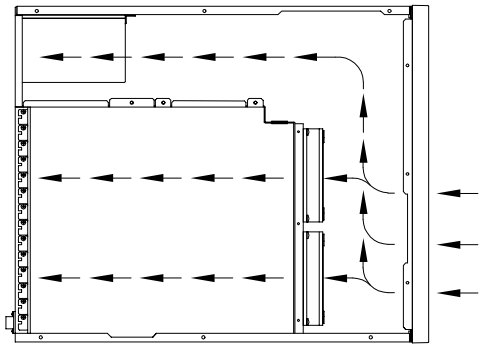
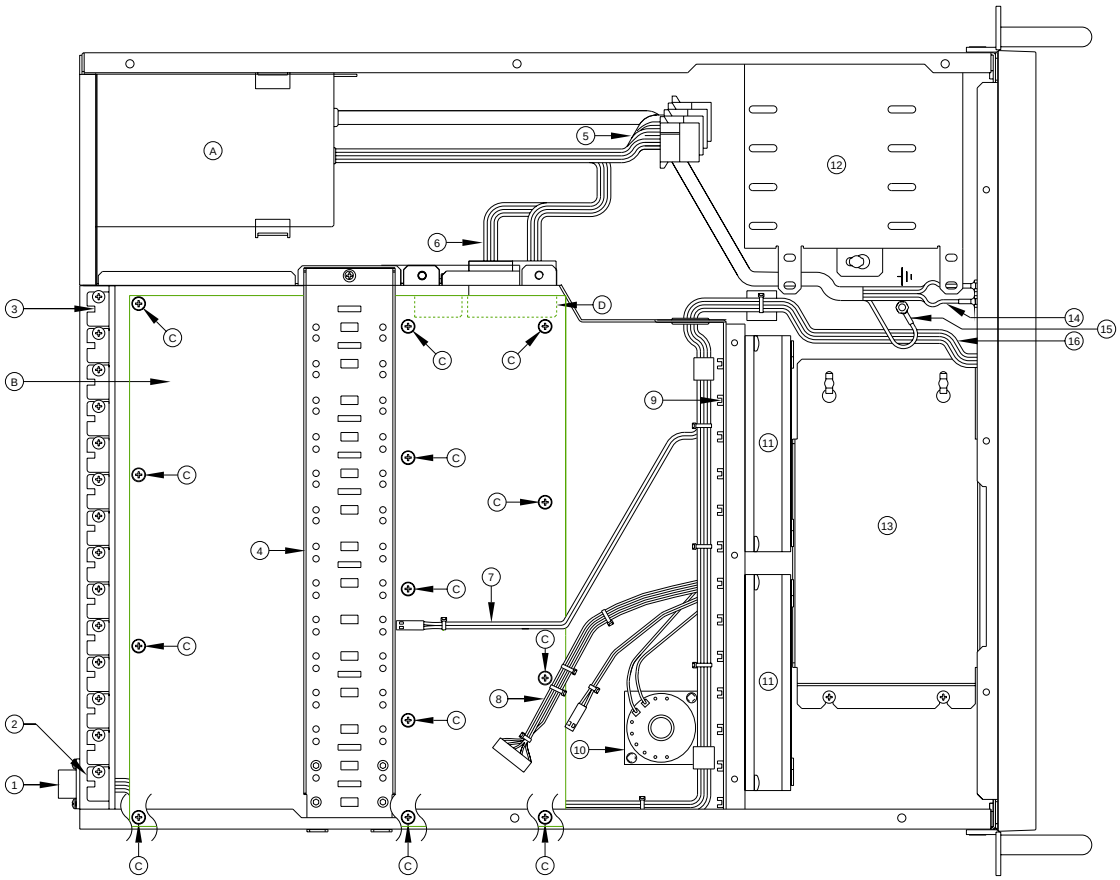


Figure 7 Internal Components and Functions



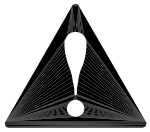
1. AT Keyboard Connector
2. Expansion Slot 1
3. Expansion Slot 14 (up to 14 available on backplane)
4. Expansion Card Retention Bracket
5. Peripheral Devices Power Cables
6. Passive Backplane Power Cables
7. IDE/SCSI Activity LED Cable (connect to SBC or controller)
8. Keyboard Cable (connect to SBC)
9. Card-End Slots (13)
10. Speaker
11. Cooling Fans (2)
12. User-Accessible Drive Bay
13. Auxiliary Drive Bay
14. Power Switch Cables (4)
15. Electrical Grounding Cable
16. Reset Button and IDE/SCSI Activity LED Cables (4)

A. Power Supply
B. Passive Backplane
C. Passive Backplane Mounting Holes
D. Passive Backplane Power Headers

Expansion Cards

Overview

Before installing expansion cards into the MP3600D (Figure 8), consult the documentation provided with each card. You should follow the manufacturer's instructions for installing the card.



