

# **Power775 Disk Enclosure Chassis Service Procedure**

## **Last Modified 3/6/2012**



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# 1 GENERAL

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## 1.1 Release / Revision History

File Name	Date	Description
"p775_de_chassis.pdf"	3/6/2012	Initial Release

**Table 1 Release / Revision History**

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## 1.2 Where to find this document

The current "Power775 Disk Enclosure Chassis Service Procedure" document is "p775\_de\_chassis.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 (DE)", click "Disk Enclosure Chassis" to download PDF "p775\_de\_chassis.pdf"

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

---

## 1.3 Required Documents

Document	PN	Location
Safety Notices <a href="http://publib.boulder.ibm.com/infocenter/powersys/v3r1m5/topic/p7hdx/G229-9054.pdf">http://publib.boulder.ibm.com/infocenter/powersys/v3r1m5/topic/p7hdx/G229-9054.pdf</a>	Doc# G229-9054	InfoCenter *

**Table 2 Required Documents**

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

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## 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
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	
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	

## 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 cautions 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:**

**Service 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.

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

**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: Do not remove or install this unit without using the provided lift tool. (C017)**

**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: This unit must not be left running unattended, service personnel should always be overseeing the process. (C038)**



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



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



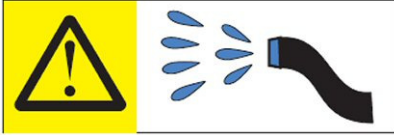
**CAUTION:** Pinch hazard. (L012)



**DANGER:** Heavy equipment—personal injury or equipment damage might result if mishandled. (L013)



**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)**

---

## 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 the customer to shut down GPFS.

---

## 2.3 Confirm how you got to this Power 775 DE Chassis Replace Service Procedure

You should be performing this procedure if you are working on a DE with a damaged chassis or a shorted power domain that has been diagnosed to be on the internal cards in the DE chassis.

You must contact Product Engineering (PE) for approval and have a new chassis and transfer cart shipped to the customer's location where the damaged DE chassis is located.

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 Chassis Service Procedure.

---

## 2.4 Disk Enclosure Chassis Description

The Disk Enclosure Chassis contains the following internal parts that are not replaceable in the field:

- a. One metal chassis
- b. Three backplane printed circuit boards
- c. One Water/Air Heat Exchanger

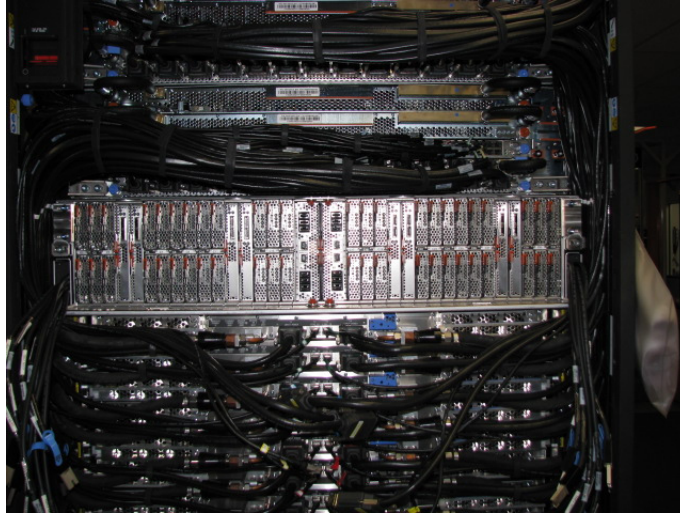
The Disk Enclosure Chassis has been designed to withstand many faults, so a chassis replacement should almost never be required. The only faults requiring a chassis replacement are:

- a. A short in the power distribution system that is confirmed to be present on one of the internal printed circuit boards
- b. Physical damage that prevents the plugging of a DE DCCA, DE Fan, Drive Carrier or Port Card

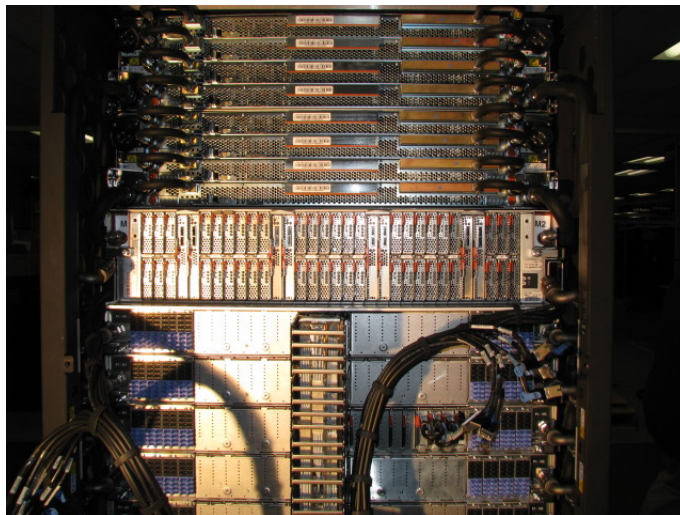
All DE Chassis service events must be reviewed by PE (Product Engineering) before a replacement DE Chassis is ordered.

## Power775 Disk Enclosure Chassis Service Procedure

Figures 1 and 2 show a Disk Enclosure to be removed and replaced. All cables have been disconnected. The FRUs (Drives, Drive Carriers, Port Cards, and DE DCCAs are still present in these figures and will be moved to the new chassis).



**Figure 1 DE front view cables disconnected**



**Figure 2 DE rear view cables disconnected**



### 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 3 DE Enclosure VPD Label

An example of a location code of Fan 4 in the DE with the label shown in Figure 3 is:

U78AD.001.992001B-P1-A4

---

## 2.5 Concurrency

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

---

## 2.6 DE Chassis Weight

The weight of the DE chassis is 550 lbs (250 kg) when filled with 376 hard drives, 8 SSDs, 96 Drive Carriers, 16 Port Cards, and 2 DE DCCAs. The transfer cart and the lift tool will be used to move both the damaged chassis and the new chassis.

## 2.7 Required SSRs and Roles

This service procedure requires two SSRs.

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 time required to unpack a new chassis, change out a DE chassis and package the damaged chassis to be shipped back to IBM is about 4 hours.

---

## 2.9 Required Tools

Service card (shipped in the Power 775 frame)

Fill and Drain Tool P/N 45D6928.

- 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)

Lift Tool Kit 74Y1087

- Ladder PN 46G5947 may be required for upper DE locations (shipped in the Power 775 Lift Tool Kit)

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 code of the DE to be serviced.
- 2) The frame number and frame serial number of the DE to be serviced.

## 2.11 Overview of Procedure

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

- 3.1 [UNPACK AND PRESSURE TEST THE NEW DE CHASSIS <= SSR TASK](#).....**ERROR! BOOKMARK NOT DEFINED.**
- 3.2 [ASSESS SHUTDOWN OF FILE SYSTEM <= CUSTOMER TASK](#)**ERROR! BOOKMARK NOT DEFINED.**
- 3.3 [SHUTDOWN THE FILE SYSTEM <= CUSTOMER TASK](#).....**ERROR! BOOKMARK NOT DEFINED.**
- 3.4 [IDENTIFY THE FRAME <= SSR TASK](#).....**ERROR! BOOKMARK NOT DEFINED.**
- 3.5 [POWER OFF THE DISK ENCLOSURE <= CUSTOMER TASK](#)..**ERROR! BOOKMARK NOT DEFINED.**
- 3.6 [CONFIRM THAT 350V IS OFF TO THE DISK ENCLOSURE <= SSR TASK](#) .**ERROR! BOOKMARK NOT DEFINED.**
- 3.7 [REMOVE FRONT DOOR AND LATCH PLATE, MOVE UEPO PANEL <= SSR TASK](#).....**ERROR! BOOKMARK NOT DEFINED.**
- 3.8 [DISCONNECT CABLES, HOSES, AND RETENTION SCREWS <= SSR TASK](#)..... **ERROR! BOOKMARK NOT DEFINED.**
- 3.9 [ATTACH THE LIFT TOOL TO THE FRAME <= SSR TASK](#)..... **ERROR! BOOKMARK NOT DEFINED.**
- 3.10 [MOVE THE DISK ENCLOSURE ONTO THE LIFT TOOL <= SSR TASK](#) .....**ERROR! BOOKMARK NOT DEFINED.**
- 3.11 [REMOVE FANS <= SSR TASK](#).....**ERROR! BOOKMARK NOT DEFINED.**
- 3.12 [USING LIFT TOOL, MOVE DE TO TRANSFER CART <= SSR TASK](#).....**ERROR! BOOKMARK NOT DEFINED.**
- 3.13 [MOVE FRUs FROM DAMAGED DE TO NEW DE <= SSR TASK](#)**ERROR! BOOKMARK NOT DEFINED.**
- 3.14 [MOVE NEW DE TO TRANSFER CART <= SSR TASK](#).....**ERROR! BOOKMARK NOT DEFINED.**
- 3.15 [INSTALL THE FANS INTO THE NEW DE <= SSR TASK](#) .....**ERROR! BOOKMARK NOT DEFINED.**
- 3.16 [INSTALL NEW DE INTO FRAME <= SSR TASK](#) .....**ERROR! BOOKMARK NOT DEFINED.**
- 3.17 [SHIP DAMAGED DE BACK FOR FAILURE ANALYSIS. <= SSR TASK](#) .....**ERROR! BOOKMARK NOT DEFINED.**
- 3.18 [STORE ALL TOOLS. <= SSR TASK](#).....**ERROR! BOOKMARK NOT DEFINED.**
- 3.19 [POWER ON THE DISK ENCLOSURE <= CUSTOMER TASK](#)...**ERROR! BOOKMARK NOT DEFINED.**
- 3.20 [CONFIRM WITH THE CUSTOMER <= SSR TASK](#).....**ERROR! BOOKMARK NOT DEFINED.**



## 3 SERVICE PROCEDURE

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

---

### 3.1 Unpack and pressure test the new DE Chassis <= SSR TASK

STEP 1 Remove the new DE Chassis and transfer cart from shipping container. The new chassis and transfer cart will arrive in an Arbo box. Open the box, install the ramp and roll the transfer cart out of the box. Do not destroy the shipping container as it will be reused to ship the transfer cart and defective chassis back to IBM..

STEP 2 Using the procedure “Appendix A: Power775 DE Pressure Test Procedure”, pressure test the new DE Chassis. This will require the Fill and Drain Tool P/N 45D6928

If the new DE Chassis fails the pressure test, return it and order another new chassis. When it arrives perform STEPS 1 and 2 again.

If the new DE Chassis passes the pressure test, proceed to STEP 3.

---

### 3.2 Assess shutdown of file system <= CUSTOMER TASK

STEP 3 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 4.

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.

---

### 3.3 Shutdown the file system <= CUSTOMER TASK

STEP 4 Stop all client applications.

STEP 5 Shut down GPFS. Wait for complete shutdown before proceeding to STEP 6.

### 3.4 Identify the frame <= SSR TASK

- STEP 6 Use the procedure “Appendix B: Power775 BPC FSP Command Line Procedure” to access the BPC FSP command line of the frame containing the Disk Enclosure with the FRU needing replacement.
- STEP 7 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:

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

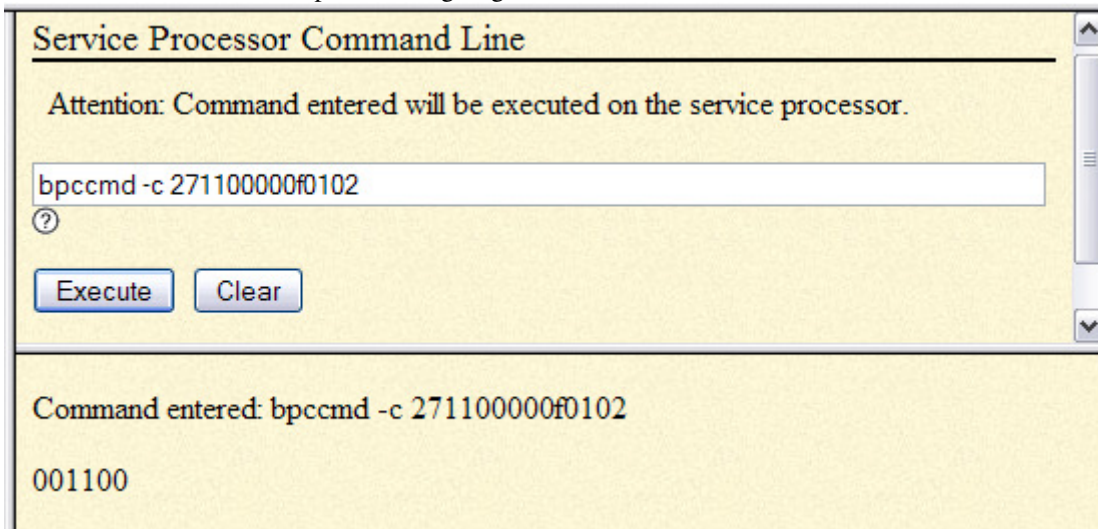
<blank>	= “11”
<cage ID>	= see Figure 4
<FRU ID>	= “01” for the DE Identify LED.
<LED state>	= “02” for this step

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

```
bpcmd -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 4).

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



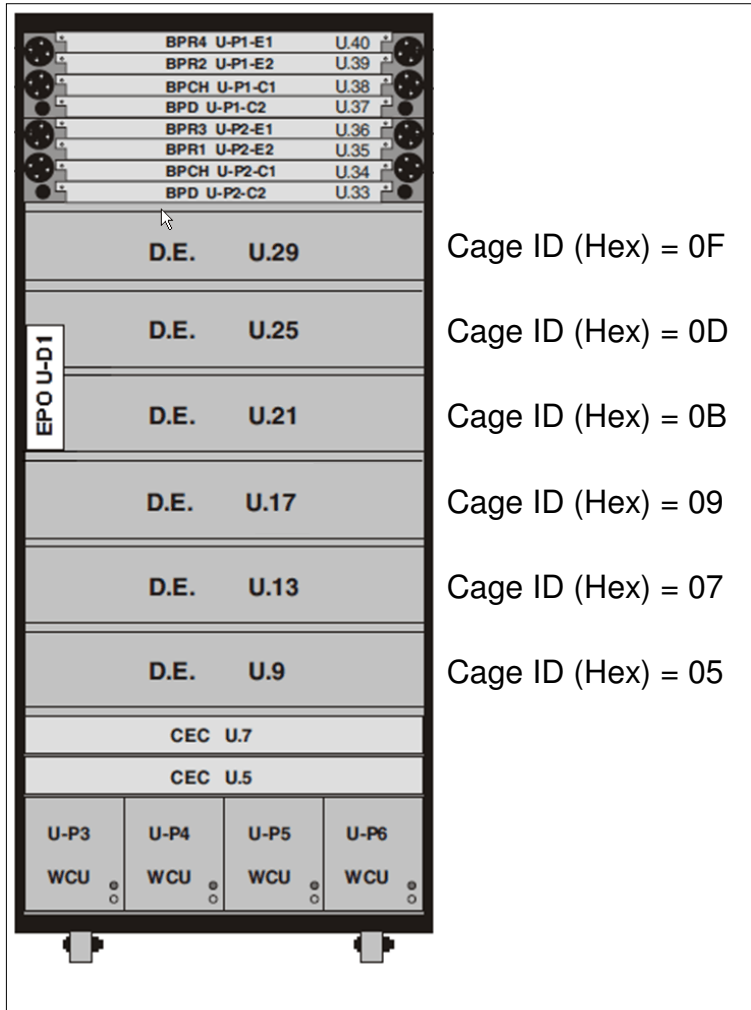
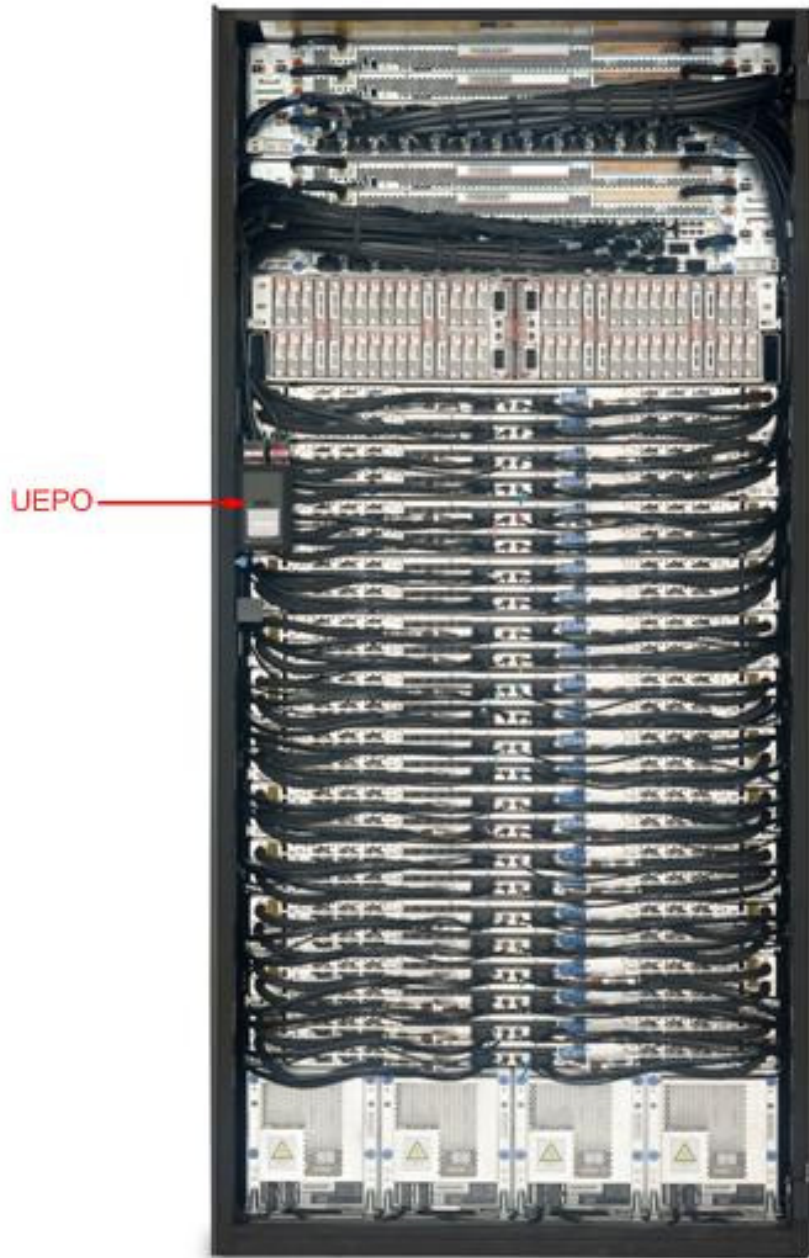


Figure 4 Disk Enclosure HEX Cage ID

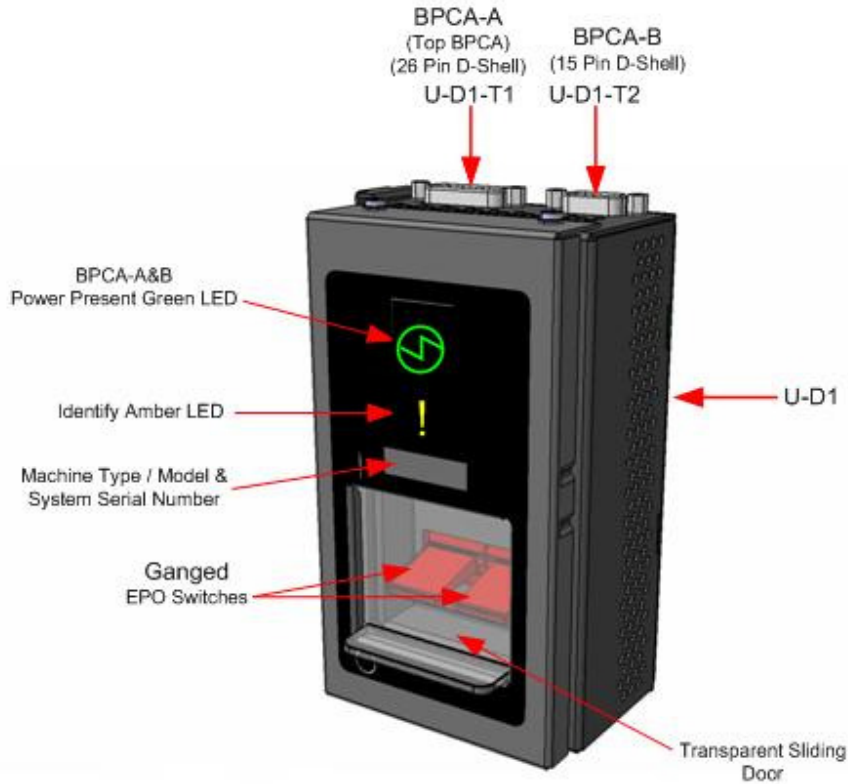


- STEP 8 Locate the frame. Confirm that it is the correct frame by checking that its UEPO Panel Identify LED is blinking. This LED is located on the UEPO panel and it is marked by the “!” symbol (see Figure 5 and Figure 6).



**Figure 5 Frame Photo showing UEPO location**





**Figure 6 UEPO assembly showing frame Identify Amber LED**

STEP 9 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 7 and Figure 8).



**Figure 7 Door Latch**



**Figure 8 Door Latch handle shown extended**

STEP 10 If it will be needed for service, bring over the Ladder PN 46G5947 (shipped in the Power 775 Lift Tool Kit).

STEP 11 Identify the Disk Enclosure

Identify the Disk Enclosure requiring service by looking for the blinking amber Enclosure ID LEDs on the DE DCCAs on the front side of the Disk Enclosure (see Figure 9) OR on the right side of the rear of the Disk Enclosure (see Figure 10).

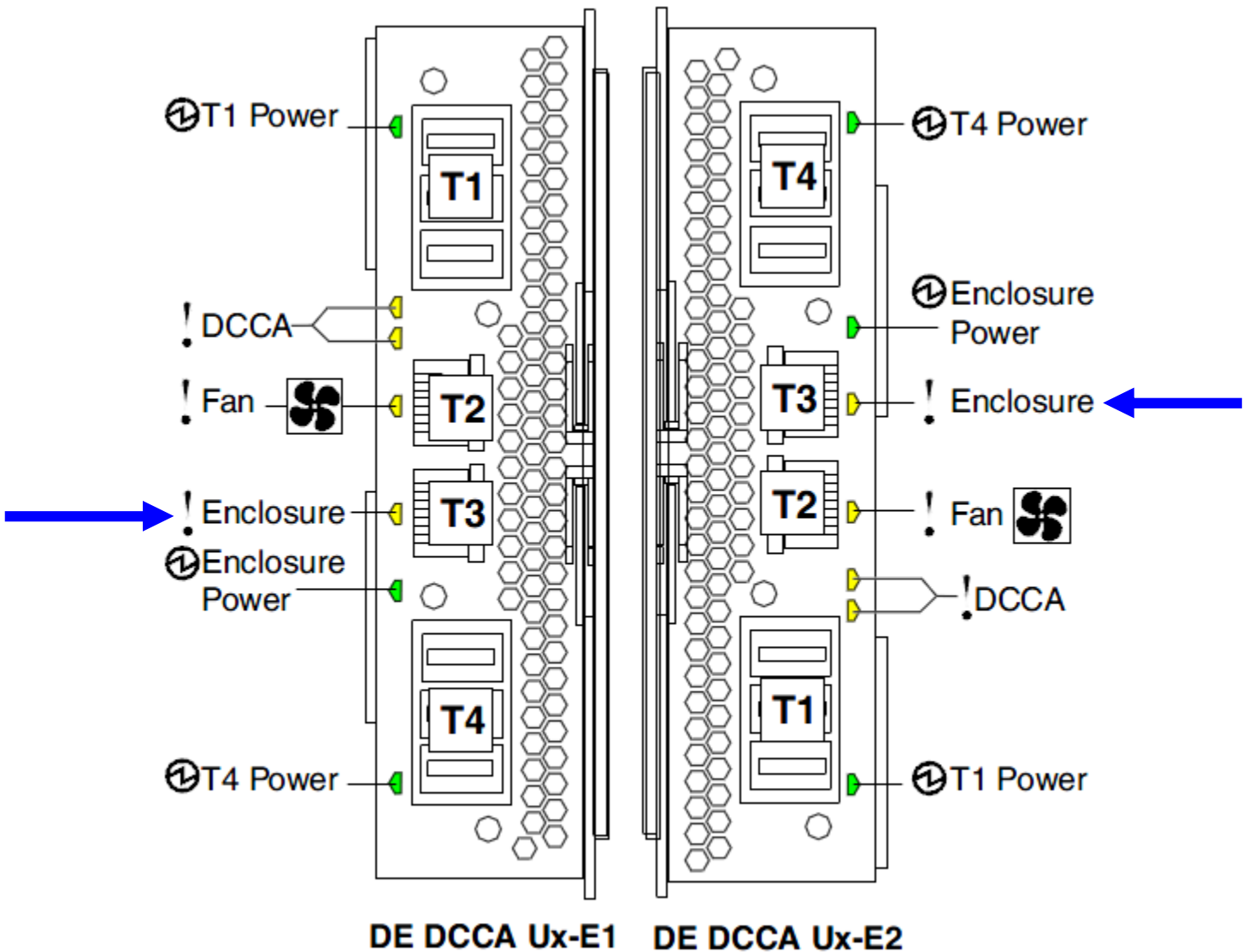
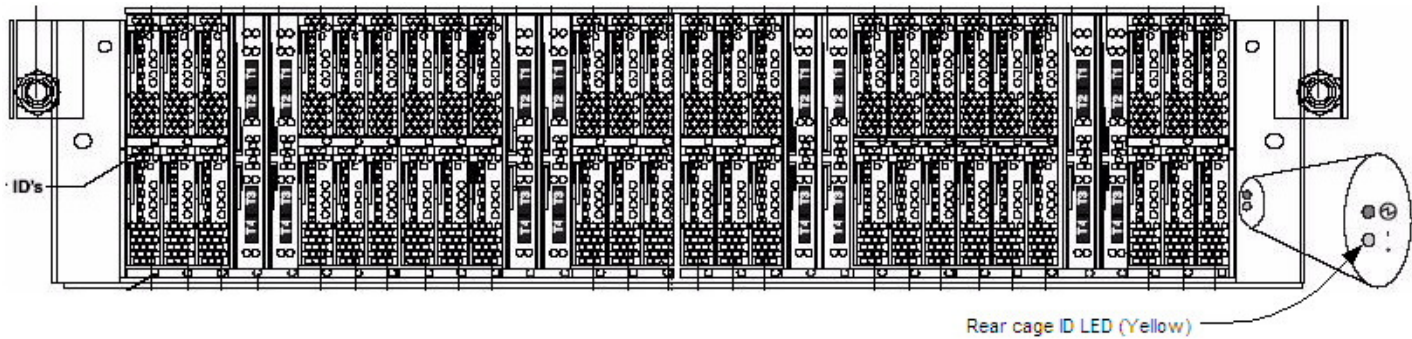


Figure 9 The Front Enclosure ID LED is located on the DE DCCAs



**Figure 10** Rear Enclosure ID LED is located on the bottom right side of the DE

**STEP 12** 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 13** Turn off the DE Identify LEDs of the DE with the damaged chassis 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 4).

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

**Service Processor Command Line**

Attention: Command entered will be executed on the service processor.

?

---

Command entered: bpccmd -c 271100000f0100

001100

---

### 3.5 Power off the Disk Enclosure <= CUSTOMER TASK

- STEP 14 Power Off the Disk Enclosure from the BPC FSP command line by using the following command which will unlock the Drive Carriers and power off the Disk Enclosure. This will power down to standby, but 350V will remain on.

This is the command syntax:

```
bpcmd -c 81<blank>00<version><Cage ID>
```

<blank> = "11"  
 <version> = "08" This is the version to unlock and power off the DE.  
 <Cage ID> = see Figure 4.

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

```
bpcmd -c 81110008xx
```

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 4).

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.

- STEP 15 Power Off 350V to the Disk Enclosure from the BPC FSP command line by using the following command:

This is the command syntax:

```
bpcmd -c 40<blank>0000<Cage ID>
```

<blank> = "11"  
 <Cage ID> = see Figure 4.

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

