HP StorageWorks EVA3000/5000 M5314 drive enclosure installation instructions

This document contains the instructions for adding an M5314 drive enclosure to an EVA3000/5000 storage system.

5697-6536

Adding a drive enclosure to an EVA5000

This section contains the procedure for adding an M5314 drive enclosure to an EVA5000 while the storage system is operating.

NOTE:

HP highly recommends that you perform this upgrade procedure during off-peak hours.

WARNING!

An fully loaded drive enclosure with all components installed weighs more than 29.5 kg (65 lb.) and requires a minimum of two people to move. To safely and easily install the drive enclosure, remove the drives, power supplies, blowers, EMU, and I/O modules. This reduces the drive enclosure weight to approximately 11.0 kg (24 lb.). Even though a single person can lift this weight, the drive enclosure is difficult to install because of the physical size. Therefore, HP recommends that a minimum of two people install an empty drive enclosure in a rack.

Before you begin this hardware upgrade, you must verify that the Enterprise Virtual Array is functioning properly. Use HP Command View EVA to verify that each drive enclosure and disk drive has a good operational status. If a drive enclosure or disk drive does not have a good operational status, correct the problem.

1. Label each new FC cable with the labels contained in the drive enclosure kit. Each drive enclosure has two FC copper cables. Use the labeling scheme described in Table 1.

Table 1 FC cable labels

Drive Enclosure	FC Cable Labels
4	11 and 17
5	12 and 18
6	13 and 19
12	23 and 29
13	24 and 30
14	25 and 31

NOTE:

The cabinet address bus in an EVA5000 uses either JB (junction box) hardware or ID expansion cables. If expansion ID cables are used in your EVA5000, skip the following step and any others that deal with removing or installing a JB.

2. Uninstall the junction boxes near the desired drive enclosure location. See Figure 1.

   a. Loosen and remove the two mounting screws.

   b. Slide the shelf ID expansion cable off the rail.
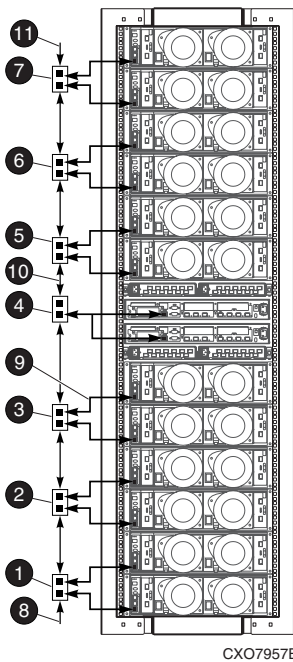
CXO7957B

1. JB 1–Enclosures 1 and 2

2. JB 2–Enclosures 3 and 4

3. JB 3–Enclosures 5 and 6

4. JB 4–Enclosure 7

5. JB 5–Enclosures 9 and 10

6. JB 6–Enclosures 11 and 12

7. JB 7–Enclosures 13 and 14

Figure 1 JB numbering

3. If an FC cable loop is near the shelf ID expansion cable, carefully turn the captive fastener 1/4 turn and slide the cable loop off of the rail. Carefully, let the spool hang.

4. Remove the nearby velcro cable ties.

5. Cut the plastic ties on the drive enclosure power cables.

6. Install the drive enclosure snap-in rail kit (part number 302465-001).

7. Install the enclosure address bus adapter brackets for the junction boxes that you removed from the rail. See Figure 2.

