

Power775

Disk Enclosure Fan Service Procedure

Last Modified 11/03/2011



Power775 Disk Enclosure Fan Service Procedure

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1 GENERAL

1.1 Release / Revision History

Document Name	Date	PDF name	Description
Power775 Disk Enclosure Fan Service Procedure	11/03/2011	"p775_de_fan.pdf"	Initial Release

Table 1 Release / Revision History

1.2 Where to find this document

The current "Power775 Disk Enclosure Fan Service Procedure" document is "p775_de_fan.pdf" which is to be downloaded from: InfoCenter Website: <http://publib.boulder.ibm.com/infocenter/powersys/v3r1m5/topic/p7ee2/p7ee2kickoff.htm>

Click "PDF files for the IBM Power 775 (9125-F2C) removing and replacing parts"

Under "Disk Enclosure", click "Disk Enclosure Fan" to download PDF "p775_de_fan.pdf"

This is the only valid source for the latest Power775 Disk Enclosure Fan Service Procedure.

1.3 Required Documents

Document	Doc Number	Location
Safety Notices http://publib.boulder.ibm.com/infocenter/powersys/v3r1m5/topic/p7hdx/G229-9054.pdf	G229-9054	InfoCenter

Table 2 Required Documents

*InfoCenter Website: <http://publib.boulder.ibm.com/infocenter/powersys/v3r1m5/topic/p7ee2/p7ee2kickoff.htm>

1.4 Related Documents

Document	PN	Location
GPFS Native RAID Administration and Programming Reference	Document # SA23-1354	InfoCenter *

Table 3 Related Documents

*InfoCenter Website: <http://publib.boulder.ibm.com/infocenter/powersys/v3r1m5/topic/p7ee2/p7ee2kickoff.htm>

1.5 Abbreviations

Abbreviation	Definition	Details
BPA	Bulk Power Assembly	
CEC	Central Electronic Complex	Also referred to as the node.
DCCA	Distributed Conversion and Control Assembly	The power supplies for the CEC and DE are called the CEC DCCA and DE DCCA respectively.
DE	Disk Enclosure	
GPFS	Global Parallel File System	IBM's file system utilizing software RAID
HDD	Hard Disk Drive	This also means hard drive
LED	Light Emitting Diode	
LIC	Licensed Internal Code	
PCB	Printed Circuit Board	
RAID	Redundant Array of Inexpensive Disks	
SAS	Serial Attached SCSI	Protocol used for direct attached storage
SSR	Systems Services Representative	IBM Service personnel
SSD	Solid State Drive	
UEPO	Unit Emergency Power Off	

Table 3 Abbreviations

2 OVERVIEW

This section is an overview only. Do not start the service procedure until Section 3 which contains the detailed steps.

2.1 Safety Notices

Read “Safety_Notices “ available from InfoCenter – see Section 1.3.
<http://publib.boulder.ibm.com/infocenter/powersys/v3r1m5/topic/p7hdx/G229-9054.pdf>

The following notices apply to all Power775 service procedures:

CAUTION:

Energy hazard present. Shorting might result in system outage and possible physical injury. Remove all metallic jewelry before servicing. (C001)

CAUTION:

The doors and covers to the product are to be closed at all times except for service by trained service personnel. All covers must be replaced and doors locked at the conclusion of the service operation. (C013)

CAUTION:

Servicing of this product or unit is to be performed by trained service personnel only. (C032)

The following notices specifically pertain to this Power775 service procedure.

DANGER: Heavy equipment — personal injury or equipment damage might result if mishandled. (D006)

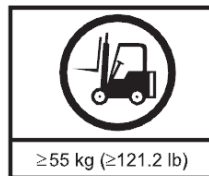
CAUTION:



or

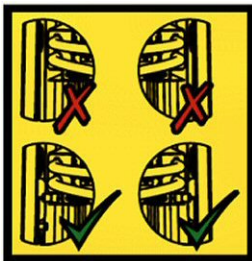


or



The weight of this part or unit is more than 55 kg (121.2 lb). It takes specially trained persons, a lifting device, or both to safely lift this part or unit. (C011)

CAUTION: The water-based coolant solution may contain an additive intended to inhibit corrosion (or provide other functions). The solution may cause irritation to the skin or eyes. Avoid direct contact with the solution. Employ appropriate Personal Protective Equipment when performing operations involving the coolant or which may potentially expose you to the coolant. Refer to the MSDS for more information. (C037)



DANGER: Risk of injury due to heavy components falling from rack if the supplemental supports are not installed. (L019)

ATTENTION: The supplemental supports (Cam Followers) must be installed for the CEC or DE slide out service.

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DANGER: Rack-mounted devices are not to be used as shelves or work spaces. (L002)



DANGER: Hazardous voltage present. Voltages present constitute a shock hazard, which can cause severe injury or death. (L004)



CAUTION: Sharp edges, corners, or joints nearby. (L006)



CAUTION: Hazardous moving parts nearby. (L008)



CAUTION: System or part is heavy. The label is accompanied by a specific weight range. (L009)



CAUTION: Protective eyewear is needed for the procedure. (L011)

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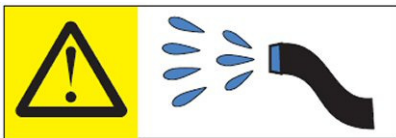


CAUTION: Pinch hazard. (L012)

ATTENTION: Small gaps exist that could pinch body parts if care is not exercised.



CAUTION: Chemical resistant gloves are needed for this procedure. (L014)



DANGER: Risk of electric shock due to water or a water solution which is present in this product.

Avoid working on or near energized equipment with wet hands or when spilled water is present. (L016)



CAUTION: Do not pull out more than one drawer at a time. The rack might become unstable if you pull out more than one drawer at a time. (L024)

2.2 ATTENTION: File System Risk Statement

The Global Parallel File System (GPFS) implementation of software RAID stripes data across all the Disk Enclosures in the cluster. **If a single Disk Enclosure is powered off while GPFS is active, the file system will go into panic and become unavailable.**

This service procedure requires powering off a Disk Enclosure and because of this requires interaction with GPFS in order to limit impact to performance.

2.3 Confirm how you got to this Power 775 DE Fan Service Procedure

You should be performing this procedure if you have determined a Disk Enclosure Fan has failed and needs replacement.

You should have downloaded this procedure from:

InfoCenter Website: <http://publib.boulder.ibm.com/infocenter/powersys/v3r1m5/topic/p7ee2/p7ee2kickoff.htm>

This is the only valid source for the latest Power775 DE Fan Service Procedure

2.4 DE Fan Description

The Power775 Disk Enclosure contains 12 internal cooling fans. Since the Disk Enclosure is capable of running with only 8 fans, a service request will not be scheduled until at least 2 or 3 fans fail depending on the location of the failed fans. When 2 or more fans fail, the fan speed will increase to compensate and maintain airflow. See Figures 1, 2, 3, and 4 for photographs of the Fan assembly.

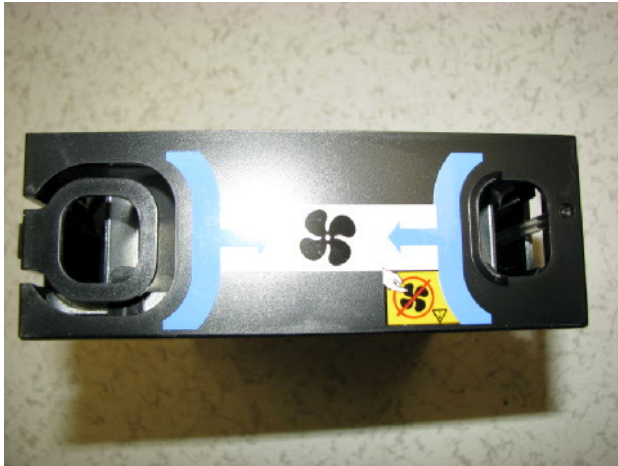


Figure 1 Fan Assembly: Top View



Figure 2 Fan Assembly: Bottom View

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Figure 3 Fan Assembly: Front View

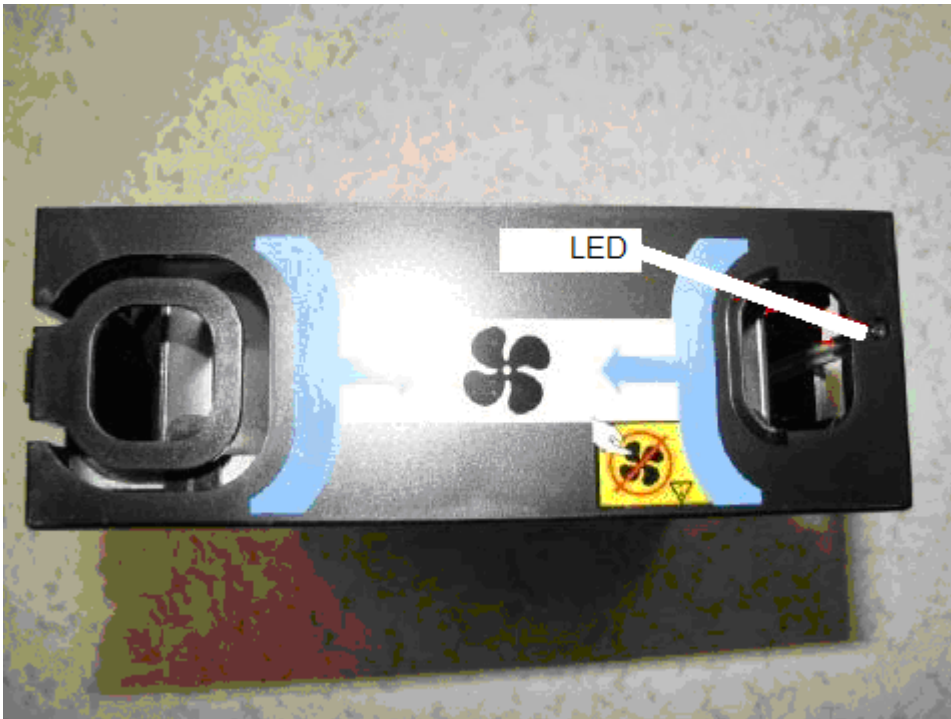


Figure 4 Fan Assembly: Top View Showing Identify LED Location

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2.4.1 Enclosure VPD label and Location Code

The enclosure VPD label is placed on the rear of a Disk Enclosure just above the enclosure LEDs (see Figure 5 DE Enclosure VPD Label).



Figure 5 DE Enclosure VPD Label

An example of a location code of Fan 4 in the DE with the label shown in Figure 5 is:

U78AD.001.992001B-P1-A4

2.5 Concurrency

The DE Fans are NOT concurrently maintainable. This procedure requires the customer to stop all client applications and shut down the file system.

2.6 DE Fan Weight

Each fan weighs about 1.25 lbs (0.57 kg)

2.7 Required SSRs and Roles

This service procedure requires one SSR.

This service procedure contains steps to be performed by a customer system administrator and an IBM SSR (System Service Representative).

- The customer system administrator performs the STEPs in Sections marked with “<= CUSTOMER TASK”
- The SSR performs the STEPs in Sections marked with “<= SSR TASK”

2.8 Estimated Service Time

The estimated service time for this procedure is about 1 hour.

2.9 Required Tools

Service card (shipped in the Power 775 frame)

Cam Followers (shipped in lowest CEC position in frame, near EIA location 5)

Hand Tool Kit P/N 74Y0988

- Torque Clutch P/N 74Y0985 (shipped in the Hand Tool Kit)
- Ratchet handle P/N 6428240 (shipped in the Hand Tool Kit)
- Extension (18”) P/N 46K2707 (shipped in the Hand Tool Kit)
- 2 mm Hex Torque Driver P/N 74Y0983 (shipped in the Hand Tool Kit)
- 3 mm Hex Torque Driver P/N 74Y0998 (shipped in the Hand Tool Kit)
- 4mm Hex Torque Driver PN 41V1059 (shipped in the Hand Tool Kit)
- 5 mm Hex tool P/N 74Y0986 (shipped in the Hand Tool Kit)
- 10 mm Socket P/N 02F3582 (shipped in the Hand Tool Kit)

2.10 Prerequisites for this Procedure

In order to perform this procedure, you will need the following information:

- 1) The location codes of the Fans to be serviced
- 2) The cage location of the DE with the Fans to be serviced
- 3) The frame number and frame serial number of the frame containing the DE with the Fans to be serviced

2.11 Service Procedure Overview

This is an overview of the tasks to be performed. Read this overview but do not perform any of the tasks yet.

3.1	ASSESS SHUTDOWN OF FILE SYSTEM <= CUSTOMER TASK	15
3.2	SHUTDOWN THE FILE SYSTEM <= CUSTOMER TASK	15
3.3	IDENTIFY THE FRAME <= SSR TASK	16
3.4	POWER OFF THE DISK ENCLOSURE <= CUSTOMER TASK	23
3.5	CONFIRM THAT 350V IS OFF TO THE DISK ENCLOSURE <= SSR TASK	23
3.6	MOVE UEPO PANEL <= SSR TASK	25
3.7	DISCONNECT CABLES, HOSES, AND RETENTION SCREWS <= SSR TASK	27
3.8	INSTALL CAM FOLLOWERS AND SLIDE DE TO SERVICE POSITION <= SSR TASK	35
3.9	POWER ON THE DE TO FAN SERVICE MODE AND REPLACE THE FANS <= SSR TASK	45
3.10	SLIDE DISK ENCLOSURE BACK INTO THE FRAME <= SSR TASK	51
3.11	POWER ON THE DISK ENCLOSURE <= CUSTOMER TASK	57
3.12	CONFIRM WITH THE CUSTOMER <= SSR TASK	58

3 SERVICE PROCEDURE

STOP – Do not proceed unless you have read “Safety Notices” which is available from InfoCenter; see Section 1.3.

3.1 Assess shutdown of file system <= CUSTOMER TASK

STEP 1 The customer must assess whether all client applications can be stopped at this time and whether the Global Parallel File System (GPFS) can be shut down at this time.

This procedure requires powering off a Disk Enclosure, which under most conditions, if the file system is active, will result in putting the file system into panic and making it unavailable. While it is technically possible to drain all the data from a Disk Enclosure before shutting it down and leave the file system active for this procedure, it is assumed impractical due to the excessive time required to move all the data.

For more details, see related document “GPFS Native RAID Administration and Programming Reference”, which can be found in InfoCenter.

If all client applications can be stopped and if GPFS can be shut down, proceed to STEP 2.

If you cannot stop the applications and file system at this time, you must wait to perform this procedure until a time when the file system can be shut down. The Disk Enclosure will continue to operate as long as at least 8 fans are operational. If enough fans fail, the Disk Enclosure can overheat and shut down which will most likely result in file system panic.

3.2 Shutdown the file system <= CUSTOMER TASK

STEP 2 Stop all client applications.

STEP 3 Shut down GPFS. Wait for complete shutdown before proceeding to STEP 4.

3.3 Identify the frame <= SSR TASK

- STEP 4 Use the procedure “Appendix A: Power775 BPC FSP Command Line Procedure” (included in Section 5 of this document) to access the BPC FSP command line of the frame containing the Disk Enclosure with the FRU needing replacement..
- STEP 5 Blink the Enclosure Identify LEDs of the DE with the FRU needing replacement by using the following command from the BPC Command Line:

This is the command syntax:

```
bpccmd -c 27<blank>0000<cage ID><FRU ID><LED blink state 00=off, 02=blink>
```

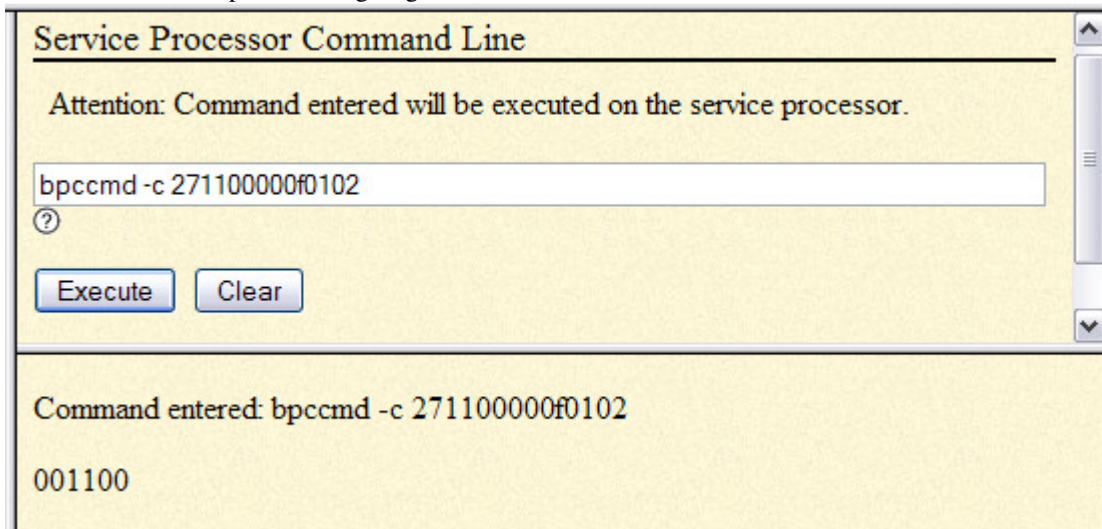
<blank>	= “11”
<cage ID>	= see Figure 6
<FRU ID>	= “01” for the DE Identify LED.
<LED state>	= “02” for this step

Type in the following, inserting the correct Cage ID DE chassis location:

```
bpccmd -c 27110000xx0102
```

Where “xx” is the Cage ID of the DE you are servicing. This field will be 05,07,09,0B,0D, or 0F (see Figure 6).