To avoid damage or injury, always power-off the system and disconnect all power cords from their source before handling the equipment.
To help prevent accidental damage caused by static discharge, use a grounding wrist strap or other static-dissipating device when handling the equipment.

Card-End Slot

A full-length expansion card will reach from the expansion slot at the rear panel of the chassis to a card-end slot mounted on the partition bracket. The card-end slot reduces lateral movement of the expansion card and helps prevent its being dislodged.

Regardless of the length of the card, it can be secured by the retention bracket.

Retention Bracket

The expansion card retention bracket extends from the side of the chassis, across the tops of the expansion cards, to the top of the partition bracket. The retention bracket secures the expansion cards in place.

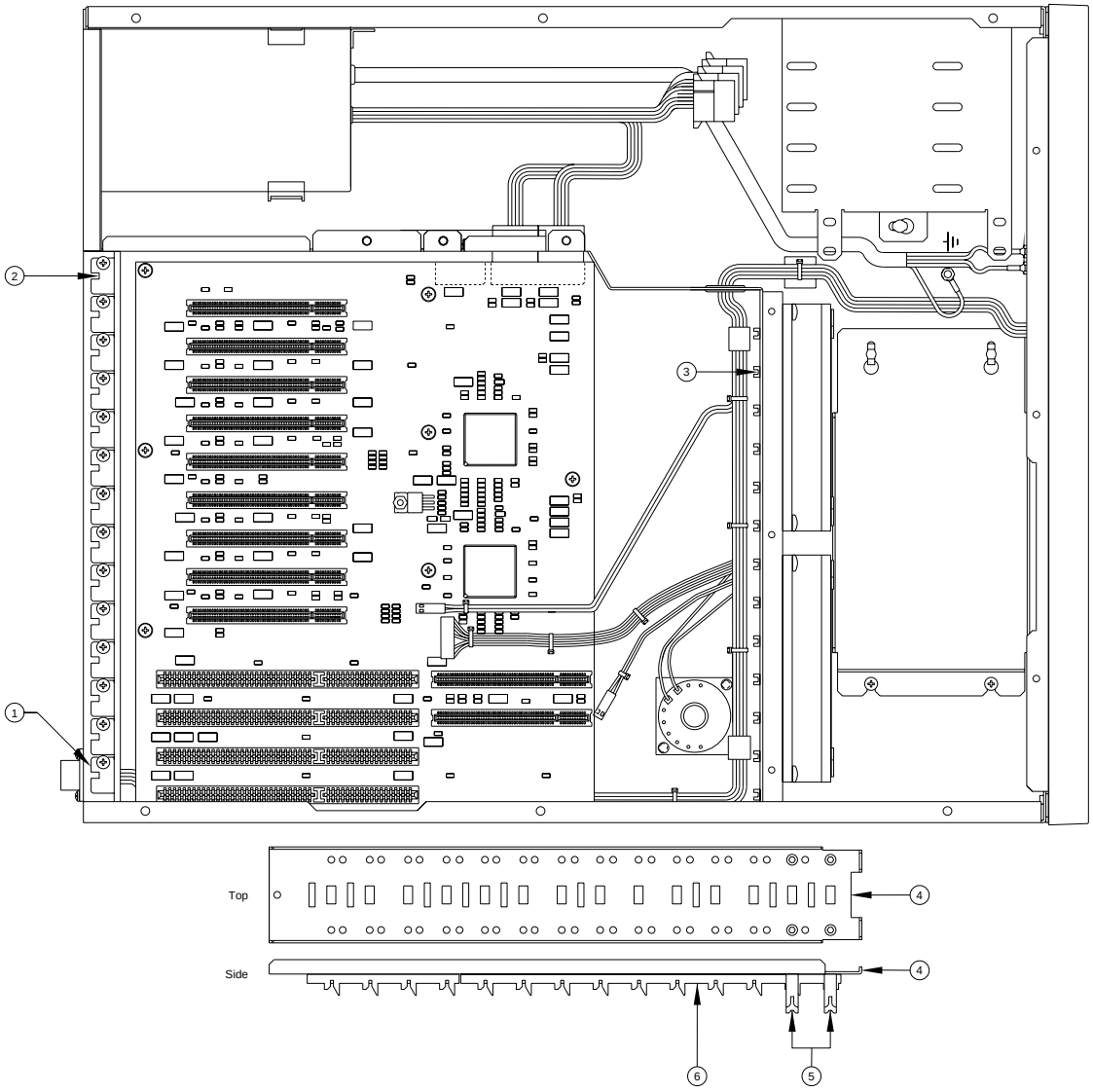
The retention bracket has two accessories:

- **Card Retention Cushion**: grips the top of full-height expansion cards.
- **Card Retention Clamp** (quantity 2): extends downward from the retention bracket to the top of an expansion card which does not reach the height of the bracket.
  Note: RadiSys provides an assortment of retention clamps to accommodate a variety of expansion cards with odd dimensions. For more information, contact your sales representative.

The retention cushion and clamps greatly reduce lateral movement of expansion cards and help prevent cards from being dislodged. The retention cushion and clamps are adjustable, each fitting a series of mounting holes along the length of the retention bracket.

Figure 8 Installing Expansion Cards

Note: This illustration shows the expansion card retention bracket removed and the BP13-C2P9 passive backplane installed.



1. Expansion Slot 1
2. Expansion Slot 14
3. Card-End Slots (13)
4. Expansion Card Retention Bracket
5. Card Retention Clamps (2)
6. Card Retention Cushion

Drives and Media

Overview

The following media can be installed in the MP3600D:

- Two 5¼” drives (user-accessible)
- Four 3½” drives (one user-accessible; three auxiliary)
- Two 2½” drives (auxiliary)

The chassis is designed to accommodate all conventional devices such as fixed and floppy disk drives, CD-ROM or tape drives, etc.

Installation

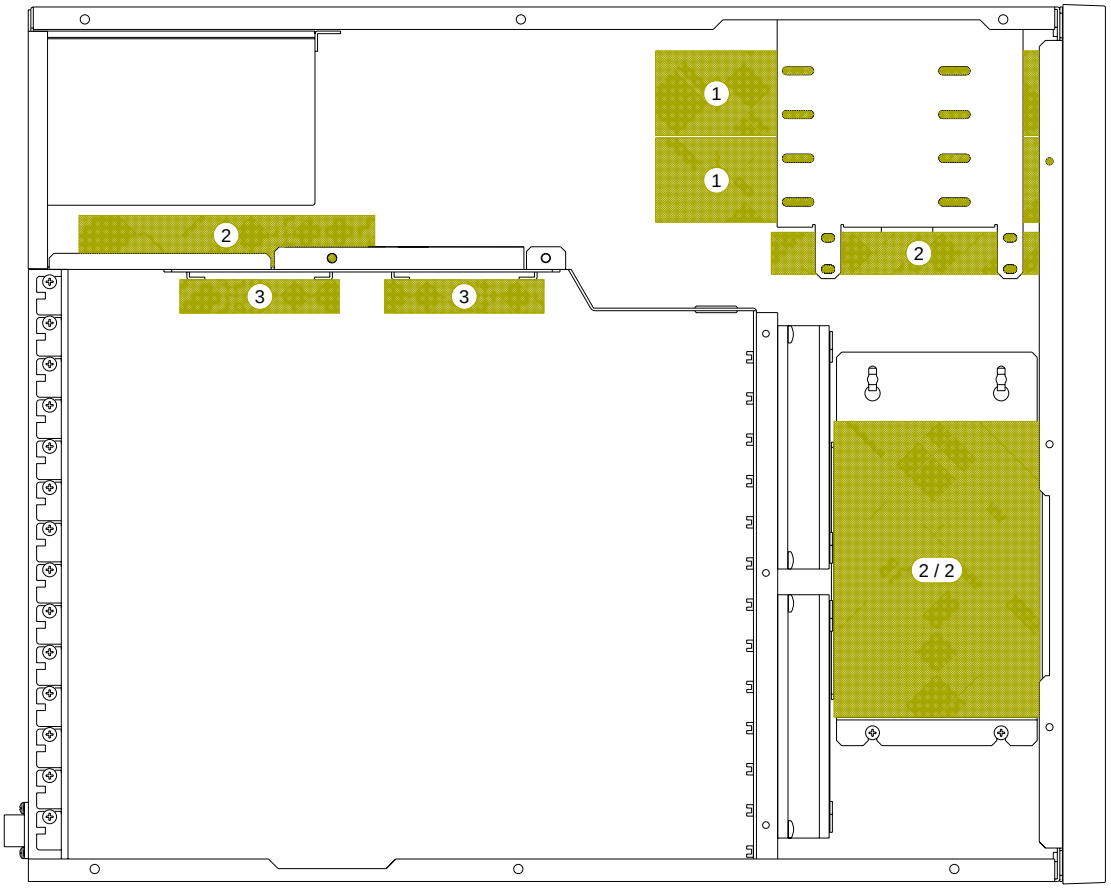
The chassis is designed for easy access and installation of media. Drives can be removed and installed with a minimum of time and effort (Figure 9).

