DISCLAIMER:

This PDF was generated on February 28, 2001.

SuperDome Configuration

Adding additional capacity to an existing system requires careful consideration and planning. A Solution Implementation Plan (SIP) should be developed before visiting the customer site.

A Solution Manager assigned by HP's Global Sales Services (GSS) working with the account owner, will identify the system configurations, services, and training required to meet the customer's needs.

The physical configuration and site preparation will be handled by Global Deployment Services (GDS), managed by their Deployment Manager, working with ESSO to complete the physical installation.

Configuration Guidelines

To achieve the best performance and high availability consider the following factors as shown in order of importance:

1. [Memory Population](#)
2. [Cell Population](#)
3. [Partition Size](#)
4. [I/O Chassis Allocation](#)

Memory Population

Each cell has two memory busses that must be evenly populated to achieve full bandwidth and reduce latency. Configurations of 4 Gbytes, 8 Gbytes, 12 Gbytes, and 16 Gbytes per cell accomplish this.

Memory must be symmetric within each partition for interleaving to be even across all the cells, otherwise performance problems can result. Consider the following example:

Example 1   Incorrect Memory Distribution Across Partitions

If a two cell partition has 2 Gbytes of memory on one cell and 16 Gbytes on another, 4 Gbytes will be interleaved (two from each cell) and 14 Gbytes will be assigned to one cell only. This will result in inconsistent bandwidth and latency problems.

Cell Population

A group of four cells (a *quad*) resides on one Crossbar Chip (XBC) and has the lowest latency. *Quads* are slots 0-3, 4-7, 8-11 and 12-15.

Keep partitions with a size less than or equal to four on the same *quad*.

Memory traffic from one *quad* to another is routed in pairs. The following pairs share the same path: 0 and 1, 2 and 3, 4 and 5, and 6 and 7.

The SD3200 can have dual links between *quads* if U-turns are installed on the backplane. To use both links a six-cell partition uses slots 0-3, 5, and 7 as would 4 and 6.

Partitions that share links share common points of failure.

XBC-XBC links can saturate and kill performance. An eight-cell partition on an SD6400 should be spread across cabinets. Cab 0, slots 0-3, 5, 7 and Cab 1, slots 4 and 6.

Partition Size

For best performance, partitions should be either single cell or greater powers of 2: 2, 4, 8, and 16 cells.

Memory interleaving is performed by taking either four or six physical address bits and using them to index into a cell mapping table entry consisting of 16 or 64 sub-entries. For a single cell partition, each sub-entry is loaded with only one cell. A two-cell partition alternates between the two cells. There is one 64 sub-entry cell map entry and a 48-16 sub-entry cell entry.

Partitions that are not powers of two will undergo *revisiting*. Consecutive accesses will go through all the cell boards and come back through revisiting as many cells as necessary until all memory is utilized and the 64-entry table is filled.

Table 1, SD 64 Way Partition Configurations, shows configurations that yield the best performance. However, memory may be left over. This memory is interleaved in the 16-entry tables and does not always yield the best performance. Depending on the memory configuration and the partition size the memory system performance will always increase, although not always linearly.

Use the following guidelines when building partitions:

- Build the largest partition first.

- Keep partitions with four cells or less on the same quad. (Slots 0-3, 4-7, 8-11, and 12-15)

- Keep the amount of memory on each cell in a partition as equal as possible.

- Fill empty cabinets before adding to a partially populated cabinet.

- For best performance, partitions should be either single cell or greater powers of 2: 2, 4, 8, and 16 cells.

- Always check a new partition for bottlenecks with the formula Qx*Qy/Qt/I. See XBC-XBC Link Load Equation for more information.

The partitions in the following table provide good but not always optimum link loading while allowing for growth.

Table 1 SD 64 Way Partition Configurations

#Cells per partition	Cabinet 0 -Cell Slots								Cabinet 1 - Cell Slots								#Cells per partition
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
1	A	I	E	M	C	K	G	O	B	J	F	N	D	L	H	P	16
2	A	E	A	E	C	G	C	G	B	F	B	F	D	H	D	H	8
3	A	A	A		C	C	C		B	B	B		D	D	D		4
4	A	A	A	A	C	C	C	C	B	B	B	B	D	D	D	D	4
5	A	A	A	A				A	B	B	B	B				B	2
6	A	A	A	A		A		A	B	B	B	B		B		B	2
7	A	A	A	A		A	B	A	B	B	B	B	A	B		B	2
8	A	A	A	A	B	A	B	A	B	B	B	B	A	B	A	B	2
9	A	A	A	A	A	A		A					A		A		1
10	A	A	A	A	A	A	A	A					A		A		1
11	A	A	A	A	A	A	A	A					A	A	A		1

	Slot																Count
12	A	A	A	A	A	A	A	A					A	A	A	A	1
13	A	A	A	A	A	A	A	A				A	A	A	A	A	1
14	A	A	A	A	A	A	A	A	A			A	A	A	A	A	1
15	A	A	A	A	A	A	A	A	A	A		A	A	A	A	A	1
16	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	1
																	48

Table 2 and <u>Figure 1</u> show the SD 32 way partition configurations.

Table 2 SD 32 Way Partition Configurations

#Cells per partition	Cabinet 0 - Cell Slots								#Cells per partition
1	0	1	2	3	4	5	5	7	8
2	A	E	C	G	B	F	D	H	4
3	A	C	A	C	B	D	B	D	2
4	A	A	A		C	C	C	C	2
5	A	A	A	A	B	B	B	B	1
6	A	A	A	A		A		A	1
7	A	A	A	A		A	A	A	1
8	A	A	A	A	A	A	A	A	1
									20

Figure 1 SD 32 Way
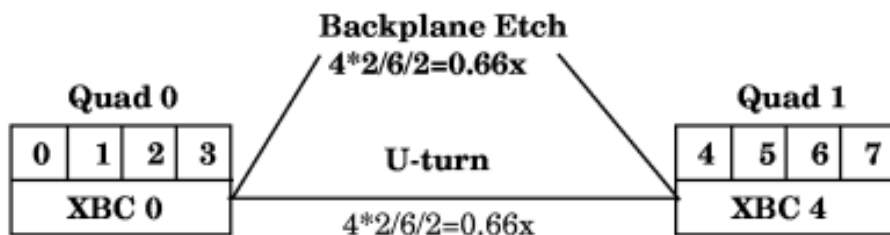
XBC-XBC Link Load Equation   A simple calculation can be made to evaluate whether or not a particular configuration will have bottlenecks.

1. The number of cells on one quad, Qx, that talk to another quad Qy
2. The total number of cells is Qt
3. The number of links between the two quads is L. (Always 1)
4. Link load is Qx*Qy/Qt/L. (Link load = 4*4/8/2 = 1).
   Strive always for a link load of 1.0 or less.

The lower the link load, the better off the system. If link loads begin to approach 2, bottlenecks may occur.

For a dual cabinet system, there are six equations covering each link:

1. Quad 0 talking to Quad 1 L1 = Q0*Q1/Qt/1
2. Quad 0 talking to Quad 2 L2 = Q0*Q2/Qt/1
3. Quad 0 talking to Quad 3 L3 = Q0*Q3/Qt/1
4. Quad 1 talking to Quad 2 L4 = Q1*Q2/Qt/1
5. Quad 1 talking to Quad 3 L5 = Q1*Q3/Qt/1
6. Quad 2 talking to Quad 3 L6 = Q2*Q3/Qt/1

Figure 2 shows a nine-cell partition on superdome 64 way spread across cabinets: Cab 0, slots 0-5, 7 and Cab 1, slots 12 and 14.

Figure 2 9 Cell Partition
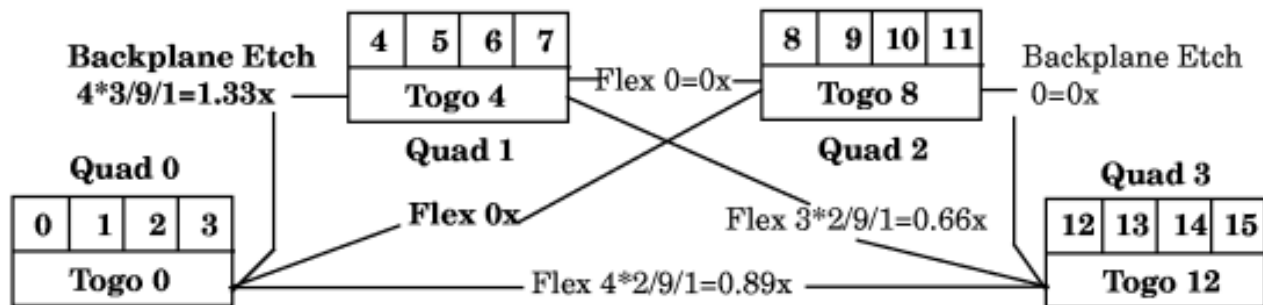
I/O Chassis Allocation

For best high availability, I/O devices are connected to different I/O Bays to reduce single points of failure.

Rules dictate that the roots are selected first, then all other I/O are added.

I/O can connect anywhere, but tools will guide you to the best selection.

System Planner

The System Planner is a tool available under AIM. Click on File>Enable>SuperDome>Calculator and Planner.

Using the System Planner you can create a system with partitions ordered with the following information:

- Number of cell boards, memory modules, and active CPUs
- Number of cell boards to reserve for future expansion

Additional Configuration Resources

You can find other information on superdome configuration by searching for *configuration* on this EPSS.

Other configuration resources include:

[The superdome Servers Configuration Guide](#).

[The superdome technical white paper.](#)

Installing Additional Cell Boards

Adding additional capacity to an existing system requires careful consideration and planning. A Solution Implementation Plan (SIP) should be developed before visiting the customer site.

See SuperDome configuration for configuration information and resources.

Add-on Overview

This section gives an overview of the installation of additional equipment to a system:

Step 1. Check and record the existing configuration.

Step 2. Understand any hardware, firmware, or software prerequisites that may exist.

Step 3. Make sure a system backup has been performed and/or a make_recovery tape created by the customer.

Step 4. Plan the installation of the add-on before reaching the site. Know exactly what you will have to do before you arrive on site if at all possible.

Step 5. Verify the functionality of the system and customer applications before introducing the add-on equipment.

Install the add-on.

Step 6. **NOTE** Adding a cell board may require the removal of existing cell boards for DIMM redistribution. See Installing Add-on Cell Boards Requiring DIMM Redistribution for details.

Step 7. Configure and integrate the add-on into the system.

Step 8. Verify the functionality of the system.

Step 9. If applicable, update the system logbook (Gold book).

Step 10. Clean the work area including the removal of all packaging material.

Step 11. Advise the customer of the completed add-on and thank them for choosing Hewlett-Packard.

Figure 1 Cell Board Location
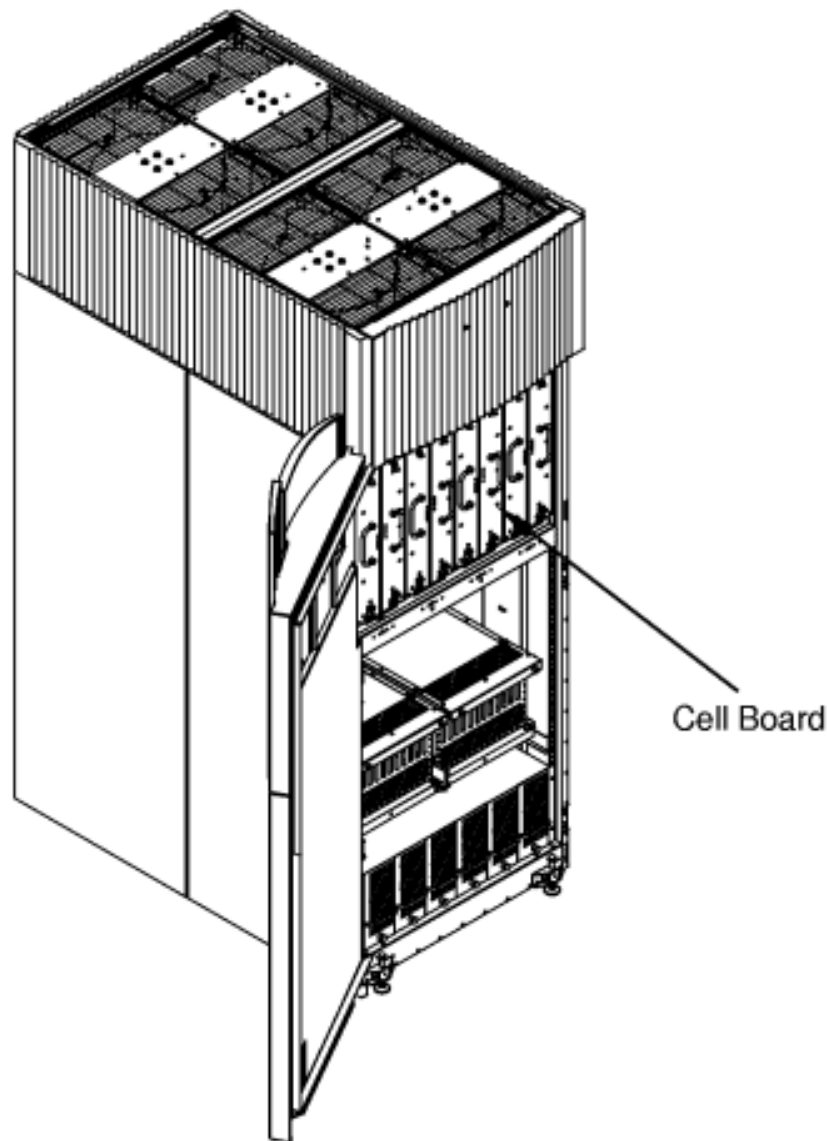
Cell Board

60RR012B
5/9/00

Installing the New Cell Board

This section contains information on installing a new cell board and assumes that the add-on planning has been performed.

Adding a cell board to an existing system may require that you remove cell boards already in the system to redistribute cell boards and memory.

If you must remove existing cell boards to redistribute memory or cell boards, go to Installing Add-on Cell Boards Requiring DIMM Redistribution.

If you are simply installing an additional cell board and memory or cell board redistribution is not necessary go to Installing An Add-on Cell Board.

Installing Add-on Cell Boards Requiring DIMM Redistribution

Memory must be symmetrically distributed within a partition for even interleaving across all cells. Therefore you may have to remove existing cell boards and redistribute the DIMMs. Have only the minimum number of cell boards necessary out of the cabinet at one time to redistribute DIMMs in a systematic fashion. Cell boards

are large and easily damaged.

Example 1 Incorrect Memory Distribution Across Partitions

If a two cell partition has 2 Gbytes of memory on one cell and 16 Gbytes on another, 4 Gbytes will be interleaved (two from each cell) and 14 Gbytes will be assigned to one cell only. This results in inconsistent bandwidth and latency problems.