The correct return code is 001100. If you do not receive this, contact the next level of support. Below is an example assuming Cage ID=0f



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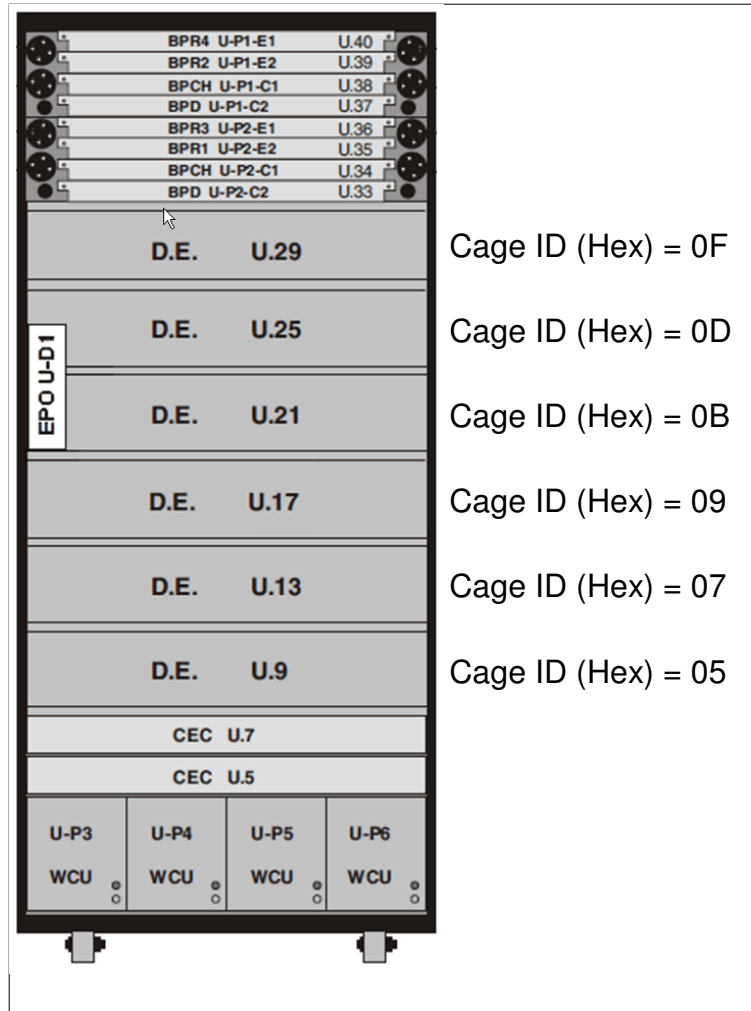


Figure 6 Disk Enclosure HEX Cage ID

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- STEP 6 Locate the frame. Confirm that it is the correct frame by checking that its UEPO Panel Identify LED is blinking. This LED is located on the UEPO panel and it is marked by the “!” symbol (see Figure 7 and Figure 8).

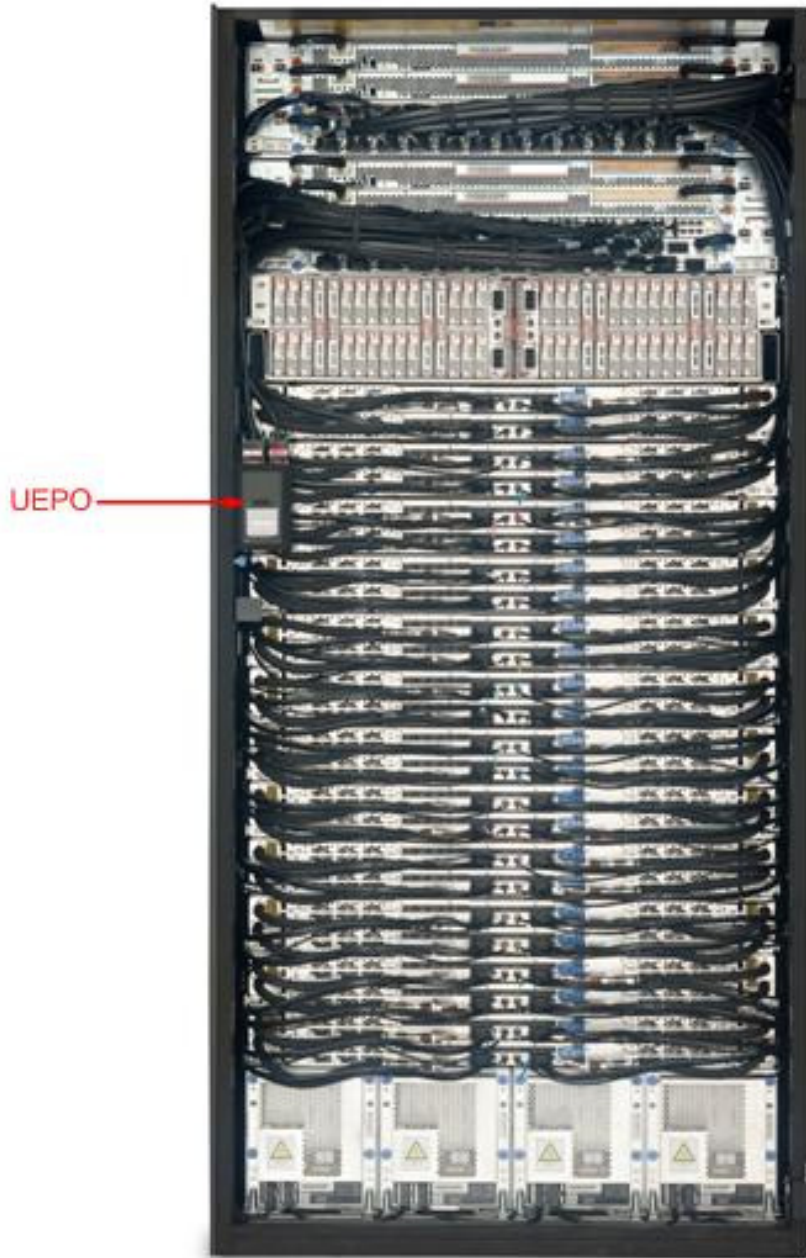


Figure 7 Frame Photo showing UEPO location

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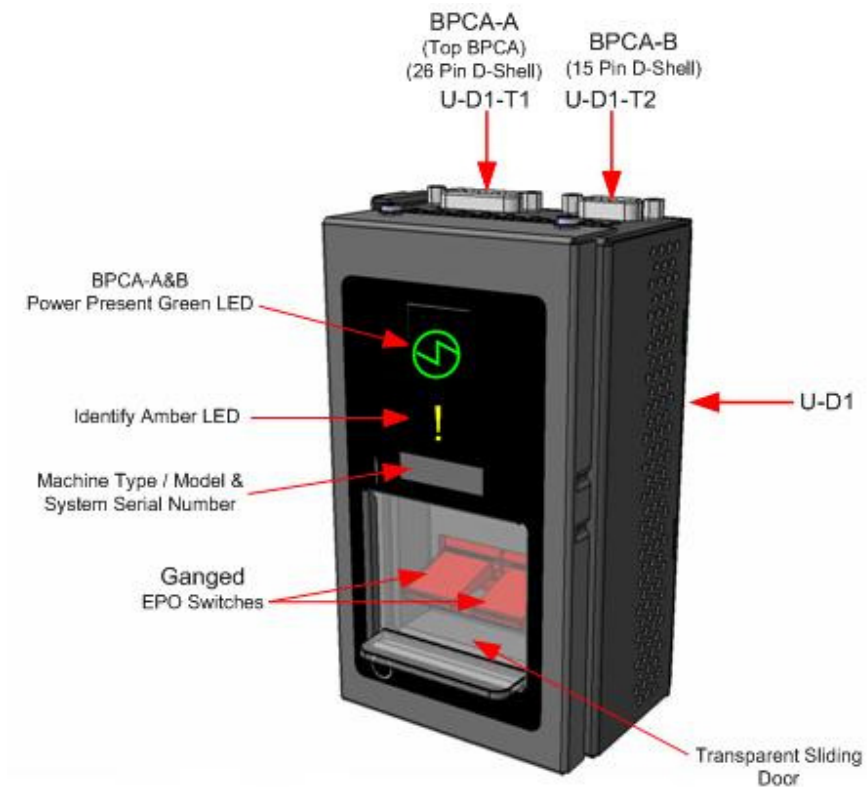


Figure 8 UEPO assembly showing frame Identify Amber LED

STEP 7 Open the front and rear doors



DANGER: Hazardous voltage present. Voltages present constitute a shock hazard, which can cause severe injury or death. (L004)

Locate the latch along the left side of the door; push in on the X button, the latch handle will pop out, extended out from the latch pocket. Grasp the latch handle and swing the door to the right (see Figure 9 and Figure 10).

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Figure 9 Door Latch



Figure 10 Door Latch handle shown extended

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STEP 8 If it will be needed for service, bring over the Ladder PN 46G5947 (shipped in the Power 775 Lift Tool Kit).

STEP 9 Identify the Disk Enclosure

Identify the Disk Enclosure with the failed fans by looking for the blinking amber Enclosure ID LEDs on the DE DCCAs on the front side of the Disk Enclosure (see Figure 11) OR on the right side of the rear of the Disk Enclosure (see Figure 12).

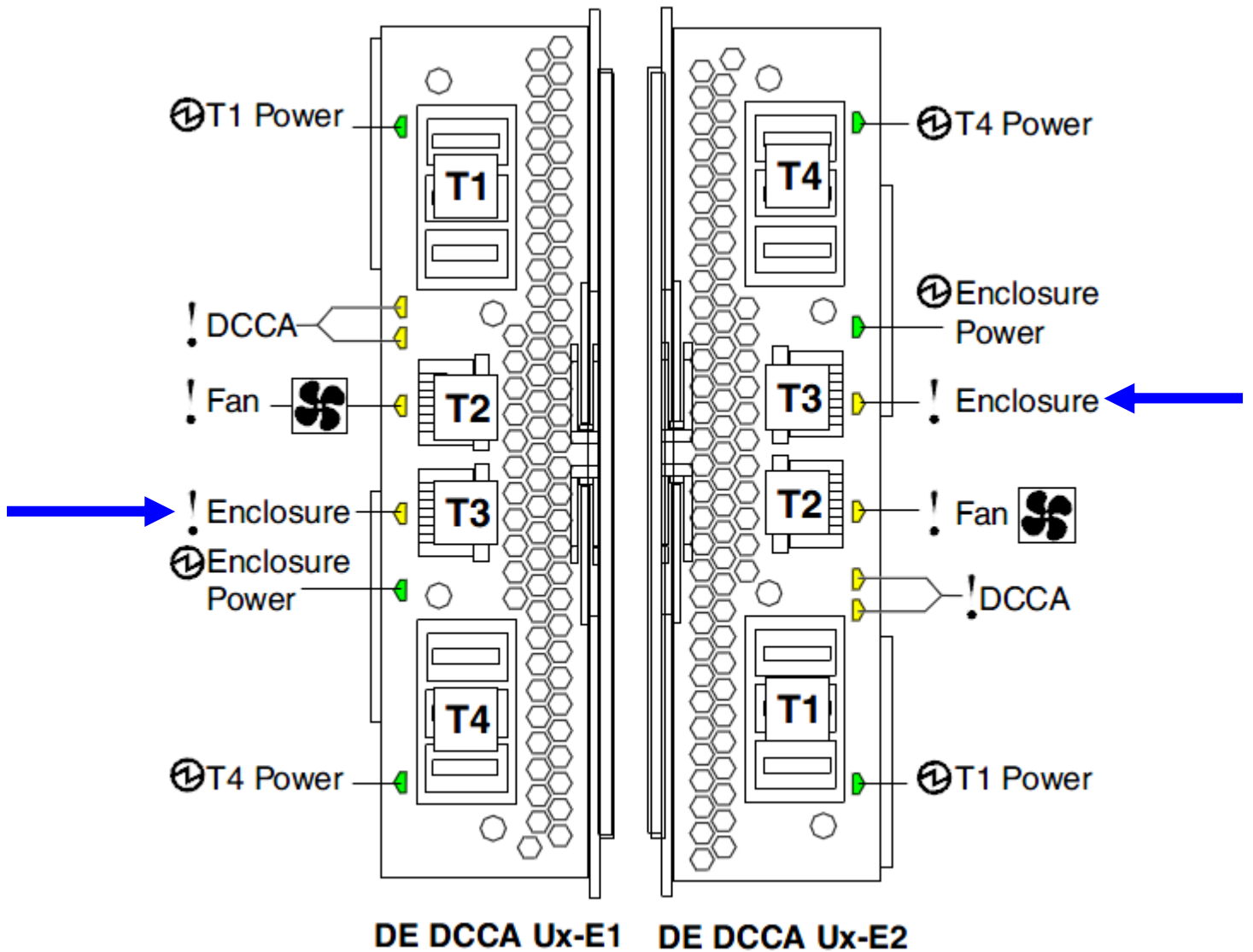


Figure 11 The Front Enclosure ID LED is located on the DE DCCAs

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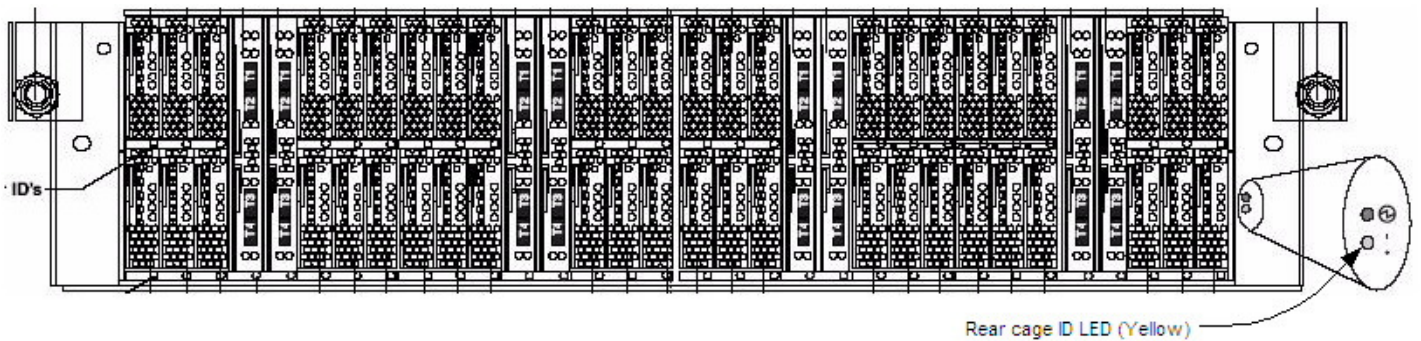


Figure 12 Rear Enclosure ID LED is located on the bottom right side of the DE

STEP 10 Check the Enclosure VPD Label

Verify that the location codes of the Fans to be replaced match the enclosure VPD Label of the DE you have identified (see Figure 5).

STEP 11 Turn off the Enclosure Identify LEDs of the DE by using the following command from the BPC FSP Command Line:

This is the command syntax:

```
bpccmd -c 27<blank>0000<cage ID><FRU ID><LED blink state 00=off, 02=blink>
```

<blank>	= "11"
<cage ID>	= see table below
<FRU ID>	= "01" for the DE Identify LED.
<LED state>	= "00" for this step

Type in the following, inserting the correct cage ID DE chassis location:

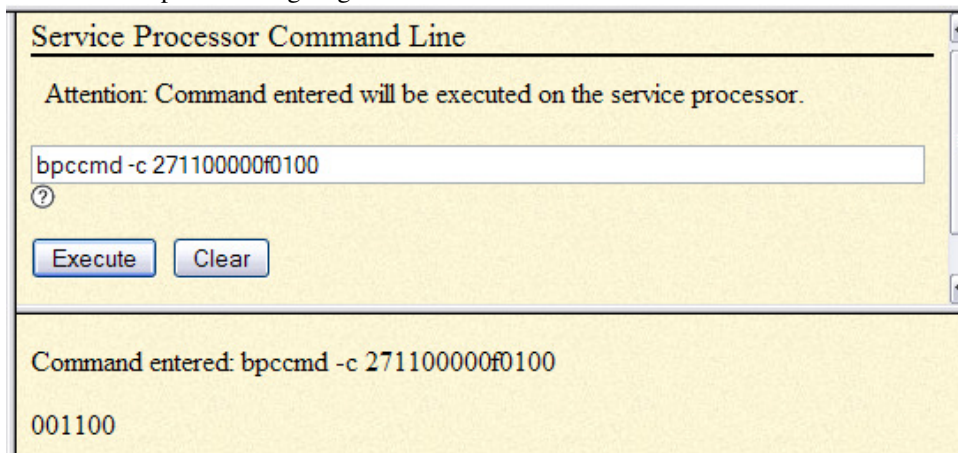
```
bpccmd -c 27110000xx0100
```

Where "xx" is the cage ID of the DE you are replacing.

This field will be 05,07,09,0B,0D, or 0F (see Figure 6).

The correct return code is 001100. If you do not receive this, contact the next level of support.

Below is an example assuming Cage ID=0f



3.4 Power off the Disk Enclosure <= CUSTOMER TASK

STEP 12 Power Off the Disk Enclosure by using the following command from the BPC Command Line:

This is the command syntax:

```
bpccmd -c 40<blank>0000<cage ID>  
  
    <blank>      = "11"  
    <cage ID>    = see Figure 6
```

Type in the following, inserting the correct cage ID for the damaged DE chassis location:

```
bpccmd -c 40110000xx
```

Where "xx" is the cage ID of the DE you are replacing. This field will be 05,07,09,0B,0D, or 0F (see Figure 6).

The correct return code is 001100. If you do not receive this, contact the next level of support.

ATTENTION: Be very careful that you are in the correct frame and that you type this command exactly as it will power off the cage you type. If you are off by just one digit, you can easily power off a CEC or DE in another cage of the frame.

3.5 Confirm that 350V is off to the Disk Enclosure <= SSR TASK

STEP 13 Confirm that 350V is off

All LEDs in the DE should now be off. If they are not, **do not proceed**. Have the customer attempt the power off again or contact the next level of support.

NOTE: It is possible for the DE to have its outputs off, but the 350V still on.