More...

For more information, see the following:

- User-accessible drives, page 16
- Removable auxiliary drives, page 18
- Internal auxiliary drives, page 20

Figure 9 Drive Locations



1. 5¼” Drive
2. 3½” Drive
3. 2½” Drive

Drives and Media (continued)

User-Accessible Drives

The following media can be accessed from the front panel (Figure 10):

- Two 5¼” drives
- One 3½” drive

The procedure for installing user-accessible drives is outlined in the following table:

Step	Action
1	Install the drive(s) in the removable bay. **Note:** Orient the controller and power headers for each drive toward the *rear* of the chassis.
2	Lower the user-accessible bay to the floor of the chassis, aligning the keyhole bracket with the mounting tab on the floor of the chassis.
3	Slide the bay approximately ¼” (.635 cm) toward the front of the chassis. This will anchor the keyhole bracket against the mounting tab on the floor of the chassis.
4	Fasten the four screws through the side of the chassis to the bay. This will secure the bay in the chassis.
5	Connect the controller and power cables for each drive.

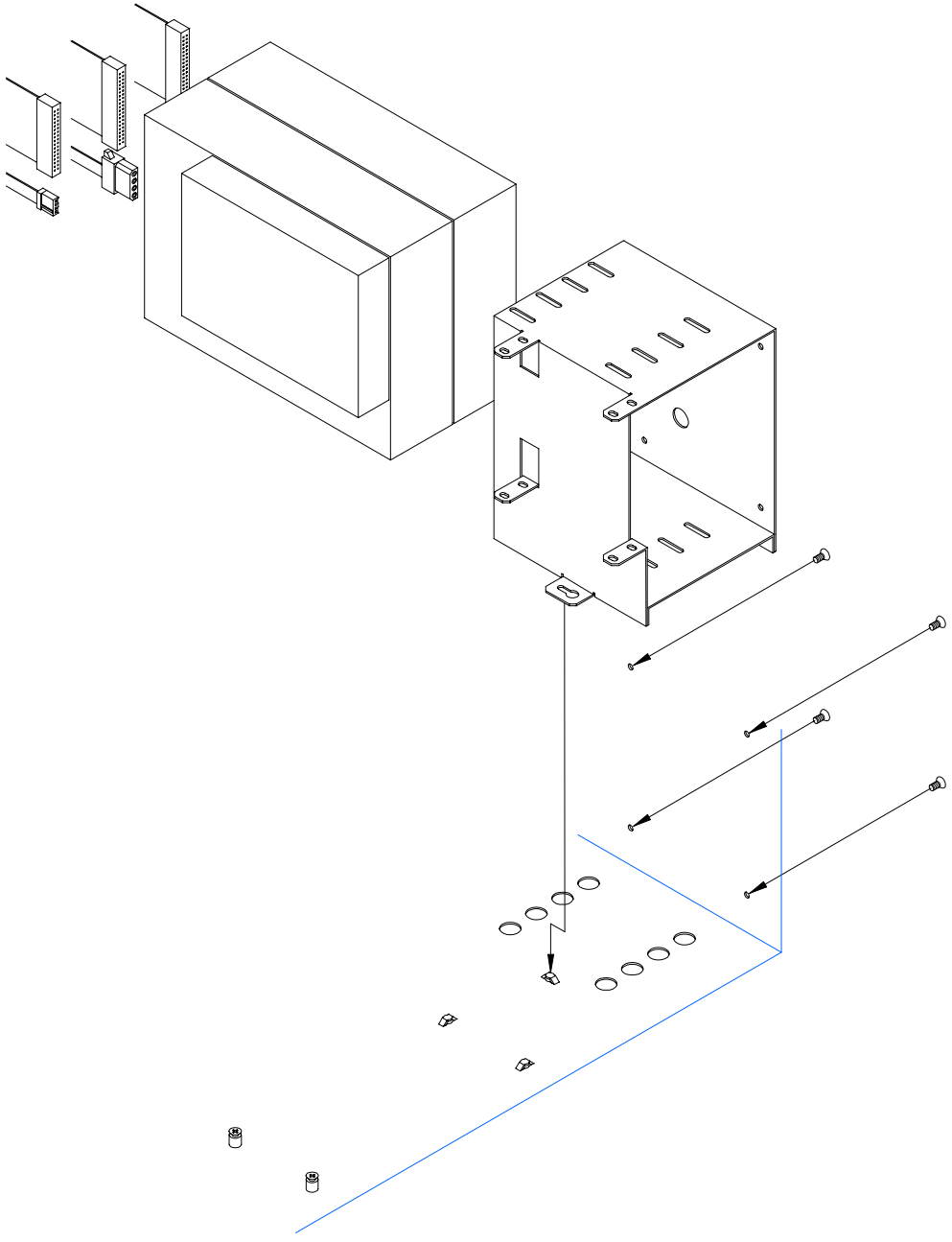
Drives can be installed in the user-accessible media bay when the bay is secured in the chassis. To install drives when the bay is secured in the chassis, use the access holes in the bottom of the chassis to reach the mounting screws for the each drive.

