



FibreSTORE RAID System

Rack Installation Guide

Table of Contents

Table of Contents	1
Customer Support	2
Customer Service	2
Chapter 1 Introduction	3
Supported Rack Configurations	6
Safety Considerations	9
Preparing the Installation Site	10
Chapter 2 Installing in a Ciprico Rack	11
Overview	12
Step 1. Preparing the Rack	13
Step 2. Installing a Cache Retention Unit (CRU)	14
Step 3. Installing a Disk Enclosure	16
Step 4. Installing a Controller Enclosure	20
Step 5. Putting on the Filler Panels	23
Chapter 3 Installing in a Generic Rack	25
Overview	25
Step 1. Preparing the Rack	26
Step 2. Installing the Cache Retention Unit (CRU)	26
Step 3. Installing a Disk Enclosure	26
Step 4. Installing the Controller Enclosure	33

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Customer Support

For customer support within the United States, call 1-877-CIPRICO (1-877-247-7426), 8:00 am to 5:00 pm, CST, Monday through Friday. Then choose Option 2. After hours, Ciprico Support is on standby and will respond to customers as soon as possible. For customer support outside of the United States, call 01-763-551-4000, 8:00 am to 5:00 pm, United States CST, Monday through Friday. E-mail customer support at support@ciprico.com.

Customer Service

The following table lists Ciprico service options.

Service	Explanation
Hot Spares	Overnight replacement of failed parts. Currently available only in U.S. and Europe.
Hot Spares 8	Same-day (8 hour) replacement of failed parts. Currently available only in U.S.
Hot Spares 4	Same-day (4 hour) replacement of failed parts. Currently available only in U.S.
Safety Net Lite	On-site Ciprico spare parts; two of three sub-assemblies. Overnight replacement.
Safety Net	On-site Ciprico spare parts; full complement of sub-assemblies. Overnight replacement.
Spare purchase with Hot Spares	Customer purchases own spare parts. Hot Spares assures overnight replacement of failed parts. Currently available only in U.S. and Europe.
Advantage Support	Customized program for the large user. On-site Ciprico spare parts.
On-site Support	Full service, on-site, rapid support solutions. Currently available only within some areas of the U.S.
Warranty	3-year warranty.

Table 1: Ciprico Service Options

For more details on customer service programs, go to www.ciprico.com/service.html or contact your local Ciprico sales manager or Ciprico Inside Sales at 763-551-4000.



Chapter 1

Introduction

This manual provides step-by-step procedures for installing FibreSTORE RAID systems in a rack. A technician who has some experience installing computer hardware should be in charge of the installation. A second person should be available to help lift the components (disk enclosures, controller enclosures, and cache retention units), because they are heavy.

When you order the components and the rack at the same time, Ciprico installs the Support angles for each controller enclosure in the rack.

You may have purchased a component at a different time than you ordered the rack. In this case, you need to install the enclosure slide rails on a disk enclosure and/or the support angles for a controller enclosure.

This chapter includes:

- Back and front views of a rack with a RAID system installed.
- Layout of each supported rack configuration for RAID systems.
- Important procedures for safe and efficient operations.
- Information on the system components to help you select an appropriate site for the rack.

See Chapter 2 for instructions for installing disk enclosures, controller enclosures, and cache retention units (CRUs) in a FibreSTORE RAID rack.

See Chapter 3 for instructions for installing FibreSTORE RAID disk enclosures, controller enclosures, and cache retention units (CRUs) in a generic rack.

For information on cabling the FibreSTORE RAID and setting up the system, see the *FibreSTORE RAID System Installation Manual* (Ciprico Part No. 21021370).

Note Configurations not described in Ciprico Manuals can void your warranty. For more information, contact your sales representative.

Figure 1 shows the back view of a rack with a controller enclosure in the top position, five disk enclosures, and a CRU.

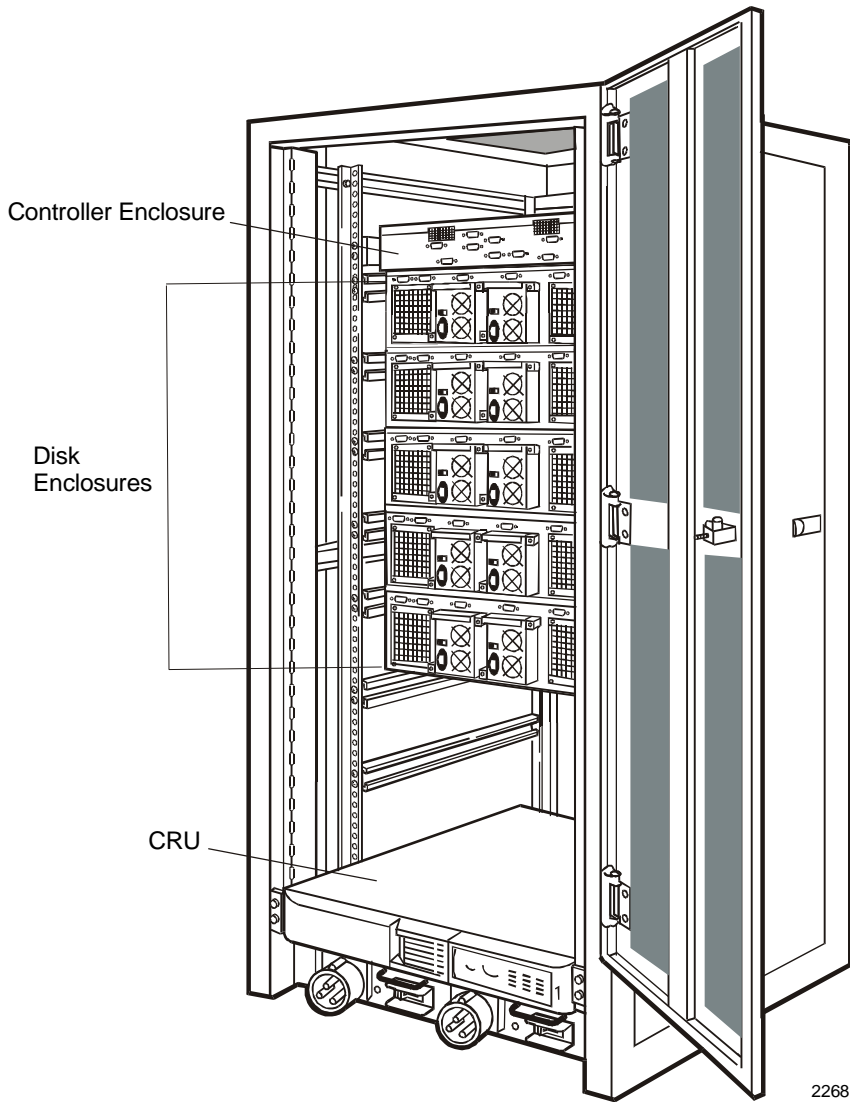
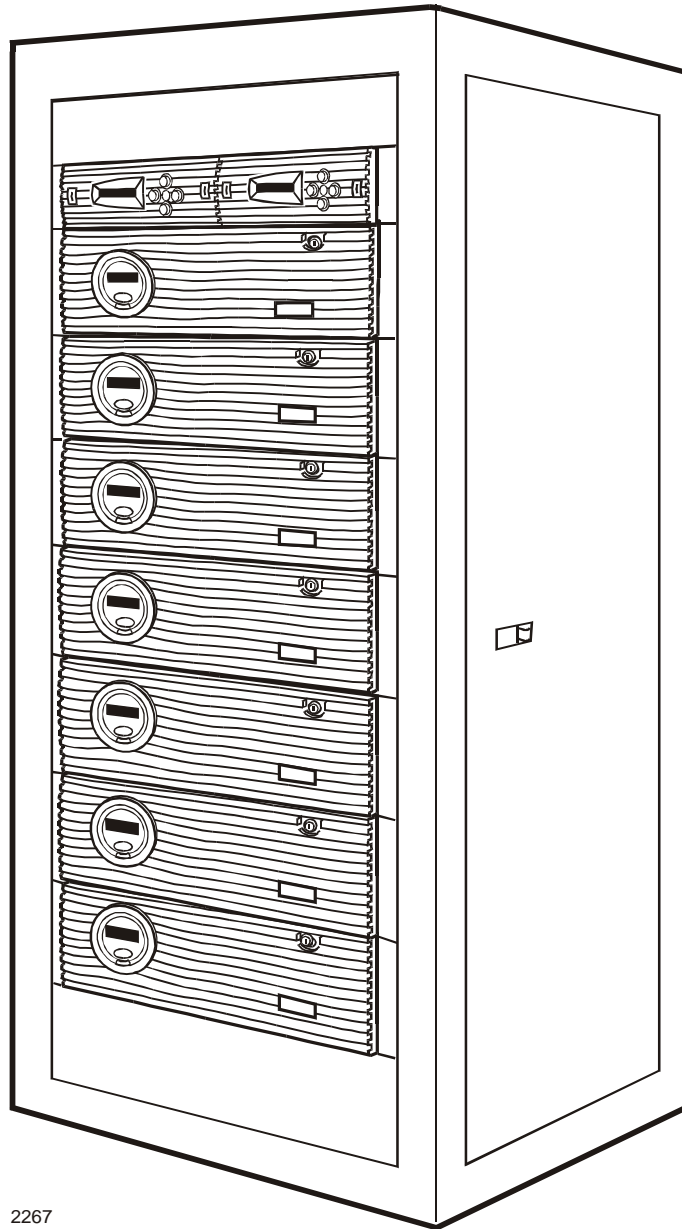