For more details on memory configuration see [Overview: Memory](). For detailed instructions on how to remove and replace DIMMs see [Replacing a DIMM]().

Preliminary Procedures This procedure must be completed prior to installing the new cell board.

Step 1. Visually inspect the new part for proper part number and revision.

Step 2. Using your add-on configuration as a guide determine which cell boards must be removed to have their DIMMs redistributed.

Step 3. Verify the cabinet number(s) using the front and rear panel displays. The displays show a numeric cabinet value and are located on the Superdome front and rear door assemblies.

Step 4. Prepare a electrostatic discharge (ESD) safe work surface and make proper ESD connections.

Step 5. Shutdown the target partition in an orderly manner.

Step 6. Open the front cabinet door using the latch located on the right side of the front door.

Removing Cell Boards For each cell requiring removal, complete the following steps:

Remove +48 V power from the *target* cell board using the pe command on the GSP.

NOTE You may have to power off +48 V power to all FRUs within the *target* cabinet.

Figure 2 Removing a Cell Board

Step 1.

60RR012A
2/17/00
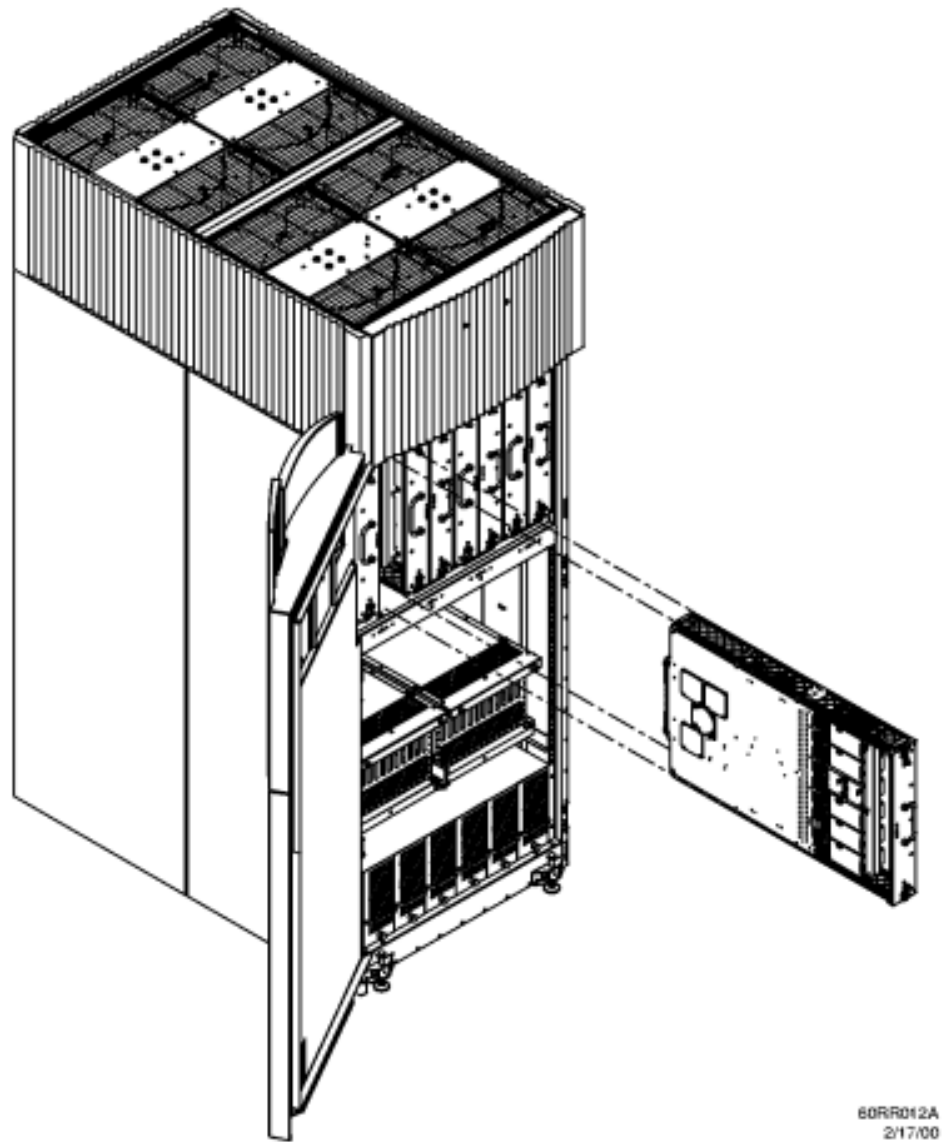
Step 2. Release the locking levers located at the top and bottom of the cell board.

Step 3. Remove the cell board and place it on a flat surface.

Step 4. Employing the proper ESD procedures, carefully remove or install DIMMs as necessary. For more details on memory configuration see <u>Overview: Memory</u>. For detailed instructions on how to remove and replace DIMMs see <u>Replacing a DIMM</u>.

Installing the Cell Board For each cell board complete the following steps:

Step 1. Position and install the cell board.

Step 2. Secure the locking levers.

Step 3. When all cell boards that needed DIMM redistribution have been completed apply +48 Volt power to *target* partition/cabinet; boot O/S.

Installing An Add-on Cell Board

The procedure covers the addition of a cell that will be a single cell partition or already has a DIMMs configuration that matches the cells in the target partition.

Preliminary Procedures This procedure must be completed prior to installing the new cell board.

Step 1. Visually inspect the new part for proper part number and revision.

Step 2. Using your add-on configuration as a guide determine which slot will receive the new cell board.

Step 3. Verify the cabinet number(s) using the front and rear panel displays. The displays show a numeric cabinet value and are located on the Superdome front and rear door assemblies.

Step 4. Prepare a electrostatic discharge (ESD) safe work surface and make proper ESD connections.

Step 5. Shutdown the target partition in an orderly manner if necessary.

Step 6. Open the front cabinet door using the latch located on the right side of the front door.

Installing the New Cell Board Complete the following steps:

Step 1. Position and install the cell board into the chassis.

Step 2. Secure the locking levers.

Step 3. Apply +48 Volt power to *target* partition/cabinet; boot O/S.

Figure 3 Installing a Cell Boards
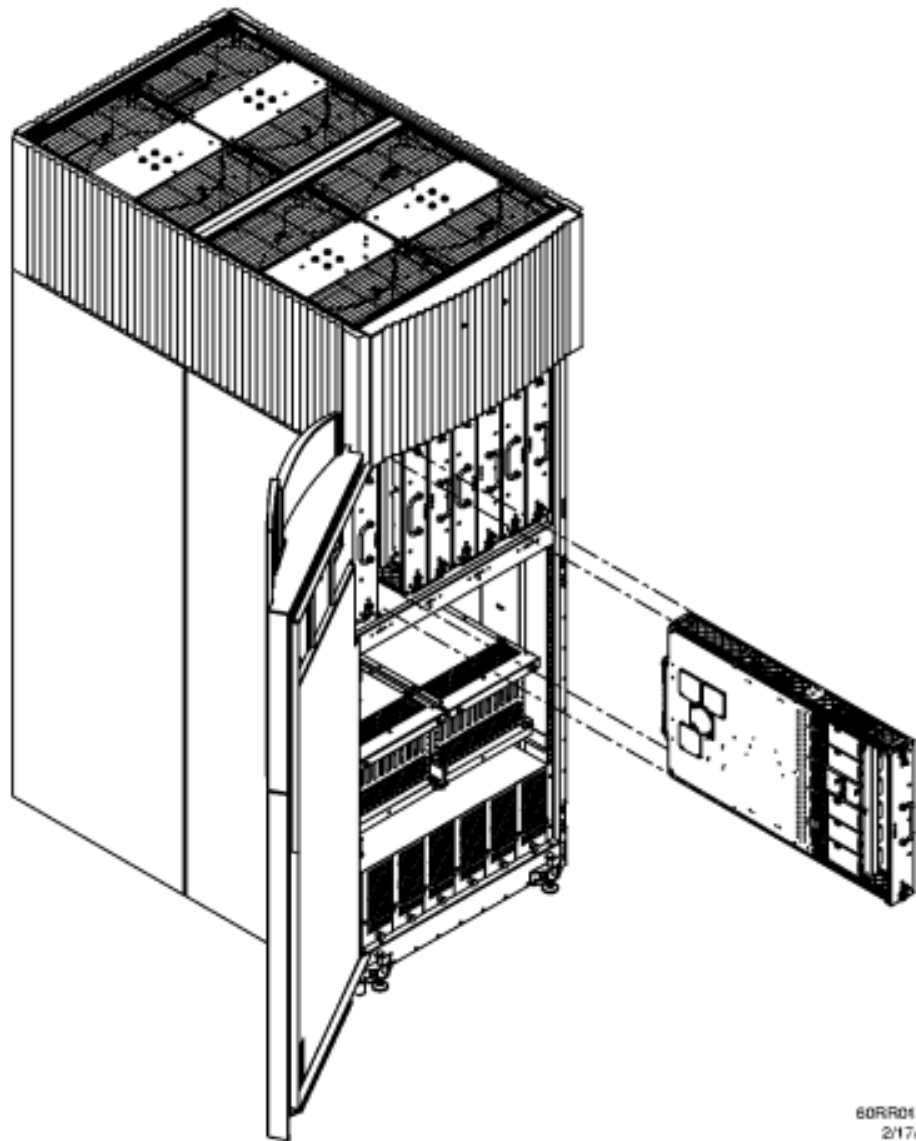
60RR012A
2/17/00

Verifying the Task

To verify the functionality of system complete the following steps:

Step 1. If there are any Mesa online tests for the cell board and memory, run them now.

Step 2. Resolve any diagnostic faults.

Step 3. Label any defective material with the proper information and package it for return to the local parts hub.

Step 4. If applicable, update the system logbook (Gold book).

Step 5. Clean the work area including the removal of all packaging material.

Step 6. Advise the customer of the completed add-on and thank them for choosing Hewlett-Packard.

Overview: Memory

On SuperDome systems, each cell board holds a portion of the total system memory. Part of the memory address identifies the cell so that packets, which reference memory, can be routed to the correct cell board. Once the packet reaches the appropriate cell, the memory address is converted into the proper memory physical address, i.e., rank, bank, column, and row. The physical address is used to address the memory Dual In-Line Memory modules (DIMMs) on the cell board. If the memory address refers to an I/O subsystem address, the packet is forwarded to the I/O subsystem.

Cell Memory System

The cell memory system consists of the Memory Unit (MU) block of the cell controller (CC) Application Specific Integrated Circuit (ASIC), the memory multiplexer/demultiplexer (M2) ASIC, the memory DIMMs, and the supported hardware / busses on the cell board. The cell memory system has two independent data paths, as shown in Figure 1, Cell Memory System.

 Figure 1 Cell Memory System
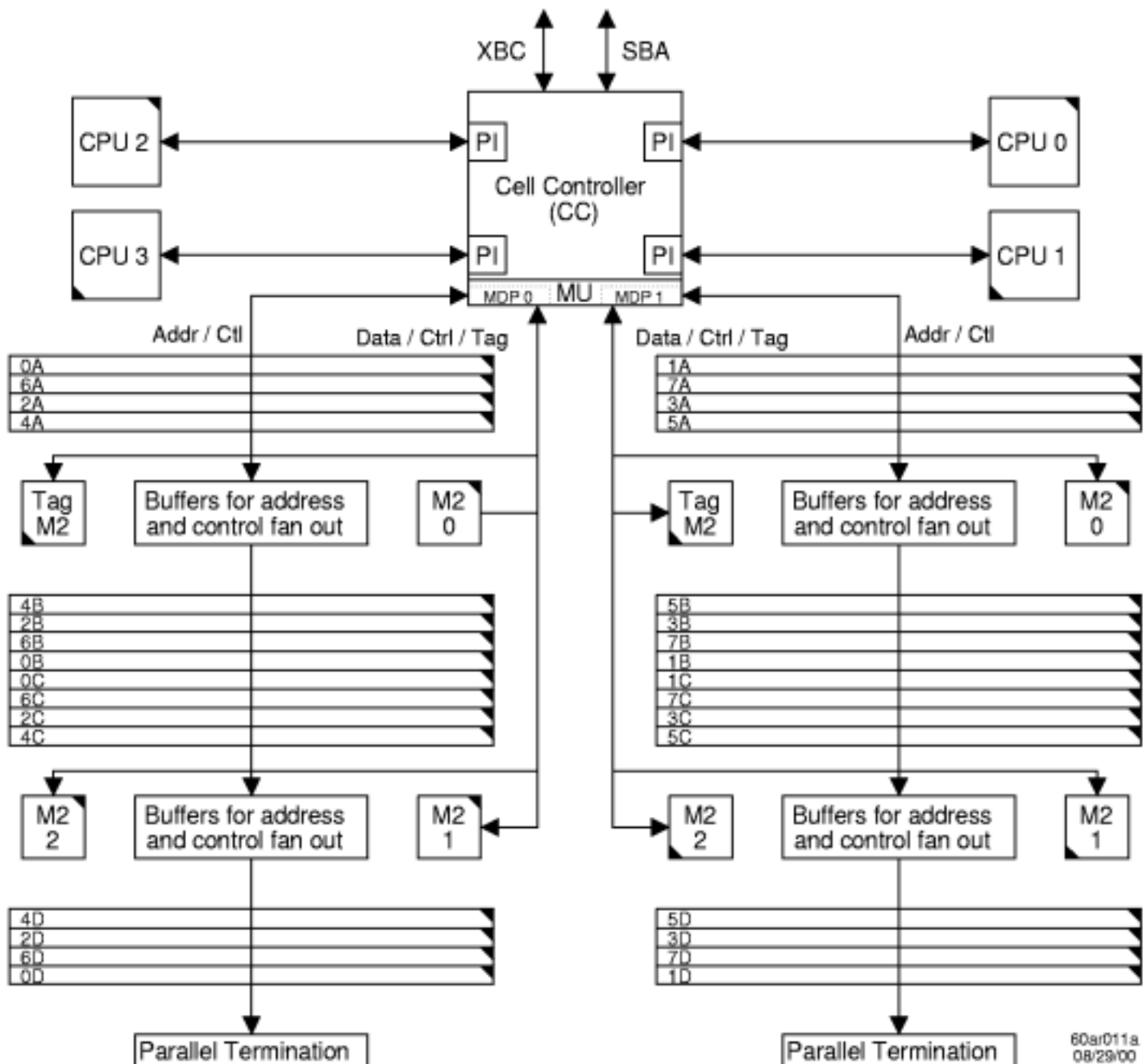
Each path has its own address bus, control bus, data bus, M2s, and DIMMs. The cell controller (CC) runs each path 180 degrees out of phase, with respect to the other, to facilitate pipelining in the CC. Address and control signals are fanned out through registers to the DIMMs. Data is transferred between the CC and the DIMMs through the M2 ASICs.