```
bpcmd -c 40110000xx
```

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 4).

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.

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

STEP 16 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 11).

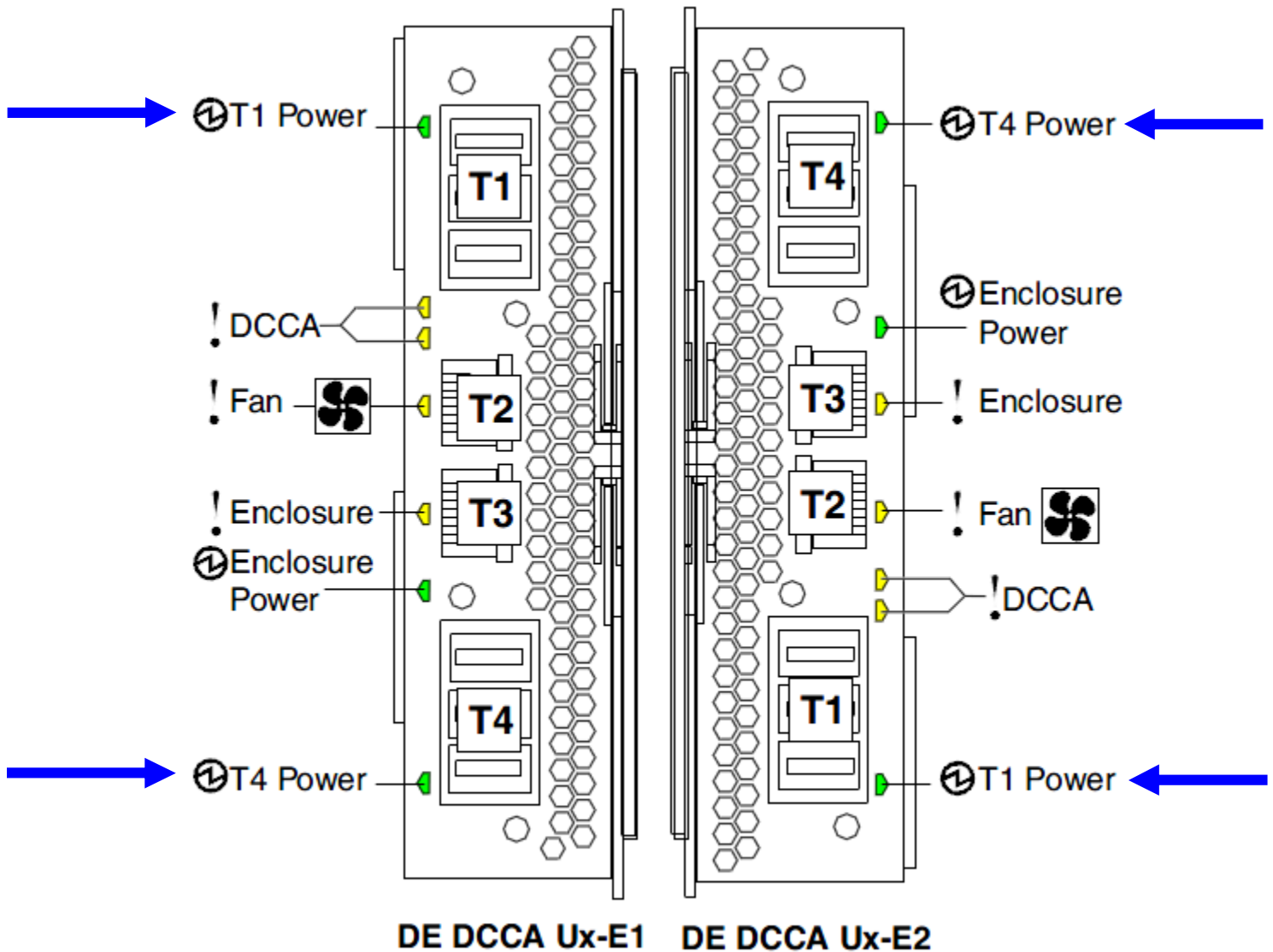


Figure 11: T1 and T4 Input Power LEDs on the DE DCCAs



---

### 3.7 Remove Front Door and Latch Plate, Move UEPO Panel <= SSR TASK

STEP 17 Remove the front door. The front door weighs 37lbs (16.8 kg).



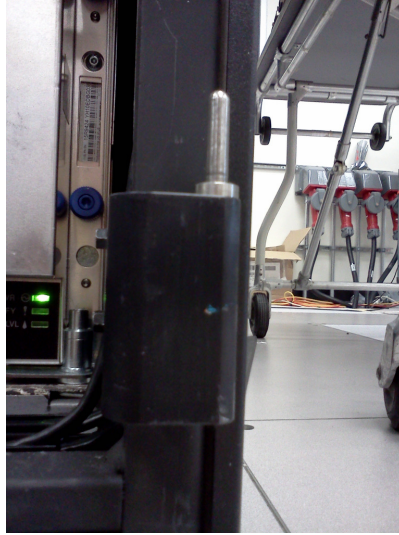
**CAUTION: Sharp edges, corners, or joints nearby. (L006)**

- Face the inside of the door and place hands on the cross bars (see Figure 12 Removal of Front Door)
- Lift straight up off the hinge pins (see Figure 13 Door Hinge Pin)



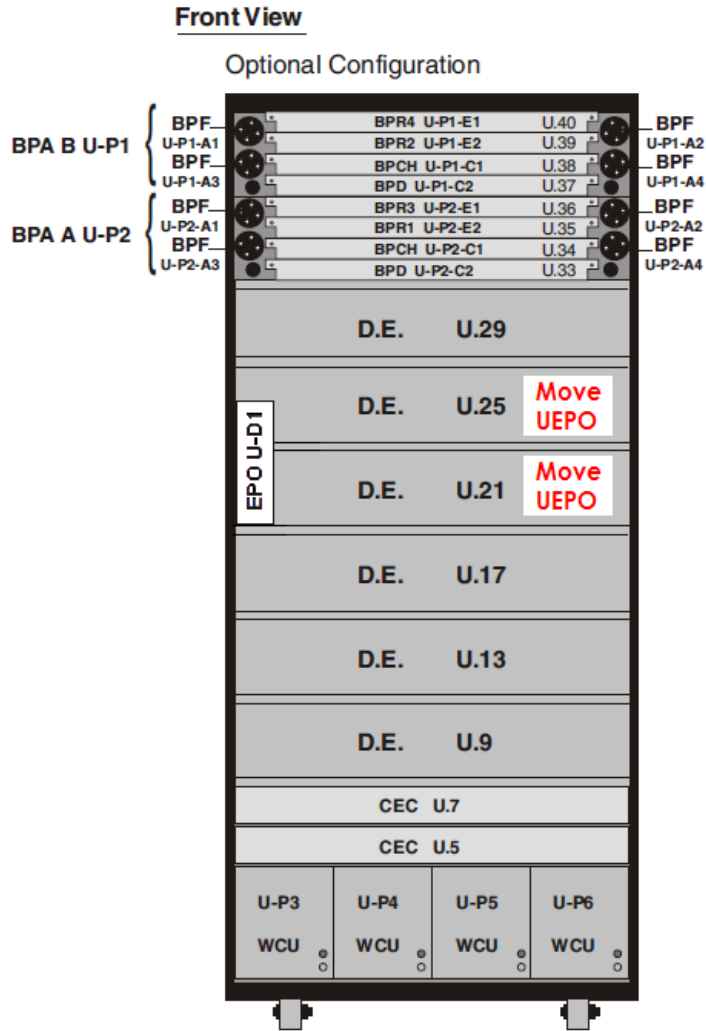
**Figure 12 Removal of Front Door**





**Figure 13 Door Hinge Pin**

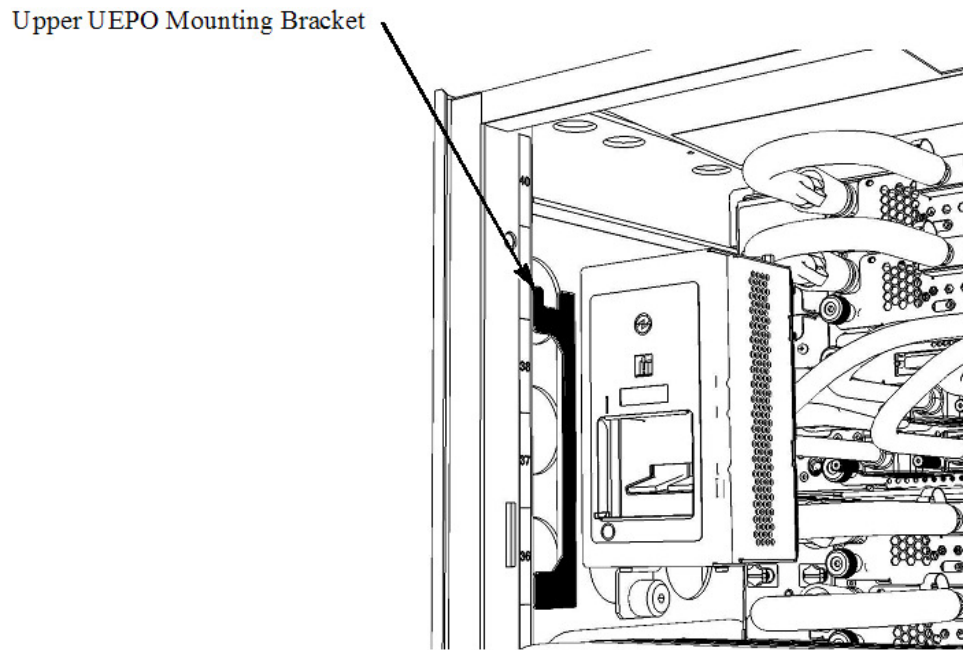
- STEP 18 Is the Disk Enclosure being serviced located in U21 or U25 (see Figure 14)?
- If “YES”, then go to STEP 18.
  - If “NO”, then go to STEP 22.



**Figure 14: Disk Enclosure and UEPO Location Info**

- STEP 19 **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 20 Unhook the UEPO switch assembly from the Rack by sliding it upward and then away from the Rack.

STEP 21 Place the UEPO in the “Frame UEPO Service Position” in the Rack (see Figure 15).

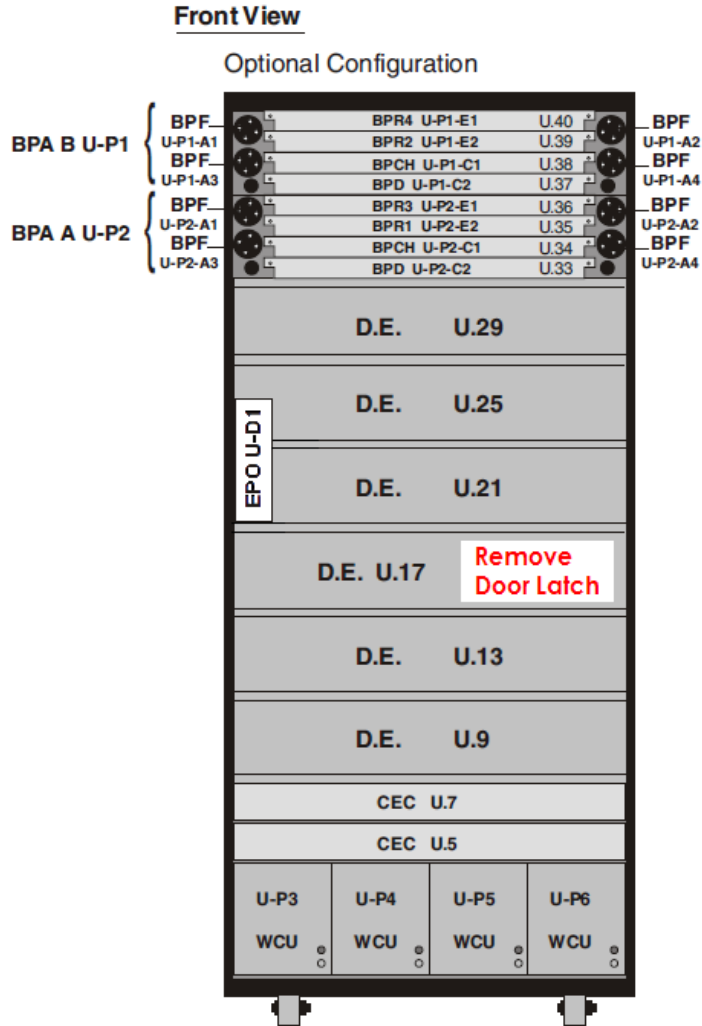


**Figure 15: Frame UEPO Service Position**

STEP 22 Hand tighten the UEPO blue thumb screw to secure the UEPO in the Rack.

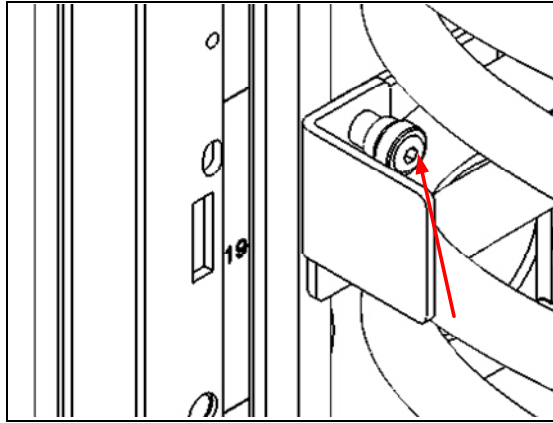
STEP 23 Does the Disk Enclosure being serviced reside in U.17 (see Figure 16)?

- If “YES”, then go to step 27.
- If “NO”, then go to step 29.



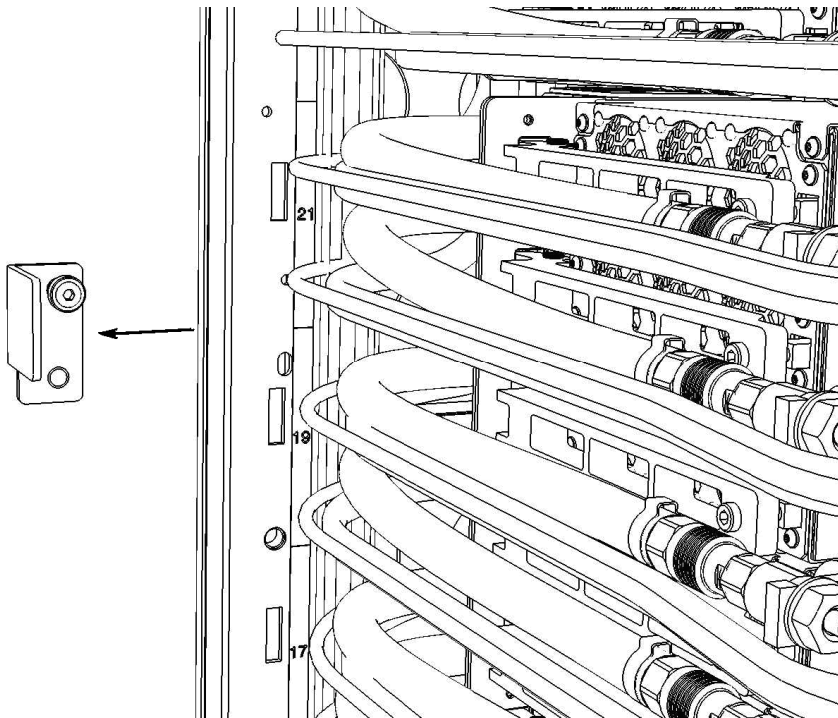
**Figure 16: Disk Enclosure and Door Latch Plate Location Info.**

STEP 24 Remove the door latch plate. Unscrew the plate using the Hex Driver torque tool PN 41V1059 (4mm Hex Driver 1.5-1.75 Nm) provided in the tool kit (see Figure 17: Door Latch Plate Screw Location).



**Figure 17: Door Latch Plate Screw Location**

STEP 25 Remove latch plate from the rack (see Figure 18: Door Latch Plate Removal).

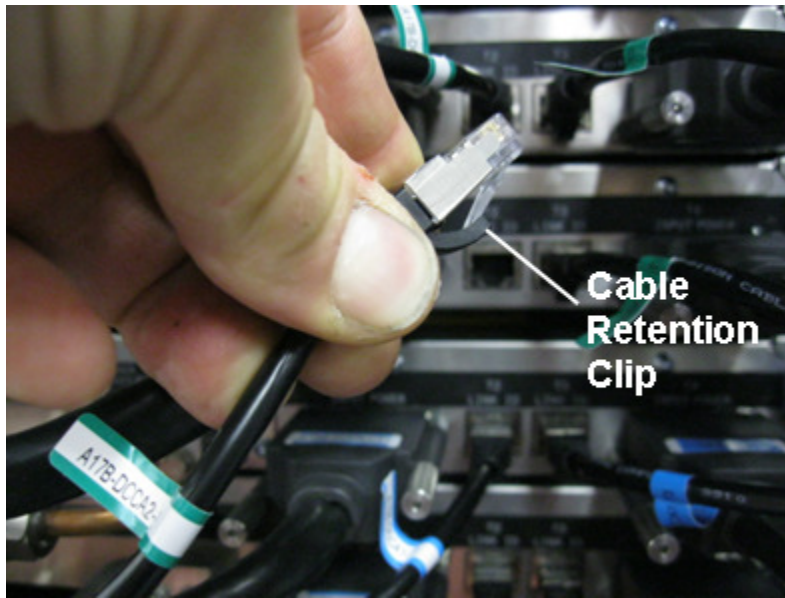


**Figure 18: Door Latch Plate Removal**

---

### 3.8 Disconnect Cables, Hoses, and Retention Screws <= SSR TASK

- STEP 26 Disconnect the four DCCA Service Network Communications (E/NET) cables from both DE DCCAs by depressing the “retention clip” (see Figure 19 and Figure 20). **All cables should be labeled to help when re-cabling the DE.** If any of these cables are not labeled, label them now.



**Figure 19: DCCA Service Network Communications (E/NET) Cable**

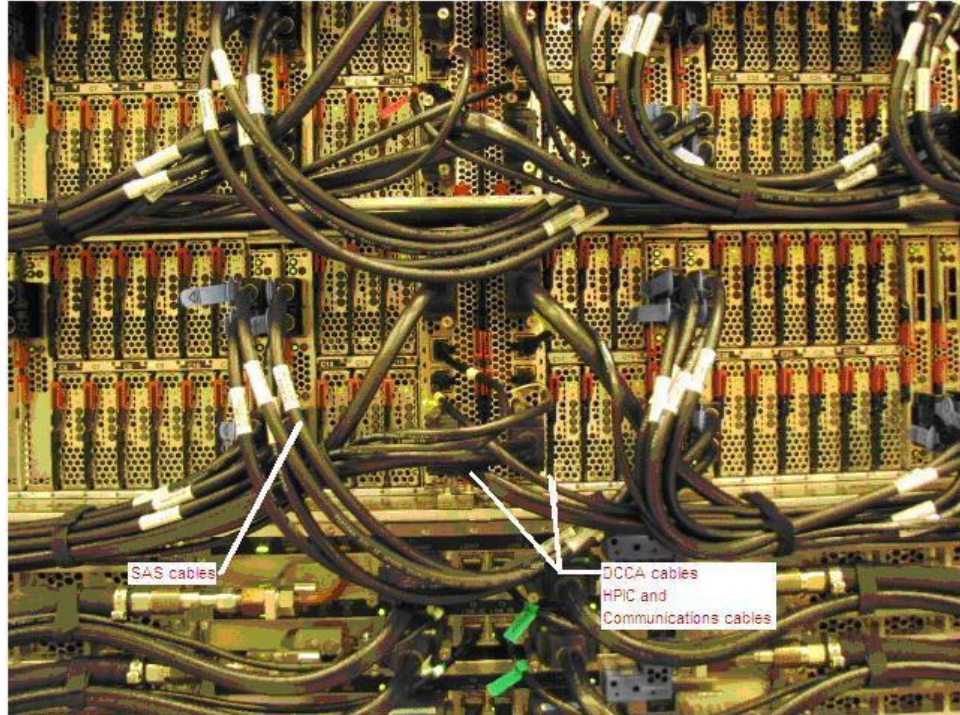


Figure 20 DE cabling

STEP 27 **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 21). **All cables should be labeled to help when re-cabling the DE.** If any of these cables are not labeled, label them now.



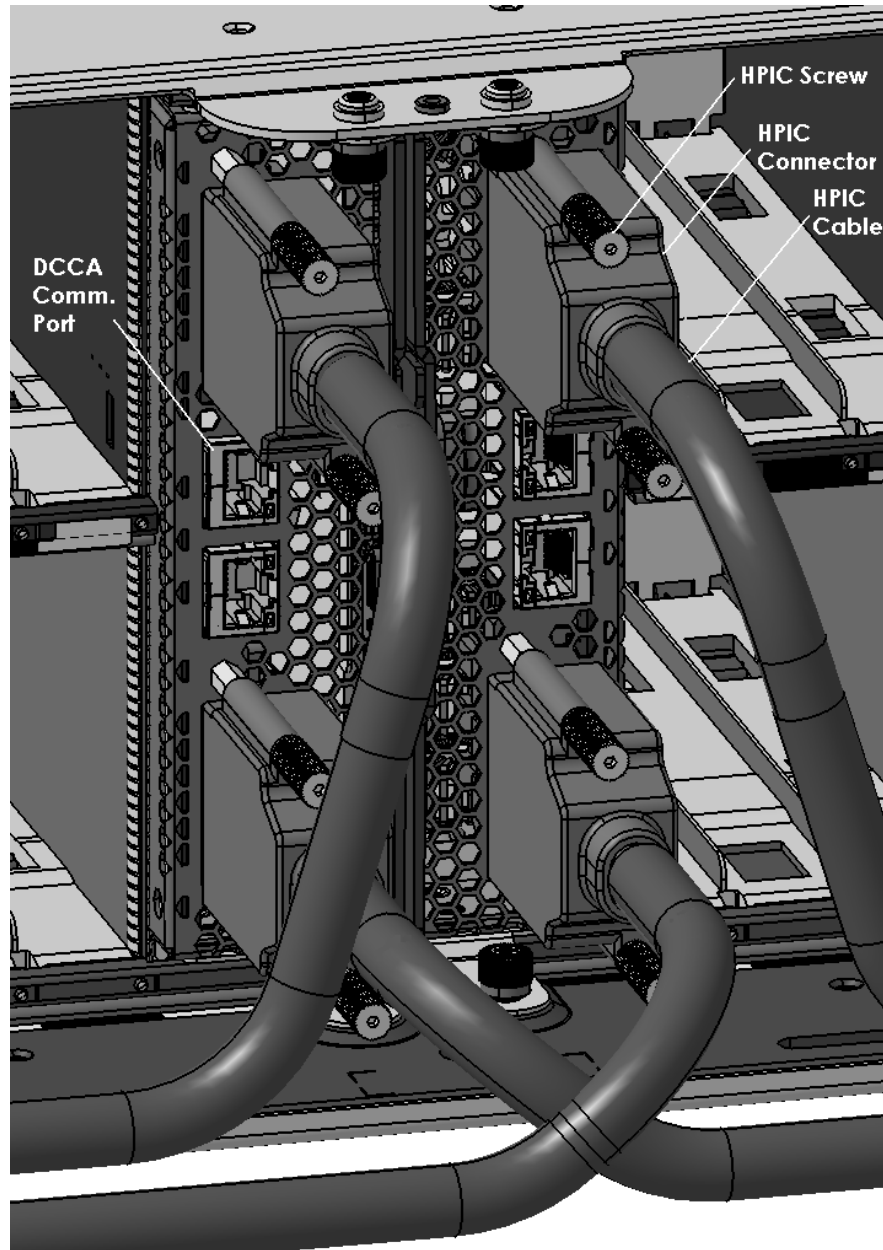


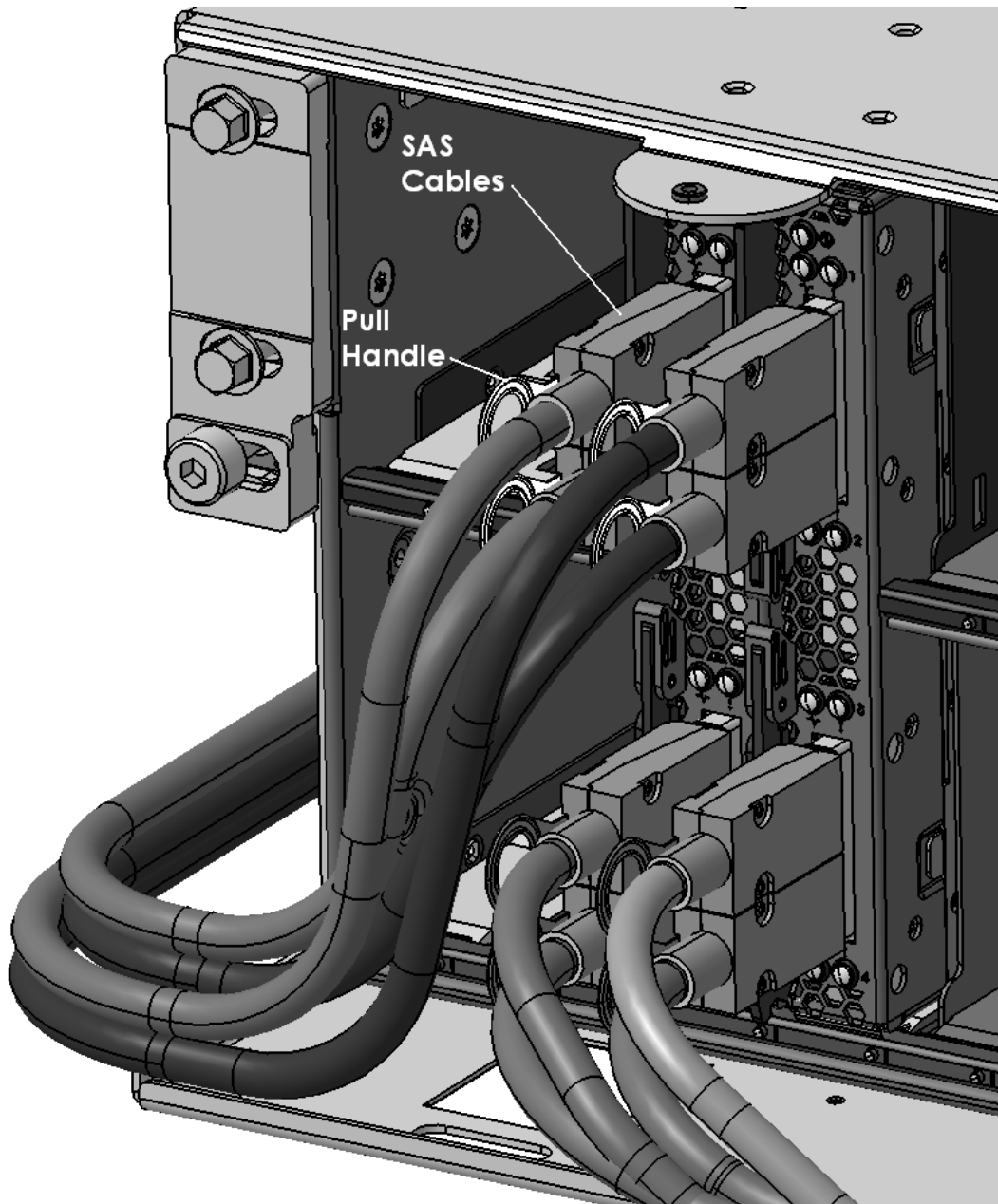
Figure 21 Disk Enclosure DCCA Power Cables (HPIC)

STEP 28 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 22). You may have to remove some of the velcro ties in order to disconnect the cables.



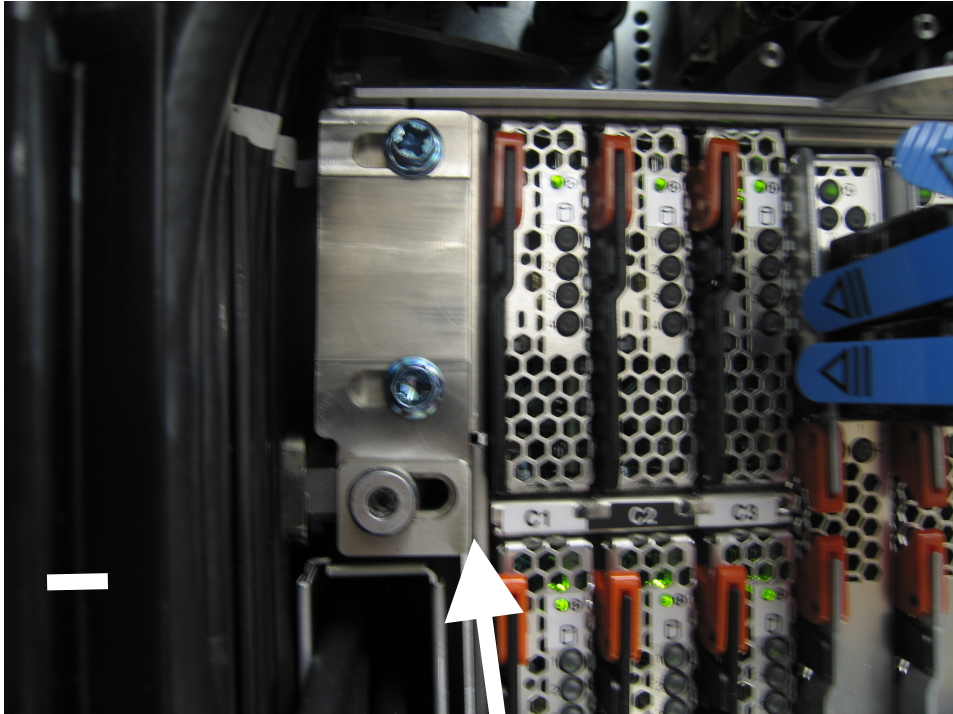
There may also be SAS cables that connect Port Cards in the DE to other Port Cards in the same DE; e.g. if the DE is cascaded. Do not disconnect these cables. Make sure they are dressed sufficiently that they do not get stuck on anything when you slide out the DE in a later step.



**Figure 22: Disk Enclosure Port Card Cabling**

**STEP 29** 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 24).

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 Photo of Front Rail Block Captive Screw**

**STEP 30** 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 24) 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)
- 8 mm Socket

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

Front Rail  
Block Hex  
Screws

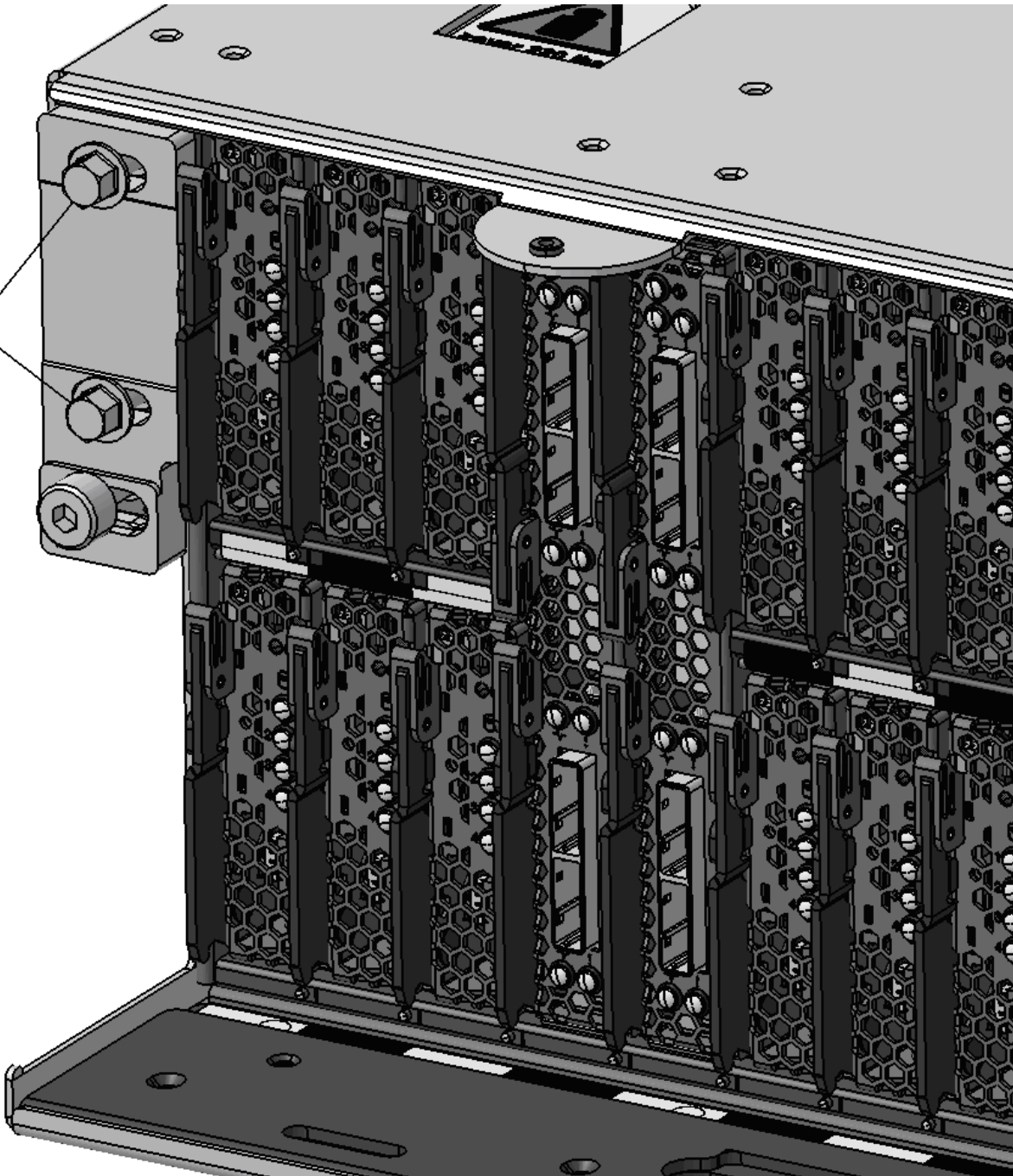


Figure 24: Front Rail Block Screws

- STEP 31 Disconnect the 2 Water Hoses from the rear of the Disk Enclosure by pulling the retaining ring on the hose (see Figure 25 Water Hose Connector).

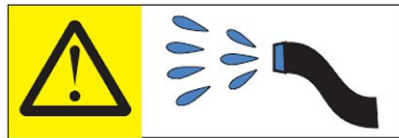
**CAUTION:** The water-based coolant solution may contain an additive intended to inhibit corrosion (or provide other functions). The solution may cause irritation to the skin or eyes. Avoid direct contact with the solution. Employ appropriate Personal Protective Equipment when performing operations 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)



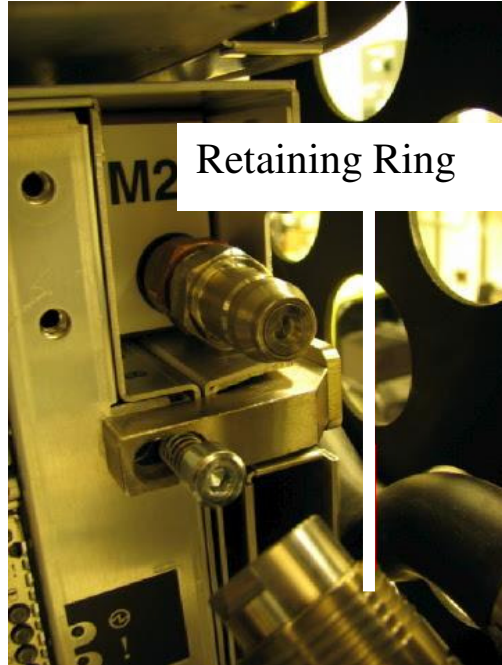
**CAUTION:** Chemical resistant gloves are needed for this procedure. (L014)



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

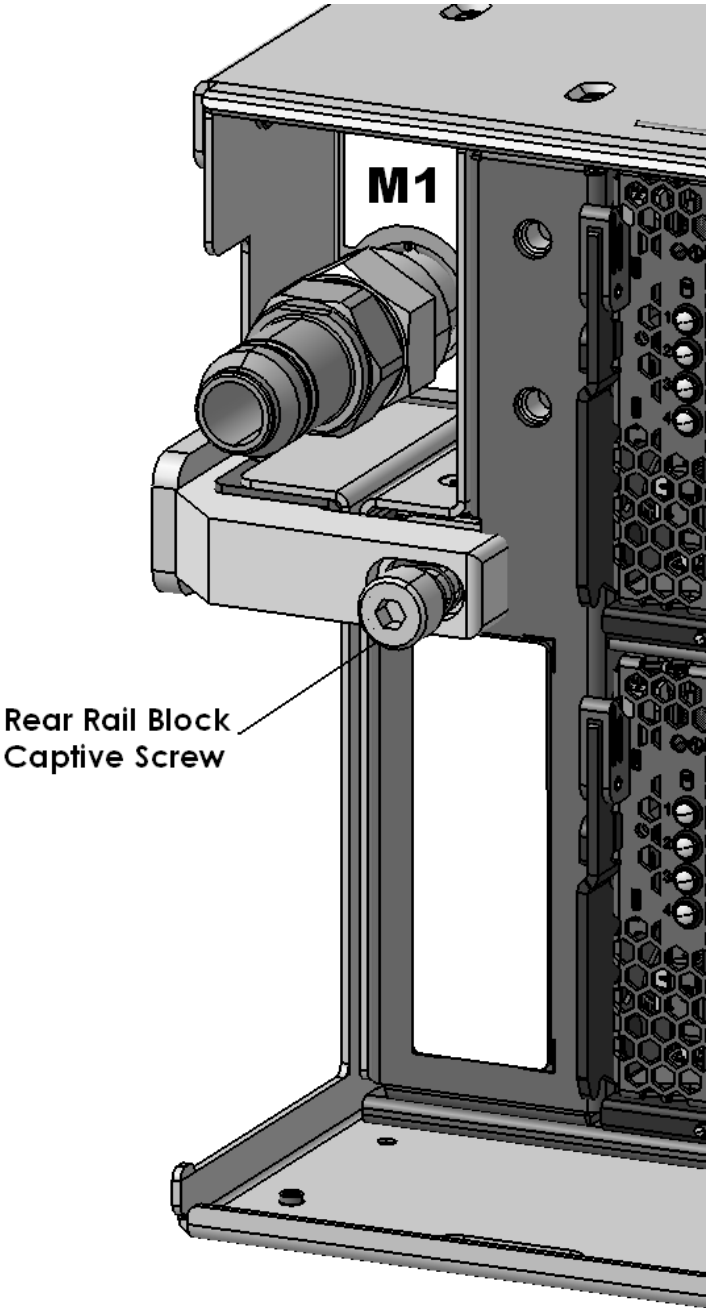
Avoid working on or near energized equipment with wet hands or when spilled water is present. (L016)

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



**Figure 25 Water Hose Connector**

- STEP 32 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 26 ).
- Loosen these screws using the 5mm Hex Torque Tool PN 74Y0986 (shipped in the Hand Tool Kit). Rotate the 2 screws counterclockwise until they are free from the DE.

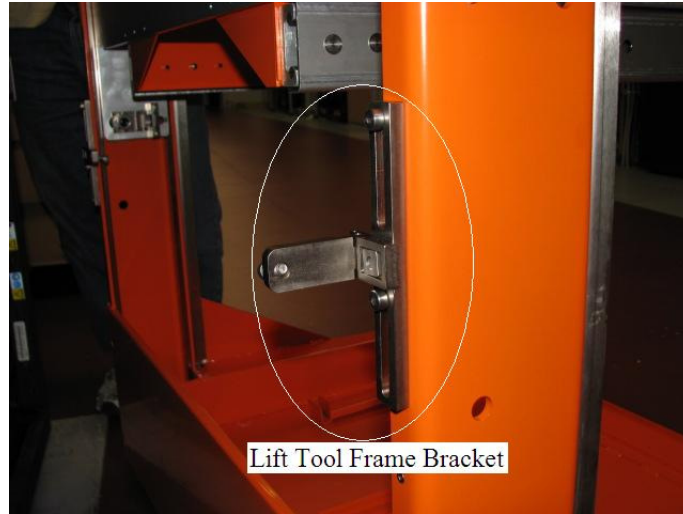


**Figure 26 Disk Enclosure Rear Rail Block Captive Screws**

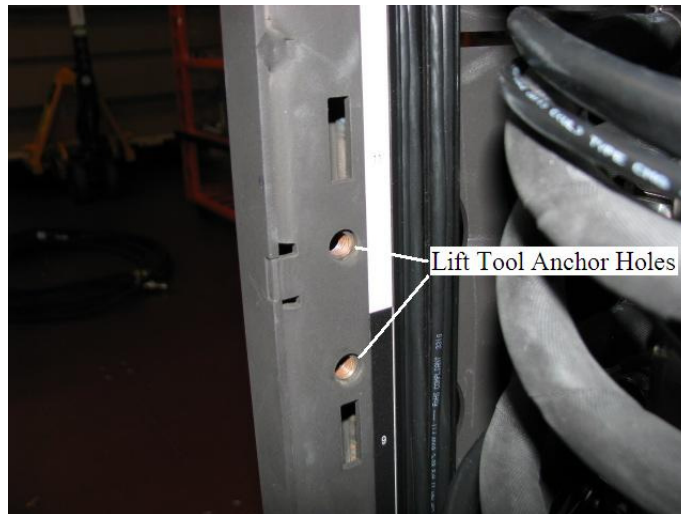
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### 3.9 Attach the Lift Tool to the frame <= SSR TASK

- STEP 33 Find the frame attachment bracket on the lift tool (see Figure 27).  
Find the lift tool anchor locations on the front side of the Power 775 frame (see Figure 28).  
Slide the Lift Tool up against the frame (see Figure 29).

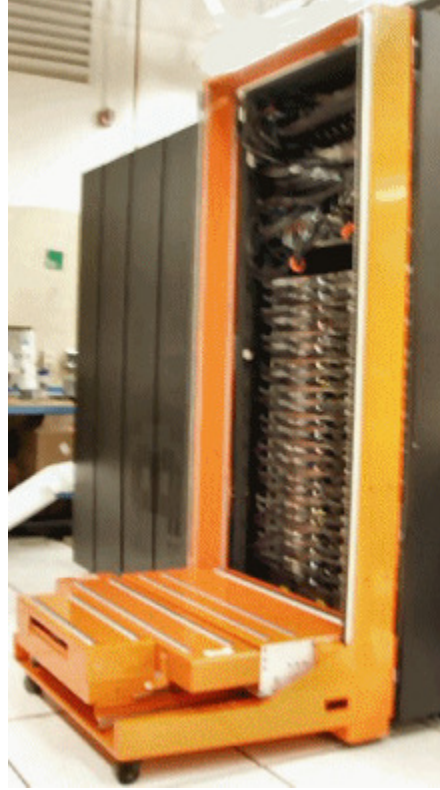


**Figure 27 Lift Tool attachment Bracket**



**Figure 28 Lift Tool Anchor Holes**





**Figure 29: Lift Tool against Front Side of Frame**

- STEP 34 Using the 5 mm Hex tool P/N 74Y0986 and 3/8in-ratchet handle 23-31 Nm torque clutch P/N 74Y0985 (shipped in the Hand Tool Kit), screw the attachment screws into the Lift Tool anchor holes in the frame and torque screws until seated (see Figure 30).



**Figure 30 Lift Tool attached to frame**

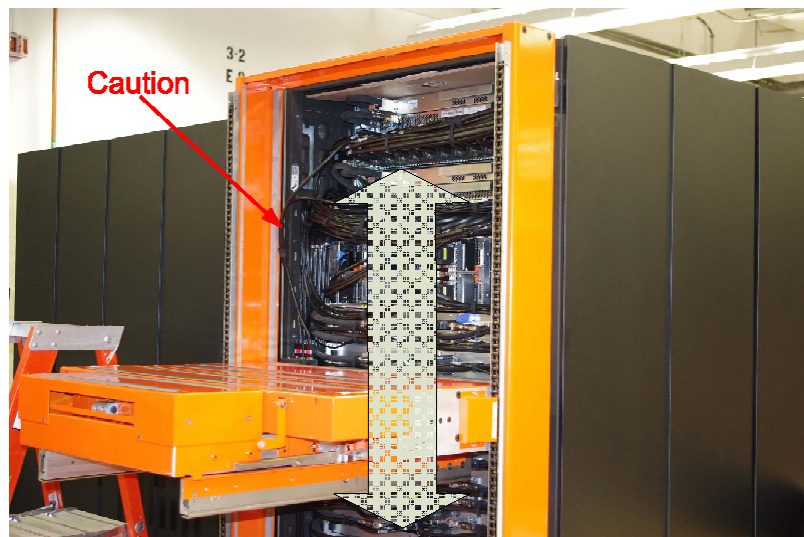


STEP 35 Extend and flip up the lift tool Front Table Stop (see Figure 31).



**Figure 31: Front Table Stop**

STEP 36 Ensure that all the cables of the rack are dressed such that the lift table will not catch on cables as it is moved up and down across the face of the rack (see Figure 32 and Figure 33).



**Figure 32: Lift Table Movement Path**



**Figure 33: Secure Cables**

STEP 37 Ensure that the UEPO will not be hit as the table moves up and down. Also ensure that the UEPO is secured to the frame so it does not move during the service procedure.

STEP 38 Raise the lift tool table just below the DE to be removed. The platform is raised via the Table Lift Drive, using the battery powered drill shipped with the Lift Tool, and a 5/16" hex socket.

**ATTENTION:**

- Use two hands to operate the battery powered drill as it is a high torque tool (see Figure 34).
- Use the "Drill" setting on speed "LOW (1)" (Figure 35).
- Be aware that when lowering the tool, as you approach the bottom of the lift table range, reduce the speed of the drill to avoid high torque to the hands and drill slippage from the tool.

Required Tools:

Milwaukee Cordless Drill 2602-20 & Milwaukee 18V Lithium-ION Battery 48-11-1828

## Power Drill Operation – Correct Technique

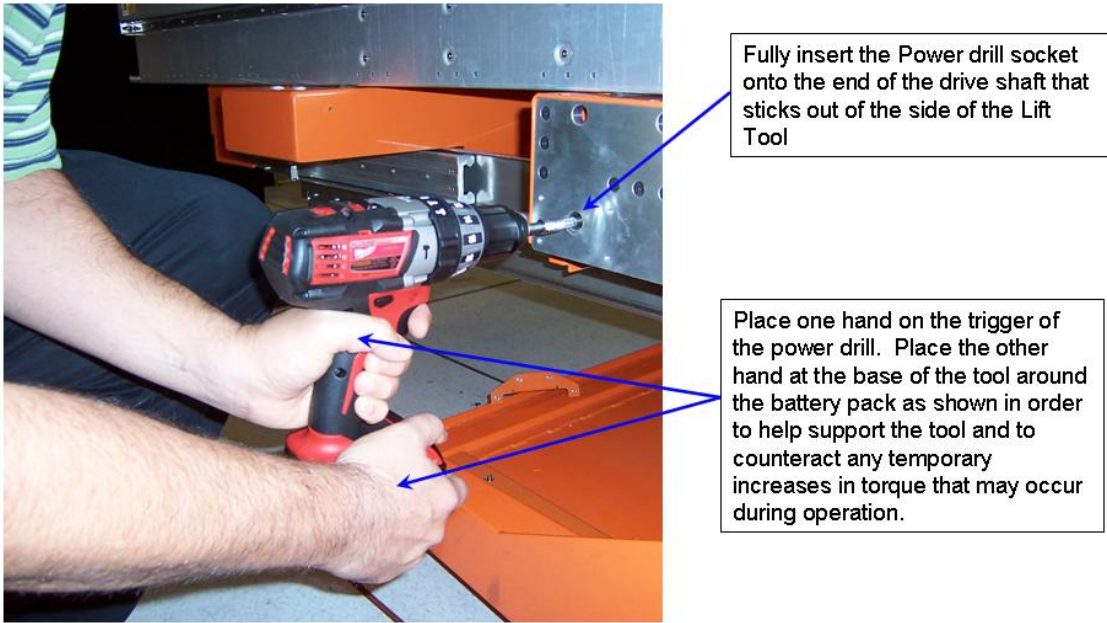


Figure 34 Power Drill Operation – Correct Technique

## Power Drill Operation – Correct Settings For Use

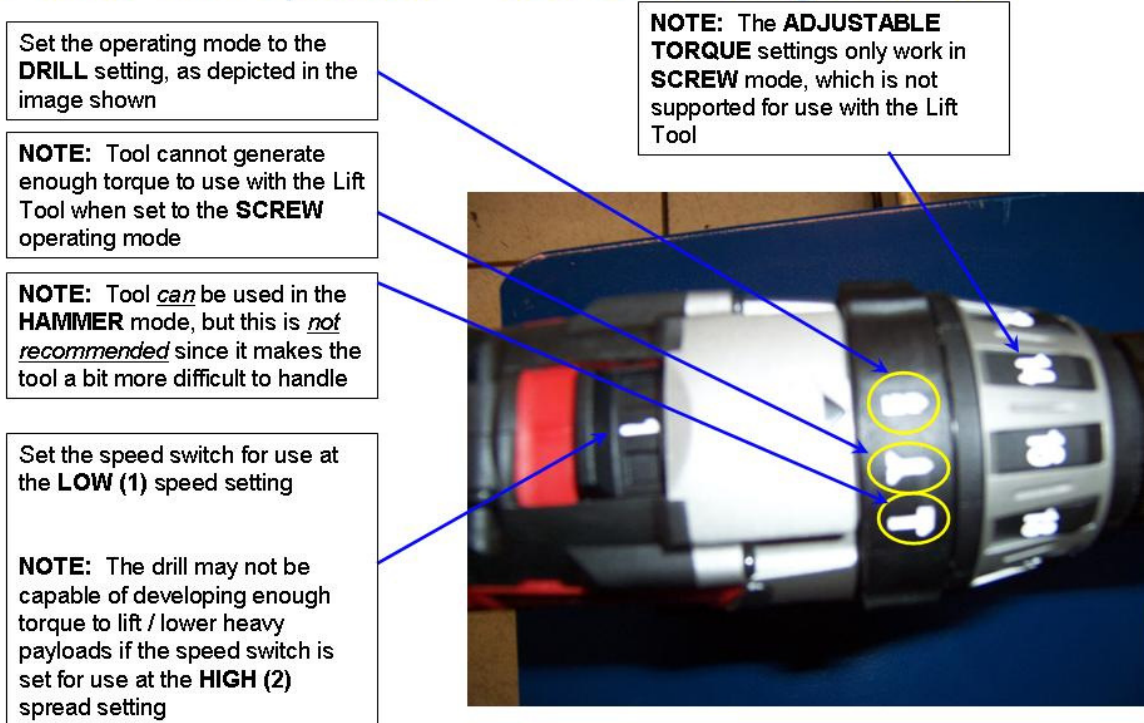


Figure 35 Power Drill Operation – Correct Settings for Use

## Power775 Disk Enclosure Chassis Service Procedure

STEP 39 Fully extend the table to the open position.

STEP 40 If necessary bring over Ladder P/N 46G5947 shipped with the POWER 775 Lift Tool Kit.

---

### 3.10 Move the Disk Enclosure onto the Lift Tool <= SSR TASK

**CAUTION:** Do not remove or install this unit without using the provided lift tool. (C017)



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

**ATTENTION:** The DE weighs about 550 lbs (250 kg) when full.



**CAUTION:** Pinch hazard. (L012)

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



**DANGER:** Heavy equipment—personal injury or equipment damage might result if mishandled. (L013)

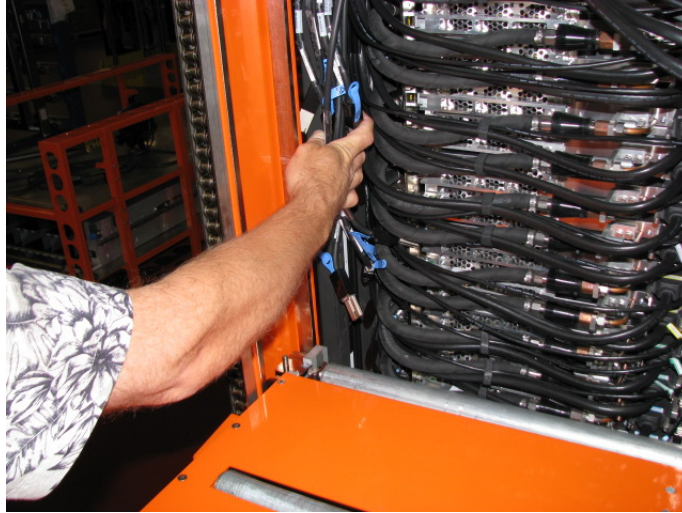
STEP 41 Ensure the DE will clear all cables.

Lift the DCCA cables that were connected to the DE out of the left raceway to create clearance for the DE to slide out of the frame (see Figure 36). Make sure the DE, especially the corners, will clear all cables.



For some DE locations it may be necessary to use the cable protector sheet P/N 41U8226 shipped with the hand tool kit 74Y0988 (see Figure 37). Fold the cable protector sheet (see Figure 38) and slide the folded sheet between the DE chassis and any interfering cables (see Figure 39).

NOTE: It is very important to move the ensure the DCCA HPIC cables are clear and to use the cable protector sheet if necessary as it is easy to tear the insulation of the DCCA HPIC cables when extracting the Disk Enclosure if you are not careful.



**Figure 36 Relocate the DCCA cables**



**Figure 37 Cable Protector Sheet**

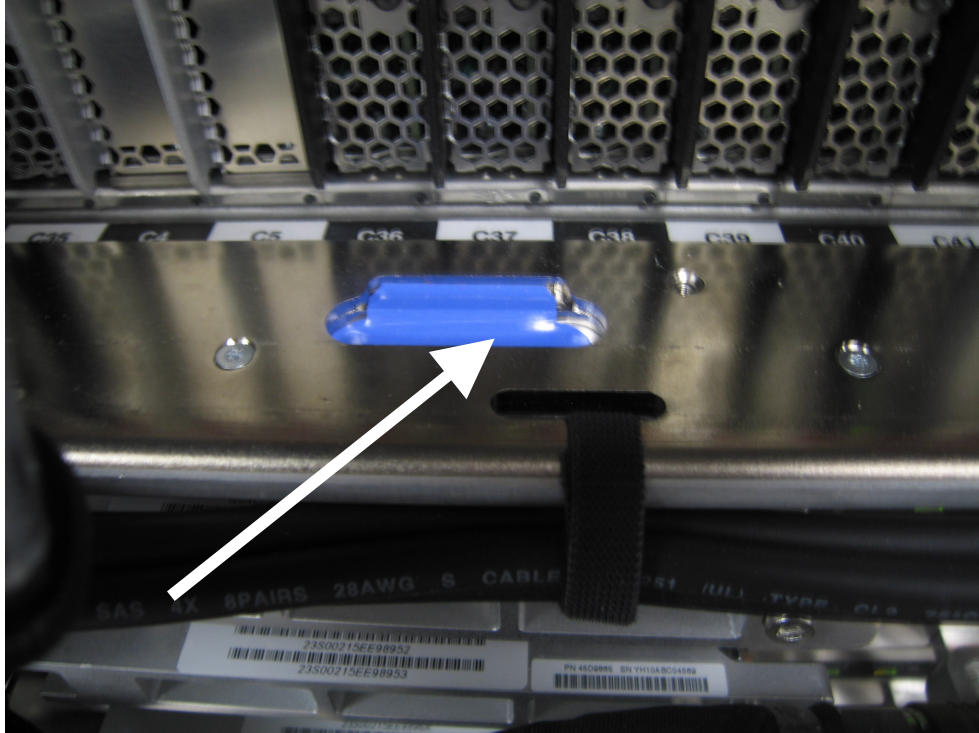


**Figure 38 Fold Cable Protector Sheet**



**Figure 39 Cable protector sheet shown in upper left position**

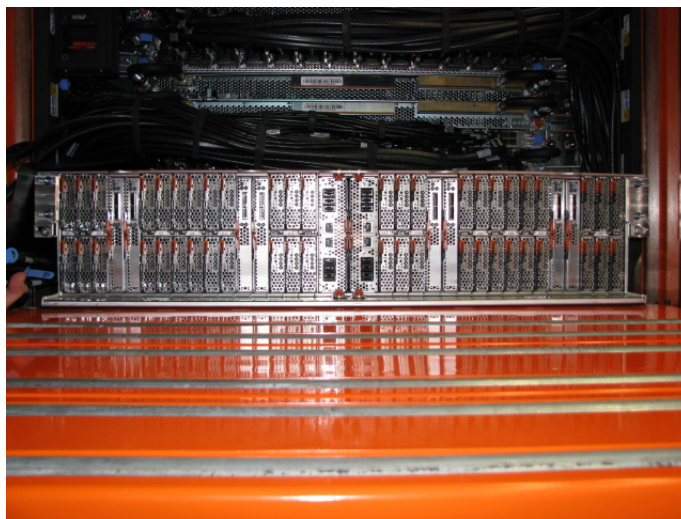
- STEP 42 Grasping the blue-purple recessed touch points on the front DE cable tray, pull the DE out of the frame a few inches until the front cable tray is just above the first Lift Tool roller (see **Figure 40**).



**Figure 40 Blue-purple Recessed Touch Points**

STEP 43 Raise the Lift Tool until the roller contacts the DE.

- Using the *Manual Drive* raise the lift tool table so it contacts the DE and then slightly further to transfer the DE weight to the lift tool table. *Do not raise the lift tool table too high as this will result in the DE being driven into the CEC or BPA above which can cause damage (see Figure 41).*



**Figure 41 Front of DE resting on lift tool**



STEP 44 Grasping the recessed touch points on the DE cable tray, slide the DE forward onto the Lift Tool **slowly** so that the Safety Latches do not get damaged when they engage on the rack rails (see Figure 42).

- The DE should slide about half way out and then the right side safety latch will engage on the Rack rail to stop the DE from sliding out any further.



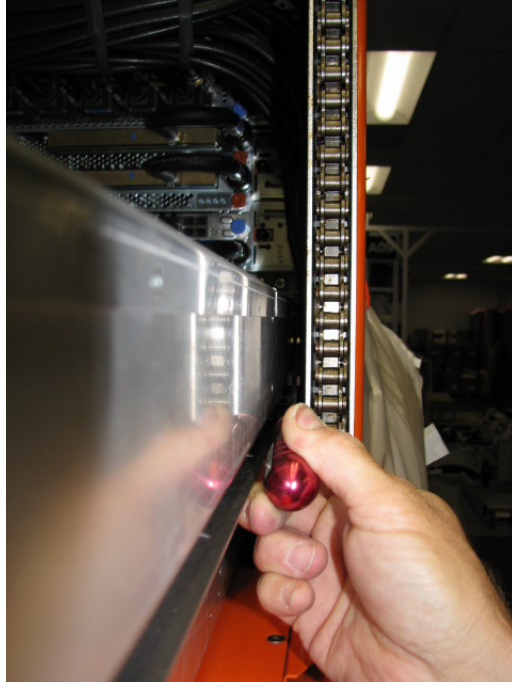
Figure 42 DE slid out slowly to point of latch engagement

**ATTENTION: Do not go under the DE while it is partially or fully out of the frame**

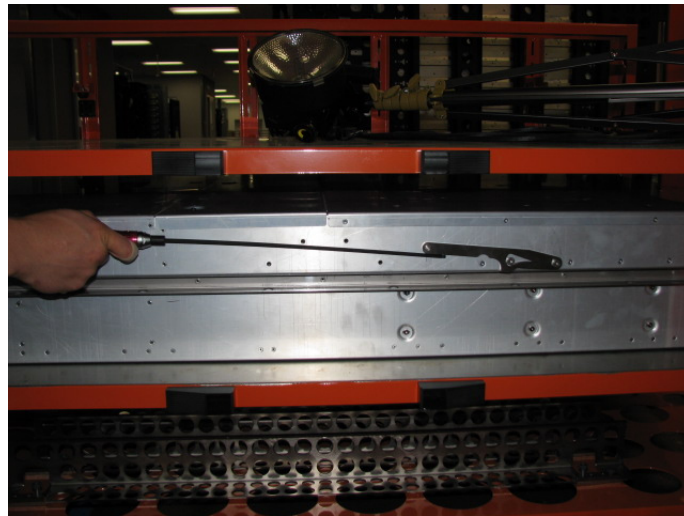
STEP 45 Using the 4mm Hex driver P/N 41V1059 (shipped in Hand Tool Kit P/N 74Y0988), release the DE safety latches (see Figure 43 and Figure 44).

- a. Hold the right latch up with the tool while pulling the drawer forward until the left latch is engaged.
- b. Release the right latch
- c. Lift the left latch up with the tool, slide the DE forward, and then release the left latch.

NOTE: When releasing latches it maybe necessary to slide the DE back toward the frame slightly (< 1mm) to release the tension on the latch.

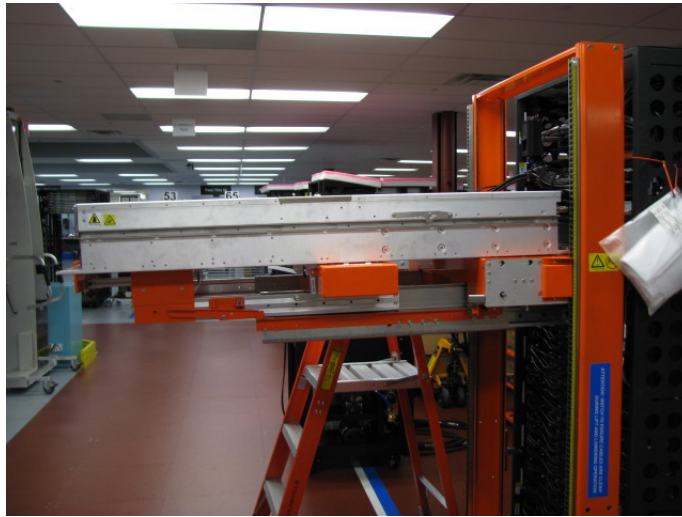


**Figure 43 Disengage the right latch first**



**Figure 44 Side view of latching system of DE out of frame**

- STEP 46 Slide the DE out of frame until it is completely supported by the lift tool and will not interfere with the frame when the Lift Tool is raised or lowered (see Figure 45 and Figure 46).



**Figure 45 DE removed from frame**



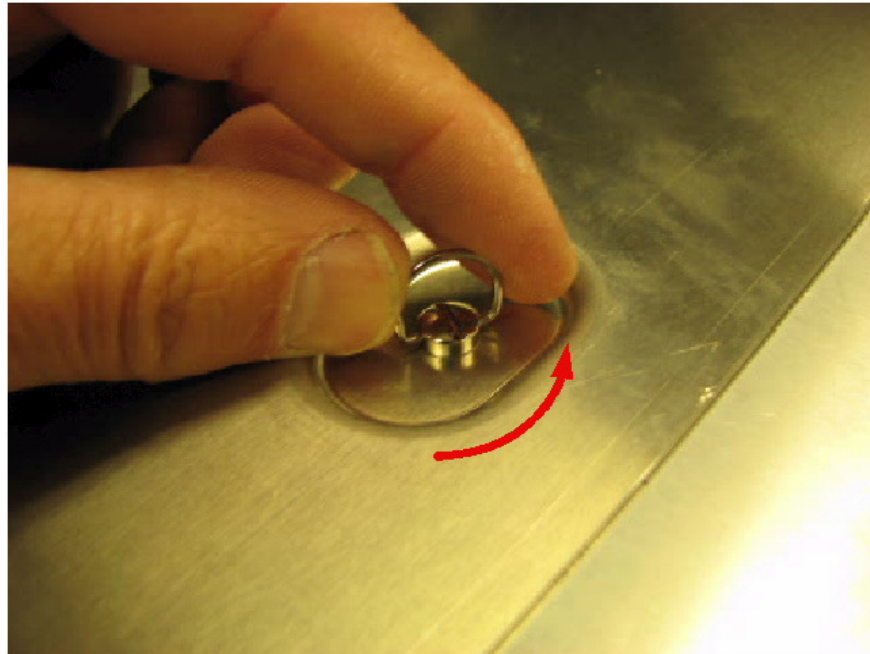
