



© Copyright 2001. Black Box Corporation. All rights reserved.

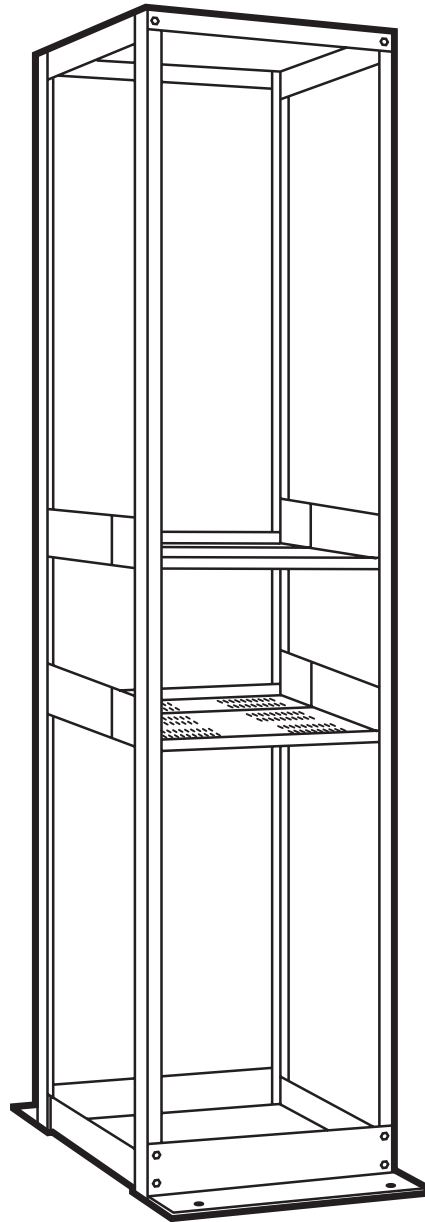
1000 Park Drive • Lawrence, PA 15055-1018 • 724-746-5500 • Fax 724-746-0746



MARCH 2001

RM440A-R2	RM445	RM480A
RM441	RM446	RM485A
RM442	RM447	RM486
RM443-R2	RM448	RM487
		RM488

Freedom Rack



**CUSTOMER
SUPPORT
INFORMATION**

Order **toll-free** in the U.S.: Call **877-877-BBOX** (outside U.S. call **724-746-5500**)
FREE technical support 24 hours a day, 7 days a week: Call **724-746-5500** or fax **724-746-0746**
Mailing address: **Black Box Corporation**, 1000 Park Drive, Lawrence, PA 15055-1018
Web site: www.blackbox.com • E-mail: info@blackbox.com

1. Specifications

Load Rating—RM441, RM442, RM445–RM446: 200 lb. (90.7 kg); RM447: 250 lb. (113.4 kg); RM448: 15 lb. (6.8 kg); RM486, RM487: 200 lb. (90.7 kg); RM488: 250 lb. (113.4 kg)

Size—RM440A-R2: 84"H x 19"W x 21 to 26"D (213.4 x 48.3 x 53.3 to 66 cm) with $\frac{5}{8}$ ", $\frac{5}{8}$ ", $\frac{1}{2}$ " mounting-hole spacing; RM480A: 84"H x 19"W x 27 to 32"D (213.4 x 48.3 x 68.6 to 81.3 cm); RM485A: 96"H x 19"W x 27 to 32"D (243.8 x 48.3 x 68.6 to 81.3 cm); RM441, RM442, RM445–RM447: 21 to 26"D (53.3 to 66 cm); RM448: 19" (48.3 cm); RM486–RM488: 27 to 32"D (68.6 to 81.3 cm)

2. Introduction

2.1 Description

The Freedom Rack and Shelves provide a solid, sturdy foundation for mounting heavier network equipment. Installation is quick, thanks to the rack's self-squaring features. The rack is adjustable to accommodate a variety of hubs, routers, and other heavy network equipment. It comes with a patented reinforced base to assure high load-bearing capacity. Three sizes of Freedom Racks are available:

- 84"H x 26"D (RM440A-R2)
- 84"H x 32"D (RM480A)
- 96"H x 32"D (RM485A)

For an exact fit with networking equipment, use Freedom Adjustable Solid (RM441 and RM486) or Vented (RM442 and RM487) Shelves. These shelves adjust in the same $\frac{1}{2}$ -inch increments as the Freedom Rack, so they expand to fit your ever-changing system requirements. The shelves attach to all four uprights for maximum stability.