Check to make sure the green T1 and T4 350V Input Power LEDs have turned off on both DE DCCAs before proceeding (see Figure 13).

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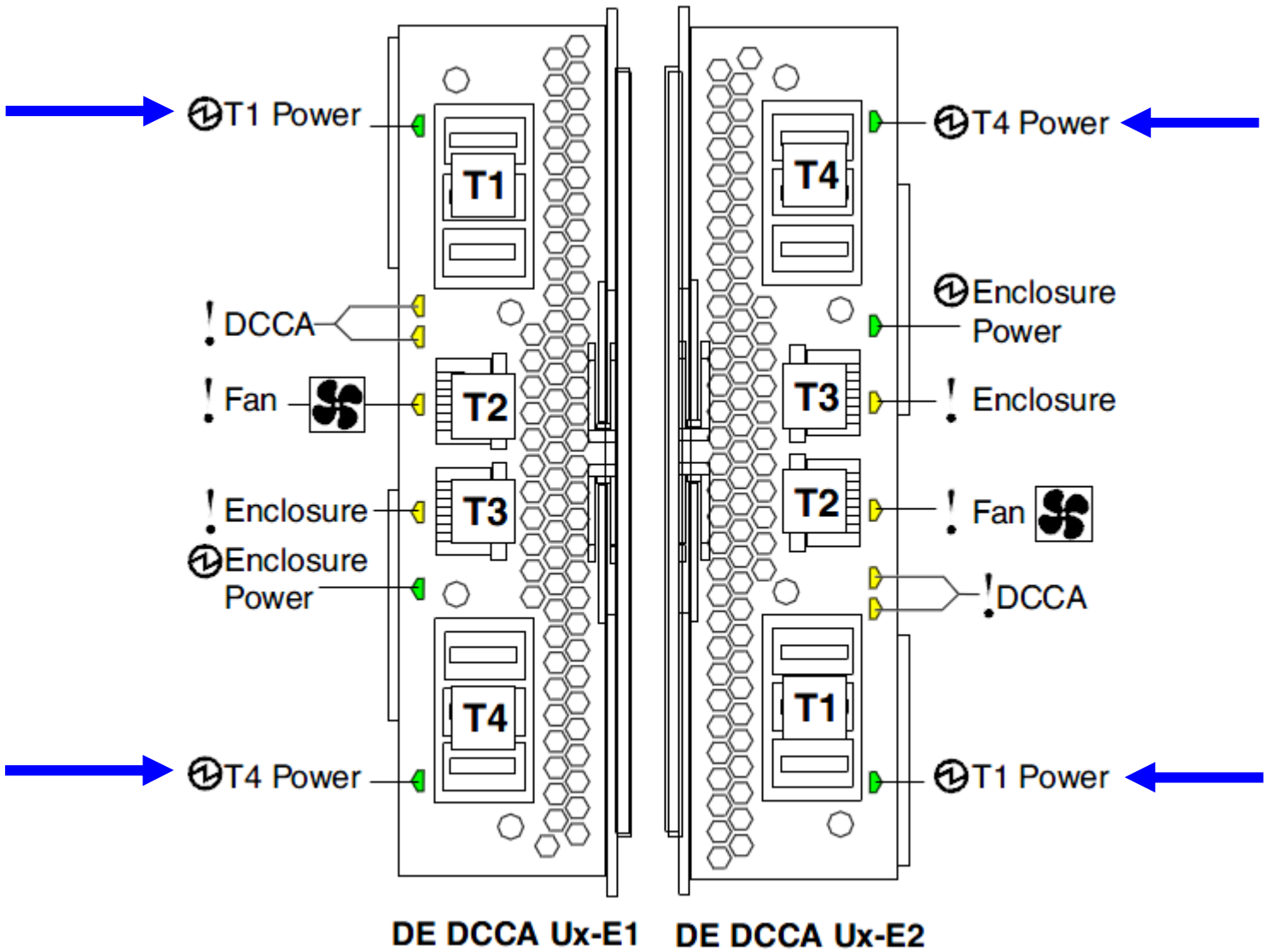


Figure 13 T1 and T4 Input Power LEDs on the DE DCCAs

3.6 Move UEPO Panel <= SSR TASK

- STEP 14 Is the Disk Enclosure being serviced located in U21 or U25 (see Figure 14)?
- If “YES”, then go to STEP 15.
 - If “NO”, then go to STEP 19.

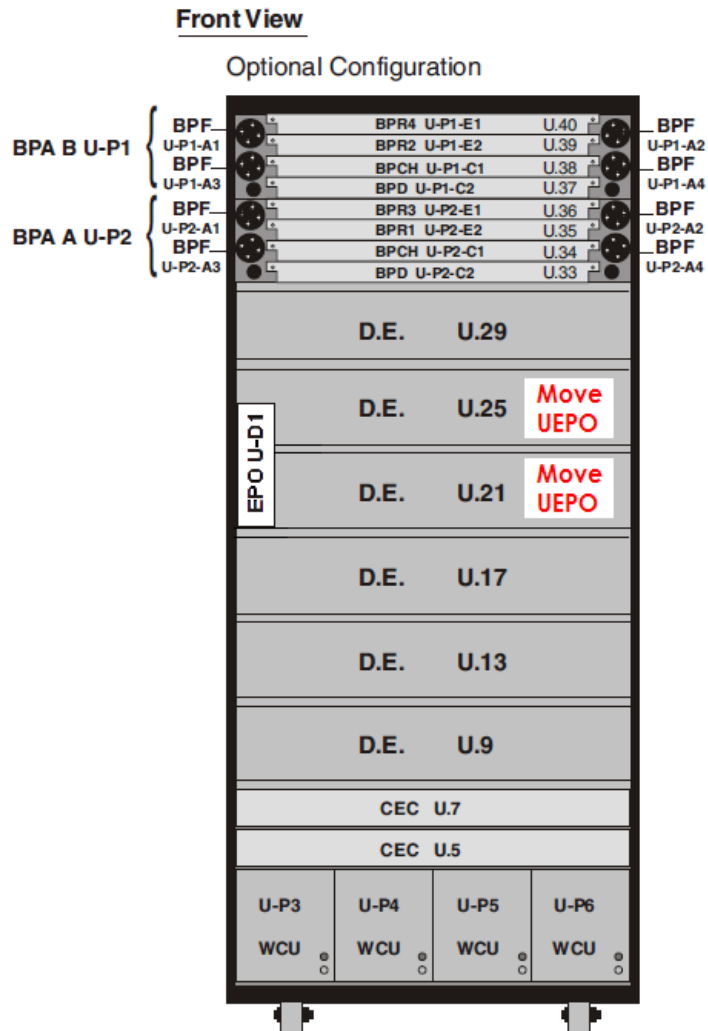


Figure 14: Disk Enclosure and UEPO Location Info

- STEP 15 **DO NOT** disconnect the UEPO cables and **DO NOT** put the UEPO switch in the “OFF” position. Loosen the blue-colored thumb screw located at the bottom of the UEPO using the Hex Driver torque tool PN 41V1059 (4mm Hex Driver 1.5-1.75 Nm) provided in the tool kit.
- STEP 16 Unhook the UEPO switch assembly from the Rack by sliding it upward and then away from the Rack.

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STEP 17 Place the UEPO in the “Frame UEPO Service Position” in the Rack (see Figure 15).

Upper UEPO Mounting Bracket

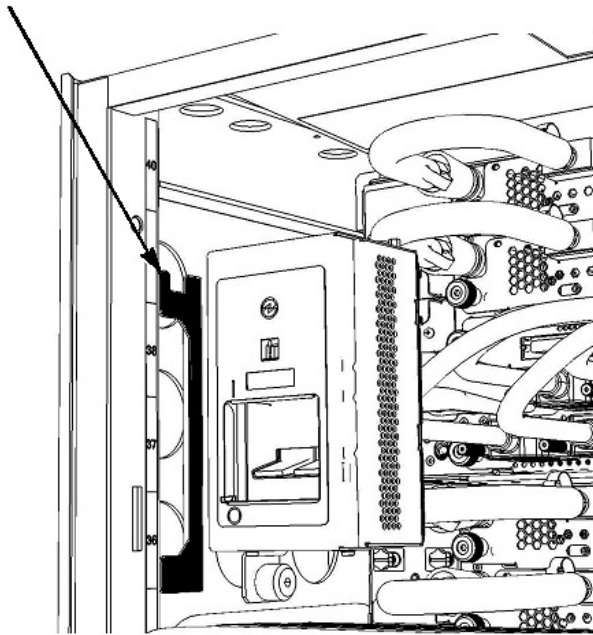


Figure 15: Frame UEPO Service Position

STEP 18 Hand tighten the UEPO blue thumb screw to secure the UEPO in the Rack.

3.7 Disconnect Cables, Hoses, and Retention Screws <= SSR TASK

STEP 19 Disconnect the four DCCA Service Network Communications (E/NET) cables from both DE DCCAs by depressing the “retention clip” (see Figure 16 and Figure 17). **All cables should be labeled to help when recabling the DE.** If any of these cables are not labeled, label them now.

Find the cable that was connected to and labeled DCCA1-T2. Connect this cable to Cable Assembly E/NET (test tool) P/N 45D8000 (shipped in Power 775 Fill & Drain Tool Kit). If the test tool is not labelled, follow the E/NET cable to the other end and label it T2. Do not connect it to the DCCA at this time.

Find the cable that was connected to and labeled DCCA1-T3. Connect this cable to Cable Assembly E/NET (test tool) P/N 45D8000 (shipped in Power 775 Fill & Drain Tool Kit). If the test tool is not labelled, follow the E/NET cable to the other end and label it T3. Do not connect it to the DCCA at this time.

Tools required:

Cable Assembly E/NET (test tool) P/N 45D8000 (shipped in Power 775 Fill & Drain Tool Kit)

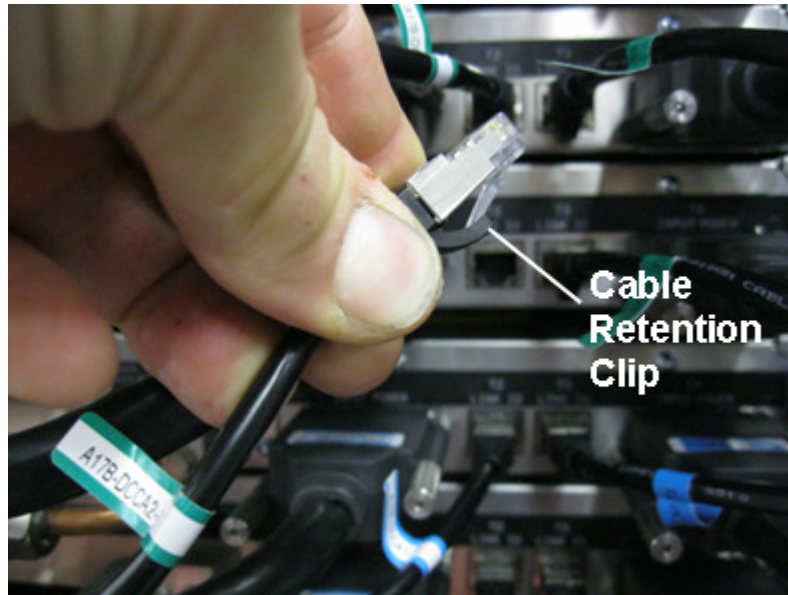


Figure 16: DCCA Service Network Communications (E/NET) Cable

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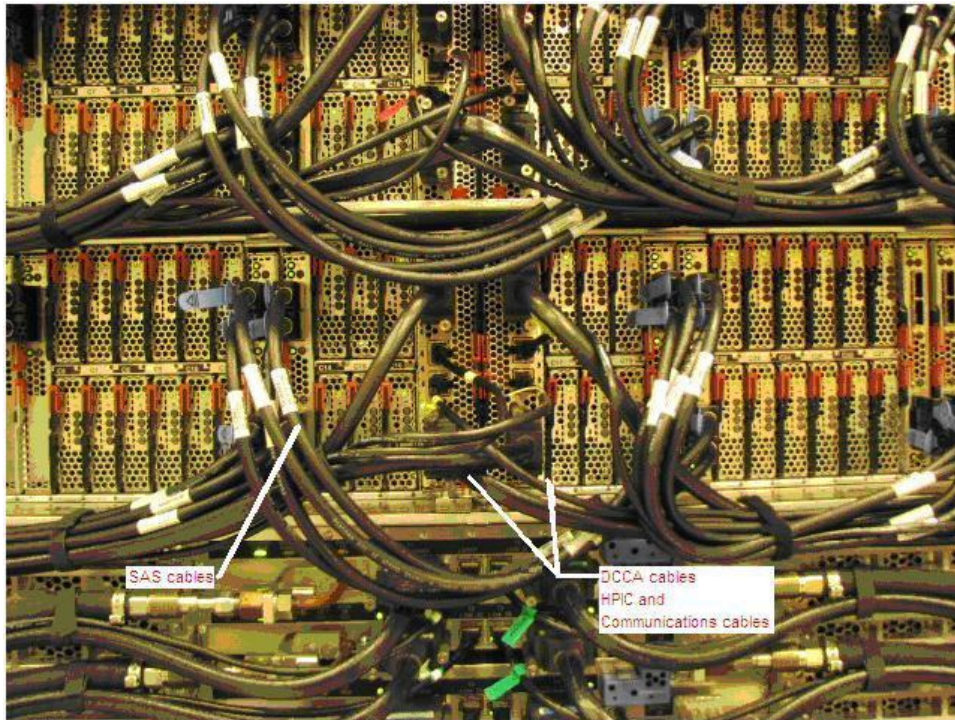


Figure 17 DE cabling

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STEP 20 CAUTION: Following the service procedure assures power is removed from 350 VDC power distribution connectors before they are unplugged. However, unplugging 350 VDC power distribution connectors while powered on, should not be done because it can cause connector damage and could result in burn and/or shock injury from electrical arcing. (C039)

Using the 2mm Hex Torque Driver P/N 74Y0983, disconnect the four DCCA Power Cables (HPICs) from the DE DCCAs (see Figure 18). **All cables should be labeled to help when re-cabling the DE.** If any of these cables are not labeled, label them now.

Find the cable that was connected to and labeled DCCA1-T1. Connect this cable to Cable Assembly, HPIC tool P/N 45D7998 (shipped in Power 775 Fill & Drain Tool Kit), using 0.07Nm torque. If the HPIC tool is not labelled, follow the HPIC cable to the other end and label it T1. Do not connect it to the DCCA at this time.

Find the cable that was connected to and labeled DCCA1-T4. Connect this cable to Cable Assembly, HPIC tool P/N 45D7998 (shipped in Power 775 Fill & Drain Tool Kit), using 0.07Nm torque. If the HPIC tool is not labelled, follow the HPIC cable to the other end and label it T4. Do not connect it to the DCCA at this time.

Tools required:

2mm Hex Torque Driver P/N 74Y0983

Cable Assembly, HPIC tool P/N 45D7998 (shipped in Power 775 Fill & Drain Tool Kit)

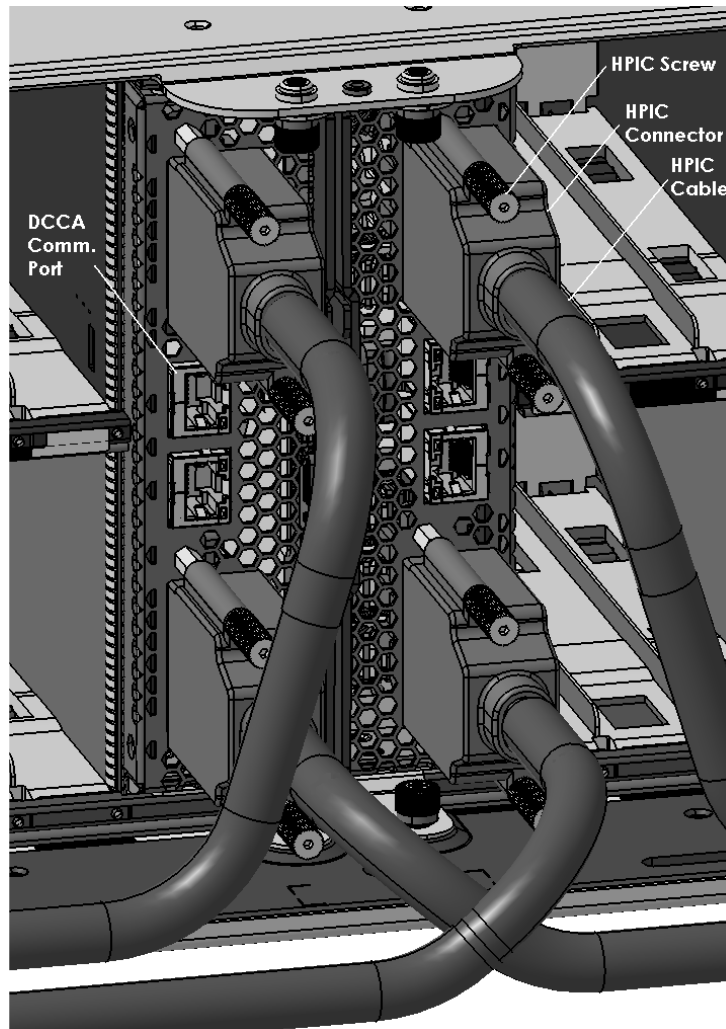


Figure 18 Disk Enclosure DCCA Power Cables (HPIC)

Power775 Disk Enclosure Fan Service Procedure

STEP 21 Identify the SAS cables that need to be disconnected and disconnect them.

The SAS cables connect to Port Card in the front and rear of the DE. All cables should be labeled to help when re-cabling the DE. Find the SAS cables that connect the DE to CECs. **If any of these cables are not labeled, label them now.** Disconnect these cables from the DE. There will be up to 32 such cables (see Figure 19). You may have to remove some of the velcro ties in order to disconnect the cables.

