# Power775 System Drain Procedure Last Modified 3/6/2012 2:05 PM



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## **1 GENERAL**

## 1.1 Release / Revision History

Document Name	Date	PDF name	Description
Power775 System Drain	3/6/2012	"p775 sys drain.pdf"	Initial Release
Procedure	5/0/2012	prro_sys_aram.par	initial release

 Table 1 Release / Revision History

## 1.2 Where to find this document, and contents of the parent PDF

The current "Power775 System Drain Procedure" document is "p775\_sys\_Drain.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 "Fill and Drain Tool (EDT) procedures to support P&V EPUs", click "System" to download PDI

Under "Fill and Drain Tool (FDT) procedures to support R&V FRUs", click "System" to download PDF "p775\_sys\_drain.pdf"

This is the only valid source for the latest "Power775 System Drain Procedure" document.

### **1.3 Required Documents**

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

**Table 2 Required Documents** 

Abbreviation	Definition	Details
BPA	Bulk Power Assembly	
BPD	Bulk Power Distributor	
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	
FRU	Field Replaceable Unit	
HPIC	High Power Interface Cable	DCCA power cable
LED	Light Emitting Diode	
LIC	Licensed Internal Code	
SAS	Serial Attached SCSI	Protocol used for direct attached storage
SSR	Systems Services Representative	IBM Service personnel
UEPO	Unit Emergency Power Off	
UPIC	Universal Power Interface Cable	Cable used for power and communication to the Power 775 Fill and Drain Tool (FDT).
RDHX	Rear Door Heat Exchanger	This is the Rear Door Heat Exchanger.
WCU	Water Conditioning Unit	Up to 4 of these are located in the bottom of the system frame.

## 1.4 Abbreviations

Table 3 Abbreviations

Power775 System Drain Procedure ---- System Fill Procedure ----

## **2 POWER775 SYSTEM DRAIN PROCEDURE**

### 2.1 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)

Power775 System Drain Procedure ----- System Pressure Test Procedure -----



**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 Background:

This document contains the procedure for draining a **IBM Power 775** system with conditioned water using an **IBM Power 775** Fill and Drain Tool (FDT).

Due to high packaging density and heat load, many components within the **Power 775** system are water cooled. The system and water cooled sub-components contain internal plumbing to route cooling water towards and carry heat away from these critical power components. In the event that a **Power 775** system is to moved or shipped the system must be drained prior to being moved.

The **IBM Power 775** system needs to be drained and void of system water prior to shipping as the water could freeze and cause plumbing damage along with damage due to shock and vibration. The system Drain procedure should be used to completely drain the system and have it ready for shipping

Due to the large system volume on a fully configured **Power 775** system, up to six (6) empty system water containers may be needed for draining the FDT as the system drain procedure is performed. The FDT internal volume is approximately 9 gallons; when water is being transferred from the system into the FDT during a system drain procedure, the FDT may be emptied up to three (3) times. This will require up to three (3) **IBM Power 775 Fill and Drain Tool (FDT) Tank Drain Procedures**, depending on system configuration, at some point in the system drain procedure. While the FDT is draining water from the system, status will indicate the water level state within the FDT, and this procedure will identify when the FDT requires draining based on that status.

### Reference Information:

 I BM Power 775 FDT P/N:
 45D6928

 Hose assemblies/adapters required:
 HA1 (45D8561)

 HA2 (45D8562)
 HA2 (45D8562)

Approximate system water volume (minimum configuration): 46.8 L (12.4 U.S. gal) Approximate system water volume (maximum configuration): 88.8 L (23.5 U.S. gal)

Estimated time to fully fill **IBM Power 775** system with FDT: 1 to 2 hours

**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.

### 2.3 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 draining.

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. Un-wrap 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.
  - If frame Status reads Rack Standby/Rack Standby OK. Continue to next step.
  - If frame Status does not read Rack Standby/Rack Standby action required.
    - 1) Save all data and close applications running on all partitions.
    - 2) Turn off CEC logic power on all drawers in the system.
    - 3) Put the system in Rack Standby with the command

bpccmd --c 425F0000

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).