**Figure 46 DE supported by Lift Tool and cage stop bracket**

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### 3.11 Remove fans <= SSR Task

STEP 47 Remove the fan cover.

Locate the fan cover and the three ¼ turn fasteners on the top of the DE chassis (see Figure 47). Lift the handle on the ¼ turn fasteners and rotate them ¼ turn counterclockwise. Rotate the fan cover to the vertical position then the fan cover off of the DE.

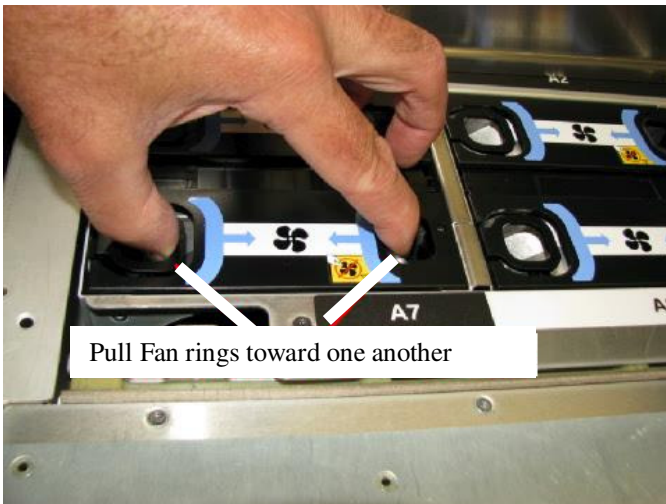


**Figure 47 Rotate ¼ turn fasteners for fan cover removal**

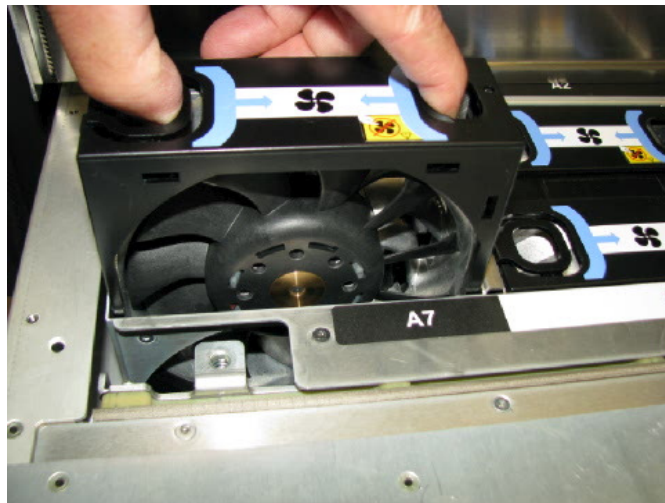
- STEP 48 Remove the fans by pulling the retention rings toward each other and lifting the fan out of the DE (see Figure 48 and Figure 49).



**CAUTION: Hazardous moving parts nearby. (L008)**



**Figure 48 Fan removal rings**



**Figure 49 Lift fan out of disk enclosure**



STEP 49 Replace fan cover of the damaged DE.

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 (see Figure 50).

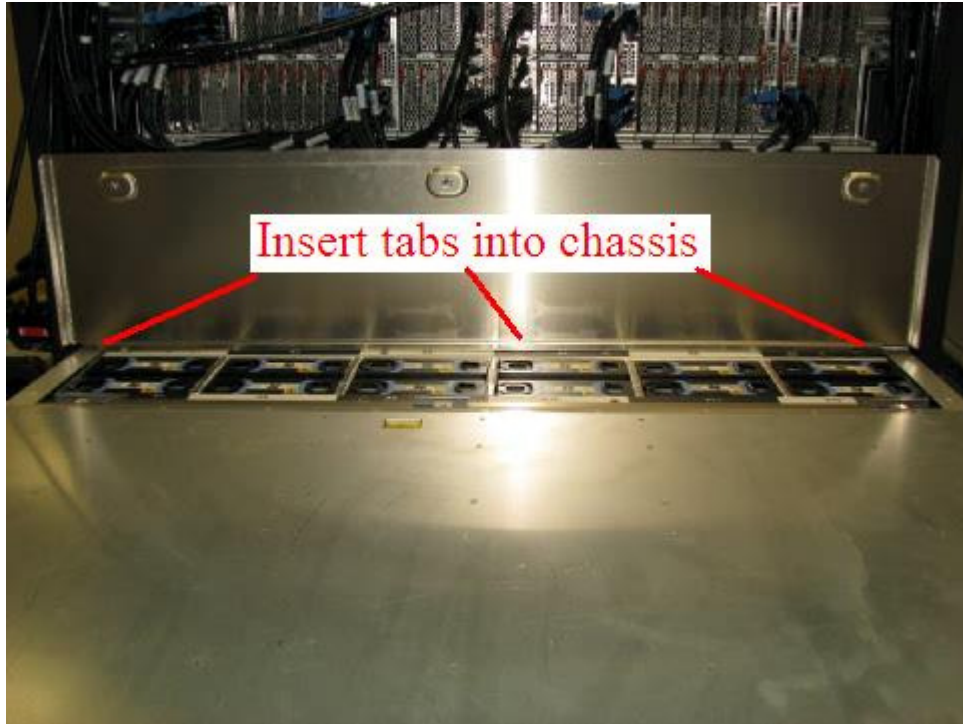


Figure 50 Reinstall cover

---

### 3.12 Using Lift Tool, Move DE to Transfer Cart <= SSR Task



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

**ATTENTION:** The DE weighs about 550 lbs (250 kg) when full.

STEP 50 Position the transfer cart adjacent to the left side of the Lift Tool and lower the Lift Tool until the bottom of the DE is at the same height as the shelf on the transfer cart.

STEP 51 Remove transfer cart guard rail.

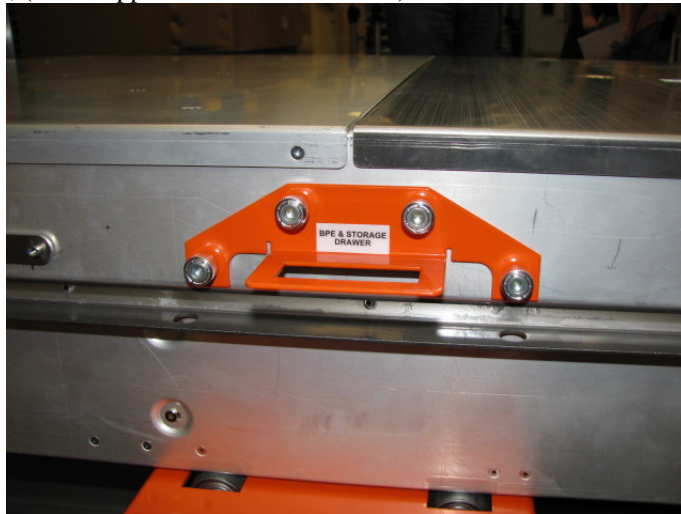
Using 5 mm Hex tool P/N 74Y0986 (shipped in the Hand Tool Kit) remove the eight screws that retain the transfer cart guard rails (see Figure 51).



**Figure 51 Remove transfer cart guard rails.**

**STEP 52** Attach winch hook to defective DE.

Locate the winch hook that was shipped with the transfer cart and attach it to the defective DE (see Figure 52). The tools required are the 5 mm Hex tool P/N 74Y0986 and Ratchet handle P/N 6428240, (both shipped in the Hand Tool Kit).

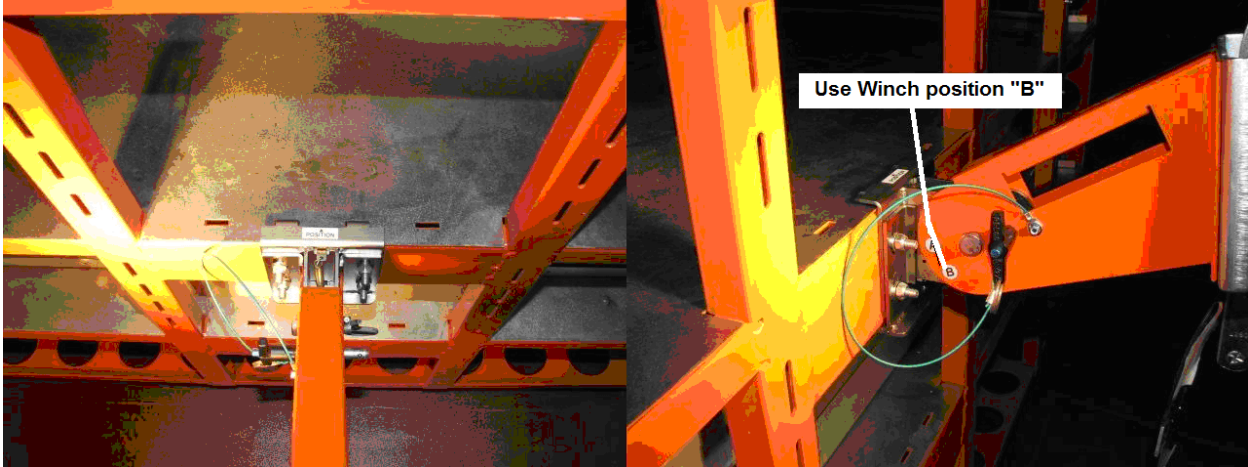


**Figure 52 Attach winch hook**

**STEP 53** Setup the winch on transfer cart.

Locate the winch that was shipped with lift tool. Attach the winch to the transfer cart (see Figure 53). The winch is designed to work with the Power775 CEC, BPA and DE.

For the DE use winch angle A. Adjust the winch angle by depressing the button in the center of the "T" handle, removing the "T" handle and reinserting it into the winch when the holes are aligned to the "A" angle label (see Figure 53).

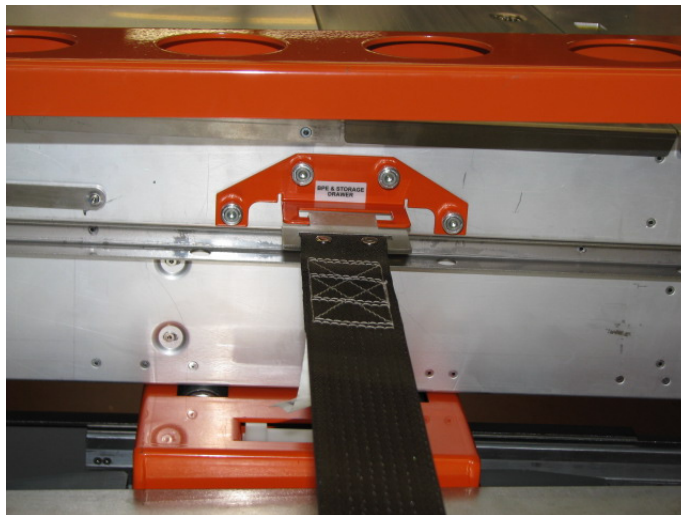


**Figure 53 Transfer cart winch attachment position and winch position “B”**

STEP 54 Pull the damaged DE onto transfer cart.

Align the transfer cart with the damaged DE. Attach the winch to the winch hook on the damaged DE (see Figure 54 and Figure 55). You will need to proceed slowly and make sure the DE is travelling straight as it enters the transfer cart, otherwise it can bind against the side rails. Crank the winch slowly counterclockwise to pull the damaged DE 90% of the way onto the transfer cart.

Using the 4 mm hex driver P/N 74Y0984 shipped in the hand tool kit P/N 74Y0988, adjust the drawer hold down bracket up away from damaged DE (see Figure 56). Using the winch pull the damaged DE all the way onto the transfer cart. Using the 4 mm driver, drop the drawer shipping brackets onto the top of defective drawer and tighten screws so that the defective drawer is retained for shipping.

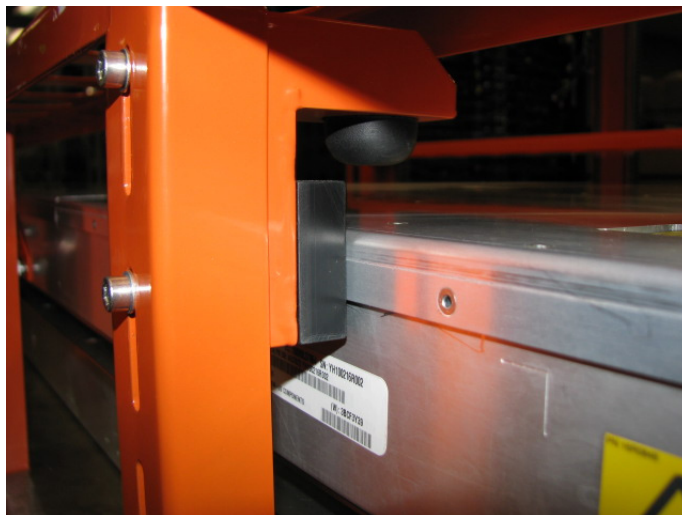


**Figure 54 Winch hook attached to drawer**





**Figure 55 Use Winch to pull DE onto transfer cart**



**Figure 56 DE shipping hold downs shown in up position**

- STEP 55 Move the transfer cart away from lift tool so that it can be accessed from all 4 sides.
- STEP 56 Remove the guide rails from transfer the cart by using the 5 mm Hex tool P/N 74Y0986, Ratchet handle P/N 6428240, Extension (18") P/N 46K2707 (all shipped in the Hand Tool Kit) to loosen the captive fasteners and remove the rails (see Figure 57).



Figure 57 Remove transfer cart guide rails

---

### 3.13 Move FRUs from damaged DE to new DE <= SSR Task

STEP 57 Move all FRUs from the damaged DE to exactly the same location in the new DE.

**ATTENTION: Do a visual inspection of the signal pins on each FRU before installing it to the new DE chassis. A damaged connector on a FRU will destroy the backplane connector of the new chassis. Be very careful not to bump the signal connectors when transferring the FRUs.**

- a. Move the 2 DE DCCAs to the new DE chassis
- b. Move the 16 Port Cards to the new DE chassis
- c. Move the 96 Drive Carriers (leaving drives in place) to the new DE chassis

It is very important to move the Drive Carriers to the same locations in the new DE chassis as they were in the old DE chassis. If they get mixed up, GPFS will have errors.

NOTE: ESD precaution must be exercised in this step as it requires handling drives. The Drive Carriers do not fully enclose the drives, so circuitry is exposed.

STEP 58 Copy the information from the Enclosure VPD label of the damaged DE Chassis to the write-in Enclosure VPD label of the new chassis (see Figure 3).

STEP 59 Transfer the winch hook.

Using the 5 mm Hex tool P/N 74Y0986 and Ratchet handle P/N 6428240, (both shipped in the Hand Tool Kit), transfer the winch hook from damaged DE and install it on the opposite side of new DE so that the new DE can be pulled onto the lift tool.

### 3.14 Move new DE to Transfer Cart <= SSR Task



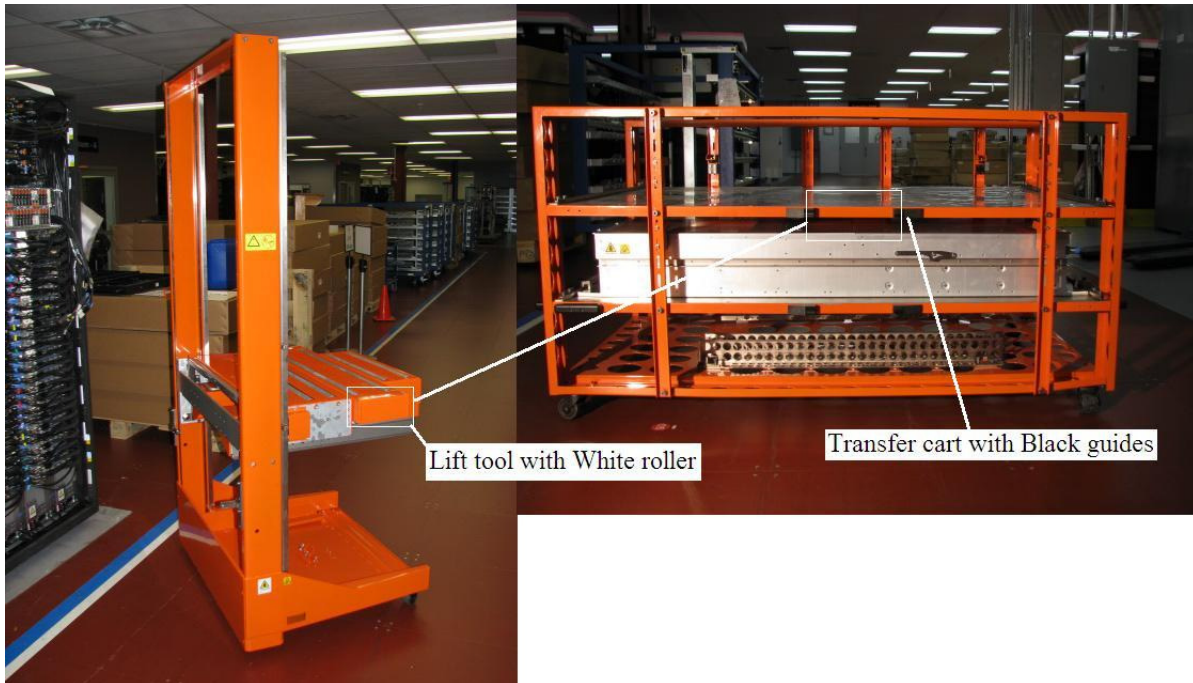
**CAUTION: Sharp edges, corners, or joints nearby. (L006)**



**CAUTION: Pinch hazard. (L012)**

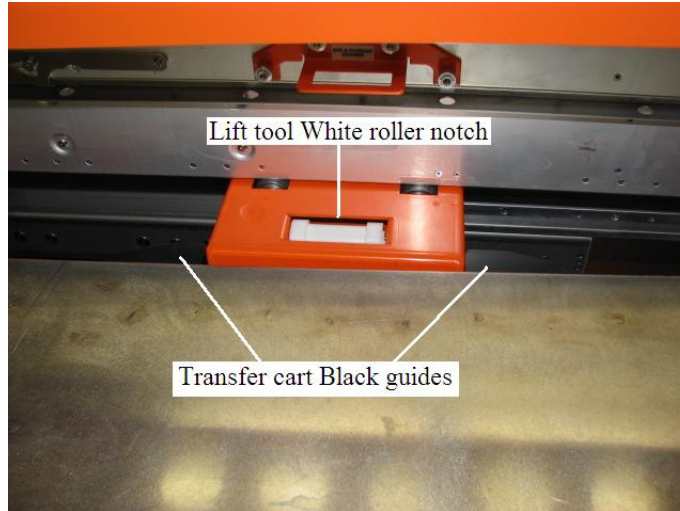
STEP 60 Lower lift tool to the level of new DE.

Position the transfer cart to the left side of the lift tool. Using the battery powered drill with a 5/16" hex socket, adjust the height of the lift tool level with the bottom of the new DE (see Figure 58 and Figure 59). See Figure 34 and Figure 35 for operation of the drill.



**Figure 58 Lift tool showing White roller engagement area and the transfer cart Black rubber guides**





**Figure 59 Transfer cart coupled to lift tool**

- STEP 61 Remove winch from transfer cart and attach to lift tool.  
Disengage the winch from the transfer cart and insert into the lift tool slots (see Figure 60).



**Figure 60 Winch tool anchor slots**

- STEP 62 Reattach the guide rails to transfer the cart by using the 5 mm Hex tool P/N 74Y0986, Ratchet handle P/N 6428240, Extension (18") P/N 46K2707 (all shipped in the Hand Tool Kit) to tighten the captive fasteners and attach the rails (see Figure 57).
- STEP 63 Winch new DE onto the Lift Tool.

## Power775 Disk Enclosure Chassis Service Procedure

Attach the winch cable to the winch hook on the new DE. Rotate the winch counterclockwise until the new DE is centered on the lift tool. Disconnect the winch cable and the winch from Lift Tool. Remove the winch hook from new DE.

---

### 3.15 Install the fans into the new DE <= SSR Task

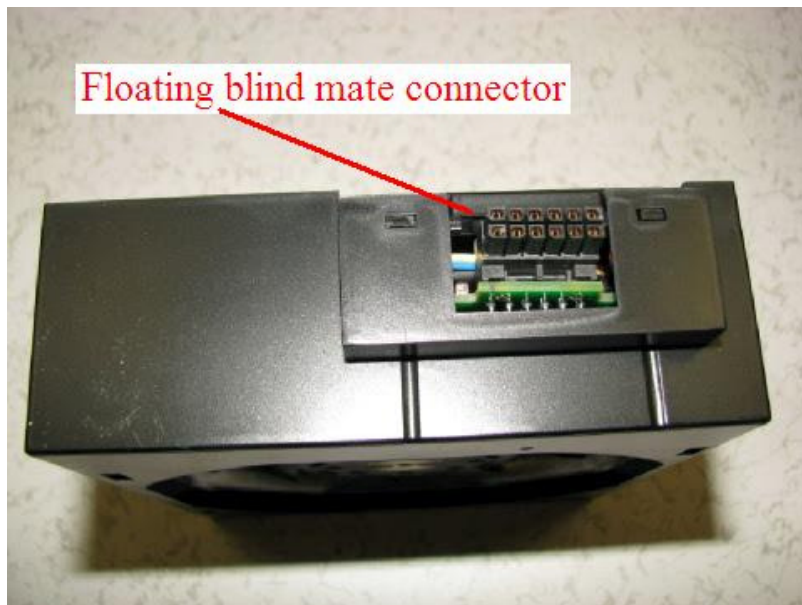
STEP 64 Remove fan cover of the new DE (see Figure 61).

Locate the fan cover on the new DE and the three ¼ turn fasteners. Lift the handle on the ¼ turn fasteners and rotate them ¼ turn counterclockwise. Lift the fan cover off the DE.



**Figure 61** ¼ turn fastener fan cover removal

STEP 65 Insert the fans that were removed from the damaged chassis. Insert fan assemblies into all 12 fan

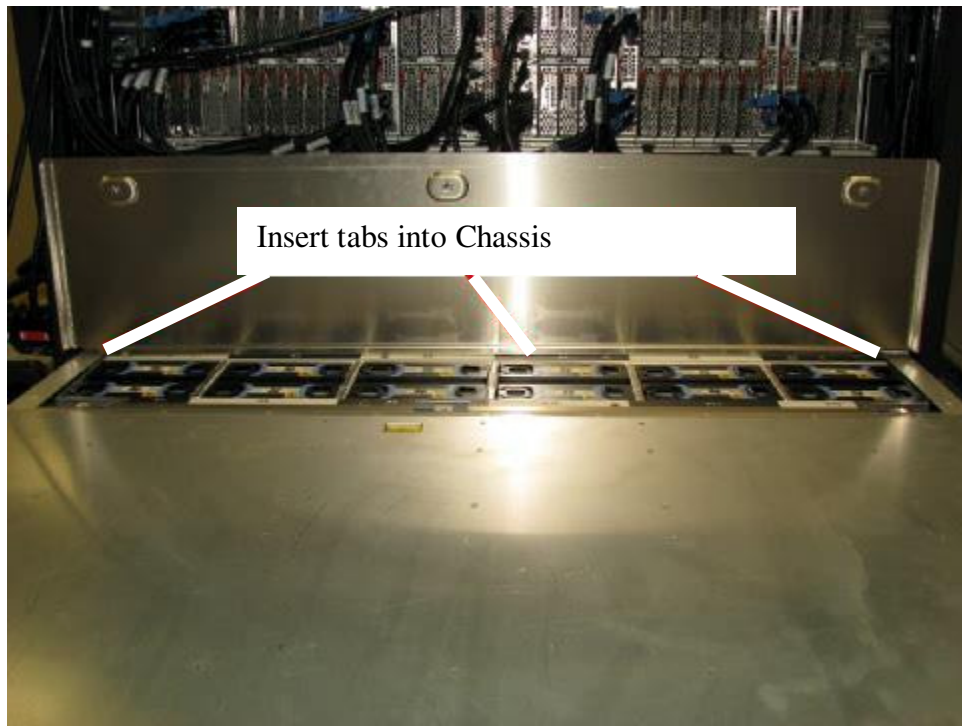


slots. The fan is fully seated when it is into the DE. To test this, after the fans are inserted, pull up

on one fan ring to check if the fan is fully seated. Never force the fan down. If a fan is not fully seated, remove the fan and straightened the floating blind mate connector before reinsertion (see Figure 62).

**Figure 62 Fan floating blind mate connector**

- 
- STEP 66 Replace fan cover on the new DE. With cover oriented vertically insert tabs into chasses and rotate cover to the closed position. Then rotate the three ¼ turn fasteners clockwise to the locked position (see Figure 63).



**Figure 63 Reinstall cover**

---

### 3.16 Install new DE into frame <= SSR Task

**CAUTION: Do not remove or install this unit without using the provided lift tool. (C017)**



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

STEP 67 **Attention: Ensure that all the cables of the frame are clear** so that the Lift Tool table will not catch on cables as it is moved up and down across the face of the frame. Also ensure that the UEPO Panel is still out of the way.

STEP 68 Using Battery powered drill shipped with the Lift Tool, 5/16 inch socket , ¼ inch drive adapter P/N 39F8449, raise the Lift Tool table until the DE is lined up with the frame location that the damaged DE removed from.

STEP 69 Align the DE channels with the DE rail rollers and 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.

STEP 70 Install the two Rear Rail Block Captive Allen head screws (see Figure 26).

STEP 71 Lower the Lift Tool, detach it from the frame, and store it.

- Retract the table extensions and stop plate extended in STEP 36 and STEP 37.
- Detach the Lift Tool brackets that were installed in STEP 32. Be sure to completely disengage brackets from frame before attempting to move Lift Tool.
- Using the battery powered drill lower the Lift Tool table to its lowest most stable position. **Attention: Watch to ensure cables are clear during this operation!**
- Store the winch with Lift Tool for future use.

STEP 72 Using the procedure “Appendix C: Power775 DE Fill Procedure”, fill the new DE Chassis. This will require the Fill and Drain Tool P/N 45D6928.

STEP 73 Attach the water hoses by pushing the quick connects onto the DE water connectors.



**STEP 74** 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>.

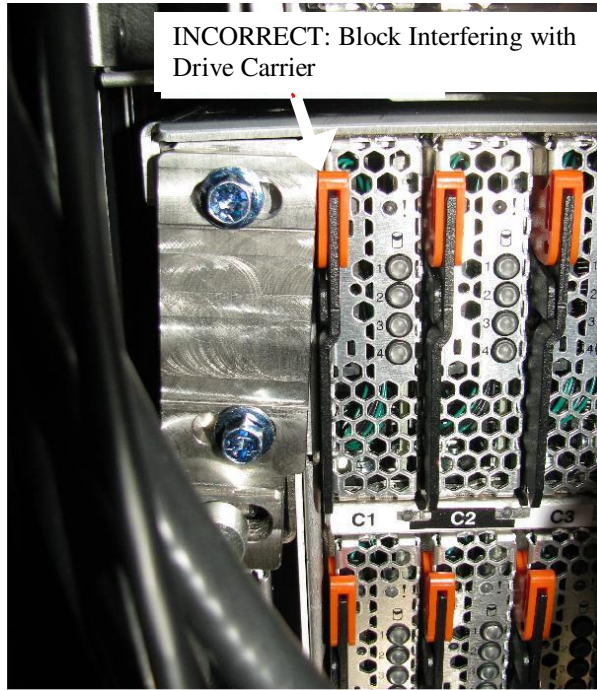
If velcro ties were removed, reinstall them.

When complete, all the Port Card connectors should be populated; there should be no open connectors.

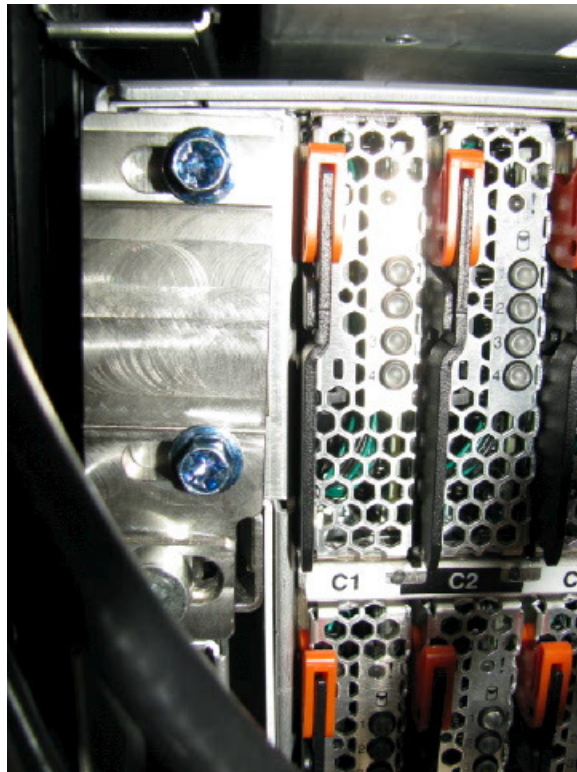
**STEP 75** Close the rear door of the frame.

**STEP 76** If you removed the Front Rail Blocks, reinstall them using the Front Rail Block hex screws (see Figure 24).

**NOTE:** Make sure the Rail Blocks will not interfere with removal of the adjacent Drive Carriers



**Figure 64: Rail Block Interfering with Drive Carrier**



**Figure 65: Rail Block Correctly Installed**

- STEP 77 Install the two Front Rail Block Captive Allen head screws (one on the left side and one on the right side of the DE) (see Figure 24).
- STEP 78 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 21).
- STEP 79 Reconnect the four DCCA Service Network Communications (E/NET) cables to the DE DCCAs (see Figure 19 and Figure 20).
- STEP 80 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 81 Reattach front door latch if removed in an earlier step.
- STEP 82 Reposition UEPO assembly if moved in an earlier step.
- STEP 83 Reattach and close the front door of the frame.

---

### 3.17 Ship damaged DE back for Failure Analysis. <= SSR TASK

- STEP 84 Using the procedure “Appendix D: Power775 DE Drain Procedure”, drain the damaged DE Chassis. This will require the Fill and Drain Tool P/N 45D6928.
- STEP 85 Fasten the damaged DE to transfer cart, using the hold down brackets.
- STEP 86 Reattach the transfer cart guard rails.
- STEP 87 Push the transfer cart with damaged DE into the shipping container.
- STEP 88 Close shipping container and ship to IBM for Failure Analysis.

---

### 3.18 Store all tools. <= SSR TASK

- STEP 89 Return all hand tools to hand tool kit.
- STEP 90 Store the ladder.
- STEP 91 Store the Lift Tool and all other tools for future use.

---

### 3.19 Power on the Disk Enclosure <= CUSTOMER TASK

- STEP 92 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 93 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 4

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