Figure 1. Back View of FibreSTORE RAID Rack

Figure 2 shows the front view of a rack with a controller enclosure in the top position and seven disk enclosures.



2267

Figure 2. Front View of FibreSTORE RAID Rack

Supported Rack Configurations

Ciprico supports four certified configurations of FibreSTORE RAID components in a Ciprico rack. The product numbers for these rack configurations are:

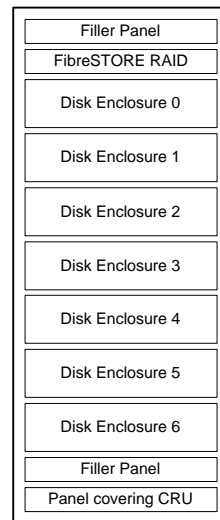
- AAMK36A
- AAMK36A2
- AAMK36A3
- AAMK36A4

In the following pages, each rack configuration is described for a fully-loaded rack. If your rack is not going to be fully loaded, leave the bottom slots empty and cover them with filler panels.

Configuration for One RAID System (AAMK36A)

Figure 3 shows a front view of a fully-loaded rack with:

- Filler panels. These should be located as shown in the figure to guarantee air flow for cooling.
- FibreSTORE RAID controller enclosure. This should be located in the top position.
- Disk enclosures. These should be installed directly below the FibreSTORE RAID controller enclosure. Any empty slots should be located near the bottom of the rack.
- The Cache Retention Unit (CRU) is always located at the bottom of the rack.



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Figure 3. AAMK36A Rack Configuration

Configuration for Two RAID Systems (AAMK36A2)

Figure 4 shows a front view of a fully-loaded rack with:

- Filler panels. These should be located as shown in the figure to guarantee air flow for cooling.
- Two FibreSTORE RAID controller enclosures.
- Disk enclosures. If you are using fewer than three disk enclosures in any System, leave the slot(s) at the bottom of that System empty.
- The two Cache Retention Units (CRUs) are always located at the bottom of the rack.

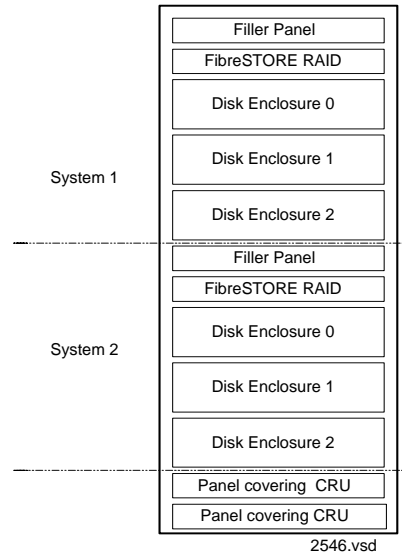


Figure 4. AAMK36A2 Rack Configuration

Configuration for Three RAID Systems (AAMK36A3)

Figure 5 shows a front view of a fully-loaded rack with:

- Three FibreSTORE RAID controller enclosures.
- Disk enclosures. If you are using fewer than two disk enclosures in any System, leave the slot at the bottom of that System empty.
- The three Cache Retention Units (CRUs) are always located at the bottom of the rack.

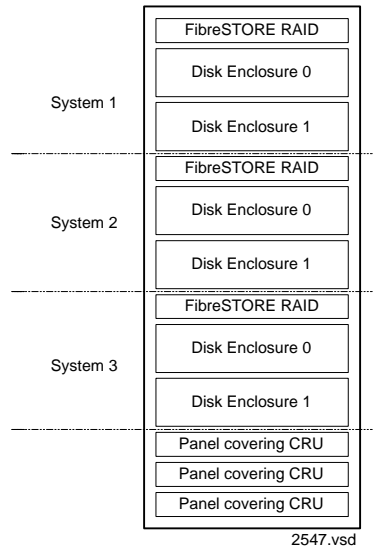


Figure 5. AAMK36A3 Rack Configuration

Configuration for Four RAID Systems (AAMK36A4)

Figure 6 shows a front view of a fully-loaded rack with:

- Filler panels. These should be located as shown in the figure to guarantee air flow for cooling.
- Four FibreSTORE RAID controller enclosures.
- Disk enclosures.
- The four Cache Retention Units (CRUs) are always located at the bottom of the rack.

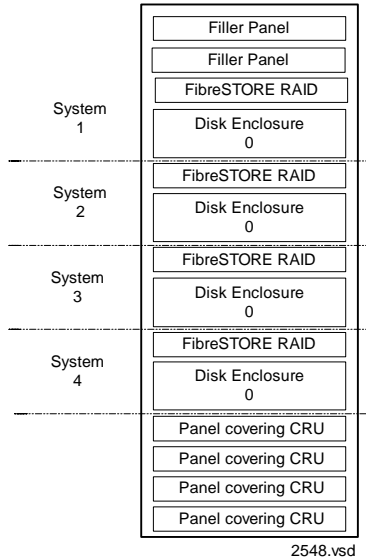


Figure 6. AAMK36A4 Rack Configuration

Safety Considerations

For safe and efficient operations, you should always install the components as shown in Supported Rack Configurations:

- Configuration for One RAID System (AAMK36A) on page 6.
- Configuration for Two RAID Systems (AAMK36A2) on page 7.
- Configuration for Three RAID Systems (AAMK36A3) on page 7.
- Configuration for Four RAID Systems (AAMK36A4) on page 8.

CAUTION To guarantee air flow for cooling the system, filler panels must be installed as shown in the configurations.

WARNING The disk enclosures, controller enclosures, and CRUs are heavy. Allow for two people to lift and move each of these components.

WARNING To avoid a top-heavy rack, never put a disk enclosure into the top rack slot. A controller enclosure, which weighs less than a disk enclosure, must always be in the top slot.

WARNING Never slide more than one rack component forward at the same time. This can cause the entire rack to become unstable.

Note Remember that there must be a disk enclosure located immediately beneath the controller for cabling.

Preparing the Installation Site

The first step for installing any FibreSTORE RAID system in any rack is to select an appropriate location for the rack. Use the information in Table 2 to prepare the site.