#### Power775 System Drain Procedure ---- System Pressure Test Procedure ----

Fill ar 78AC	Fill and Drain Tool (FDT) Command Interface - Server- 78AC-100BC50029				
The tab	The table below shows the FDT Port locations that can communicate				
Tool is a	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 To	Drain Tool connected to a port.				
FDT P	ort Locations:				
Select	Location Code	Description			
0	78AC-100*BC50029-P7-C1	Lower BPC Port T10			
0	78AC-100*BC50029-P8-C1	Upper BPC Port T10			
Activa	te FDT Deactivate FDT				
Get FD	T Status Decode Error State	us			
Fill FD	T Drain FDT				
Start \	Water Pump Reset FDT S	tart Air Pump			
Pressu	re Test Calibration Compon	ent Pressure Test			
_		1 11 -			
Launc	h WCU Commands WCU Tar	nk 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 your 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 your next level of support.

Fill and Drain Tool (FDT) Com 78AC-100BC50029 The table below shows the FDT Po with the Fill and Drain Tool. Select t Tool is connected. Use the buttons Drain Tool connected to a port.	mand Interface - Se rt locations that can co the port to which the Fi to drive commands to	rver- mmunicate II and Drain the Fill and	
Select Location Code	Description		
<ul> <li>78AC-100*BC50029-P7-C1</li> </ul>	Lower BPC Port T10		
O 78AC-100*BC50029-P8-C1	Upper BPC Port T10		
Activate FDT Deactivate FDT			
Get FDT Status Decode Error Sta	tus		
Fill FDT Drain FDT			
Start Water Pump Reset FDT	Start Air Pump		
Pressure Test Calibration Compo	nent Pressure Test		
EDT Rower/Comm: GOOD			
Frame Attached: IBM Power7 775			
MDA-FD RL: 45D			
Error Status: WARNING			
Tank Level: Full			
Air Pump: Off	C K		
water Pump: DISABLED			
Tool Mode: Ready			
Pressure Test Calibration: Incompl	ete		
Component Pressure Test: Incomp	lete		
Launch WCU Commands WCU Ta	ink Air Purge		
Exit Help			
		Sample FDT	Stati

Power775 System Drain Procedure ---- System Pressure Test Procedure ----

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

Status Item	State	Action
• Tool Mode:	Ready – OK.	Check next Status item.
• Error Status:	NONE – OK C	Check next Status item.
	WARNING – information re	<i>click</i> the <b>Decode Error Status</b> button, record the turned and check Tank Level.
	<b>CRITICAL</b> – of information re	click the <b>Decode Error Status</b> button, record the sturned and contact your next level of support.
• Tank Level:	Empty – OK.	Check next Status item.
	Lower, Uppe	<b>r Full</b> – action required.
	Exit this proce <b>Tool (FDT) T</b> a document)	edure and perform the <b>Power 775 Fill and Drain</b> ank Drain Procedure. (in Section 3 of this
	Once FDT tar with procedur	nk level is <b>Empty</b> , return to this step and continue e.

- 16. Verify that all CEC drawer water connections are **NOT** connected.
- 17. Verify that all DE water connections are NOT connected
- 18. Verify that the BPAs water connections from the rack manifolds are NOT connected.
- 19. Disconnect the System Water connections (upper) on all WCUs in the frame.
- 20. Disconnect the Customer Water connections (Lower) on all WCUs in the frame.
- 21. Disconnect the Rear Door Heat Exchanger hoses at the manifolds.
- 22. The following steps 23 33 will get all the WCUs in the system setup for a drain.

