

# Superdome Site Preparation Guide

**HP 9000 Systems**

**Eighth Edition**



**Manufacturing Part Number: A5201-10024  
80602**

USA

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**Eighth Edition**

June 2002

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## Legal Notices

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HEWLETT-PACKARD COMPANY 3000 Hanover Street Palo Alto, California 94304 U.S.A.

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## **Preface**

## Revision History

**Table 1**                      **Revisions After May 2001**

<b>Revision</b>	<b>Part Number</b>	<b>Release Date</b>	<b>Description</b>
Eighth		June 2002	Added recommendations for the in-line connector and the wall panel receptacle that are supplied by the end user (customer). These parts are not provided by H.P. due to the extensive options available for the cusomter's building wiring infrastructure.  Added miscellaneous updates and corrections.
Seventh	A5201-10023	November 2001	Added new PDCA options.
Sixth	A5201-10016	August 2001	Updated for Caribe. Update safety and regulatory information. Changed power, circuit breaker, and wiring infomation. Added ramp angle note.
Fifth	A5201-10013	July 2001	Added Safety and Regulatory section.  Added info on lower breaker value usage, pay-per-use and iCOD modem support, and general corrections per edits.
Fourth	A5201-10011	May 2001	Added IOX information.

## Safety and Regulatory Information



For your protection, this product has been tested to various national and international regulations and standards. The scope of this regulatory testing includes electrical/mechanical safety, radio frequency interference, acoustics, and know hazardous materials. Where applicable, approvals obtained from third-party test agencies are shown on the product label.

### Notational Conventions

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**WARNING** Warnings highlight procedures or information necessary to avoid injury to personnel. The warning should tell the reader exactly what will result from what actions and how to avoid them.

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**CAUTION** A caution highlights procedures or information necessary to avoid damage to equipment, damage to software, loss of data, or invalid test results.

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**NOTE** A note highlights supplemental information.

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### Acronyms

Table 2 lists acronyms used in this document.

**Table 2** Acronyms

Acronym	Definition
PE	Protective earth
Class 1	Grounded equipment
PDCA	Power Distribution Controller Assembly
EPSS	Electronic Performance Support Service

### Safety in Material Handling

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**WARNING** Do not lift the cabinet manually. To avoid physical injury you must use a mechanical lifting device.

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**WARNING** Use care when lifting a cell board. Each cell board can weigh as much as 48 pounds (22kg).

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**WARNING** Use care when working with hazardous voltages. This equipment may be configured with dual input line sources. Hazardous voltages and energy may be present even after the removal of a single input source. Trained service personnel must follow the service guidelines.

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**WARNING** Do not stand in front of the equipment as it is rolled off the pallet onto the ramps. When removing the equipment from the shipping pallet, follow the guidelines specified in the Installation Procedures section of the appropriate equipment guides (Superdome or I/O Expansion Cabinet).

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**WARNING** Do not attempt to move the Superdome cabinet, either packed or unpacked, up or down an incline of more than 15 degrees.

---

**IOX Only:**

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**WARNING** Attach stabilizer feet to both front and back before extending the equipment drawers. Failure to attach the stabilizer feet may result in a tip hazard.

---

**IOX Only:**

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**WARNING** Observe pinch hazard areas. Keep fingers away from closing parts.

---

## **USA Radio Frequency Interference FCC Notice**

The Federal Communications Commission (in 47 CFR Part 15 subpart B) has specified that the following notice be brought to the attention of the users of this product.

---

**NOTE** This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

---



The user is cautioned that changes or modifications not expressly approved by Hewlett-Packard could result in the equipment being noncompliant with FCC Class A requirements and void the user's authority to operated the equipment.

## Japanese Radio Frequency Interference VCCI

This equipment is in the Class A category information technology equipment based on the rules of Voluntary Control Council For Interference by Information Technology Equipment (VCCI). When used in a residential area, radio interference may be caused. In this case, user may be required to take appropriate corrective actions.

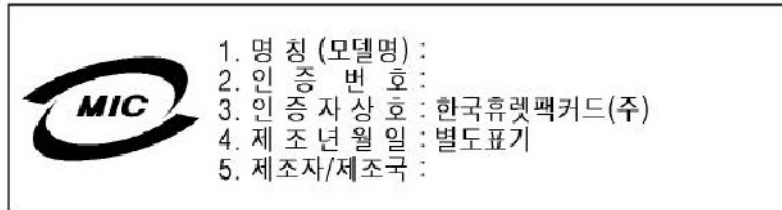
Figure 1

この装置は、クラスA情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。 VCCI-A

## Korean RFI Statement

1. Equipment Name (Model Name):
2. Certification No:
3. Name of Certification Recipient:
4. Date of Manufacture:
5. Manufacturer/Nation:

Figure 2



Certification Number: E - AAAAA - BB - CCCC

- E: EMC registration
- AAAAA: equipment codes (RRL notice, 2000.10.26)
- BB: certification year
- CCCC: registration number
- E: EMC registration
- AAAAA: equipment codes (RRL notice, 2000.10.26)
- BB: certification year

- CCCC: registration number

### **Figure 3            Korean RFI**

#### **사용자 안내문 (A 급기기)**

이 기기는 업무용으로 전자파 장애검정을 받은 기기이오니, 만약 잘못 구입 하셨을 때에는 구입한 곳에서 비업무용으로 교환 하시기 바랍니다.

#### **사용자 안내문 (B 급기기)**

이 기기는 비업무용으로 전자파 장애검정을 받은 기기로서, 주거지역에서는 물론 모든 지역에서 사용할 수 있습니다.

### **Translation**

#### **Class A Equipment:**

Please note that this equipment has been approved for business purpose with regards to electromagnetic interference, if purchased un error for use in residential area, you may wish to exchange the equipment where you purchase it.

#### **Class B Equipment:**

Please note that this equipment has been approved for non-business with regards to electromagnetic interference. So, this equipment can be allowed to use all area as well as residential area.

### **European Union RFI Statement**

This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

### **Canada RFI Statement**

This Class A digital apparatus complies with Canadian ICES-003.

### **Notice relative aux interférences radioélectriques (Canada)**

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

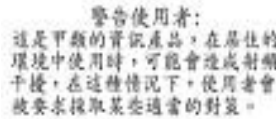
## BSMI (Taiwan Areas)

This product is fully compliant to CNS 13438 (CISPR 22: 1993) Class A. The EMC label is in the form shown in Figure 4. The eight # signs represent an eight-character, alpha-number string.

Figure 4



Figure 5



## Acoustics (Germany)

Acoustic Noise (A-weighted Sound Pressure Level LpA) measured at the bystander position, normal operation, to ISO 7779: LpA = 65.1 dB.

## Geräuschemission (Deutschland)

Lärmangabe (Schalldruckpegel LpA) gemessen am fiktiven Arbeitsplatz bei normalem Betrieb nach DIN 45635, Teil 19: LpA = 65.1 dB.

## IT Power System

This product has not been evaluated for connection to an IT power system (an AC distribution system having no direct connection to earth according to IEC 60950).

## TT, TN-C, and TN-C-S Power Systems

These products should not be connected to power systems that switch open the return lead when the return lead also functions as the protective earth (PE). A separate PE ground wire must be connected to the equipment at the designated PE terminal tie point.

## High Leakage Current

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**WARNING High leakage current. Ground (earth) connection essential before connecting the supply.**

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## Installation Conditions

See installation instructions before connecting this equipment to the input supply.

Voir la notice d'installation avant de raccorder au réseau.

---

**WARNING Please note the following conditions of installation:**

---

**Install a PE (protective earthing) conductor that is identical in size, insulation material, and thickness to the branch-circuit supply conductors. The PE conductor insulation must be green with yellow stripes. The earthing conductor is to be connected from the unit to the building installation earth or, if supplied by a separately derived system, at the supply transformer or motor-generator set grounding point.**

---

**WARNING** NORDIC Class 1 Equipment

**Denmark: Før tilslutning af de øvrige ledere, se medfølgende installationsvejledning.**

---

**WARNING** NORDIC Class 1 Equipment

**Sweden: Apparaten skall anslutas till jordat uttag, när den ansluts till ett nätverk.**

---

**Recommended Wire Sizes** Table 3 shows the wire size requirements for conductors in power supply cords (Extracted from IEC 60950, Table 11).

---

**NOTE** Specific countries require a derating factor for the wire size when running multiple conductors in the same power cord. It is Hewlett-Packards recommendation to use only power cord conductors sized for this derating factor.

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**Table 3 Recommended Wire Sizes**

Current	Wire Size	Derating Factor
0-25 Amps	2.5 mm (14 AWG)	4 mm (12 AWG)
25-32 Amps	4 mm (12 AWG)	6 mm (10 AWG)
32-40 Amps	6 mm (10 AWG)	10 mm (8 AWG)
40-63 Amps	10 mm (8 AWG)	16 mm (6 AWG)
63-80 Amps	16 mm (6 AWG)	25mm (4 AWG)

**Disconnect Devices** Disconnect devices or circuit breakers must be used to protect the system against abnormal hazards. Table 4 details the circuit breaker specifications.

**Table 4 Wall Disconnect Device Circuit Breaker Specification**

Agency approvals:	UL, CSA, VDE
Interrupt capacity	5,000A minimum
Breaker type	Magnetic trip
Voltage rating	250V minimum 3-pole+PE, 420V minimum 4-pole+PE
Input Source	3 pole + PE or 4-pole + PE

**Table 4 Wall Disconnect Device Circuit Breaker Specification (Continued)**

Circuit Interruption	Simultaneous trip of all poles
Ground	The protective earth (PE) ground wire is not switched

---

**WARNING** Provide a disconnect device to protect against abnormal hazards.

**Systems configured with a full complement of cells, memory, and I/O and connected to a 5-wire source must have a maximum 24A 3-phase with neutral (4-pole) circuit breaker installed as part of the building installation.**

**Systems configured with a full complement of cells, memory, and I/O and connected to a 4-wire source must have a maximum 44A 3-phase (3-pole) circuit breaker installed as part of the building installation.**

---



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**CAUTION** Refer to Table E-1 on page 104 to select the appropriate size circuit breaker for systems configured without a full complement of cells, memory, and I/O.

---

Table E-1 on page 104 shows Superdome power requirements by configuration (i.e. number of cell boards, amount of memory per cell, and number of I/O chassis). This requirement applies to 32-way-capable systems with PA8600 or PA8700 processors.

There are two columns of power numbers (Watts). The Power Breaker column shows the power used to size the wall breaker at the installation site. The Typical Power column shows typical power. Typical power numbers are for PA8600 systems and may be used to assess average utility cost of cooling and electrical power. Expect these typical numbers to be about 18% less for PA8700 systems.

---

**CAUTION** For supply connections, use wires suitable for at least 105 °C.

Utiliser des fils convenant á une température de 105 °C pour les connexions d'allmenation.

---

**Network Connected Equipment**The installation must provide a ground connection for the network equipment.

---

**CAUTION** Sweden: Apparaten skall anslutas till jordat uttang när deb abskuts till ett nätverk.

---

### **IOX Multiple Power Sources and Cords**

This equipment may be configured with dual-input line sources. Hazardous voltages and energy may be present even after the removal of a single input source. Trained service personnel must follow the guidelines stipulated in the *Service Guidelines* section of the Superdome EPSS.

**IOX Only:**

---

**WARNING** Remove both input power sources before replacing an internal fuse.

---

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**WARNING** If the system has two PDCA installed, ensure that power is removed from both PDCA before removing fuses.