	Ciprico Rack	Disk Enclosure	Controller Enclosure	Cache Retention Unit
Dimensions	24" w x 77" h x 35" d (61 cm x 195.6 cm x 88.9 cm)	17" w x 7" h x 24" d (43.2 cm x 17.8 cm x 61 cm)	17.5" w x 3.5" h x 24" d (44.5 cm x 8.9 cm x 61 cm)	17.5" w x 3.5" h x 18" d (44.5 cm x 8.9 cm x 45.7 cm)
Weight	Approximately 400 lbs (181.4 Kg) empty; 1100 lbs (499 Kg) fully assembled	Approximately 80 lbs (37 Kg)	40 lbs (19 Kg) with dual controllers	65 lbs (30 Kg)
Power Requirements	200 - 240 VAC, 50/60 Hz, maximum 20 amps, single phase	100 - 120 / 200 - 240 VAC, 50 /60 Hz, 6/3 amps	DC input from FibreSTORE disk enclosure, maximum 60 watts	208 to 240 VAC, 6.5 amp maximum output
Operating Temperature	5° to 40° C (41° to 104° F) with 7,200 rpm drives 5° to 35° C (41° to 95° F) with 10,000 rpm drives			
Rack Plug Type	Dual Power cords have 30A 250V plugs NEMA L6-30P			
Cooling Requirements	Approximately 10,000 BTU/hr fully assembled			
Cable Entry	Rear, at bottom of rack			
Airflow	Through front of disk enclosures and out the top and back of rack			
Rear clearance	10 inches			
Front clearance	6 inches			
Top clearance	6 - 12"			
Side clearances	Ciprico rack has side doors - approximately 2 feet when fully open			

Table 2. Rack and Components Information



Chapter 2 Installing in a Ciprico Rack

Overview

This chapter provides instructions for installing disk enclosures, controller enclosures, and cache retention units (CRUs) in a Ciprico FibreSTORE RAID rack.

If you purchased your rack from a company other than Ciprico, see Chapter 3, *Installing in a Generic Rack*.

After reading the safety issues and preparing the installation site (see Chapter 1), complete the following steps to install the FibreSTORE RAID systems in a Ciprico rack:

1. Prepare the rack.
2. Install the CRUs.
3. Install the disk enclosures.
4. Install the controller enclosures.
5. Mount the filler panels.

Install all components as specified in *Supported Rack Configurations*:

Configuration for One RAID System (AAMK36A) on page 6;

Configuration for Two RAID Systems (AAMK36A2) on page 7;

Configuration for Three RAID Systems (AAMK36A3) on page 7;

Configuration for Four RAID Systems (AAMK36A4) on page 8

Step 1. Preparing the Rack

Ciprico ships racks with slide rails already installed in the rack.

1. Remove packaging from the rack.
2. Roll the rack to the place of operation.

Make sure there is ample space in back of the rack to fully open the rack door (approximately 3 feet) for installation and cabling. Make sure you have enough room in front of the rack (approximately 3 feet) to install disk enclosures.

You can access the components in the rack from the side by opening the doors on both sides of the rack.

Step 2. Installing a Cache Retention Unit (CRU)

The CRU is shipped without mounting brackets on it; you must install them before inserting the CRU in the rack. The install kit for the CRU contains the parts you need to mount the brackets and to attach the CRU to the rack.

Ciprico ships the rack with the CRU support angles installed in the rack.

Install the CRU from the back of the rack.

1. Remove the packaging from the CRU.
2. Install mounting brackets on both sides of the CRU as shown in Figure 7. (Instructions are contained in the CRU install kit.)
3. Open the back door of the rack.
4. Using the CRU install kit, insert four cage nuts (two nuts on each side of the rack) above the support angles over the power distribution units. Align the cage nuts with the screw slots in the CRU mounting bracket. See Figure 7.

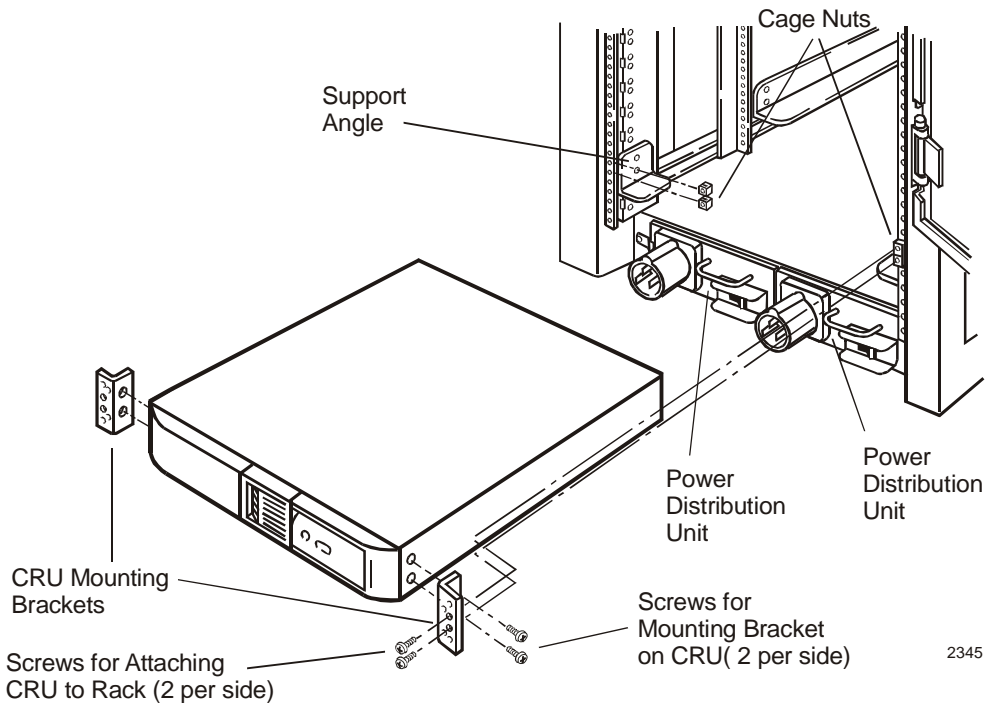


Figure 7. Installing a CRU

5. Rest the CRU on the support angles above the power distribution units, and slide the unit back and into place. See Figure 8.

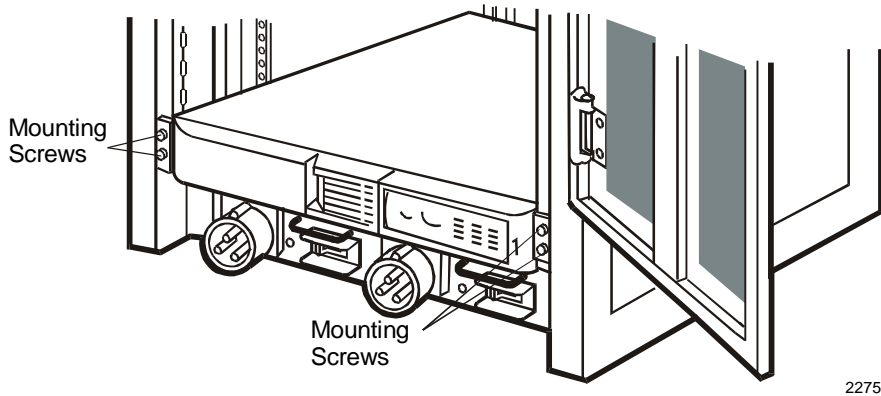


Figure 8. CRU Screwed into the Rack

Step 3. Installing a Disk Enclosure

Before you can install the disk enclosure, you must first remove the enclosure slide rails from the rack, then you need to attach the enclosure slide rails to the disk enclosure(s). Instructions for this procedure are provided below.

Removing Enclosure Slide Rails from the Rack

The slide rails are delivered already mounted in the flange mounts on the rack. You must remove the slide rails from the rack and attach them to the disk enclosure.

Open the side doors, as this is the easiest way to access enclosure slide rails, which are mounted in the stationary flange mounts. See Figure 9.

1. Pull the left slide rail forward in the flange mount until the lock button locks into place.
2. Press in the button on the back of the slide rail (1) to unlock it from the stationary flange mount, and slide it out until it stops.