Drive Sizes

3½” drives can be installed in both the 5¼” and the 3½” bays in the following arrangements:

- **5¼” Bays**:1” (2.540 cm) or 1.6” (4.064 cm) high, using mounting rails
- **3½” Bay**:1” high

Figure 10 Installing the User-Accessible Drive Bay



Drives and Media (continued)

Removable Auxiliary Drives

Two 3½” drives can be installed in the removable auxiliary bay (Figure 11).

The procedure for installing drives in the removable auxiliary bay is outlined in the following table:

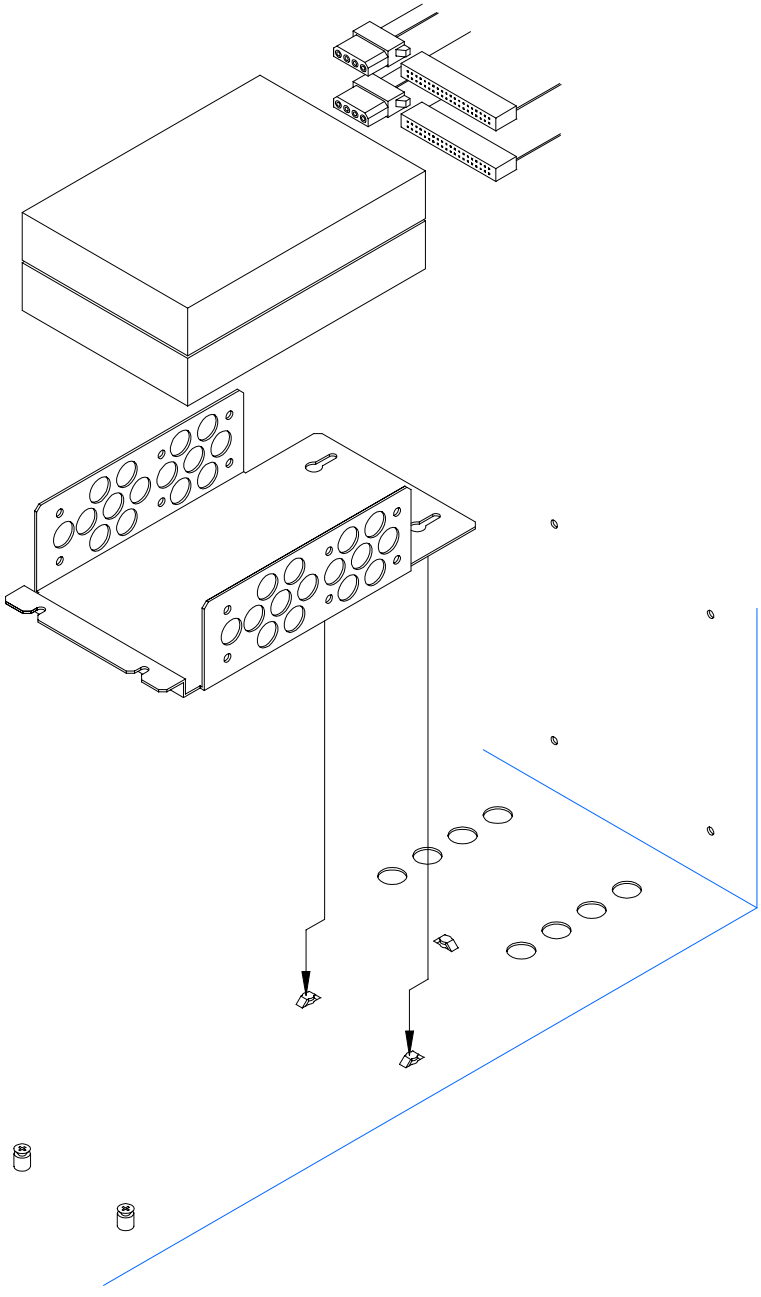
Step	Action
1	Install the drive(s) in the removable bay. **Note:** Orient the controller and power headers for each drive toward the *right side* of the chassis, toward the user-accessible drive bay.
2	Lower the auxiliary bay to the floor of the chassis, aligning the keyhole bracket with the two mounting tabs on the floor of the chassis.
3	Slide the bay approximately ¼” (.635 cm) toward the two mooring posts. This will anchor the keyhole bracket against the mounting tabs on the floor of the chassis.
4	Tighten the screws in the tops of the mooring posts. This will secure the bay in the chassis.
5	Connect the controller and power cables for each drive.