---

## Fuse Warnings

Superdome Only:

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**WARNING** Disconnect power before changing fuse.

---

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**CAUTION** For continued protection against risk of fire, replace fuses only with same type and rating.

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## Lithium Battery Caution

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**WARNING** Observe the correct polarity when changing the lithium battery. There is a danger of explosion if battery is installed incorrectly.

Replace only with the same or equivalent type recommended by the manufacturer.  
Dispose of used batteries according to the manufacturer's instructions and local disposal requirements.

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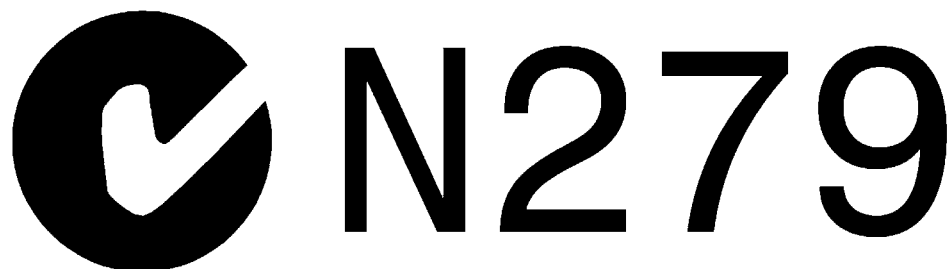
---

**IMPORTANT** Switzerland: Annex 4.10 of SR 814.013 applies to batteries.

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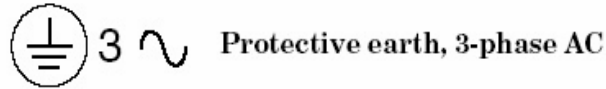
## Australian C-Tick Label

Figure 6

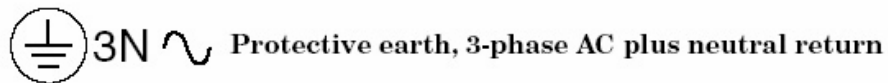


## International Symbols (IEC335-1)

**Figure 7**      **Four Wire Connection**



**Figure 8**      **Five Wire Connection**

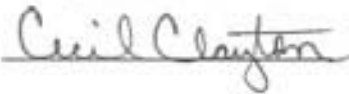


## Associated Documents

The following documents provide more details on the topics presented in this manual:

- *Standard for the Protection of Electronic Computer Data Processing Equipment*, (NFPA75) National Fire Protection Association
- EIA Standard RS-232-C, Electronic Industries Association
- *Electrostatic Discharge Failures of Semiconductor Devices*, Unger, B.A. 1981, Bell Laboratories
- IEC 60950, EN 60950, UL 60950, CSA 22.2 No. 950 *Standards for Safety of Information Technology Equipment*
- IEC 60417, IEC 335-1, ISO 3864, IEC 617-2 International Symbols

**Figure 9 Superdome Declaration of Conformity Page 1**

<b>DECLARATION OF CONFORMITY</b> <small>according to ISO/IEC Guide 22 and EN 45014</small>																													
<b>Manufacturer's Name:</b>	Hewlett-Packard Company																												
<b>Address:</b>	3000 Waterview Parkway Richardson, TX 75080, USA																												
declares that the product																													
<b>Product Name:</b>	SUPERDOME (HP High Performance SMP Server)																												
<b>Model Number(s):</b>	SPP5, [Marketing nomenclature: Model 16, SD16000, Model 32, SD32000, Model 64, SD64000]																												
<b>Base Product Number(s):</b>	A5200A, A5201A, A5202A, A6113A, A6445A, A6862A																												
<b>Product Option(s):</b>	All																												
conforms to the following Product Specifications:																													
<b>Safety:</b>	IEC 60950:1991 + A1+A2+A3+A4 (with national differences for the countries & areas listed on page 2) EN 60950:1992 + A1+A2+A3+A4+A11 UL 1950, Third Edition; CAN/CSA C22.2 No. 950-95 Third Edition																												
<b>EMC:</b>	<table style="width: 100%; border: none;"> <tr> <td style="width: 70%;">CISPR 22:1997 / EN 55022: 1998 Class A</td> <td style="width: 30%;"></td> </tr> <tr> <td>EN 55022:1998, Class A, 30 MHz to 5.56 GHz</td> <td>Radiated Emissions</td> </tr> <tr> <td>EN 55022:1998, Class A, 150 kHz to 30 MHz</td> <td>Conducted Emissions</td> </tr> <tr> <td>EN 55024:1998</td> <td>Immunity for ITE</td> </tr> <tr> <td>EN 61000-4-2:1995, 8kV CD / 15kV AD</td> <td>ESD</td> </tr> <tr> <td>EN 61000-4-3:1996, 100kHz-30MHz, 10 V/m, 1kHz AM</td> <td>Radiated Immunity</td> </tr> <tr> <td style="padding-left: 20px;">30MHz-80MHz, 3V/m, 1kHz AM</td> <td></td> </tr> <tr> <td style="padding-left: 20px;">80MHz-1GHz, 10V/m, 1kHz AM</td> <td></td> </tr> <tr> <td>ENV 50204:1995, 900MHz, 1.89GHz, PM, 10 V/m</td> <td>Radiated Immunity</td> </tr> <tr> <td>EN 61000-4-4:1995, 1kV Power line, 0.5kV signal cables</td> <td>EFT</td> </tr> <tr> <td>EN 61000-4-5:1995, 2kV CM, 1kV DM</td> <td>Surge</td> </tr> <tr> <td>EN 61000-4-6:1996, .150MHz - 400MHz, 3 V<sub>rms</sub>, 1kHz AM</td> <td>Conducted Immunity</td> </tr> <tr> <td>EN 61000-4-8:1993, 3 A/m, 50Hz</td> <td>Magnetic Immunity</td> </tr> <tr> <td>EN 61000-4-11:1994, 11V<sub>rms</sub> (10ms), 161V<sub>rms</sub> (0.5s), 11 V<sub>rms</sub> (5s)</td> <td>Voltage Dips &amp; Interrupts</td> </tr> </table>	CISPR 22:1997 / EN 55022: 1998 Class A		EN 55022:1998, Class A, 30 MHz to 5.56 GHz	Radiated Emissions	EN 55022:1998, Class A, 150 kHz to 30 MHz	Conducted Emissions	EN 55024:1998	Immunity for ITE	EN 61000-4-2:1995, 8kV CD / 15kV AD	ESD	EN 61000-4-3:1996, 100kHz-30MHz, 10 V/m, 1kHz AM	Radiated Immunity	30MHz-80MHz, 3V/m, 1kHz AM		80MHz-1GHz, 10V/m, 1kHz AM		ENV 50204:1995, 900MHz, 1.89GHz, PM, 10 V/m	Radiated Immunity	EN 61000-4-4:1995, 1kV Power line, 0.5kV signal cables	EFT	EN 61000-4-5:1995, 2kV CM, 1kV DM	Surge	EN 61000-4-6:1996, .150MHz - 400MHz, 3 V <sub>rms</sub> , 1kHz AM	Conducted Immunity	EN 61000-4-8:1993, 3 A/m, 50Hz	Magnetic Immunity	EN 61000-4-11:1994, 11V <sub>rms</sub> (10ms), 161V <sub>rms</sub> (0.5s), 11 V <sub>rms</sub> (5s)	Voltage Dips & Interrupts
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<b>Supplementary Information:</b>																													
The product as stated above complies with the requirements of the Low Voltage Directive 73/23/EEC, and the EMC Directive 89/336/EEC, as amended by 93/68/EEC.																													
<u>April 25, 2002</u> Date	 by: Cecil Clayton Hewlett-Packard Company Product Regulations Manager																												
European Contact: Your Local Hewlett-Packard Sales and Service Office or Hewlett-Packard GmbH, Department HC-TRE / Standards Europe, Henenberger Strasse 140, D-71034 Boeblingen, Germany (FAX +49-7031-14-3143)																													



**Figure 10 Superdome Declaration of Conformity Page 2**

### **FCC Regulations (USA Only)**

The Federal Communications Commission (in 47 CFR Part 15) has specified that the following notice be brought to the attention of the users of this product.

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

The user is cautioned that changes or modifications not expressly approved by the party responsible for compliance (Hewlett-Packard) could result in the equipment being non-compliant with the FCC Class A requirements and void the user's authority to operate the equipment.

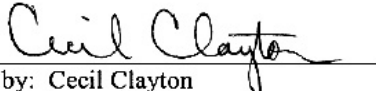
### **Additional International Approvals**

AS/NZS 3548:1995 C-Tick & Supplier Code (N279)  
CSA C22.2 No. 950-95  
ICES-003 Issue 3  
GB4943-1995  
GB9254-1988  
VCCI Class A  
MIC No. 1996-18, Class A  
BSMI, CNS-13438 11/94(Rev. 5/97)

Australia/New Zealand  
Canada  
Canada  
China  
China  
Japan  
Korean  
Taiwan

### **IEC 60950 Evaluated National Differences for the following countries and areas.**

CENELEC, AT= Austria, AU= Australia, BE= Belgium, CA= Canada, CH= Switzerland, CN= China, CZ= Czech Republic, DE= Germany, DK= Denmark, ES= Spain, FI= Finland, FR= France, GB= United Kingdom, GR= Greece, HU= Hungary, IE= Ireland, IL= Israel, IN= India, IT= Italy, JP= Japan, KR= Republic of Korea, NL= The Netherlands, NO= Norway, PL= Poland, RU= Russia, SE= Sweden, SG= Singapore, SI= Slovenia, SK= Slovakia, TR= Turkey, UA= Ukraine, US= United States, ZA= South Africa