23. Click the Launch WCU Commands button:



24. In the WCU Command Interface window, select WCU-1, from the WCU locations:

VCU Command Interface Server-78AC-1008PC0227     VCU Command Interface Server-78AC-1008PC0227     The table below shows the available WCU (Water Conditioning Units) locations.     Select the correct WCU location. Use the buttons to drive commands to the selected WCU.     WCU Locations:     Select Location Code Description FDT Location     78AC-100*BPC0227-P3-C1 MDA-WCU for WCU-1 Lower BPC Port T10     Activate WCU Deactivate WCU     Get WCU Status Decode Error Status     Service Mode Off     Pump 000 RPM Pump 2000 RPM Pump 3000 RPM     Open Central Valve     WCU Top-off Enable Exit WCU Top-Off Enable     Venfy Rump Speeds Exit Venfy Rump Speeds	https://hmci17.austin.ibm.com/hmc/wcl/T16fd#tableTo	
WCU Command Interface - Server-7/8AC-1008PC0227         The table below shows the available WCU (Water Conditioning Units) locations.         Select the correct WCU location. Use the buttons to drive commands to the selected WCU.         WCU Locations:         Select Location Code       Description         FDT Location         * 78AC-100*BPC0227-P3-C1 MDA-WCU for WCU-1 Lower BPC Port T10         C 78AC-100*BPC0227-P3-C1 MDA-WCU for WCU-4 Lower BPC Port T10         Activate WCU         Get WCU Status       Descede Error Status         Gerwice Mode Off       Pump 000 RPM         Pump 001       Fump 1000 RPM         Open Central Valve       Close Control Valve         WCU Tog-Off Enable       Eait WCU Tog-Off Enable         Venfly Pump Speeds       Eait Venfly Pump Speeds		op_2acc2acc
The table below shows the available WCU (Water Conditioning Units) locations. Select the correct WCU location. Use the buttons to drive commands to the selected WCU. WCU Locations: Select Location Code Description FDT Location • 78AC-100*BPC0227-P3-C1 MDA-WCU for WCU-1 Lower BPC Port T10 • 78AC-100*BPC0227-P3-C1 MDA-WCU for WCU-1 Lower BPC Port T10 Activate WCU Deactivate WCU Get WCU Status Decode Error Status Service Mode Ont Service Mode Off Pump Off Pump 1000 RPM Pump 2000 RPM Open Control Valve Close Control Valve WCU Top-Off Enable East WCU Top-Off Enable Verify Pump Speeds Exit Verify Pump Speeds	VCU Command Interface - Server-78AC-100BPC0227	
Description     FDT Location       Select Location Code     Description       FDT Location     FDT Location       Select Location Code     Description       FDT Location     FDT Location       Select Location Code     PBC0227-P3-C1       MDA-WCU for WCU-1     Lower BPC Port T10       Activate WCU     Description       Service Mode Off     Pump 300 RPM       Pump 000     Pump 1000 RPM       Open Control Valve     Close Control Valve       WCU Top-off Enable     Exit WCU Top-Off Enable       Verify Pump Speeds     Exit Verify Pump Speeds	he table below shows the available WCU (Water Conditionin elect the correct WCU location. Use the buttons to drive con lected WCU.	ng Units) locations. ommands to the
	elect Location Code Description	EDT Location