Like the Freedom Adjustable Shelves above, the Open-Ended Adjustable Shelves (RM445 and RM446) adjust in the same $\frac{1}{2}$ -inch increments as the Freedom Rack. The design of the shelves does not include a front or back 90° bend, which makes it easier to add and remove equipment. The flat surface is also useful for mounting deeper equipment. These shelves are available in both standard and vented versions.

The Freedom Adjustable Vented Pull-Out Shelves (RM447 and RM488) feature a sliding mechanism that allows the shelf to glide forward and backward for equipment access. The shelf also includes an auto-lock function that responds when fully extended. Brackets secure the shelf to the rack when it is returned to its standard operating position.

The Keyboard Shelf with Mouse Tray (RM448) is a stationary tray that provides solid support for your keyboard and mouse. The mouse tray slides beneath the keyboard and rotates 180° from left to right center.

2.2 Available Models

- Freedom Rack 84"H x 26"D (RM440A-R2), with $\frac{5}{8}$ ", $\frac{5}{8}$ ", $\frac{1}{2}$ " mounting-hole spacing and (45) 1.75" rack spaces
- Freedom Rack 84"H x 32"D (RM480A)

- Freedom Rack 96"H x 32"D (RM485A)
- Freedom Adjustable Solid Shelf, 21 to 26"D (RM441)
- Freedom Adjustable Vented Shelf, 21 to 26"D (RM442)
- Freedom Adjustable Solid Shelf, Open-Ended, 21 to 26"D (RM445)
- Freedom Adjustable Vented Shelf, Open-Ended, 21 to 26"D (RM446)
- Freedom Adjustable Vented Pull-Out Shelf, 21 to 26"D (RM447)
- Keyboard Shelf with Mouse Tray (RM448)
- Freedom Adjustable Solid Shelf, 27 to 32"D (RM486)
- Freedom Adjustable Vented Shelf, 27 to 32"D (RM487)
- Freedom Adjustable Vented Pull-Out Shelf, 27 to 32"D (RM488)
- Freedom Rack Kit (RM443-R2), which includes the rack (RM440A-R2) and two shelves (RM441 and RM442)

2.3 Features

- Constructed of 6061-T6 structural-grade aluminum
- Self-supporting, self-squaring rack
- Assembles quickly and easily
- Top angles, patented reinforced base are standard
- Mounts 19" equipment and includes 24 cross-recessed black panel mounting screws, 12-24 x $\frac{5}{8}$ "
- $\frac{5}{8}$ ", $\frac{5}{8}$ ", $\frac{1}{2}$ " universal hole mounting pattern
- Equipped with standard $\frac{1}{2}$ " junctioning holes for securing multiple-rack lineups
- Attractive, durable black powder coat finish
- Meets EIA-310-E standards

3. Assembly

3.1 What the Package Includes

Your Freedom Rack (RM440A-R2, RM480A, or RM485A) package should include the following items:

- (4) Uprights, 7-ft. (2.1-m) tall 3" x 1½" channels, tapped 12-24 threads (45 TIA rack spaces), black
- (2) Top angles, 20¼" x 1½" x 1½" angles, black
- (2) Self-support reinforced bases, black
- (4) Adjustable rack spacers, assembled, black
- (24) ⅝-18 x 1" hex-head bolts, zinc plate
- (24) ⅝ split lock washers
- (24) 12-24 x ⅝" cross-recessed screws (dog-nose point), black oxide

Your Freedom Adjustable Vented Pull-Out Shelf (RM447 or RM488) package should include the following items:

- (1) Pull-Out Shelf/slide assembly
- (2) Stop brackets
- (4) #8-32 x ½ round-head screws
- (4) #8-32 nuts
- (4) #8 lockwashers
- (10) #12-24 x ⅞ mounting screws, black

Your Freedom Rack Kit (RM443-R2) package should include the following items:

- (1) Freedom Rack (RM440A-R2) and everything that comes with it (see above)
- (1) Freedom Adjustable Solid Shelf (RM441)
- (1) Freedom Adjustable Vented Shelf (RM442)

If anything is missing or damaged, please call Black Box at 724-746-5500.