8. Attach the junction boxes to the adapter brackets.

△ CAUTION:

Do not over torque the screws. The screws that connect the shelf ID expansion cable to the adapter bracket are 9 in/lb. screws.
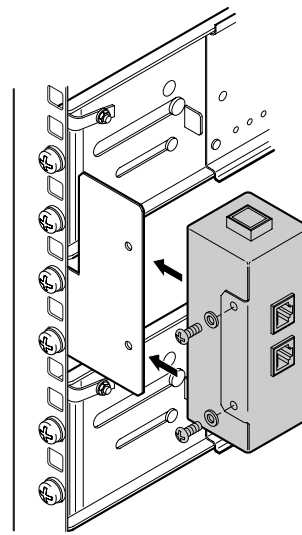

Figure 2 Enclosure address bus adapter bracket and junction box

9. Install the drive enclosure into the rack.

10. Insert and seat all disk drives and other components into the drive enclosure, but do not connect the cables.

△ CAUTION:

When adding disks to an expansion cabinet on an EVA5000, do not install a disk in bays 12, 13, or 14 in enclosures 17, 20, or 24. These bays in enclosures 17, 20, and 24 do not receive a hard assigned AL-PA. Installing a disk in any of these slots may impact the operation of the storage system.

11. Connect the AC power to the drive enclosure and do the following.

   a. Wait for all FC disk drives to spin up.

   📝 NOTE:

   The first drive in the drive enclosure might have the orange Drive Failure icon lit. This is expected behavior.

   b. Check the EMU alphanumeric display for errors. See Figure 3. Resolve any errors.

CXO7373A
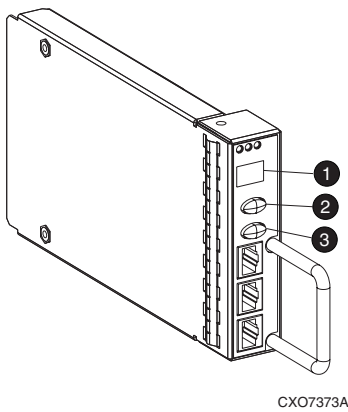
1. Alphanumeric display

2. Function select

3. Display group select

Figure 3 EMU alphanumeric display and controls

c. Verify that the EMU displays 00, indicating that the disk enclosure is not connected to the enclosure address bus.

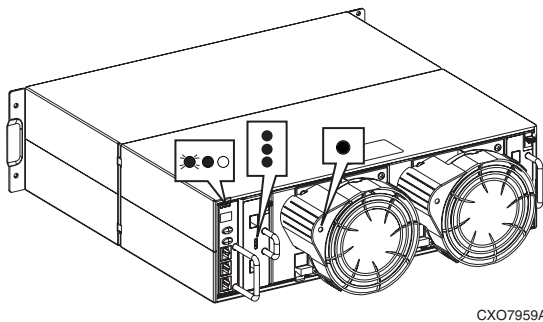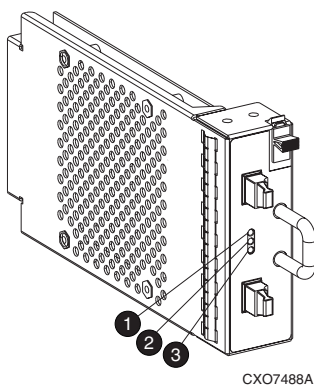**d.** Verify that the fan LEDs are on and steady. See Figure 4.

CXO7959A

Figure 4 Enclosure operational status indications

e. On both I/O modules, verify that the Power status indicator is on and steady. Verify that both port status indicators are off. See Figure 5.

f. Resolve any problems before proceeding to the next step.

CXO7488A

1. Upper port

2. Power

3. Lower port

Figure 5 I/O module status indicators

12. Check the operational status of the FC loops.

a. On the controller, verify that the A-side and B-side device port indicators are on and steady.

b. Resolve any problems before proceeding to the next step.

13. Remove the GBICs from the required ports on the A and B loop switches.

14. Using a copper FC cable, connect I/O module A to the appropriate A-side loop switch. The A-side of the rack is the right side of the rack, when viewed from the rear. See Figure 6 and refer to Table 2 to determine which cables and port connections to use.

The location of the drive enclosure in the rack determines the loop switch it connects to. Drive enclosures mounted in the lower half of the rack (enclosures 1 through 6) connect to loops 1A and 1B. Drive enclosures mounted in the upper half of the rack (enclosures 8 through 13) connect to loops 2A and 2B. See Figure 6.

a. Plug the FC cable into the correct port on the A-side loop switch.

b. Route the copper cable through the appropriate cable management arm and radial clip. Do not route the copper cables through flumes that contain fiber optic cables. Instead, route the copper cables through vacant flumes.