The M2s are bit sliced and four are required to form one 72 bit CC memory data bus (MID). It takes eight cycles for one 576 bit cache line to be sent to the M2s.

The memory side of the group of 4 M2s connects to a 576 bit DIMM bus, which interfaces with 4 logical DIMM ranks. Each logical DIMM rank consists of 4 physical DIMMs, which are 144 bits wide and are accessed in parallel. The M2s queue up the cache line from the CC, and transfer it to the DIMMs in one cycle. When taking a cache line from memory, the M2 receives the cache line in one cycle and sends the line to the CC in 72 bits groups over eight cycles.

Memory Configurations

Memory must be installed in sets of four DIMMs, called DIMM ranks. The DIMM ranks are installed in numerical order, starting with rank 0 and proceeding up to rank 7. Figure 2, Memory Configuration - 1 DIMM Rank, Figure 3, Memory Configuration - 2 DIMM Ranks, and Figure 3, Memory Configuration - 2 DIMM Ranks, show examples of the memory configurations for 1, 2, and 3 DIMM rank configurations.

Currently, SuperDome supports 512Gbyte DIMMs using 128Mbit SDRAM parts. Since DIMMs must be installed in groups of 4 DIMM, the minimum memory upgrade size is 2Gbyte.

Figure 2 Memory Configuration - 1 DIMM Rank
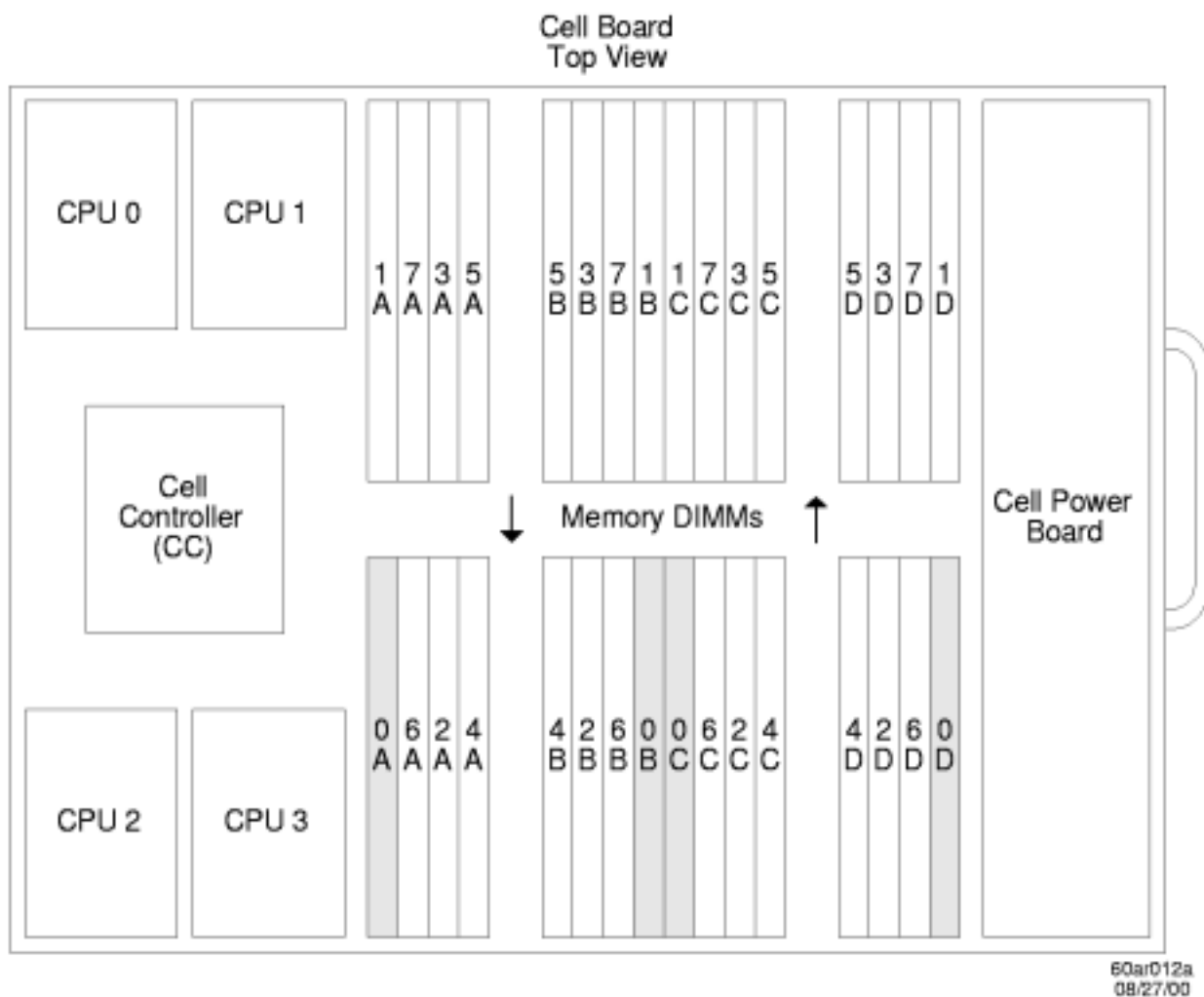
Figure 3 Memory Configuration - 2 DIMM Ranks
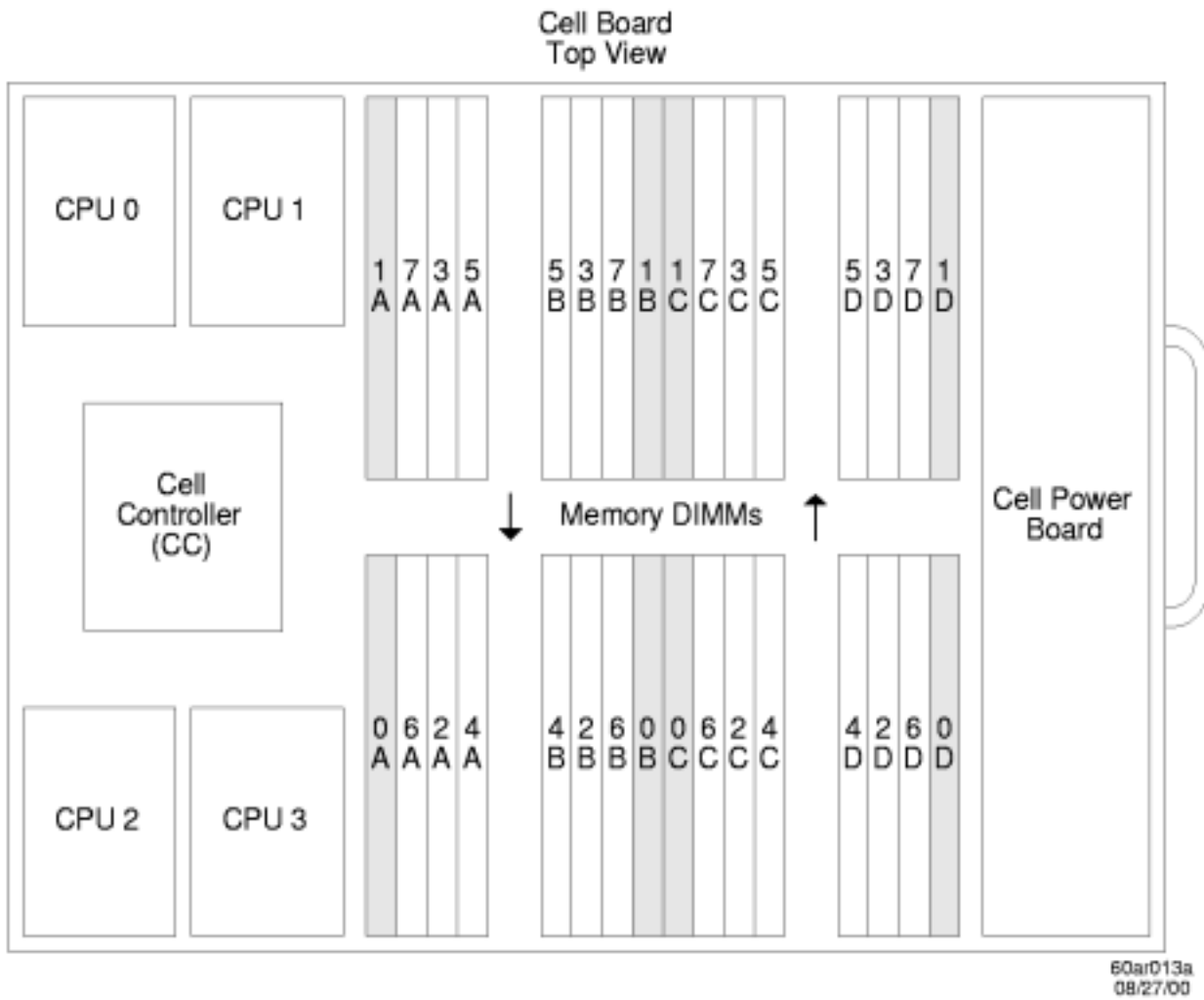
Figure 4 Memory Configuration - 3 DIMM Ranks

Cell Board
Top View

CPU 0   CPU 1

Cell
Controller
(CC)

CPU 2   CPU 3

1 7 3 5
A A A A

5 3 7 1 1 7 3 5
B B B B C C C C

5 3 7 1
D D D D

↓   Memory DIMMs   ↑

0 6 2 4
A A A A

4 2 6 0 0 6 2 4
B B B B C C C C

4 2 6 0
D D D D

Cell Power
Board
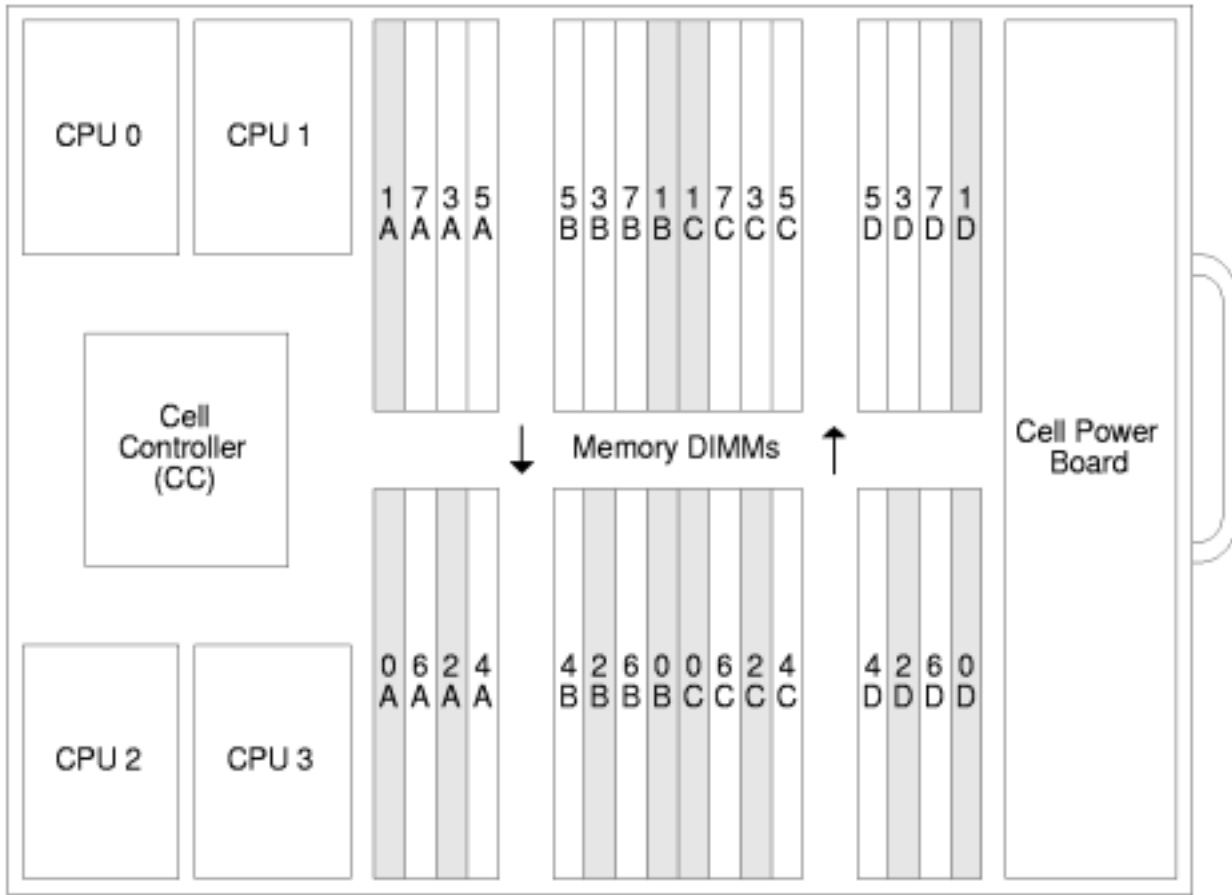
60ar014a
08/27/00

Replacing a DIMM

The cell controller is located on the cell board. Be sure to follow all procedures to ensure successful operation.

Figure 1 DIMM Location
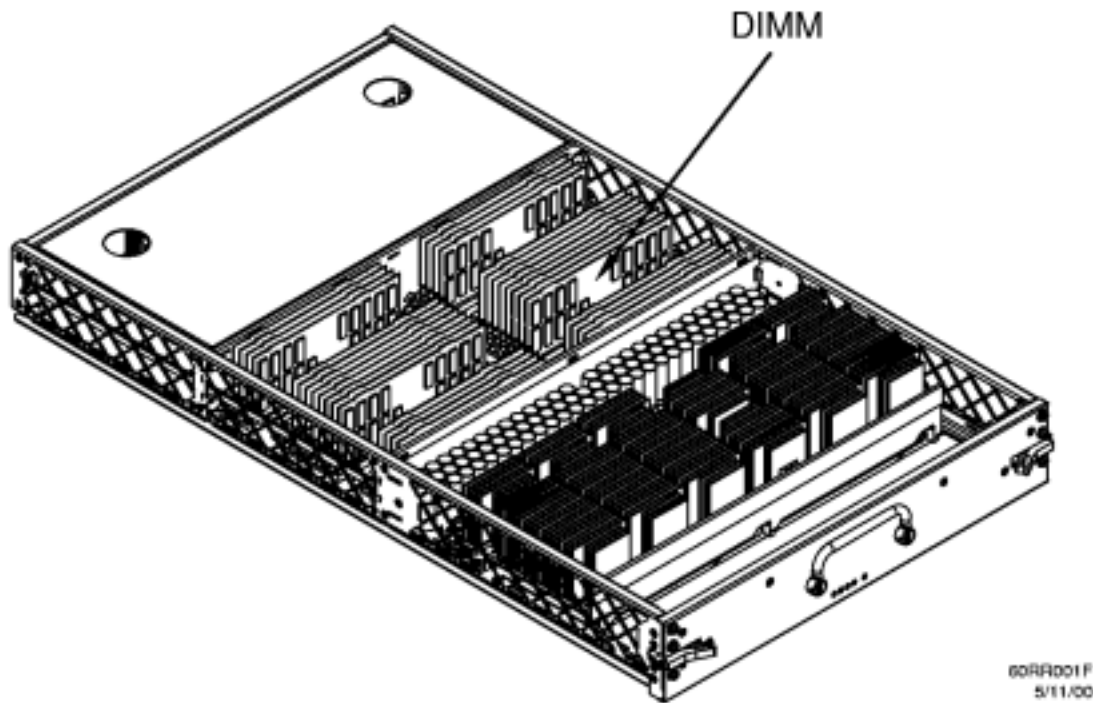
Preliminary Procedures

This procedure must be completed prior to replacing a DIMM.