<b>DECLARATION OF CONFORMITY</b>																													
according to ISO/IEC Guide 22 and EN 45014																													
<b>Manufacturer's Name:</b>	Hewlett-Packard Company																												
<b>Address:</b>	3000 Waterview Parkway Richardson, TX 75080, USA																												
<b>Declares that the product:</b>																													
<b>Product Name:</b>	I/O Expansion (IOX) cabinet for SuperDome																												
<b>Model Number(s):</b>	SPP6:IOX, SPP6-1:XPC, SPP6-2:XUC/RDM, SPP6-3:ICE																												
<b>Base Product Number(s):</b>	A5861A:IOX, A5861-26001:XPC, A5861-26002:XUC, A5861-26003:RDM, A5862A:ICE																												
<b>Product Option(s):</b>	All																												
<b>Conforms to the following Product Specifications:</b>																													
<b>Safety:</b>	IEC 60950:1999 (with national differences for the countries listed on page 2) EN 60950:2000 UL 60950:2000																												
<b>EMC:</b>	<table style="width: 100%; border: none;"> <tr> <td style="width: 60%;">CISPR 22 3rd edition:1997/ EN 55022:1998</td> <td>Class A</td> </tr> <tr> <td>EN 55022:1998, Class A, 30 MHz to 5 GHz</td> <td>Radiated Emissions</td> </tr> <tr> <td>EN 55022:1998, Class A, 150 kHz to 30 MHz</td> <td>Conducted Emissions</td> </tr> <tr> <td>CISPR 24:1997/EN 55024:1998</td> <td>Immunity for ITE</td> </tr> <tr> <td>EN 61000-4-2:1995, 8kV CD / 15kV AD</td> <td>ESD</td> </tr> <tr> <td>EN 61000-4-3:1996, 100kHz-1GHz, 10V/m, 1kHz AM</td> <td>Radiated Immunity</td> </tr> <tr> <td>ENV 50204:1995, 900MHz/1.89GHz, PM, 10 V/m</td> <td>Radiated Immunity</td> </tr> <tr> <td>EN 61000-4-4:1995, 1kV Power line, 0.5kV signal cables</td> <td>EFT</td> </tr> <tr> <td>EN 61000-4-5:1995, 2kV CM, 1kV DM</td> <td>Surge</td> </tr> <tr> <td>EN 61000-4-6:1996, 150kHz - 400MHz, 3V<sub>rms</sub>, 1kHz AM</td> <td>Conducted Immunity</td> </tr> <tr> <td>EN 61000-4-8:1993, 3 A/m, 50Hz</td> <td>Magnetic Immunity</td> </tr> <tr> <td>EN 61000-4-11:1994, 11V<sub>rms</sub> (10ms), 161V<sub>rms</sub> (0.5s), 11 V<sub>rms</sub> (5s)</td> <td>Voltage Dips &amp; Interrupts</td> </tr> <tr> <td>EN61000-3-2; '95 +A14</td> <td>Power line Harmonics</td> </tr> <tr> <td>EN61000-3-3; '95</td> <td>Voltage Flicker</td> </tr> </table>	CISPR 22 3rd edition:1997/ EN 55022:1998	Class A	EN 55022:1998, Class A, 30 MHz to 5 GHz	Radiated Emissions	EN 55022:1998, Class A, 150 kHz to 30 MHz	Conducted Emissions	CISPR 24:1997/EN 55024:1998	Immunity for ITE	EN 61000-4-2:1995, 8kV CD / 15kV AD	ESD	EN 61000-4-3:1996, 100kHz-1GHz, 10V/m, 1kHz AM	Radiated Immunity	ENV 50204:1995, 900MHz/1.89GHz, PM, 10 V/m	Radiated Immunity	EN 61000-4-4:1995, 1kV Power line, 0.5kV signal cables	EFT	EN 61000-4-5:1995, 2kV CM, 1kV DM	Surge	EN 61000-4-6:1996, 150kHz - 400MHz, 3V <sub>rms</sub> , 1kHz AM	Conducted Immunity	EN 61000-4-8:1993, 3 A/m, 50Hz	Magnetic Immunity	EN 61000-4-11:1994, 11V <sub>rms</sub> (10ms), 161V <sub>rms</sub> (0.5s), 11 V <sub>rms</sub> (5s)	Voltage Dips & Interrupts	EN61000-3-2; '95 +A14	Power line Harmonics	EN61000-3-3; '95	Voltage Flicker
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EN61000-3-2; '95 +A14	Power line Harmonics																												
EN61000-3-3; '95	Voltage Flicker																												
<b>Supplementary Information:</b>																													
The product as stated above complies with the requirements of the Low Voltage Directive 73/23/EEC, and the EMC Directive 89/336/EEC, as amended by 93/68/EEC.																													
<u>May 31, 2001</u>																													
Date	by: Cecil Clayton Hewlett-Packard Company Product Regulations Manager																												
<b>European Contact:</b> Your Local Hewlett-Packard Sales and Service Office or Hewlett-Packard GmbH, Department HQ-TRE / Standards Europe, Herrenberger Strasse 130, D-71034 Boeblingen, Germany (FAX +49-7031-14-3143)																													

**FCC Regulations (USA Only)**

The Federal Communications Commission (in 47 CFR Part 15) has specified that the following notice be brought to the attention of the users of this product.

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

The user is cautioned that changes or modifications not expressly approved by the party responsible for compliance (Hewlett-Packard) could result in the equipment being non-compliant with the FCC Class A requirements and void the user's authority to operate the equipment.

**Additional International Approvals**

AS/NZS 3548:1995 C-Tick & Supplier Code (N279)  
 CSA C22.2 No. 60950:2000  
 ICES-003 Issue 3  
 VCCI Class A  
 BSMI, CNS-13438 11/94(Rev. 5/97)  
 MIC No. 1996-18, Class A  
 GB4943-1995  
 GB9254-1988

Australia/New Zealand  
 Canada  
 Canada  
 Japan  
 Taiwan  
 Korean  
 China  
 China

**IEC 60950 Evaluated for Country National Differences**

CENELEC, AT = Austria, AU = Australia, BE = Belgium, CA = Canada, CH = Switzerland,  
 CN = China, CZ = Czech Republic, DE = Germany, DK = Denmark, ES = Spain, FI = Finland,  
 FR = France, GB = United Kingdom, GR = Greece, HU = Hungary, IE = Ireland, IL = Israel,  
 IN = India, IT = Italy, JP = Japan, KR = Republic of Korea, NL = The Netherlands, NO = Norway,  
 PL = Poland, RU = Russia, SE = Sweden, SG = Singapore, SI = Slovenia, SK = Slovakia,  
 TR = Turkey, UA = Ukraine, US = United States, ZA = South Africa



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# 1 System Specifications

The following Superdome specifications are based on HP Environmental Class C2. Class C2 is a controlled computer room environment where products are subject only to controlled temperature and humidity extremes.

This chapter describes the basic Superdome configuration including physical specifications and requirements:

- “Server System” on page 4 describes the basic system building blocks.
- “Upgrading Superdomes and Server Systems” on page 9 discusses the additional requirements resulting from upgrading Superdomes.
- “Dimensions and Weights” on page 10 discusses the physical size and weight of the Superdome components.
- “Electrical Specifications” on page 13 discusses the power requirements for the system and Support Management Station.
- “Environmental Requirements” on page 31 discusses temperature and humidity, power dissipation, and air flow information about the server and Support Management Station.

## **General**

This chapter lists the specifications of a Superdome. Throughout this chapter each specification is defined as thoroughly as possible to ensure that all data is considered to ensure a successful site preparation.

## Server System

This section provides an overview of the basic system building blocks of a Superdome.

### Basic System Building Blocks

The basic system building blocks used to configure a Superdome are as follows:

- Server cabinet
- Support Management Station

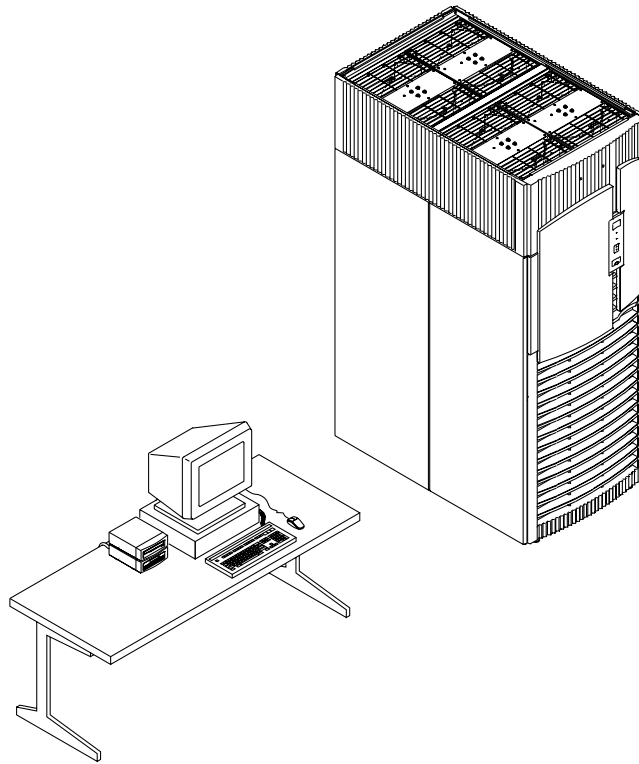
Figure 1-1 on page 5 illustrates a typical Superdome 16 Way/Superdome 32 Way installation.

Figure 1-2 on page 6 illustrates a typical Superdome 64 Way installation.



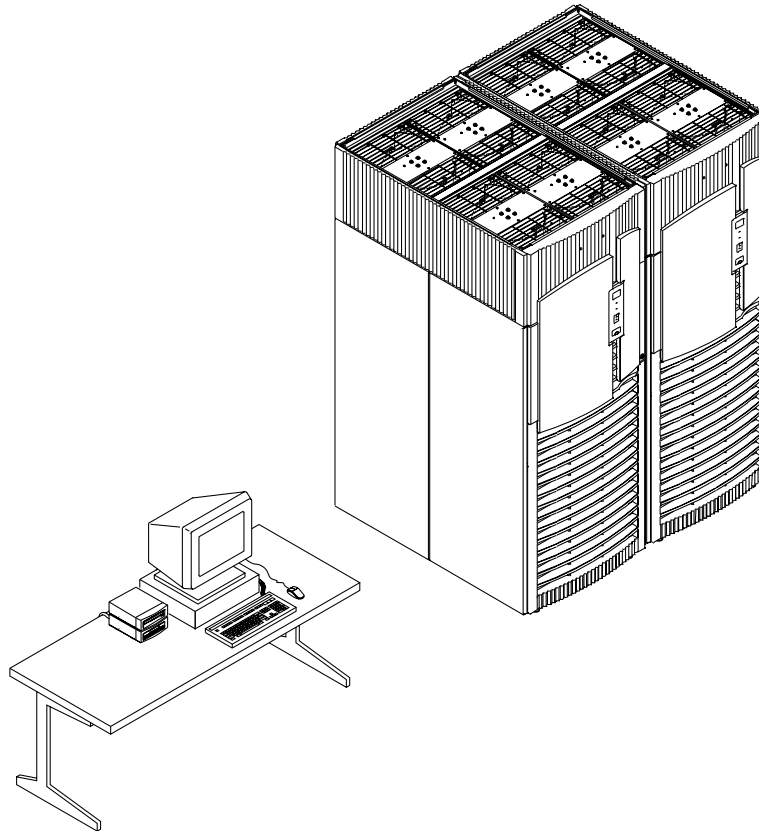
Figure 1-3 on page 7 illustrates a typical Superdome 64 Way and I/O expansion cabinet installation.