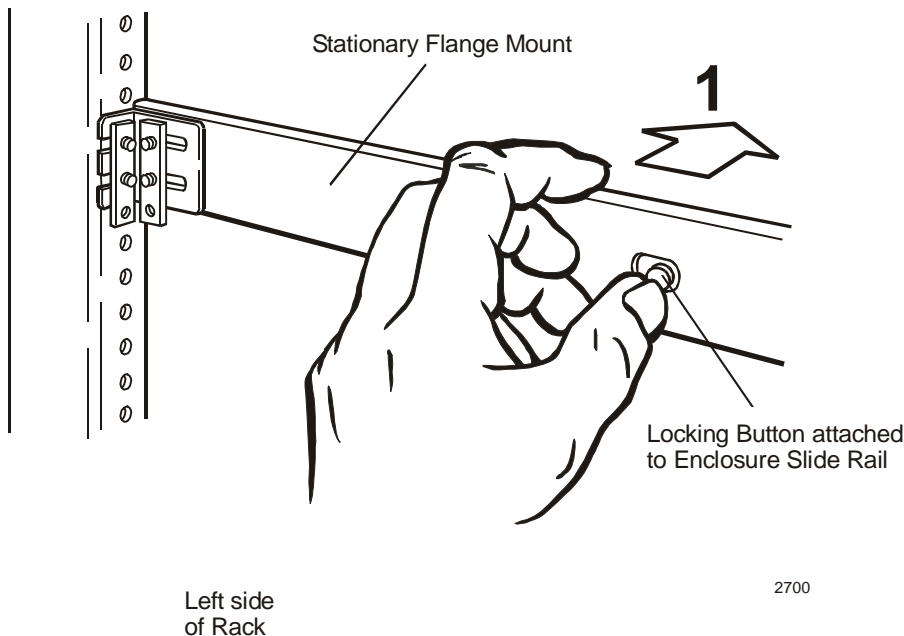


Figure 9. Releasing the Lock Button from the Lock Button Mating Hole

- Using caution, push the tab (2) and pull the slide rail completely out of the stationary flange mount (3), as shown in Figure 10.

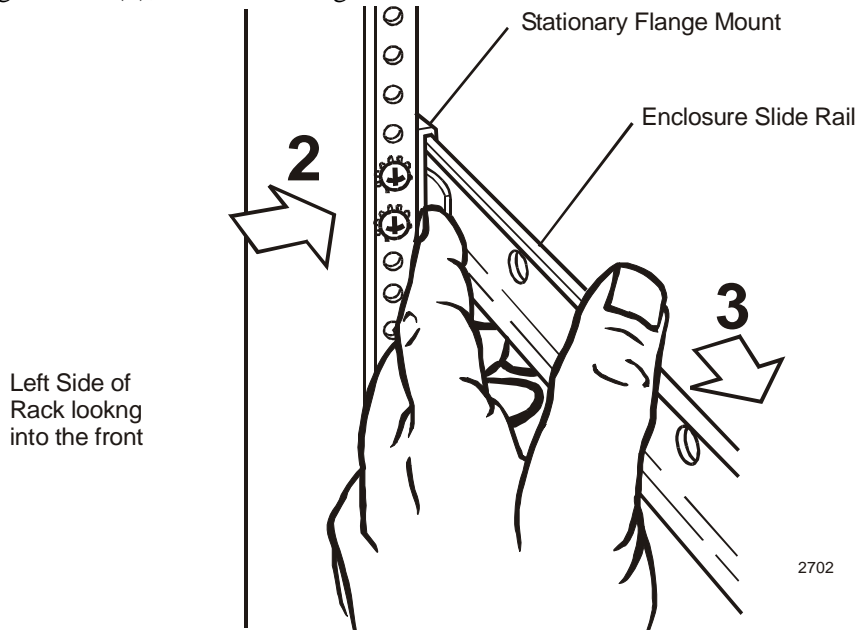


Figure 10. Removing Enclosure Slide Rail from Stationary Flange Mount

WARNING Be very careful, not to pinch your fingers when completing this step.

- Repeat steps 1 - 3 for the right side.
- Install one slide rail on each side of the disk enclosure, as shown in Figure 11. Position the lock button assembly to the rear. Secure the slide rails, using five 3/8" #10-32 pan head screws for each slide rail.

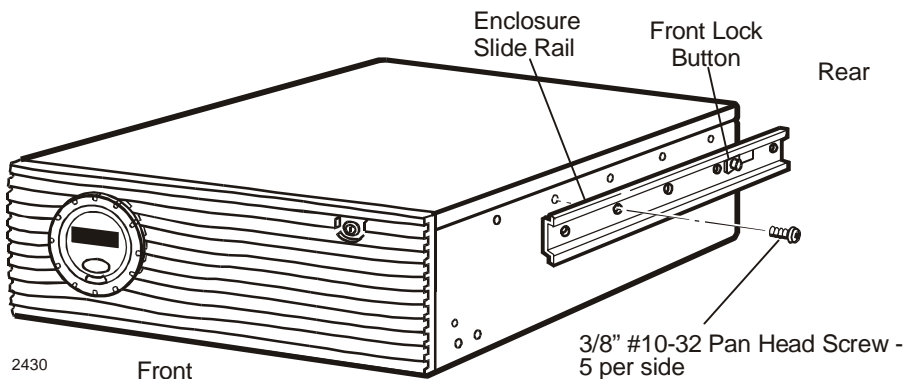


Figure 11. Disk Enclosure Rack Mount Components

Installing a Disk Enclosure in the Rack

Install the disk enclosures from the front of the rack, load enclosures from the top down, starting underneath the controller enclosure.

1. Align the slide rails mounted on the disk enclosure with the stationary flange mounts on the rack, as shown in Figure 12.

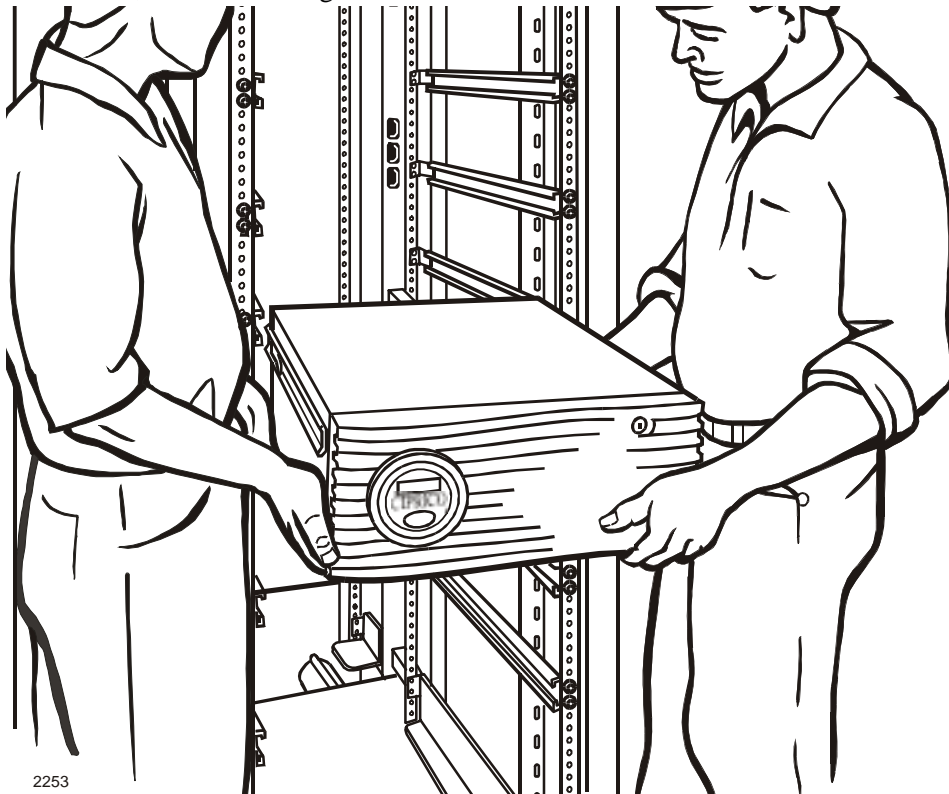


Figure 12. Lifting Disk Enclosure and Aligning Enclosure slides

2. Slowly slide the enclosure slide rails into the flange mounts on the rack. If enclosure does not fit, adjust the Stationary Flange Mounts to fit the enclosure into the rack, as follows:
 - a. Remove enclosure that does not fit into place.
 - b. Loosen both Front and Rear Stationary Flange Mount mounting screws (refer to Figure 13) on both the right and left sides of the rack for that enclosure. Adjust the Stationary Flange Mounts, then secure mounting screws.
 - c. Repeat steps 1 and 2 until enclosure fits into rack.

- Using caution, push in the tabs for the lock buttons located on each slide rail that is mounted on the disk enclosure (Figure 13), and slide the enclosure in until the lock buttons fit securely into the mating holes in the flange mount. You should hear a click when the lock buttons slide into the mating holes.

WARNING Be very careful not to pinch fingers when completing this step.