Step 1. Verify the cabinet number using the front and rear panel displays. The displays show a numeric cabinet value and are located on the Superdome front and rear door assemblies.

Step 2. Make proper electrostatic discharge (ESD) connections and perform daily selftest.

Step 3. To insure part quality, visually inspect the replacement part for proper part number and revision.

Step 4. Open the front cabinet door. The latch is located on the right side of the rear door.

Step 5. Remove the applicable cell board to gain access to the DIMMs.

Replacing a DIMM

This section contains information on removing and installing a DIMM.

Removing a DIMM

Figure 2 DIMM Removal Details
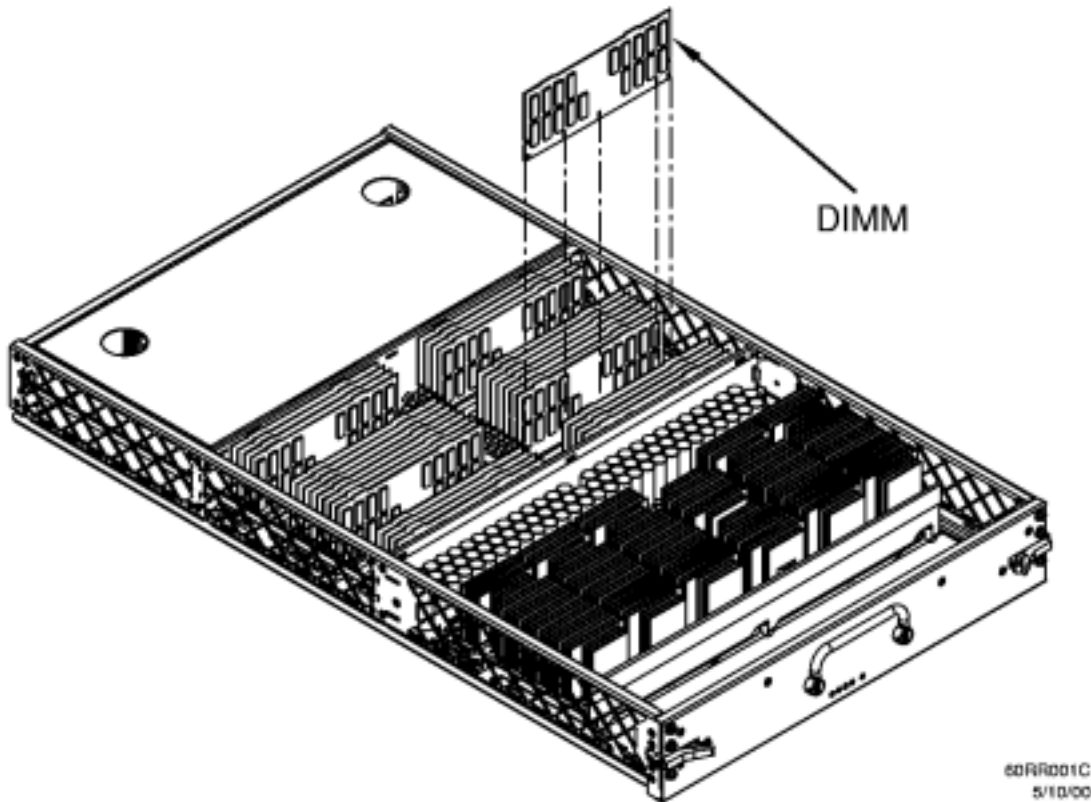
Step 1. Attach the DIMM extraction tool to the DIMM to be replaced.

Step 2. Depress the DIMM extractors at the ends of the DIMM socket and carefully extract the DIMM by lifting the extraction tool.

Installing a DIMM

Step 1. Attach the DIMM extraction tool to the DIMM to be installed.

Step 2. Depress the DIMM extractors at the ends of the DIMM socket and carefully insert the DIMM using the extraction tool.

Verifying the Task

This section contains information on verifying the replacement of the DIMM.

Step 1. If there are any Mesa online tests for GSP, run them now.

Step 2. Resolve any diagnostic faults.

Step 3. Label the defective power board with the proper information and package it for return to the local parts hub.

Step 4. If applicable, update the system logbook (Gold book).

Step 5. Clean the work area including the removal of all packaging material.

Step 6. Advise the customer of completed repair, and thank them for choosing Hewlett-Packard.

[Overview: Memory](#)   [Installing Additional DIMMs](#)

Installing Additional DIMMs

The DIMMs are located on the cell board. Be sure to follow all procedures to ensure successful operation.

Adding additional capacity to an existing system requires careful consideration and planning. A Solution Implementation Plan (SIP) should be developed before visiting the customer site.

See Superdome Configuration for configuration information and resources.

Add-on Overview

This section gives an overview of the installation of additional equipment to a system:

Step 1. Check and record the existing configuration.

Step 2. Understand any hardware, firmware, or software prerequisites that may exist.

Step 3. Make sure a system backup has been performed and/or a make_recovery tape created by the customer.

Step 4. Plan the installation of the add-on before reaching the site. Know exactly what you will have to do before you arrive on site if at all possible.

Step 5. Verify the functionality of the system and customer applications before introducing the add-on equipment.

Step 6. Install the add-on.

Step 7. Configure and integrate the add-on into the system.

Step 8. Verify the functionality of the system.

Step 9. If applicable, update the system logbook (Gold book).

Step 10. Clean the work area including the removal of all packaging material.

Step 11. Advise the customer of the completed add-on and thank them for choosing Hewlett-Packard.

Figure 1 Cell Board Location

Cell Board
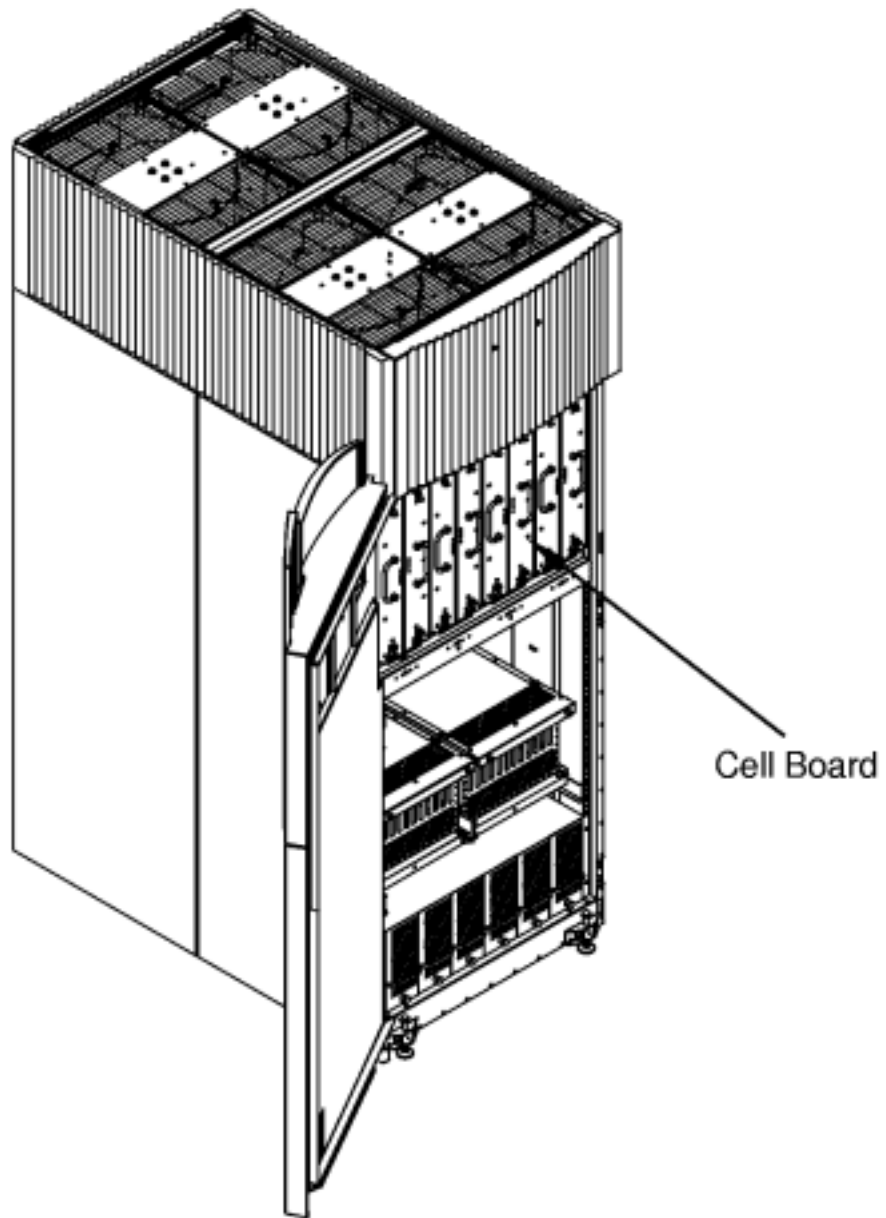
60RR012B
5/9/00

Figure 2 DIMM Location

DIMM

6DRR001F
5/11/00
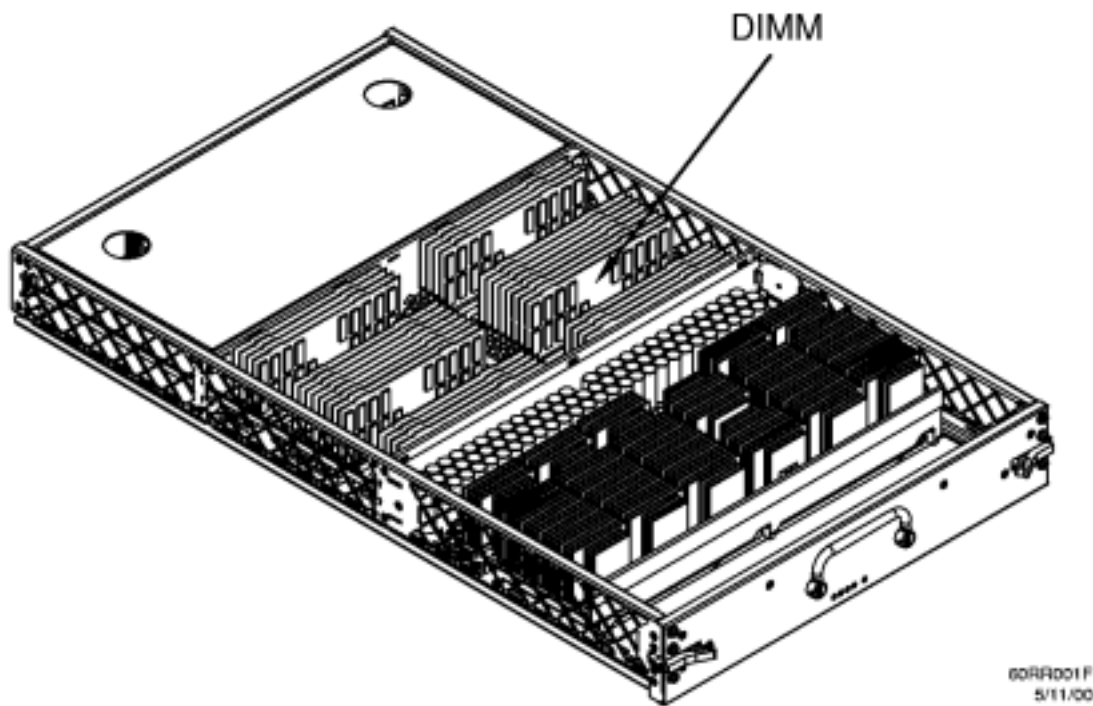
Preliminary Procedures

This procedure must be completed prior to adding a DIMM.

Step 1. Verify the cabinet number using the front and rear panel displays. The displays show a numeric cabinet value and are located on the Superdome front and rear door assemblies.

Step 2. Prepare a electrostatic discharge (ESD) safe work surface and make proper ESD connections.

Step 3. Visually inspect the replacement part(s) for proper part number and revision.

Step 4. Open the front cabinet door. The latch is located on the right side of the front door.

Step 5. Remove the applicable cell board to gain access to the DIMMs.

Installing Additional DIMMs

This section contains information on installing a DIMM.

Step 1. Attach the DIMM extraction tool to the DIMM to be installed.

Step 2. Depress the DIMM extractors at the ends of the DIMM socket and carefully insert the DIMM using the extraction tool.

Figure 3 DIMM Removal Details

DIMM

60RR001C
5/10/00
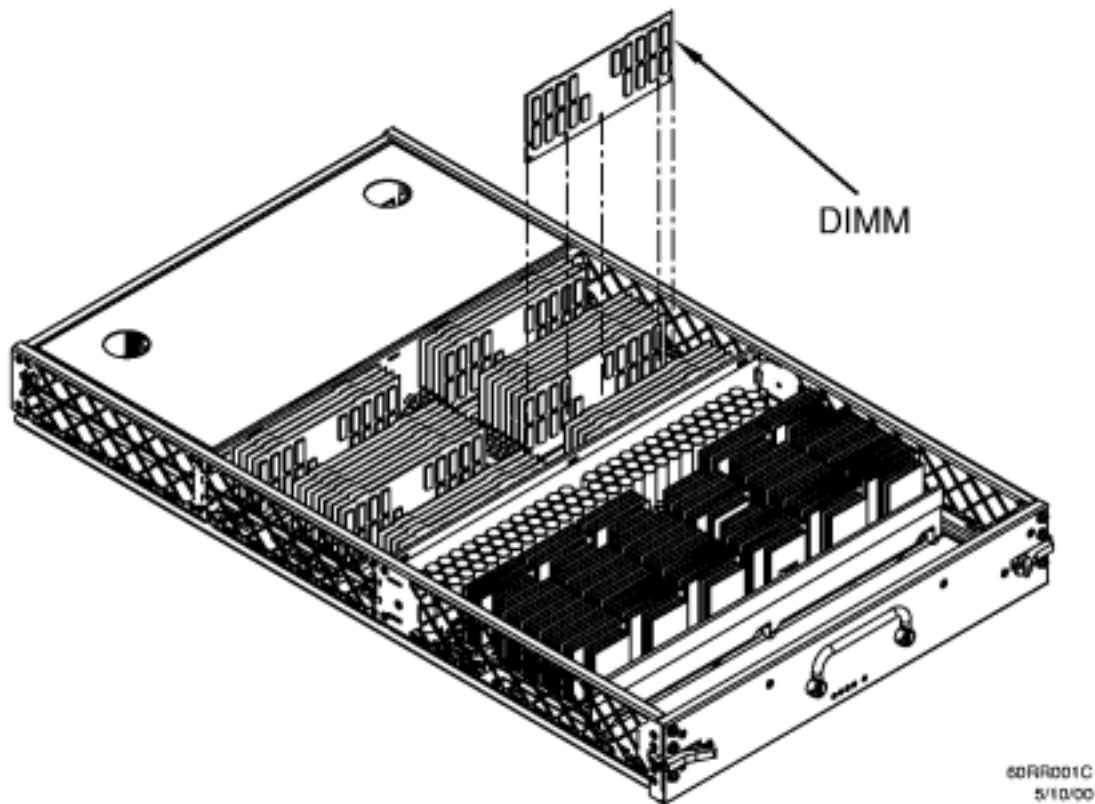
Verifying the Task

This section contains information on verifying the add-on DIMM(s).