**Figure 1-1      Typical Superdome 16 Way/Superdome 32 Way Installation**



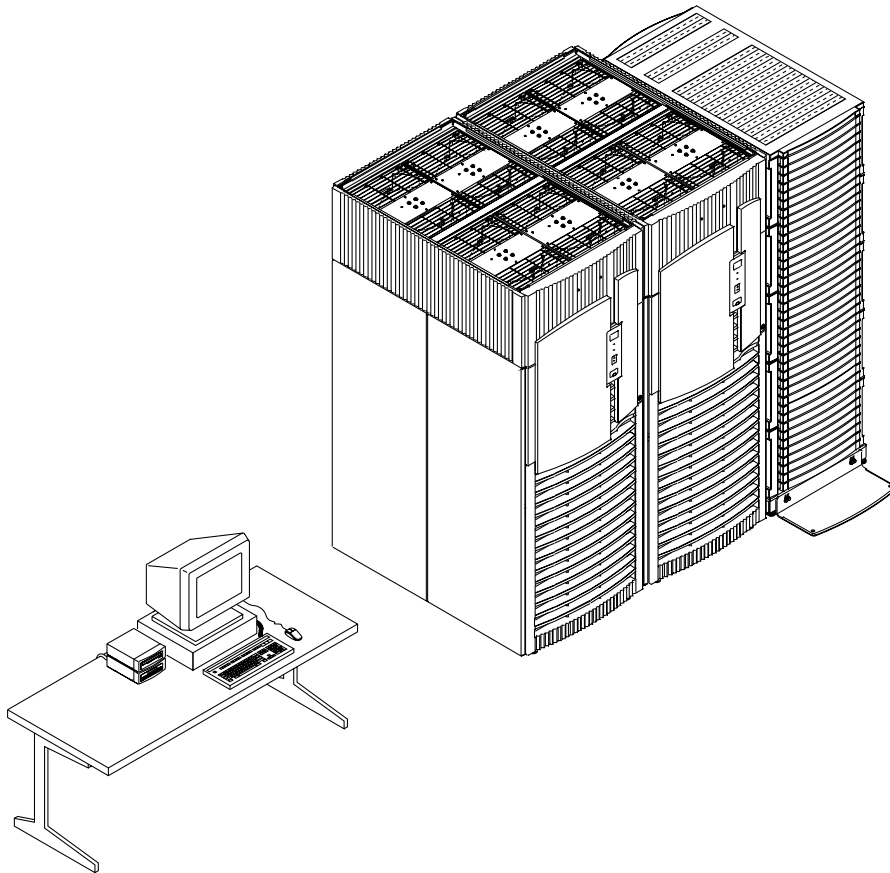
60SP001A  
4/17/00

**Figure 1-2**      **Typical Superdome 64 Way Superdome Installation**



60SP002A  
4/17/00

**Figure 1-3** Typical Superdome 64 Way Superdome and I/O Expansion Cabinet Installation



60SP003A  
4/26/00

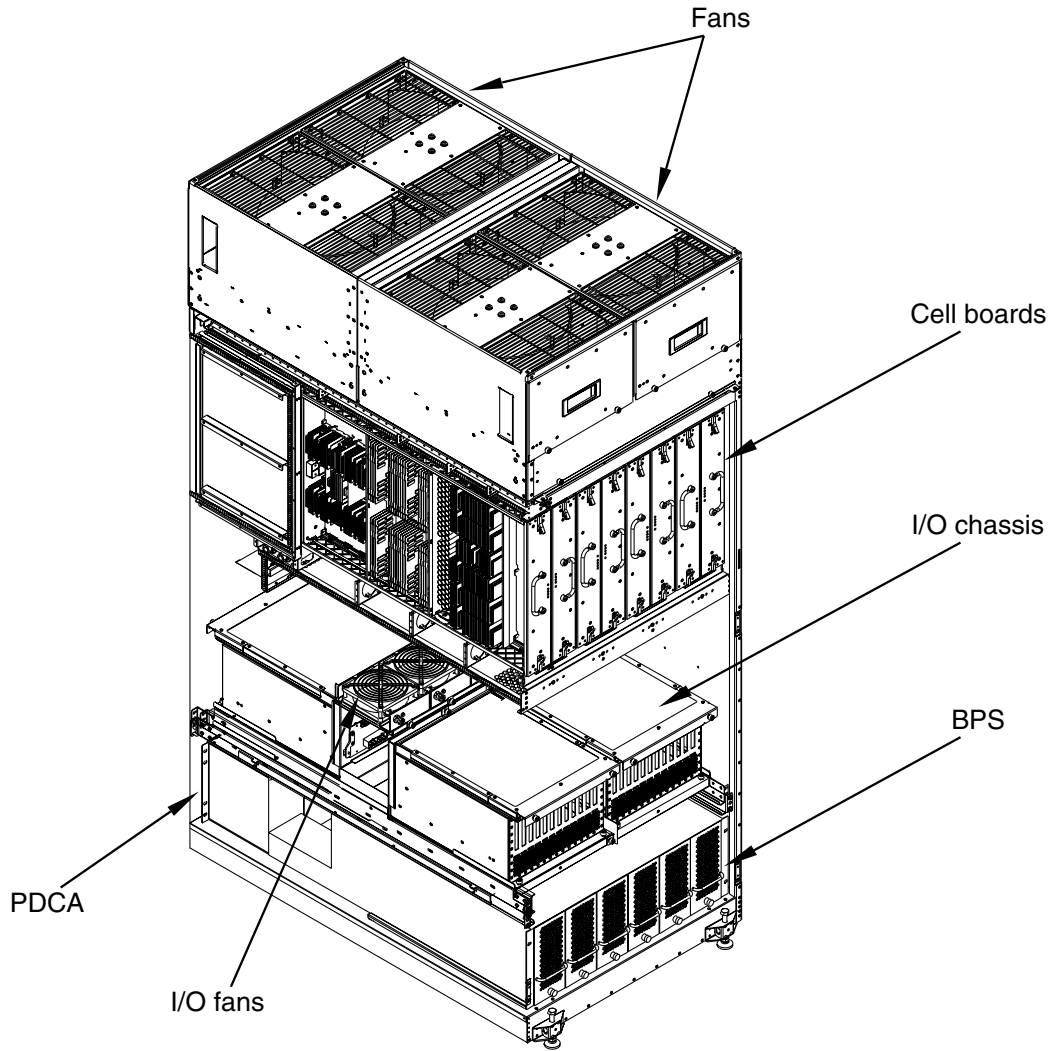
## Server Cabinet

The server cabinet is the main building block of the Superdome. A Superdome 64 Way comprises two server cabinets interconnected.

A single cabinet Superdome 32 Way may contain up to eight cell boards (32 processors), four I/O card cages, six I/O fans, four system cooling fans, six bulk power supplies, and two PDCA. Figure 1-4 illustrates the location of these components.

A single cabinet Superdome 16 Way may contain up to four cell boards (16 processors), four I/O card cages, six I/O fans, four system cooling fans, four bulk power supplies, and two PDCA. Additionally, to the above, two backplane power supplies provides N+1 for the Superdome 16 Way.

**Figure 1-4 Server Cabinet Components**



60SP020A  
12/16/99

## Upgrading Superdomes and Server Systems

This section provides the details relating to upgrading a Superdome.

---

**IMPORTANT** Ensure that the customer is aware of the iCOD email requirements. That is, each bootable partition requires a connection to the internet to send email to notify Hewlett-Packard that the customer has allocated additional CPUs beyond the amount initially purchased. Each bootable partition must be configured to perform this operation.

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For more details, go to <http://superdome.hp.com> and click on the iCOD link.

### Upgrading the Server

Space requirements remain the same, but power and cooling must be increased when upgrading within a cabinet (adding additional cells, I/O, etc.).

Special attention should be given to the original circuit breaker and wiring sizes to ensure safety compliance and margins are still appropriate.

Identify and plan for future upgrades and expansions. It is cost effective to provide the cooling and power capability now for potential future expansions.

### Upgrading the System

Space, power, and cooling requirements must be considered and increased as necessary when upgrading a Superdome (adding additional cabinets, cells, I/O, etc.).

## Dimensions and Weights

This section provides dimensions and weights of the system components.

### Component Dimensions

Table 1-1 lists the dimensions for the cabinet and components of a Superdome.

**Table 1-1 Server Component Dimensions**

Component	Width (cm)	Depth/Length (cm)	Height (cm)	Maximum Quantity per Cabinet
Cabinet	30 (76.2)	48 (121.9)	77.2 (195.6)	1
Cell board (HCB)	16.5 (41.9)	20.0 (50.2)	3.0 (7.6)	8 <sup>a</sup>
Cell board power board (HCPB)	16.5 (41.9)	10.125 (25.7)	3.0 (7.6)	8a
I/O backplane (HIQB)	11 (27.9)	17.6 (44.7)		1
Master I/O backplane (HMIQB)	3.25 (8.3)	23.75 (60.3)	1.5 (3.8)	1
I/O cardcage	12.0 (30.5)	17.5 (44.4)	8.38 (21.3)	4
PDCA	7.5 (19.0)	11.0 (27.9)	9.75 (24.3)	2

a. Superdome 16 Way is limited to a maximum of 4.

**Table 1-2 I/O Expansion Cabinet Component Dimensions**

Component	Width (cm)	Depth/Length (cm)	Height (cm)	Maximum Quantity per Cabinet
Cabinet	24.0 (61.0)	53.2 (135.1)	77.3 (196.0)	1
ICE	17.6 (44.8)	33.5 (82.0)	16.2 (39.7)	3
I/O cardcage	12.0 (30.5)	17.5 (44.4)	8.38 (21.3)	6

## Component Weights

Table 1-3 lists the server and component weights. To determine the overall weight of your specific system, see Table A-1 on page 80 and Table A-2 on page 81.

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**NOTE** Refer to the appropriate documents to determine the weight of the SMS and any console that will be used with this server.

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**Table 1-3 System Component Weights**

Component	Quantity	Weight (kg)
Chassis <sup>a</sup>	1	745.17 lbs (338.10)
Cell Board	8	328.00 lbs (148.82)
DIMMs	256	51.20 (23.27)
Bulk Power Supply (BPS)	6	23.00 lbs (10.44)
PDCA	2	52.00 lbs (23.59)
I/O cardcage	4	146.00 lbs (66.24)
I/O Cards	48	21.60 (9.80)
Fully configured server (32-way cabinet)	1	1366.97 lbs (621.35) <sup>b</sup>

- a. The listed weight for a chassis includes the weight of all components not listed in Table 1-3.
- b. The listed weight for a fully configured cabinet includes all components and quantities listed in Table 1-3.

**Table 1-4 I/O Expansion Cabinet Weights**

Component	Weight <sup>a</sup> (kg)
Fully configured cabinet	1104.9 lbs (502.2)
I/O cardcage	36.50 lbs (16.56)
Chassis	264 lbs (120)

- a. The listed weight for a fully configured cabinet includes all items installed in a 1.6 meter cabinet. Add approximately 11 lbs when using a 1.9 meter cabinet.

## Shipping Dimensions and Weights

Table 1-5 lists the dimensions and weights of the Support Management Station and the Superdome cabinet with shipping pallet.

**Table 1-5** Miscellaneous Dimensions and Weights

Equipment	Width (cm)	Depth/Length (cm)	Height (cm)	Weight (kg)
Superdome on shipping pallet <sup>a b c</sup>	39.00 in (99.06)	48.63 in (123.5)	73.25 in (186.7)	1360.8lbs (618.54)
Blowers/Frame on shipping pallet	40.00 in (101.6)	48.00 in (121.9)	62.00 (157.5)	99.2 lbs (45.01)
I/O Expansion cabinet on shipping pallet <sup>d</sup>	38.00in (96.52)	48.00 in (121.9)	88.25 in (224.1)	1115 lbs (505.8)

- a. Shipping box, pallet, ramp, and container adds approximately 116 lbs (52.63 kg) to the total system weight.
- b. Blowers/Frame are shipped on a separate pallet.
- c. Size and number of miscellaneous pallets are determined by the equipment ordered by the customer.
- d. Assumes no I/O cards or cables installed. The shipping kit and pallet and all I/O cards adds approximately 209 lbs to the total weight.



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## Electrical Specifications

This section provides electrical specifications for Superdomes.

### Grounding

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

This equipment is CLASS 1 and requires full implementation of the grounding scheme to all equipment connections. Failure to attach Protective Earth results in loss of regulatory compliance and creates a possible safety hazard.

### Circuit Breaker

Each Superdome cabinet using a 3-phase, 4-wire input requires dedicated circuit breaker to support the Marked Electrical current of 44A per phase. The facility electrician and local service codes will determine proper circuit breaker selection.

Each Superdome cabinet using a 3-phase 5-wire input requires a dedicated circuit breaker to support the Marked Electrical current of 24A per phase. The facility electrician and local service codes will determine proper circuit breaker selection.

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**NOTE** See Table E-1 on page 104 for systems that are configured with less than a full compliment of cell boards, memory, and I/O modules.

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

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**NOTE** As of March, 2002, PDCA Options 4 and 5 are obsolete.