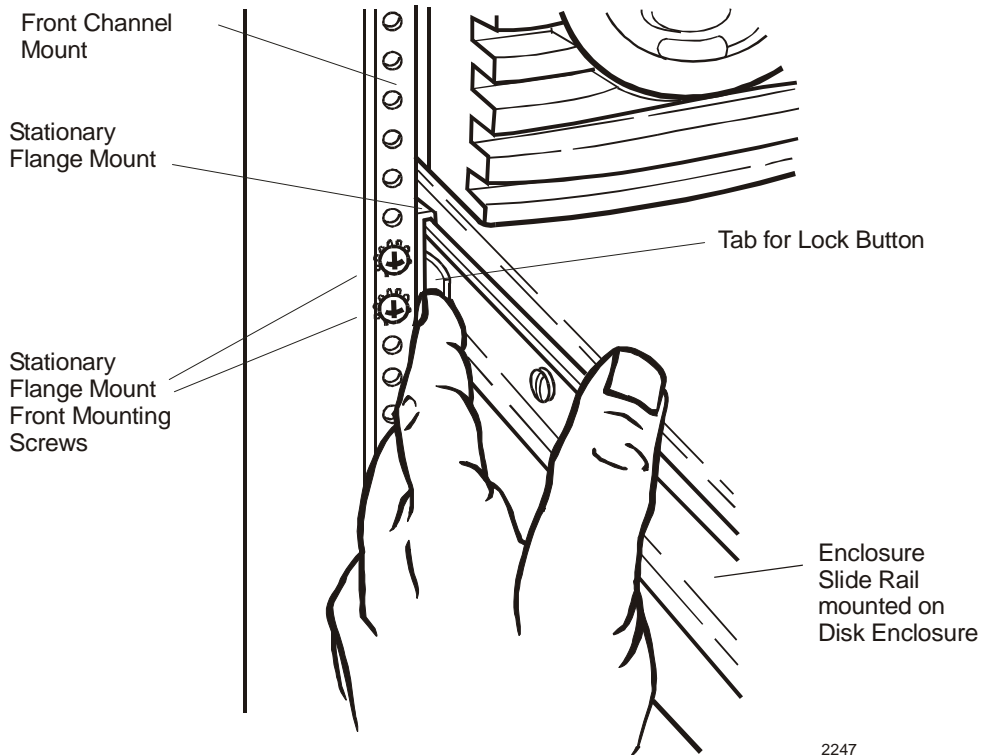


Figure 13. Adjusting Lock Buttons on Slide

- Open the side doors and push the lock buttons. Slide enclosure into position
- Repeat steps 1 - 4 for each enclosure.

Step 4. Installing a Controller Enclosure

When you order the controller enclosure and the rack at the same time, Ciprico ships the rack with the controller enclosure support angles and cage nuts that correspond to the rack configuration you ordered already installed in the rack. In this situation, skip the next procedure and go directly to Installing Mounting Brackets on page 22.

Attaching Controller Enclosure Support Angles

If you are installing an additional controller enclosure in a rack that was not originally configured to include this controller, you need to attach support angles in the rack. This situation can arise if, for example, you originally ordered an AAMK36A rack and now want to convert it to an AAMK36A2. In this situation, order the controller enclosure mounting kit when you order the controller enclosure.

Install all controllers as specified in Supported Rack Configurations:

- Configuration for One RAID System (AAMK36A) on page 6;

- Configuration for Two RAID Systems (AAMK36A2) on page 7

- Configuration for Three RAID Systems (AAMK36A3) on page 7;

- Configuration for Four RAID Systems (AAMK36A4) on page 8

Note To install support angles, you may have to remove disk enclosures or rails.

1. Attach the rear bracket to the support angle with four 1/2" #10-32 screws. (Figure 14 shows a right support angle.)

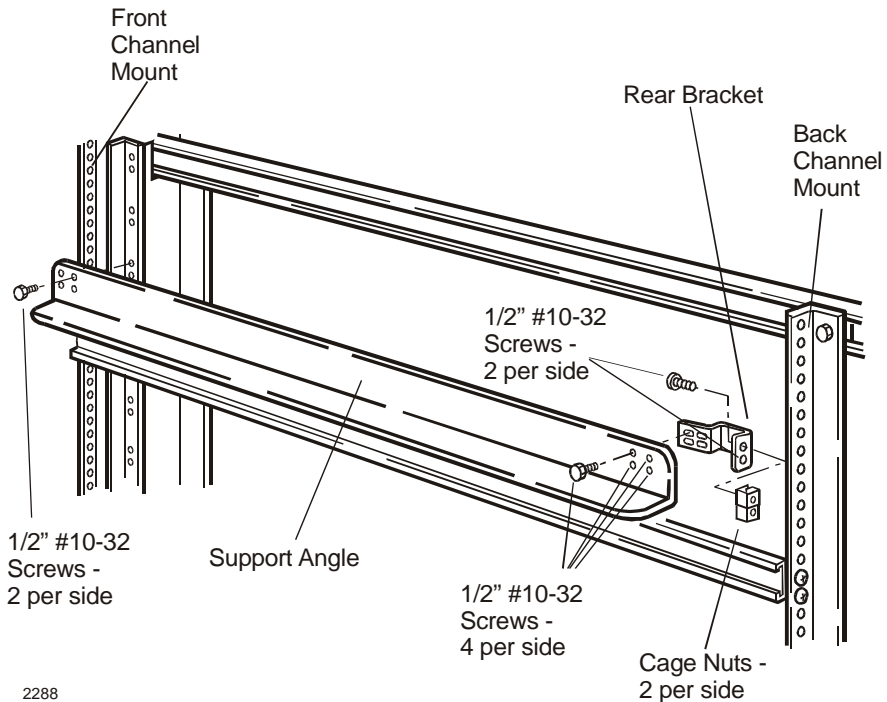


Figure 14. Installing Support Angles

2. Install the front end of a support angle into matching holes at the front of the rack with two 1/2" #10-32 screws.
3. Insert two cage nuts onto the back channel mount over the holes you aligned.
4. Align the rear (bracketed) end of the support angle with the holes in the back channel mount.
5. Fasten the rear bracket attached to the back of the support angle with two 1/2" #10-32 screws through the cage nuts.
6. Repeat steps 1 - 5 to attach the other support angle to the rack. The left support angle should mirror the right and be at the same height.

Installing Mounting Brackets

A controller enclosure is shipped without the mounting brackets installed; you must install them before you install the controller enclosure in a rack. The Ciprico-provided install kit contains the parts you need to attach the mounting brackets to the controller enclosure and the enclosure to the rack.

Install the controller enclosure from the front of the rack.

1. Attach the brackets on both right and left sides of the controller enclosure with three counter-sunk Phillips head 1/4" #6-32 screws, as shown in Figure 15.
2. Align the slots on the mounting brackets of the controller enclosure with the cage nuts as shown in Figure 15.

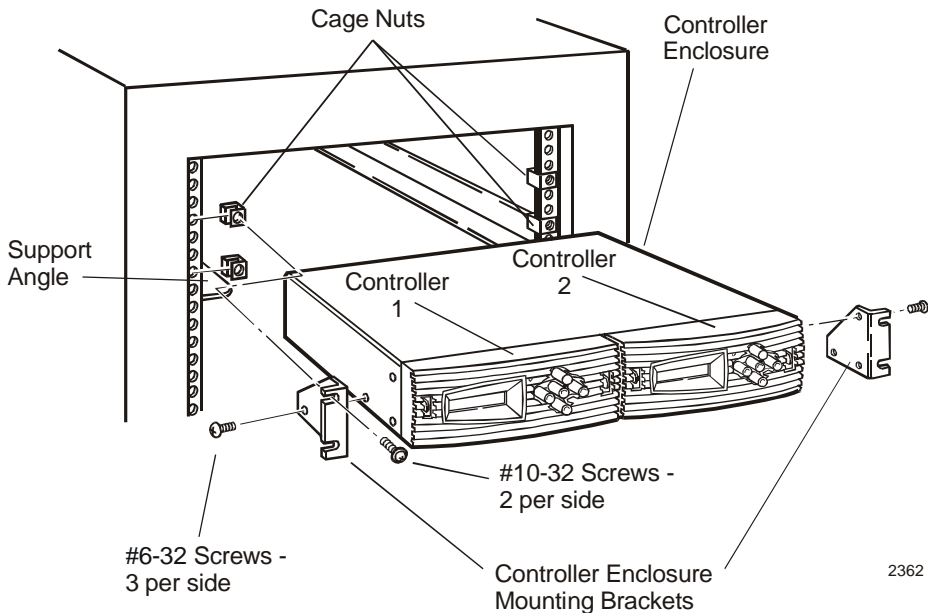


Figure 15. Installing the Controller Enclosure in a Ciprico (Hoffman) Rack

3. Rest the controller enclosure on the support angles and slide the enclosure back and into place.
4. Secure the controller enclosure to the rack with four 1/2" #10-32 (2 per side) screws in the cage nuts as shown in Figure 15.