Step 1. If there are any Mesa online tests for GSP, run them now.

Step 2. Resolve any diagnostic faults.

Step 3. Label the defective power board with the proper information and package it for return to the local parts hub.

Step 4. If applicable, update the system logbook (Gold book).

Step 5. Clean the work area including the removal of all packaging material.

Step 6. Advise the customer of completed add-on and thank them for choosing Hewlett-Packard.

Installing a 12-Slot Peripheral Component Interconnect (PCI) Chassis - Offline

The 12-slot card cage may be installed into *almost* any available I/O bay within a powered off *target* cabinet. Chassis or card cage power is off when no card cage is installed.

Card cage addition is less complicated than replacement, because fewer steps are needed. Be sure to follow all the steps listed to ensure successful operation.

PCI Chassis Locations Within The SD 32 Way Cabinet

There are 4 spaces available for 12-slot card cage, on the pair of master I/O backplanes within a Superdome 32-Way cabinet (two spaces in the front and two spaces in the rear).

PCI Chassis Locations Within The I/O Expansion Cabinet

There are 2 spaces available for 12-slot card cages, on the single master I/O backplane per I/O Chassis Enclosure (ICE) assembly within an I/O expansion cabinet. However, there may be up to three ICE assemblies within an I/O expansion cabinet.

Initial (Offline) Addition Procedure

This procedure must be followed prior to adding a 12-slot card cage, while the *target* cabinet is powered off:

Step 1. Visually inspect the *target* PCI chassis for the proper part number and revision. This will help ensure part quality.

Step 2. Make proper Electrostatic Discharge (ESD) connections to the *target* master I/O backplane, and perform a daily ESD selftest. [refer to nugget]

Step 3. Install the PCI card cage in the *target* I/O bay and chassis slot of the master I/O backplane.

Step 4. Install the pair of Ring I/O Adapter (REO) Link cable bundles between the *target* cell and the *target* master I/O backplane, within the *target* cabinet.

Step 5. Go directly to: "Final (Offline) Addition Procedure."

Final (Offline) Addition Procedure

This section contains information on verifying the installation of both the REO link cables and the *target* PCI chassis:

Step 1. Apply +48 V. power to the *target* cabinet; boot the *target* cell/partition to the Boot Console Handler (BCH) prompt.

Step 2. Run dc scan tests for the newly installed REO Link cables. [refer to nugget]

Step 3. Resolve any dc scan test faults. [refer to nugget]

Step 4. Boot the *target* cell/partition to the Initial System Loader (ISL) prompt; load the Offline Diagnostics Environment (ODE); load and run REODIAG; then run CIODIAG, if a core I/O card is installed in PCI slot 0.

Step 5. Go directly to: "Installation Task Verification."

Installation Task Verification

This section contains information on verifying the installation of any PCI host adapters in the newly installed PCI chassis:

Step 1. Run Support Tools Manager (STM) online tests for PCI cards, if any. [refer to nugget]

Step 2. Resolve any diagnostic faults. [refer to nugget]

Step 3. Label defective REO link cable(s), PCI chassis, or PCI cards with proper information, and package them for return to your local parts hub.

Step 4. Update the system logbook (Gold book), if applicable.

Step 5. Clean the work are, including the removal of all packaging material.

Step 6. Advise the customer that the repair is completed, and thank them for choosing Hewlett Packard.

Installing An Additional Power Distribution Control Assembly

Adding additional capacity to an existing system requires careful consideration and planning. A Solution Implementation Plan (SIP) should be developed before visiting the customer site.

Figure 1 shows a cabinet with both PDCAs installed. PDCA 0 is the first PDCA. PDCA 1 is the position of the additional PDCA.

Figure 1 PDCA Locations

PDCA 0

PDCA 1

60SP040A
4/28/00
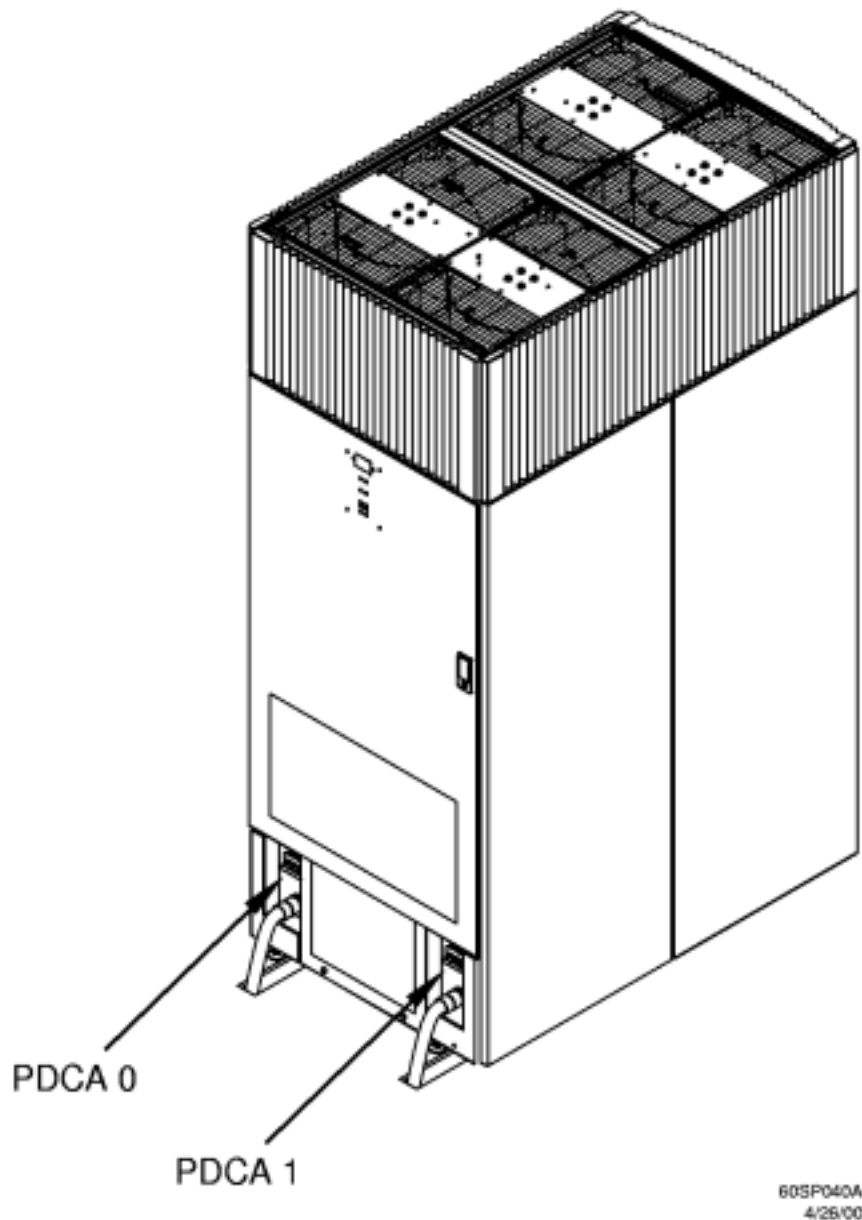
Installing and Verifying an Additional PDCA

NOTE Plan the installation of the add-on before reaching the site. Know exactly what you will have to do before you arrive on site if at all possible.

Use the following procedure to install and verify the PDCA:

Step 1. Select or make sure that the proper PDCA has been selected. See [PDCA Selection Criteria](#).

Step 2. If the PDCA is to be hardwired, give the unit to the customer to allow an electrician, using local electrical codes, to wire it.

Step 3. Check and record the existing configuration.

Step 4. Verify the functionality of the system before introducing the add-on equipment.

Step 5. Prepare a electrostatic discharge (ESD) safe work surface and make proper ESD connections.

Step 6. Make sure the circuit breaker on the PDCA is **OFF**.

Insert the PDCA into the PDCA enclosure on the rear-right side of the SPU cabinet.

Figure 2 Installing the Additional PDCA

Step 7.

Retaining Screw (4)
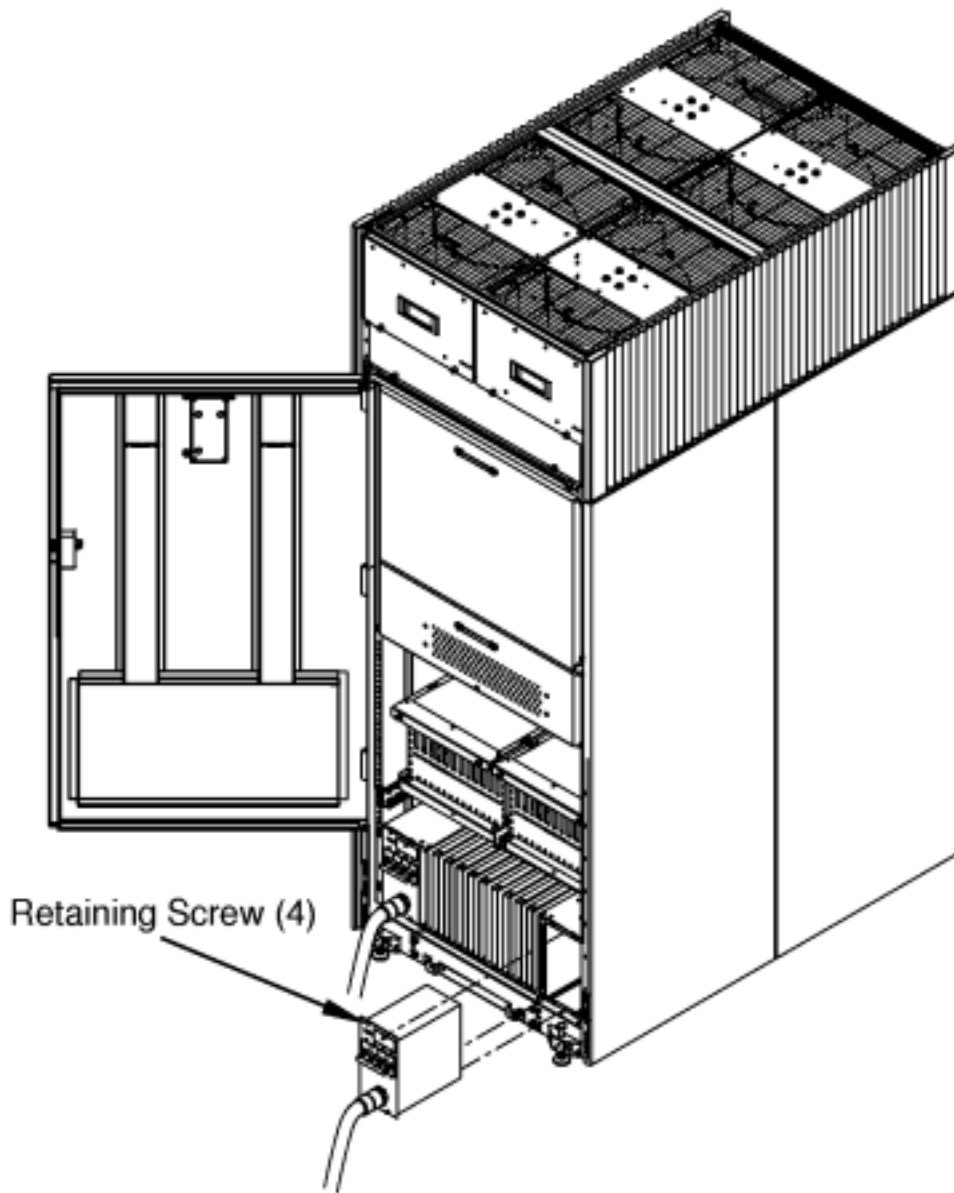
80IN087A
12/20/00

Using a T20 Torx driver, attach the four screws that hold the PDCA in place.

Step 8. CAUTION ⚠ Before checking the voltage, make sure the Panel Breaker is **ON** and the PDCA breaker is **OFF**.

Step 9. Using a T20 Torx driver, remove the screw on the hinged panel at the top of the PDCA. See Figure 3.

Using a Volt-Ohm meter (VOM), check the following test points to make sure they conform to the specifications for the PDCA and local electrical specifications:

Table 1 Four- and Five-Wire Voltage Ranges

Four-Wire	Five-Wire
L2 to L3: 200-240 V	L1 to N: 200-240 V
L2 to L1: 200-240 V	L2 to N: 200-240 V
L1 to L3: 200-240 V	L3 to N: 200-240 V
	N to Ground: 1

Figure 3 Checking PDCA Test Points (five-Wire)

Step 10.