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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 4-wire \_\_\_\_\_ 5-wire \_\_\_\_\_
- Source voltage phase-to-phase \_\_\_\_\_ Vac
- Source voltage phase-to-neutral \_\_\_\_\_ Vac

Using the above information, determine the appropriate power option from Table 1-6.

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.
4. The customer must either provide the correct mating in-line connector or order one from HP. See Table 1-8 for details.

**Example 1-1**      **The customer has a 3-phase source with a Source Voltage of 208 VAC measured phase-to-phase indicating that a 4-wire PDCA is required.**

**Example 1-2**      **The customer has a 3-phase source with a Source Voltage of 220 VAC measured phase-to-neutral indicating that a 5-wire PDCA is required.**

**Example 1-3**      **The customer has a 3-phase source with a Source Voltage of 230 VAC measured phase-to-phase indicating that a 4-wire PDCA is required.**

**Example 1-4**      **The customer has a 3-phase source with a source voltage of 415 VAC measure phase-to-phase and a measured phase-to-neutral source voltage of 240 VAC, indicating a 5-wire PDCA is required.**

### Input Power Options

Table 1-6 describes the available power options:

**Table 1-6 Available Power Options**

<b>PDCA Product Number</b>	<b>Source Type</b>	<b>Source Voltage (nominal)</b>	<b>PDCA Required</b>	<b>Input Current Per Phase 200-240 VAC</b>	<b>In-line Connector Required</b>
A5800A Option 001 <sup>a</sup>	3-phase	Voltage range 200-240 VAC, phase-to-neutral, 50/60 Hz (EUR typical) <sup>b</sup>	5-wire	24A Maximum per phase	None required. Electrician must hard wire power to the PDCA <sup>c</sup>
A5800A Option 002 <sup>a</sup>	3-phase	Voltage range 200-240 VAC, phase-to-phase, 50/60 Hz (US typical)	4-wire	44A Maximum per phase	None required. Electrician must hard-wire power to the PDCA <sup>c</sup>
A5800A Option 004 <sup>d</sup>	3-phase	Voltage range 200-240 VAC, phase-to-phase, 50/60 Hz (US typical)	4-wire	44A Maximum per phase	In-line connector and plug provided with a 2.5-meter power cable. Electrician must hard-wire in-line connector to 100A site power. <sup>c,e</sup>

**Table 1-6 Available Power Options (Continued)**

PDCA Product Number	Source Type	Source Voltage (nominal)	PDCA Required	Input Current Per Phase 200-240 VAC	In-line Connector Required
A5800A Option 005 <sup>d</sup>	3-phase	Voltage range 200-240 VAC, phase-to-neutral, 50/60 Hz (EUR typical)	5-wire	24A Maximum per phase	In-line connector and plug provided with a 2.5-meter power cable. Electrician must hard-wire in-line connector to 60/63A site power. <sup>c,e,f</sup>
A5800A Option 006 <sup>g</sup>	3-phase	Voltage range 200-240 VAC, phase-to-phase, 50/60 Hz	4-wire	44A Maximum per phase	2.5meter UL power cord and UL approved plug provided. The customer must provide the mating in-line connector or purchase quantity one A6440A opt 401 to receive a mating inline connector. An electrician must hard wire the in-line connector to 60A/63A site power. <sup>c,f,h</sup>
A5800A Option 007 <sup>i</sup>	3-phase	Voltage range 200-240 VAC, phase-to-neutral, 50/60 Hz	5-wire	24A Maximum per phase	2.5meter <HAR> power cord and VDE approved plug provided. The customer must provide the mating in-line connector or purchase Quantity 1 A6440A opt 501 to receive a mating in line connector. An electrician must hard wire the in-line connector to 30A/32A site power. <sup>c,h,j</sup>

- a. Options 1 and 2 have been deleted.
- b. 415 VAC phase-to-phase is possible.
- c. A dedicated branch is required for each PDCA installed.
- d. Options 4 and 5 have been deleted.
- e. Refer to Table 1-7 for detailed specifics related to this option.
- f. In the U.S.A., site power is 60 Amps; In Europe site power is 63 Amps.
- g. Customer must provide in-line connector or purchase A6440A option 401.
- h. Refer to Table 1-8 for detailed specifics related to this option.
- i. Customer must provide in-line connector or purchase A6440A option 501.

j. In the U.S.A., site power is 30 Amps; In Europe site power is 32 Amps.

**Table 1-7 Option 004 and 005 Specifics<sup>a</sup>**

<b>PDCA Product Number</b>	<b>Attached Power Cord</b>	<b>Attached Plug</b>	<b>Connector Provided</b>
A5800A Option 004	OLFLEX 190 (PN 600404) is a 2.5 meter multi conductor, 600 volt, 90 degree C, UL and CSA approved, oil resistant flexible cable. (100 A capacity)	Mennekes ME 4100P9 (100 A capacity)	Mennekes ME 4100C9 (100 A capacity)
A5800A Option 005	H07RN-F (OLFLEX PN 1600111) is a 2.5 meter heavy duty neoprene jacketed harmonized European flexible cable. (63 A capacity)	Mennekes ME 563P6-1235 (63 A capacity)	Mennekes ME 563C6-1245 (63 A capacity)

a. Options 4 and 5 have been deleted.

**Table 1-8 Options 006 and 007 Specifics**

<b>PDCA Product Number</b>	<b>Attached Power Cord</b>	<b>Attached Plug</b>	<b>Customer-Provided Part</b>	
			<b>In-Line Connector</b>	<b>Panel-Mount Receptacle</b>
A5800A Option 006	OLFLEX 190 (PN 600804), four-conductor, 6-AWG (16-mm <sup>2</sup> ), 600-Volt, 60-Amp, 90-degree C, UL, and CSA approved, conforms to CE directives GN/YW ground wire.	Mennekes ME 460P9 3-phase, 4-wire, 60-amp, 250-volt, UL approved. color blue, IEC 309-1, IEC 309-1, grounded at 3:00 o'clock.	Mennekes ME 460C9 3-phase, 4-wire, 60-amp, 250-volt, UL approved. color blue, IEC 309-1, IEC 309-1, grounded at 9:00 o'clock. <sup>a</sup>	Mennekes ME 460R9 3-phase, 4-wire, 60-amp, 250-volt, UL approved. color blue, IEC 309-1, IEC 309-1, grounded at 9:00 o'clock. <sup>b</sup>
A5800A Option 007	Five conductors, 10-AWG (6-mm <sup>2</sup> ), 450/475-volt, 32-amp, <HAR> European wire cordage, GN/YW ground wire.	Mennekes ME 532P6-14 3-phase, 5-wire, 32-amp, 450/475-volt, VDE certified, color red, IEC 309-1, IEC 309-2, ground at 6:00 o'clock.	Mennekes ME 532C6-16 3-phase, 5-wire, 32-amp, 450/475-volt, VDE certified, color red, IEC 309-1, IEC 309-2, ground at 6:00 o'clock. <sup>c</sup>	Mennekes ME532R6-1276 3-phase, 5-wire, 32-amp, 450/475-volt, VDE certified, color red, IEC 309-1, IEC 309-2, ground at 6:00 o'clock. <sup>b</sup>

a. In-line connector is available from HP by purchasing A6440A, Option 401.

- b. Panel-mount receptacles must be purchased by the customer from a local Mennekes supplier.
- c. In-line connector is available from HP by purchasing A6440A, Option 501.

---

**NOTE** A qualified electrician must wire the PDCA in-line connector 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.

When only one PDCA is to be installed in a Superdome, it must be installed as PDCA 0. Refer to Figure 1-5 for PDCA 0 location.

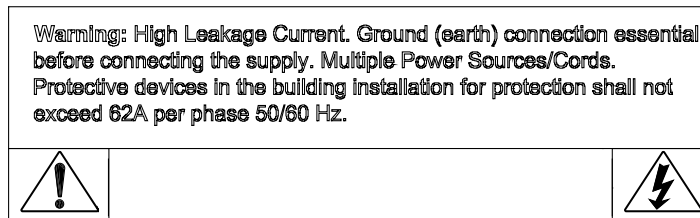
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**WARNING** Do not install a PDCA that does not have one of the following set of labels attached.

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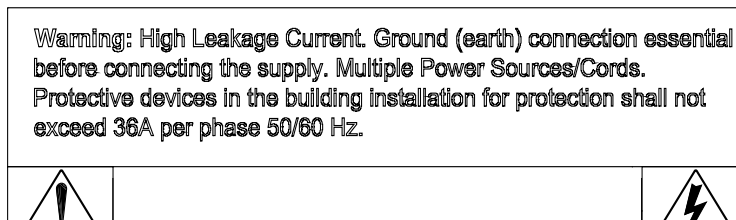
**AND**



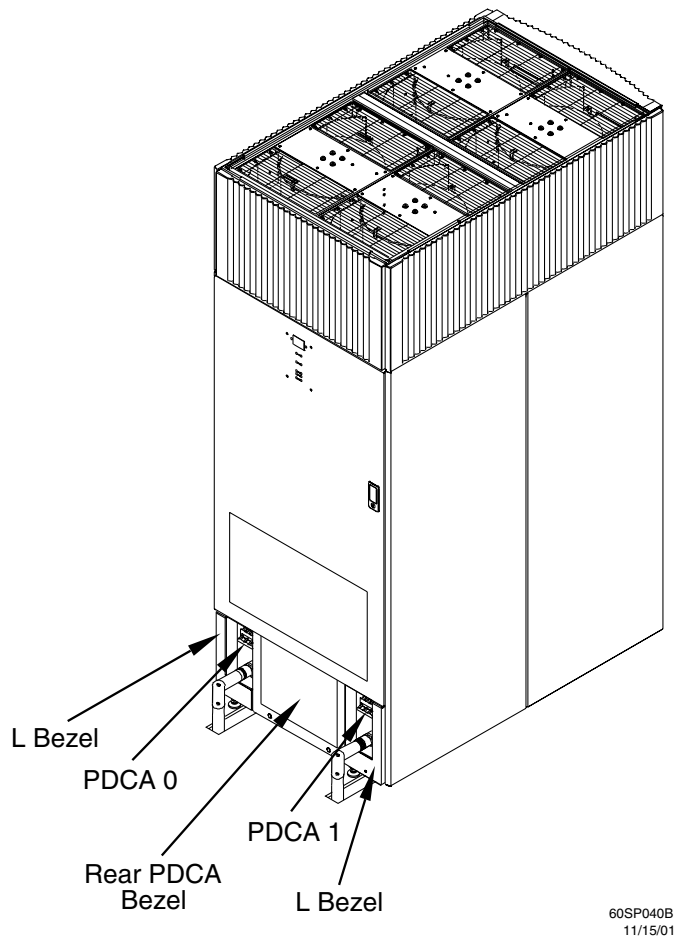
**OR**



**AND**



**Figure 1-5 PDCA Locations**



## Power Cords

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

### Pre-wired PDCAs Options 6 and 7

All Superdomes are delivered with the appropriate cable and plug. The mating in-line connector is not provided.

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**IMPORTANT** Verify that the source power is correct for the appropriate PDCA wiring.