```
bpccmd -c 41110000xx
```

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 4).

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.

STEP 94 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 Figure 4

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

```
bpccmd -c 82110000xx
```

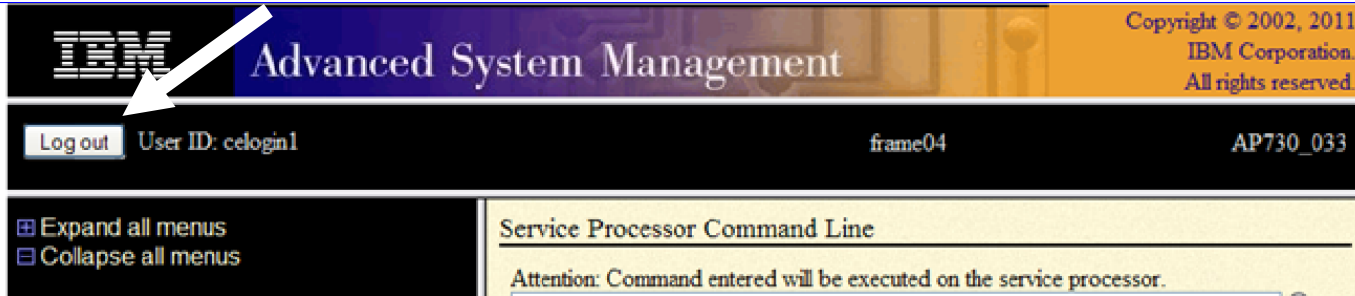
Where "xx" is the Cage ID of the DE you are servicing. This field will be 05,07,09,0B,0D, or 0F (see Figure 4).

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

STEP 95 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 96 Log out of ASM.



STEP 97 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 98 You are now ready to turn GPFS back on.

---

### 3.20 Confirm with the customer <= SSR Task

STEP 99 You are now ready to turn GPFS back on.

---

## 4 END OF POWER775 DISK ENCLOSURE CHASSIS SERVICE PROCEDURE

---

## 5 APPENDIX A: POWER775 DISK ENCLOSURE (DE) PRESSURE TEST PROCEDURE

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### 5.1 Safety Notices

Read “Safety Notices“ available from InfoCenter:

<http://publib.boulder.ibm.com/infocenter/powersys/v3r1m5/topic/p7hdx/G229-9054.pdf>

The following cautions apply to all Power775 service procedures:

**CAUTION:**

**Energy hazard present and 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.

**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: This unit must not be left running unattended, service personnel should always be overseeing the process. (C038)**



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



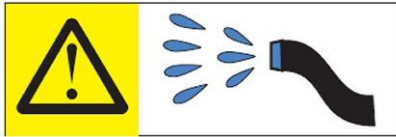
**CAUTION: Protective eyewear is needed for the procedure. (L011)**



**DANGER:** Heavy equipment—personal injury or equipment damage might result if mishandled. (L013)



**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)

## 5.2 Background:

This document contains the procedure for performing an air pressure test on a Disk Enclosure (DE) on an **IBM Power 775** system, using an **IBM Power 775** Fill and Drain Tool (FDT). The successful execution of a **FDT Pressure Test Calibration** procedure is required for this procedure to be performed.

To ensure that all **IBM Power 775** water-cooled DE's are leak-free, the **IBM Power 775** Fill and Drain Tool (FDT) is equipped with pressure testing capability. The DE pressure test is designed to identify leaks in the DE internal plumbing, and must be completed before a DE fill procedure is executed so that any potential for water leakage in the system can be avoided.

The results of the DE pressure test are recorded within the FDT; if the test passes, a DE fill procedure can be completed. If this test fails, there is a functional defect in the DE, and the component fill cannot be completed. Upon a pressure test failure of a component, the next level of support must be contacted to replace the hardware.

A DE fill procedure should not be executed unless both the **FDT Pressure Test Calibration** and **DE Pressure Test** have passed since FDT activation.

The pressure test must be completed on an empty DE. A new DE should ship without water to the customer location, and no additional drainage is required. If the FDT senses that the DE is not empty when the pressure test begins, the pressure test will stop. The pressure test status will be set as incomplete, and a DE drain operation will be required.

### **Reference Information:**

<b>IBM Power 775</b> FDT P/N:	<b>45D6928</b>
Hose assemblies/adapters required:	<b>HA1</b> (45D8561) <b>HA2</b> (45D8562)

Expected maximum time to complete DE pressure test: 4 min

**NOTE:** *Some steps in this procedure may be redundant due to other service operations being completed prior to this procedure. If a step has already been completed, verify that the step has been completed properly and proceed to the next step.*

**NOTE:** *The location of the component for the pressure test procedure is not important. The pressure test can be completed with the component on a cart, on the lift tool, or mechanically installed in the frame.*

---

## 5.3 Procedure:

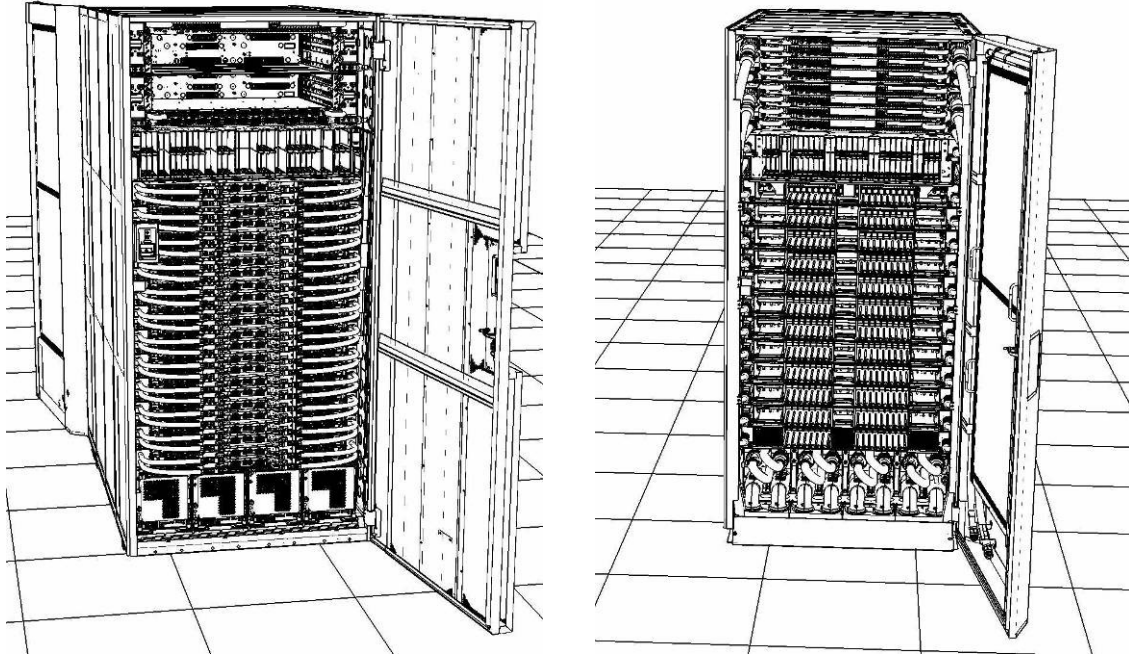
**NOTE:** If you already have the FDT powered on, proceed to **Step 14**. Otherwise, start procedure at **Step 1**.



1. Identify the **Power 775** frame that requires service.

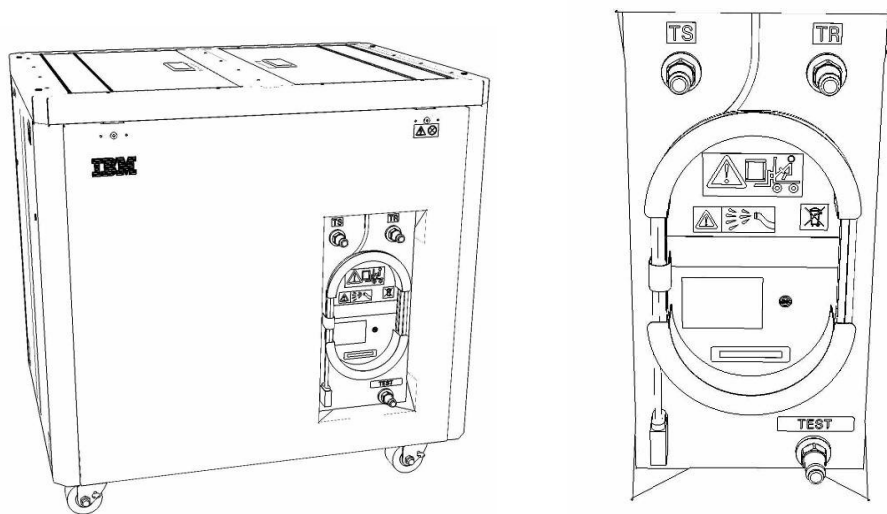
Verify that the system UEPO is set to **ON**, and the managing consoles (HMC and XCat) are powered on and communicating with the frame.

2. Open front and rear doors of the **Power 775** frame that requires service.



3. Bring the FDT to the front side of the **Power 775** frame that requires service.
4. Locate the panel of the FDT that contains the Universal Power and Information Cable (UPIC), as well as the **TS**, **TR**, and **TEST** water connections.

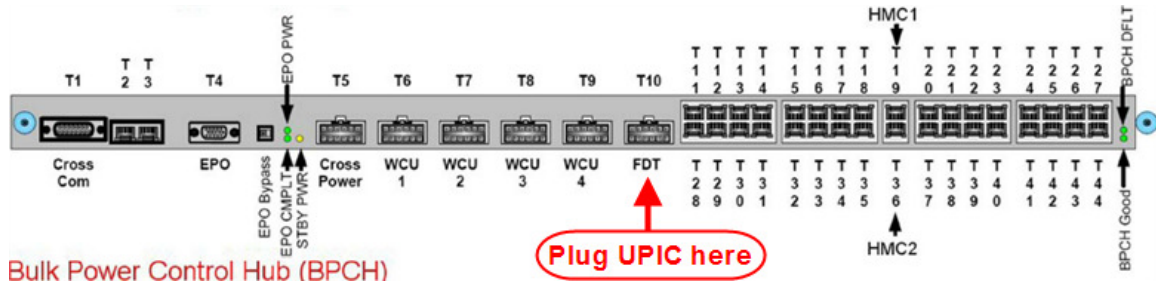
This side of the tool should be facing the front of the frame.



5. Unwrap the FDT UPIC cable from the storage loop on the FDT.

6. Select BPC port for FDT

- If the lower BPA is not targeted for service, and is functional:  
Plug the FDT UPIC cable into **port T10 of the lower BPC.**
- If the lower BPA is targeted for service, or is not functional:  
Plug the FDT UPIC cable into **port T10 of the upper BPC.**



7. Login to the HMC with the User ID `hscroot`.

Use the HMC that is connected to the BPA where the FDT is plugged.

8. From the HMC left Navigation menu, expand **Systems Management** then select **Frames**.

Verify frame serial number for the frame to be serviced.

9. In the **Frames** view on the HMC, place a checkmark in the **Select** column for the frame to be serviced.

10. Verify that the frame **Status** is **Rack Standby/Rack Standby** or **Standby/Standby**.

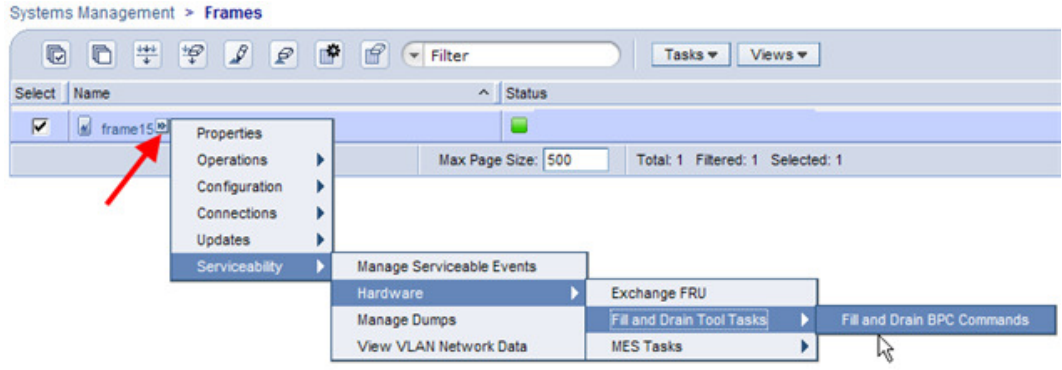
- If frame **Status** reads **Rack Standby/Rack Standby** or **Standby/Standby** – OK.

Continue to next step.

- If frame **Status** does not read **Rack Standby/Rack Standby** or **Standby/Standby** – action required. Contact next level of support.

11. From the **Task** menu on the HMC, *select* **Serviceability** > **Hardware** > **Fill and Drain Tool Tasks** > **Fill and Drain Command Interface**

Power775 Disk Enclosure Chassis Service Procedure  
 ----Appendix A: DE Pressure Test Procedure ----



**Fill and Drain Tool Command Interface** will display. See below for a sample image of the interface (FDT deactivated).

**Fill and Drain Tool (FDT) Command Interface - Server-78AC-100BC50029**

The table below shows the FDT Port locations that can communicate with the Fill and Drain Tool. Select the port to which the Fill and Drain Tool is connected. Use the buttons to drive commands to the Fill and Drain Tool connected to a port.

FDT Port Locations:

Select	Location Code	Description
<input type="radio"/>	78AC-100*BC50029-P7-C1	Lower BPC Port T10
<input type="radio"/>	78AC-100*BC50029-P8-C1	Upper BPC Port T10

12. Select the BPC port that the FDT was plugged into in **Step 6** from the **FDT Port Locations:** list.

13. *Click* the **Activate FDT** button.

- If the Activate FDT command is successful – OK. Wait 30 seconds and continue to next step.
- If the **Activate FDT** command fails – action required.

*Click* the **Deactivate FDT** button.

Wait 2 minutes and repeat **Step 13**. If the **Activate** command fails again, contact next level of support.

14. *Click* the **Get FDT Status** button.

- If the **Get FDT Status** command is successful – OK.

See below for a sample status (does not reflect expected state)

- If the **Get FDT Status** command fails – action required.

Repeat **Step 14**. If the **Get FDT Status** command fails again, contact next level of support.

**Fill and Drain Tool (FDT) Command Interface - Server-78AC-100BC50029**

The table below shows the FDT Port locations that can communicate with the Fill and Drain Tool. Select the port to which the Fill and Drain Tool is connected. Use the buttons to drive commands to the Fill and Drain Tool connected to a port.

FDT Port Locations:

Select	Location Code	Description
<input checked="" type="radio"/>	78AC-100*BC50029-P7-C1	Lower BPC Port T10
<input type="radio"/>	78AC-100*BC50029-P8-C1	Upper BPC Port T10

FDT Power/Comm: GOOD  
 Frame Attached: IBM Power7 775  
 MDA-FD RL: 45D  
 Error Status: WARNING  
 Tank Level: Full  
 Air Pump: Off  
 Water Pump: DISABLED  
 Tool Mode: Ready  
 Pressure Test Calibration: Incomplete  
 Component Pressure Test: Incomplete

Sample FDT Status

15. Review the FDT status screen and ensure that the following conditions are true:

- **Tool Mode:** **Ready** – OK. Check Error Status.
- **Error Status:** **NONE** – OK. Check Tank Level.  
**WARNING** – *click* the **Decode Error Status** button, record the information returned and check Tank Level.  
**CRITICAL** – *click* the **Decode Error Status** button, record the information returned and contact next level of support.
- **Tank Level:** **Upper Half, Lower Half** or **Empty**– OK. Check Pressure Test Calibration.  
**Full** – action required.

Exit this procedure and complete a **Fill and Drain Tool (FDT) Tank Drain Procedure**.

Once FDT tank level is **Upper Half**, **Lower Half** or **Empty**, return to this step and continue with procedure.

- **Pressure Test Calibration:** **Pass** - OK. Check Component Pressure Test. **Incomplete** or **Fail** – action required.  
Exit this procedure and complete the **Pressure Test Calibration** procedure.  
Once a **passing** result is confirmed, return to this step and continue with procedure.
- **Component Pressure Test:** **Incomplete** – OK. Continue to next step. **Pass** or **Fail** – action required.  
*Click* the **Reset FDT** button and proceed to next step.

16. Verify that DE water connections **are not** connected to system manifolds.  
DE should be drained of water.

17. Before proceeding, read required safety information:

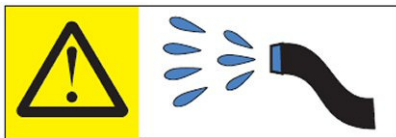
**CAUTION:** The water-based coolant solution may contain an additive intended to inhibit corrosion (or provide other functions). The solution may cause irritation to the skin or eyes. Avoid direct contact with the solution. Employ appropriate Personal Protective Equipment when performing operations 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)



18. Verify DE position for pressure test.

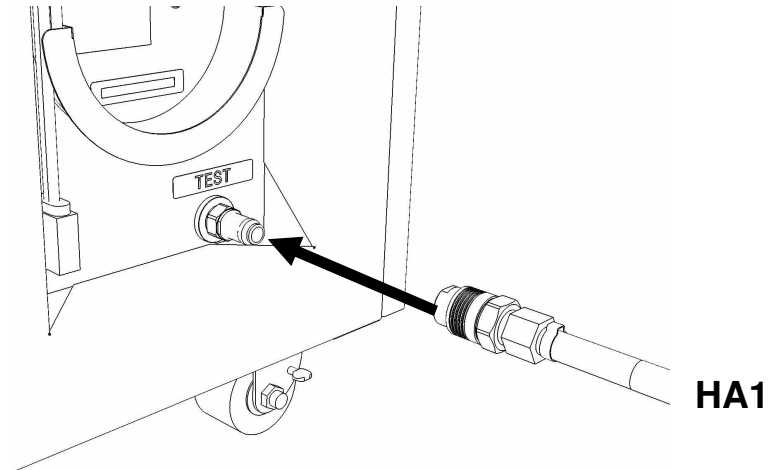
- If the DE is not installed in the system – continue to next step.
- If the DE is installed in the system – action required.

Pass the unattached ends of **HA1** and **HA2** to the rear of the frame.

**NOTE:** Hose assemblies **HA1** and **HA2** can be passed **around** the frame or **over** the frame, depending on frame position. These hoses are long enough to complete all FDT service actions on the rear of the frame.

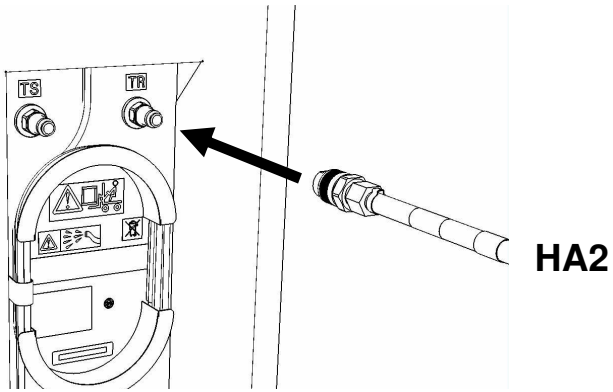
19. Remove hose assembly **HA1** from the upper tool storage compartment.

Connect either end of hose assembly **HA1** to the **TEST** connection on the front panel of the FDT.

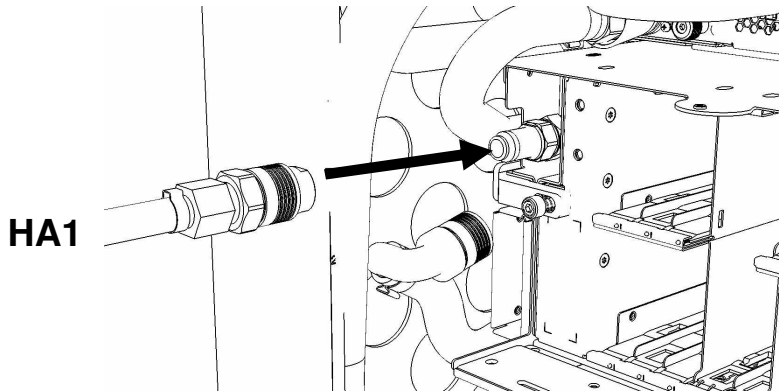


20. Remove hose assembly **HA2** from the upper tool storage compartment.

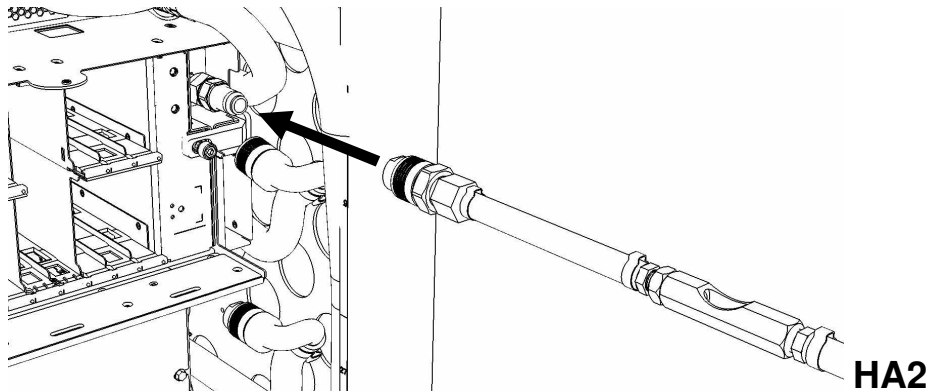
Connect end *without sight glass* to the **TR** connection on the FDT.



21. Connect the unattached end of hose assembly **HA1** to the left side DE water connection.

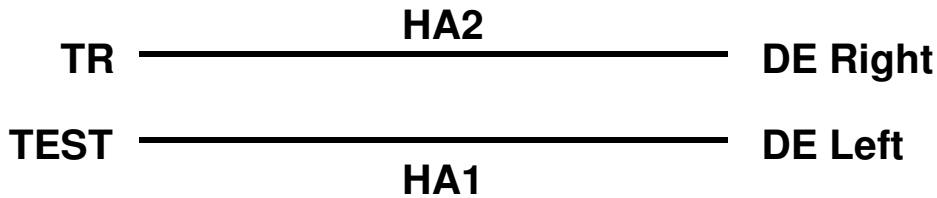


22. Connect the unattached end *with sight glass* of hose assembly **HA2** the right side DE water connection.



23. Ensure all hose connections are made properly and securely.

Verify hoses are connected as outlined in the schematic below.



24. On the FDT Panel, *click* the **Component Pressure Test** button.

The **Get FDT Status** button may be *clicked* to examine FDT status.

**NOTE:** *The pressure testing will last for 4 minutes (2 minutes with air pump on)*

**CAUTION:** **This unit must not be left running unattended, service personnel should always be overseeing the process. (C038)**

25. *Click* the **Get FDT Status** button and review the following:

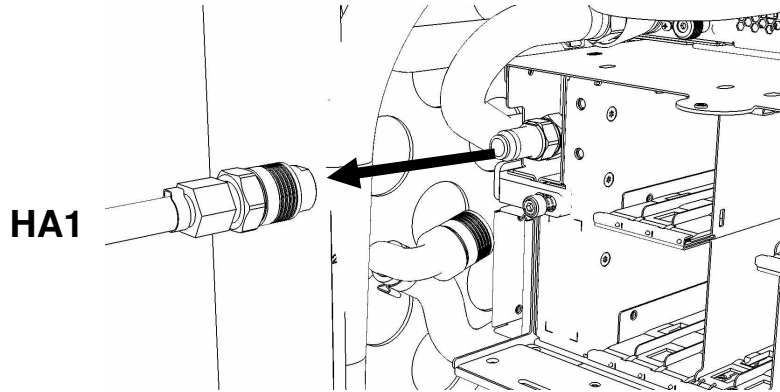
- **Tool mode:** **Ready** – OK. Check Error Status.  
**System/Component Pressure Test Mode** – pressure test still running.  
Wait 30 seconds and repeat **Step 25**.
- **Error Status:** **NONE** – OK. Check Component Pressure Test.  
**WARNING** – *click* the **Decode Error Status** button, record information returned and proceed to next step.  
**CRITICAL** – *click* the **Decode Error Status** button, record information returned and contact next level of support.
- **Component Pressure Test:** **Pass** – OK. Proceed to next step.  
**Fail or Incomplete** – action required.  
*Click* the **Reset FDT** button.  
Repeat **Step 19** through **Step 24** and continue with procedure.  
If the test read **Fail** twice, hardware is defective. Contact next level of support.

26. The component pressure test has passed successfully.

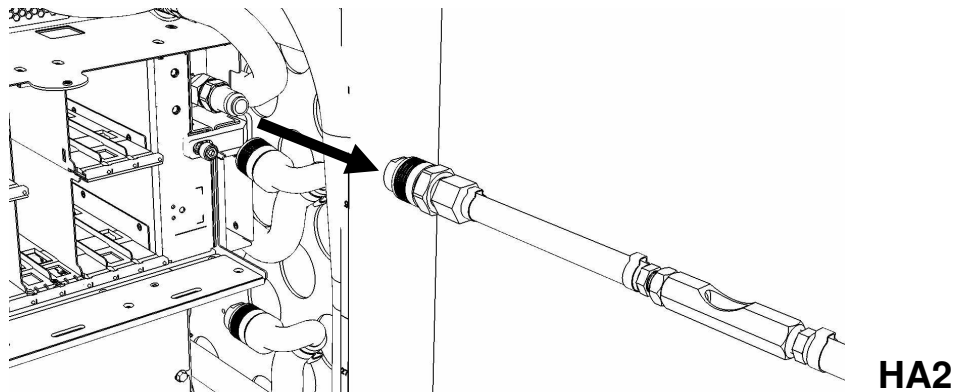
If required, a DE fill procedure can now be completed.

**NOTE:** If a **DE Fill Procedure** will be completed following this test, disregard **Step 27 - 28**, and **30**. These hose connections will be the same in the DE fill procedure.

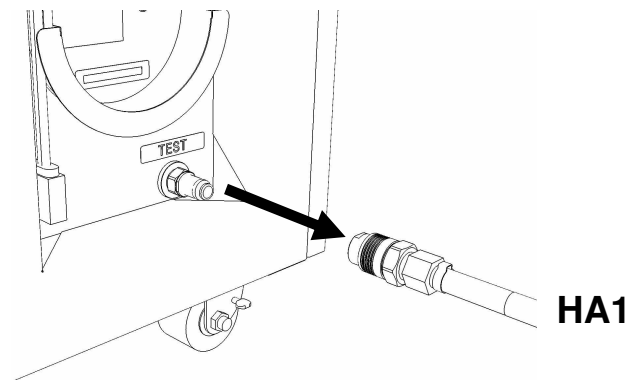
27. Disconnect the **HA1** hose assembly from the left side DE water connection.



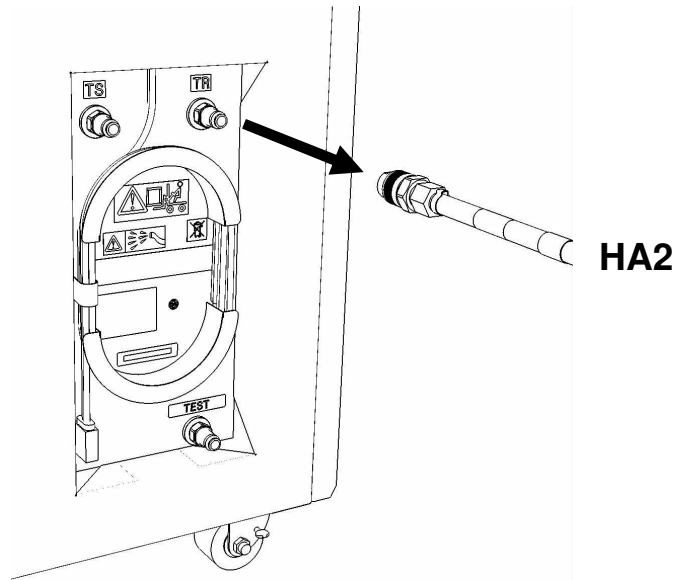
28. Disconnect the **HA2** hose assembly from the right side DE water connection.



29. Disconnect the FDT end of **HA1** from **TEST** on the FDT.



30. Disconnect the FDT end of **HA2** from **TR** on the FDT.



31. Place all hose assemblies and adapters in their appropriate locations within the FDT storage enclosure.
32. Determine whether the FDT will be used for another procedure:
  - If the FDT will be used for another procedure, leave tool activated and go to that procedure now; skip the remaining steps of this procedure.
  - If the FDT requires no further use - proceed to the next step.
33. *Click* the **Deactivate FDT** button.
  - If the **Deactivate FDT** command is successful – OK. Proceed to next step.
  - If the **Deactivate FDT** command fails– action required.  
Repeat **Deactivate FDT**. If the **Deactivate FDT** command fails again, contact next level of support.
34. Disconnect FDT UPIC power cable from port T10 of BPC used.
35. Wrap the UPIC cable in appropriate cable storage location on FDT.
36. If this procedure was referenced from another procedure, return to parent procedure.

---

## 5.4 End of Power775 Error! Reference source not found. Pressure Test Procedure

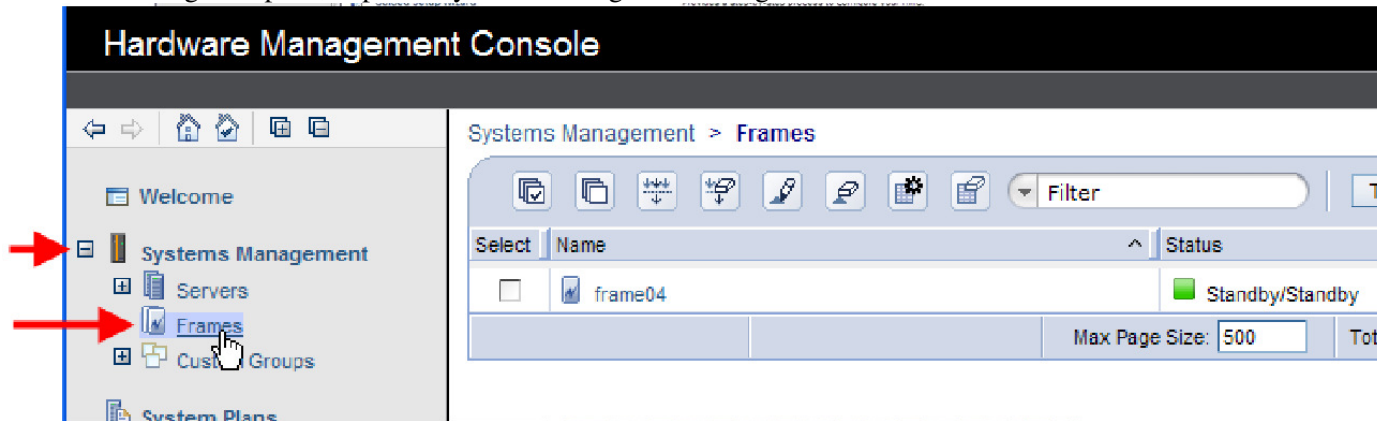




## 6 APPENDIX B: POWER775 BPC FSP COMMAND LINE PROCEDURE

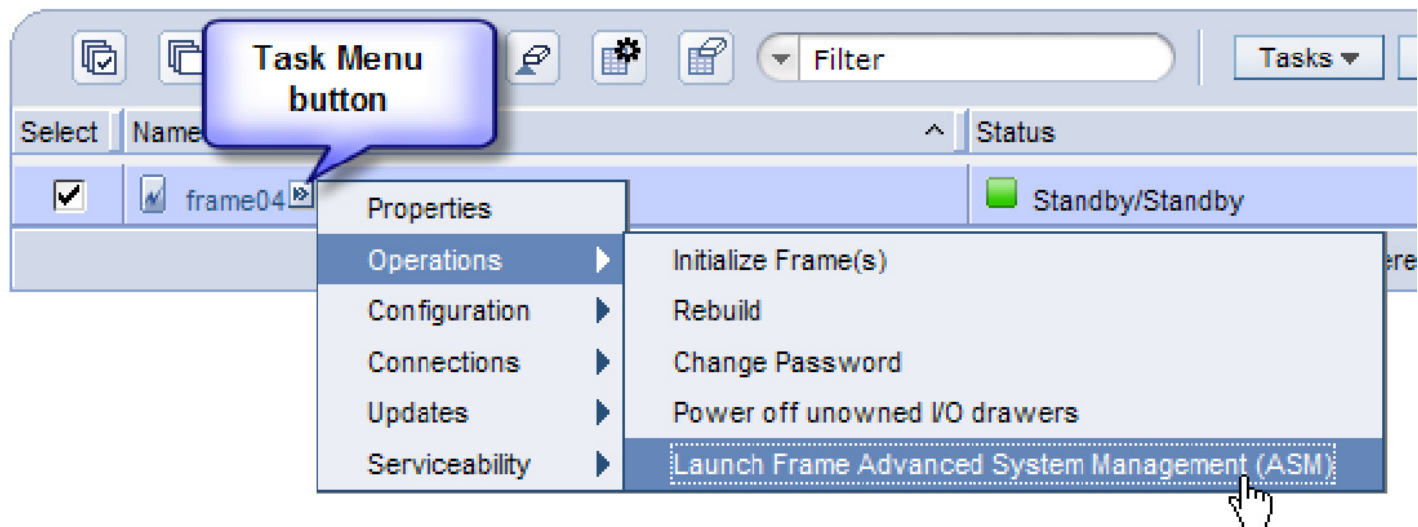
### 6.1 Procedure to Access the BPC FSP Command Line

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':



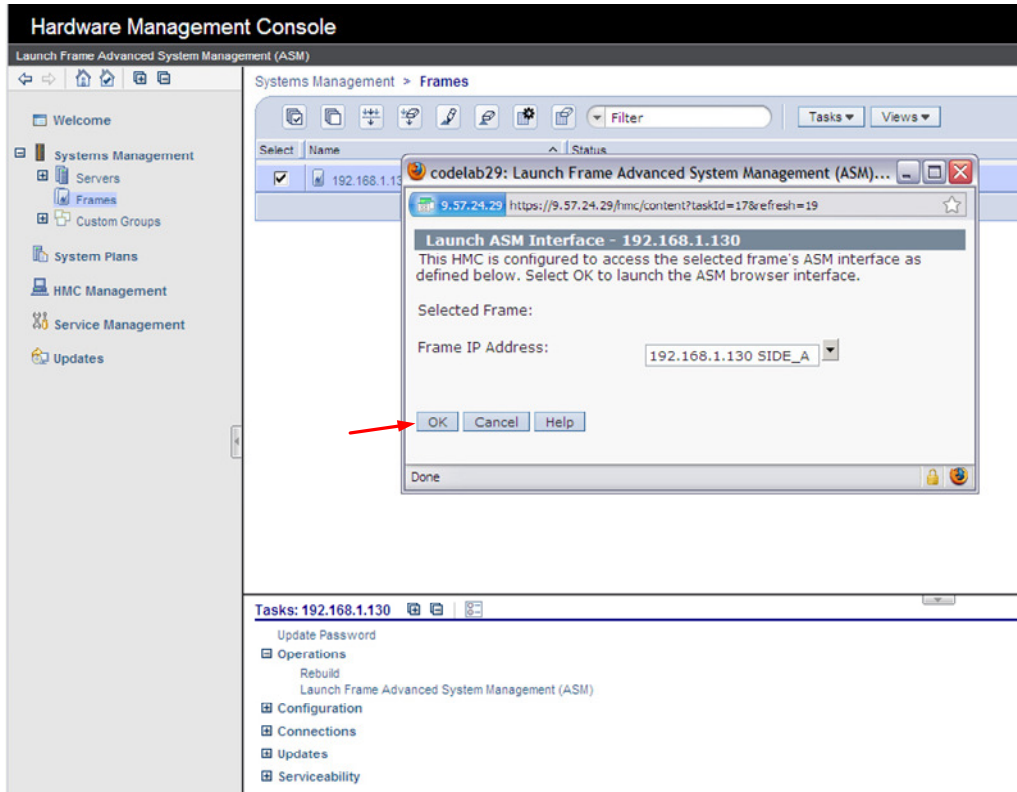
4. From the Tasks Menu right-arrow pull-down menu, click **Operations** → **Launch Frame Advanced Systems Management (ASM)**

Systems Management > Frames



Power775 Disk Enclosure Chassis Service Procedure  
---- Appendix B: BPC FSP Command Line Procedure ----

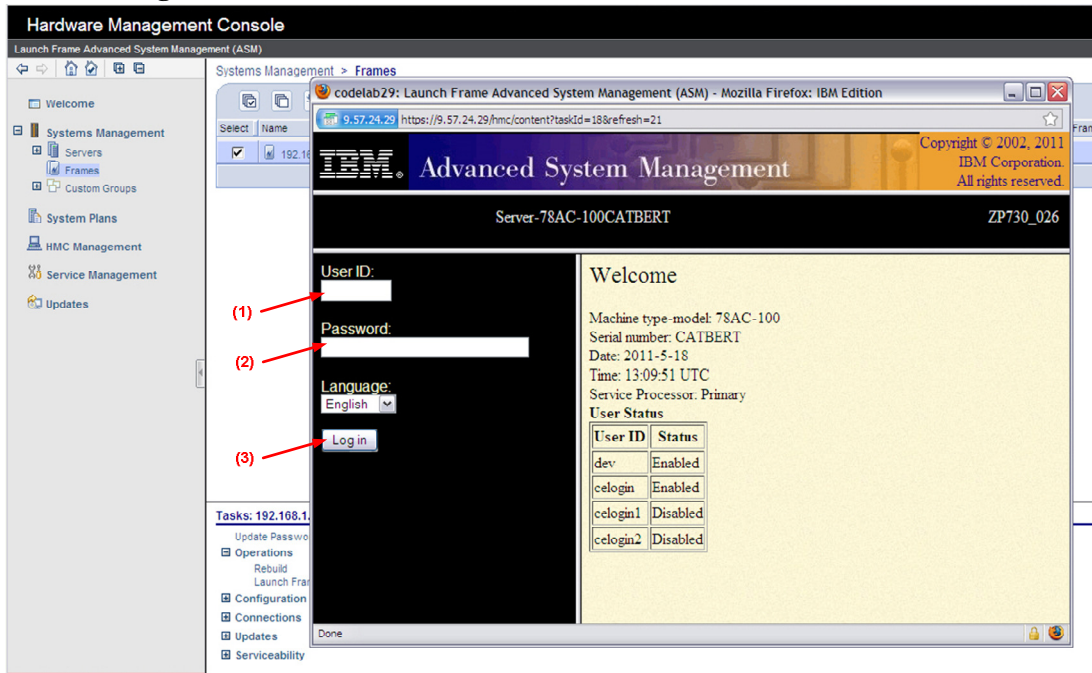
5. From the Launch ASM Interface window, select **SIDE\_A** for the 'Frame IP Address' then click the **OK** button.



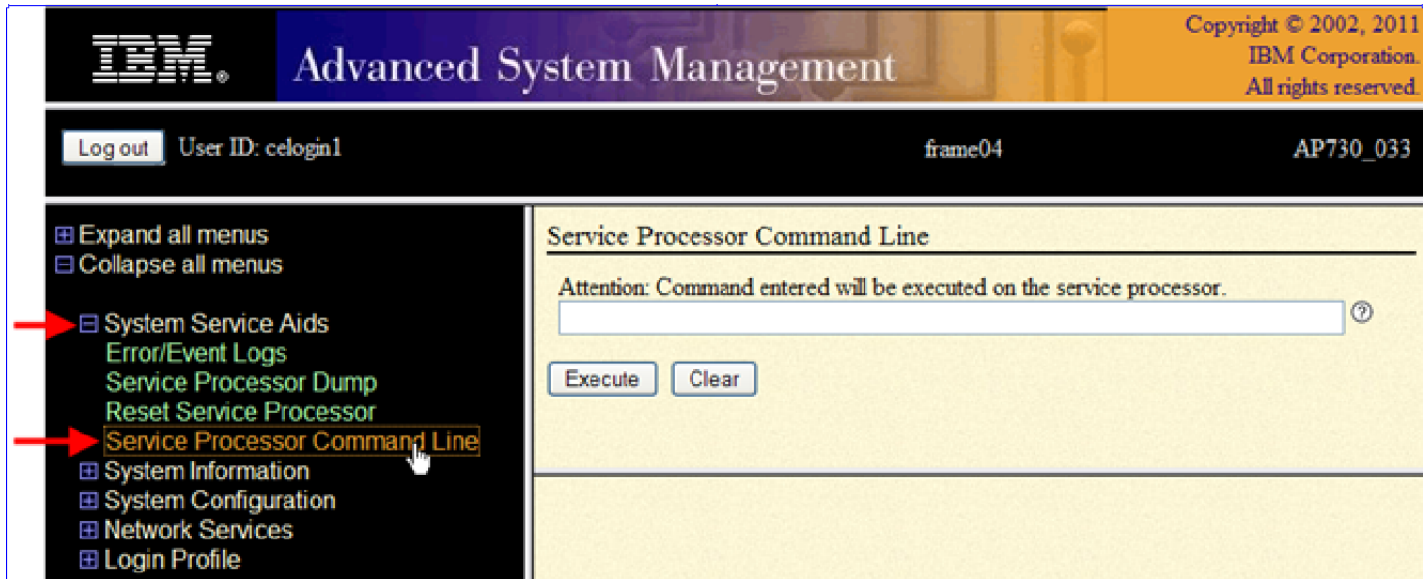
6. The ASM login window is presented. Acquire the necessary User ID and Password.
  - “celogin” requires Daily PW from the IBM Support Center.
  - “celogin1” might be has enabled by the customer. If so, obtain the password from the customer.
  1. Enter User ID
  2. Enter Password

Power775 Disk Enclosure Chassis Service Procedure  
---- Appendix B: BPC FSP Command Line Procedure ----

3. Click **Log in** button



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



8. 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).

9. Return to the step of the paper service procedure that directed you to this Appendix.

## 6.2 End of Appendix B: Power775 BPC FSP Command Line Procedure

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## 7 APPENDIX C: POWER775 DISK ENCLOSURE (DE) FILL PROCEDURE

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### 7.1 Safety Notices

Read “Safety Notices“ available from InfoCenter:

<http://publib.boulder.ibm.com/infocenter/powersys/v3r1m5/topic/p7hdx/G229-9054.pdf>

The following cautions apply to all Power775 service procedures:

**CAUTION:**

**Energy hazard present and 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.

**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: This unit must not be left running unattended, service personnel should always be overseeing the process. (C038)**



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



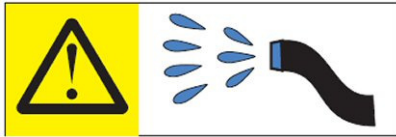
**CAUTION: Protective eyewear is needed for the procedure. (L011)**



**DANGER:** Heavy equipment—personal injury or equipment damage might result if mishandled. (L013)



**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)

## 7.2 Background:

This document contains the procedure for filling a Disk Enclosure (DE) on an **IBM Power 775** system with conditioned water using an **IBM Power 775** Fill and Drain Tool (FDT). The successful execution of a **DE Pressure Test** procedure is required for this procedure to be performed.

Due to high packaging density and heat load, the **IBM Power 775** DE is water cooled, and contains internal plumbing to route cooling water towards and carry heat away from critical power sub-components.