See Details
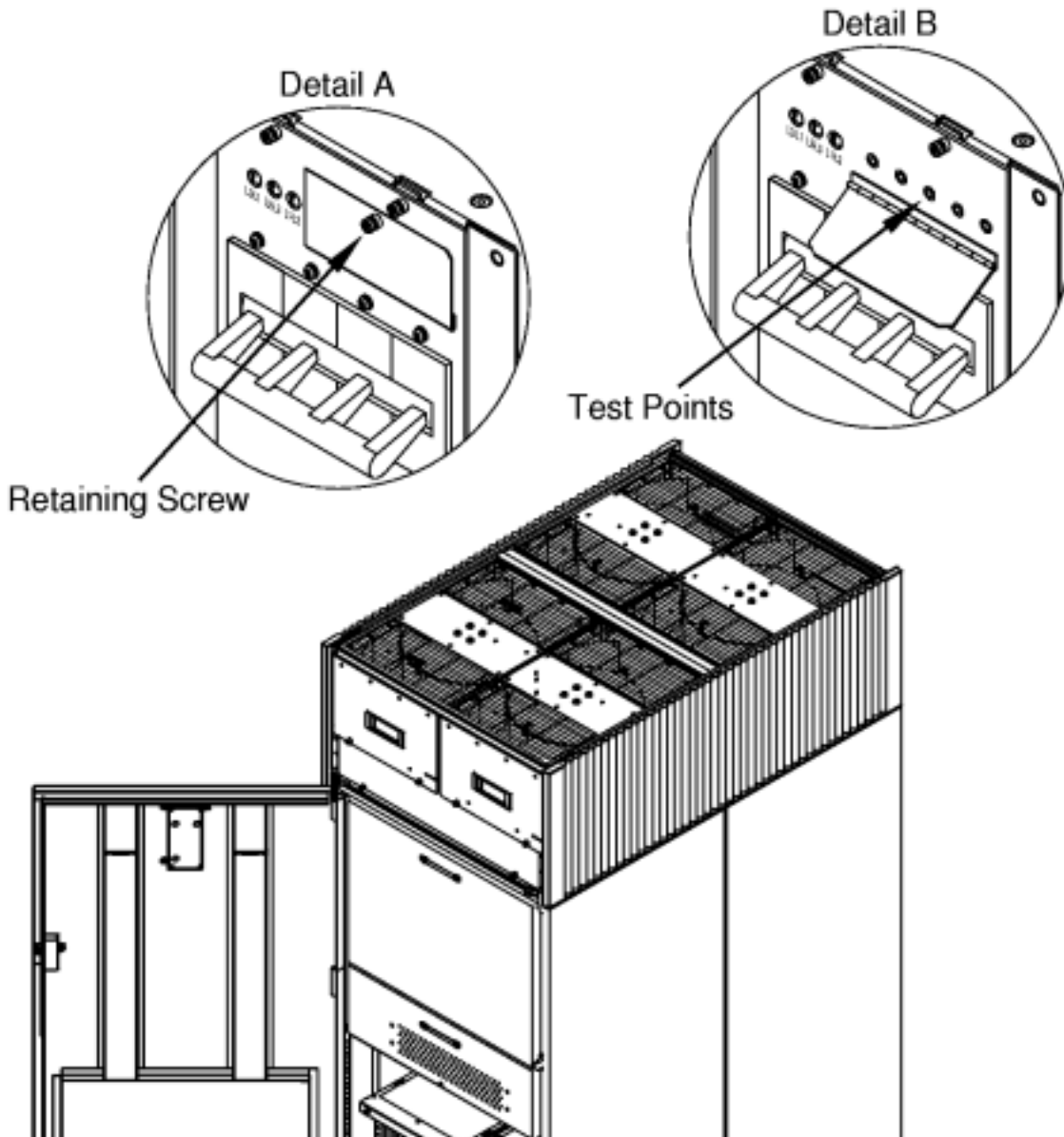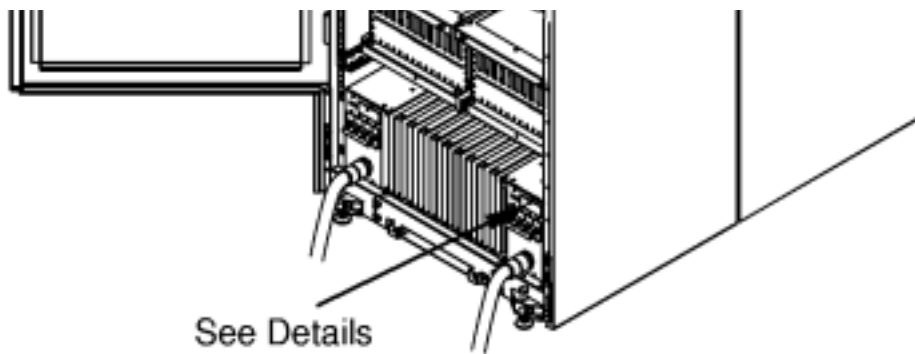
80IN057B
12/20/00

> If the voltage values do not match the specifications, have the customer contact the electrician who wired the PDCA to troubleshoot the problem.

Step 11. Update the system logbook (Gold book).

Step 12. Clean the work area including the removal of all packaging material.

Step 13. Notify the customer that the add-on is complete.

PDCA Selection Criteria

This section describes the AC power requirements for a Superdome system.

The site building shall provide a safety ground/protective earth for each AC service entrance to all Superdome cabinets.

Each Superdome server cabinet using a three-phase four-wire input is required to have a dedicated circuit breaker to support the Marked Electrical current of 62A per phase. The facility electrician and local service codes will determine proper circuit breaker selection.

Each Superdome server cabinet using a three-phase five-wire input is required to have a dedicated circuit breaker to support the Marked Electrical current of 36A per phase. The facility electrician and local service codes will determine proper circuit breaker selection.

NOTE When using the minimum sized breaker, always choose circuit breakers with the maximum allowed trip delay to avoid nuisance tripping.

Detailed site power information is required to configure the system correctly and prevent delays in system installation.

Collect the following information from the customer site electrician before selecting the appropriate PDCA:

- Type of source available: four wire_____ or five wire_____

- Source voltage phase to phase: _____ Vac

- Source voltage phase to neutral: _____Vac

Using the above information, proceed to Table 2.

1. Select the source type that matches the customer source.
2. Within the matching Source Type selection, select the matching voltage range to the customer's source voltage.
3. Select the appropriate PDCA.

Example 1 The customer has a three-phase source with a Source Voltage of 208 VAC measured phase to phase indicating that a four-wire PDCA is required.

Example 2 The customer has a three-phase source with a Source Voltage of 220 VAC measured phase to neutral indicating that a five-wire PDCA is required.

Example 3 The customer has a three-phase source with a Source Voltage of 230 VAC measured phase to phase indicating that a four-wire PDCA is required.

Power Options

NOTE Initially all Superdome servers are delivered utilizing either option 1 or option 2. In approximately mid January, 2001, option 4 and 5 will replace option 1 and option 2.

Table 2 describes the available power options.

Table 2 Available Power Options

Option	Source Type	Source Voltage (nominal)	PDCA Required	Marked Electrical at 180 VAC [23]	Power Receptacle Required

1	three-phase	Voltage range 200-240 VAC, phase to neutral, 47-63 Hz (EUR typical)[4]	five-wire	36A Marked Electrical per phase	No receptacle required. Electrician must hardwire power to the PDCA[b]
2	three-phase	Voltage range 200-240 VAC, phase to phase, 47-63 Hz (US typical)	four-wire	62 A Marked Electrical per phase	No receptacle required. Electrician must hardwire power to the PDCA[b]
4	three-phase	Voltage range 200-240 VAC, phase to phase, 47-63 Hz (US typical)	four-wire	62 A Marked Electrical per phase	Receptacle provided. Electrician must hardwire receptacle to site power[b]
5	three-phase	Voltage range 200-240 VAC, phase to neutral, 47-63 Hz (EUR typical)[c]	five-wire	36A Marked Electrical per phase	Receptacle provided. Electrician must hardwire receptacle to site power[b]

NOTE A qualified electrician must wire the PDCA receptacle to site power using copper wire and in compliance with all local codes.

Each branch circuit used within a Superdome Complex must be connected together to form a common ground.

WARNING Do not install a PDCA that does not have one of the following set of labels attached.

| ⚠ | No Internal User Serviceable Parts or Assemblies
4 Wire Connection
High Voltage: 200-240VAC Phase to Phase | ⚡ |

Warning: High Leakage Current. Ground (earth) connection essential before connecting the supply. Multiple Power Sources/Cords. Protective devices in the building installation for protection shall not exceed 62A per phase 50/60 Hz.

| ⚠ | | ⚡ |

OR

	No Internal User Serviceable Parts or Assemblies 5 Wire Connection High Voltage: 200-240VAC Phase to Neutral	

Warning: High Leakage Current. Ground (earth) connection essential before connecting the supply. Multiple Power Sources/Cords. Protective devices in the building installation for protection shall not exceed 36A per phase 50/60 Hz.
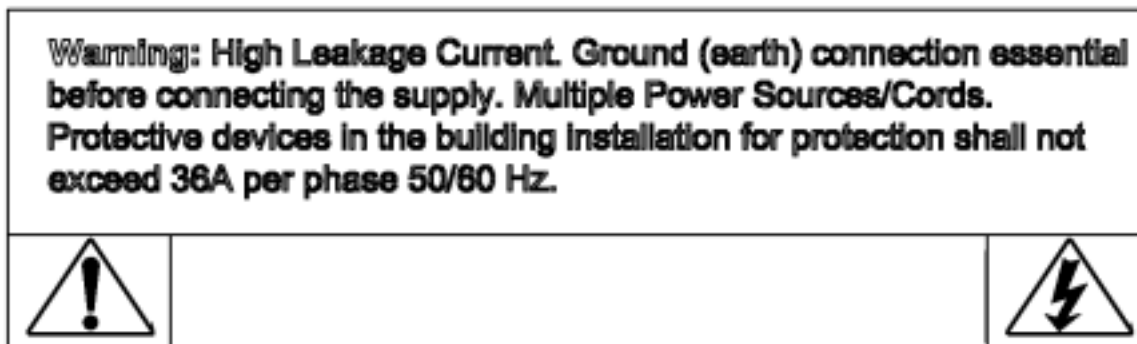
Figure 4 through Figure 7 illustrate the PDCA wiring preparations and connections for the options in Table 2.

Figure 4 Access to PDCA Terminal Block

1.36 in DIA
3.45 cm DIA
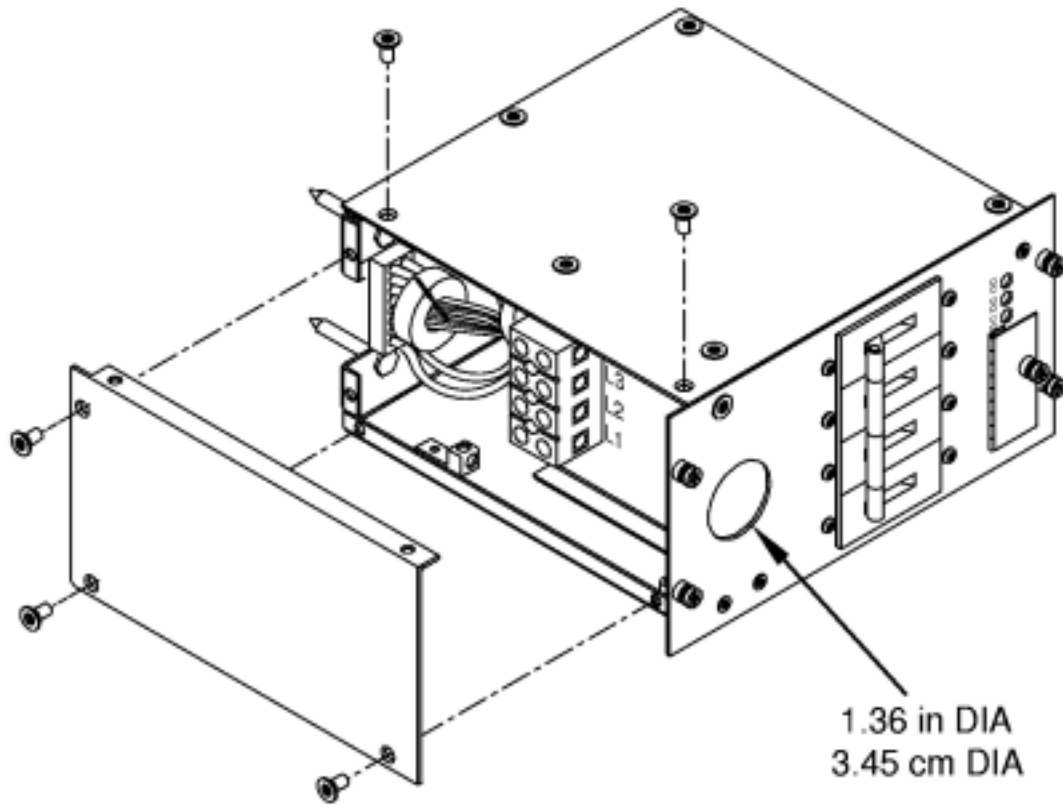
60SP042C
1/7/00

NOTE Due to local codes, solid conductor or low count stranded cabling may be required to meet the fill ratio and current/cable derating guidelines for multi-conductor cabling, as well as to pass through the inside diameter of the strain relief or conduit coupling.