There may also be SAS cables that connect Port Cards in the DE to other Port Cards in the same DE; e.g. if the DE is cascaded. Do not disconnect these cables. Make sure they are dressed sufficiently that they do not get stuck on anything when you slide out the DE in a later step.

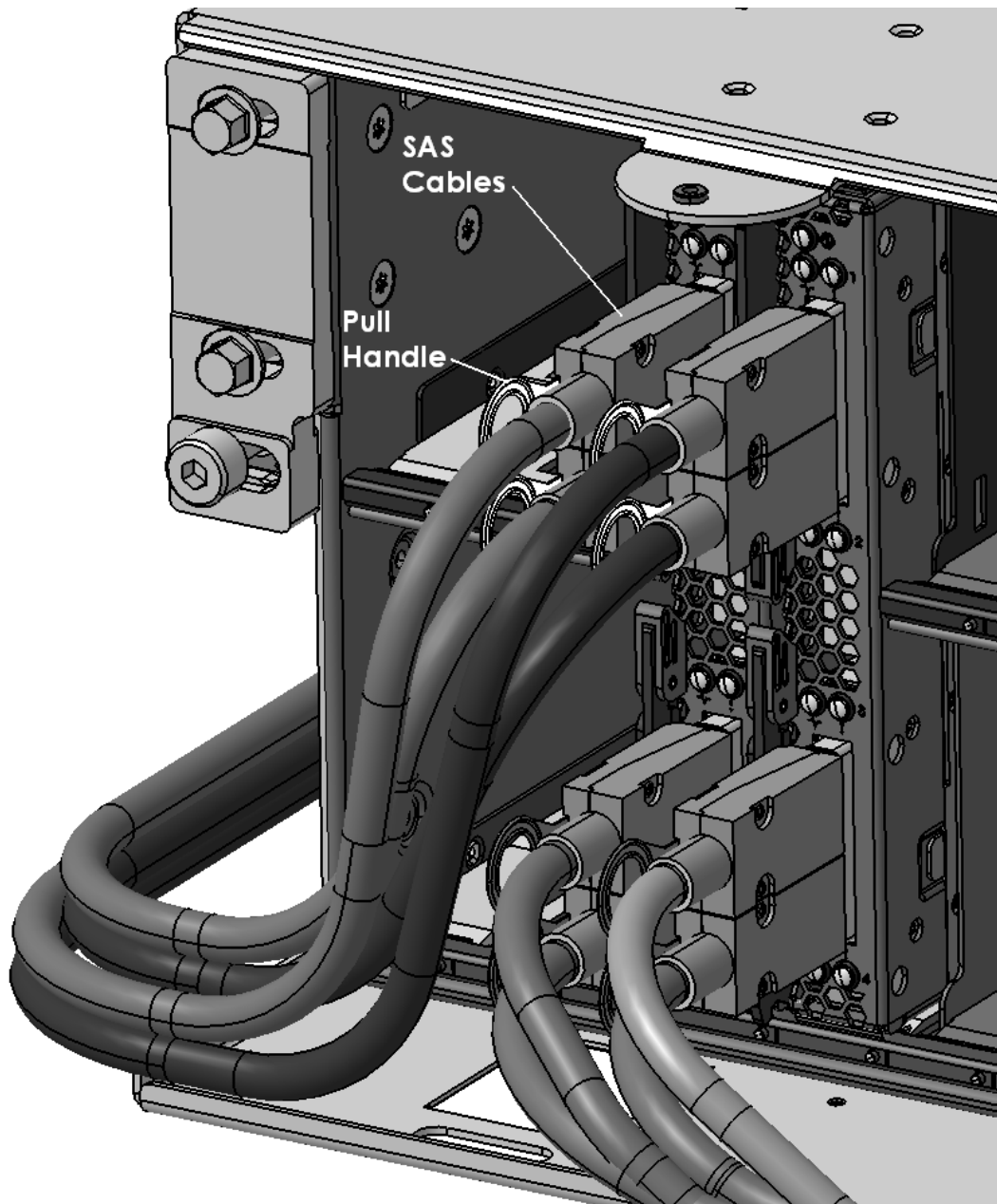


Figure 19: Disk Enclosure Port Card Cabling

Power775 Disk Enclosure Fan Service Procedure

STEP 22 Locate the two Front Rail Block Captive Allen head screws (one on the left side and one on the right side of the DE) which hold the Front Rail Block to the DE Rails (see Figure 20).

Loosen these screws using the 5mm Hex Torque Tool PN 74Y0986 (shipped in the Hand Tool Kit). Rotate the 4 screws counterclockwise until they are free from the DE.

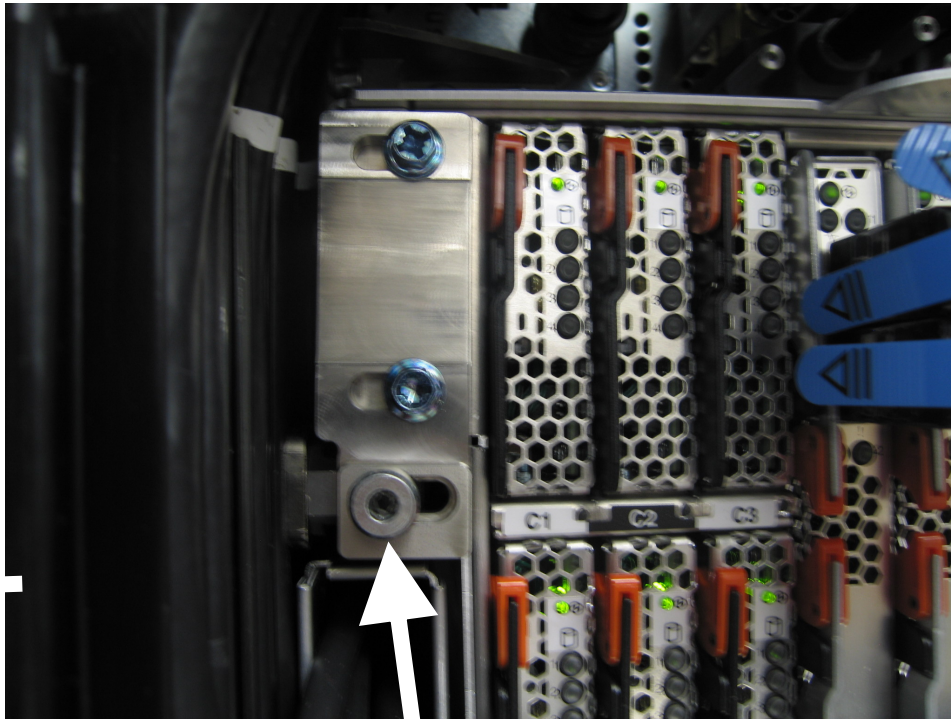


Figure 20 Photo of Front Rail Block Captive Screw

STEP 23 Determine if the Front Rail Blocks will interfere with any cables (which will damage the cables). If you are sure they will not interfere, you can leave them attached.

If they will interfere with any cables, remove the Front Rail Blocks by loosening the four Front Rail Block Hex Screws (two on the left side, and two on the right side of the DE) (see Figure 21) using the following tools:

- Ratchet handle P/N 6428240 (shipped in the Hand Tool Kit)
- Extension (18") P/N 46K2707 (shipped in the Hand Tool Kit)
- 10 mm Socket P/N 02F3582 (shipped in the Hand Tool Kit)

If you have removed the Front Rail Blocks, store the blocks and hex screws for reinstalling later.

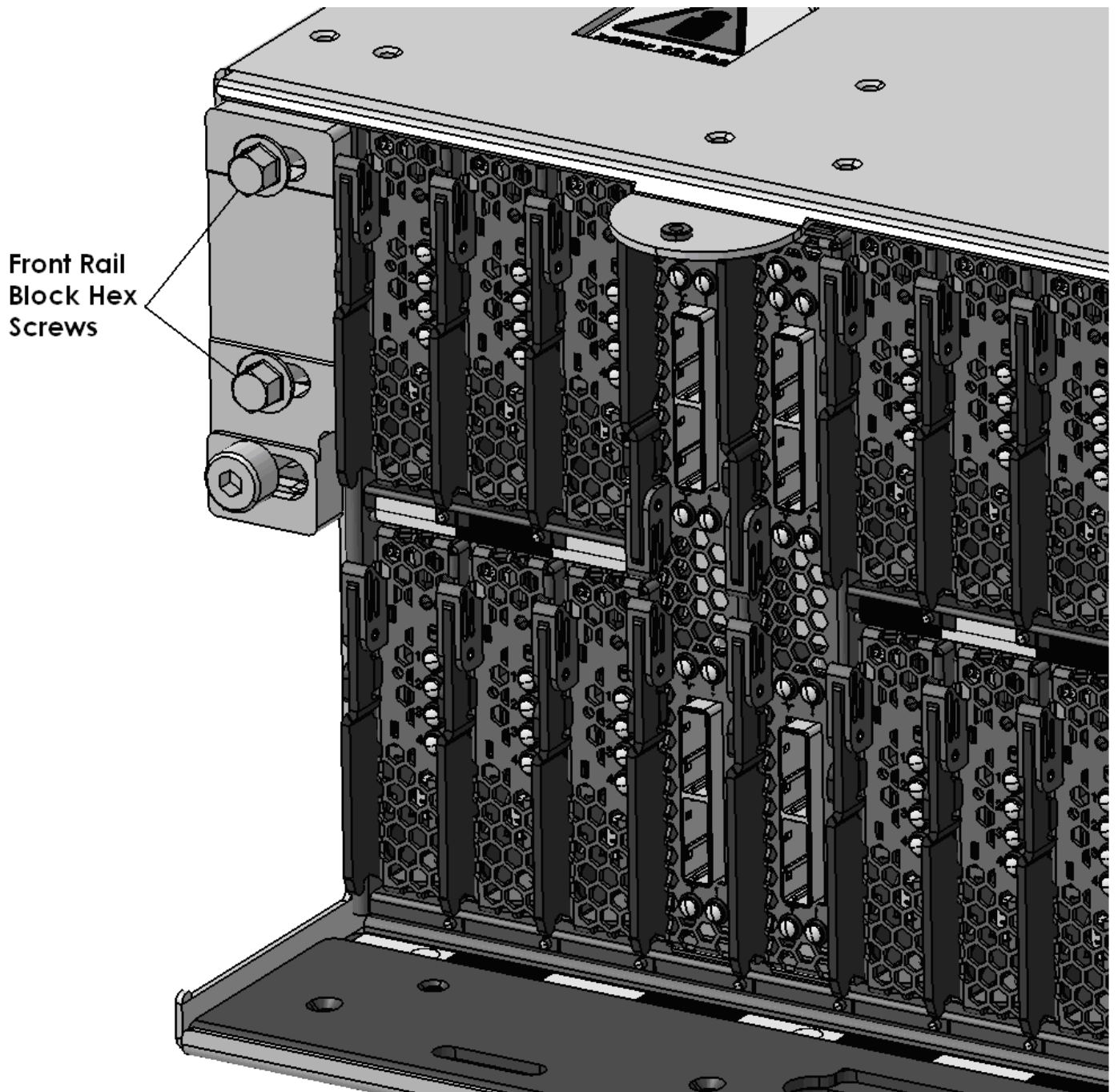


Figure 21: Front Rail Block Screws

Power775 Disk Enclosure Fan Service Procedure

STEP 24 Disconnect the 2 Water Hoses from the rear of the Disk Enclosure by pulling the retaining ring on the hose (see Figure 22 Water Hose Connector).

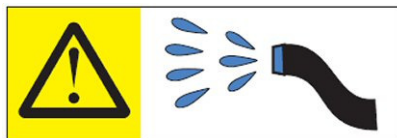
CAUTION: The water-based coolant solution may contain an additive intended to inhibit corrosion (or provide other functions). The solution may cause irritation to the skin or eyes. Avoid direct contact with the solution. Employ appropriate Personal Protective Equipment when performing operations involving the coolant or which may potentially expose you to the coolant. Refer to the MSDS for more information. (C037)



CAUTION: Protective eyewear is needed for the procedure. (L011)



CAUTION: Chemical resistant gloves are needed for this procedure. (L014)



DANGER: Risk of electric shock due to water or a water solution which is present in this product. Avoid working on or near energized equipment with wet hands or when spilled water is present. (L016)

ATTENTION: Observe the 4 safety notices above for all future steps involving attaching or disconnecting water hoses.

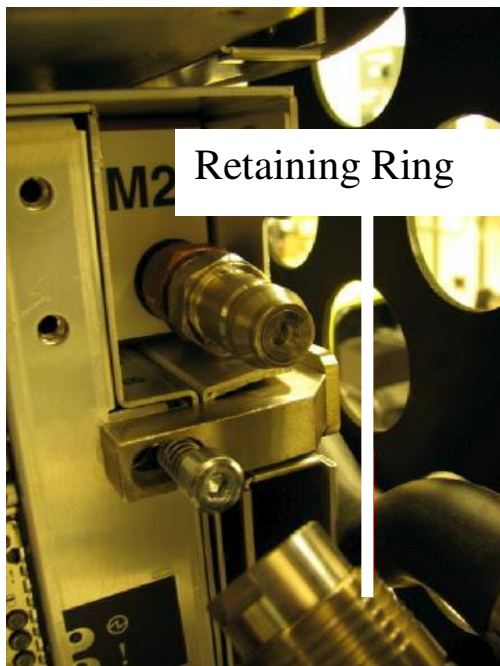


Figure 22 Water Hose Connector

Power775 Disk Enclosure Fan Service Procedure

STEP 25 Locate the two Rear Rail Block Captive Allen head screws (one on the left side and one on the right side of the DE) which hold the Rear Rail Block to the Rack Slide-Rails (see Figure 23).

Loosen these screws using the 5mm Hex Torque Tool PN 74Y0986 (shipped in the Hand Tool Kit). Rotate the 4 screws counterclockwise until they are free from the DE.

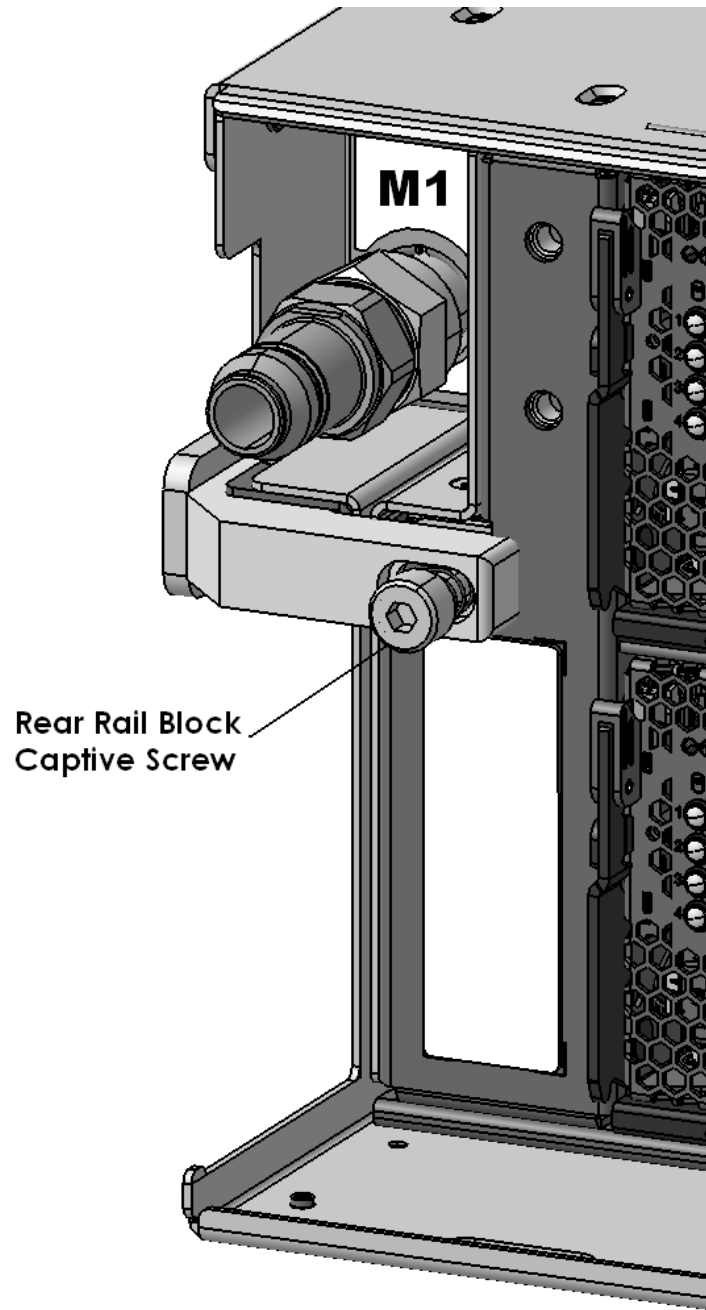


Figure 23: Disk Enclosure Rear Rail Block Captive Screws

3.8 Install Cam Followers and Slide DE to Service Position <= SSR TASK

STEP 26 Move the Cam Followers from the storage position near EIA 5 in the lowest slot in the frame (see Figure 19 and 20) to the location of the Disk Enclosure with the failed fans.



DANGER: Risk of injury due to heavy components falling from rack if the supplemental supports are not installed. (L019)

ATTENTION: The supplemental supports (Cam Followers) must be installed for the CEC or DE slide out service.

In order to do this, unscrew the shipping screws of the left and right cam followers (see Figure 24) and keep the screws to reinstall later.

Remove the cam followers from their storage location. The cam followers are removed by pulling out the plunger and sliding the cam follower up.

Install the cam followers in the frame slot of the Disk Enclosure with the failed fans. Slide the cam follower hook into the slot so the roller aligns with Disk Enclosure channels, and then insert pin into frame rail (see Figures 21 to 24).