3.2 Assembling the Freedom Rack

1. Lay two uprights parallel to each other on the floor. Set each upright with one 1½" leg on the floor, facing the other upright. Align the tops (the end with one ⅝-18 tapped hole) and the bottoms (the end with two ⅝-18 tapped holes) and space approximately 20 inches (50.8 cm) apart. Attach a base to the bottoms of the two uprights using four ⅝ bolts and ⅝ lock washers.
2. Repeat step 1 with the other two uprights and the remaining top angle and base.

3. Adjust the four rack spacers to the desired spacing. They are set at the factory at the minimum setting. Set the spacers 6 inches (15.2 cm) shorter than the required overall depth (to allow for the two 3-inch channels).
4. Place the two upright assemblies from steps 1 and 2 parallel to each other on the floor. Space them to the approximate depth of the adjustable rack spacer. Attach a spacer to the bottom of each upright using the two $\frac{5}{16}$ -18 tapped holes, two $\frac{5}{16}$ bolts, and $\frac{5}{16}$ lock washers on each upright.
5. Attach another spacer to the top of the four uprights using the $\frac{5}{16}$ -18 tapped hole, one $\frac{5}{16}$ bolt, and $\frac{5}{16}$ lock washers on each upright.
6. Turn the assembly over and repeat steps 4 and 5.

3.3 Assembling the Freedom Adjustable Vented Pull-Out Shelf

The Pull-Out Shelf is of a fixed depth. The four mounting brackets will have to be positioned to match the depth of your installed rack. The amount of overhang on the front of the rack can also be adjusted from flush in the front to flush in the back. It is easiest to adjust the mounting brackets *before* the Shelf is installed. The installation steps in this section will guide you through this.

The Pull-Out Shelf is shipped assembled with the mounting brackets installed for mounting in a fully extended Freedom Rack with the Pull-Out Shelf mounted flush to the front rail.

3.3.1 ADJUSTING THE SHELF'S MOUNTING BRACKETS

1. Remove all items from the box and verify them against the parts list (see **Section 3.1**).
2. Measure the depth of the installed Freedom Rack from outside to outside of the uprights. (The Freedom Rack is adjustable in $\frac{1}{2}$ -inch increments.)

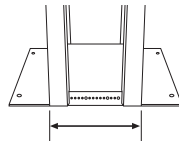


Figure 1. Frame depth.

3. Refer to Table 3-1. In the “Depth of Freedom Rack” column, find the depth measured in step 2. Note that there may be more than one combination of mounting positions for each depth.

FREEDOM RACK

Table 3-1. Bracket positioning (all dimensions in inches).

Depth of Freedom Rack	Position of Front Bracket	Position of Rear Bracket	"F" Dimension	"B" Dimension
21	1	1	2½	2½
21½	2	1	2	2½
21½	1	2	2½	2
22	3	1	1½	2½
22	2	2	2	2
22	1	3	2½	1½
22½	4	1	1	2½
22½	3	2	1½	2
22½	2	3	2	1½
22½	1	4	2½	1
23	5	1	½	2½
23	4	2	1	2
23	3	3	1½	1½
23	2	4	2	1
23	1	5	2½	½
23½	6	1	0	2½
23½	5	2	½	2
23½	4	3	1	1½
23½	3	4	1½	1
23½	2	5	2	½
23½	1	6	2½	0
24	7	1	-½	2½
24	6	2	0	2
24	5	3	½	1½
24	4	4	1	1
24	3	5	1½	½
24	2	6	2	0
24½	7	2	-½	2
24½	6	3	0	1½
24½	5	4	½	1
24½	4	5	1	½
24½	3	6	1½	0
25	7	3	-½	1½
25	6	4	0	1
25	5	5	½	½
25	4	6	1	0
25½	7	4	-½	1
25½	6	5	0	½
25½	5	6	½	0
26	7	5	-½	½
26	6	6	0	0

Table 3-1 (continued). Bracket positioning (all dimensions in inches).