Figure 5 Cable Preparation Detail

1.36 in DIA
3.45 cm DIA
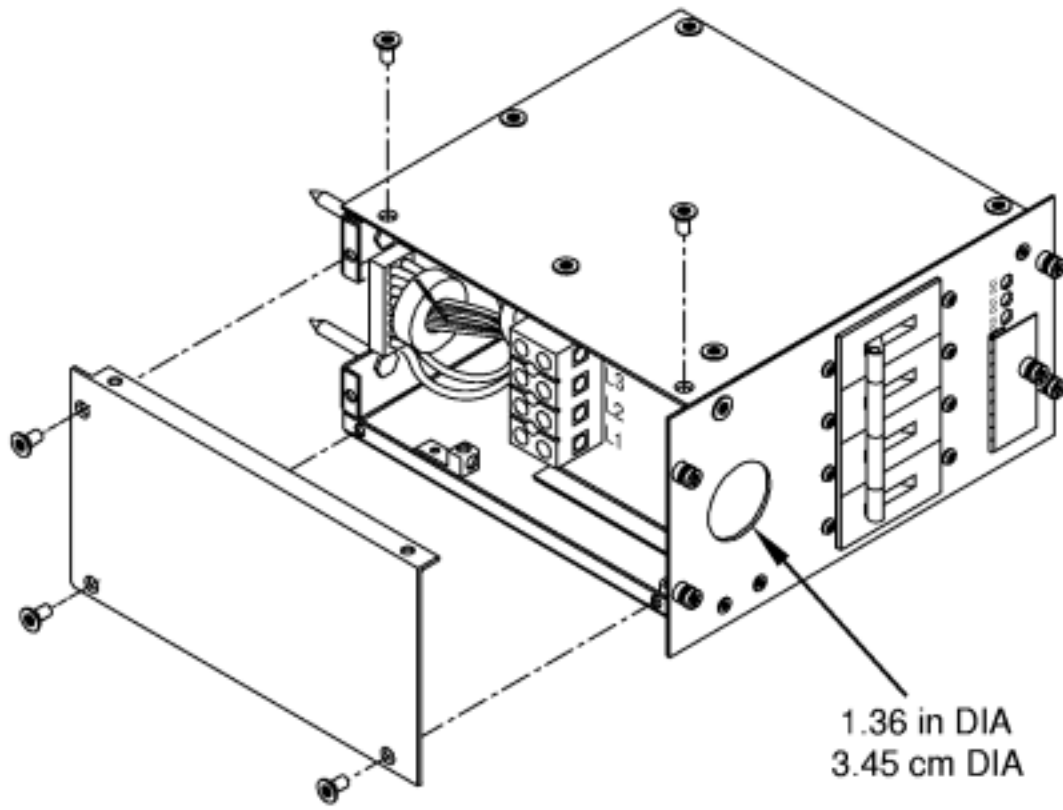
60SP042C
1/7/00

Figure 6 PDCA (five-wire) Input Wiring Connections
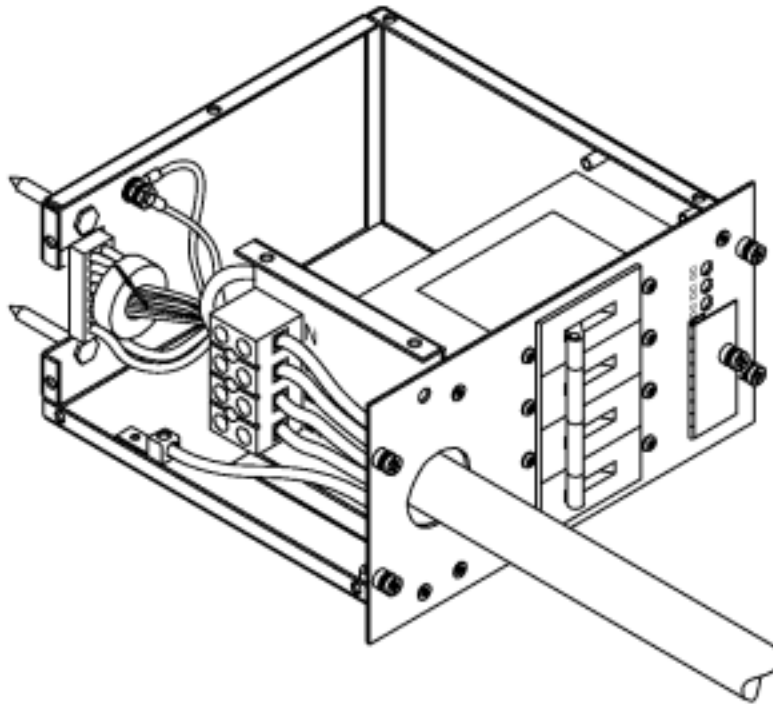
60SP041A
7/13/00

Figure 7 PDCA (four-wire) Input Wiring Connections
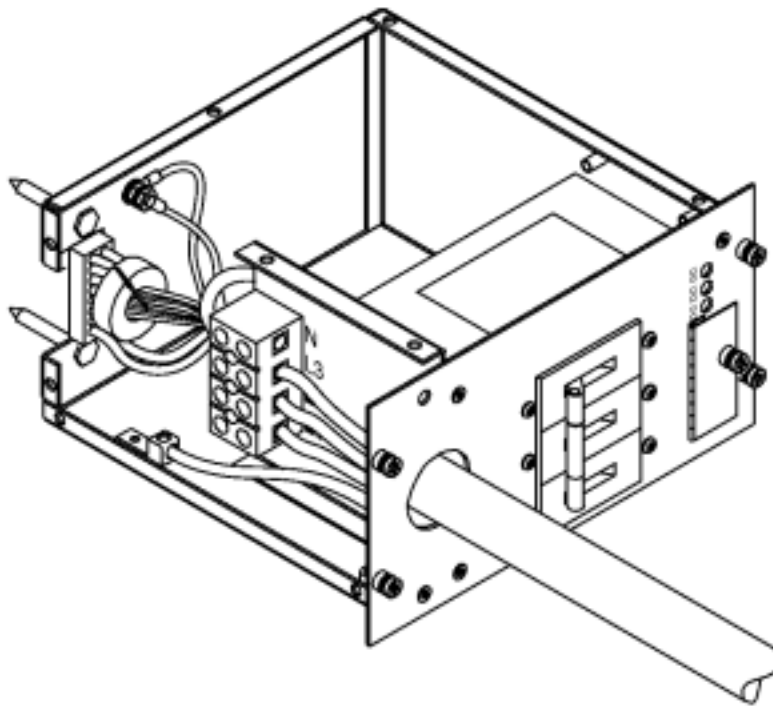
605P041B
7/13/00

[Figure 8](#) and [Figure 9](#) detail a suggested configuration for connecting the PDCA when the use of rigid conduit is required or desired. Using a four-inch nipple and a 90º elbow allows the conduit to pass through the raised floor at a point immediately past the cabinet. This prevents the conduit from extending beyond the cabinet creating a possible trip hazard.

Figure 8 PDCA Conduit Connection
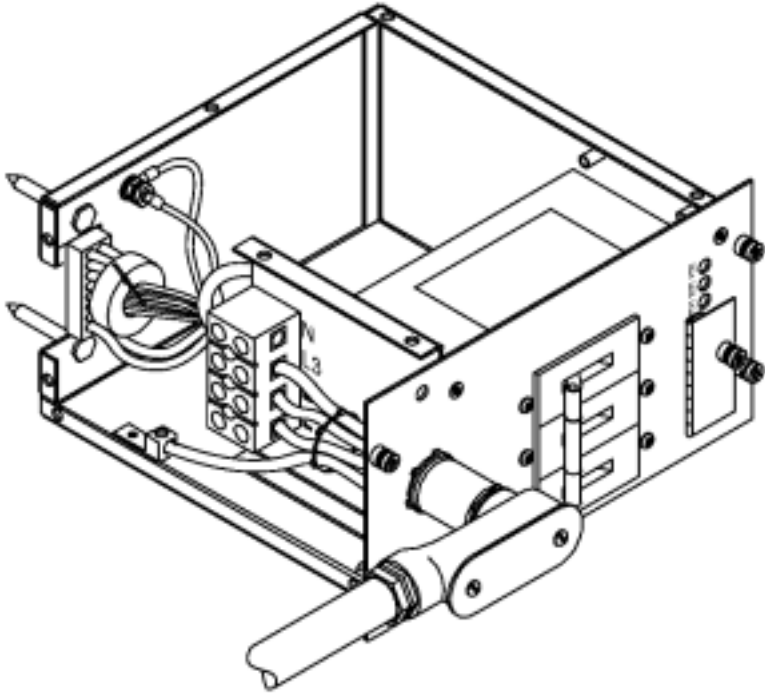
60SP046A
8/18/00

Figure 9 Conduit Required for PDCA Connection
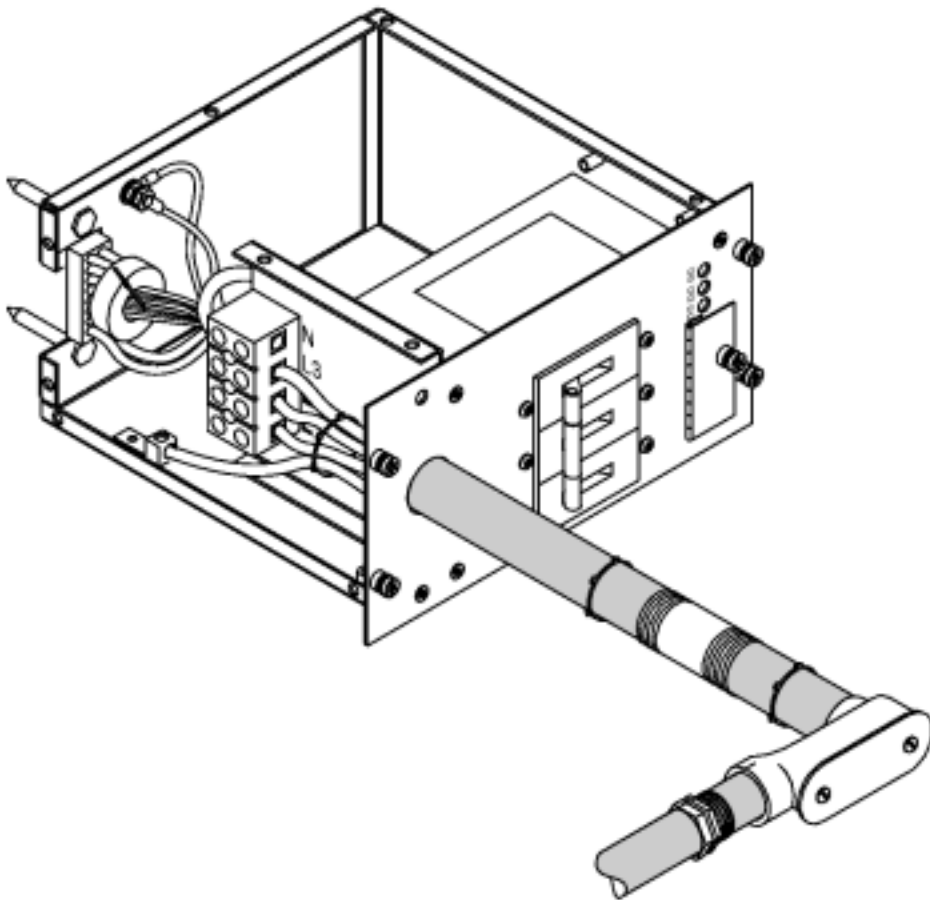
60SP045A
8/18/00

Power Cords

This section discusses the different configurations for Superdome PDCA power cords.

Pre-wired PDCAs (Options 4 and 5) All Superdome servers are delivered with the appropriate cable, plug, and receptacle.

Because each system is shipped pre-wired, it is very important that the source power be verified during the site preparation to ensure that the proper PDCA wiring, plug, and connector ship with the system.

NOTE When installing the receptacle, ensure that there is enough room to allow for mating the receptacle with the plug.

Check the voltages at the receptacle prior to connecting the newly installed receptacle to the PDCA plug. Refer to Figure 10 and Figure 11 for pin locations.

- To verify the proper wiring for a four-wire PDCA, use a DVM to measure the voltage at the receptacle. Voltage should read 200 - 240 Vac phase to phase as measured between the receptacle pins as follows: L1 to L2, L2 to L3, L1 to L3.

- To verify the proper wiring for a five-wire PDCA, use a DVM to measure the voltage at the receptacle. Voltage should read 200 - 240 Vac phase to neutral; as measured between the

receptacle pins as follows: L1 to N, L2 to N, L3 to N.

Figure 10 Four Wire Connector
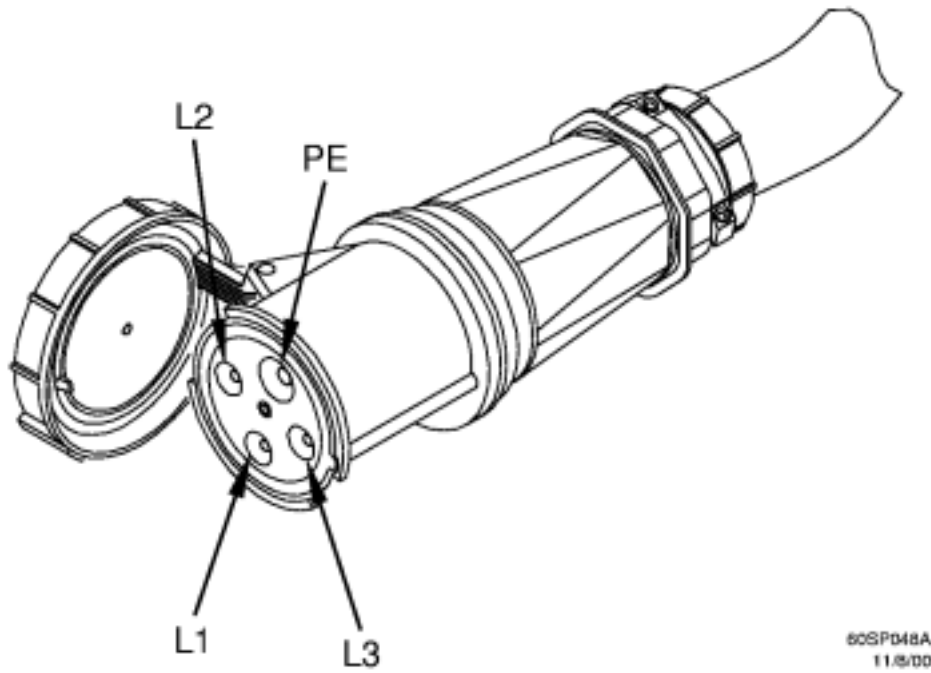
Figure 11 Five Wire Connector
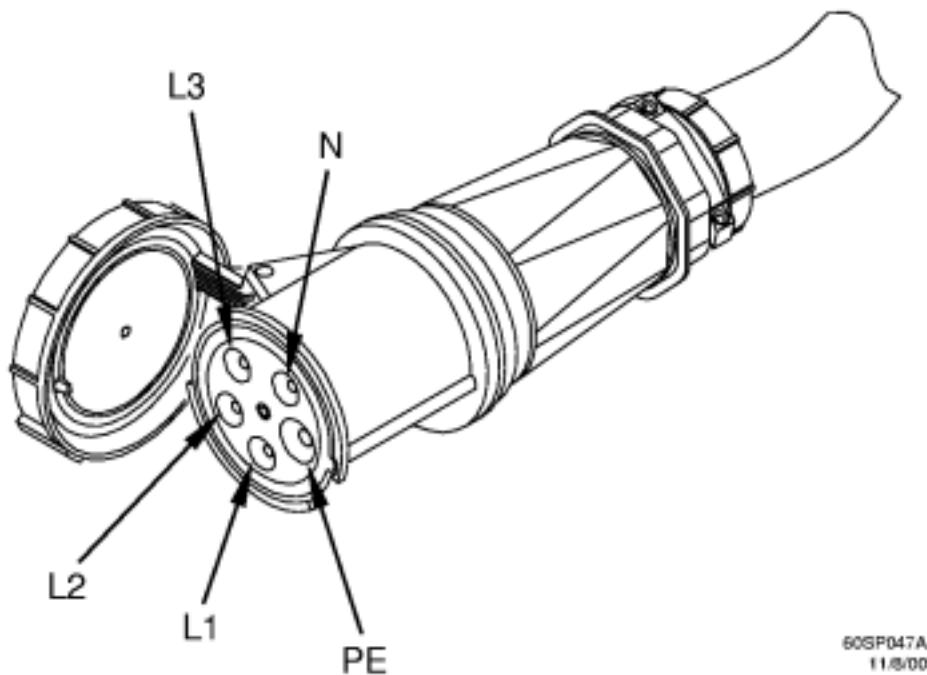
Hardwired PDCA   Some installations may either require or desire that the Superdome server(s) be hardwired in lieu of using the standard plugs and connectors provided. In these cases, it is necessary to remove the installed power cable from the PDCA.Use the following procedures to remove and replace the existing power cable.

Cable Removal

Step 1.   Locate and remove the PDCAs.

Step 2.   Remove the five screws securing the bottom of the PDCA. Retain the screws. Refer to Figure 12 for details.