Power775 Disk Enclosure Fan Service Procedure

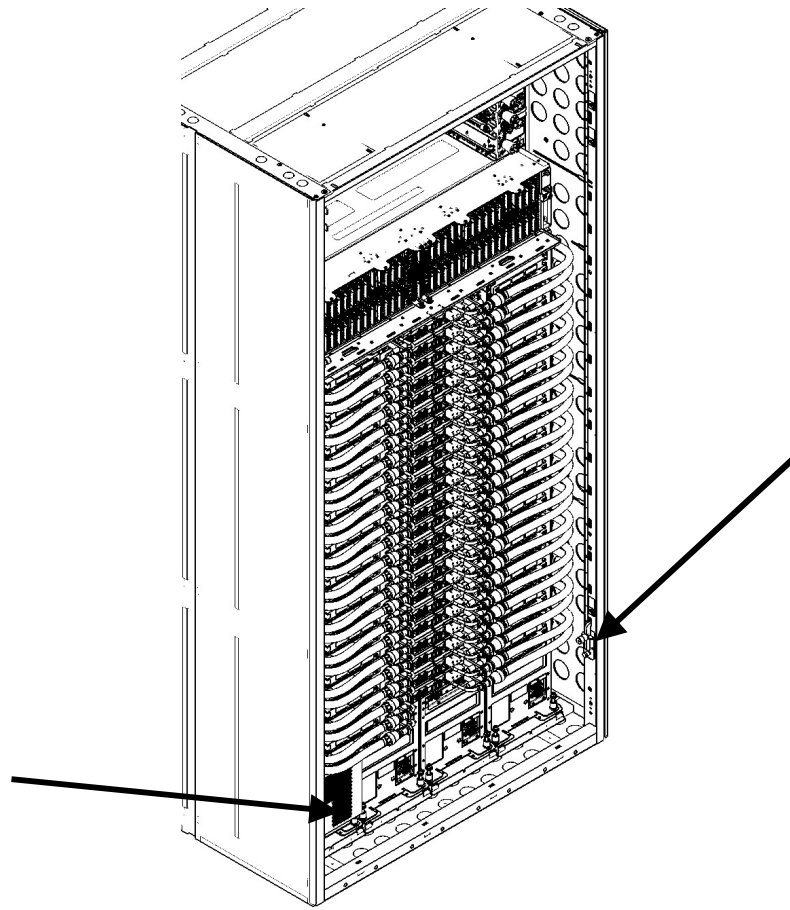


Figure 24 Cam Follower Storage Location Drawing

Power775 Disk Enclosure Fan Service Procedure

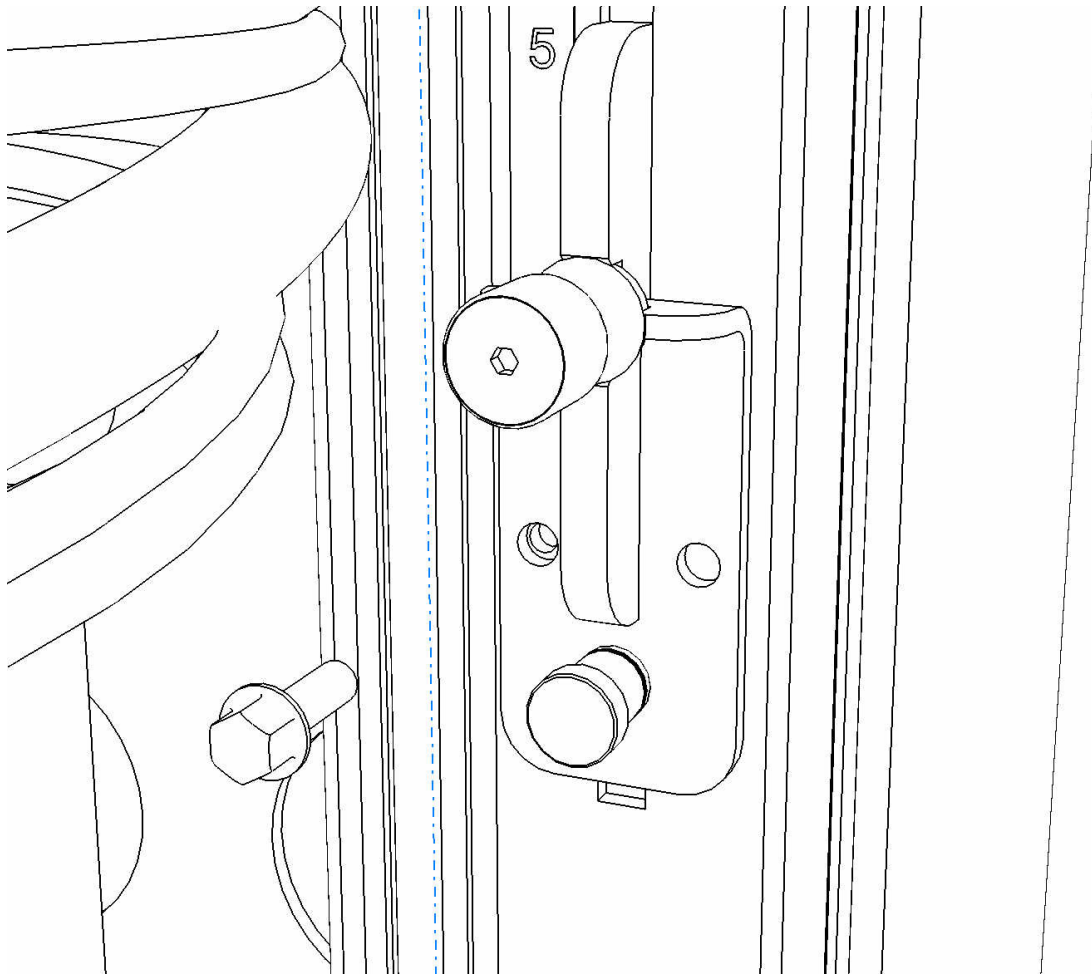


Figure 25 Cam Follower Drawing – in storage location at EIA 5 – zoomed in

Power775 Disk Enclosure Fan Service Procedure



Figure 26 Cam Followers Picture



Figure 27 Left Cam Follower



Figure 28 Right Cam Follower

Power775 Disk Enclosure Fan Service Procedure

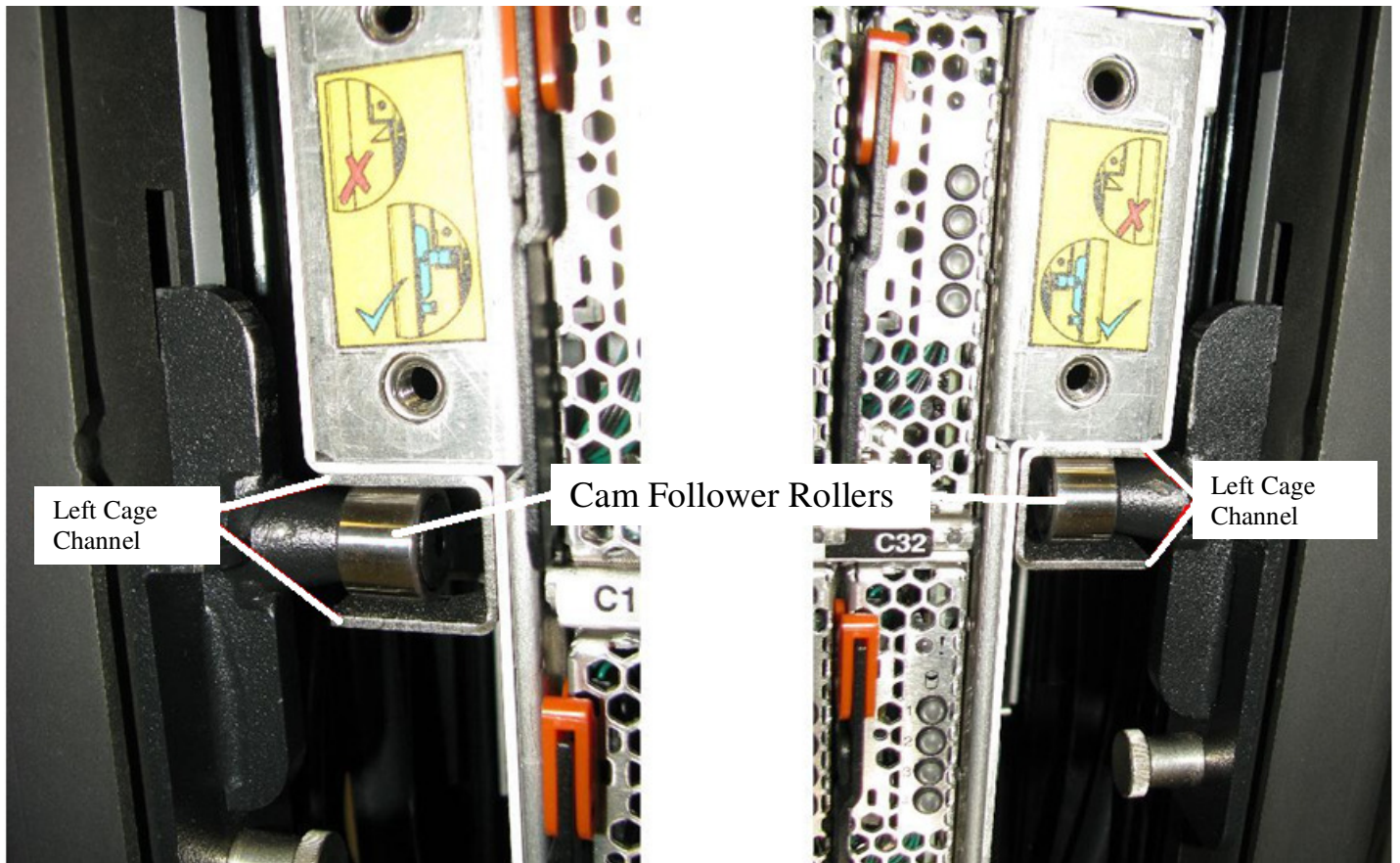


Figure 29 Cam Follower engaged in Disk Enclosure channels

Power775 Disk Enclosure Fan Service Procedure

STEP 27 Slowly slide the Disk Enclosure to service position, observing the following notices and instructions below.

DANGER: Heavy equipment — personal injury or equipment damage might result if mishandled. (D006)



DANGER: Rack-mounted devices are not to be used as shelves or work spaces. (L002)



CAUTION: System or part is heavy. The label is accompanied by a specific weight range. (L009)
The Disk Enclosure weighs about 550 lbs (250 kg) when full.



DANGER: Risk of injury due to heavy components falling from rack if the supplemental supports are not installed. (L019)

ATTENTION: The supplemental supports (Cam Followers) must be installed for the CEC or DE slide out service.



CAUTION: Do not pull out more than one drawer at a time. The rack might become unstable if you pull out more than one drawer at a time. (L024)

Check carefully that all cables are out of the way of the top, bottom, sides, and **especially the corners** of the DE.

For this operation it may be necessary to use Ladder P/N 46G5947 shipped with the POWER 775 Lift Tool Kit. Grasping the blue-purple recessed touch points on the cable tray (see Figure 30), slide the disk enclosure forward slowly, checking that the cam followers were placed in the correct position and that the DE channels are supported by the cam followers as you slide out the DE.

Slowly slide the DE until the fan cover is fully exposed. One of the two safety latches will engage to stop the DE from sliding, just after the fan cover is exposed (see Figure 31 and Figure 32).

ATTENTION: Do not go under or reach under the DE while it is at service position

Power775 Disk Enclosure Fan Service Procedure

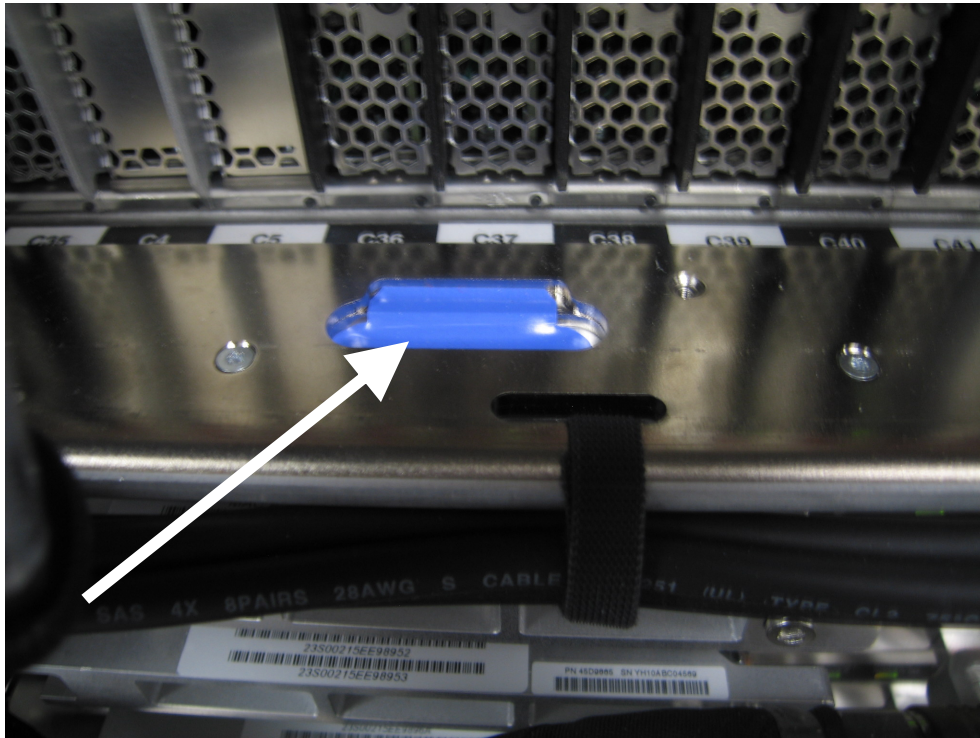


Figure 30 Blue-purple Recessed Touch Points



Figure 31 Photo of Disk Enclosure in service position

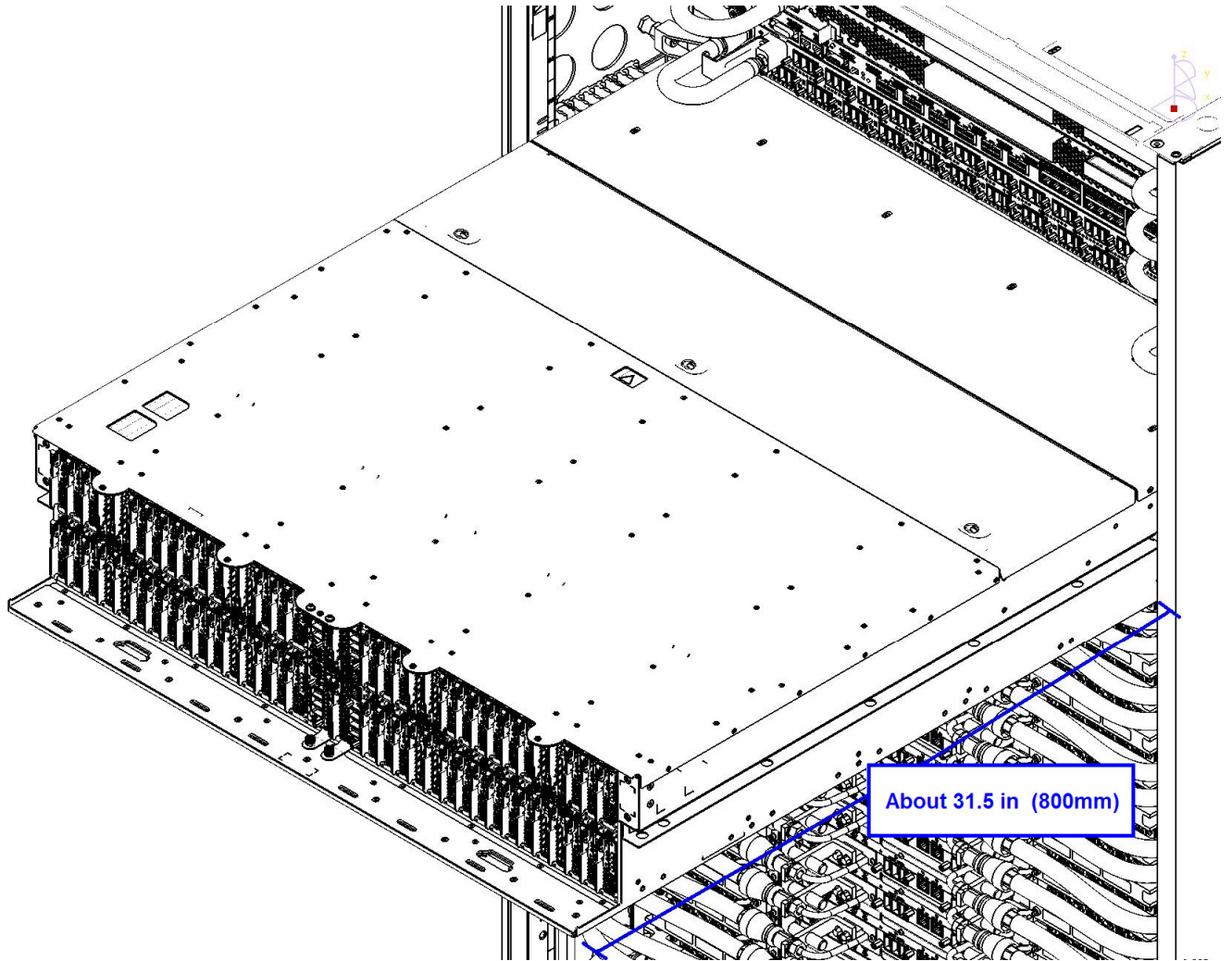


Figure 32 DE Extraction distance (edge of frame to tip of cable tray)

Power775 Disk Enclosure Fan Service Procedure

STEP 28 Attach the HPIC tool (45D7998) and E/NET (45D8000) extension cable assemblies to DCCA1

ATTENTION: Do not go under or reach under the DE while it is at service position.