---

**NOTE** When installing the power connector, allow enough room for mating the connector with the plug.

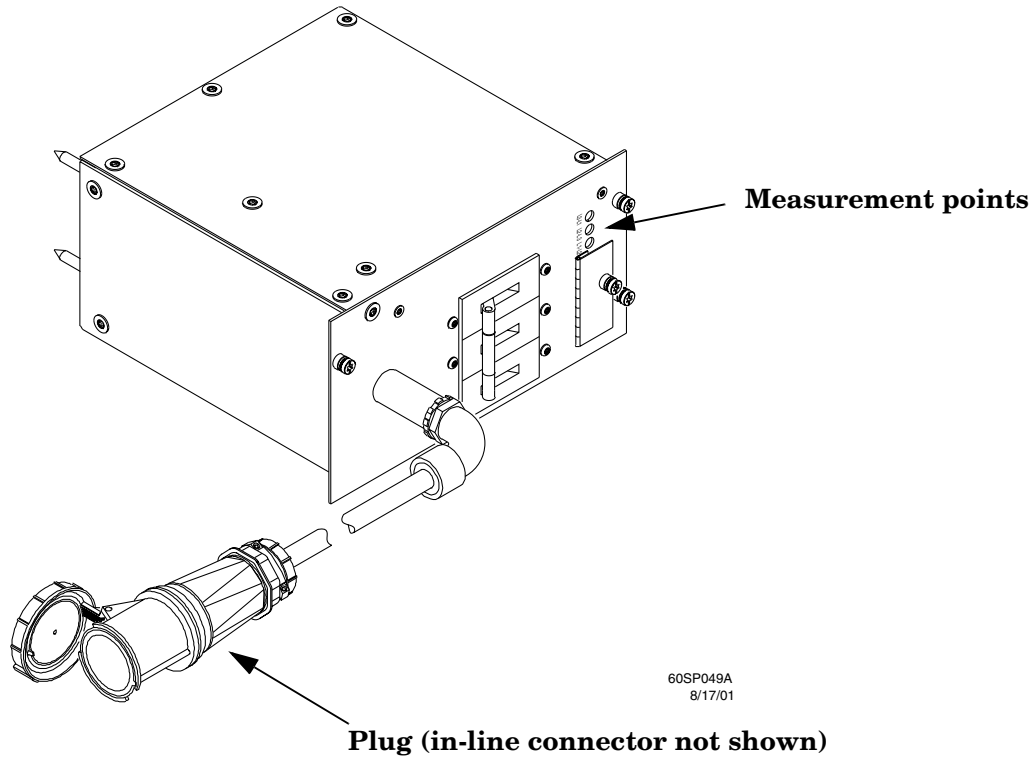
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Check the voltages at the connector prior to connecting the newly installed connector to the PDCA plug. Refer to Figure 1-7 and Figure 1-8 on page 21 for pin locations.

System Specifications  
**Electrical Specifications**

- To verify the proper wiring for a 4-wire PDCA, use a DVM to measure the voltage at the in-line connector. Voltage should read 200 - 240 Vac phase-to-phase as measured between the connector pins as follows: L1 to L2, L2 to L3, L1 to L3.
- To verify the proper wiring for a 5-wire PDCA, use a DVM to measure the voltage at the connector. Voltage should read 200 - 240 Vac phase-to-neutral as measured between the connector pins as follows: L1 to N, L2 to N, L3 to N.

**Figure 1-6 PDCA Assembly for Options 6 and 7 (4-Wire Unit Shown)**



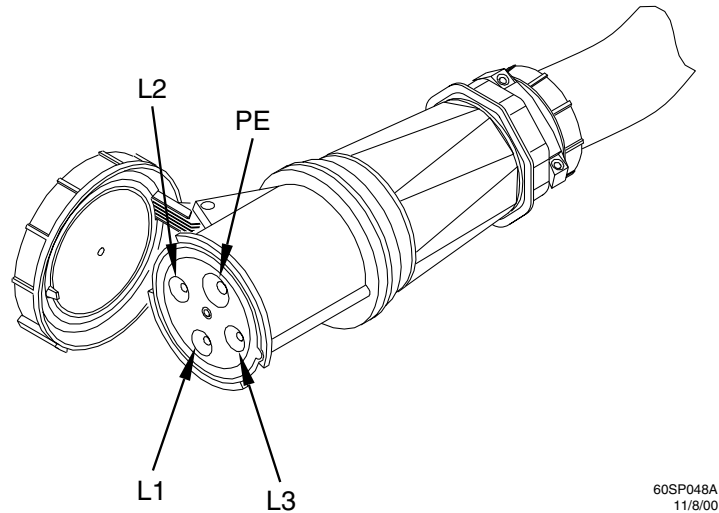


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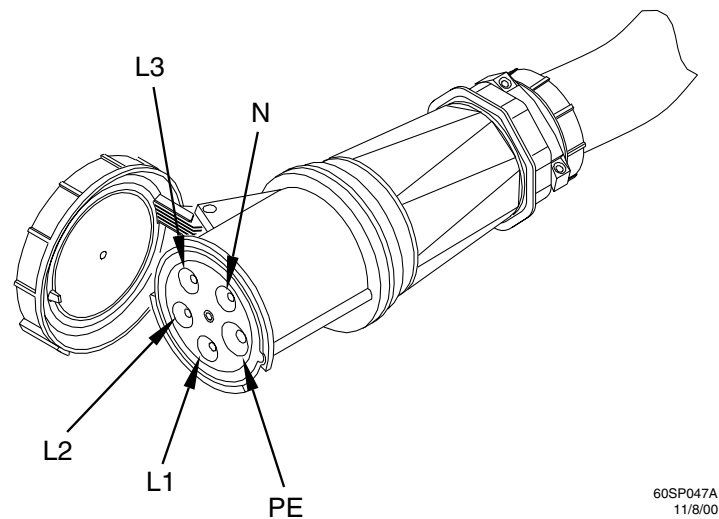
**IMPORTANT** Ensure that your DVM is capable of measuring AC voltages of at least 500VAC. A number of 5-wire power distribution systems may have phase-to-phase voltages in excess of 400VAC. Many hand-held volt meters are limited to 300VAC.

---

**Figure 1-7 Four-Wire In-Line Connector (A4660A Opt 401)**



**Figure 1-8 Five-Wire In-Line Connector (A4660A Opt 501)**



### Cable Removal

Some installations may either require or desire that the Superdome(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. The following procedures are used to remove and replace the existing power cable.

To remove the existing cable from the PDCA, begin by removing the five T-10 Torx screws detailed in Figure 1-9 on page 23. Then remove the bottom panel of the PDCA. Retain the panel and screws for future use.

---

**NOTE** The cable removal and installation requires only the bottom panel to be removed. For image clarity, Figure 1-9 does not show cable or cable strain relief.

---

**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 1-9 for details.

**Step 3.** Disconnect the existing wires from the PDCA terminal lugs. Refer to Figure 1-9 for details.

---

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

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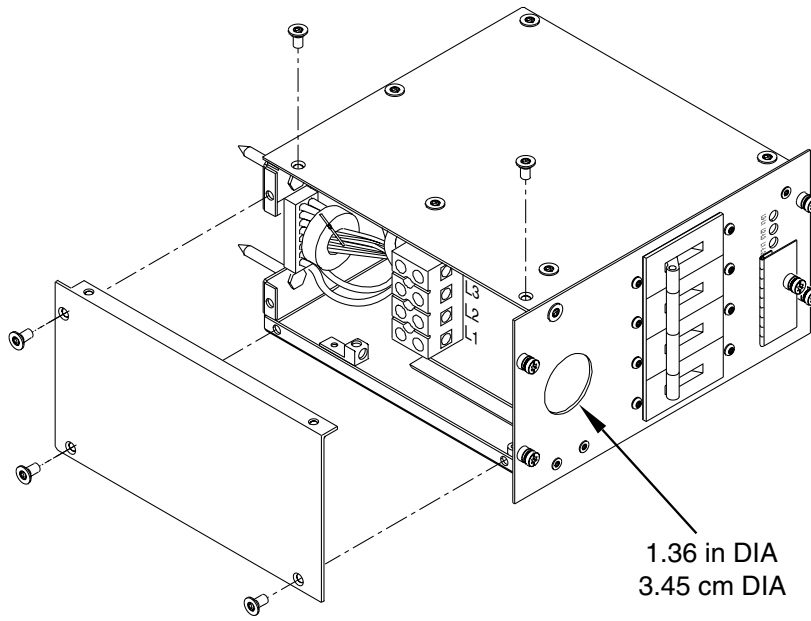
**NOTE** For 5-wire cables, loosen four lugs. For 4-wire cables, loosen three lugs.

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**Step 4.** Using an 11-mm socket, remove the safety ground cable (green and yellow cable). Retain the attaching hardware.

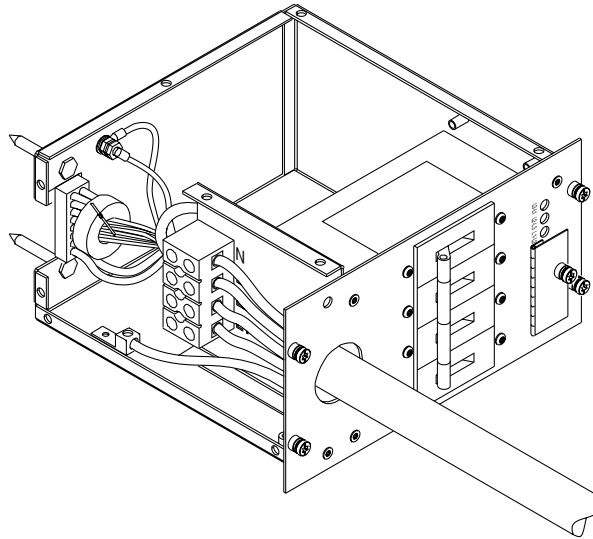
**Step 5.** Remove the cable from the PDCA. Keep all retaining hardware for use during installation of the new cable.

**Figure 1-9 PDCA Cable Access (5-Wire Unit Shown)**



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**Figure 1-10 PDCA Input Wiring Connections (5-Wire Unit Shown)**



60SP041A  
7/13/00

## Cable Installation

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**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 cabinet using a 3-phase, 4-wire input is required to 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 maximum Product Label current of 44A 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. Observe derating factors for multiple wires per cable.
- Each Superdome cabinet using a 3-phase 5-wire input is required to 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 maximum Product Label current of 24A 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. Observe derating factors for multiple wires per cable.

**Step 1.** Prepare the new cable as shown in Figure 1-11 on page 25.

**Step 2.** Using the cable retaining hardware saved from the cable removal, route the new cable into the PDCA.

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

**Step 4.** Using the hardware that was retained during the cable removal, attach the green and yellow ground cable.

- Step 5.** Using the five screws retained from the removal procedure, replace the bottom panel on the PDCA. Refer to Figure 1-9 on page 23 for panel installation details.
- Step 6.** To verify the proper wiring to a 4-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.