In the event that a new DE is to be added to a **IBM Power 775** system, the DE must be tested for leaks and then filled with treated system water prior to installation into the frame. All water cooled field replaceable units (FRU's), including DE's, are shipped empty to the client location from IBM to eliminate the risk of damage from water leakage.

Do not connect an empty DE to the system as this would cause a large volume of air to be distributed throughout the system, resulting in increased component temperatures. Filling a DE with the FDT prior to system connection prevents these conditions, and purges the air from the DE through the use of a circulating water pump.

To ensure that the DE plumbing is leak free prior to installation, the DE must pass a DE pressure test before the DE can be filled. A DE fill operation should not be performed unless the DE pressure test has a passing result with a calibrated FDT.

### **Reference Information:**

<b>IBM Power 775</b> FDT P/N:	<b>45D6928</b>
Hose assemblies/adapters required:	<b>HA1</b> (45D8561) <b>HA2</b> (45D8562)

Approximate DE water volume: 0.5 L  
Expected time to fully fill DE with FDT: 30 s

**NOTE:** *Some steps in this procedure may be redundant due to other service operations being completed prior to this procedure. If a step has already been completed, verify that the step has been completed properly and proceed to the next step.*

**NOTE:** *The location of the component for the fill procedure is not important. The fill procedure can be completed with the component on a cart, on the lift tool, or mechanically installed in the frame.*

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## 7.3 Procedure:

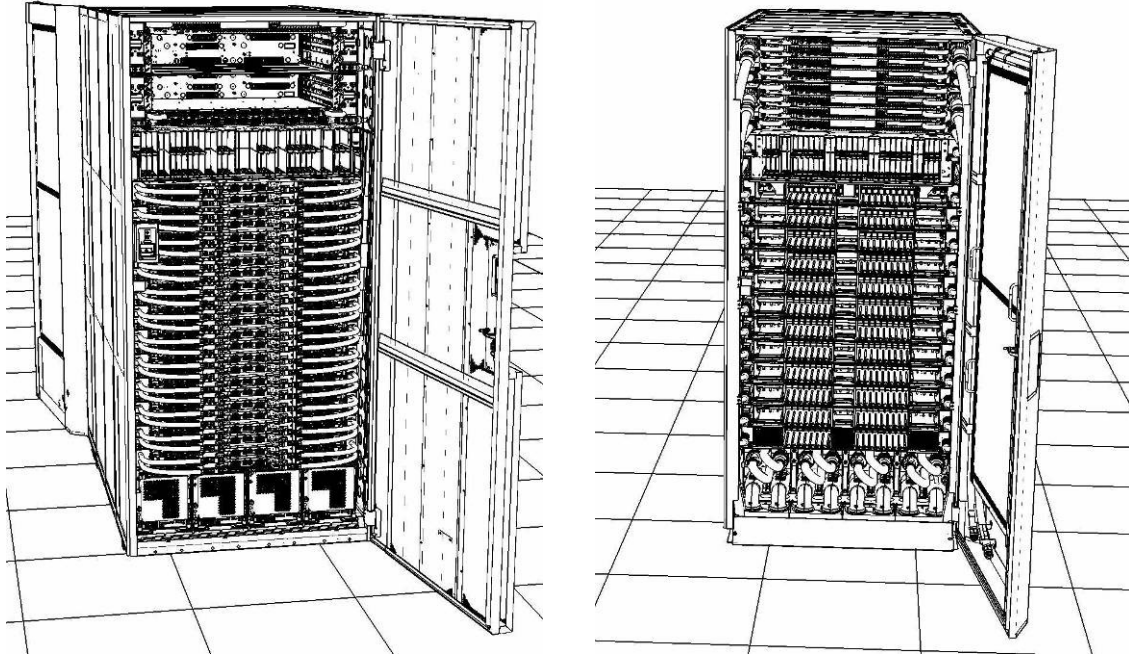
**NOTE:** If you already have the FDT powered on, proceed to **Step 14**. Otherwise, start procedure at **Step 1**.



1. Identify the **Power 775** frame that requires service.

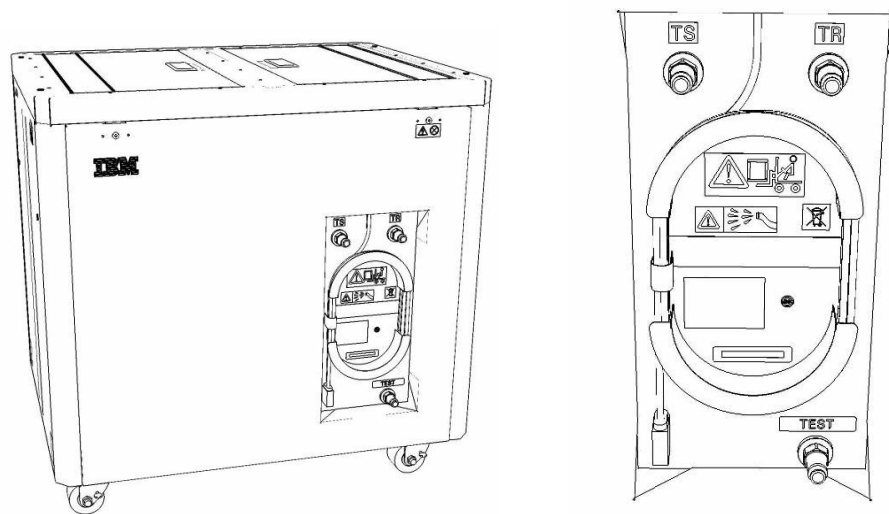
Verify that the system UEPO is set to **ON**, and the managing consoles (HMC and XCat) are powered on and communicating with the frame.

2. Open front and rear doors of the **Power 775** frame that requires service.



3. Bring the FDT to the front side of the **Power 775** frame that requires service.
4. Locate the panel of the FDT that contains the Universal Power and Information Cable (UPIC), as well as the **TS**, **TR**, and **TEST** water connections.

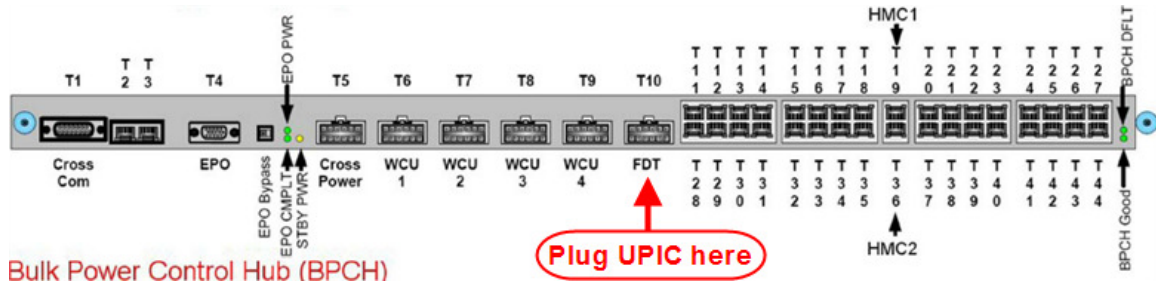
This side of the tool should be facing the front of the frame.



5. Unwrap the FDT UPIC cable from the storage loop on the FDT.

6. Select BPC port for FDT

- If the lower BPA is not targeted for service, and is functional:  
Plug the FDT UPIC cable into **port T10 of the lower BPC**.
- If the lower BPA is targeted for service, or is not functional:  
Plug the FDT UPIC cable into **port T10 of the upper BPC**.



7. Login to the HMC with the User ID `hscroot`.

Use the HMC that is connected to the BPA where the FDT is plugged.

8. From the HMC left Navigation menu, expand **Systems Management** then select **Frames**.

Verify frame serial number for the frame to be serviced.

9. In the **Frames** view on the HMC, place a checkmark in the **Select** column for the frame to be serviced.

10. Verify that the frame **Status** is **Rack Standby/Rack Standby** or **Standby/Standby**.

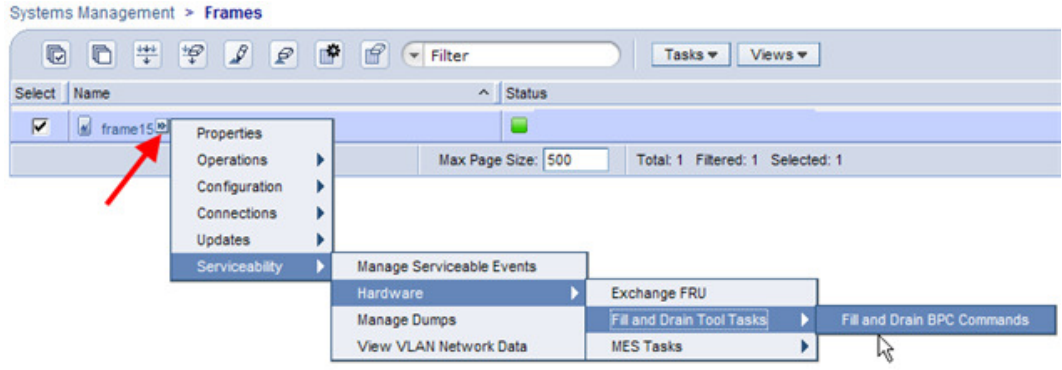
- If frame **Status** reads **Rack Standby/Rack Standby** or **Standby/Standby** – OK.

Continue to next step.

- If frame **Status** does not read **Rack Standby/Rack Standby** or **Standby/Standby** – action required. Contact next level of support.

11. From the **Task** menu on the HMC, *select* **Serviceability** > **Hardware** > **Fill and Drain Tool Tasks** > **Fill and Drain Command Interface**

Power775 Disk Enclosure Chassis Service Procedure  
 ---- Appendix C: DE Fill Procedure ----



**Fill and Drain Tool Command Interface** will display. See below for a sample image of the interface (FDT deactivated).

**Fill and Drain Tool (FDT) Command Interface - Server-78AC-100BC50029**

The table below shows the FDT Port locations that can communicate with the Fill and Drain Tool. Select the port to which the Fill and Drain Tool is connected. Use the buttons to drive commands to the Fill and Drain Tool connected to a port.

FDT Port Locations:

Select	Location Code	Description
<input type="radio"/>	78AC-100*BC50029-P7-C1	Lower BPC Port T10
<input type="radio"/>	78AC-100*BC50029-P8-C1	Upper BPC Port T10

12. Select the BPC port that the FDT was plugged into in **Step 6** from the **FDT Port Locations:** list.

13. *Click* the **Activate FDT** button.

- If the Activate FDT command is successful – OK. Wait 30 seconds and continue to next step.
- If the **Activate FDT** command fails – action required.

*Click* the **Deactivate FDT** button.

Wait 2 minutes and repeat **Step 13**. If the **Activate** command fails again, contact next level of support.

14. *Click* the **Get FDT Status** button.

- If the **Get FDT Status** command is successful – OK.

See below for a sample status (does not reflect expected state)

- If the **Get FDT Status** command fails – action required.

Repeat **Step 14**. If the **Get FDT Status** command fails again, contact next level of support.

**Fill and Drain Tool (FDT) Command Interface - Server-78AC-100BC50029**

The table below shows the FDT Port locations that can communicate with the Fill and Drain Tool. Select the port to which the Fill and Drain Tool is connected. Use the buttons to drive commands to the Fill and Drain Tool connected to a port.

FDT Port Locations:

Select	Location Code	Description
<input checked="" type="radio"/>	78AC-100*BC50029-P7-C1	Lower BPC Port T10
<input type="radio"/>	78AC-100*BC50029-P8-C1	Upper BPC Port T10

Activate FDT    Deactivate FDT

Get FDT Status    Decode Error Status

Fill FDT    Drain FDT

Start Water Pump    Reset FDT    Start Air Pump

Pressure Test Calibration    Component Pressure Test

FDT Power/Comm: GOOD  
Frame Attached: IBM Power7 775  
MDA-FD RL: 45D  
Error Status: WARNING  
Tank Level: Full  
Air Pump: Off  
Water Pump: DISABLED  
Tool Mode: Ready  
Pressure Test Calibration: Incomplete  
Component Pressure Test: Incomplete

Launch WCU Commands    WCU Tank Air Purge

Exit    Help

Sample FDT Status

15. Review the FDT status screen for the following:

- **Tool Mode:** **Ready** – OK. Check Error Status.
- **Error Status:** **NONE** – OK. Check Tank Level.  
**WARNING** – *click* the **Decode Error Status** button, record the information returned and check Tank Level.  
**CRITICAL** – *click* the **Decode Error Status** button, record the information returned and contact next level of support.
- **Tank Level:** **Full** or **Upper Half** – OK. Check Component Pressure Test.  
**Lower Half** or **Empty** – action required.

Exit this procedure and perform a **Fill and Drain Tool (FDT) Tank Fill Procedure**.

Once FDT tank level is **Full** or **Upper Half**, return to this step and continue with procedure.

- **Component Pressure Test: Pass** – OK. Proceed to next step.

This procedure **should not** be continued if the component pressure test did not **Pass**.

**Incomplete** or **Fail** – action required.

Exit this procedure and complete a **DE Pressure Test Procedure**.

Once a **passing** result is confirmed, return to this step and continue with procedure.

16. Verify DE main water connections **are not** connected to system manifolds.

17. Before proceeding, read required safety information:

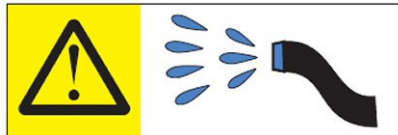
**CAUTION:** The water-based coolant solution may contain an additive intended to inhibit corrosion (or provide other functions). The solution may cause irritation to the skin or eyes. Avoid direct contact with the solution. Employ appropriate Personal Protective Equipment when performing operations 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)

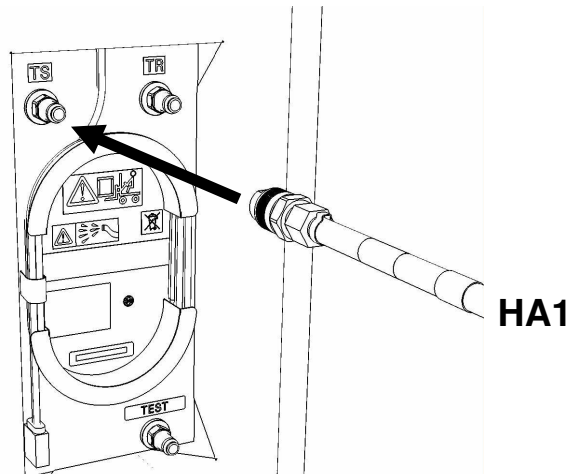


**DANGER:** Risk of electric shock due to water or a water solution which is present in this product. Avoid working on or near energized equipment with wet hands or when spilled water is present. (L016)

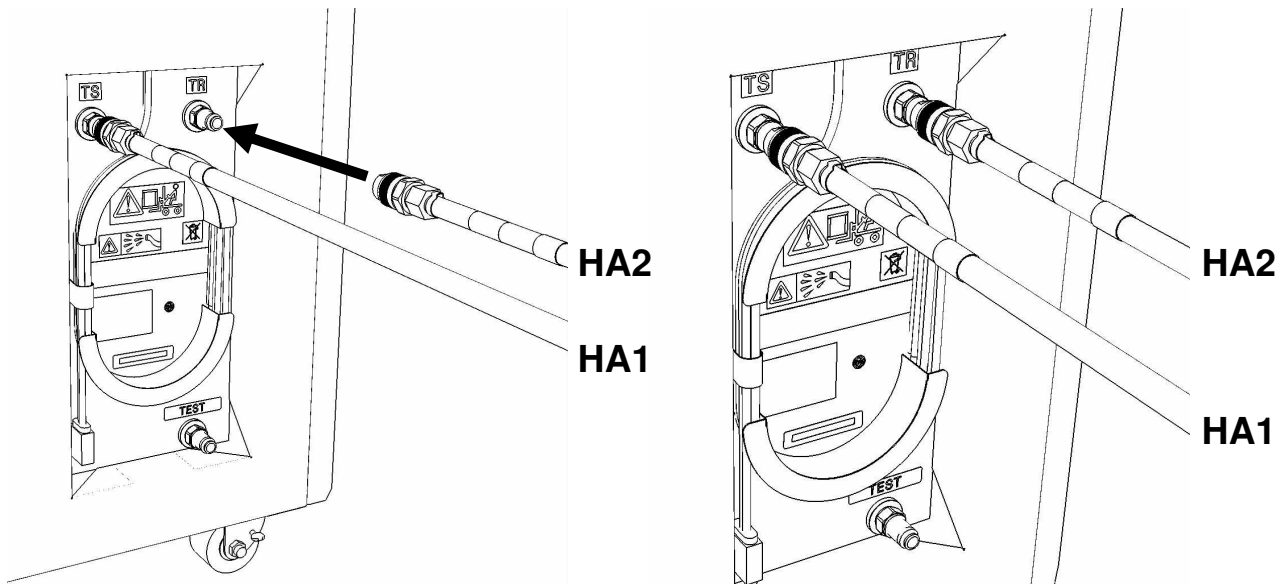
18. Remove hose assembly **HA1** from the upper tool storage compartment.

Connect either end of hose assembly **HA1** to the **TS** connection on the front panel of the FDT.





19. Remove hose assembly **HA2** from the upper tool storage compartment.  
Connect end *without sight glass* to the **TR** connection on the FDT.



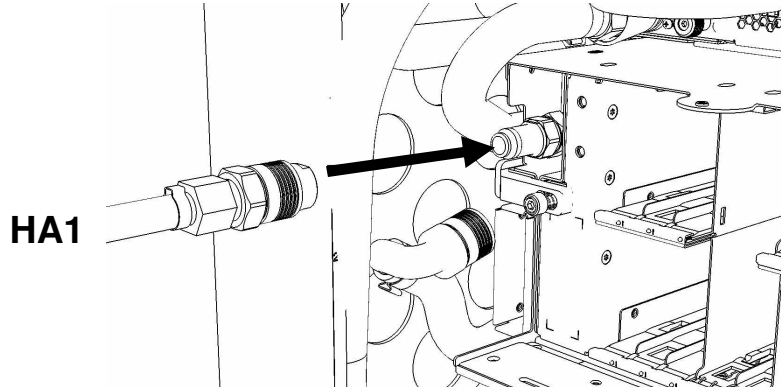
20. Verify DE position for fill procedure.

- If the DE is not installed in the system – continue to next step.
- If the DE is installed in the system – action required.

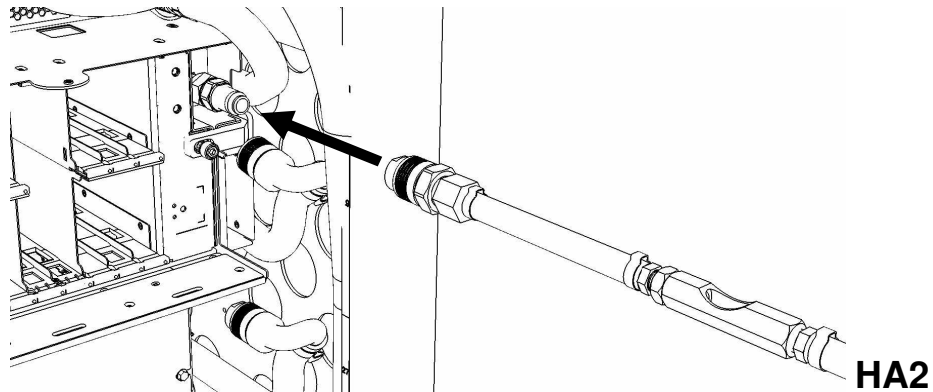
Pass the unattached ends of **HA1** and **HA2** to the rear of the frame.

**NOTE:** Hose assemblies **HA1** and **HA2** can be passed **around** the frame or **over** the frame, depending on frame position. These hoses are long enough to complete all FDT service actions on the rear of the frame.

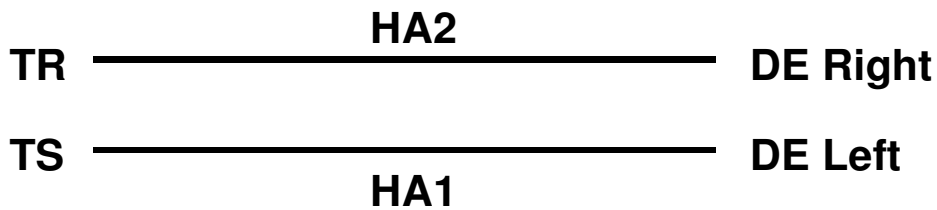
21. Connect the unattached end of hose assembly **HA1** to the left side DE water connection.



22. Connect the unattached end *with sight glass* of hose assembly **HA2** the right side DE water connection.



23. Ensure all hose connections are made properly and securely.  
Verify hoses are connected as outlined in the schematic below.



24. On the FDT panel, *click* the **Start Water Pump** button.

The **Get FDT Status** button may be *clicked* to examine FDT status.

**NOTE:** *The water pump will shut off after 30 minutes of run time.*

**Approximate time to fill a DE:** 60 seconds.

**CAUTION: This unit must not be left running unattended, service personnel should always be overseeing the process. (C038)**

25. Inspect the sight glass in hose assembly **HA2** while the water pump is running.

The sight glass will indicate the filling status of this step.

**Expected sight glass behavior**

- Sight glass will start out full of air while the component is being purged of air.
- After some period of time, water will start passing through the sight glass in an air/water mixture.
- Eventually the sight glass will become full of water, with intermittent small air bubbles.

**Full sight glass definition**

- The sight glass is considered full of water **when** water flow is obvious (white ball pinned in direction of FDT) **and** no large bubbles of air are observed.
- If the above description is observed and the water appears cloudy, this is also considered full.

26. If the water pump has stopped unexpectedly without *clicking* the **Reset FDT** button:

*Click* the **Get FDT Status** button and review the following.

- **Tool mode:**     **Ready** – OK. Check Tank Level.  
                          **Tool mode: System/Component Fill Mode** – water pump still running. Proceed to **Step 27**.
- **Tank Level:**    **Full, Upper Half, or Lower Half** – OK. Check Error Status.  
                          **Empty** – action required. FDT tank fill required.  
                          Exit this procedure and complete a **Fill and Drain Tool (FDT) Tank Fill Procedure**.

Once FDT tank level is **Full** or **Upper Half** return to **Step 18** and continue with procedure.

- **Error Status:** **NONE** – OK. Proceed to next step.

**WARNING** – *click* the **Decode Error Status** button, record information returned and proceed to next step.

**CRITICAL** – *click* the **Decode Error Status** button, record information returned and contact next level of support.

27. If the sight glass in **HA2** never becomes full of water:

Ensure all hose connections in **Step 18** through **Step 23** are made properly.

Complete the diagnostics in **Step 26**.

- If the sight glass in **HA2** becomes full of water, continue with procedure.
- If the sight glass in **HA2** does not become full of water, contact next level of support.

28. When the sight glass in **HA2** has been mostly solid water for 60 seconds:

*Click* the **Reset FDT** button.

29. *Click* the **Get FDT Status** button and review the following:

- **Tool mode:** **Ready** – OK. Check Error Status.

**System/Component Fill Mode** – water pump still running. Repeat **Step 28**.

- **Error Status:** **NONE** – OK. Proceed to next step.

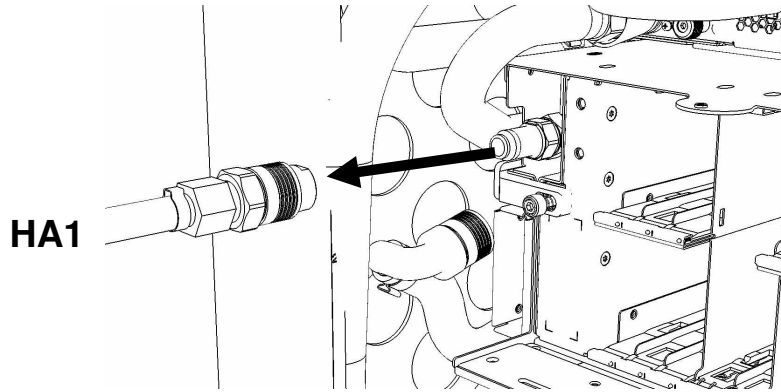
**WARNING** – *click* the **Decode Error Status** button, record information returned and proceed to next step.

**CRITICAL** – *click* the **Decode Error Status** button, record information returned and contact next level of support.

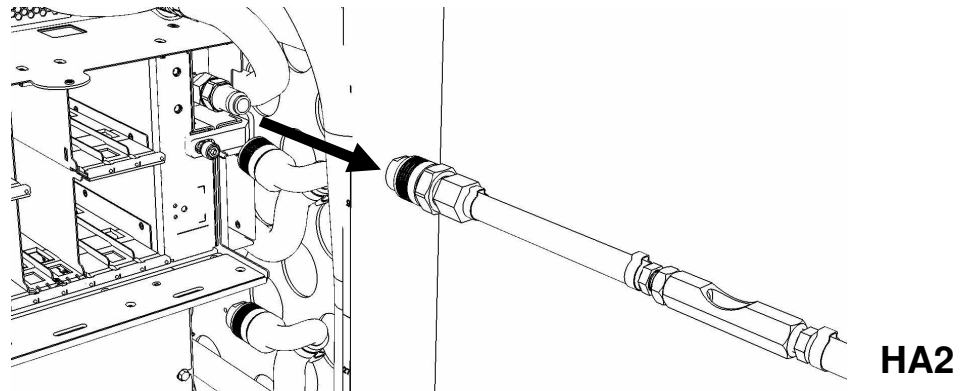
30. The DE fill procedure has completed successfully.

The DE can be connected to the system manifolds.

31. Disconnect the **HA1** hose assembly from the left side DE water connection.

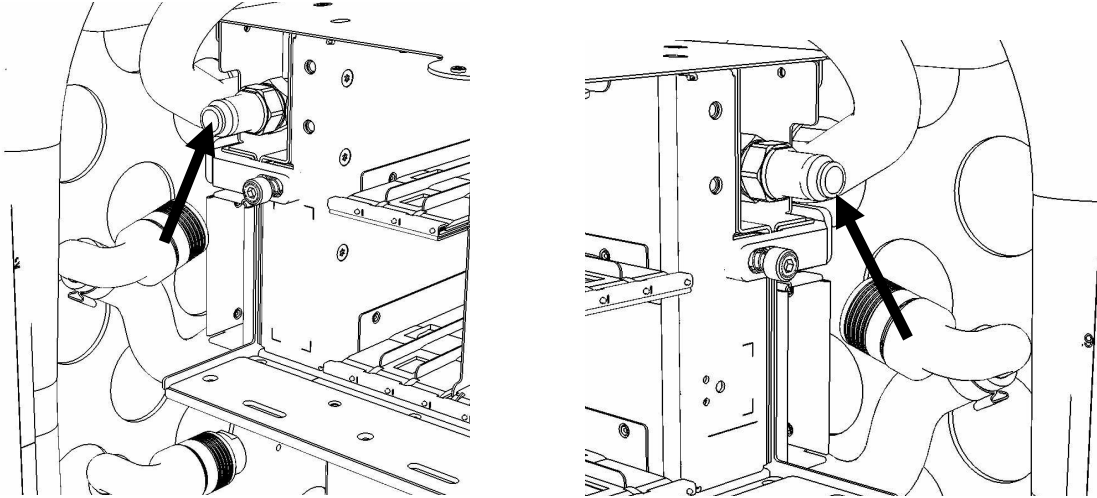


32. Disconnect the **HA2** hose assembly from the right side DE water connection.

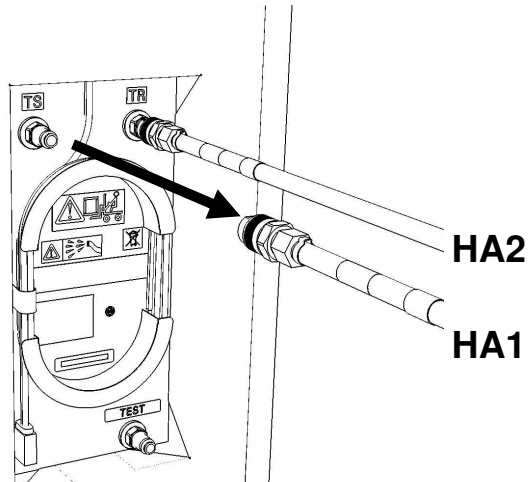


33. Connect the system manifold hoses to the DE water connections.

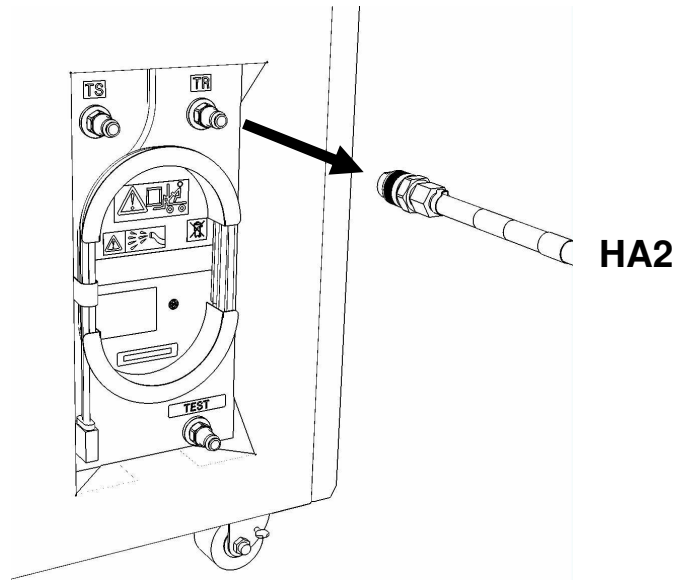
Power775 Disk Enclosure Chassis Service Procedure  
---- Appendix C: DE Fill Procedure ----



34. Disconnect the FDT end of **HA1** from **TS** on the FDT.



35. Disconnect the FDT end of **HA2** from **TR** on the FDT.



36. Place all hose assemblies and adapters in their appropriate locations within the FDT storage enclosure.

37. Determine whether the FDT will be used for another procedure:

- If the FDT will be used for another procedure, leave tool activated and go to that procedure now; skip the remaining steps of this procedure.
- If the FDT requires no further use - proceed to the next step.

38. Click the **Deactivate FDT** button.

- If the **Deactivate FDT** command is successful – OK. Proceed to next step.
- If the **Deactivate FDT** command fails– action required.

Repeat **Deactivate FDT**. If the **Deactivate FDT** command fails again, contact next level of support.

39. Disconnect FDT UPIC power cable from port T10 of BPC used.

Wrap the UPIC cable in appropriate cable storage location on FDT.

40. If this procedure was referenced from another procedure, return to parent procedure.

---

## 7.4 End of Appendix C: Power775 DE Fill Procedure



## 8 APPENDIX D: POWER775 DISK ENCLOSURE (DE) DRAIN PROCEDURE

### 8.1 Safety Notices

Read “Safety Notices“ available from InfoCenter:

<http://publib.boulder.ibm.com/infocenter/powersys/v3r1m5/topic/p7hdx/G229-9054.pdf>

The following cautions apply to all Power775 service procedures:

**CAUTION:**

Energy hazard present and 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.

**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:** This unit must not be left running unattended, service personnel should always be overseeing the process. (C038)



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



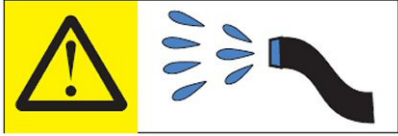
**CAUTION:** Protective eyewear is needed for the procedure. (L011)



**DANGER:** Heavy equipment—personal injury or equipment damage might result if mishandled. (L013)



**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)

## 8.2 Background:

This document contains the procedure for draining the water out of a Disk Enclosure (DE) on an **IBM Power 775** system using an **IBM Power 775** Fill and Drain Tool (FDT).

Due to high packaging density and heat load, the **IBM Power 775** DE is water cooled, and contains internal plumbing to route cooling water towards and carry heat away from critical power sub-components.

In the event that a DE is scheduled for removal from a **IBM Power 775** system, the DE will need to be drained of water prior to removal. All water cooled field replaceable units (FRU's), including DE's, must be shipped empty from the client location to IBM to eliminate the risk of damage from water leakage. Draining components with the **IBM Power 775** Fill and Drain Tool (FDT) eliminates the risk of water leaks due to low temperatures or shock and vibration, which could result in permanently damaged cooling and electronic components on the DE. Draining a DE with the FDT purges the water from the component with pressurized air, and returns the water to the internal reservoir within the FDT for reuse.

After a DE drain procedure has been completed, the DE water plumbing may be under a slight positive pressure due to the pressurized air that was flowing through the component. This is expected, and the pressure will be no greater than 5 psi.

### **Reference Information:**

<b>IBM Power 775</b> FDT P/N:	<b>45D6928</b>
Hose assemblies/adapters required:	<b>HA1</b> (45D8561) <b>HA2</b> (45D8562)

Approximate DE water volume: 1.0 L  
Expected time to fully drain DE with FDT: 20 s

---

**NOTE:** Some steps in this procedure may be redundant due to other service operations being completed prior to this procedure. If a step has already been completed, verify that the step has been completed properly and proceed to the next step.

**NOTE:** The location of the component for the drain procedure is not important. The drain procedure can be completed with the component on a cart, on the lift tool, or mechanically installed in the frame.

---

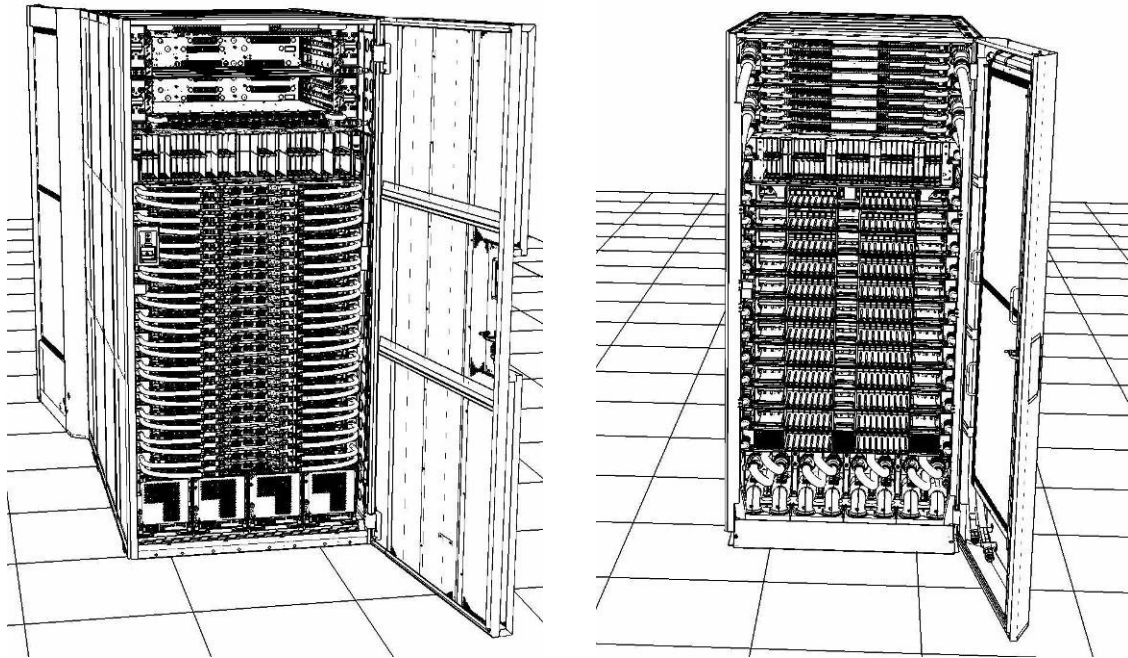
## 8.3 Procedure:

**NOTE:** If you already have the FDT powered on, proceed to **Step 14**. Otherwise, start procedure at **Step 1**.

1. Identify the **Power 775** frame that requires service.

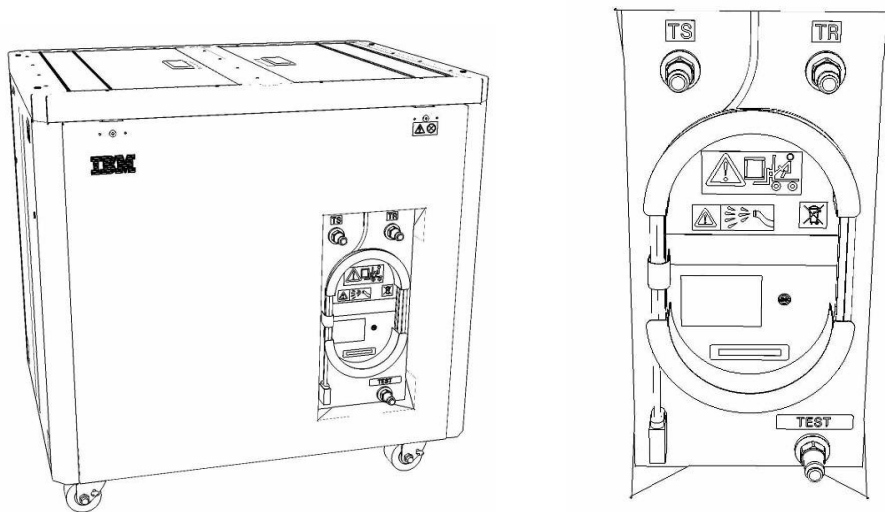
Verify that the system UEPO is set to **ON**, and the managing consoles (HMC and XCat) are powered on and communicating with the frame.

2. Open front and rear doors of the **Power 775** frame that requires service.



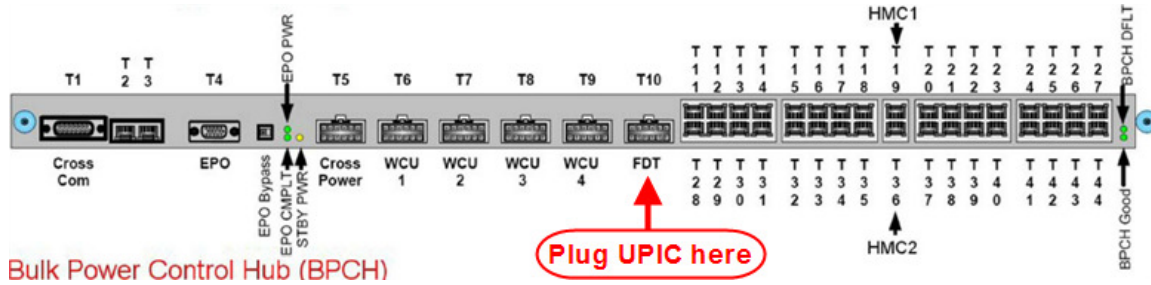