Depth of Freedom Rack	Position of Front Bracket	Position of Rear Bracket	"F" Dimension	"B" Dimension
27	1	1	2½	2½
27½	2	1	2	2½
27½	1	2	2½	2
28	3	1	1½	2½
28	2	2	2	2
28	1	3	2½	1½
28½	4	1	1	2½
28½	3	2	1½	2
28½	2	3	2	1½
28½	1	4	2½	1
29	5	1	½	2½
29	4	2	1	2
29	3	3	1½	1½
29	2	4	2	1
29	1	5	2½	½
29½	6	1	0	2½
29½	5	2	½	2
29½	4	3	1	1½
29½	3	4	1½	1
29½	2	5	2	1/
29½	1	6	2½	0
30	7	1	-½	2½
30	6	2	0	2
30	5	3	½	1½
30	4	4	1	1
30	3	5	1½	½
30	2	6	2	0
30½	7	2	-½	2
30½	6	3	0	1½
30½	5	4	½	1
30½	4	5	1	½
30½	3	6	1½	0
31	7	3	-½	1½
31	6	4	0	1
31	5	5	½	½
31	4	6	1	0
31½	7	4	-½	1
31½	6	5	0	½
31½	5	6	½	0
32	7	5	-½	½
32	6	6	0	0

FREEDOM RACK

4. Select the appropriate mounting positions based on how far in front of the Freedom Rack you want the Pull-Out Shelf to be when in the closed position (Dimension "F"). Keep in mind that the further out it is mounted, the further you can extend the Pull-Out Shelf.

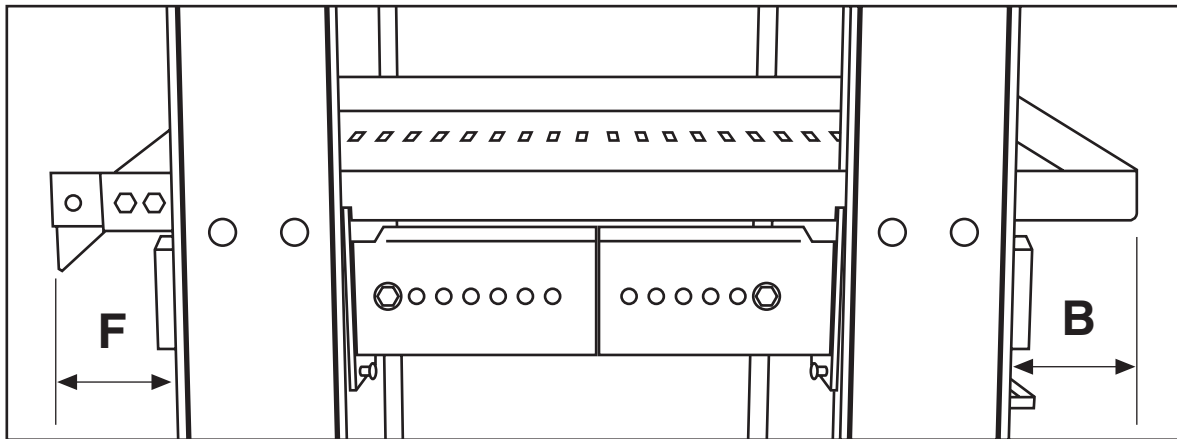


Figure 2. Front and rear dimensions.

5. Lay the assembled Pull-Out Shelf on its side. Adjust the mounting brackets one at a time. The brackets are *not* interchangeable (front-to-back).