C     78AC-100*BPC0227-P6-C1 MDA-WCU For WCU-4 Lower BPC Port 110       Activate WCU     Deactivate WCU       Get WCU Status     Decode Error Status       Service Mode On:     service Mode On:       Pump Off     Pump 1000 RPM       Pump Off     Pump 1000 RPM       Pump 2000 RPM     Pump 3000 RPM       Open Control Valva     Close Control Valva       WCU Top-Off Enable     Exit WCU Top-Off Enable       Verify Pump Speeds     Exit Verify Pump Speeds	A 78AC 100*BDC0227 D3 C1 MDA WCU for WCU 1	Lower BDC Port T10
Activate WCU     Deactivate WCU       Get WCU     Secucide Error Status       Service Mode     Off       Pump Off     Pump 1000 RPM       Pump Off     Pump 1000 RPM       Open Control Valve     Close Control Valve       WCU Top-Off Enable     Exit Venfy Pump Speeds       Venfy Pump Speeds     Exit Venfy Pump Speeds	78AC-100*BPC0227-P5-C1 MDA-WC010FWC0-1 78AC-100*BPC0227-P6-C1 MDA-WCU1for WCU-4	Lower BPC Port T10
Durative WCD         Desclavate WCD           Get WCD Status         Decode Error Status           Service Mede On         Service Mede Off           Pump Off         Pump 1000 RPM           Pump Off         Pump 1000 RPM           Pump Off         Pump 1000 RPM           Pump Off         Exist WCU Top-Off Enable           Verify Pump Speeds         Exit Verify Pump Speeds		Lower bie for fit
Unit         Decode         End of status           Service         Mode         Mode         Off           Pump         Off         Pump         1000         RPM         Pump         2000         RPM           Open         Control         Valva         Close         Control         Valva         WCU         Top-Off         Exit         WCU         Top-Off         Exit         Verify         Pump         Speeds         Exit         Verify         Pump         Speeds         Exit         Verify         Pump         Speeds         Speeds	Activate web Deactivate web	
Service Mode Un Service Mode UT Pump 2000 RPM Pump 2000 RPM Pump 2000 RPM Off Pump 2000 RPM Close Control Valve Close Control Valve WCU Top-Off Enable Exit WCU Top-Off Enable Verify Pump Speeds Exit Verify Pump Speeds	set wcu Status Decode error Status	
Pump Off         Pump 2000 RPM         Pump 2000 RPM         Pump 3000 RPM           Open Control Valve         Close Control Valve         WCU Top-Off Enable         Exit WCU Top-Off Enable           Verify Pump Speeds         Exit Wclf Ypump Speeds         Exit Verify Pump Speeds         Exit Verify Pump Speeds	service Mode On Service Mode Off	-
Open Control Valve         Close Control Valve           WCU Top-Off Enable         Exit WCU Top-Off Enable           Verify Pump Speeds         Exit Verify Pump Speeds	Pump Off Pump 1000 RPM Pump 2000 RPM Pump 3000 RPM	M
WCU Top-Off Enable         Exit WCU Top-Off Enable           Verify Pump Speeds         Exit Verify Pump Speeds	Open Control Valve Close Control Valve	
Verify Pump Speeds Exit Verify Pump Speeds	WCU Top-Off Enable Exit WCU Top-Off Enable	
	/enify Pump Speeds Exit Verify Pump Speeds	
	zerny zunip speeus Exic verny zunip speeus	
Exit / Return to Fill and Drain Command Interface Help	Exit / Return to Fill and Drain Command Interface Help	