3. Bring the FDT to the front side of the **Power 775** frame that requires service.
4. Locate the panel of the FDT that contains the Universal Power and Information Cable (UPIC), as well as the **TS**, **TR**, and **TEST** water connections.

This side of the tool should be facing the front of the frame.

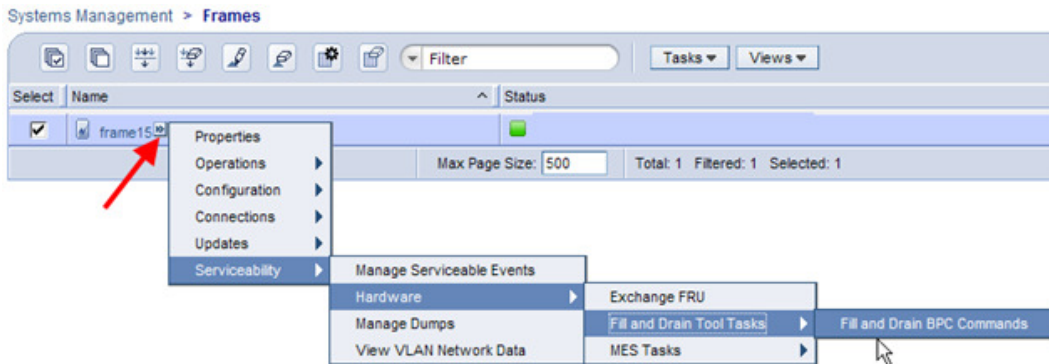


5. Unwrap the FDT UPIC cable from the storage loop on the FDT.
6. Select BPC port for FDT
  - If the lower BPA is not targeted for service, and is functional:  
Plug the FDT UPIC cable into **port T10 of the lower BPC**.
  - If the lower BPA is targeted for service, or is not functional:

Plug the FDT UPIC cable into **port T10 of the upper BPC**.



7. Login to the HMC with the User ID **hscroot**.  
Use the HMC that is connected to the BPA where the FDT is plugged.
8. From the HMC left Navigation menu, expand **Systems Management** then select **Frames**.  
Verify frame serial number for the frame to be serviced.
9. In the **Frames** view on the HMC, place a checkmark in the **Select** column for the frame to be serviced.
10. Verify that the frame **Status** is **Rack Standby/Rack Standby** or **Standby/Standby**.
  - If frame **Status** reads **Rack Standby/Rack Standby** or **Standby/Standby** – OK.  
Continue to next step.
  - If frame **Status** does not read **Rack Standby/Rack Standby** or **Standby/Standby** – action required. Contact next level of support.
11. From the **Task** menu on the HMC, *select* **Serviceability** > **Hardware** > **Fill and Drain Tool Tasks** > **Fill and Drain Command Interface**



**Fill and Drain Tool Command Interface** will display. See below for a sample image of the interface (FDT deactivated).

**Fill and Drain Tool (FDT) Command Interface - Server-78AC-100BC50029**

The table below shows the FDT Port locations that can communicate with the Fill and Drain Tool. Select the port to which the Fill and Drain Tool is connected. Use the buttons to drive commands to the Fill and Drain Tool connected to a port.

FDT Port Locations:

Select	Location Code	Description
<input type="radio"/>	78AC-100*BC50029-P7-C1	Lower BPC Port T10
<input type="radio"/>	78AC-100*BC50029-P8-C1	Upper BPC Port T10

Activate FDT    Deactivate FDT

Get FDT Status    Decode Error Status

Fill FDT    Drain FDT

Start Water Pump    Reset FDT    Start Air Pump

Pressure Test Calibration    Component Pressure Test

Launch WCU Commands    WCU Tank Air Purge

Exit    Help

12. Select the BPC port that the FDT was plugged into in **Step 6** from the **FDT Port Locations:** list.

13. *Click* the **Activate FDT** button.

- If the Activate FDT command is successful – OK. Wait 30 seconds and continue to next step.
- If the **Activate FDT** command fails – action required.  
*Click* the **Deactivate FDT** button.

Wait 2 minutes and repeat **Step 13**. If the **Activate** command fails again, contact next level of support.

14. *Click* the **Get FDT Status** button.

- If the **Get FDT Status** command is successful – OK.

See below for a sample status (does not reflect expected state)

- If the **Get FDT Status** command fails – action required.

Repeat **Step 14**. If the **Get FDT Status** command fails again, contact next level of support.

**Fill and Drain Tool (FDT) Command Interface - Server-78AC-100BC50029**

The table below shows the FDT Port locations that can communicate with the Fill and Drain Tool. Select the port to which the Fill and Drain Tool is connected. Use the buttons to drive commands to the Fill and Drain Tool connected to a port.

FDT Port Locations:

Select	Location Code	Description
<input checked="" type="radio"/>	78AC-100*BC50029-P7-C1	Lower BPC Port T10
<input type="radio"/>	78AC-100*BC50029-P8-C1	Upper BPC Port T10

Buttons: Activate FDT, Deactivate FDT, Get FDT Status, Decode Error Status, Fill FDT, Drain FDT, Start Water Pump, Reset FDT, Start Air Pump, Pressure Test Calibration, Component Pressure Test

FDT Power/Comm: GOOD  
Frame Attached: IBM Power7 775  
MDA-FD RL: 45D  
Error Status: WARNING  
Tank Level: Full  
Air Pump: Off  
Water Pump: DISABLED  
Tool Mode: Ready  
Pressure Test Calibration: Incomplete  
Component Pressure Test: Incomplete

Buttons: Launch WCU Commands, WCU Tank Air Purge, Exit, Help

**Sample FDT Status**

15. Review the FDT status screen and ensure that the following conditions are true:

- **Tool Mode:** **Ready** – OK. Check Error Status.
- **Error Status:** **NONE** – OK. Check Tank Level.

**WARNING** – *click* the **Decode Error Status** button, record the information returned and check Tank Level.



**CRITICAL** – *click* the **Decode Error Status** button, record the information returned and contact next level of support.

- **Tank Level:** **Lower Half** or **Empty**– OK. Continue to next step.  
**Full** or **Upper Half** – action required.

Exit this procedure and complete a **Fill and Drain Tool (FDT) Tank Drain Procedure**.

Once FDT tank level is **Lower Half** or **Empty**, return to this step and continue with procedure.

16. Verify that the DE is powered-off.

Verify DE position for drain procedure.

17. Before proceeding, read required safety information:

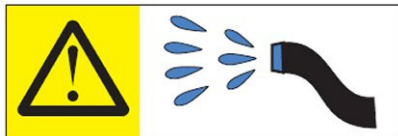
**CAUTION:** The water-based coolant solution may contain an additive intended to inhibit corrosion (or provide other functions). The solution may cause irritation to the skin or eyes. Avoid direct contact with the solution. Employ appropriate Personal Protective Equipment when performing operations 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)

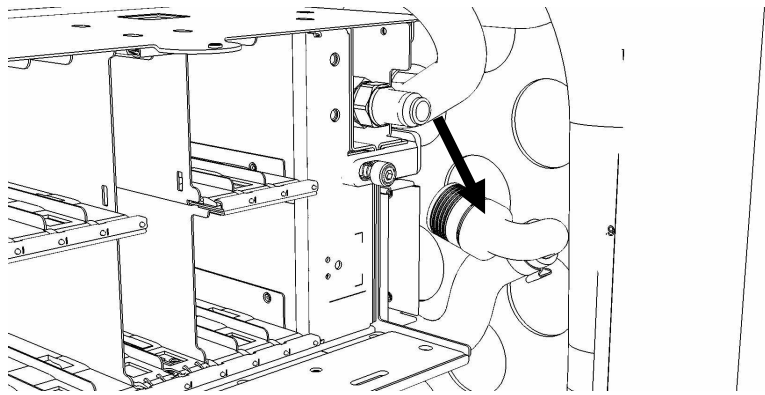
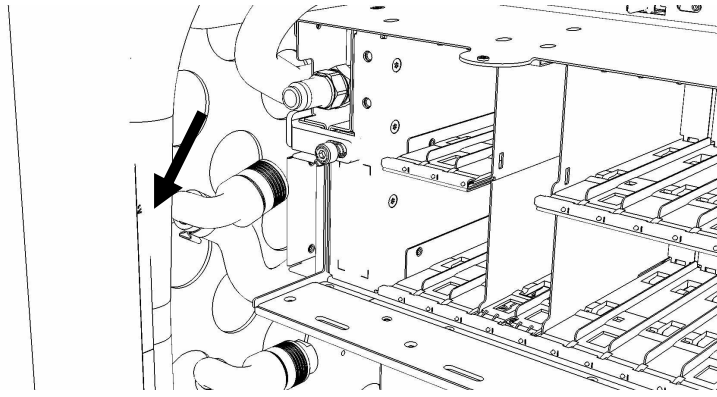
18. Verify DE position for drain procedure.

- If the DE is not installed in the system – continue to next step.
- If the DE is installed in the system – action required.

Disconnect the left and right main water connections from the DE to be drained.

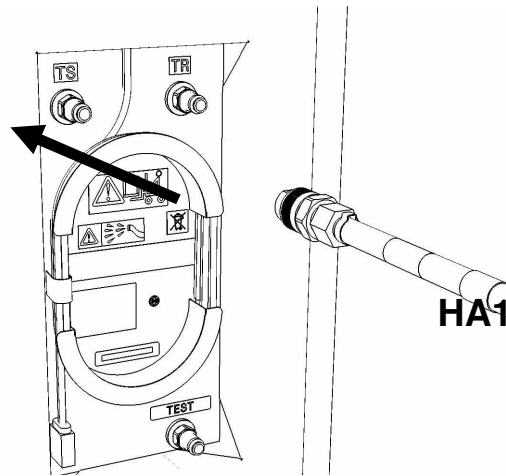
**NOTE:** Do not disconnect water connections on a DE that has not been powered off. Loss of water flow will result in DE overheating and failure.

Power775 Disk Enclosure Chassis Service Procedure  
---- Appendix D: DE Drain Procedure ----



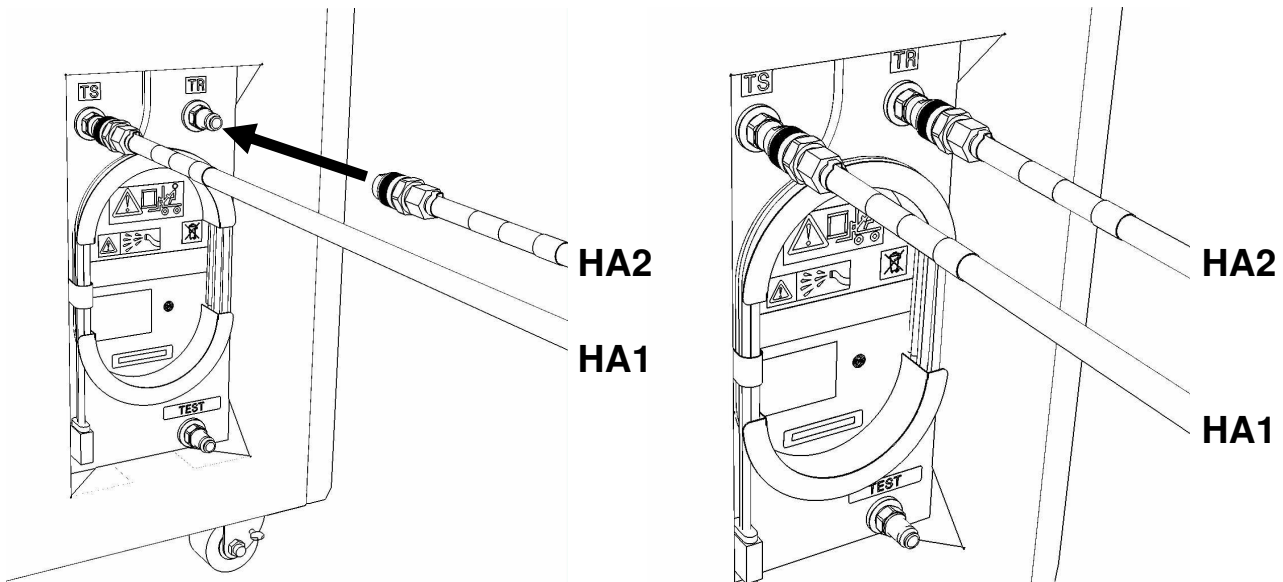
19. Remove hose assembly **HA1** from the upper tool storage compartment.

Connect either end of hose assembly **HA1** to the **TS** connection on the front panel of the FDT.



20. Remove hose assembly **HA2** from the upper tool storage compartment.

Connect end *without sight glass* to the **TR** connection on the FDT.



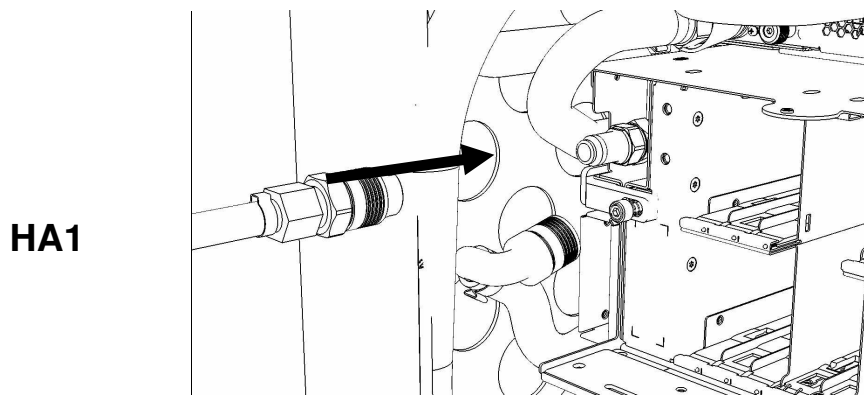
21. Verify DE position for drain procedure.

- If the DE is not installed in the system – continue to next step.
- If the DE is installed in the system – action required.

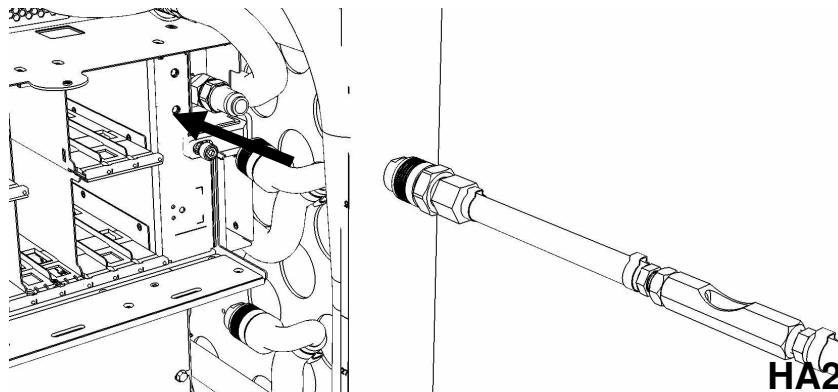
Pass the unattached ends of **HA1** and **HA2** to the rear of the frame.

**NOTE:** Hose assemblies **HA1** and **HA2** can be passed **around** the frame or **over** the frame, depending on frame position. These hoses are long enough to complete all FDT service actions on the rear of the frame.

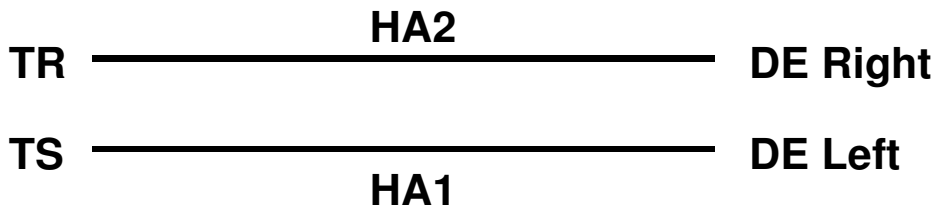
22. Connect the unattached end of hose assembly HA1 to the left side DE water connection.



23. Connect the unattached end with sight glass of hose assembly HA2 the right side DE water connection.



24. Ensure all hose connections are made properly and securely.  
Verify hoses are connected as outlined in the schematic below.



25. On the FDT Panel, click the Start Air Pump button.

The **Get FDT Status** button may be *clicked* to examine FDT status.

**NOTE:** The air pump will shut off after 1 minute, 30 seconds of run time.

**CAUTION:** This unit must not be left running unattended, service personnel should always be overseeing the process. (C038)

26. Inspect the sight glass in hose assembly HA2 while the air pump is running.  
The sight glass will provide verification that the component has been drained.

**Expected sight glass behavior**

- Sight glass will start out full of water while the component is being emptied.
- After some period of time, air will start passing through the sight glass in an air/water mixture.
- Eventually the sight glass will become full of air, with small water droplets/mist passing through the sight glass.

27. When the air pump has stopped running, review the following

- **HA2** sight glass filled with air when pump stopped – OK.  
Component empty. Proceed to next step.
- **HA2** sight glass filled with water when air pump stopped – Repeat **Step 19** through **Step 26**.
- **HA2** sight glass air/water mixture when pump stopped – repeat **Step 25** and **Step 26**.

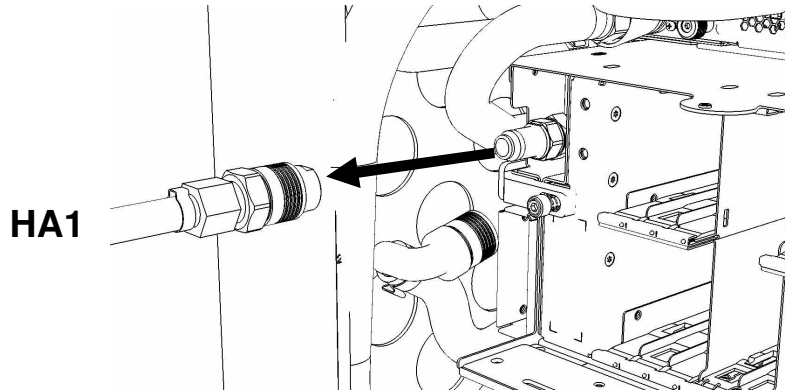
28. Click the Get FDT Status button on the HMC and review the following:

- **Tool mode:** **Ready** – OK. Check Error Status.  
**System/Component Drain Mode** – air pump still running.  
Wait 30 seconds and repeat **Step 28**.
- **Error Status:** **NONE** – OK. Check Tank Level.  
**WARNING** – *click* the **Decode Error Status** button, record information returned and proceed to next step.  
**CRITICAL** – *click* the **Decode Error Status** button, record information returned and contact next level of support.
- **Tank Level:** **Empty, Lower Half, Upper Half** – OK. Proceed to next step.  
**Full** – action required. FDT tank drain required.  
Exit this procedure and complete a **Fill and Drain Tool (FDT) Tank Drain Procedure**.  
Once FDT tank level is **Empty** or **Lower Half**, return to **Step 18** and continue with procedure.

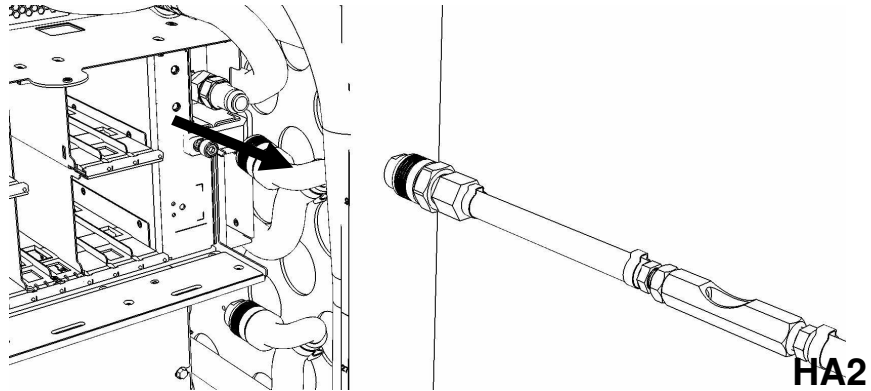
29. The DE drain procedure has completed successfully, and the DE has been emptied of water.

**NOTE:** *If a DE Pressure Test Procedure will be completed following this test, disregard Step 29, 30, and 32. These hose connections will be the same in the DE fill procedure.*

30. Disconnect the HA1 hose assembly from the left side DE water connection.

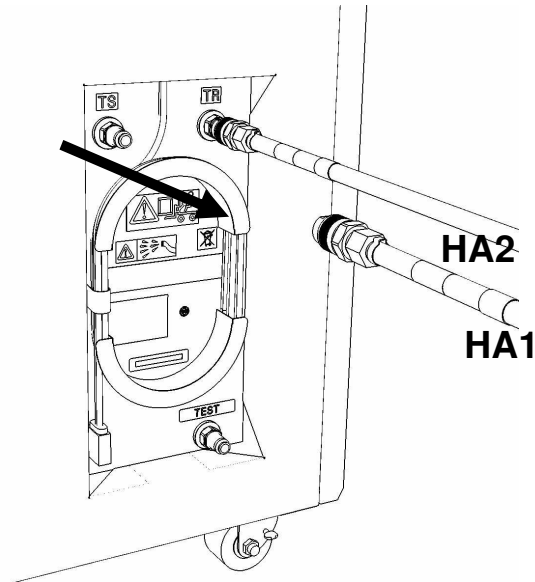


31. Disconnect the HA2 hose assembly from the right side DE water connection

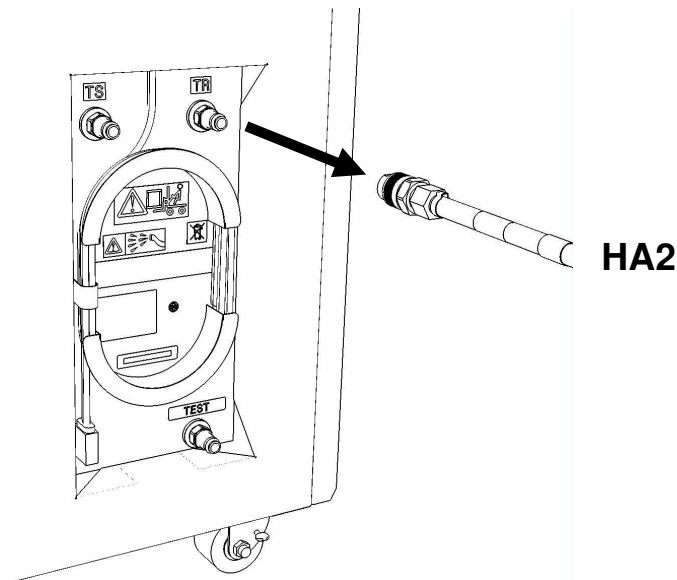




32. 1 Disconnect the FDT end of HA1 from TS on the FDT.



33. Disconnect the FDT end of HA2 from TR on the FDT.



34. Place all hose assemblies (HA1 and HA2) in their appropriate locations within the FDT storage enclosure.

35. Determine whether the FDT will be used for another procedure:

- If the FDT will be used for another procedure, leave tool activated and go to that procedure now; skip the remaining steps of this procedure.
- If the FDT requires no further use - proceed to the next step.

36. Click the **Deactivate FDT** button.

- If the **Deactivate FDT** command is successful – OK. Proceed to next step.

- If the **Deactivate FDT** command fails– action required.

Repeat **Deactivate FDT**. If the **Deactivate FDT** command fails again, contact next level of support.

37. Disconnect FDT UPIC power cable from port T10 of BPC used.

Wrap the UPIC cable in appropriate cable storage location on FDT.

38. If this procedure was referenced from another procedure, return to parent procedure.

---

## 8.4 End of Appendix D: Power775 Disk Enclosure (DE) Drain Procedure

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## 9 APPENDIX E: POWER775 FILL AND DRAIN TOOL (FDT) TANK DRAIN PROCEDURE

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### 9.1 Safety Notices

Read “Safety Notices“ available from InfoCenter:

<http://publib.boulder.ibm.com/infocenter/powersys/v3r1m5/topic/p7hdx/G229-9054.pdf>

The following cautions apply to all Power775 service procedures:

**CAUTION:**

Energy hazard present and 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.

**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:** This unit must not be left running unattended, service personnel should always be overseeing the process. (C038)



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



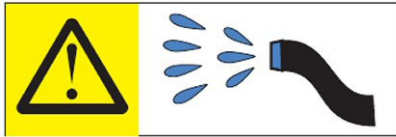
**CAUTION:** Protective eyewear is needed for the procedure. (L011)



**DANGER:** Heavy equipment—personal injury or equipment damage might result if mishandled. (L013)



**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)

## 9.2 Background:

This document contains the procedure for draining the water out of the internal reservoir of an **IBM Power 775** Fill and Drain Tool (FDT).

The FDT is used to transfer water into and out of various components of the **IBM Power 775** system. When a system component or the entire system is drained, the water will be transferred into the tank (internal reservoir) within the FDT. During drain operations, the FDT tank may become full, and if so, will need to be periodically emptied into the supplied system water containers. The FDT Tank Drain Procedure instructs the user to properly transfer water out of the FDT Tank and into an empty system water container.

During system or component drain operations, if the FDT senses that the internal reservoir has become full, it will terminate any running drain routine, as well as prevent any further drain routines from being executed. This may occur during a system or component drain procedure; if so, the system or component drain procedure must be paused, and this FDT Tank Drain Procedure must be completed before system/component draining can resume. Individual system water containers treated with a corrosion inhibitor are shipped with the system and after the initial system fill, the empty containers must be stored to be available for the FDT Tank Drain operation.

**The system water is treated and must not be poured down a sink or on the ground.**

### **Reference Information:**

**IBM Power 775** FDT P/N: **45D6928**  
**IBM** System Water Container P/N: **45D2124** (U.S.), **45D2129** (non-U.S.)  
Hose assemblies/adapters required: **THA** (45D8563)

Approximate FDT internal water volume: 32 L

Expected drainage time for one (1) system water container: 1 min, 40 s

**NOTE:** *Some steps in this procedure may be redundant due to other service operations being completed prior to this procedure. If a step has already been completed, verify that the step has been completed properly and proceed to the next step.*

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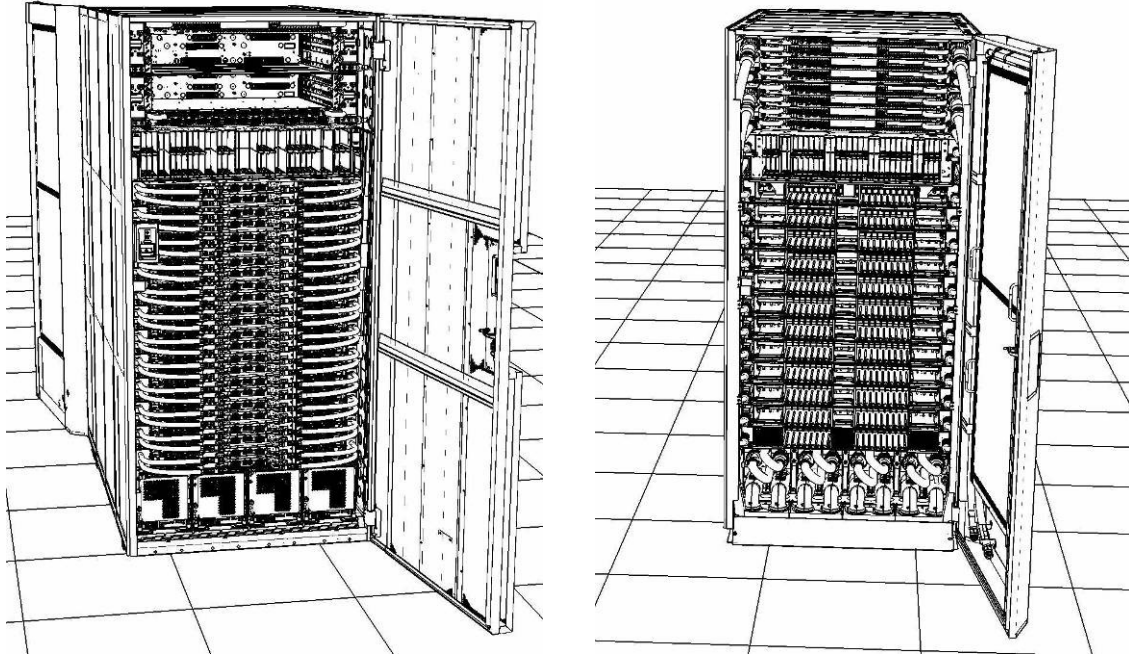
## 9.3 Procedure:

**NOTE:** If you already have the FDT powered on, proceed to **Step 14**. Otherwise, start procedure at **Step 1**.

1. Identify the **Power 775** frame that requires service.

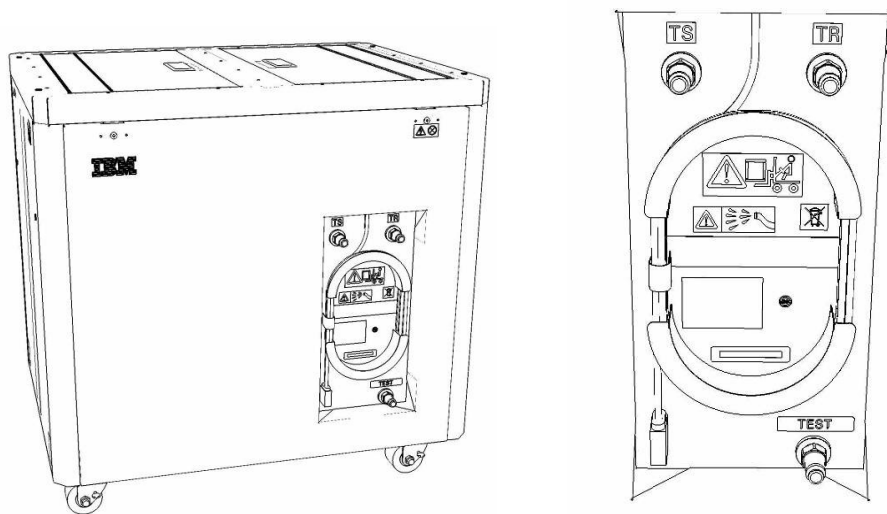
Verify that the system UEPO is set to **ON**, and the managing consoles (HMC and XCat) are powered on and communicating with the frame.

2. Open front and rear doors of the **Power 775** frame that requires service.



3. Bring the FDT to the front side of the **Power 775** frame that requires service.
4. Locate the panel of the FDT that contains the Universal Power and Information Cable (UPIC), as well as the **TS**, **TR**, and **TEST** water connections.

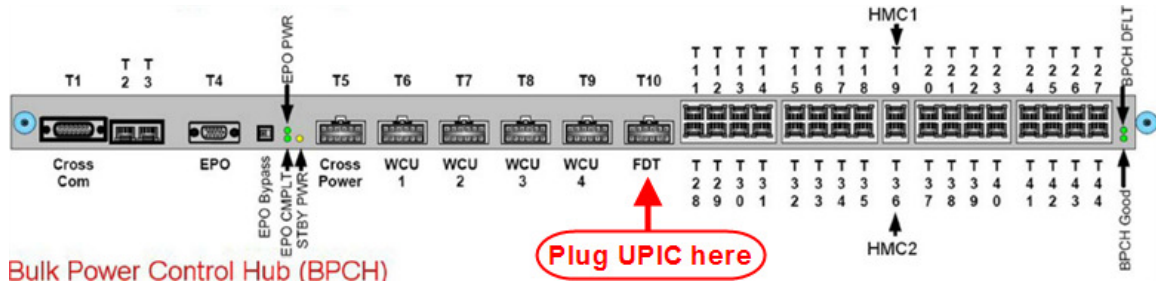
This side of the tool should be facing the front of the frame.



5. Unwrap the FDT UPIC cable from the storage loop on the FDT.

6. Select BPC port for FDT

- If the lower BPA is not targeted for service, and is functional:  
 Plug the FDT UPIC cable into **port T10 of the lower BPC.**
- If the lower BPA is targeted for service, or is not functional:  
 Plug the FDT UPIC cable into **port T10 of the upper BPC.**



7. Login to the HMC with the User ID `hscroot`.

Use the HMC that is connected to the BPA where the FDT is plugged.

8. From the HMC left Navigation menu, expand **Systems Management** then select **Frames**.

Verify frame serial number for the frame to be serviced.

9. In the **Frames** view on the HMC, place a checkmark in the **Select** column for the frame to be serviced.

10. Verify that the frame **Status** is **Rack Standby/Rack Standby** or **Standby/Standby**.

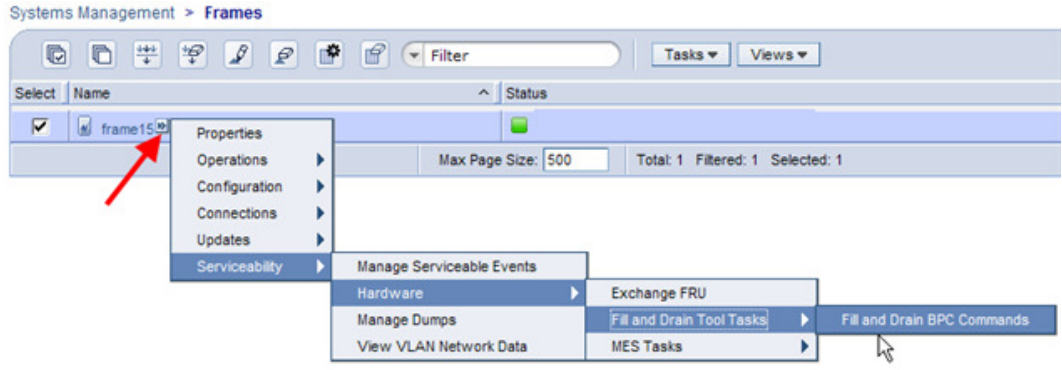
- If frame **Status** reads **Rack Standby/Rack Standby** or **Standby/Standby** – OK.

Continue to next step.

- If frame **Status** does not read **Rack Standby/Rack Standby** or **Standby/Standby** – action required. Contact next level of support.

11. From the **Task** menu on the HMC, *select* **Serviceability** > **Hardware** > **Fill and Drain Tool Tasks** > **Fill and Drain Command Interface**

Power775 Disk Enclosure Chassis Service Procedure  
 ---- Appendix E: FDT Tank Drain Procedure ----



**Fill and Drain Tool Command Interface** will display. See below for a sample image of the interface (FDT deactivated).

### Fill and Drain Tool (FDT) Command Interface - Server-78AC-100BC50029

The table below shows the FDT Port locations that can communicate with the Fill and Drain Tool. Select the port to which the Fill and Drain Tool is connected. Use the buttons to drive commands to the Fill and Drain Tool connected to a port.

FDT Port Locations:

Select	Location Code	Description
<input type="radio"/>	78AC-100*BC50029-P7-C1	Lower BPC Port T10
<input type="radio"/>	78AC-100*BC50029-P8-C1	Upper BPC Port T10

Activate FDT Deactivate FDT  
Get FDT Status Decode Error Status  
Fill FDT Drain FDT  
Start Water Pump Reset FDT Start Air Pump  
Pressure Test Calibration Component Pressure Test

Launch WCU Commands WCU Tank Air Purge  
Exit Help



12. Select the BPC port that the FDT was plugged into in **Step 6** from the **FDT Port Locations:** list.

13. *Click* the **Activate FDT** button.

- If the Activate FDT command is successful – OK. **Wait 30 seconds and continue to next step.**
- If the **Activate FDT** command fails – action required.

*Click* the **Deactivate FDT** button.