⚠ CAUTION:

When you are adding the copper cables to the rack, handle the fiber optic cables with care. If you are not careful, you can damage the fiber optic cables.

c. Coil the excess copper cable and secure the cable behind the rail with cable ties.

d. Plug the cable into I/O module A of the drive enclosure.
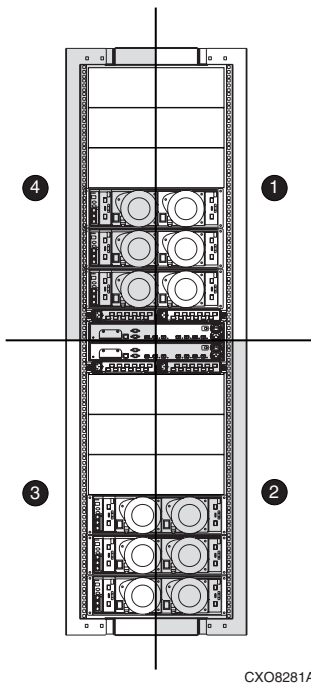
CXO8281A

1. Loop 2A   2. Loop 1A

3. Loop 1B   4. Loop 2B

Figure 6 Loop locations in the Enterprise rack

Table 2 FC cable connections for I/O module A

| Drive En-closure	I/O Module	FC Cable	FC Loop Switch	FC Loop Switch Port
4	A	11	1A	6
5	A	12	1A	4
6	A	13	1A	2
12	A	23	2A	7
13	A	24	2A	9
14	A	25	2A	11

15. Verify that the FC connection is operating correctly.

a. Verify that the green SFP Status LED on the FC loop switch is on and steady and the Port bypassed LED is off. See Figure 7.

b. Verify that the corresponding port status indicator on I/O module A is on and steady.

c. Verify that the corresponding A device port on the controller is on and steady.

📝 NOTE:

The orange Drive Failure icon on first drive in drive enclosure is turned off.

d. Verify that the upgraded configuration is working properly, using Command View EVA.

- Verify that the added drive enclosure has a good status.
- Verify that each disk drive in the added drive enclosure has a good status.

e. Resolve any problems before proceeding to the next step.

Bezel

Front

Rear
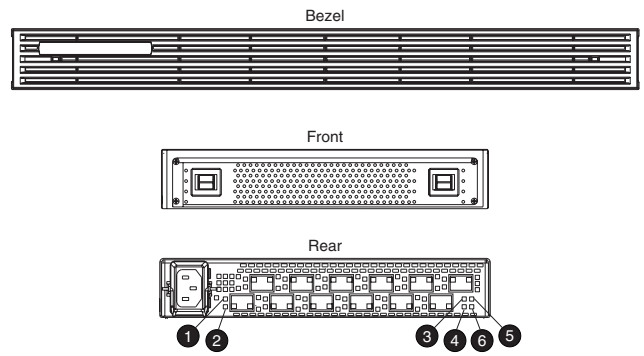
CXO7884A

1. SFP status   2. Port bypassed

3. POST fault   4. Over temp

5. Power   6. Loop operational

Figure 7 FC loop switch status indicators

16. Using a copper FC cable, connect I/O module B to the appropriate B-side loop switch. The B-side of the rack is the left side of the rack when viewed from the rear. See Table 3 to determine which cables and port connections to use.

⚠ CAUTION:

Make sure you are connecting the drive enclosure to corresponding loop switches. If you used loop switch 1A for port A, then you must use loop switch 1B. If you used loop switch 2A, then you must use loop switch 2B. If you fail to connect the drive enclosure to corresponding loop switches, you can make the data in the other drive enclosures inaccessible.

a. Plug the FC cable into the correct port on the B-side loop switch.

b. Route the copper cable through the appropriate cable management arm and radial clip. Do not route the copper cables through flumes that contain fiber optic cables. Instead, route the copper cables through vacant flumes.