In STEP 19 and STEP 20, the extension cables were attached to the existing cables that were disconnected from DCCA1. The extension cables were labeled T1,T2,T3 and T4. Now attach the HPIC and E/NET assemblies to DCCA1 (see Figure 28) using the 2mm Hex Torque Driver P/N 74Y0983 with a torque of 0.07Nm.

Care must be taken to insure that the cables are connected correctly. The HPIC extension tool must connect HPIC cable DCCA1-T1 to DE DCCA1 connector T1, and HPIC cable DCCA1-T4 to DE DCCA1 connector T4. The E/NET extension tool must connect E/NET cable DCCA1-T2 to DE DCCA2 connector T2, and E/NET cable DCCA1-T3 to DE DCCA2 connector T3.

Tools required:

2mm Hex Torque Driver P/N 74Y0983

Cable Assembly, HPIC tool P/N 45D7998 (shipped in Power 775 Fill & Drain Tool Kit)

Cable Assembly E/NET (test tool) P/N 45D8000 (shipped in Power 775 Fill & Drain Tool Kit)

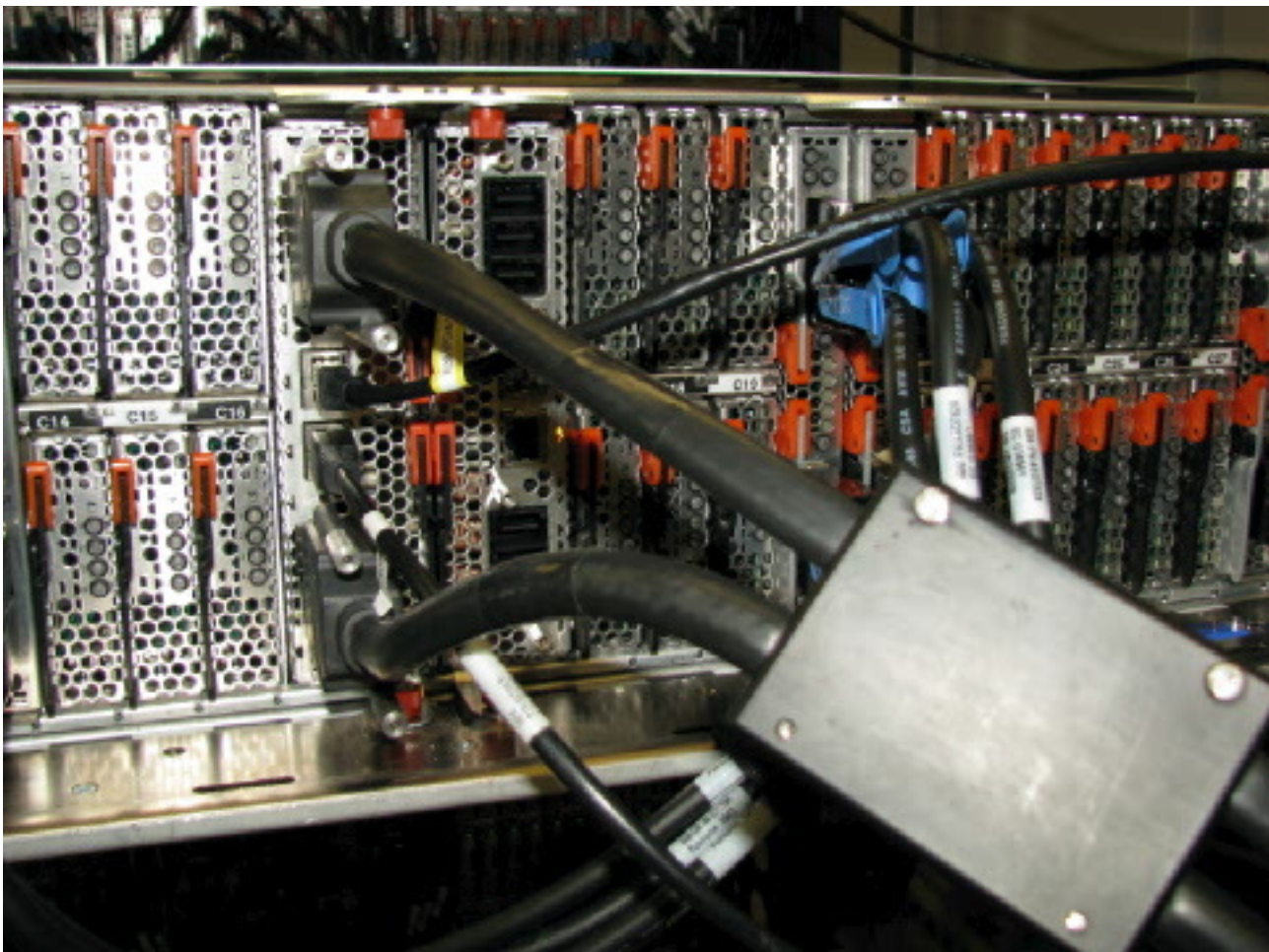


Figure 33 Extender cables attached to DCCA1

Power775 Disk Enclosure Fan Service Procedure

STEP 29 Open fan cover (1/4 turn fasteners)

For this step please refer to Figure 29. Locate the fan cover and the three 1/4 turn fasteners. Lift the handle on the 1/4 turn fasteners and rotate them 1/4 turn counterclockwise. Lift the fan cover off the box. For this operation it may be necessary to use Ladder P/N 46G5947 shipped with the POWER 775 Lift Tool Kit.

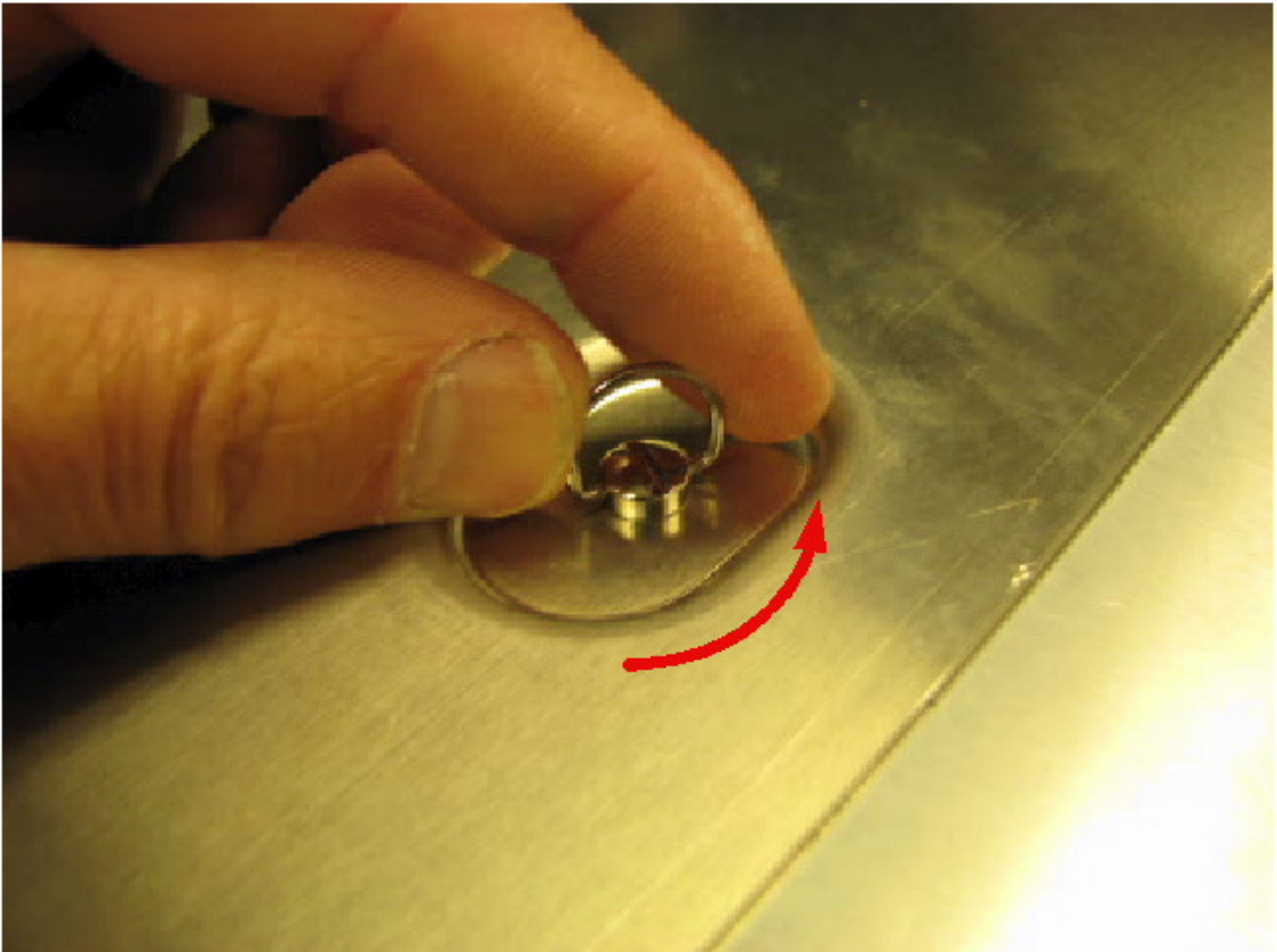


Figure 34 1/4 turn fastener fan cover removal

3.9 Power on the DE to Fan Service Mode and replace the fans <= SSR TASK

STEP 30 Power On the Disk Enclosure to Fan Service Mode from the BPC FSP command line by using the following command:

This is the command syntax:

```
bpccmd -c 11<blank>00<version><Cage ID><FRU ID>
```

<blank>	= "11"
<version>	= "02" This is the version to activate the DE in Fan Service Mode
<Cage ID>	= see Figure 6
<FRU ID>	= "90" to select DCCA1

Type in the following, inserting the correct Cage ID for the DE you are servicing:

```
bpccmd -c 11110002xx90
```

Where "xx" is the Cage ID of the DE you are servicing. This field will be 05,07,09,0B,0D, or 0F (see Figure 6).

The correct return code is 001100. If you do not receive this, contact the next level of support.

ATTENTION: If the DE powers down during STEPs 31-34, mark the HPIC tool (45D7998) as bad, skip to STEP 36 to power off the DE, and then throw out the HPIC tool and get a new one. The DE is designed to power off if there is a problem with the HPIC tool safety ground wiring, and this is why you must throw out the HPIC tool.

Power775 Disk Enclosure Fan Service Procedure

STEP 31 Blink the Fan Identify LED for the each Fan you are replacing by using the following command from the BPC Command Line:

This is the command syntax:

```
bpccmd -c 27<blank>0000<case ID><FRU ID><LED blink state 00=off, 02=blink>
```

<blank> = "11"
 <case ID> = see Figure 6
 <FRU ID> = see Table 4 for the DE Identify LED.
 <LED state> = "02" for this step

Type in the following, inserting the correct cage ID DE chassis location:

```
bpccmd -c 27110000xxyy02
```

"xx" is the cage ID of the DE you are replacing. This field will be 05,07,09,0B,0D, or 0F (see Figure 6).

"yy" is the "<FRU ID>". Choose this based on the "FAN position" column in Table 5.

The correct return code is 001100. If you do not receive this, contact the next level of support.

FAN position	Example command	<FRU ID>	02 = BLINK '00 = OFF
FAN1 (A1)	bpccmd -c 27110000xxB002	B0	02
FAN2 (A2)	bpccmd -c 27110000xxB102	B1	02
FAN3 (A3)	bpccmd -c 27110000xxB202	B2	02
FAN4 (A4)	bpccmd -c 27110000xxB302	B3	02
FAN5 (A5)	bpccmd -c 27110000xxB402	B4	02
FAN6 (A6)	bpccmd -c 27110000xxB502	B5	02
FAN7 (A7)	bpccmd -c 27110000xxB602	B6	02
FAN8 (A8)	bpccmd -c 27110000xxB702	B7	02
FAN9 (A9)	bpccmd -c 27110000xxB802	B8	02
FAN10 (A10)	bpccmd -c 27110000xxB902	B9	02
FAN11 (A11)	bpccmd -c 27110000xxBA02	BA	02
FAN12 (A12)	bpccmd -c 27110000xxBB02	BB	02

Table 4 Format for BPC command to blink a DE Fan ID LED.

Power775 Disk Enclosure Fan Service Procedure

STEP 32 Locate fans to be replaced

The failing fan ID LEDs should be blinking showing which fans are to be replaced (see Figure 30). Confirm also the A1..A12 location labels against the location codes of the failed fans. For the this and the next several STEPs, it may be necessary to use Ladder P/N 46G5947 shipped with the POWER 775 Lift Tool Kit.

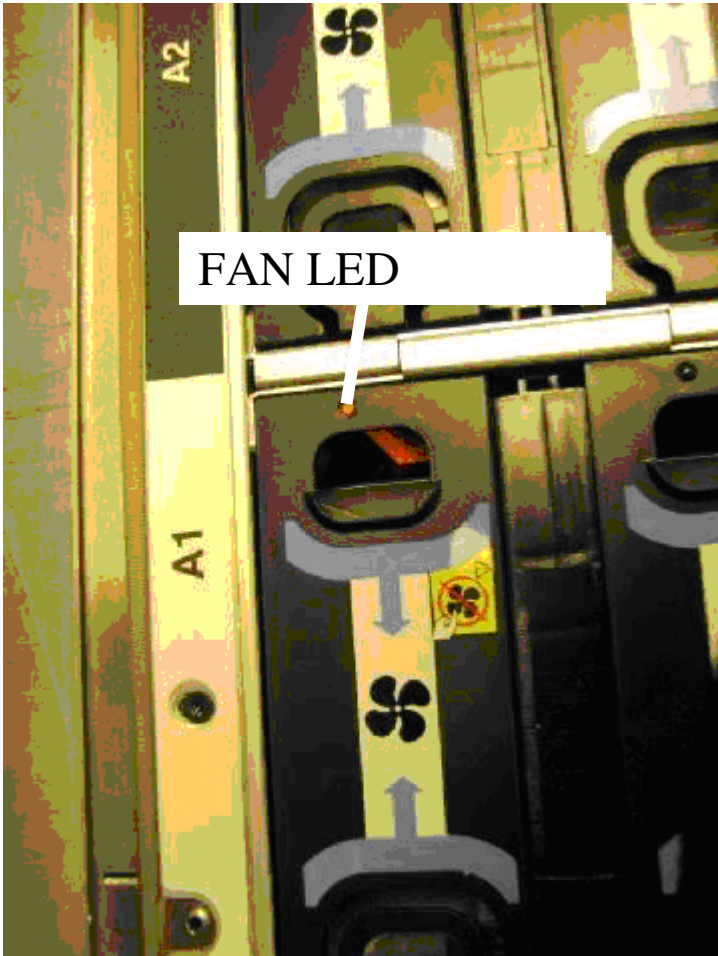


Figure 35 Fan failure ID LED

Power775 Disk Enclosure Fan Service Procedure

- STEP 33 Remove the fans by pulling the retention rings toward each other and lifting the fan out of the DE (see Figure 36 and Figure 37).



CAUTION: Hazardous moving parts nearby. (L008)

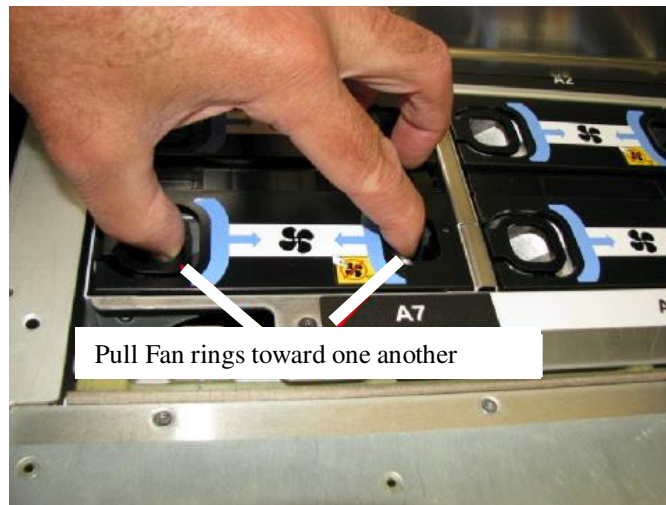


Figure 36 Fan removal rings

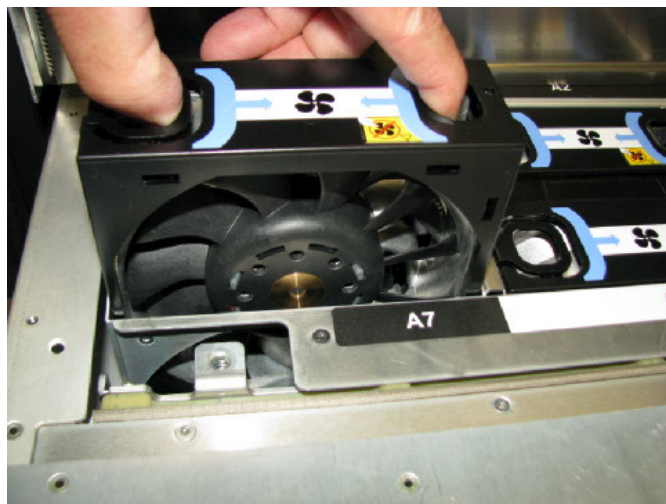


Figure 37 Lift fan out of disk enclosure

Power775 Disk Enclosure Fan Service Procedure

STEP 34 Insert replacement fans

Insert a new fan assembly into each open slot (see Figure 38). When fully seated, the fan will be latched into the Disk Enclosure. Pull up on one fan ring to check if the fan is fully seated. Never force the fan down. If the fan is not seating properly, remove the fan and straighten the floating blind mate connector.