Drive Sizes

3½” drives of different heights can be installed in the removable auxiliary bay in the following arrangements:

- **Top Position**:1” (2.540 cm) or 1.6” (4.064 cm) high
- **Bottom Position**:1” high

Figure 11 Installing the Removable Auxiliary Drive Bay



Drives and Media (continued)

Auxiliary 3½" Drive

An additional 3½" drive can be installed in the chassis (Figure 12). This drive is mounted to the side of the partition bracket, toward the power supply.
Note: This drive cannot exceed 1" (2.540 cm) in height (thickness).

The procedure for installing the 3½" auxiliary drive is outlined in the following table:

Step	Action
1	If necessary, remove the 2½" drive mounting plate from the partition bracket. **Note:** See the procedure below.
2	Using four screws, mount the drive to the side of the partition bracket. **Note:** Orient the controller and power headers for the drive toward the *front* of the chassis.
3	Connect the controller and power cables for the drive.
4	If necessary, replace the 2½" drive mounting plate.

Auxiliary 2½" Drives

Two (2) 2½" drives can be installed in the chassis (Figure 13). These drives are installed on a plate that is mounted to the side of the partition bracket, toward the passive backplane.

The procedure for installing the 2½" auxiliary drives is outlined in the following table:

Step	Action
1	Remove the 2½" drive mounting plate from the partition bracket. **Note:** The mounting plate is secured to the partition bracket with six (6) snap rivets.
2	Using four screws for each drive, secure the drives to the mounting plate. **Note:** Orient the controller and power headers for each drive toward the *top* of the chassis.
3	Using six snap rivets, secure the mounting plate to the side of the partition bracket.
4	Connect the controller and power cables for each drive.

2½" drives typically require an adapter for the controller and power cables. The adapter supplies both the controller signal and power to a single header on the drive. For more information, see "Customer Support," page v.