25. *Click* the **Activate** button, and wait 30 seconds before proceeding to **Step** Error! Reference source not found.**4**.

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Tibm.com https://hmci17.austin.ibm.com/hmc/wcl/T16fd#tableTc	p_2acc2acc 🏠
WCU Command Interface - Server 78AC-1008PC0227 The table below shows the available WCU (Water Conditioni Select the correct WCU location. Use the buttons to drive co selected WCU.	ng Units) locations. mmands to the
WCU Locations: Select Location Code Description	EDT Location
<ul> <li>78AC-100*BPC0227-P3-C1 MDA-WCU for WCU-1</li> </ul>	Lower BPC Port T10
<ul> <li>78AC-100*BPC0227-P6-C1 MDA-WCU for WCU-4</li> </ul>	Lower BPC Port T10
Activate WCU Deactivate WCU	
Service Mode On Service Mode Off	
Pump Off Pump 1000 RPM Pump 2000 RPM Pump 3000 RPM	4
Open Control Valve Close Control Valve	
WCU Top-Off Enable Exit WCU Top-Off Enable	
Verify Pump Speeds Exit Verify Pump Speeds	
Exit / Return to Fill and Drain Command Interface Help	
 Done	â 💀

26. *Click* the **Service Mode On** button.

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ttps://hmci17.austin.ibm.com/hmc/wcl/T16fd#tableTop_2acc2acc	슈
WCU Command Interface - Server-78AC-100BPC0227 The table below shows the available WCU (Water Conditioning Units) loc Select the correct WCU location. Use the buttons to drive commands to selected WCU.	ations. the
WCU Locations:	
Select Location Code Description FDT Locati 78Ac-100*BPC0227-P3-C1 MDA-WCU for WCU-1 Lower BPC 78Ac-100*BPC0227-P5-C1 MDA-WCU for WCU-4 Lower BPC Actuate WCU GesetUvate WCU Get WCU Status Decode Error Status	on Port T10 Port T10
Service Mode On Service Mode Off Pump Off Pump 1000 RPM Pump 2000 RPM Pump 3000 RPM Open Control Valve Close Control Valve WCU Top-Off Enable Exit: WCU Top-Off Enable Verify Pump Speeds Exit: Verify Pump Speeds	
N	
Exit / Return to Fill and Drain Command Interface Help	
Done	â 🔂

27. *Click* the **Open Control Valve** button, and wait 30 seconds before proceeding to **Step** Error! Reference source not found.**5**.

# Power775 System Drain Procedure ---- System Pressure Test Procedure ----

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	WCU Command Interface - Server-78AC-100BPC0227	
	The table below shows the available WCU (Water Conditioning Units) locations. Select the correct WCU location. Use the buttons to drive commands to the selected WCU. WCU Locations:	
	Select Location Code Description FDT Location	
	<ul> <li>78AC-100*BPC0227-P3-C1 MDA-WCU for WCU-1 Lower BPC Port T10</li> <li>78AC-100*BPC0227-P6-C1 MDA-WCU for WCU-4 Lower BPC Port T10</li> </ul>	
	Activate WCU Deactivate WCU	
	Service Mode On Service Mode Off	
	Pump Off Pump 1000 RPM Pump 2000 RPM Pump 3000 RPM	
	Open Control Valve Close Control Valve	
1	WCU Top-Off Enable Exit WCU Top-Off Enable Verify Pump Speeds Exit Verify Pump Speeds	
	Exit / Return to Fill and Drain Command Interface Help	
	Done	

28. Click the **Get WCU Status** button and ensure the control valve position is greater than 200. If the position is less than 50% repeat steps 24 – 25 as the valve may be opening and the value increasing.

hmci17: Fill and Drain Tool Comma	nd Interface - Mozilla Firefox: I	BM Edi 😑 💷 🗙
🖶 ibm.com https://hmci17.austin.ibi	n.com/hmc/wcl/T16fd#tableT	op_2acc2acc 🗘
WCU Command Interface - Serve The table below shows the availa Select the correct WCU location. selected WCU. WCU Locations:	r-78AC-100BPC0227 ble WCU (Water Condition Use the buttons to drive c	ing Units) locations. ommands to the
Select Location Code	Description	FDT Location
• 78AC-100*BPC0227-P3	-C1 MDA-WCU for WCU-1	Lower BPC Port T10
O 78AC-100*BPC0227-P6	-C1 MDA-WCU for WCU-4	Lower BPC Port T10
 Activate WCU Deactivate WCU	and the second se	
Get WCU Status Decode Error Si	atus	
Pump Off Pump 1000 RPM Pum	np 2000 RPM Pump 3000 RP	PM
Open Control Valve Close Contro	I Valve	
WCU Top-Off Enable Exit WCU T	op-Off Enable	
Verify Pump Speeds Exit Verify P	ump Speeds	
Exit / Return to Fill and Drain Comm	and Interface Help	
Done		ê E

- 29. Review the WCU status screen and ensure the following status items are correct:
  - 1) Pump Speed is zero.
  - 2) Control Valve Position is greater than 50%.
  - 3) Control Valve Calibration is OFF.
  - 4) WCU Service Mode is OFF.
  - 5) Error Status is NONE.
  - 6) Customer Water Flow is 0 or a negative number.