⚠ CAUTION:

When you are adding the copper cables to the rack, handle the fiber optic cables with care. If you are not careful, you can damage the fiber optic cables.

c. Coil the excess copper cable and secure the cable behind the rail with cable ties.

d. Plug the cable into I/O module B of the drive enclosure.

Table 3 FC cable connections for I/O module B

Drive Enclosure	I/O Module	FC Cable	FC Loop Switch	FC Loop Switch Port
4	B	17	1B	8
5	B	18	1B	10
6	B	19	1B	12
12	B	29	2B	5
13	B	30	2B	3
14	B	31	2B	1

17. Verify that the FC connection is operating correctly.

   a. Verify that the green SFP Status LED on the FC loop switch is on and steady and the Port bypassed LED is off.

   b. Verify that the corresponding port status indicator on I/O module B is on and steady.

   c. Verify that the corresponding B device port on the controller is on and steady.

   d. Resolve any problems before proceeding to the next step.

18. Connect the newly added drive enclosure to the enclosure address bus. See Figure 1 for the enclosure numbering.

📝 **NOTE:**

CAB address ports 8 and 14 share a common address. When adding a drive enclosure to loop 2, make sure drive enclosures are connected to either port 8 or port 14. You can use one or the other but not both. Using both of these ports on the same loop makes it difficult to analyze disk problems because the disks in the drive enclosure connected to ports 8 and 14 appear to have the addresses.

   a. Verify that the EMU displays a unique enclosure number.

   b. Verify that the EMUs on the other drive enclosures continue to display valid enclosure numbers.

   c. Wait 15 minutes.

   d. Verify that Command View EVA displays the recently added drive enclosure under the Rack element in the Navigation pane. It should no longer be in the Unmappable Hardware folder.

   e. Verify that the upgraded configuration is working properly, using Command View EVA.

     • Verify that the added drive enclosure has a good status.

     • Verify that each disk drive in the added drive enclosure has good status.

19. Repeat the above steps to add each drive enclosure.

20. Use nylon ties to secure the copper FC cables.

21. In HP Command View EVA, configure the additional storage capacity. See the *HP StorageWorks 3000/5000 Enterprise Virtual Array user guide* and the EVA Best Practices white paper for information on using the new disk capacity.

Adding a drive enclosure to an EVA3000

This section contains the procedure for adding an M5314 drive enclosure to an EVA3000 while the storage system is operating.

This procedure can also be used when adding a disk enclosure to an EVA5000 without FC loop switches. Connect the enclosure to the appropriate loop (1 or 2) as shown in Figure 6.

📝 **NOTE:**

HP highly recommends that you perform this upgrade procedure during off-peak hours.

⚠ **WARNING!**

An fully loaded drive enclosure with all components installed weighs more than 29.5 kg (65 lb.) and requires a minimum of two people to move. To safely and easily install the drive enclosure, remove the drives, power supplies, blowers, EMU, and I/O modules. This reduces the drive enclosure weight to approximately 11.0 kg (24 lb.). Even though a single person can lift this weight, the drive enclosure is difficult to install because of the physical size. Therefore, HP recommends that a minimum of two people install an empty drive enclosure in a rack.

Before you begin this hardware upgrade, you must verify that the Enterprise Virtual Array is functioning properly. Use HP Command View EVA to verify that each drive enclosure and disk drive has a good operational status. If a drive enclosure or disk drive does not have a good operational status, correct the problem.

1. Label each new FC cable with the labels contained in the drive enclosure kit. Each drive enclosure has two FC copper cables.

📝 **NOTE:**

The cabinet address bus in an EVA3000 uses either JB (junction box) hardware or ID expansion cables. If expansion ID cables are used in your EVA5000, skip the following step and any others that deal with removing or installing a JB.