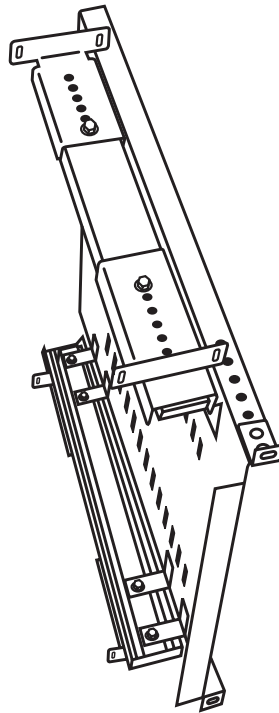


Figure 3. Assembly on side.

- Remove the front bracket (the one with seven holes) by removing the nut from the stud mounted on the slide. Do not remove the stud from the slide. Position the stud in the hole indicated in Table 3-1. Note that the holes are counted starting from the “ear.”

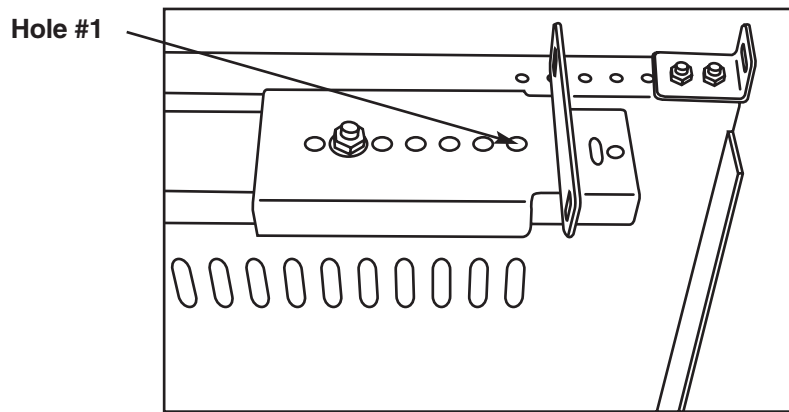


Figure 4. Front bracket.

- Remove the rear bracket (the one with six holes) and position the stud in the hole indicated in Table 3-1.

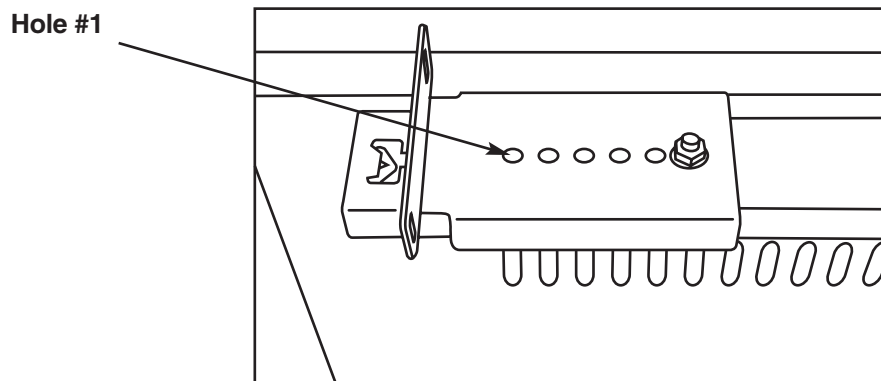


Figure 5. Rear bracket.

- Flip the Pull-Out Shelf over on its other side and repeat steps 6 and 7.
- Install the stop brackets on the Pull-Out Shelf using the #8-32 hardware. Use the mounting holes from Table 3-1. See Figure 2 for the location of stop bracket mounting holes. The Pull-Out Shelf is now ready to be installed in the Freedom Rack.

FREEDOM RACK

3.3.2 INSTALLING THE SHELF IN THE FREEDOM RACK

1. Locate the mounting holes to be used on the Freedom Rack.
2. Position the Pull-Out Shelf between the two uprights and thread a #12-24 screw into the Freedom Rack through the bottom slot of each of the mounting ears on one side of the Pull-Out Shelf. Rotate the Pull-Out Shelf up so that the mounting ears on the opposite side of the Pull-Out Shelf can be mounted.