Wait 2 minutes and repeat **Step 13**. If the **Activate** command fails again, contact next level of support.

14. *Click* the **Get FDT Status** button.

- If the **Get FDT Status** command is successful – OK.

See below for a sample status (does not reflect expected state)

- If the **Get FDT Status** command fails – action required.

Repeat **Step 14**. If the **Get FDT Status** command fails again, contact next level of support.

**Fill and Drain Tool (FDT) Command Interface - Server-78AC-100BC50029**

The table below shows the FDT Port locations that can communicate with the Fill and Drain Tool. Select the port to which the Fill and Drain Tool is connected. Use the buttons to drive commands to the Fill and Drain Tool connected to a port.

FDT Port Locations:

Select	Location Code	Description
<input checked="" type="radio"/>	78AC-100*BC50029-P7-C1	Lower BPC Port T10
<input type="radio"/>	78AC-100*BC50029-P8-C1	Upper BPC Port T10

FDT Power/Comm: GOOD  
 Frame Attached: IBM Power7 775  
 MDA-FD RL: 45D  
 Error Status: WARNING  
 Tank Level: Full  
 Air Pump: Off  
 Water Pump: DISABLED  
 Tool Mode: Ready  
 Pressure Test Calibration: Incomplete  
 Component Pressure Test: Incomplete

Sample FDT Status

15. Review the FDT status screen and ensure the following status items are OK:

Status Item	State	Action
-------------	-------	--------

- **Tool Mode:** **Ready** – OK. Check next Status item.
- **Error Status:** **NONE** – OK. Check next Status item.

**WARNING** – *click* the **Decode Error Status** button, record the information returned and check Tank Level.

**CRITICAL** – *click* the **Decode Error Status** button, record the information returned and contact next level of support.

- **Tank Level:** **Full, Upper Half, or Lower Half** – OK.  
Note tank level, and proceed to next step.  
**Empty** – FDT cannot be drained.  
Exit procedure.

16. Locate an empty system water container.

Transport the container to the location of the FDT.

Do not place the container between the FDT and the open frame.

**NOTE:** Use an empty system water container **only**. If a non-empty system water container is used, water will overflow out of the container.

IBM PN **45D2124** (U.S.), **45D2129** (non-U.S.).

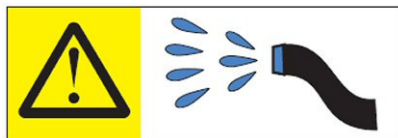
**CAUTION:** The water-based coolant solution may contain an additive intended to inhibit corrosion (or provide other functions). The solution may cause irritation to the skin or eyes. Avoid direct contact with the solution. Employ appropriate Personal Protective Equipment when performing operations 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)

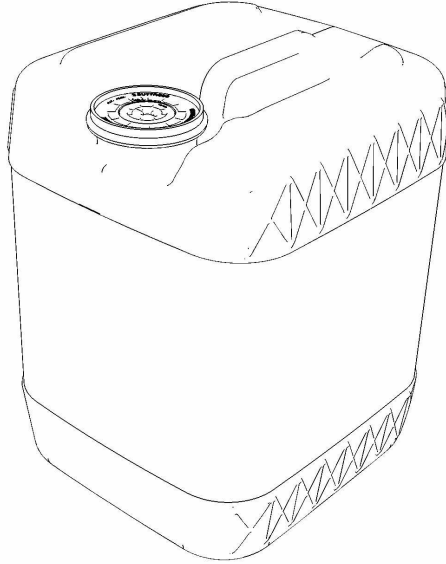


**CAUTION:** Chemical resistant gloves are needed for this procedure. (L014)

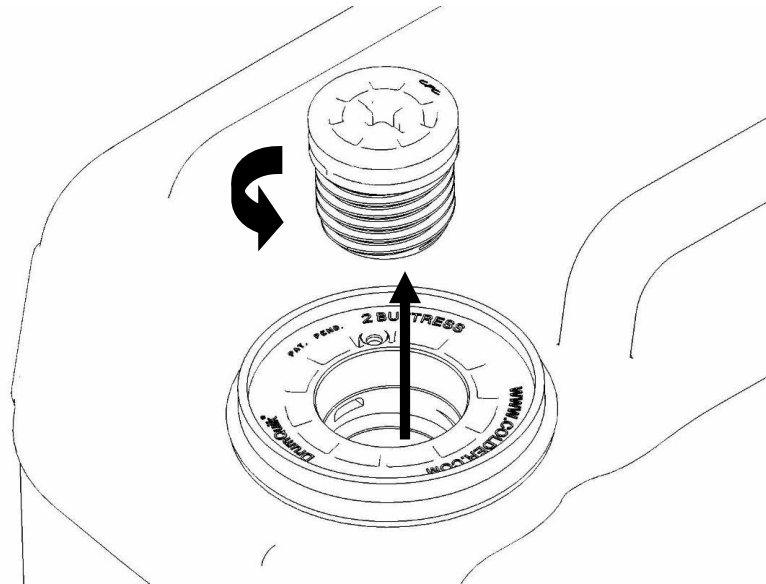


**DANGER:** Risk of electric shock due to water or a water solution which is present in this product. Avoid working on or near energized equipment with wet hands or when spilled water is present. (L016)

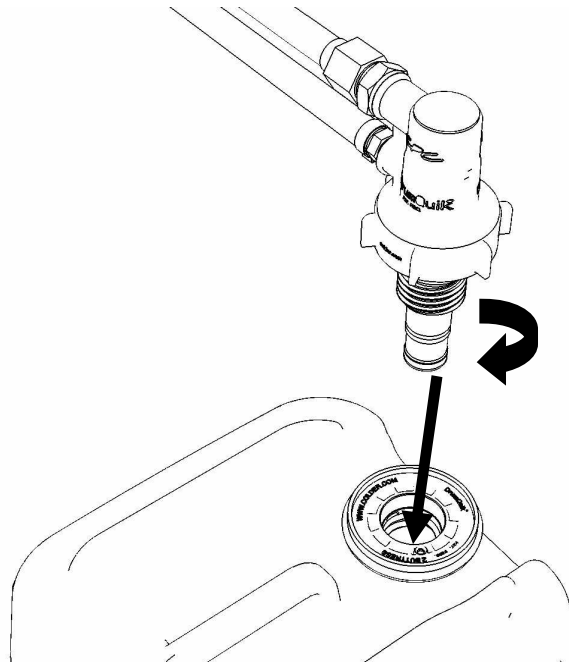
The system water is treated and must not be poured down a sink or on the ground.



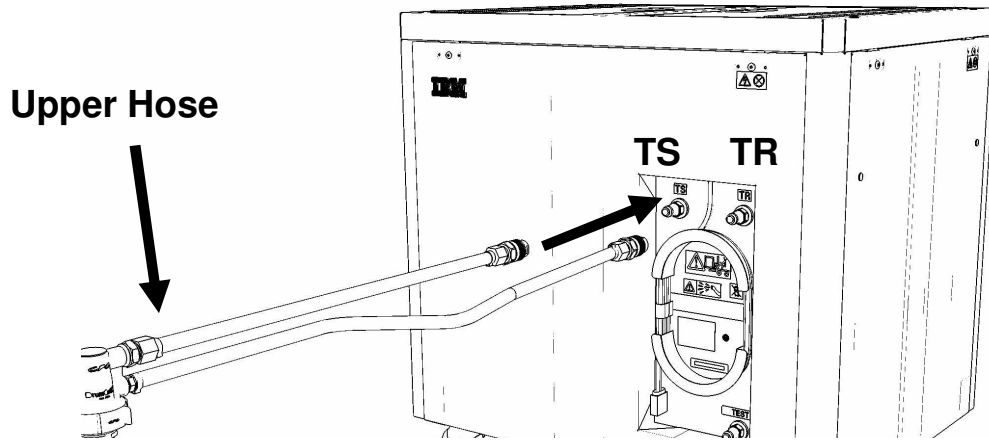
17. Remove the inner cap from the white system water container insert.  
Unthread inner cap counter-clockwise with a large screwdriver.



18. Remove transfer hose assembly **THA** from the upper tool storage compartment.
19. Insert large white threaded insert of **THA** into the system water container.  
Turn clockwise until hand tight.

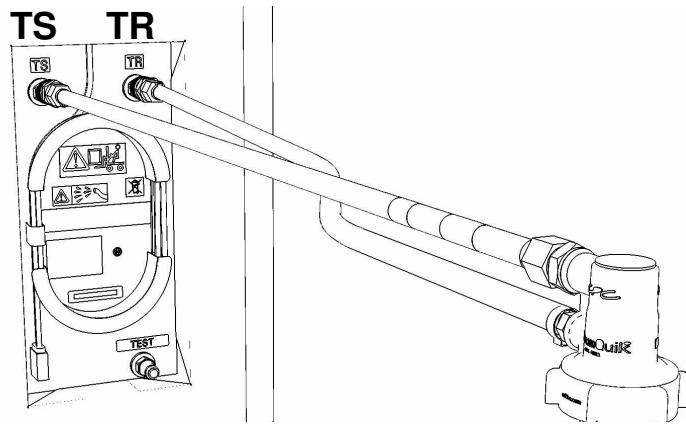
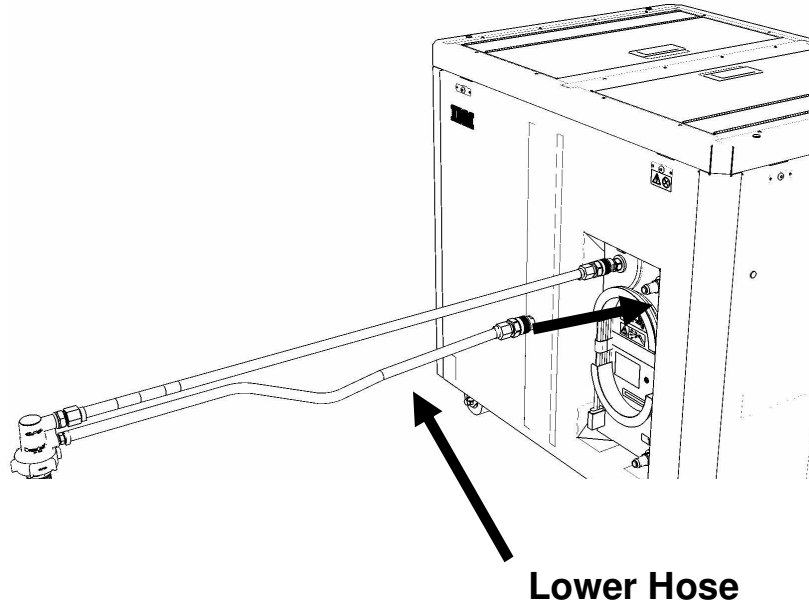


20. Connect the **Upper THA Hose** to the **TS** connection on the front panel of the FDT.

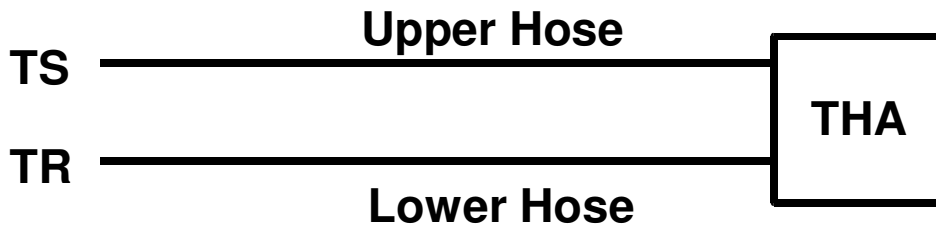


21. Connect the **Lower THA Hose** to the **TR** connection on the front panel of the FDT.

Power775 Disk Enclosure Chassis Service Procedure  
---- Appendix E: FDT Tank Drain Procedure ----



22. Ensure all water connections are made properly and securely.



23. On the FDT panel, *click* the **Drain FDT** button.

The **Get FDT Status** button may be *clicked* to examine FDT status.

**NOTE:** *The water pump will shut off after 1 minute, 40 seconds of run time.*

**CAUTION:** **This unit must not be left running unattended, service personnel should always be overseeing the process. (C038)**

24. Verify that the container feels full of water after FDT drain.

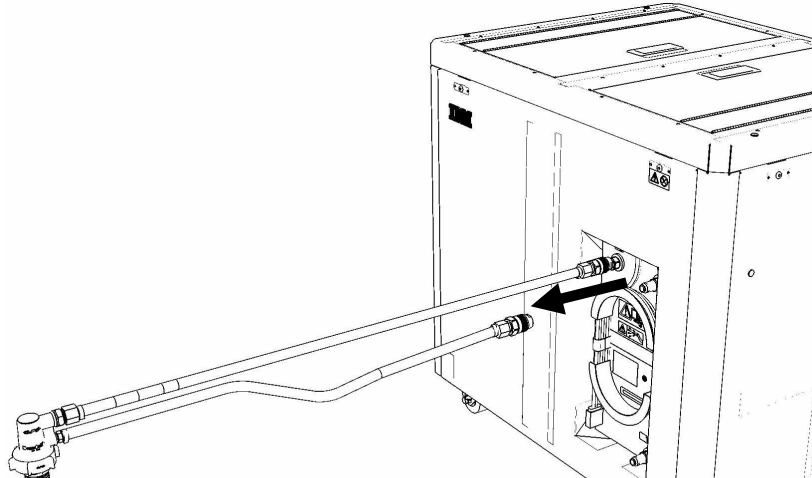
Container will weigh approximately 35 lbs. (16 kg) when full.

- If container feels full, proceed to **Step 25**.
- If container feels empty, repeat **Step 20** and continue with procedure.  
To prevent overflow, only repeat if the system water container is **still empty**.

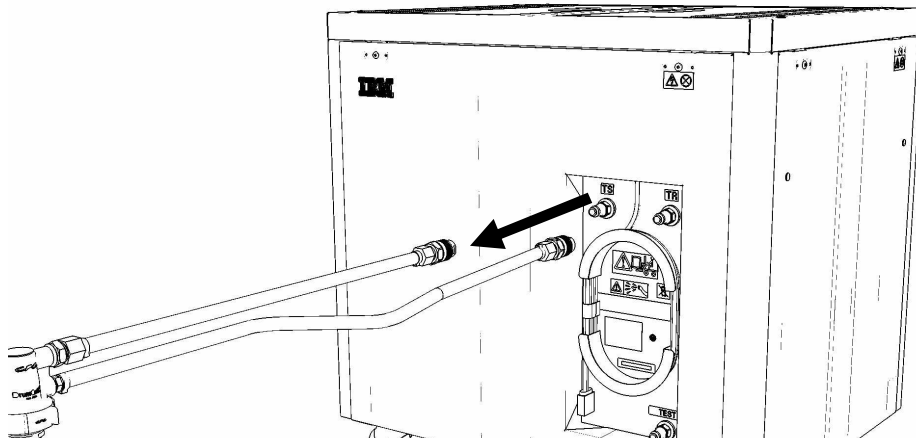
25. Review the FDT status screen and ensure the following status items are OK:

Status Item	State	Action
• <b>Tool mode:</b>	<b>Ready</b> – OK. Check next Status item. <b>FDT Drain Mode</b> – water pump still running. Wait 30 seconds and repeat <b>Step 25</b> .	
• <b>Error Status:</b>	<b>NONE</b> – OK. Check next Status item. <b>WARNING</b> – <i>click</i> the <b>Decode Error Status</b> button, record information returned and proceed to next step. <b>CRITICAL</b> – <i>click</i> the <b>Decode Error Status</b> button, record information returned and contact next level of support.	
• <b>Tank Level:</b>	Repeat <b>Step 16</b> to <b>Step 25</b> (with additional empty container) until desired level is reached. If tank level does not fall, repeat <b>Step 16</b> through <b>Step 25</b> . If tank level does not decrease after repeat, contact next level of support. To prevent overflow, only repeat if the system water container is <b>still empty</b> .	

26. Disconnect the **Lower THA Hose** from the **TR** connection on the front panel of the FDT.

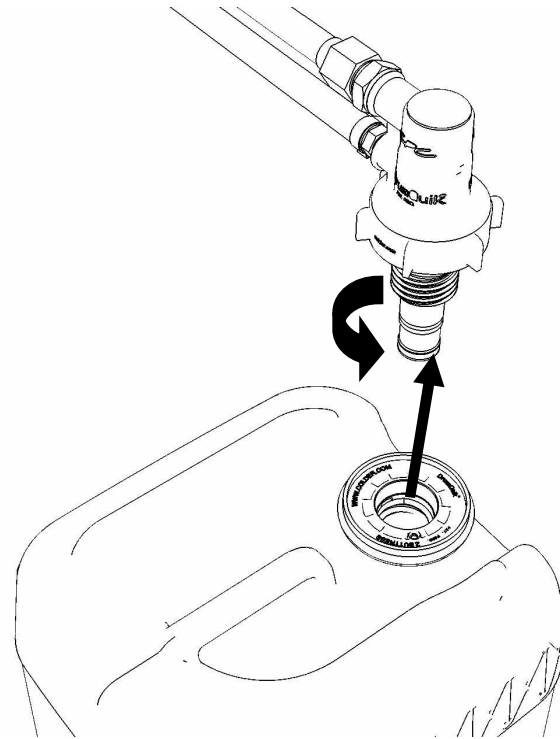


27. Disconnect the **Upper THA Hose** from the **TS** connection on the front panel of the FDT.

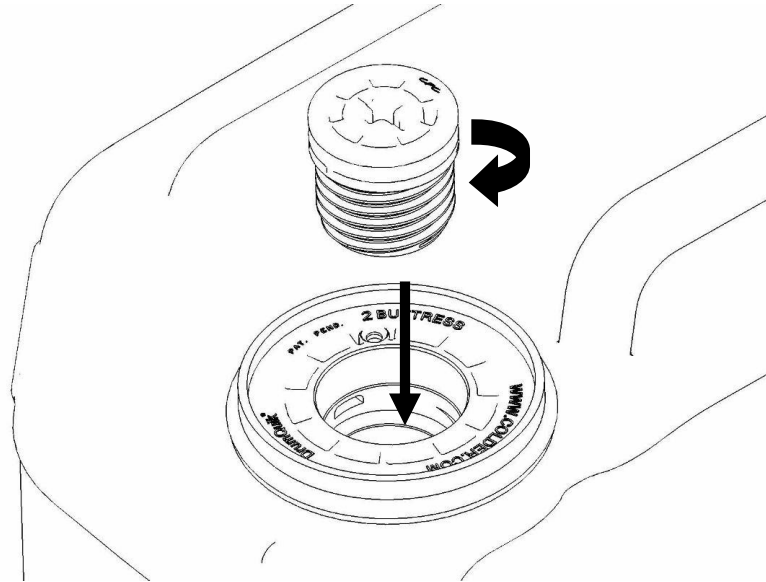




28. Remove large white threaded insert of **THA** from the system water container.  
Turn **slowly** counterclockwise until removed.  
Some residual pressure may remain on the system water container



29. Replace the inner cap into the white system water container insert.  
Turn inner cap clockwise with a large screwdriver.



30. Place all hose assemblies and adapters in their appropriate locations within the FDT storage enclosure.

31. Determine whether the FDT will be used for another procedure:

- If the FDT will be used for another procedure, leave tool activated and go to that procedure now; skip the remaining steps of this procedure.
- If the FDT requires no further use - proceed to the next step.

32. Click the **Deactivate FDT** button.

- If the **Deactivate FDT** command is successful – OK. Proceed to next step.
- If the **Deactivate FDT** command fails– action required.

Repeat **Deactivate FDT**. If the **Deactivate FDT** command fails again, contact next level of support.

33. Disconnect FDT UPIC power cable from port T10 of BPC used.

Wrap the UPIC cable in appropriate cable storage location on FDT.

34. If this procedure was referenced from another procedure, return to parent procedure.

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## 9.4 End of Appendix E: Power775 FDT Tank Drain Procedure

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# 10 APPENDIX F: POWER775 FILL AND DRAIN TOOL (FDT) TANK FILL PROCEDURE

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## 10.1 Safety Notices

Read "Safety Notices" available from InfoCenter:

<http://publib.boulder.ibm.com/infocenter/powersys/v3r1m5/topic/p7hdx/G229-9054.pdf>

The following cautions apply to all Power775 service procedures:

**CAUTION:**

Energy hazard present and 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.

**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:** This unit must not be left running unattended, service personnel should always be overseeing the process. (C038)



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



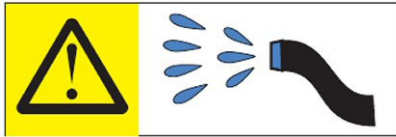
**CAUTION:** Protective eyewear is needed for the procedure. (L011)



**DANGER:** Heavy equipment—personal injury or equipment damage might result if mishandled. (L013)



**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)

## 10.2 Background:

This document contains the procedure for filling an **IBM Power 775** Fill and Drain Tool (FDT) tank (internal reservoir).

The FDT is used to transfer water into and out of various components of the **IBM Power 775** system. When a system component or the entire system is filled, the water will be transferred from the tank (internal reservoir) within the FDT to the component or system. During fill operations, the FDT tank may become empty, and if so, will need to be periodically filled using the supplied system water containers. Individual system water containers treated with a corrosion inhibitor are shipped with the system. The FDT Tank Fill Procedure instructs the user to properly transfer water out of a full system water container into the FDT Tank.

During system or component filling operations, if the FDT senses that the internal reservoir has become empty, it will terminate any running fill routine, as well as prevent any further fill routines from being executed. This may occur during a system or component fill procedure; if so, the system or component fill procedure must be paused, and this FDT Tank Fill Procedure must be completed before system/component filling can resume.

**The system water is treated and must not be poured down a sink or on the ground.**

### **Reference Information:**

<b>IBM Power 775</b> FDT P/N:	<b>45D6928</b>
<b>IBM</b> System Water Container P/N:	<b>45D2124</b> (U.S.), <b>45D2129</b> (non-U.S.)
Hose assemblies/adapters required:	<b>THA</b> (45D8563)

Approximate FDT internal water volume: 32 L

Expected filling time for one (1) system water container: 1 min, 30 s

**NOTE:** *Some steps in this procedure may be redundant due to other service operations being completed prior to this procedure. If a step has already been completed, verify that the step has been completed properly and proceed to the next step.*

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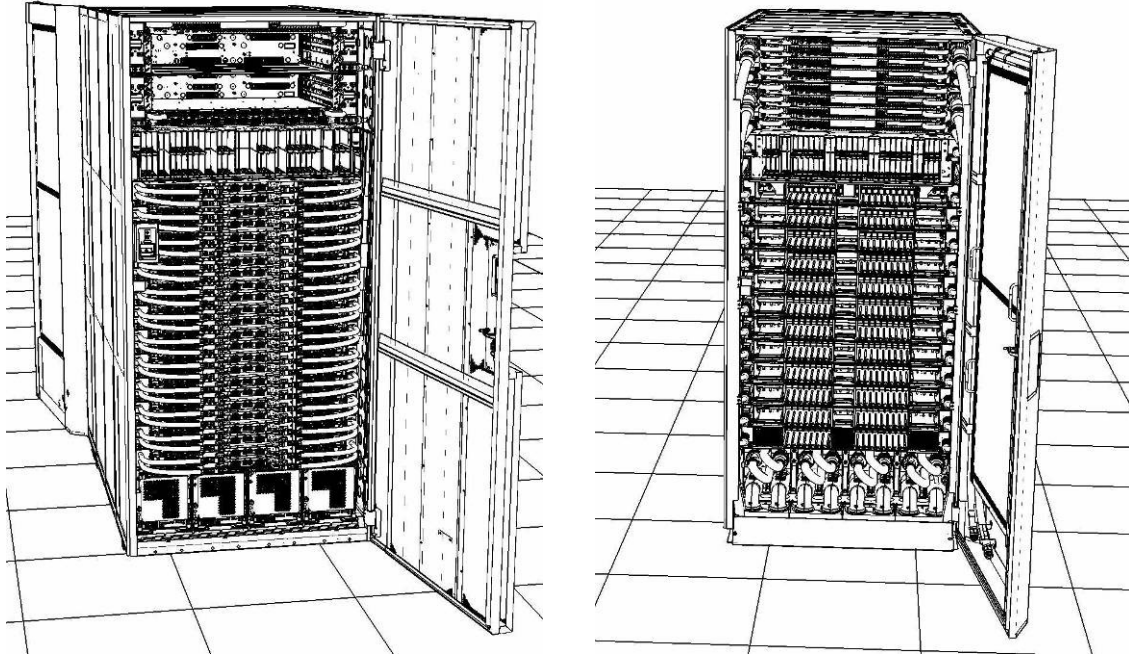
## 10.3 Procedure:

**NOTE:** If you already have the FDT powered on, proceed to **Step 14**. Otherwise, start procedure at **Step 1**.

1. Identify the **Power 775** frame that requires service.

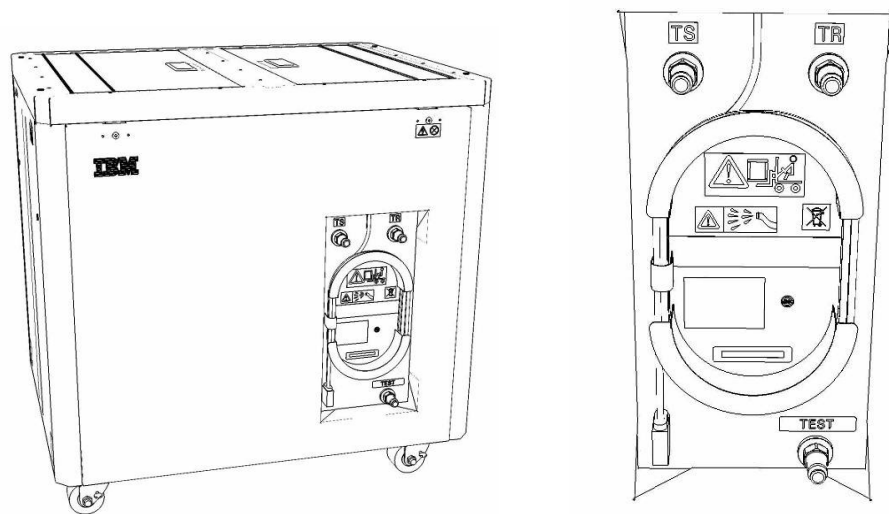
Verify that the system UEPO is set to **ON**, and the managing consoles (HMC and XCat) are powered on and communicating with the frame.

2. Open front and rear doors of the **Power 775** frame that requires service.



3. Bring the FDT to the front side of the **Power 775** frame that requires service.
4. Locate the panel of the FDT that contains the Universal Power and Information Cable (UPIC), as well as the **TS**, **TR**, and **TEST** water connections.

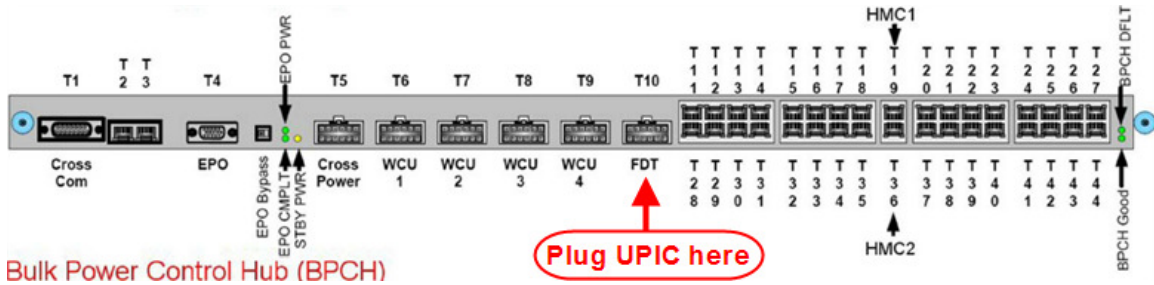
This side of the tool should be facing the front of the frame.



5. Unwrap the FDT UPIC cable from the storage loop on the FDT.

6. Select BPC port for FDT

- If the lower BPA is not targeted for service, and is functional:  
 Plug the FDT UPIC cable into **port T10 of the lower BPC.**
- If the lower BPA is targeted for service, or is not functional:  
 Plug the FDT UPIC cable into **port T10 of the upper BPC.**



7. Login to the HMC with the User ID `hscroot`.

Use the HMC that is connected to the BPA where the FDT is plugged.

8. From the HMC left Navigation menu, expand **Systems Management** then select **Frames**.

Verify frame serial number for the frame to be serviced.

9. In the **Frames** view on the HMC, place a checkmark in the **Select** column for the frame to be serviced.

10. Verify that the frame **Status** is **Rack Standby/Rack Standby** or **Standby/Standby**.

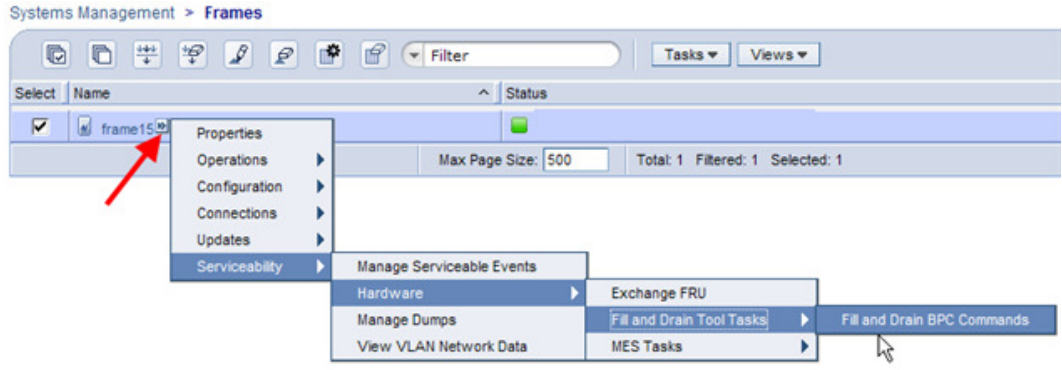
- If frame **Status** reads **Rack Standby/Rack Standby** or **Standby/Standby** – OK.

Continue to next step.

- If frame **Status** does not read **Rack Standby/Rack Standby** or **Standby/Standby** – action required. Contact next level of support.

11. From the **Task** menu on the HMC, *select* **Serviceability** > **Hardware** > **Fill and Drain Tool Tasks** > **Fill and Drain Command Interface**

Power775 Disk Enclosure Chassis Service Procedure  
 ---- Appendix F: FDT Tank Fill Procedure ----



**Fill and Drain Tool Command Interface** will display. See below for a sample image of the interface (FDT deactivated).

**Fill and Drain Tool (FDT) Command Interface - Server-78AC-100BC50029**

The table below shows the FDT Port locations that can communicate with the Fill and Drain Tool. Select the port to which the Fill and Drain Tool is connected. Use the buttons to drive commands to the Fill and Drain Tool connected to a port.

FDT Port Locations:

Select	Location Code	Description
<input type="radio"/>	78AC-100*BC50029-P7-C1	Lower BPC Port T10
<input type="radio"/>	78AC-100*BC50029-P8-C1	Upper BPC Port T10



12. Select the BPC port that the FDT was plugged into in **Step 6** from the **FDT Port Locations:** list.

13. *Click* the **Activate FDT** button.

- If the Activate FDT command is successful – OK. **Wait 30 seconds and continue to next step.**
- If the **Activate FDT** command fails – action required.

*Click* the **Deactivate FDT** button.

Wait 2 minutes and repeat **Step 13**. If the **Activate** command fails again, contact next level of support.

14. *Click* the **Get FDT Status** button.

- If the **Get FDT Status** command is successful – OK.  
See below for a sample status (does not reflect expected state)

- If the **Get FDT Status** command fails – action required.

Repeat **Step 14**. If the **Get FDT Status** command fails again, contact next level of support.

**Fill and Drain Tool (FDT) Command Interface - Server-78AC-100BC50029**

The table below shows the FDT Port locations that can communicate with the Fill and Drain Tool. Select the port to which the Fill and Drain Tool is connected. Use the buttons to drive commands to the Fill and Drain Tool connected to a port.

FDT Port Locations:

Select	Location Code	Description
<input checked="" type="radio"/>	78AC-100*BC50029-P7-C1	Lower BPC Port T10
<input type="radio"/>	78AC-100*BC50029-P8-C1	Upper BPC Port T10

FDT Power/Comm: GOOD  
 Frame Attached: IBM Power7 775  
 MDA-FD RL: 45D  
 Error Status: WARNING  
 Tank Level: Full  
 Air Pump: Off  
 Water Pump: DISABLED  
 Tool Mode: Ready  
 Pressure Test Calibration: Incomplete  
 Component Pressure Test: Incomplete

Sample FDT Status

15. Review the FDT status screen and ensure the following status items are OK:

Status Item	State	Action
• <b>Tool Mode:</b>	<b>Ready</b>	– OK. Check next Status item.
• <b>Error Status:</b>	<b>NONE</b>	– OK. Check next Status item.
	<b>WARNING</b>	– <i>click</i> the <b>Decode Error Status</b> button, record the information returned and check Tank Level.

**CRITICAL** – *click* the **Decode Error Status** button, record the information returned and contact next level of support.

- **Tank Level: Lower Half or Empty** – OK.

Note tank level, and proceed to next step.

**Upper Half or Full** – FDT should not be filled.

Exit procedure.

16. Locate a full system water container.

Transport the container to the location of the FDT.

Do not place the container between the FDT and the open frame.

**NOTE:** *Use of a non-full system water container will result in repeated FDT filling operations.*

IBM PN **45D2124** (U.S.), **45D2129** (non-U.S.).

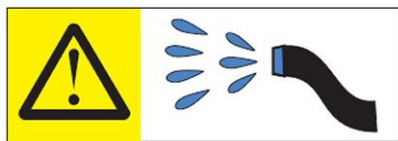
**CAUTION:** The water-based coolant solution may contain an additive intended to inhibit corrosion (or provide other functions). The solution may cause irritation to the skin or eyes. Avoid direct contact with the solution. Employ appropriate Personal Protective Equipment when performing operations 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)

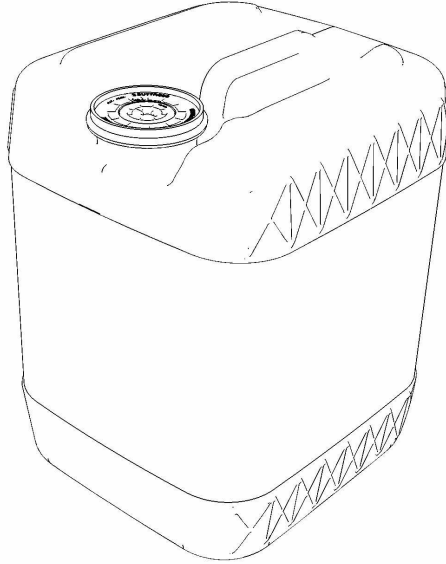


**CAUTION:** Chemical resistant gloves are needed for this procedure. (L014)

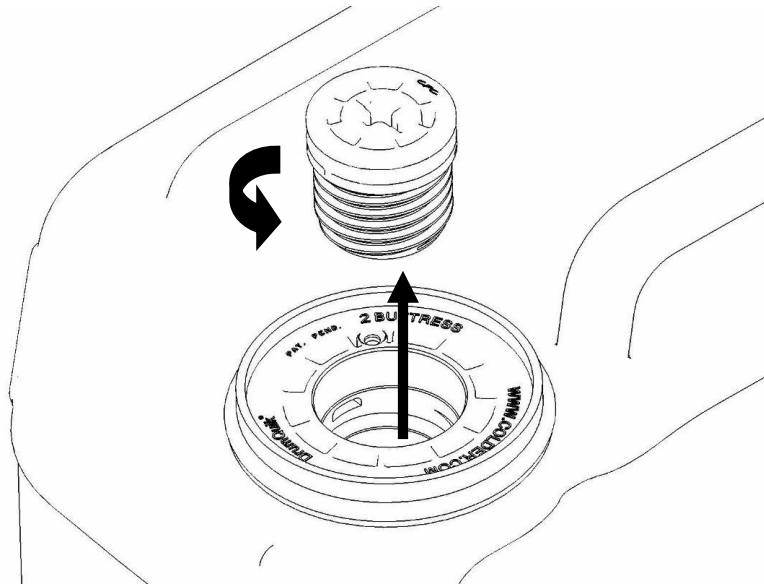


**DANGER:** Risk of electric shock due to water or a water solution which is present in this product. Avoid working on or near energized equipment with wet hands or when spilled water is present. (L016)

The system water is treated and must not be poured down a sink or on the ground.

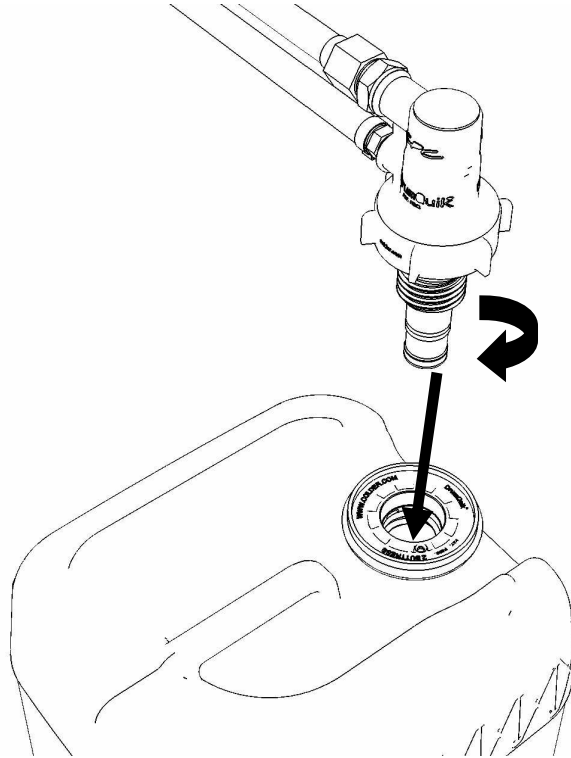


17. Remove the inner cap from the white system water container insert.  
Unthread inner cap counter-clockwise with a large screwdriver.

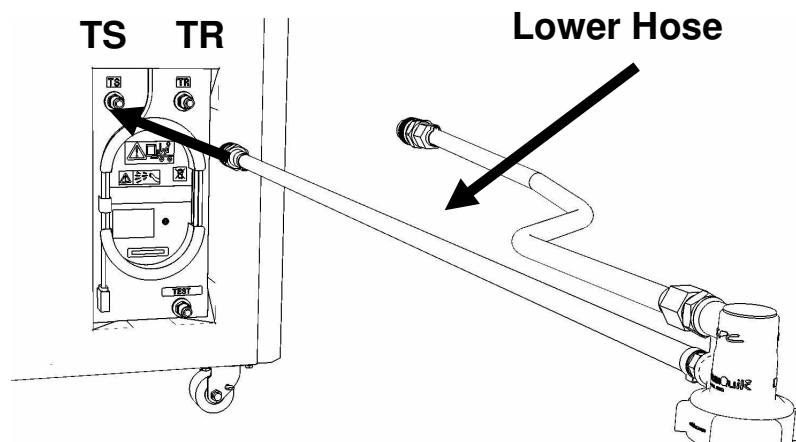


18. Remove transfer hose assembly **THA** from the upper tool storage compartment.

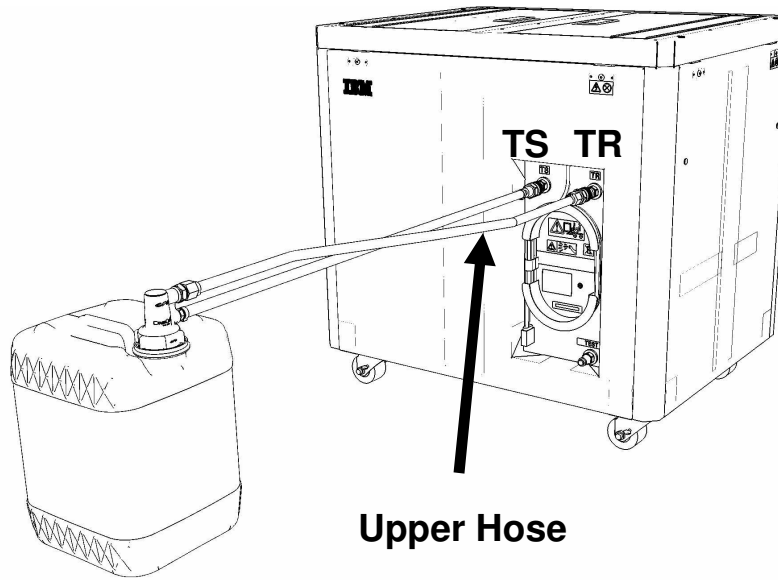
19. Insert large white threaded insert of **THA** into the system water container.  
Turn clockwise until hand tight.



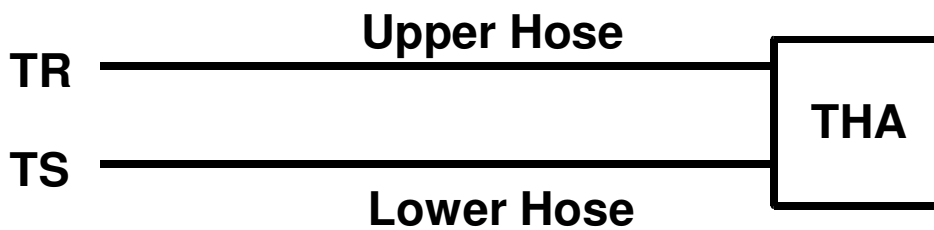
20. Connect the **Lower THA Hose** to the **TS** connection on the front panel of the FDT.



21. Connect the **Upper THA Hose** to the **TR** connection on the front panel of the FDT.



22. Ensure all water connections are made properly and securely.



23. On the FDT panel, *click* the **Fill FDT** button.

The **Get FDT Status** button may be *clicked* to examine FDT status.

**NOTE:** *The air pump will shut off after 1 minute, 40 seconds of run time.*

**CAUTION:** **This unit must not be left running unattended, service personnel should always be overseeing the process. (C038)**

24. Verify that the container feels empty after FDT fill.

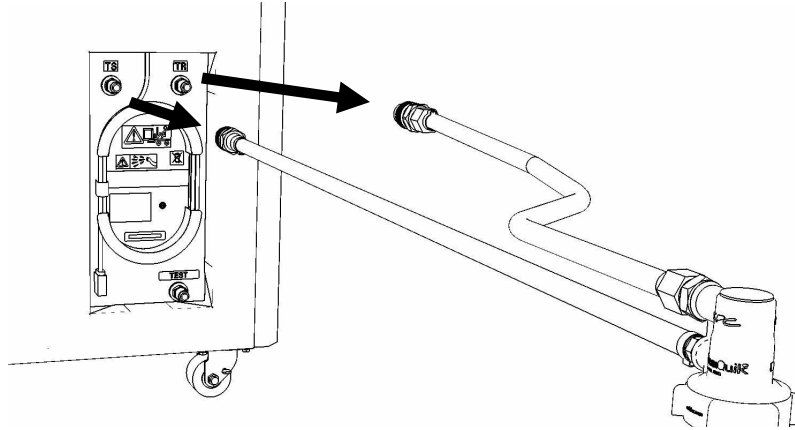