2. Uninstall the junction boxes near the desired drive enclosure location. See Figure 8.

   a. Loosen and remove the two mounting screws.

   b. Slide the shelf ID expansion cable off the rail.

3. If an FC cable loop is near the shelf ID expansion cable, carefully turn the captive fastener 1/4 turn and slide the cable loop off of the rail. Carefully, let the spool hang.

4. Remove the nearby velcro cable ties.

5. Cut the plastic ties on the drive enclosure power cables.

6. Install the snap-in rail kit (part number 302465-001).

7. Install the enclosure address bus adapter brackets for the junction boxes that you removed from the rail. See Figure 2.

8. Attach the junction boxes to the adapter brackets.

⚠ **CAUTION:**

Do not over torque the screws. The screws that connect the shelf ID expansion cable to the adapter bracket are 9 in/lb. screws.

9. Install the drive enclosure into the rack.

10. Insert and seat all drives and other components into the drive enclosure, but do not connect the cables.

📝 **NOTE:**

The drive enclosure must have a minimum of four drives installed.

11. Connect the AC power to the drive enclosure and do the following.

   a. Wait for all FC disk drives to spin up.

b. Check the EMU alphanumeric display for errors. See Figure 3. Resolve any errors.

c. Verify that the EMU displays 00, indicating that the disk enclosure is not connected to the enclosure address bus.

d. Verify that the fan LEDs are on and steady. See Figure 4.

e. On both I/O modules, verify that the Power status indicator is on and steady. Verify that both port status indicators are off. See Figure 5.

f. Resolve any problems before proceeding to the next step.

12. Check the operational status of the FC loops.

a. On the controller, verify that the A-side and B-side device port indicators are on and steady.

b. Resolve any problems before proceeding to the next step.

⚠ CAUTION:

As long as one I/O loop (1A or 1B) is operational, storage system operation will not be interrupted. Make sure you disconnect only one loop at a time. Make sure a loop is operational before disconnecting the other loop.

13. Connect the new disk enclosure to I/O loop 1A as follows:

a. Disconnect the FC cable from device port 1A on the upper storage system controller.

b. Connect this cable to the lower port on I/O module A of the new disk enclosure.

c. Connect a FC cable from the upper port on I/O module A of the new disk enclosure to device port 1A on the upper storage system controller.

Figure 9 shows typical I/O loop A connections.

14. Verify that loop 1A is operating correctly.

a. Verify that the upper and lower port LEDs on I/O module A are on and steady.

b. Verify that device port 1A on the controller is on and steady.

📝 NOTE:

The orange Drive Failure icon on first drive in drive enclosure is turned off.

c. Verify that the upgraded configuration is working properly, using Command View EVA.

- Verify that the added drive enclosure has a good status.
- Verify that each disk drive in the added drive enclosure has a good status.

d. Resolve any problems before proceeding to the next step.

15. Connect the new disk enclosure to I/O loop 1B:

a. Disconnect the FC cable from device port 1B on the lower storage system controller.

b. Connect this cable to the lower port on I/O module B of the new disk enclosure.

c. Connect a FC cable from the upper port on I/O module B of the new disk enclosure to device port 1B on the lower storage system controller.

Figure 10 shows typical I/O loop B connections.

16. Verify that loop 1B is operating correctly.

a. Verify that the upper and lower port LEDs on I/O module B are on and steady.

b. Verify that device port 1B on the controller is on and steady.

c. Resolve any problems before proceeding to the next step.

17. Connect the newly added drive enclosure to the enclosure address bus. See Figure 8 for the correct enclosure address bus ports.

a. Verify that the EMU displays a unique enclosure number.

b. Verify that the EMUs on the other drive enclosures continue to display valid enclosure numbers.

c. Wait 15 minutes.

d. Verify that HP Command View EVA displays the recently added drive enclosure under the Rack element in the Navigation pane. It should no longer be in the Unmappable Hardware folder.

e. Verify that the upgraded configuration is working properly, using HP Command View EVA.