Step 5. Putting on the Filler Panels

This step finishes off the front of the rack so that no openings show.

Put the panels in place as shown in Figure 16. Each panel has magnetic strips on the back side so that they easily adhere to the rack.

1. Put horizontal panels wherever there is an open slot or half slot. There are two sizes of horizontal panels: the half-high cover goes above the controller enclosure; the full-size panel goes over any empty disk enclosure slot.
2. Put vertical panels over all of the rack channel mounts.

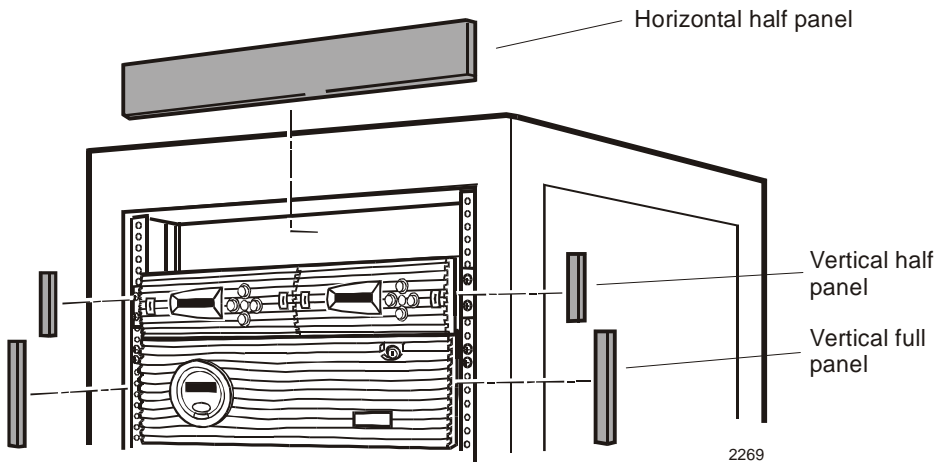


Figure 16. Putting on Filler Panels



Chapter 3

Installing in a Generic Rack

Overview

This chapter provides instructions for installing FibreSTORE Raid disk enclosures, controller enclosures, and cache retention units (CRUs) in a generic rack. Ciprico rack mounting kits are designed for racks that comply with the Radio Electronics Television Manufacturers Association (RETMA) and Electronics Industry Association (EIA) hole patterns and standard depths.

If you have a Ciprico rack, see Chapter 2, *Installing in a Ciprico Rack*.

After reading the safety issues and preparing the installation site (see Chapter 1), complete the following steps to install the FibreSTORE RAID into a generic rack:

1. Prepare the rack.
2. Install the CRUs.
3. Install the disk enclosures.
4. Install the controller enclosures.

Install all components as specified in *Supported Rack Configurations*:

Configuration for One RAID System (AAMK36A) on page 6;

Configuration for Two RAID Systems (AAMK36A2) on page 7;

Configuration for Three RAID Systems (AAMK36A3) on page 7;

Configuration for Four RAID Systems (AAMK36A4) on page 8

Step 1. Preparing the Rack

Make sure there is ample space in back of the rack to fully open the rack door (approximately 3 feet) for installation and cabling. Make sure you have enough room in front of the rack to install disk enclosures (approximately 3 feet).

Step 2. Installing the Cache Retention Unit (CRU)

The install kit for the CRU contains the parts and instructions you need to install the CRU. Follow the instructions in the CRU install kit.

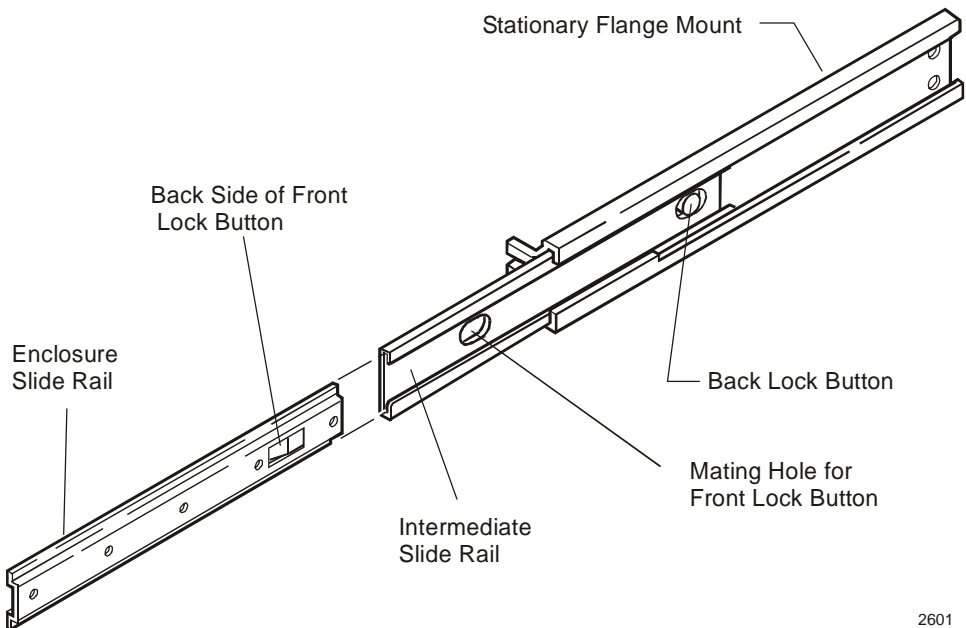
Step 3. Installing a Disk Enclosure

Ciprico ships a generic disk enclosure install kit that contains the parts needed to attach the enclosure slide rails to the disk enclosure and the stationary flange mounts in the rack.

Install the disk enclosure from the front of the rack.

Installing Slide Rails on a Disk Enclosure

1. Unpack the generic disk enclosure installation kit.
2. Slide the right and left intermediate slide rails forward until the back lock button mating hole stops at the back lock button.
3. Slide both enclosure slide rails forward until the front lock buttons stop at the front lock button mating holes. Push the front lock button to release the enclosure slide rail, and remove both enclosure slide rails from the intermediate slide rails. See Figure 17.



2601

Figure 17. Generic Disk Enclosure Installation Kit Slides

4. Push the back lock buttons and position the intermediate slide rails back in the center of both stationary flange mounts.

5. Install one enclosure slide rail on each side of the disk enclosure, as shown in Figure 18. Position the lock button assembly close to the rear of the disk enclosure. Use five 3/8" #10-32 pan head screws to secure each enclosure slide rail to the disk enclosure.

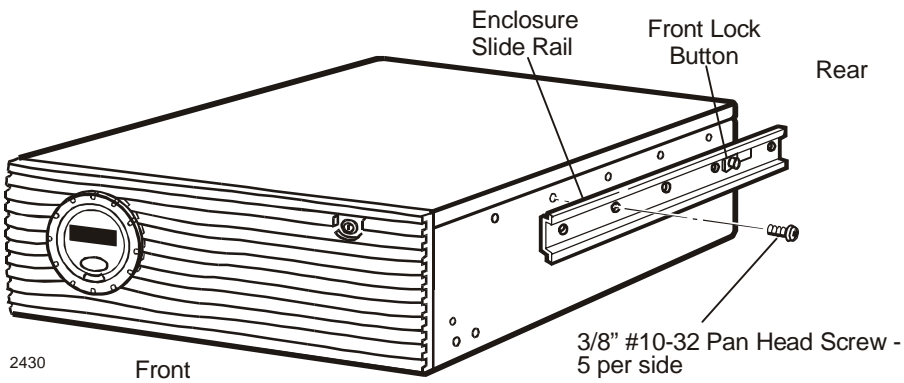


Figure 18. Disk Enclosure Rack Mount Components

Installing the Stationary Flange Mount in the Rack

1. Loosely fasten the left side rack mount bracket (use extension bracket if necessary) to the left side stationary flange mount with two screws and one bar nut*, as shown in Figure 19. Adjust the length of the stationary flange mount/rack mount bracket assembly to fit between the front and back channel mounts. Secure the screws holding the stationary flange mount to the rack mount bracket.