Figure 38 Fan blind mate connector

Power775 Disk Enclosure Fan Service Procedure

STEP 35 Turn off the FAN Identify LED for each FAN you are replacing by using the following command from the BPC Command Line:

This is the command syntax:

```
bpccmd -c 27<blank>0000<cage ID><FRU ID><LED blink state 00=off, 02=blink>
```

<blank> = "11"
 <cage ID> = see Figure 6
 <FRU ID> = see Table 5 for the DE Identify LED.
 <LED state> = "00" for this step

Type in the following, inserting the correct cage ID DE chassis location:

```
bpccmd -c 27110000xxyy00
```

"xx" is the cage ID of the DE you are replacing. This field will be 05,07,09,0B,0D, or 0F (see Figure 6).

"yy" is the "<FRU ID>". Choose this based on the "FAN position" column in Table 5.

The correct return code is 001100. If you do not receive this, contact the next level of support.

FAN position	Example command	<FRU ID>	02 = BLINK '00 = OFF
FAN1 (A1)	bpccmd -c 27110000xxB000	B0	00
FAN2 (A2)	bpccmd -c 27110000xxB100	B1	00
FAN3 (A3)	bpccmd -c 27110000xxB200	B2	00
FAN4 (A4)	bpccmd -c 27110000xxB300	B3	00
FAN5 (A5)	bpccmd -c 27110000xxB400	B4	00
FAN6 (A6)	bpccmd -c 27110000xxB500	B5	00
FAN7 (A7)	bpccmd -c 27110000xxB600	B6	00
FAN8 (A8)	bpccmd -c 27110000xxB700	B7	00
FAN9 (A9)	bpccmd -c 27110000xxB800	B8	00
FAN10 (A10)	bpccmd -c 27110000xxB900	B9	00
FAN11 (A11)	bpccmd -c 27110000xxBA00	BA	00
FAN12 (A12)	bpccmd -c 27110000xxBB00	BB	00

Table 5 Format for BPC command to turn off a DE Fan ID LED.

STEP 36 Power Off the Disk Enclosure from Fan Service Mode from the BPC FSP command line by using the following command:

This is the command syntax:

```
bpccmd -c 10<blank>00<version><Cage ID><FRU ID>
```

<blank> = "11"
 <version> = "02" This is the version to deactivate the DE from Fan Service Mode
 <Cage ID> = see Figure 6
 <FRU ID> = "90" to select DCCA1

Type in the following, inserting the correct Cage ID for the DE you are servicing:

```
bpccmd -c 10110002xx90
```


Power775 Disk Enclosure Fan Service Procedure

Where “xx” is the Cage ID of the DE you are servicing. This field will be 05,07,09,0B,0D, or 0F (see Figure 6).

The correct return code is 001100. If you do not receive this, contact the next level of support.

ATTENTION: Be very careful that you are in the correct frame and that you type this command exactly as it will power off the cage you type. If you are off by just one digit, you can easily power off a CEC or DE in another cage of the frame.

3.10 Slide Disk Enclosure back into the frame <= SSR TASK

STEP 37 Confirm that 350V is off

All LEDs in the DE should now be off. If they are not, **do not proceed**. Have the customer attempt the power off again or contact the next level of support.

NOTE: It is possible for the DE to have its outputs off, but the 350V still on.

Check to make sure the green T1 and T4 350V Input Power LEDs have turned off on both DE DCCAs before proceeding (see Figure 34).

Power775 Disk Enclosure Fan Service Procedure

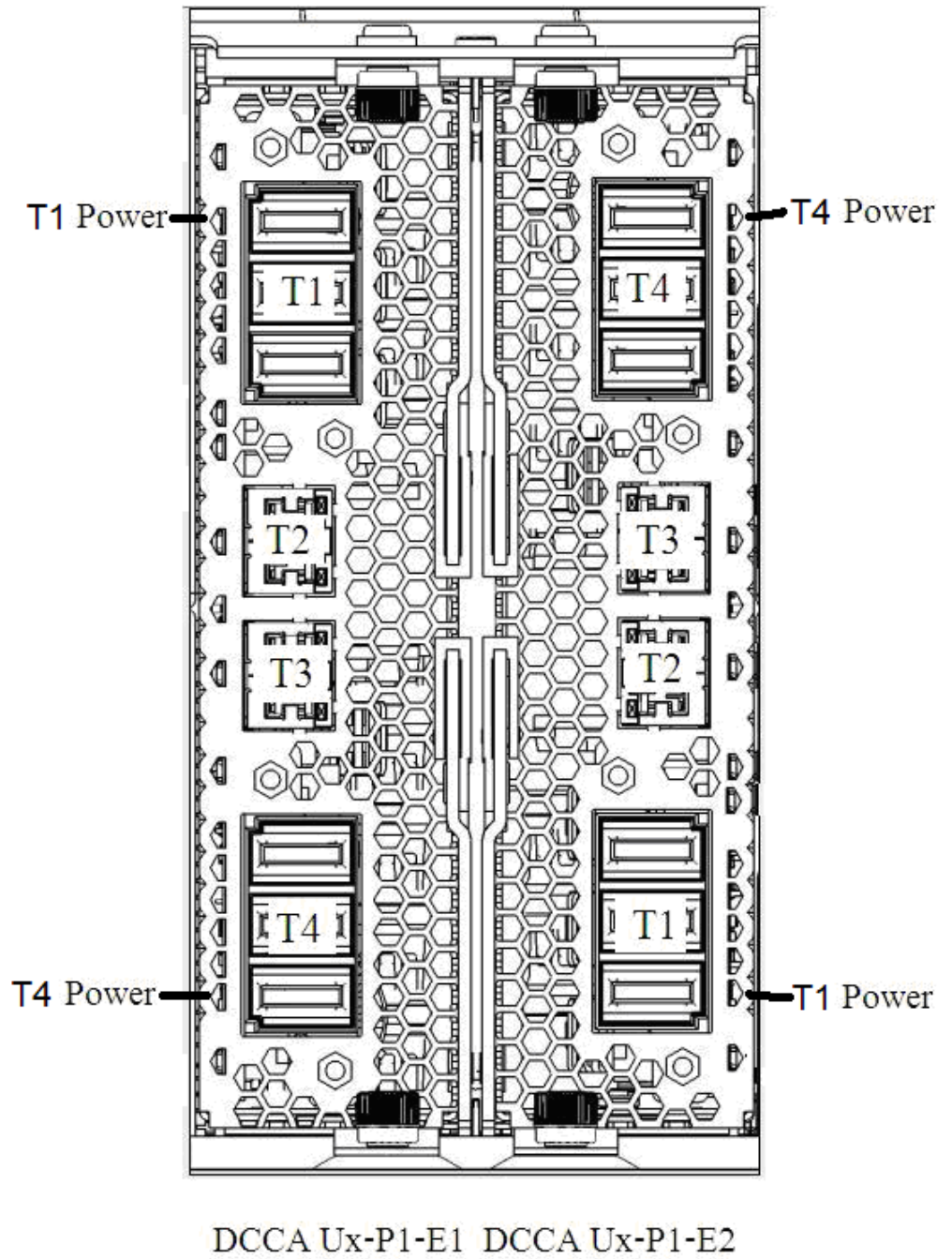


Figure 39 T1 and T4 Input Power LEDs on the DE DCCAs

Power775 Disk Enclosure Fan Service Procedure

- STEP 38 **CAUTION: Following the service procedure assures power is removed from 350 VDC power distribution connectors before they are unplugged. However, unplugging 350 VDC power distribution connectors while powered on, should not be done because it can cause connector damage and could result in burn and/or shock injury from electrical arcing. (C039)**

Disconnect the HPIC and E/NET extension assemblies from DCCA1

Using the 2mm Hex Torque Driver P/N 74Y0983, disconnect the HPIC extension assembly from DCCA1.
Disconnect the E/NET extension assembly from DCCA1.

-
- STEP 39 Replace fan cover (see Figure 35.)

With cover oriented vertically insert tabs into chassis and rotate cover to the closed position. Rotate the ¼ turn fasteners clockwise to the locked position.

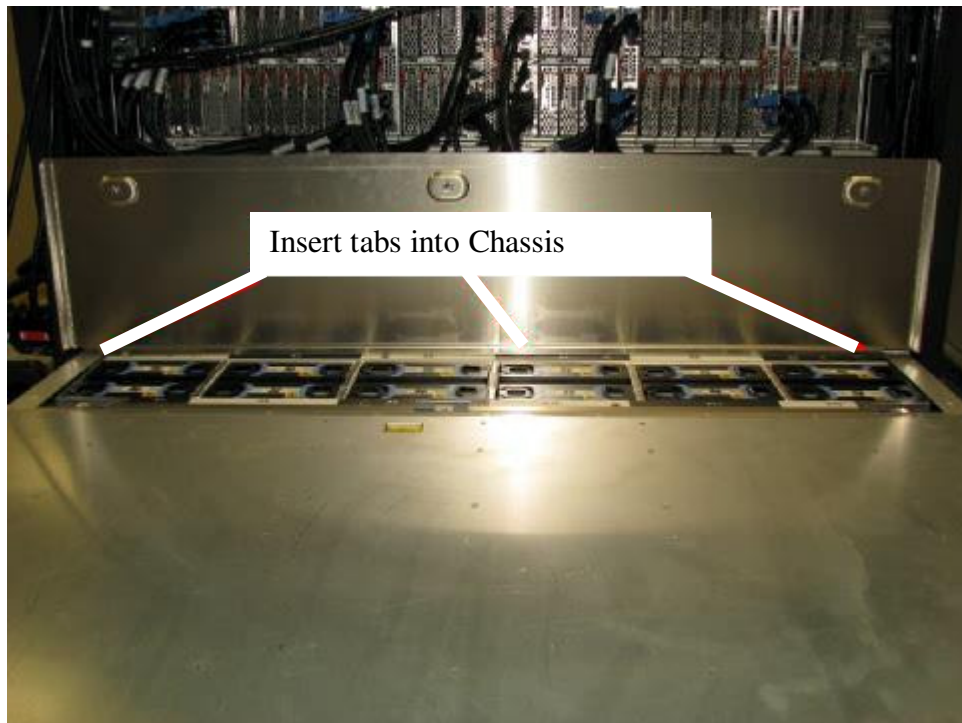


Figure 40 Reinstall cover

- STEP 40 Disconnect the HPIC (P/N 45D7998) and E/NET (P/N 45D8000) extension assemblies from the DCCA Power (HPIC) and DCCA Communication (E/NET) cables that go to DCCA1. Return the assemblies to the Fill and Drain Tool.
- STEP 41 Applying force to the cable tray, slide the DE back into the frame carefully. Be careful not to damage any cables.
ATTENTION: Do not push on any FRUs. Apply force only to the cable tray.

Power775 Disk Enclosure Fan Service Procedure

- STEP 42 Remove the Cam Followers by pulling the locating pin out of the frame and lifting the Cam Follower (see figure 36). Return the Cam Followers to the original storage location at the lowest position of the frame near EIA 5. Screw the shipping screws back into the cam followers.

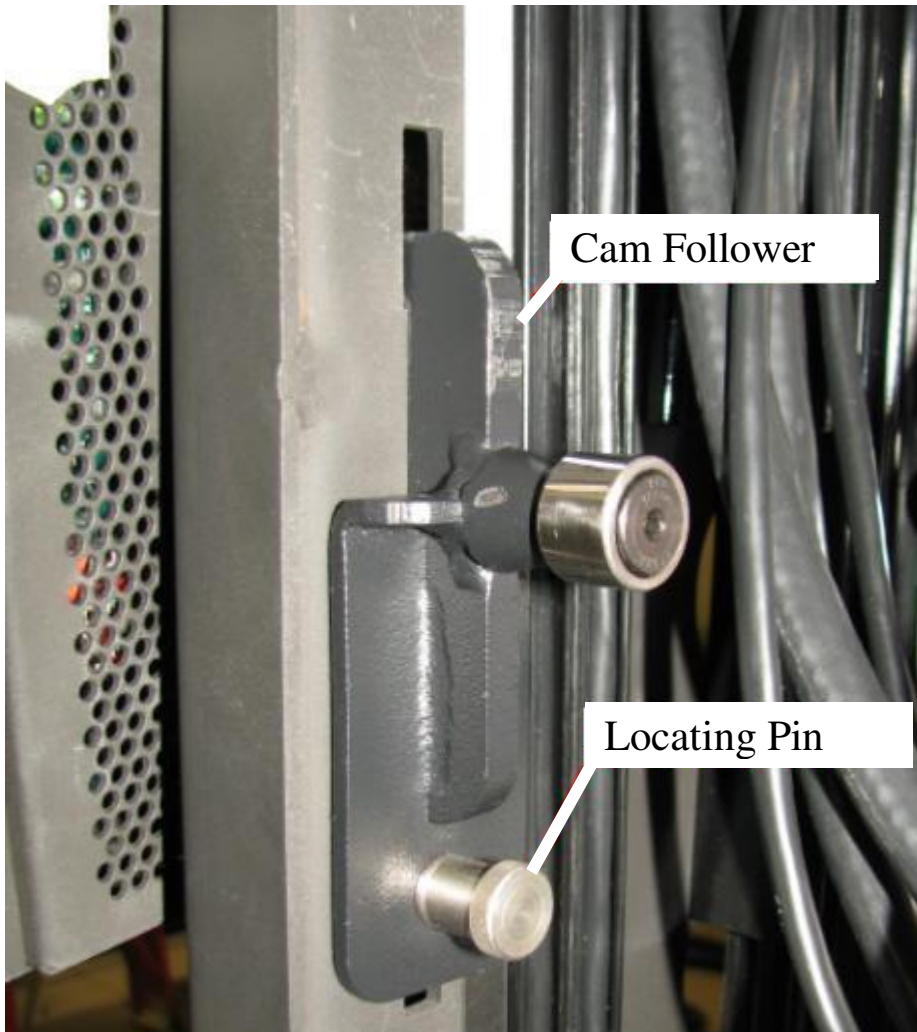


Figure 41 Cam Follower locating pin

Power775 Disk Enclosure Fan Service Procedure

- STEP 43 Install the two Rear Rail Block Captive Allen head screws.
- STEP 44 Attach the water hoses by pushing the quick connects onto the DE water connectors.
- STEP 45 Reconnect the rear SAS cables. Using the Location Codes labels, install the cables to the correct Port Card connectors. Each cable end should have two labels. The label closest to the connector (between the SN label and the connector) tells you the location to plug that end. The label on the other side of the SN label tells you where the other end of the cable is plugged. The convention for the label is like the location code of the port: <frame location> <card location><connector location>.
- If velcro ties were removed, reinstall them.
- When complete, all the Port Card connectors should be populated; there should be no open connectors.
- STEP 46 Close the rear door of the frame.

Power775 Disk Enclosure Fan Service Procedure

- STEP 47 If you removed the Front Rail Blocks, reinstall them using the Front Rail Block hex screws (see Figure 21).
NOTE: Make sure the Rail Blocks will not interfere with removal of the adjacent Drive Carriers

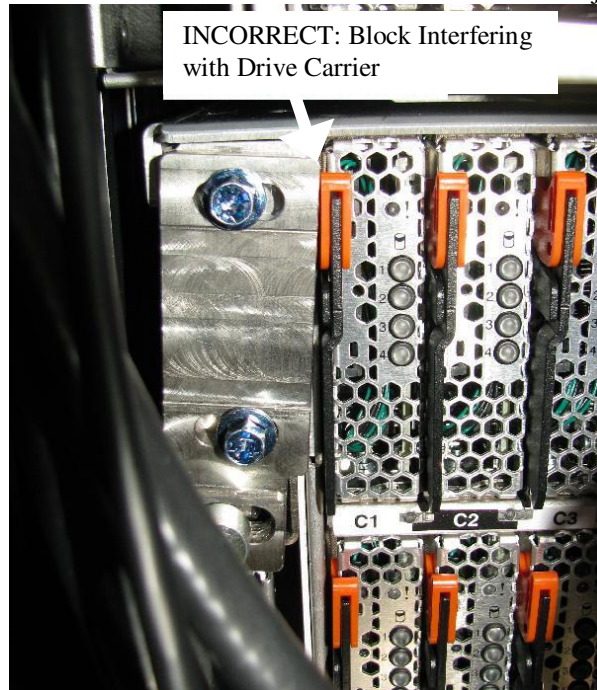


Figure 42: Rail Block Interfering with Drive Carrier

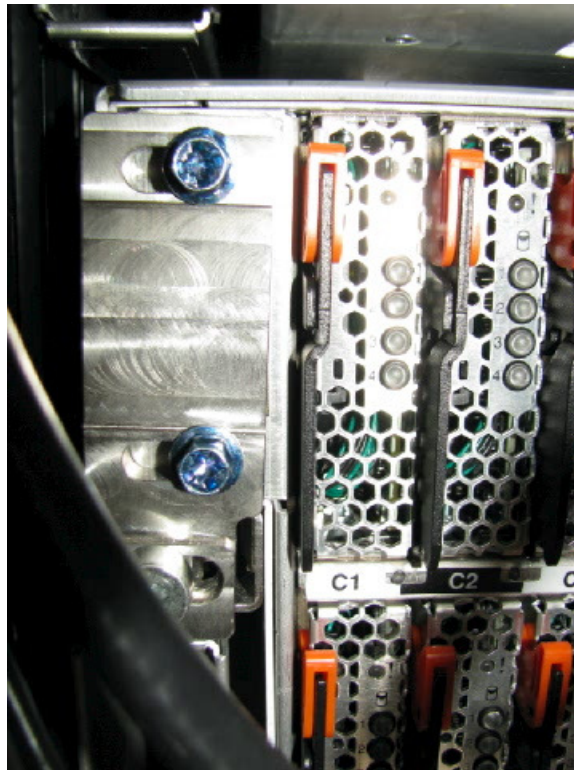


Figure 43: Rail Block Correctly Installed

Power775 Disk Enclosure Fan Service Procedure

- STEP 48 Using the 2mm Hex Torque Driver P/N 74Y0983 with torque setting of 0.07Nm, reconnect the four DCCA Power Cables (HPICs) to the DE DCCAs (see Figure 18).
- STEP 49 Reconnect the four DCCA Service Network Communications (E/NET) cables to the DE DCCAs (see Figure 16 and Figure 17).
- STEP 50 Reconnect the front SAS cables. Using the Location Codes labels, install the cables to the correct Port Card connectors. If velcro ties were removed, reinstall them.
- STEP 51 Reposition UEPO assembly if moved in an earlier step.
- STEP 52 Close the front door of the frame.