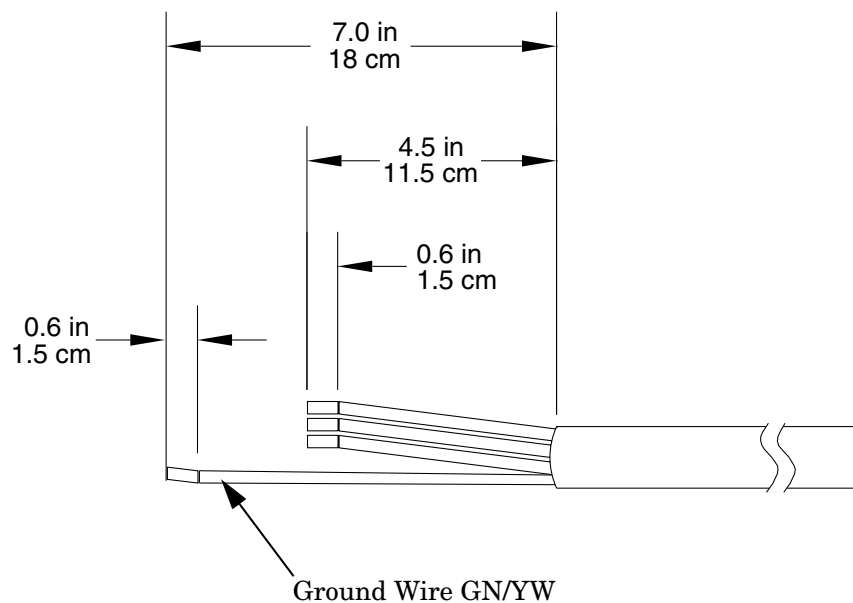
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**IMPORTANT** In some electrical distributions around the world, it is possible to measure 415 VAC phase-to-phase. Ensure that your DVM is capable of measuring AC voltages of at least 500VAC. A number of 5-wire power distribution systems may have phase-to-phase voltages in excess of 400VAC. Many hand-held volt meters are limited to 300VAC.

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To verify the proper wiring to a 5-wire PDCA, use a DVM to measure the voltage at the test points. Voltage should read 200-240VAC phase-to-neutral, as measured between the test points as follows: L1 to N, L2 to N, L3 to N.

**Figure 1-11 Cable Preparation Detail**



60

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**NOTE** Dimensions shown are for a cable strain relief without an extension nipple. If an extension nipple is used, then the cable jacket must be removed accordingly.

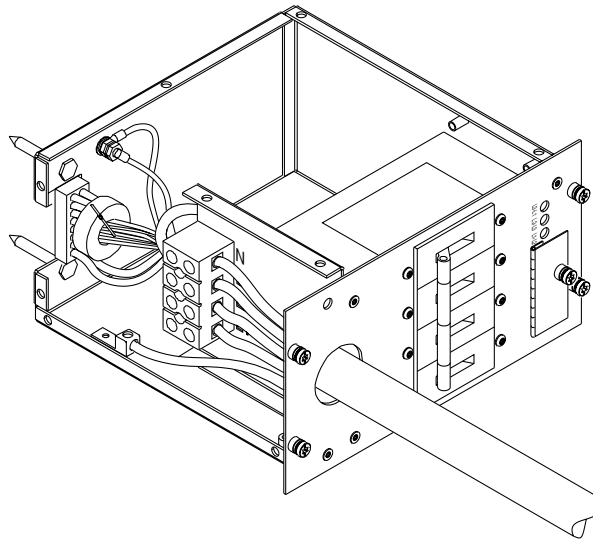
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**NOTE** Figure 1-11 shows a 4-wire cable for illustrative purposes only. 5-wire cable is dimensionally identical regarding insulation and jacket removal. The only exception is the number of conductors.

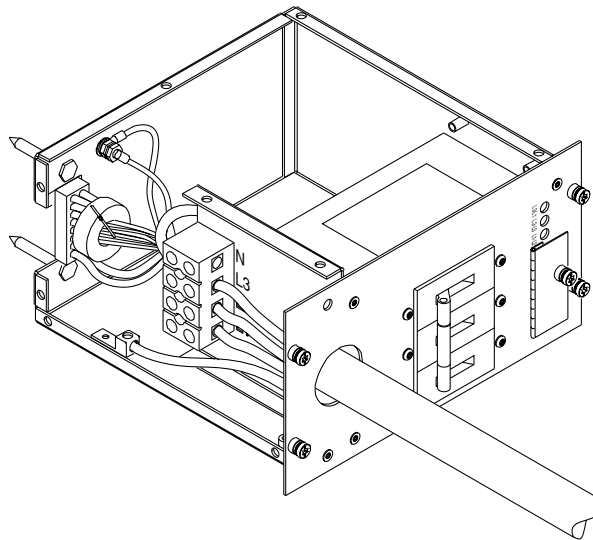
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**Figure 1-12 PDCA (Five Wire) Input Wiring Connections**



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**Figure 1-13 PDCA (Four Wire) Input Wiring Connections**

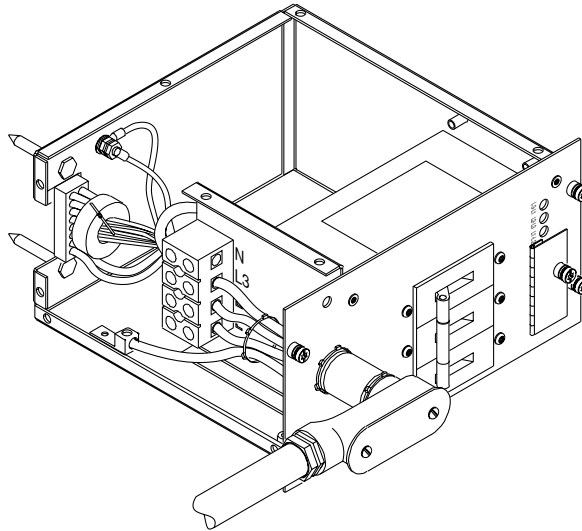


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### Customer Installation Options

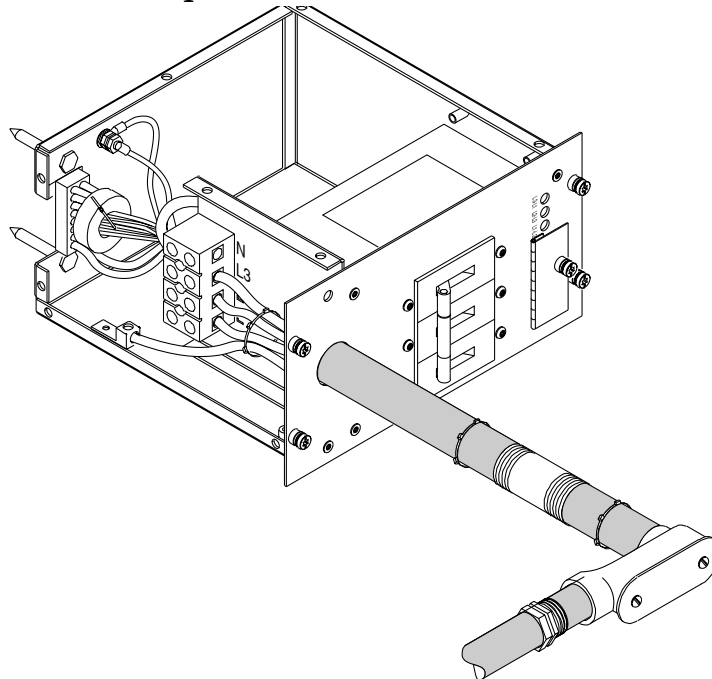
Figure 1-14 and Figure 1-15 detail a suggested configuration for connecting the PDCA when the use of rigid conduit is required or desired. Using a 2- to 4-inch nipple and a 90o elbow allows the conduit to pass through the raised floor at a point immediately past the cabinet. This prevents the conduit from extending beyond the cabinet.

**Figure 1-14 PDCA Conduit Connection**



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**Figure 1-15 Conduit Required for PDCA Connection**



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## System Power Requirements

Table 1-9 and Table 1-10 list the AC power requirements for a Superdome. These tables provide information to help determine the amount of AC power needed for your computer room.

**Table 1-9 Power Requirements (without Support Management Station)**

Requirements	Value	Comments
Nominal input voltage	200/208/220/230/240 VAC	
Input voltage range (minimum - maximum)	200 - 240 VAC	Autoselecting (measured at input terminals)
Frequency	50/60 Hz	
Number of phases	3	
Maximum inrush current	90 A peak	
Product Label maximum current, 3-phase, 4-wire	44 A max	Per phase at 200-240VAC
Product Label maximum current, 3-phase, 5-wire	24 A max	Per phase at 200-240VAC
Power factor correction	0.95 minimum	
Ground leakage current (mA)	> 3.5 ma	See WARNING below.

---

**WARNING Beware of shock hazard. When connecting or removing input power wiring, always connect the ground wire first and disconnect the ground wire last.**

---

## Component Power Requirements

Table 1-9 and Table 1-10 list the AC power requirements for a Superdome. These tables provide information to help determine the amount of AC power needed for your computer room.

**Table 1-10 Component Power Requirements (without Support Management Station)**

Power Required (50/ 60 Hz)	VA
Maximum configuration Superdome (32-Way)	12,196 <sup>a,b</sup>
Cell Board	900
I/O Cardcage	500

- a. A number that should be used for planning to allow for enough power to upgrade through the life of the system.
- b. Use Appendix A to determine the actual values required for your system.



## I/O Expansion Cabinet Power Requirements

The I/O expansion cabinet requires a single phase 200-240VAC input. Table 1-11 lists the AC power requirements for the I/O expansion cabinet.

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**NOTE** The IOX accommodates two AC inputs for redundancy

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**Table 1-11 I/O Expansion Cabinet Power Requirements (without Support Management Station)**

Requirements	Value
Nominal input voltage	200-240 VAC
Input voltage range (minimum-maximum)	200-240 VAC
Frequency range (minimum-maximum)	50/60 Hz
Number of phases	1
Marked Electrical input current	16A max
Maximum inrush current	60 A peak
Power factor correction	0.95 minimum

**Table 1-12 I/O Expansion Cabinet Component Power Requirements**

Power Required (50 - 60 Hz)	VA
Fully configured cabinet	3200
I/O cardcage	500
ICE	600

## I/O Expansion Cabinet Power Cords

Table 1-13 lists the power cords for the I/O expansion cabinet.

**Table 1-13 I/O Expansion Cabinet AC Power Cords**

Part Number A5499AZ	Where Used	Connector Type
-001	North America	L6-20
-002	International	IEC 309

## Peripheral Cabinet Power Requirements

There is a high probability that an existing peripheral cabinet may be incorporated into this system. Ensure that adequate power is available for this cabinet and the associated peripherals.

## **Support Management Station Power Requirements**

Refer to the applicable documentation for the SMS power requirements.

## Environmental Requirements

This section provides the environmental, power dissipation, noise emission, and air flow specifications for the Superdome.

### Temperature and Humidity Specifications

Ambient intake air temperature is often different from ambient room temperature. You should measure the operating temperature and humidity directly in front of the cabinet cooling air intakes rather than check only ambient room conditions. Table 1-14 lists the computer room temperature and humidity specifications for Superdome servers.

**Table 1-14 Computer Room Environment**

Parameter	Operating Range	Recommended Range	Maximum Rate of Change (per hour)
Temperature <sup>a, b</sup>	68° to 86° F (20° to 30° C)	68° to 72° F (20° to 25° C)	9° F repetitive, 36° F nonrepetitive (5° C repetitive, 20° C nonrepetitive)
Humidity	15% - 80% with no condensation	40% - 55%	6%

- a. At altitudes up to 3,000 (9,842) meters.
- b. System also requires 2400 CFM airflow.

At altitudes above 10,000 feet (3048 m), the lower air density reduces the cooling capability of air conditioning systems. If your facility is located above this altitude, the recommended temperature ranges may need to be modified. For each 1000 feet (305 m) increase in altitude above 10,000 feet (up to a maximum of 15,000 feet), subtract 1.5° F (0.83° C) from the upper limit of the temperature range listed in Table 1-14.

**NOTE** Operating ranges refer to the ambient air temperature and humidity measured 0.5 meter from the air intake cooling vents at the same height as these vents.

### Power Dissipation

Table E-1 on page 104 shows Superdome power requirements by configuration (i.e. number of cell boards, amount of memory per cell, and number of I/O chassis). This requirement applies to 32-way-capable systems with PA8600 or PA8700 processors.