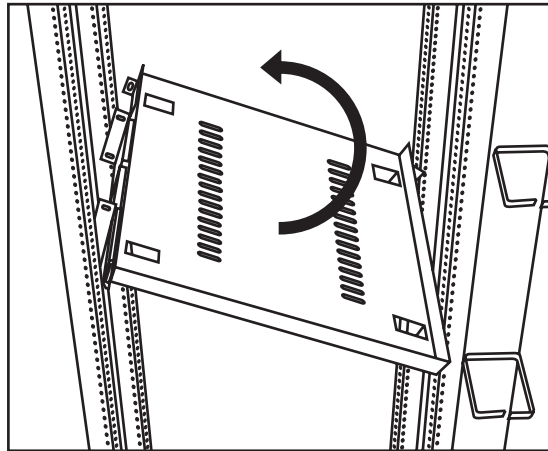


Figure 6. Rotate and attach other side to both uprights.

3. Attach the second set of mounting ears with the #12-24 screws.
4. Attach a #12-24 screw to the top slot of the first set of mounting ears. Tighten all screws.
5. Attach #12-24 screws through the stop brackets to prevent the Pull-Out Shelf from sliding out into the aisle.

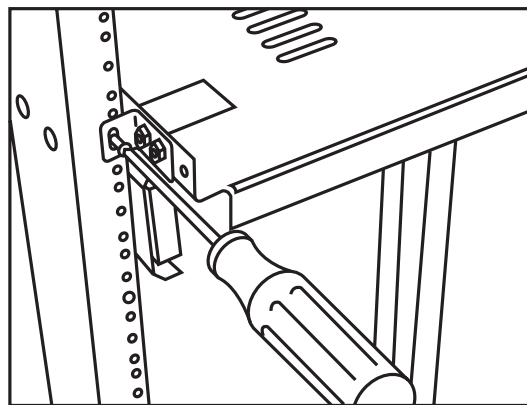


Figure 7. Secure stop bracket.

3.3.3 USING THE SHELF'S SLIDING FUNCTION

1. The Pull-Out Shelf is held closed by the stop brackets. To slide out the Pull-Out Shelf, the #12-24 screws need to be removed. The shelf will now pull out.
2. When the shelf is fully extended, it will lock in place.
3. To release the slide, locate the locking latch on each rail. Push both levers simultaneously (the right one will rotate up and the left will rotate down) and push the Pull-Out Shelf in.

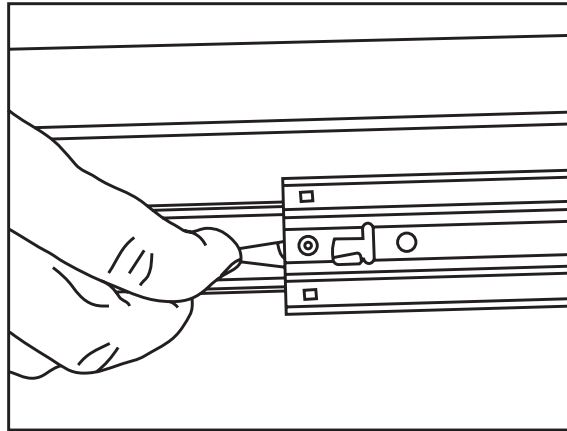


Figure 8. Releasing the slide.

4. Attach #12-24 screws through the stop brackets to prevent the Pull-Out Shelf from sliding out into the aisle.

3.3.4 REMOVING THE PULL-OUT SHELF FROM THE SLIDES

1. To remove the tray from the slides, rotate the locking levers past the unlatch point simultaneously and pull out.
2. To replace the tray on the slides, the portion of the slide in the Freedom Rack must be fully collapsed. Start each rail on the tray on its respective slide and push in.
3. The Pull-Out Shelf will stop at its locking position and the latch will need to be pushed up to push the Pull-Out Shelf all the way in.