WCU Command Interface - S The table below shows the availa Select the correct WCU location. U selected WCU.	erver-78AC-100BPC ble WCU (Water Condit se the buttons to drive	0227 ioning Units) locations. commands to the
WCU Locations:	Description	FDT I a setting
Select Location Code	Description	FDT Location
O 78AC-100 BPC0227-P3-C	1 MDA-WCU for WCU-4	Lower BPC Port T10
Activate WCU Deactivate WCU		
Get WCU Status Decode Error S	tatus	
Service Mode On Service Mode (	Off	
Pump Off Pump 1000 RPM Pu	mp 2000 RPM Pump 3	000 RPM
Open Control Valve Close Contro	ol Valve	
WCU Top-Off Enable Exit WCU T	op-Off Enable	
Verify Pump Speeds Exit Verify I	Pump Speeds	
Pump Speed (RPM): 2067		
Control Valve Position (percent op	en): 32	
Control Valve Calibration: Off		
WCU Tank Level: Full		
WCU Service Mode: Off		
Error Status: NONE		
System Supply Temperature (C): 1	16.55	
System Return Temperature (C): 2	20.13	
Customer Supply Temperature (C)	: 7.15	
Customer Return Temperature (C)	: 19.39	
Customer Water Flow (GPM): 2.83		
Exit / Return to Fill and Drain Comm	and Interface Help	

30. Click the **Deactivate WCU** button then proceed to **Step** Error! Reference source not found.**7**.



31. If **WCU-2** is installed in the system:

Repeat Step 22 through Step Error! Reference source not found.6 (selecting WCU-2 in Step 22).

32. If **WCU-3** is installed in the system:

Repeat Step 22 through Step Error! Reference source not found.6 (selecting WCU-3 in Step 22).

33. If **WCU-4** is installed in the system:

Repeat Step 22 through Step Error! Reference source not found.6 (selecting WCU-4 in Step 22).

- 34. Exit the WCU Command Interface window.
- 35. During the following operations if the FDT should become full, the FDT will NOT allow any more draining of the system. Proceed to the **P775 FDT Drain Procedure** in section 3 of this document and return to this part of the system drain procedure. The Get FDT Status can be clicked and checked and when the tool is full it must be

drained to continue. Draining of a full FDT will require two EMPTY blue water containers.

- 36. Perform a **Power 775 WCU Drain Procedure** on each WCU installed.
- 37. Perform a **Power 775 CEC Drain Procedure** on each CEC installed.
- 38. Perform a Power 775 DE Drain Procedure on each DE installed.
- 39. Perform a **Power 775 BPD Drain Procedure** on each BPD installed.
- 40. Perform a **Power 775 BRR Drain Procedure** on each BPR installed.
- 41. Perform a **Power 775 BPE Drain Procedure** on each BPE installed.
- 42. Perform a **Power 775 RDHX Drain Procedure** on each BPE installed.
- 43. The following steps will drain the Rack manifolds.
- 44. Connect HA1 to TS on the FDT.
- 45. Connect HA2 to TR on the FDT.
- 46. Connect the unconnected end of HA1 to adapter A3.
- 47. Connect HA1/A3 hose assembly to the supply manifold (left side) top hose which has been removed from the BPE plug.

# Power775 System Drain Procedure ---- System Pressure Test Procedure ----



Figure 1 Supply Manifold BPE Hose Location

## Power775 System Drain Procedure



Figure 2 BPE Supply Hose Location

48. Connect the HA2 unconnected end to the Supply Manifold plug for the Rear Door Heat exchanger. This is the upper manifold connector in the lower right side of the frame.

#### Power775 System Drain Procedure ---- System Pressure Test Procedure ----



Figure 3 RDHX Hose and Manifold Plug Locations

- 49. Click the Start Air pump button on the FDT panel.
- 50. View the site glass on HA2 and verify that no more water is being removed from the rack manifold. If the FDT stops, ensure that it's not full and click the start air pump button again. If the tool becomes full and stops, perform a Power 775 FDT Drain Procedure and then repeat steps 44 49.
- 51. Move HA1/A3 hose assembly to the return manifold (right side) top hose which has been removed from the BPE plug.

# Power775 System Drain Procedure ---- System Pressure Test Procedure ----

![](_page_23_Picture_1.jpeg)

Figure 4 Supply Manifold BPE Hose Location

# Power775 System Drain Procedure

![](_page_24_Figure_1.jpeg)

Figure 5 BPE Supply Hose Location

52. Move the HA2 unconnected end to the Return Manifold plug for the Rear Door Heat exchanger. This is the lower manifold connector in the lower right side of the frame.