3.11 Power on the Disk Enclosure <= CUSTOMER TASK

- STEP 53 If you are running AIX, remove the appropriate mpt2sas devices (those attached to the DE) from the Operating Systems owning the DE now before the DE is turned back on so that there is not time wasted in spinning down the drives.

If you are running Linux, no action is necessary.

- STEP 54 Power On the Disk Enclosure from the BPC FSP command line by using the following command:

This is the command syntax:

```
bpccmd -c 41<blank>0000<Cage ID>
```

<blank>	= "11"
<Cage ID>	= see Figure 6

Type in the following, inserting the correct Cage ID for the damaged DE chassis location:

```
bpccmd -c 41110000xx
```

Where "xx" is the Cage ID of the DE you are replacing.
This field will be 05,07,09,0B,0D, or 0F (see Figure 6).

The correct return code is 001100. If you do not receive this, contact the next level of support.

ATTENTION: Be very careful that you are in the correct frame and that you type this command exactly as it will power on the cage you type. If you are off by just one digit, you can easily power on a CEC or DE in another cage of the frame.

Power775 Disk Enclosure Fan Service Procedure

- STEP 55 Turn on the Disk Enclosure levels (5V and 12V) from the BPC FSP command line by using the following command:
This is the command syntax:

```
bpccmd -c 82<blank>0000<Cage ID>
```

```
<blank>      = "11"  
<Cage ID>   = see
```

Type in the following, inserting the correct Cage ID for the damaged DE chassis location:

```
bpccmd -c 82110000xx
```

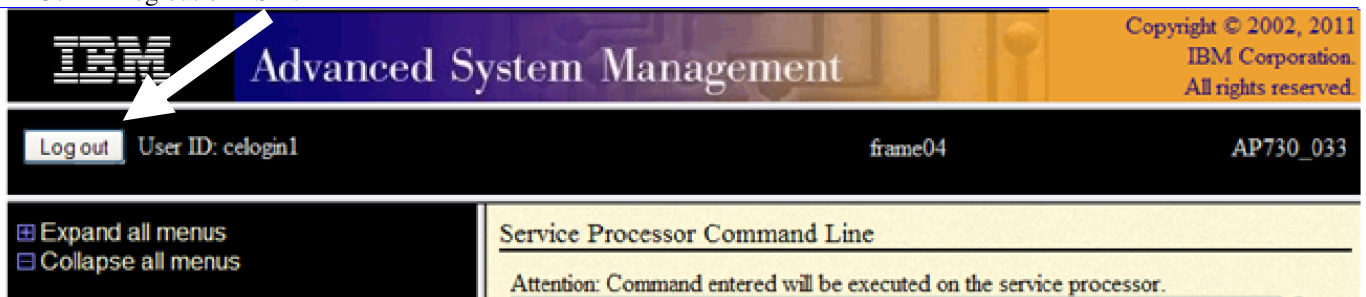
Where "xx" is the Cage ID of the DE you are replacing. This field will be 05,07,09,0B,0D, or 0F (see Figure 6).

The correct return code is 001100. If you do not receive this, contact the next level of support.

- STEP 56 From the BPC FSP command line, make sure all the fans are functional with the following command:
"bpcmd -b -f"

If a fan is not functional, use "Power775 Disk Enclosure Fan Service Procedure" from InfoCenter and instead of replacing the fan, check to make sure that it is fully seated.

- STEP 57 Log out of ASM.



- STEP 58 If you are running AIX, wait until the Disk Enclosure is finished booting up (10 minutes will be sufficient) and then run "cfgmgr".

If you are running Linux, skip this step.

- STEP 59 You are now ready to turn GPFS back on.

3.12 Confirm with the customer <= SSR Task

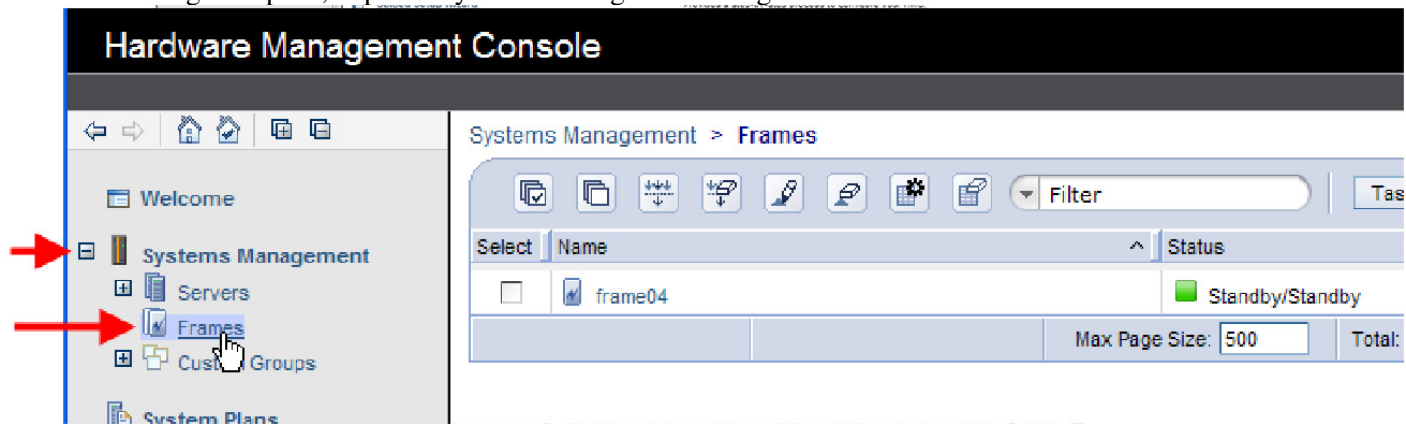
- STEP 60 Confirm with the customer that the Disk Enclosure is fully operational and the problem has been fixed.
-

4 END OF POWER775 DISK ENCLOSURE FAN SERVICE PROCEDURE

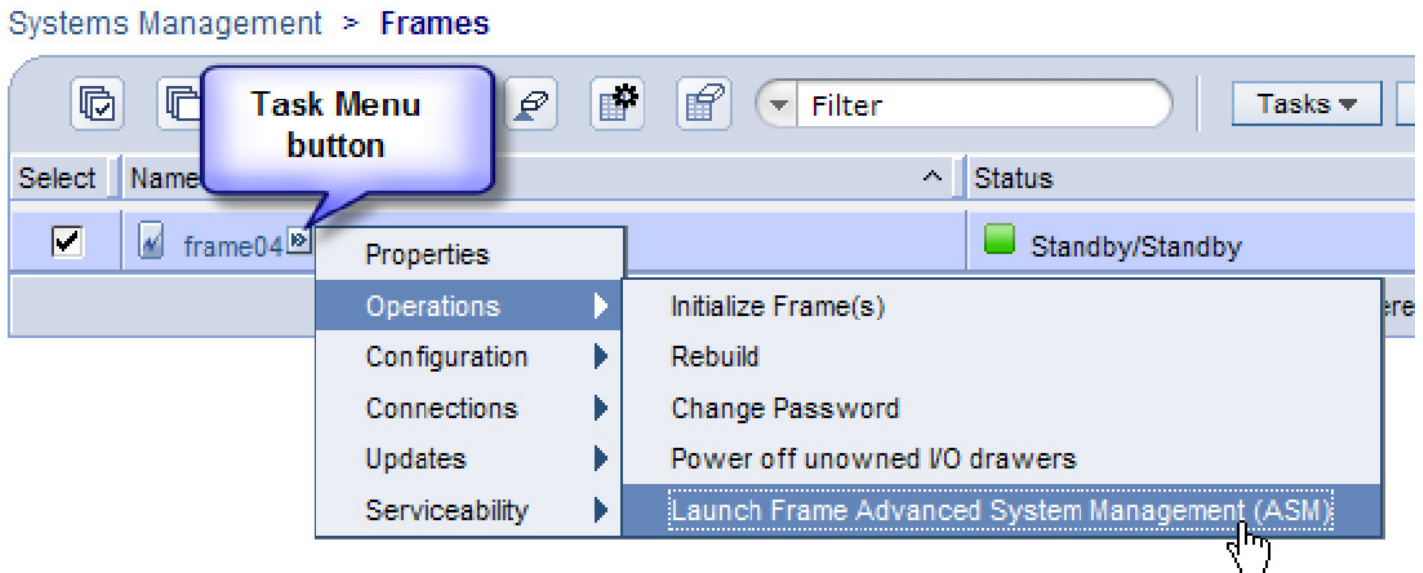
5 APPENDIX A: POWER775 BPC FSP COMMAND LINE PROCEDURE

5.1 Procedure to Access the BPC FSP Command Line

1. The HMC can be accessed via the keyboard/display that resides in the network management rack.
2. Login to the HMC if not done already.
3. In the HMC navigation pane, expand 'Systems Management' + sign and then click 'Frames':

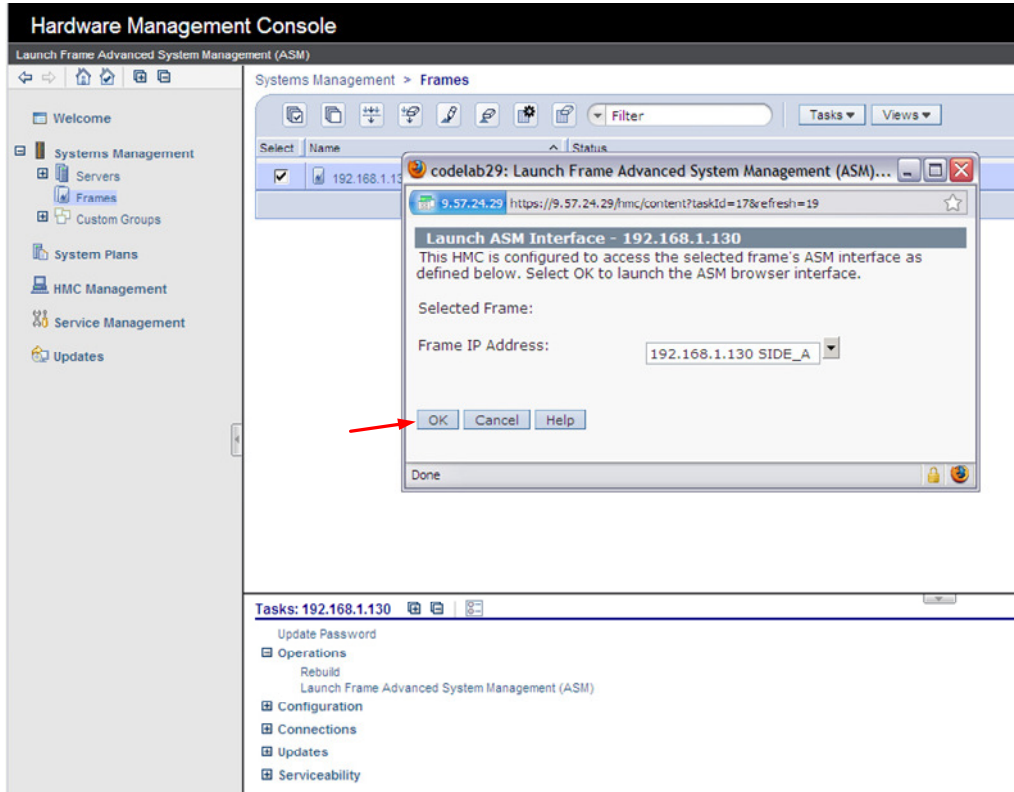


4. From the Tasks Menu right-arrow pull-down menu, click **Operations** → **Launch Frame Advanced Systems Management (ASM)**



Power775 Disk Enclosure Fan Service Procedure

- From the Launch ASM Interface window, select **SIDE_A** for the 'Frame IP Address' then click the **OK** button.

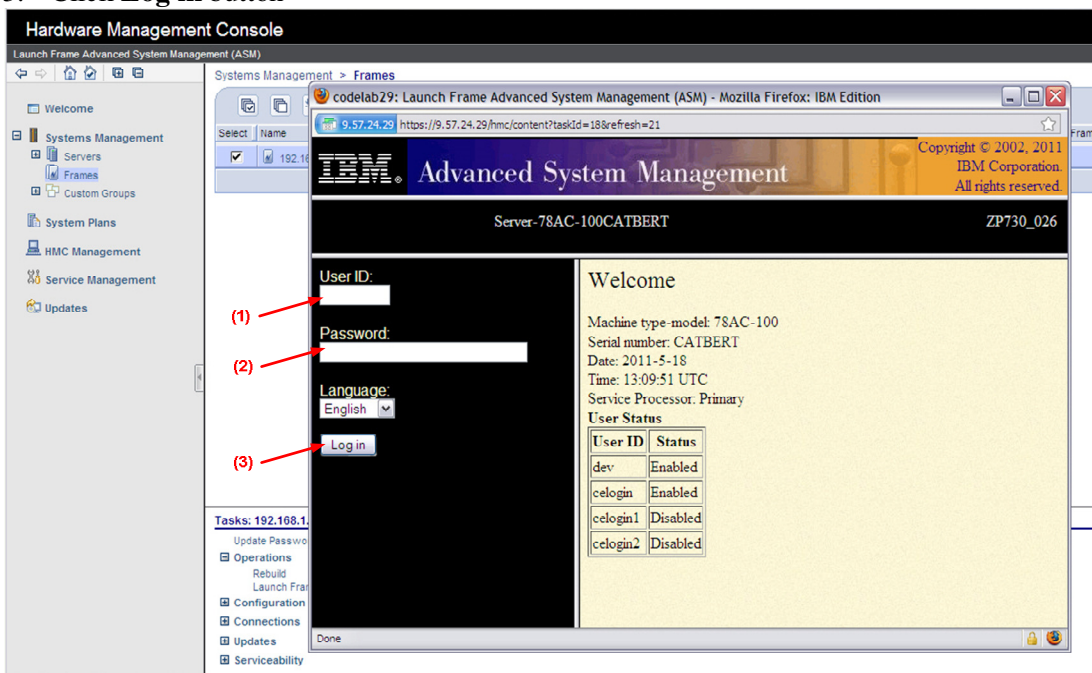


- The ASM login window is presented. Acquire the necessary User ID and Password.

“celogin” requires Daily PW from the IBM Support Center.

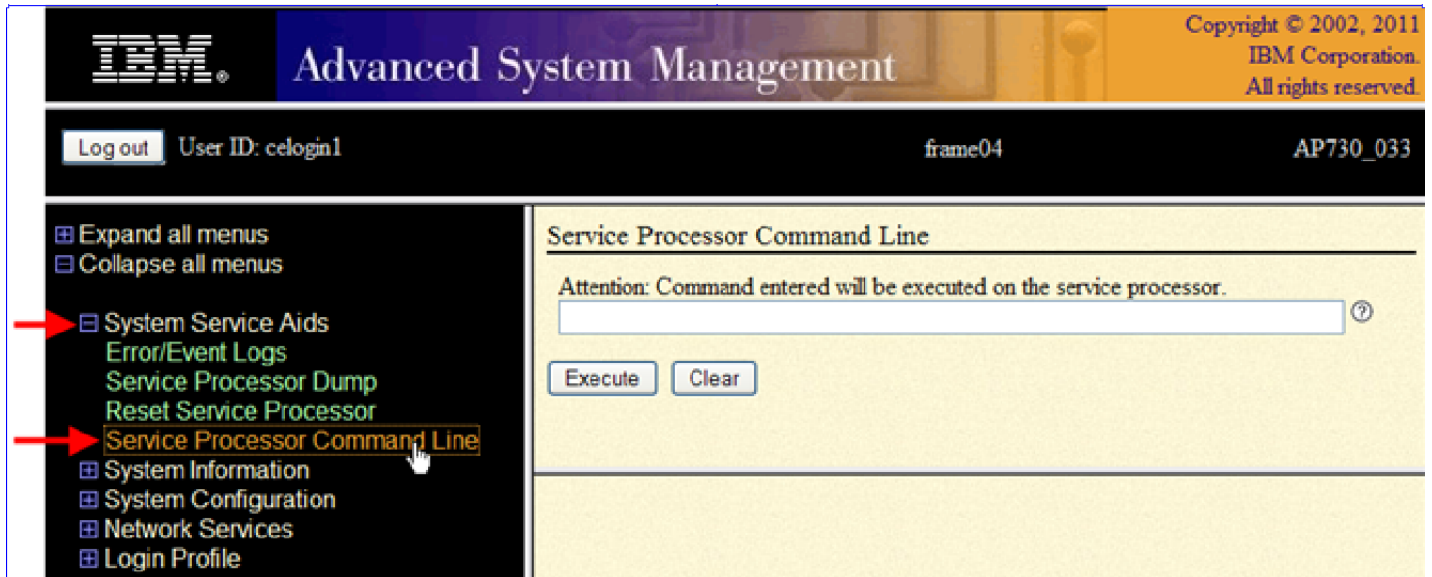
“celogin1” might be has enabled by the customer. If so, obtain the password from the customer.

- Enter User ID
- Enter Password
- Click **Log in** button



Power775 Disk Enclosure Fan Service Procedure

- Expand 'System Service Aids' + sign and Select 'Service Processor Command Line'.



- The ASM BPC FSP Command line will be presented. Enter the commands defined in the paper service procedures at this command line and press the Enter key (or click the **Execute** button).
- Return to the step of the paper service procedure that directed you to this Appendix.

5.2 End of Appendix A: Power775 BPC FSP Command Line Procedure