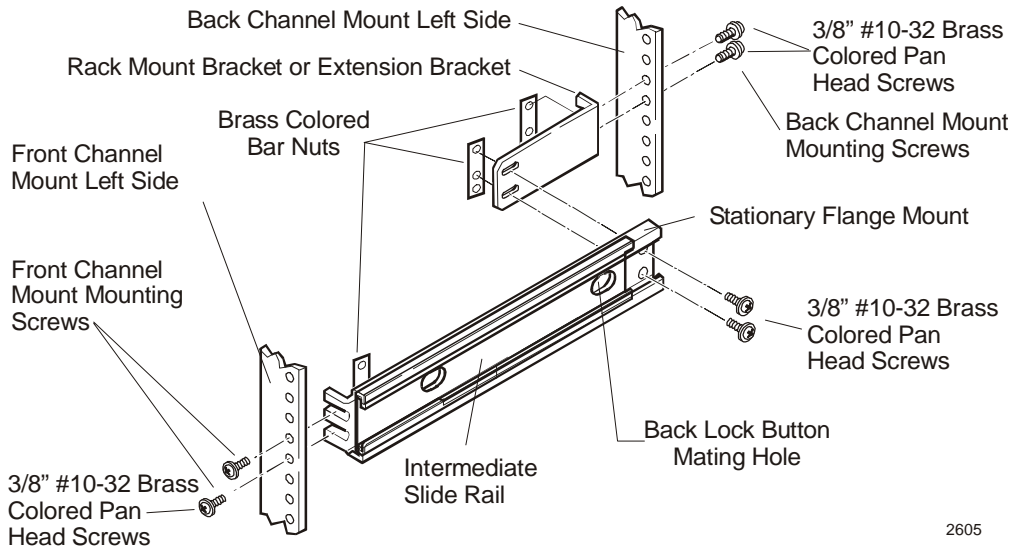


Figure 19. Stationary Flange Mount Slide Assembly

2. Position the intermediate slide rail within the stationary flange mount/rack mount bracket assembly with the back mating hole farthest from the back lock button, and center it within the stationary flange mount/rack mount bracket assembly.
3. Position the stationary flange mount/rack mount bracket assembly on the left side of the rack just beneath the enclosure location above (load rack from top down).
4. Hold the stationary flange mount/rack mount bracket assembly in a between the front and back channel mounts. Secure one bar nut with two screws to hold the stationary flange mount/rack mount bracket assembly in place for the front mounting channel, and secure one bar nut with two screws for the back mounting channel.
5. Repeat steps 1 - 4 on the right side.

* If your generic rack has square holes on the channel mounts, contact the original rack manufacturer or your model shop for installation assistance.

Installing Disk Enclosures into a Rack

1. Slide the intermediate slide rails forward until the back lock button stops at the back button mating hole.
2. Align the enclosure slide rails mounted on the disk enclosure with the intermediate slide rails, which are extended from the stationary flange mounts that are secured to the rack.

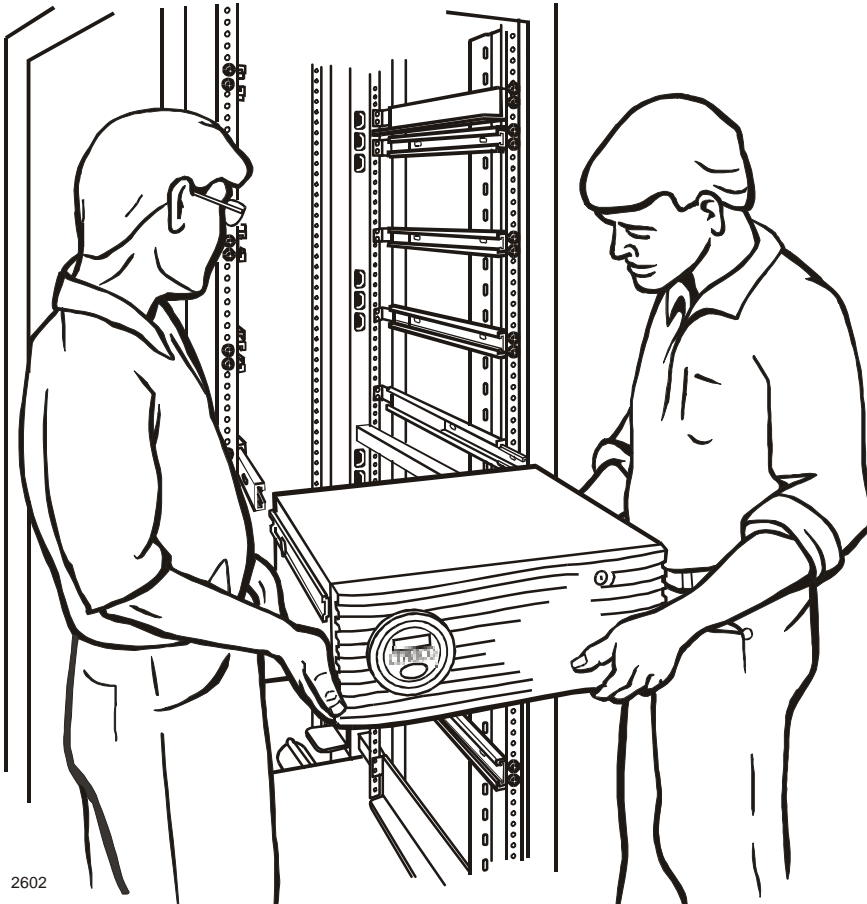


Figure 20. Aligning Disk Enclosure Slides

3. Slowly slide the enclosure slide rails into the intermediate slide rails until the front lock button prevents you from sliding further.

- Using caution, push in the tabs for the front lock buttons located on the enclosure slides mounted on the disk enclosure (see Figure 21), and slide the enclosure in until the front lock buttons fit securely into the front lock button mating holes on the intermediate slide rail.

WARNING Be very careful not to pinch fingers when completing this step.