#### Power775 System Drain Procedure ---- System Pressure Test Procedure ----

![](_page_25_Figure_1.jpeg)

Figure 6 RDHX Hose and Manifold Plug Locations

- 53. Click the Start Air Pump button on the FDT panel.
- 54. View the site glass on HA2 and verify that no more water is being removed from the rack manifold. If the FDT stops, ensure that it's not full and click the start air pump button again. If the tool becomes full and stops, perform a Power 775 FDT Drain Procedure and then repeat steps 51 53.
- 55. Deactivate the FDT.
- 56. Remove the UPIC connector.
- 57. Place all hoses and adapter in the FDT storage compartment.

## **3 POWER775 FILL AND DRAIN TOOL (FDT) TANK DRAIN PROCEDURE**

### 3.1 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)

![](_page_26_Picture_14.jpeg)

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

![](_page_26_Picture_16.jpeg)

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

![](_page_27_Picture_1.jpeg)

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

![](_page_27_Picture_3.jpeg)

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

![](_page_27_Picture_5.jpeg)

**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)

### 3.2 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:

**I BM Power 775** FDT P/N: **I BM** System Water Container P/N: Hose assemblies/adapters required:

**45D6928 45D2124** (U.S.), **45D2129** (non-U.S.) **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.

### 3.3 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.

![](_page_29_Picture_4.jpeg)

- 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.

![](_page_29_Picture_8.jpeg)

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**.

T1	T 2	Т 3	Τ4		EPO PWR	т5	Т6	<b>T</b> 7	та	Т9	T10	T 1 1	T 1 2	T 1 3	T 1 4	T 1 5	T 1 6	T 1 7	H T 1 8	IMC 1 9	1 7 2 0	T 2 1	T 2 2	T 2 3	T 2 4	T 2 5	T 2 6	T 2 7	BPCH DFLT	
•	周	厝.			1.							I			ij	111		H	Ì		同時	E				Ì			*	•
Cross Com			EPO	EPO Bypass	O CMPLT	Cross Power	WCU 1	WCU 2	WCU 3	WCU 4	FDT	T 2 8	T 2 9	Т 3 0	T 3 1	T 3 2	Т 3 3	T 3 4	Т 3 5	T 3 6 ▲	Т 3 7	T 3 8	т 3 9	T 4 0	T 4 1	T 4 2	T 4 3	т 4 4	H Good	
Bulk Pov	ver	C	ontrol I	Hu	b (	BPCH	H)		(	Plug	UPIC	; h	e	re	)				H	MC	2								BPCH	

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 your 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 System Drain Procedure ---- FDT Tank Drain Procedure ----

Systems Management	> Frames			
	÷ 1 2	P	Filter	Tasks Views V
Select Name			^ Status	
🔽 🕢 frame15	Properties		-	
<b>7</b>	Operations		Max Page Size: 500	Total: 1 Filtered: 1 Selected: 1
	Configuration			
	Connections			
	Updates			
	Serviceability		Manage Serviceable Events	
			Hardware 🕨	Exchange FRU
			Manage Dumps	Fill and Drain Tool Tasks Fill and Drain BPC Commands
			View VLAN Network Data	MES Tasks

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 o Drain To	connected. Use the buttons t ool connected to a port.	to drive commands to	the Fill and									
FDT P	ort Locations:											
Select	Location Code	Description										
0	78AC-100*BC50029-P7-C1	Lower BPC Port T10										
0	78AC-100*BC50029-P8-C1	Upper BPC Port T10										
Activat	te FDT Deactivate FDT											
Get FD	T Status Decode Error Stat	us										
Fill FD	T Drain FDT											
Start \	Nater Pump Reset FDT S	tart Air Pump										
Pressu	re Test Calibration Compon	ent Pressure Test										
Launch	n WCU Commands WCU Tar	nk 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 your 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 your next level of support.

![](_page_33_Figure_1.jpeg)

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 your next level of support.

• Tank Level: Full, Upper Half, or Lower Half – OK.