- Verify that the added drive enclosure has a good status.
- Verify that each disk drive in the added drive enclosure has good status.

**18.** Repeat the preceding steps to add additional drive enclosures.

19. In HP Command View EVA, configure the additional storage capacity. See the *HP StorageWorks 3000/5000 Enterprise Virtual Array user guide* and the EVA Best Practices white paper for information on using the new disk capacity.
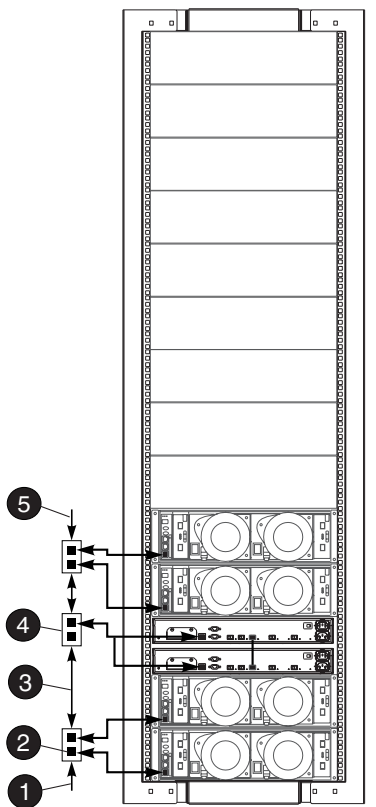
CXO8080B

1. Bottom terminator

2. Enclosure address 1

3. Enclosure address bus cable

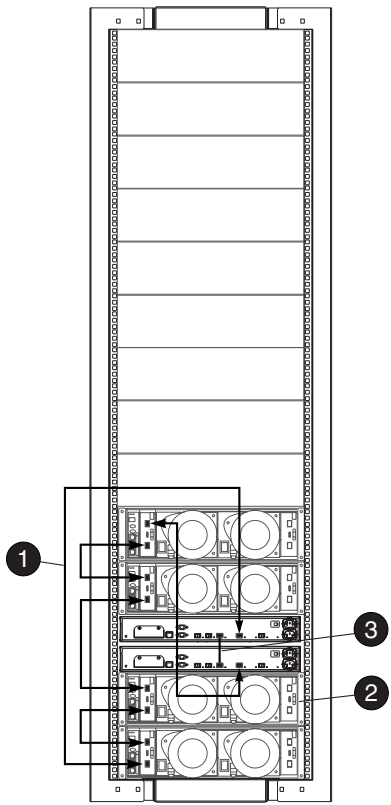4. Enclosure address bus shelf ID expansion cable

5. Top terminator

Figure 8 EVA3000 enclosure address bus configuration
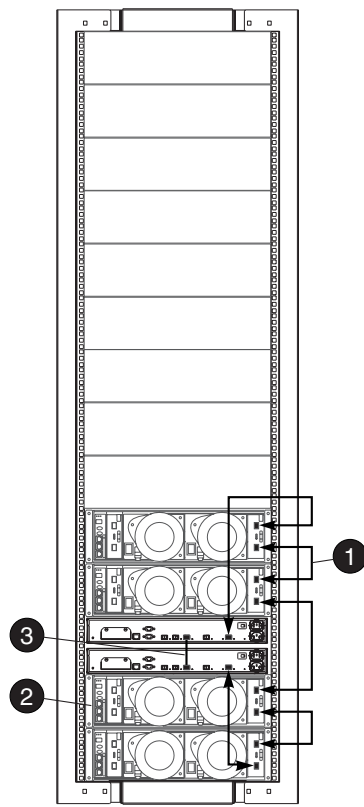
CXO8081B

1. Cable

2. FC drive enclosure

3. Controller-to-controller mirror port cable

Figure 9 EVA3000 loop 1A configuration

CXO8082B

1. Cable

2. FC drive enclosure

3. Controller-to-controller mirror port cable

Figure 10 EVA3000 loop 1B configuration