Figure 12 Installing the 3½” Auxiliary Drive

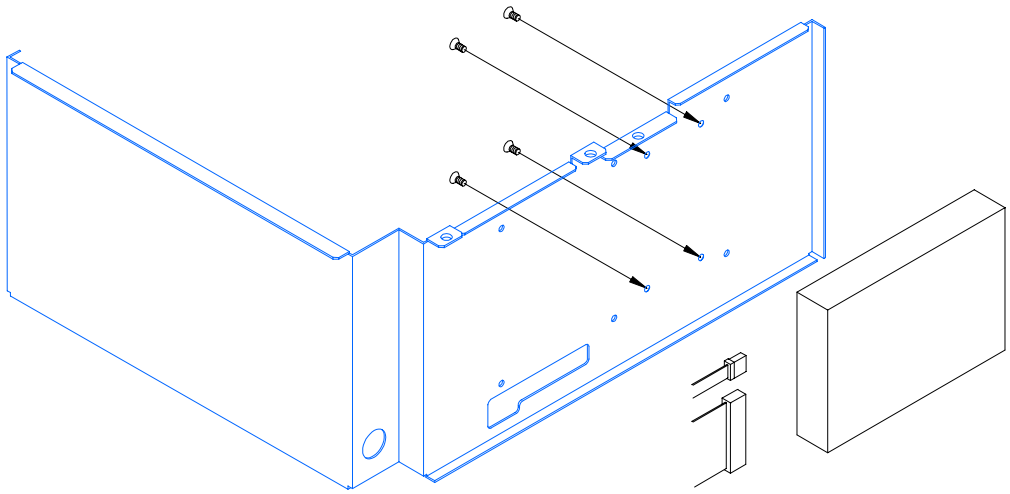
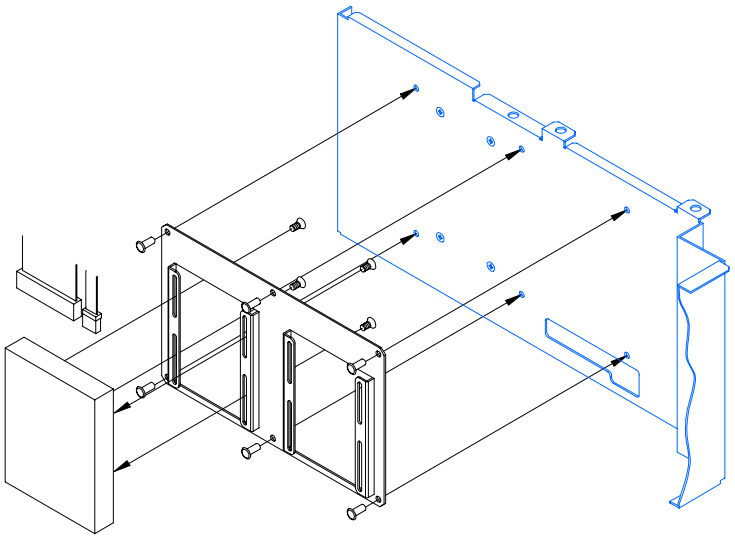


Figure 13 Installing the 2½” Auxiliary Drives



Model Components

Overview

The following components accompany each model of the MP3600D:

- Handles with mounting brackets for the rack-mount model
- Feet for the tower model

Screws for mounting components to the sides of the chassis should not exceed maximum .5” (12.7 mm), nominal .375” (9.525 mm). Screws longer than this can extend inward beyond the chassis walls and damage components installed inside.

Slide Rails

RadiSys provides a selection of slide rail kits that can be used for installing the MP3600D into a vertical cabinet or rack. These slide rails are all 85 lb. (38.59 kg) weight capacity, non-pivoting, and solid bearing.

The following slide rail kits from RadiSys will fit the MP3600D (Figure 15):

Kit	Cabinet Depth
SR1	20” (50.8 cm) **Note:** With the SR1 kit, the rear of the MP3600D will clear the front of the cabinet or rack by 1” when the slide rails are extended.
SR2	22" (55.88 cm)
SR5	24” (60.96 cm)
SR-EXT	6" (15.24 cm) Extender **Note:** This item can extend the length of the slide rails from 1 to 6 inches (2.54 to 15.24 cm).

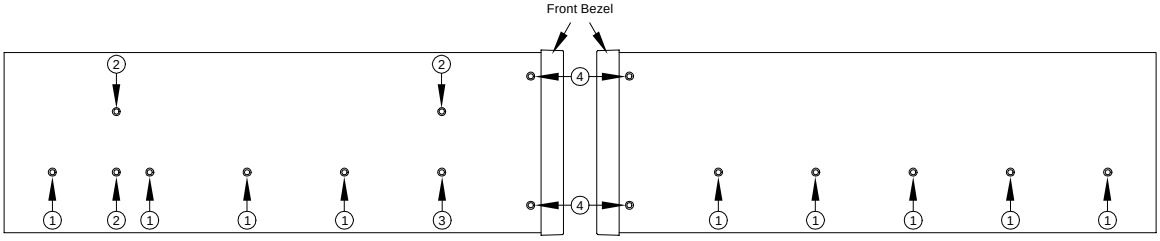
Rack Handles

Brackets can be mounted on the sides of the rack-mount MP3600D (Figure 15). The brackets can be used to secure the chassis to the cabinet or rack. Handles attached to these brackets protrude beyond the front of the chassis. These handles can be used to pull the chassis mounted on slide rails from a cabinet or rack.