![](_page_34_Picture_0.jpeg)

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)

![](_page_34_Picture_10.jpeg)

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

![](_page_34_Picture_12.jpeg)

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

![](_page_34_Picture_14.jpeg)

**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.

#### Power775 System Drain Procedure ---- FDT Tank Drain Procedure ----

![](_page_35_Picture_1.jpeg)

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

![](_page_35_Picture_3.jpeg)

- 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.

# Power775 System Drain Procedure ---- FDT Tank Drain Procedure ----

![](_page_36_Picture_1.jpeg)

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

![](_page_36_Figure_3.jpeg)

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

![](_page_37_Figure_1.jpeg)

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

![](_page_37_Figure_3.jpeg)

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

The **Get FDT Status** button may be *click*ed 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. *Click* the **Get FDT Status** button and review the following:

• Tool mode: Ready – OK. Check Error Status.

**FDT Drain Mode** – water pump still running.

Wait 30 seconds and repeat Step 25.

• 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 your next level of support.

• **Tank Level:** Repeat **Step 16** to **Step 25** (with additional empty container) until desired level is reached.

If tank level does not fall, repeat Step 16 through Step 25.

If tank level does not decrease after repeat, contact your next level of support.

To prevent overflow, only repeat if the system water container is **still empty**.

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

![](_page_39_Picture_2.jpeg)

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

![](_page_39_Picture_4.jpeg)

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

![](_page_40_Picture_3.jpeg)

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

![](_page_40_Picture_5.jpeg)

- 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 your 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.

### 3.4 End of Power775 FDT Tank Drain Procedure

# 4 APPENDIX A: IBM POWER775 FDT VOLUME TABLES

	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

### 4.1 IBM Power 775 Component Water Volumes

Table 4 IBM Power 775 Component Water Volumes

### 4.2 IBM Power 775 System Water Volumes

					N	umber	of CEC	Drawe	rs			
		2	3	4	5	6	7	8	9	10	11	12
~	0	46.8	48.6	50.5	63.6	65.4	67.3	69.2	82.3	84.1	86.0	87.9
lsi s	1	47.7	49.5	51.4	64.5	66.3	68.2	70.1	83.2	85.0	86.9	88.8
of D ure	2	48.6	50.4	52.3	65.4	67.2	69.1	71.0	84.1	85.9		
er c losi	3	49.5	51.3	53.2	66.3	68.1	70.0	71.9			-	
nd Inc	4	50.4	52.2	54.1	67.2	69.0			_			
ЪШ	5	51.3	53.1	55.0					(Volum	es in Lit	ers)	
~	6	52.2			-							-

 Table 5 IBM Power 775 System Water Volume (Liters)

					N	umber	of CEC	Drawe	rs			
		2	3	4	5	6	7	8	9	10	11	12
~	0	12.4	12.8	13.3	16.8	17.3	17.8	18.3	21.7	22.2	22.7	23.2
)ist	1	12.6	13.1	13.6	17.0	17.5	18.0	18.5	22.0	22.5	23.0	23.5
of D ure	2	12.8	13.3	13.8	17.3	17.8	18.3	18.8	22.2	22.7		
er c losi	3	13.1	13.6	14.1	17.5	18.0	18.5	19.0				
nc	4	13.3	13.8	14.3	17.7	18.2			_			
ЪШ	5	13.5	14.0	14.5			-		(Volum	es in Ga	allons)	
2	6	13.8			•							

 Table 6 IBM Power 775 System Water Volume (Gallons)

				Jon	//// //	ator	0011	annei	0 00	i i i a					
			Number of CEC Drawers												
		2	3	4	5	6	7	8	9	10	11	12			
X	0	4	4	4	5	5	5	5	6	6	6	6			
lis!	1	4	4	4	5	5	5	5	6	6	6	6			
of D ure	2	4	4	4	5	5	5	5	6	6					
er ( los	3	4	4	4	5	5	5	5			-				
nbe	4	4	4	4	5	5			-						
	5	4	4	4			-								
~	6	4													

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

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

## 4.4 End of Appendix A: Power775 FDT Volume Tables