Container will weigh approximately 5 lbs. (2 kg) when empty.

- If container feels empty, proceed to **Step 25**.
- If container does not feel empty, repeat **Step 20** and continue with procedure.

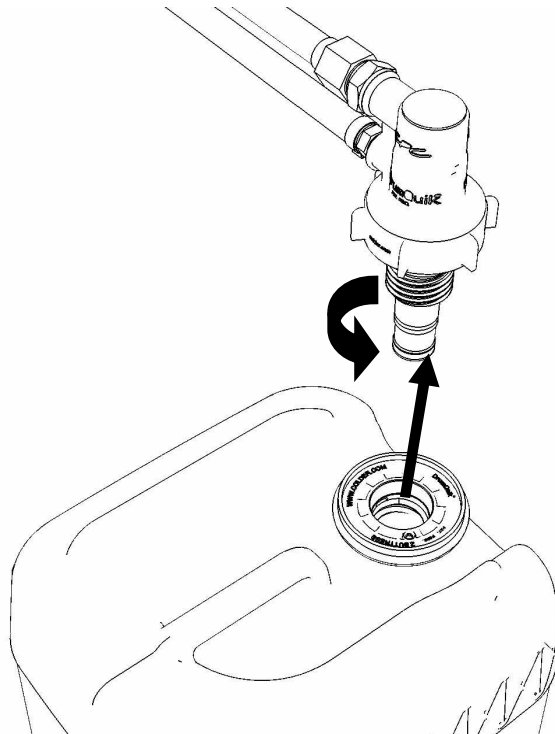
25. Click the **Get FDT Status** button and ensure the following status items are OK:

Status Item	State	Action
• <b>Tool mode:</b>	<b>Ready</b> – OK. Check next Status item. <b>FDT Fill Mode</b> – air pump still running. Wait 30 seconds and repeat <b>Step 25</b> .	
• <b>Error Status:</b>	<b>NONE</b> – OK. Check next Status item. <b>WARNING</b> – <i>click</i> the <b>Decode Error Status</b> button, record information returned and proceed to next step. <b>CRITICAL</b> – <i>click</i> the <b>Decode Error Status</b> button, record information returned and contact next level of support.	
• <b>Tank Level:</b>	Repeat <b>Step 16</b> to <b>Step 25</b> (with additional full container) until desired level is reached. If tank level does not rise, repeat <b>Step 16</b> through <b>Step 25</b> . If tank level does not increase after repeat, contact next level of support.	

26. Disconnect the **Lower THA Hose** from the **TS** connection on the front panel of the FDT.
27. Disconnect the **Upper THA Hose** from the **TR** connection on the front panel of the FDT.

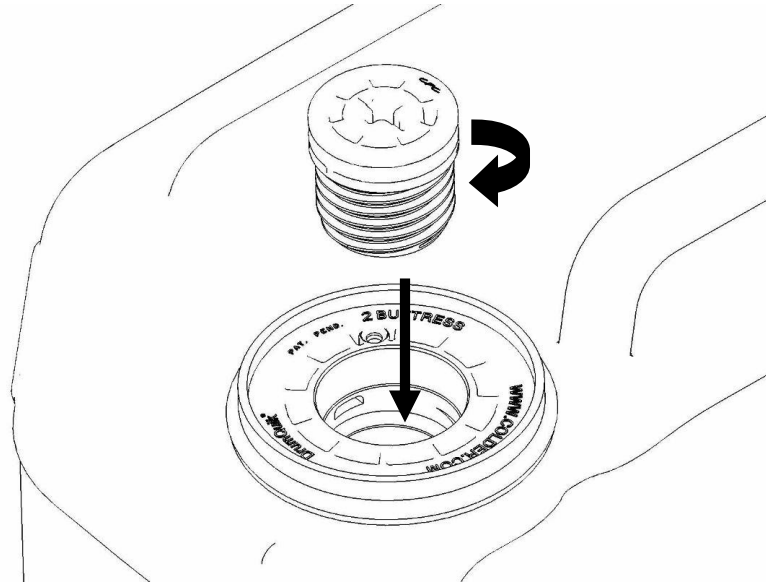


28. Remove large white threaded insert of **THA** from the system water container.  
Turn **slowly** counterclockwise until removed.  
Some residual pressure may remain on the system water container





29. Replace the inner cap into the white system water container insert.  
Turn inner cap clockwise with a large screwdriver.



30. Place all hose assemblies and adapters in their appropriate locations within the FDT storage enclosure.
31. Determine whether the FDT will be used for another procedure:
- If the FDT will be used for another procedure, leave tool activated and go to that procedure now; skip the remaining steps of this procedure.
  - If the FDT requires no further use - proceed to the next step.
32. Click the **Deactivate FDT** button.
- If the **Deactivate FDT** command is successful – OK. Proceed to next step.
  - If the **Deactivate FDT** command fails– action required.  
Repeat **Deactivate FDT**. If the **Deactivate FDT** command fails again, contact next level of support.
33. Disconnect FDT UPIC power cable from port T10 of BPC used.  
Wrap the UPIC cable in appropriate cable storage location on FDT.
34. If this procedure was referenced from another procedure, return to parent procedure.

## **10.4 End of Appendix F: Power775 FDT Tank Fill Procedure**

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# 11 APPENDIX G: POWER775 FILL AND DRAIN TOOL (FDT) PRESSURE TEST CALIBRATION PROCEDURE

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## 11.1 Safety Notices

Read "Safety Notices" available from InfoCenter:

<http://publib.boulder.ibm.com/infocenter/powersys/v3r1m5/topic/p7hdx/G229-9054.pdf>

The following cautions apply to all Power775 service procedures:

**CAUTION:**

Energy hazard present and 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.

**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:** This unit must not be left running unattended, service personnel should always be overseeing the process. (C038)



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



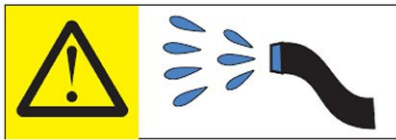
**CAUTION:** Protective eyewear is needed for the procedure. (L011)



**DANGER:** Heavy equipment—personal injury or equipment damage might result if mishandled. (L013)



**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)

## 11.2 Background:

This document contains the procedure for performing an **IBM Power 775** Fill and Drain Tool (FDT) pressure test calibration procedure for an **IBM Power 775** system.

To ensure that all water cooled components in the **IBM Power 775** system are leak-free, the **IBM Power 775** Fill and Drain Tool (FDT) is equipped with air pressure testing capability. The FDT Pressure Test Calibration routine is designed as a diagnostic test to verify the integrity of the FDT air pump, associated plumbing, and hose assemblies. This procedure tests for leaks within the FDT and FDT hose assemblies, and *must* be completed before a component (FRU) pressure test or fill is executed. The results of the calibration routine are recorded within the FDT.

**If the calibration passes**, system and component pressure tests can be completed.

**If the calibration fails**, there is a functional defect in the FDT or hose assemblies. System or component pressure tests cannot be completed. System or component fills must not be completed unless pressure tests are done first to ensure there are no leaks. Upon a calibration failure, the next level of support must be contacted for FDT debug and repair.

Once the FDT has been activated, a system or component fill procedure cannot be executed unless both the Pressure Test Calibration and Component Pressure Test have passed. The water pump within the FDT will otherwise be disabled until these conditions are met.

To properly complete a pressure test, the FDT hose assemblies must be purged of water. No specific hose drain procedure is required; the Pressure Test Calibration routine will drain all required hose assemblies if they have been left full of water.

### **Reference Information:**

<b>IBM Power 775</b> FDT P/N:	<b>45D6928</b>
Hose assemblies/adapters required:	<b>HA1</b> (45D8561)
	<b>HA2</b> (45D8562)
	<b>A3</b> (45D8567)

Total Pressure Test Calibration runtime: 1 min (air pump on 30 s)

**NOTE:** *Some steps in this procedure may be redundant due to other service operations being completed prior to this procedure. If a step has already been completed, verify that the step has been completed properly and proceed to the next step.*

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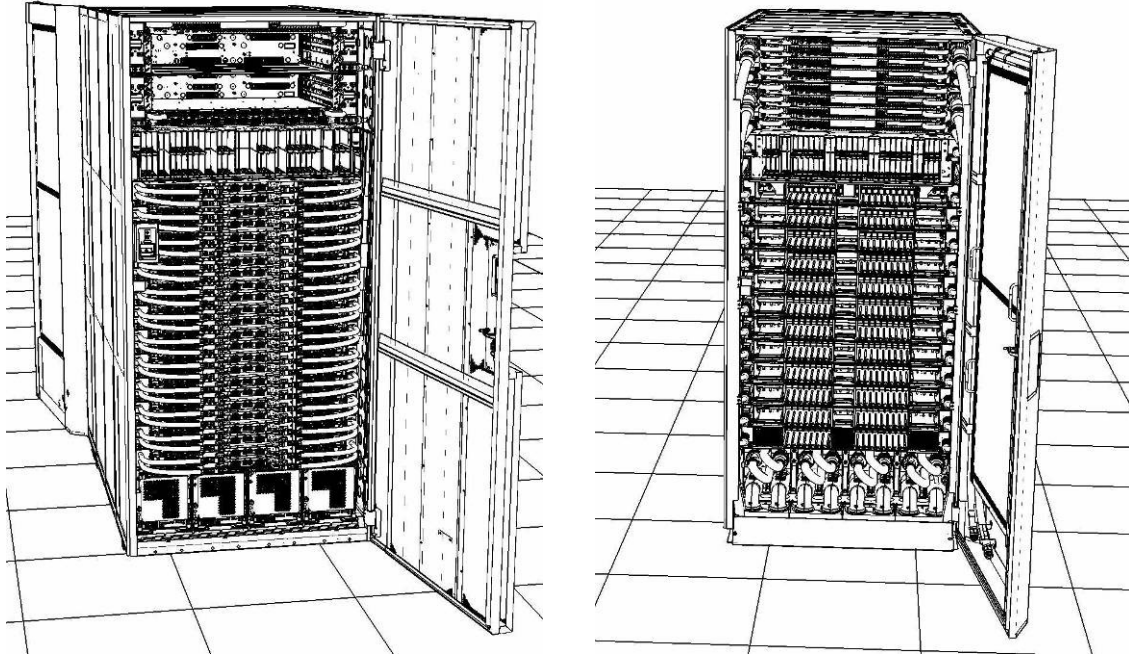
## 11.3 Procedure:

**NOTE:** If you already have the FDT powered on, proceed to **Step 14**. Otherwise, start procedure at **Step 1**.

1. Identify the **Power 775** frame that requires service.

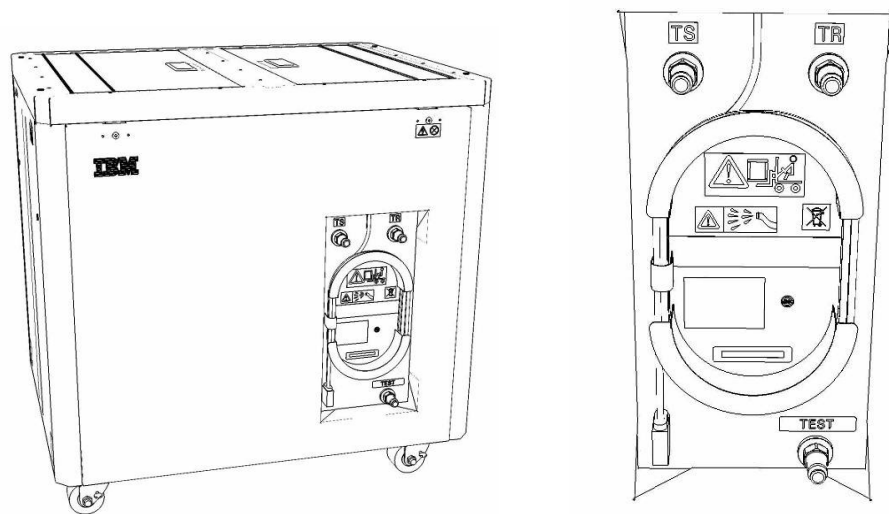
Verify that the system UEPO is set to **ON**, and the managing consoles (HMC and XCat) are powered on and communicating with the frame.

2. Open front and rear doors of the **Power 775** frame that requires service.



3. Bring the FDT to the front side of the **Power 775** frame that requires service.
4. Locate the panel of the FDT that contains the Universal Power and Information Cable (UPIC), as well as the **TS**, **TR**, and **TEST** water connections.

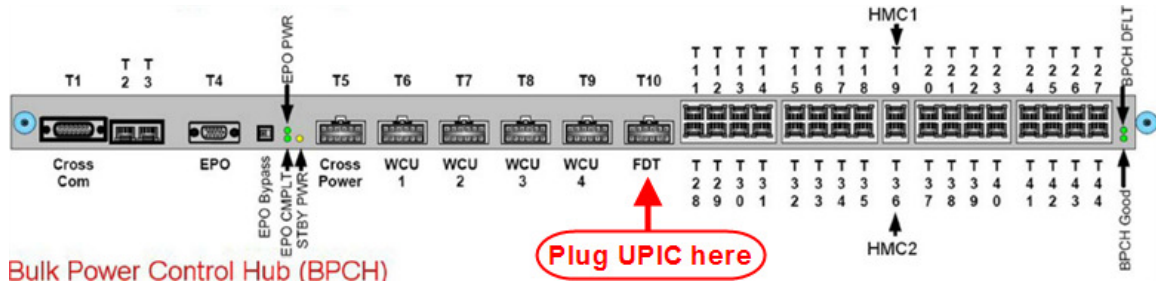
This side of the tool should be facing the front of the frame.



5. Unwrap the FDT UPIC cable from the storage loop on the FDT.

6. Select BPC port for FDT

- If the lower BPA is not targeted for service, and is functional:  
 Plug the FDT UPIC cable into **port T10 of the lower BPC.**
- If the lower BPA is targeted for service, or is not functional:  
 Plug the FDT UPIC cable into **port T10 of the upper BPC.**



7. Login to the HMC with the User ID `hscroot`.

Use the HMC that is connected to the BPA where the FDT is plugged.

8. From the HMC left Navigation menu, expand **Systems Management** then select **Frames**.

Verify frame serial number for the frame to be serviced.

9. In the **Frames** view on the HMC, place a checkmark in the **Select** column for the frame to be serviced.

10. Verify that the frame **Status** is **Rack Standby/Rack Standby** or **Standby/Standby**.

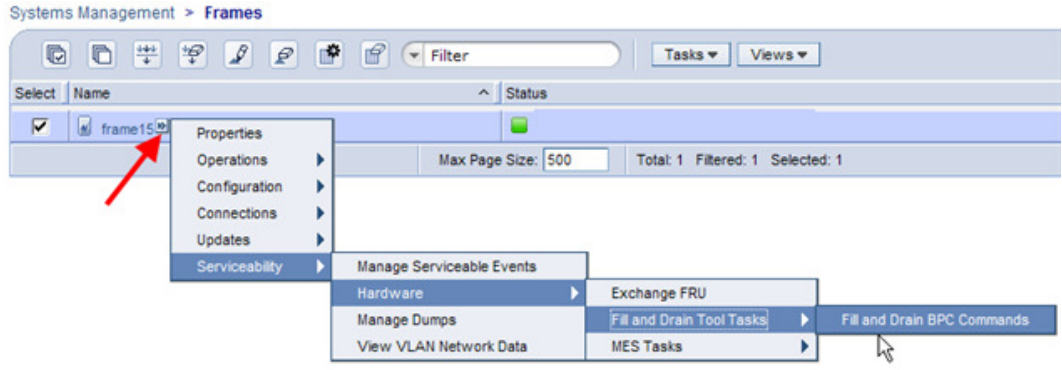
- If frame **Status** reads **Rack Standby/Rack Standby** or **Standby/Standby** – OK.

Continue to next step.

- If frame **Status** does not read **Rack Standby/Rack Standby** or **Standby/Standby** – action required. Contact next level of support.

11. From the **Task** menu on the HMC, *select* **Serviceability** > **Hardware** > **Fill and Drain Tool Tasks** > **Fill and Drain Command Interface**

Power775 Disk Enclosure Chassis Service Procedure  
 ---- Appendix G: FDT Pressure Test Calibration Procedure ----



**Fill and Drain Tool Command Interface** will display. See below for a sample image of the interface (FDT deactivated).

### Fill and Drain Tool (FDT) Command Interface - Server-78AC-100BC50029

The table below shows the FDT Port locations that can communicate with the Fill and Drain Tool. Select the port to which the Fill and Drain Tool is connected. Use the buttons to drive commands to the Fill and Drain Tool connected to a port.

FDT Port Locations:

Select	Location Code	Description
<input type="radio"/>	78AC-100*BC50029-P7-C1	Lower BPC Port T10
<input type="radio"/>	78AC-100*BC50029-P8-C1	Upper BPC Port T10

Activate FDT Deactivate FDT  
Get FDT Status Decode Error Status  
Fill FDT Drain FDT  
Start Water Pump Reset FDT Start Air Pump  
Pressure Test Calibration Component Pressure Test

Launch WCU Commands
WCU Tank Air Purge

Exit Help



12. Select the BPC port that the FDT was plugged into in **Step 6** from the **FDT Port Locations:** list.

13. *Click* the **Activate FDT** button.

- If the Activate FDT command is successful – OK. **Wait 30 seconds and continue to next step.**
- If the **Activate FDT** command fails – action required.

*Click* the **Deactivate FDT** button.

Wait 2 minutes and repeat **Step 13**. If the **Activate** command fails again, contact next level of support.

14. *Click* the **Get FDT Status** button.

- If the **Get FDT Status** command is successful – OK.

See below for a sample status (does not reflect expected state)

- If the **Get FDT Status** command fails – action required.

Repeat **Step 14**. If the **Get FDT Status** command fails again, contact next level of support.

**Fill and Drain Tool (FDT) Command Interface - Server-78AC-100BC50029**

The table below shows the FDT Port locations that can communicate with the Fill and Drain Tool. Select the port to which the Fill and Drain Tool is connected. Use the buttons to drive commands to the Fill and Drain Tool connected to a port.

FDT Port Locations:

Select	Location Code	Description
<input checked="" type="radio"/>	78AC-100*BC50029-P7-C1	Lower BPC Port T10
<input type="radio"/>	78AC-100*BC50029-P8-C1	Upper BPC Port T10

FDT Power/Comm: GOOD  
 Frame Attached: IBM Power7 775  
 MDA-FD RL: 45D  
 Error Status: WARNING  
 Tank Level: Full  
 Air Pump: Off  
 Water Pump: DISABLED  
 Tool Mode: Ready  
 Pressure Test Calibration: Incomplete  
 Component Pressure Test: Incomplete

Sample FDT Status

15. Click the **Get FDT Status** button and ensure the following status items are OK:

Status Item	State	Action
-------------	-------	--------

- **Tool Mode:** **Ready** – OK. Check next Status item.
- **Error Status:** **NONE** – OK. Check next Status item.

**WARNING** – *click* the **Decode Error Status** button, record the information returned and check Tank Level.

**CRITICAL** – *click* the **Decode Error Status** button, record the information returned and contact next level of support.

- **Tank Level:** **Upper Half, Lower Half** or **Empty** – OK. Check next Status item.  
**Full** – action required.  
Exit this procedure and perform the **Power 775 Fill and Drain Tool (FDT) Tank Drain Procedure**.  
Once FDT tank level is **Upper Half, Lower Half** or **Empty**, return to this step and continue with procedure.
- **Pressure Test Calibration:** **Incomplete** - OK. Proceed to next step.  
**Pass** or **Fail** – action required.  
*Click* the **Deactivate FDT** button.  
Repeat **Step 13** and continue with procedure.

16. Before proceeding, read required safety information:

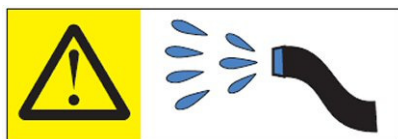
**CAUTION:** The water-based coolant solution may contain an additive intended to inhibit corrosion (or provide other functions). The solution may cause irritation to the skin or eyes. Avoid direct contact with the solution. Employ appropriate Personal Protective Equipment when performing operations 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)



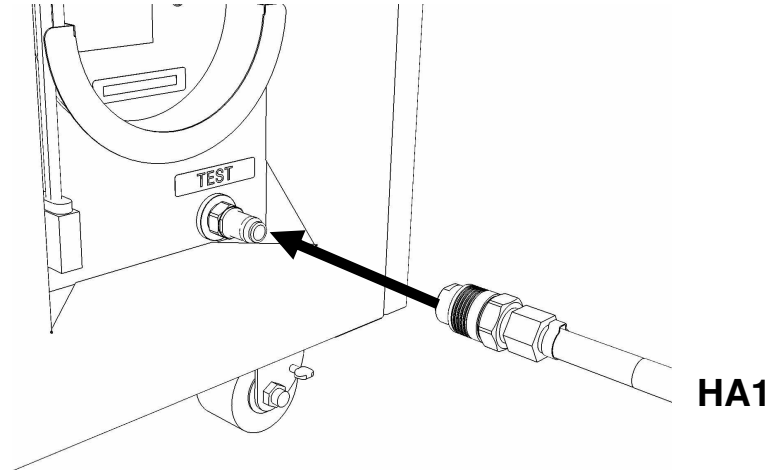
**CAUTION:** Chemical resistant gloves are needed for this procedure. (L014)



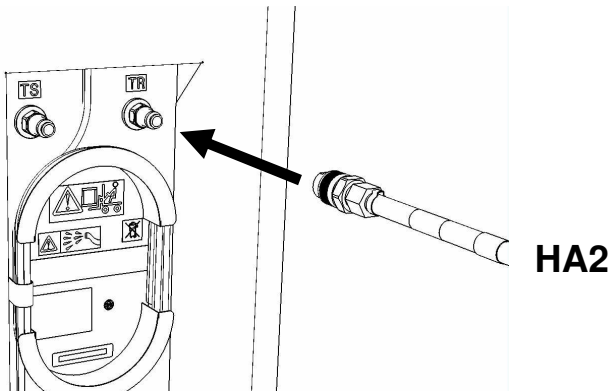
**DANGER:** Risk of electric shock due to water or a water solution which is present in this product. Avoid working on or near energized equipment with wet hands or when spilled water is present. (L016)

17. Remove hose assembly **HA1** from the upper tool storage compartment.

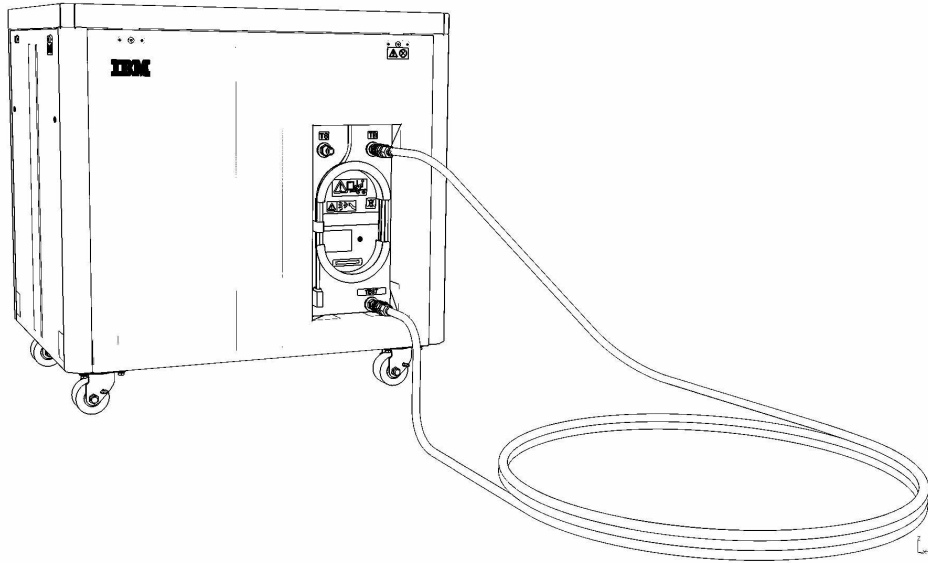
Connect either end of hose assembly **HA1** to the **TEST** connection on the front panel of the FDT.



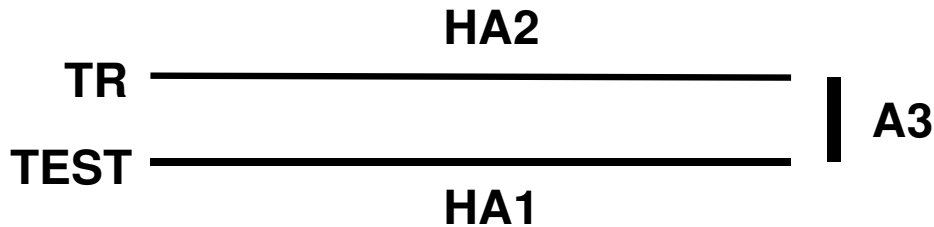
18. Remove hose assembly **HA2** from the upper tool storage compartment. Connect the end *without sight glass* to the TR connection on the FDT.



19. Remove adapter **A3** from the FDT.  
Connect the free ends of **HA1** and **HA2** together via adapter **A3**.  
Place excess hose on floor in front of FDT.



20. Ensure all water connections are made properly and securely.



21. On the FDT panel, *click* the **Pressure Test Calibration** button.

The **Get FDT Status** button may be *clicked* to examine FDT status.

**NOTE:** *The pressure testing will last for 1 minute (30 seconds with air pump on)*

**CAUTION:** **This unit must not be left running unattended, service personnel should always be overseeing the process. (C038)**

22. *Click* the **Get FDT Status** button and review the following:

- **Tool mode:**     **Ready – OK.** Check Error Status.  
                          **Pressure Test Calibration Mode** – pressure test still running.

Wait 30 seconds and repeat **Step 22**.

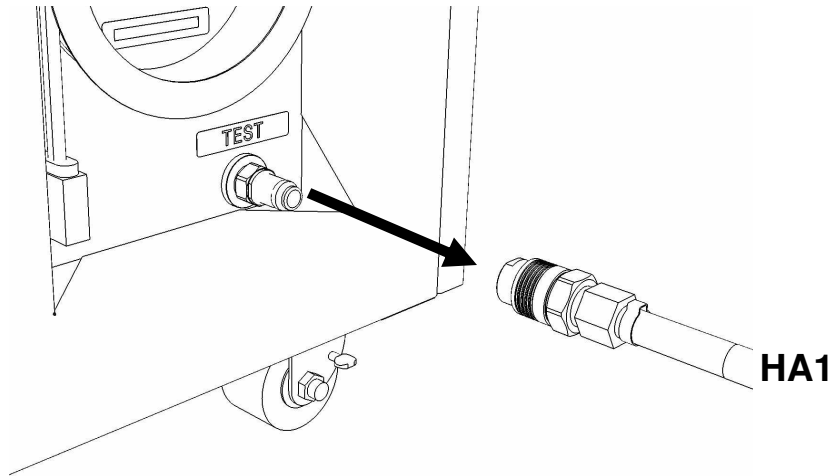
- **Error Status:** **NONE** – OK. Check Pressure Test Calibration.  
**WARNING** – *click* the **Decode Error Status** button, record information returned and proceed to next step.  
**CRITICAL** – *click* the **Decode Error Status** button, record information returned and contact next level of support.
- **Pressure Test Calibration:** **Pass** – OK. Proceed to next step.  
**Fail or Incomplete** – action required.  
*Click* the **Reset FDT** button.  
Repeat **Step 17** and continue with procedure.  
If the test read **Fail** twice, hardware is defective. Contact next level of support.

23. The FDT Pressure Test Calibration has passed successfully.

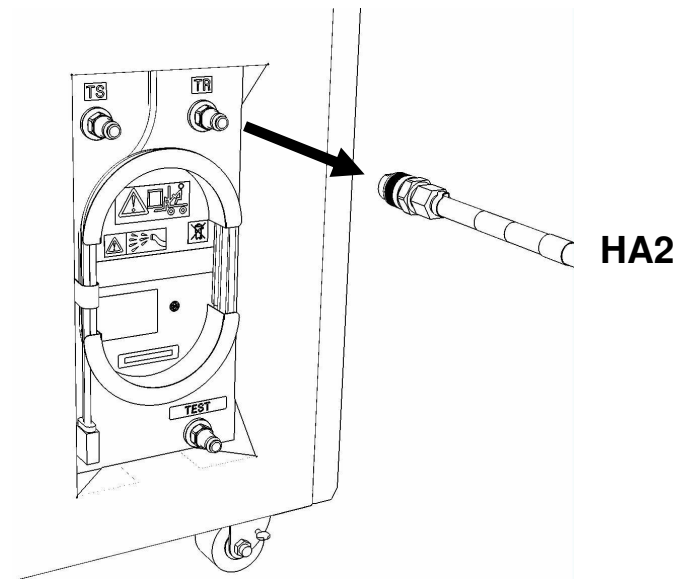
**NOTE:** *If a Component Pressure Test procedure will be completed following this test, disregard Step 25 – 26. These hose connections will be the same in the component pressure test procedure.*

24. Disconnect hose assemblies **HA1** and **HA2** from adapter **A3**.

25. Disconnect the FDT end of **HA1** from **TS** on the FDT.



26. Disconnect the FDT end of **HA2** from **TR** on the FDT.



27. Place all hose assemblies and adapters in their appropriate locations within the FDT storage enclosure.

28. Determine whether the FDT will be used for another procedure:

- If the FDT will be used for another procedure, leave tool activated and go to that procedure now; skip the remaining steps of this procedure.
- If the FDT requires no further use - proceed to the next step.

29. *Click* the **Deactivate FDT** button.

- If the **Deactivate FDT** command is successful – OK. Proceed to next step.
- If the **Deactivate FDT** command fails– action required.

Repeat **Deactivate FDT**. If the **Deactivate FDT** command fails again, contact next level of support.

30. Disconnect FDT UPIC power cable from port T10 of BPC used.

Wrap the UPIC cable in appropriate cable storage location on FDT.

31. If this procedure was referenced from another procedure, return to parent procedure.

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## 11.4 End of Appendix G: Power775 FDT Pressure Test Calibration Procedure

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# 12 APPENDIX H: IBM POWER775 FDT VOLUME TABLES

## 12.1 IBM Power 775 Component Water Volumes

	Liters	Gallons
WCU	10.75	2.84
Supply Manifold	5.64	1.49
Return Manifold	5.64	1.49
CEC	1.74	0.46
CEC DCCA	0.07	0.02
CEC + 2 DCCAs	1.87	0.49
BPE	0.97	0.26
BPR	0.12	0.03
BPD	0.18	0.05
Disk Enclosure	0.90	0.24
RDHX	7.50	1.98
System Water Container	15.00	3.96
FDT Tank (Internal Reservoir)	32.00	8.45

Table 4 IBM Power 775 Component Water Volumes

## 12.2 IBM Power 775 System Water Volumes

		Number of CEC Drawers										
		2	3	4	5	6	7	8	9	10	11	12
Number of Disk Enclosures	0	46.8	48.6	50.5	63.6	65.4	67.3	69.2	82.3	84.1	86.0	87.9
	1	47.7	49.5	51.4	64.5	66.3	68.2	70.1	83.2	85.0	86.9	88.8
	2	48.6	50.4	52.3	65.4	67.2	69.1	71.0	84.1	85.9		
	3	49.5	51.3	53.2	66.3	68.1	70.0	71.9				
	4	50.4	52.2	54.1	67.2	69.0						
	5	51.3	53.1	55.0								
	6	52.2										

(Volumes in Liters)

Table 5 IBM Power 775 System Water Volume (Liters)

		Number of CEC Drawers										
		2	3	4	5	6	7	8	9	10	11	12
Number of Disk Enclosures	0	12.4	12.8	13.3	16.8	17.3	17.8	18.3	21.7	22.2	22.7	23.2
	1	12.6	13.1	13.6	17.0	17.5	18.0	18.5	22.0	22.5	23.0	23.5
	2	12.8	13.3	13.8	17.3	17.8	18.3	18.8	22.2	22.7		
	3	13.1	13.6	14.1	17.5	18.0	18.5	19.0				
	4	13.3	13.8	14.3	17.7	18.2						
	5	13.5	14.0	14.5								
	6	13.8										

(Volumes in Gallons)

Table 6 IBM Power 775 System Water Volume (Gallons)

### 12.3 IBM Power 775 System Water Containers per Frame

		Number of CEC Drawers										
		2	3	4	5	6	7	8	9	10	11	12
Number of Disk Enclosures	0	4	4	4	5	5	5	5	6	6	6	6
	1	4	4	4	5	5	5	5	6	6	6	6
	2	4	4	4	5	5	5	5	6	6		
	3	4	4	4	5	5	5	5				
	4	4	4	4	5	5						
	5	4	4	4								
	6	4										

Table 7 IBM Power 775 Required Number of System Water Containers per Frame

### 12.4 End of Appendix H: Power775 FDT Volume Tables