Tower Feet

The tower model of the MP3600D is equipped with two 13” (33.02 cm) wide feet to increase the stability of the chassis while standing upright (Figure 16).

Figure 14 Mounting Holes for Model Components



1. Slide Rails
2. Tower Feet
3. Slide Rail / Tower Foot
4. Rack Handle Brackets

Figure 15 Installing Rack-Mount Handles and Slide Rails

Note: This illustration shows the DK36D Front Panel.

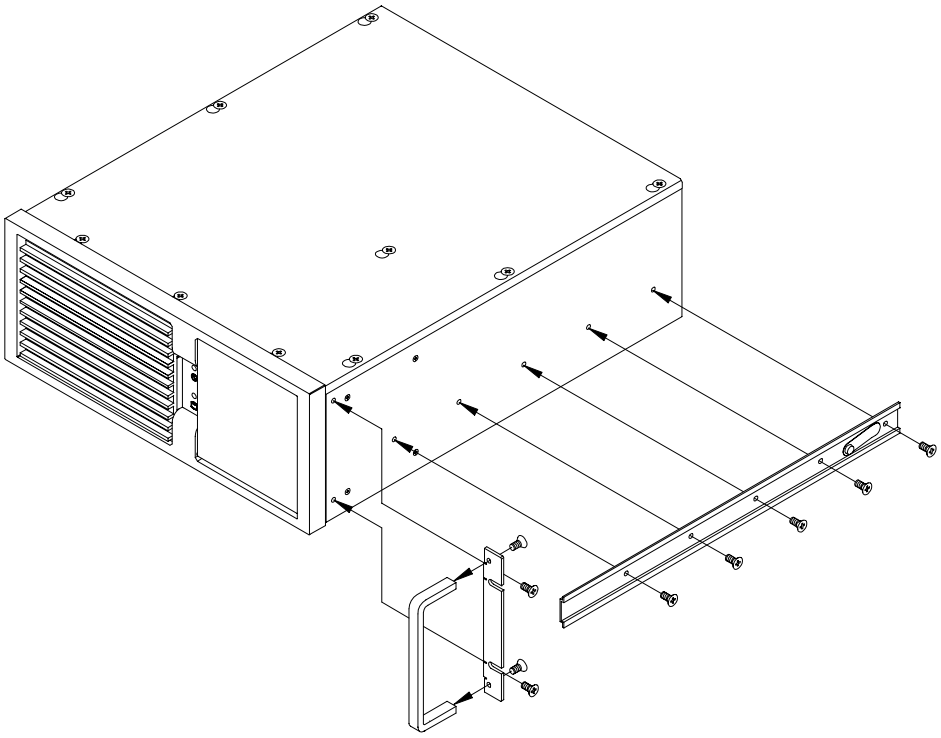
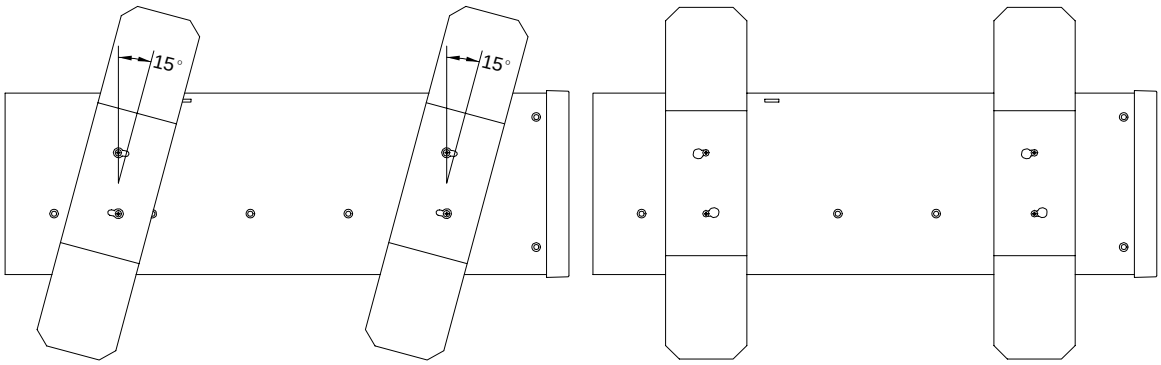


Figure 16 Installing Tower Feet



Notes