Step 3.   Disconnect the existing wires from the PDCA terminal lugs. Refer to Figure 12 for details.

NOTE   Loosen the cable side terminal lugs only. Do not loosen the PDCA side terminal lugs.

NOTE   For five-wire cables, loosen four lugs. For four-wire cables, loosen three lugs.

Step 4.   Remove the safety ground cable (green and yellow cable). Use an 11 mm socket. Retain the attaching hardware.
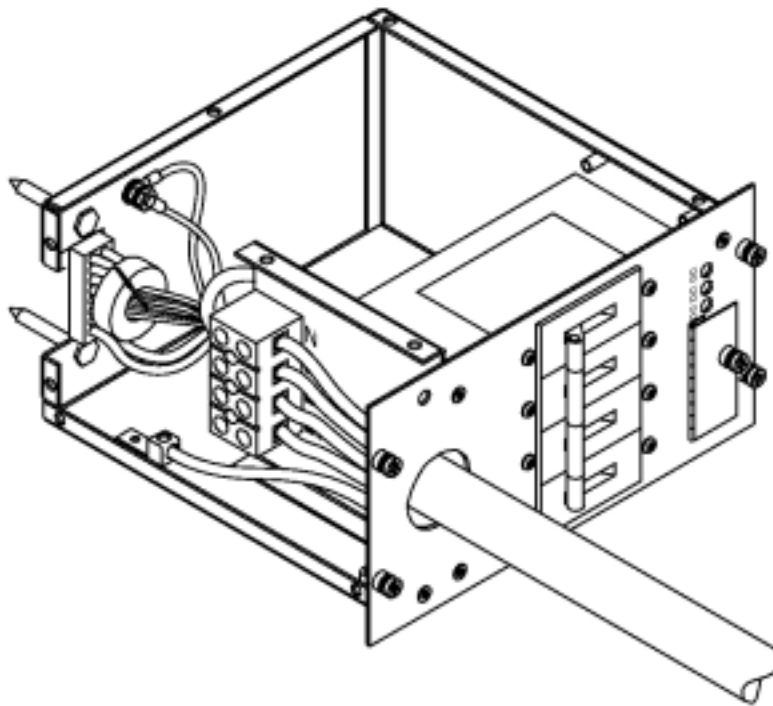
Step 5.   Remove the cable from the PDCA. Keep all retaining hardware for use during installation of the new cable.

Figure 12 PDCA Cable Access

1.36 in DIA
3.45 cm DIA
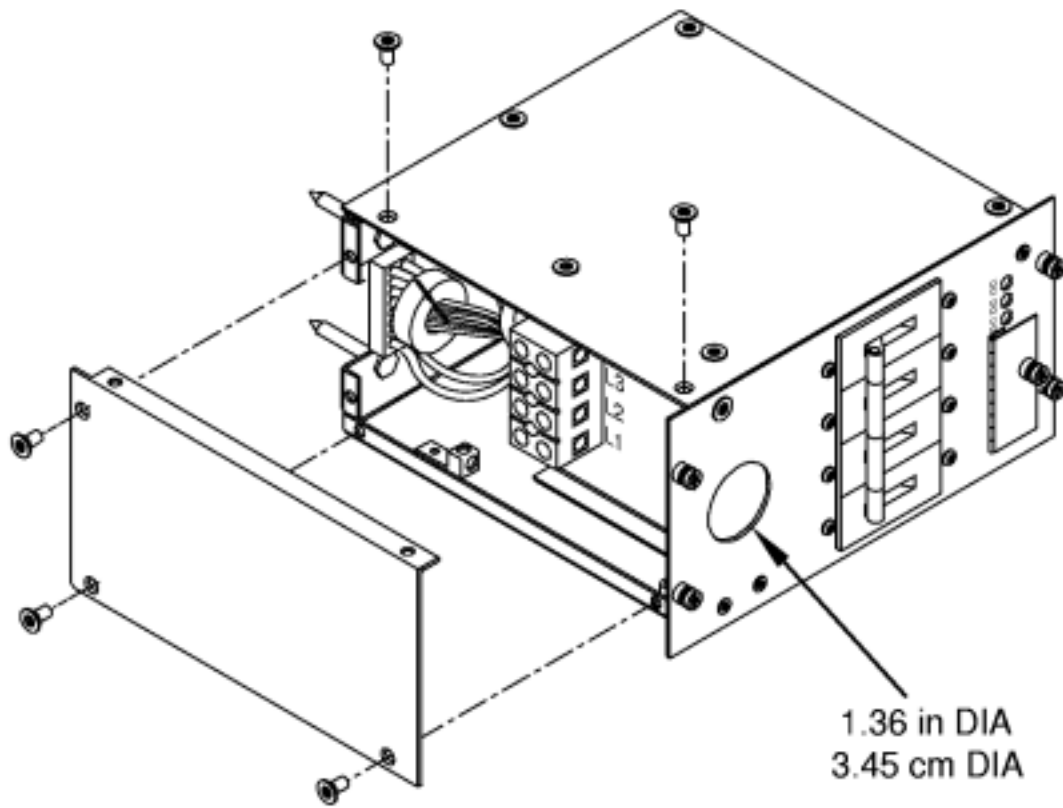
60SP042C
1/7/00

Figure 13 PDCA Input Wiring Connections

60SP041A
7/13/00

Cable Installation

NOTE These procedures may be used for early deliveries consisting of either option 1 or option 2 as well as those later systems delivered with PDCA cables attached.

Select the proper cable using the following criteria.

- Each Superdome server cabinet using a three-phase, four-wire input must have a four-conductor cable. The four-conductor cable selected by the facility electrician shall be in accordance with local electrical codes to support the selected circuit breaker for the Marked Electrical current of 62A per phase. The facility electrician and local electrical codes will determine proper power cord selection dependent upon desired application such as rigid conduit, flexible conduit, or cable bundle.

- Each Superdome server cabinet using a three-phase five-wire input must have a five-conductor cable. The five-conductor cable selected by the facility electrician shall be in accordance with local electrical codes to support the selected circuit breaker for the Marked Electrical current of 36A per phase. The facility electrician and local electrical codes will determine proper power cord selection dependent upon desired application such as rigid conduit, flexible conduit, or cable bundle.

Step 1. Prepare the new cable as shown in <u>Figure 14</u>.

Step 2. Route the new cable into the PDCA. Be sure to use the cable retaining hardware saved from the cable removal.

Step 3. Route the cable into the PDCA terminal lugs and secure in position by tightening the lugs.

Step 4. Attach the green and yellow ground cable. Use the hardware that was retained during the cable removal.

Step 5. Replace the bottom panel on the PDCA. Use the five screws retained from the removal procedure. Refer to [Figure 12](#) for panel installation details.

To verify the proper wiring to a four-wire PDCA, use a DVM to measure the voltage at the test points. Voltage should read 200 - 240 Vac phase to phase as measured between the test points as follows: L1 to L2, L2 to L3, L1 to L3.

Step 6. **NOTE** In some electrical distributions around the world, it is possible to measure 415 VAC phase to phase.

To verify the proper wiring to a five-wire PDCA, use a DVM to measure the voltage at the test points. Voltage should read 200 - 240 Vac phase to neutral, as measured between the test points as follows: L1 to N, L2 to N, L3 to N.

Figure 14 Cable Preparation Detail
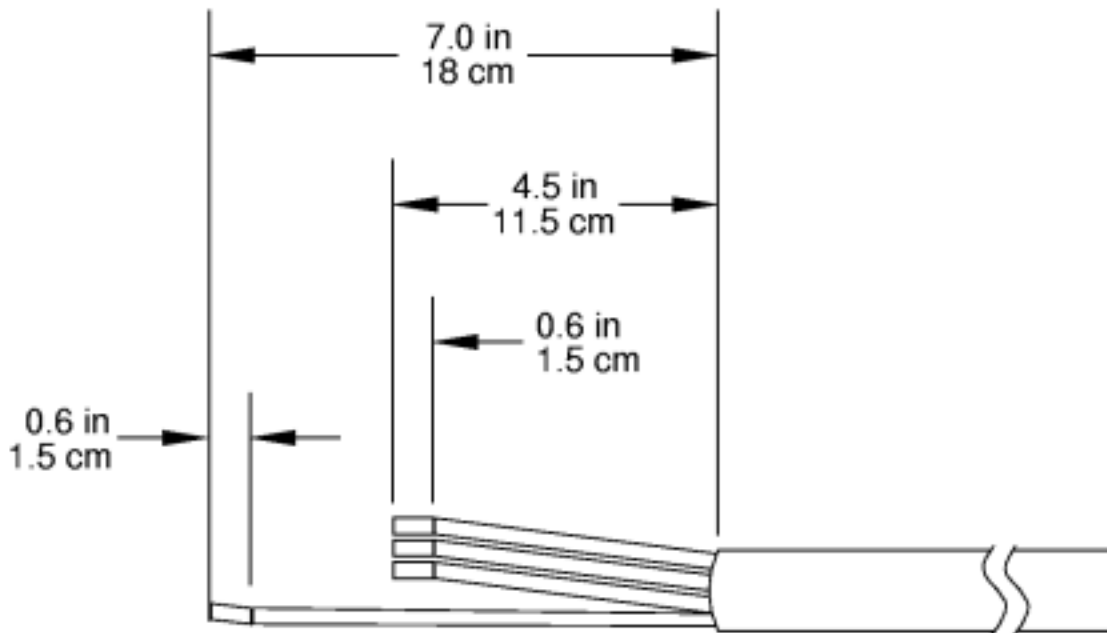
Figure 8 and Figure 9 detail a suggested configuration for connecting the PDCA when the use of rigid conduit is required or desired. Using a 4 inch nipple and a 90o elbow allows the conduit to pass through the raised floor at a point immediately past the cabinet. This prevents the conduit from extending beyond the cabinet creating a possible trip hazard.

Figure 15 PDCA Conduit Connection
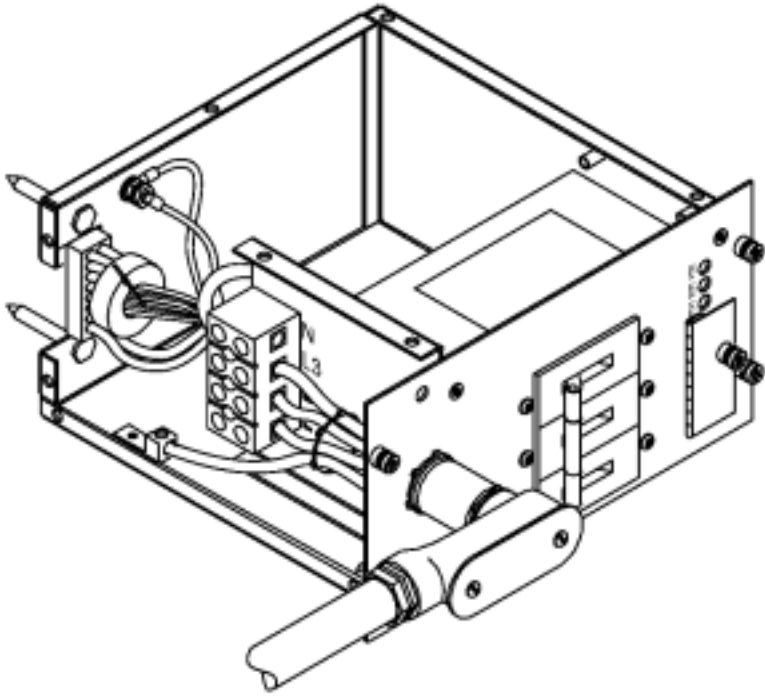
60SP046A
8/18/00

Figure 16 Conduit Required for PDCA Connection
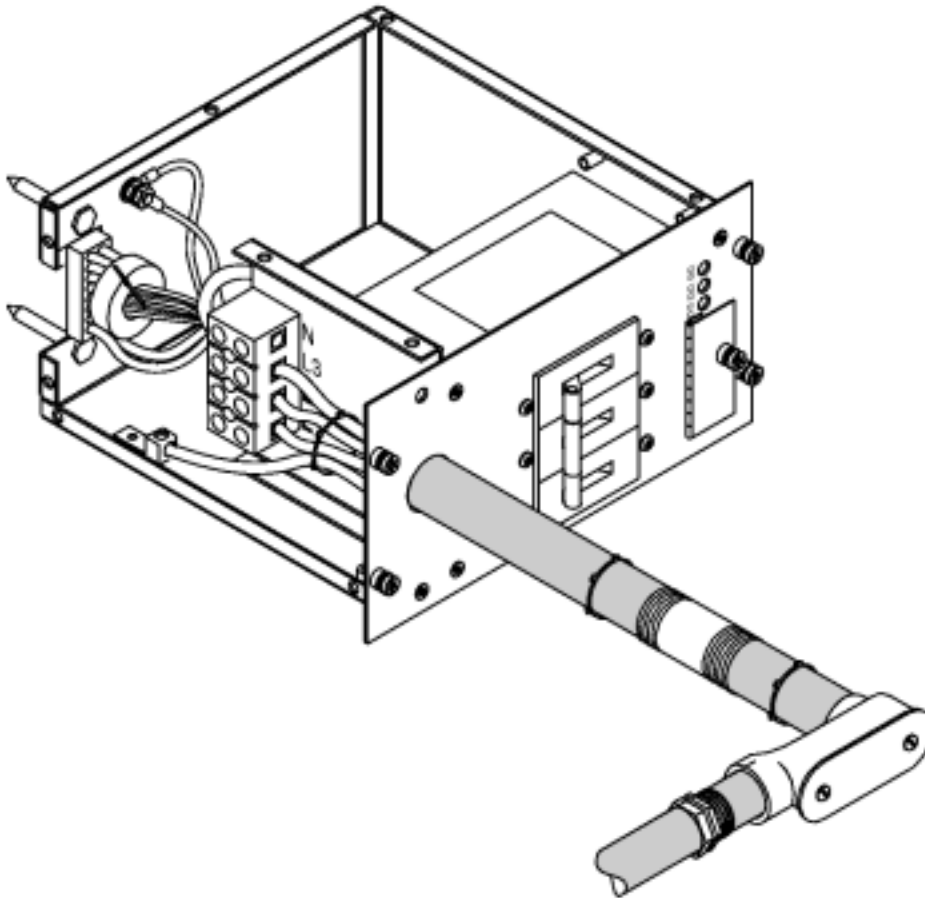
80SP045A
8/18/00

Footnotes

1 Neutral-to-ground voltage can vary from millivolts to several volts depending on the distance to the ground/neutral bond at the transformer. Any voltage over 3 V should be investigated by a site prep or power specialists.

2 Marked Electrical is defined as worst case current draw. It is that over design required by safety agencies around the world.

3 A dedicated branch circuit is required for each PDCA installed.

4 415 VAC phase to phase is possible.

(Number takes you back)

Installing a PCI Chassis - Offline