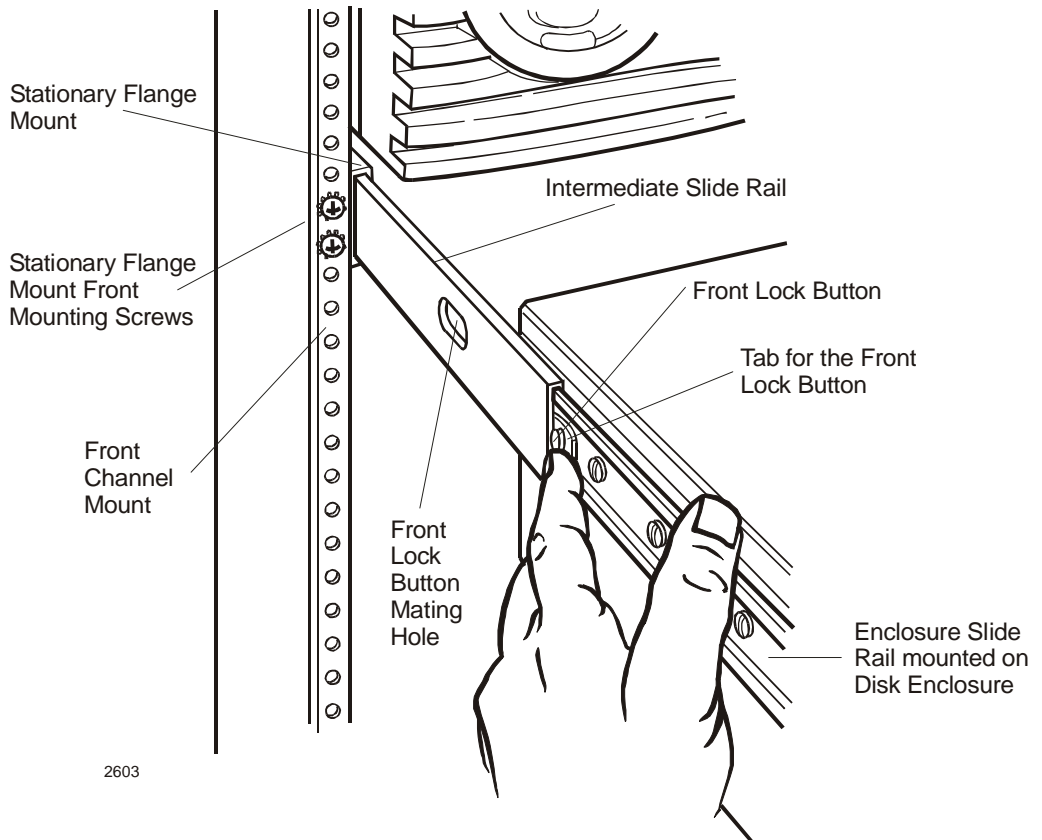
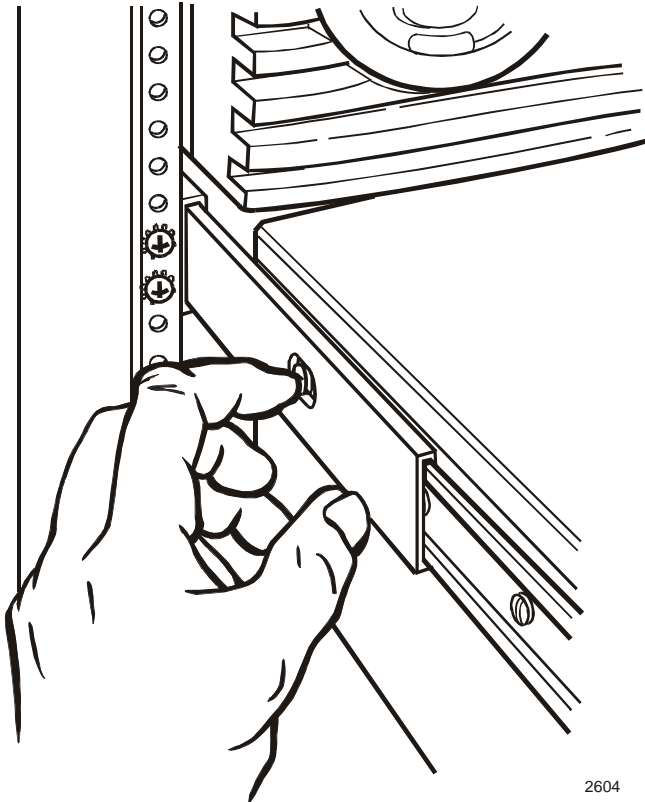


Figure 21. Releasing Lock Buttons on Enclosure Slide

5. Push in the front lock buttons that are secured by the front lock button mating holes, and slide the disk enclosure back until it stops at the back lock buttons. See Figure 22.



2604

Figure 22. Releasing Disk Enclosure Front Lock Button

6. Open the side doors and push in the back lock buttons that are held by the back lock button mating holes, and slide the disk enclosure back until it stops. Refer to Figure 17 for location of back lock button.

Step 4. Installing the Controller Enclosure

You can order an install kit for the controller enclosure. The install kit includes the parts and instructions necessary to install a controller enclosure.

Install the controller enclosure from the front of the rack.

Attaching Mounting and Support Brackets

1. Attach the mounting brackets on both right and left sides of the controller enclosure with three counter-sunk 1/4" #6-32 Phillips flathead screws on each side, as shown in Figure 23.

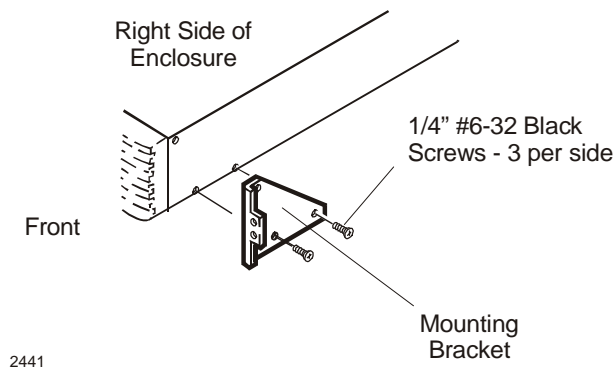


Figure 23. Attaching Mounting Brackets

2. Attach the right front support bracket to the right rear support bracket with screws and nuts as shown in Figure 24. Adjust spacing so that together they fit between the rack vertical rails (the vertical rails in front and rear of the rack cabinet). The support angle faces the center of the rack cavity.

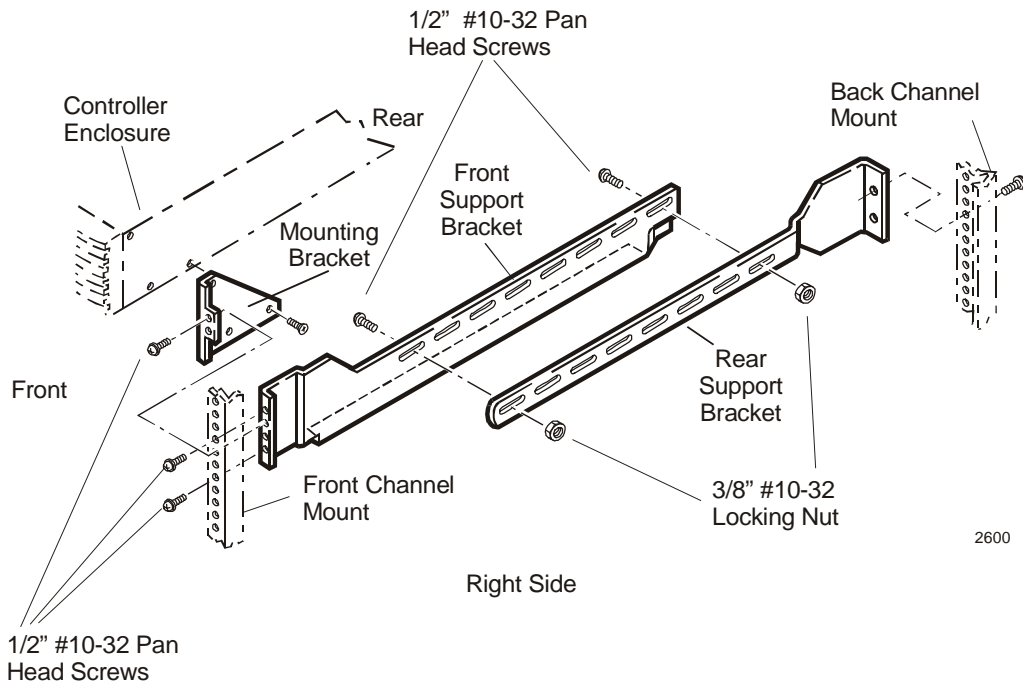


Figure 24. Installing Controller Enclosure Support Brackets

3. Mount the completed right assembly to the front and back channel mounts. Place the front support angle on the *inside* of the front channel mount with two screws. Place and tighten one screw in the top hole and the other in the bottom hole. Leave the middle two holes open for attaching the controller enclosure by means of the mounting bracket.
4. Align the rear end of the support angle screw holes with the holes in the back channel mount. The metal angle of the support bracket goes on the *inside* of the back channel mount. Fasten with screws.
5. Repeat steps 2 - 4 for the left side of the rack.

Note Make sure that the brackets are level front to rear and left to right.

Installing the Controller Enclosure

1. Place the controller enclosure on the support angles and slide the enclosure back into place.
2. Align the holes on the controller enclosure mounting brackets with the two middle holes on the front support brackets.
3. Secure the enclosure to the channel mounts with two screws on each side (through the channel mount and support brackets).

FCC Radio Frequency Interference Statement

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 radiate radio frequency energy and, if not installed and used in accordance with the 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 his own expense.

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Ciprico Inc.
2800 Campus Drive Suite 60
Plymouth, MN 55441

(763) 551-4000

<http://www.ciprico.com>

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