There are two columns of power numbers (Watts). The Power Breaker column shows the power used to size the wall breaker at the installation site. The Typical Power column shows typical power. Typical power numbers are for PA8600 systems and may be used to assess average utility cost of cooling and electrical power. Expect these typical numbers to be about 18% less for PA8700 systems. Table E-1 on page 104 also shows the recommended breaker sizes for 4-wire and 5-wire sources.

### **Support Management Station Power Dissipation**

Refer to the applicable documents for the test station power dissipation.

### **Acoustic Noise Specification**

The acoustic noise specification for the Superdome is as follows:

- 8.2 bel (sound power level)
- 65.1 dBA (sound pressure level at operator position)

The above levels are appropriate for dedicated computer room environments, not office environments.

Care should be taken to understand the acoustic noise specifications relative to operator positions within the computer room or when adding Superdomes to computer rooms with existing noise sources.

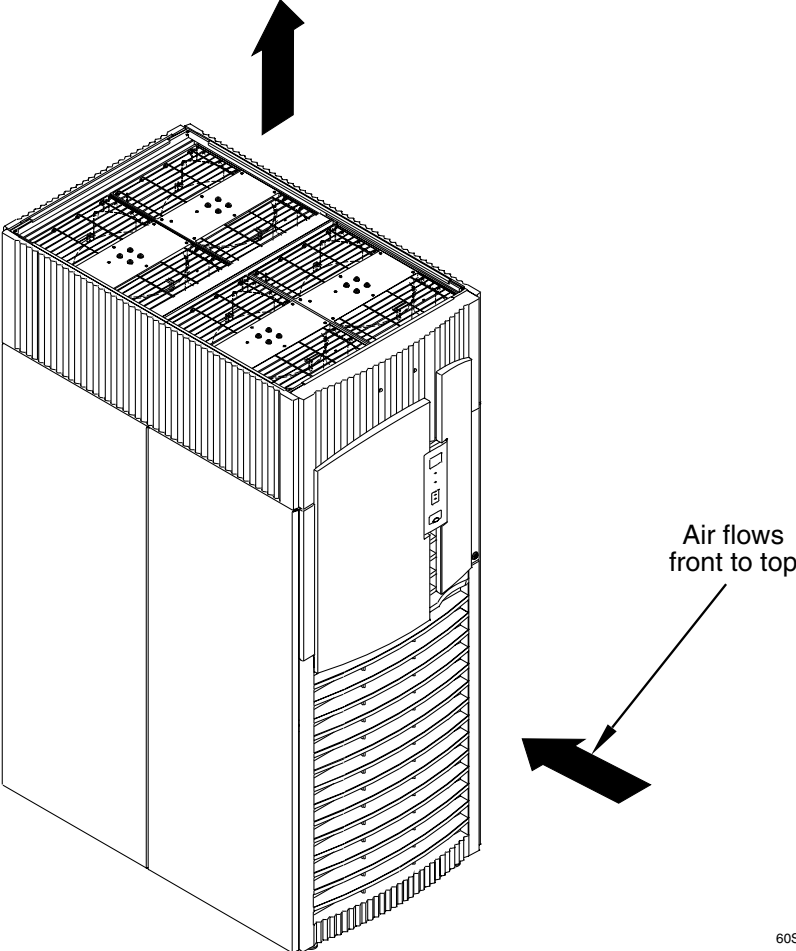
### **Air Flow**

Superdome requires the cabinet air intake temperature to be between 20o C and 30o C at 2400 CFM. Any cooling system layouts described in Chapter 2 can be adapted to cool the Superdome.

Figure 1-16 on page 33 illustrates the location of the inlet and outlet airducts on a single cabinet.

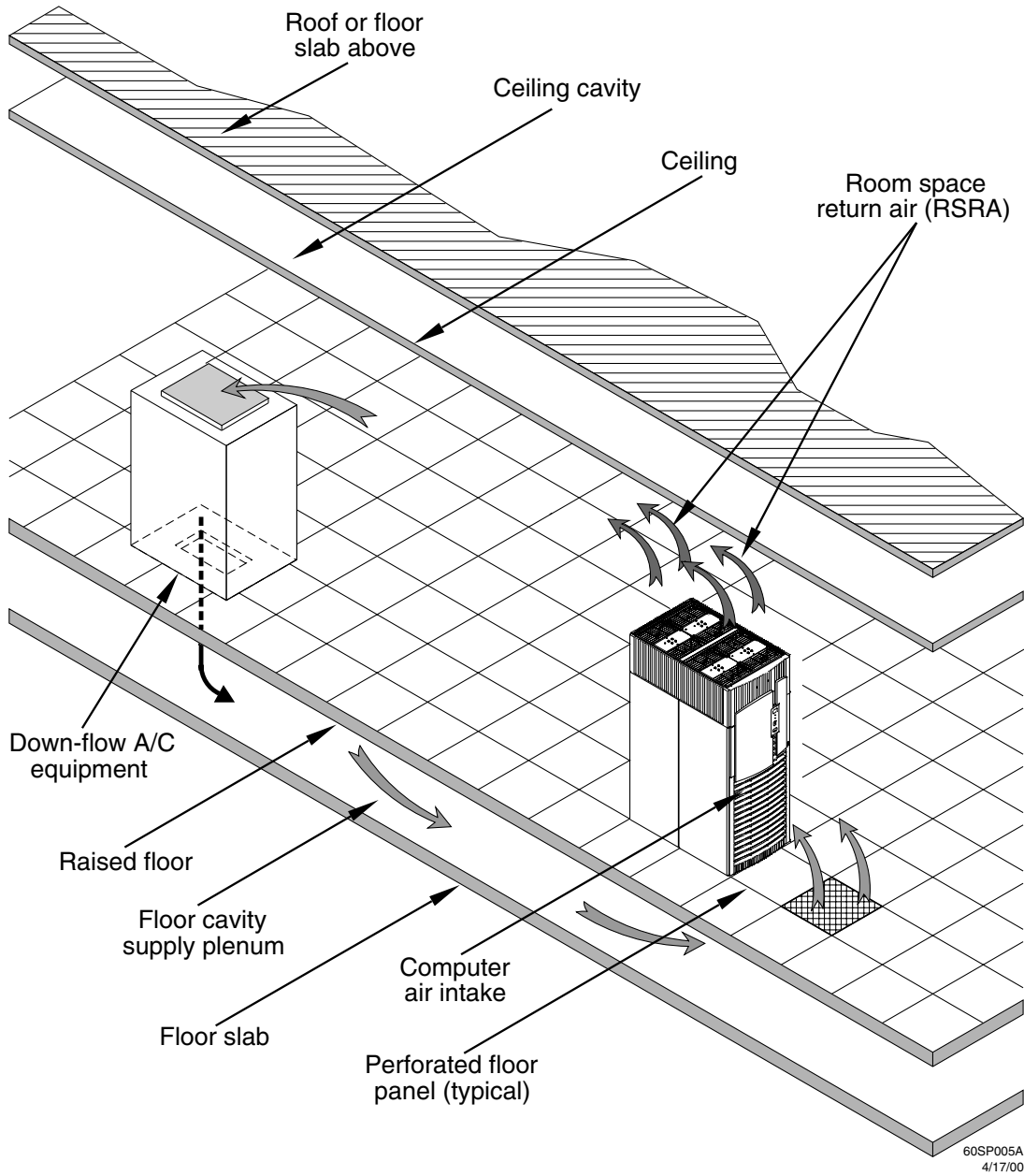
Figure 1-17 on page 34 through Figure 1-19 on page 36 illustrate typical cooling system layouts, adapted from the typical cooling system described in Chapter 2.

**Figure 1-16      Airflow Diagram**

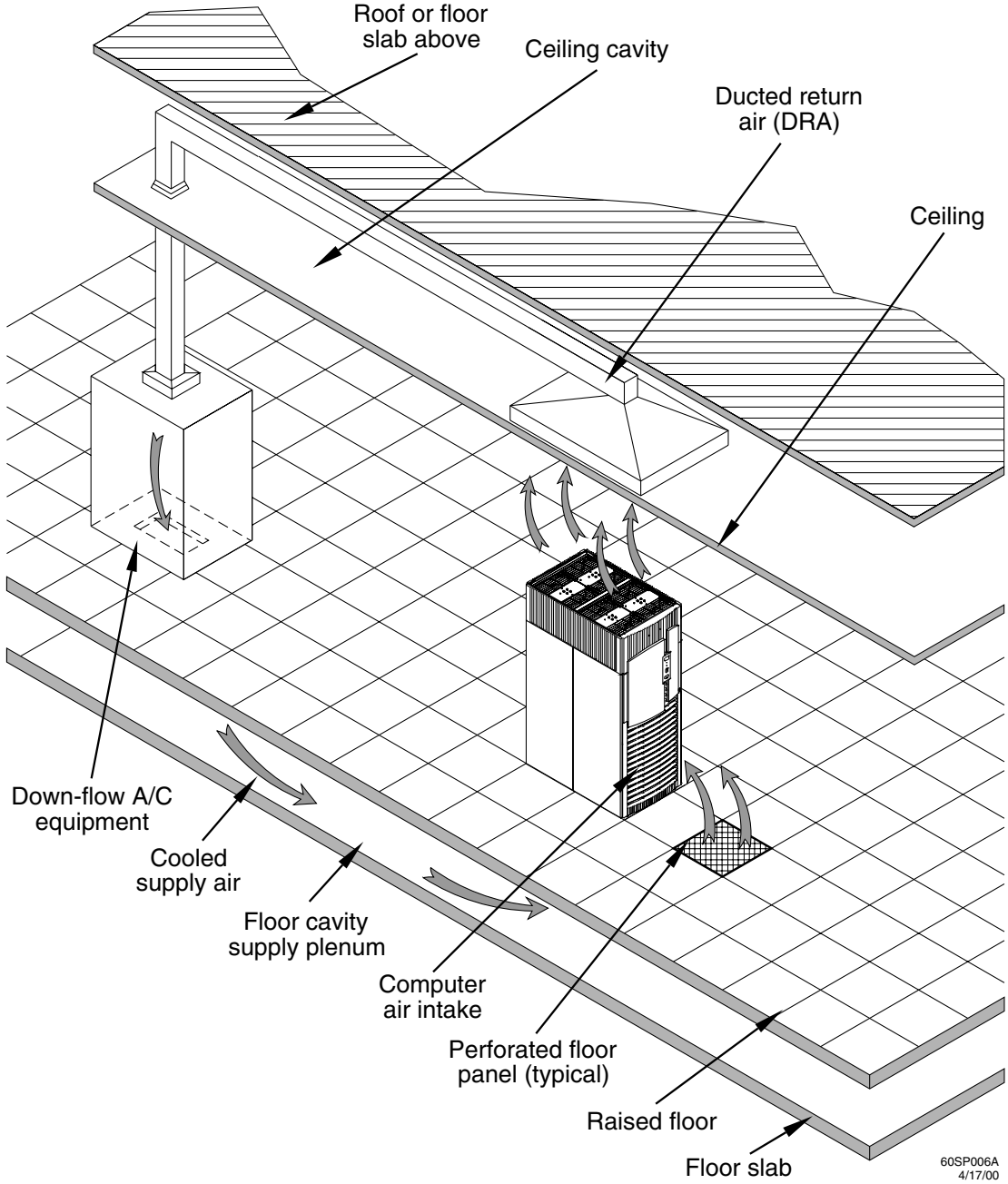


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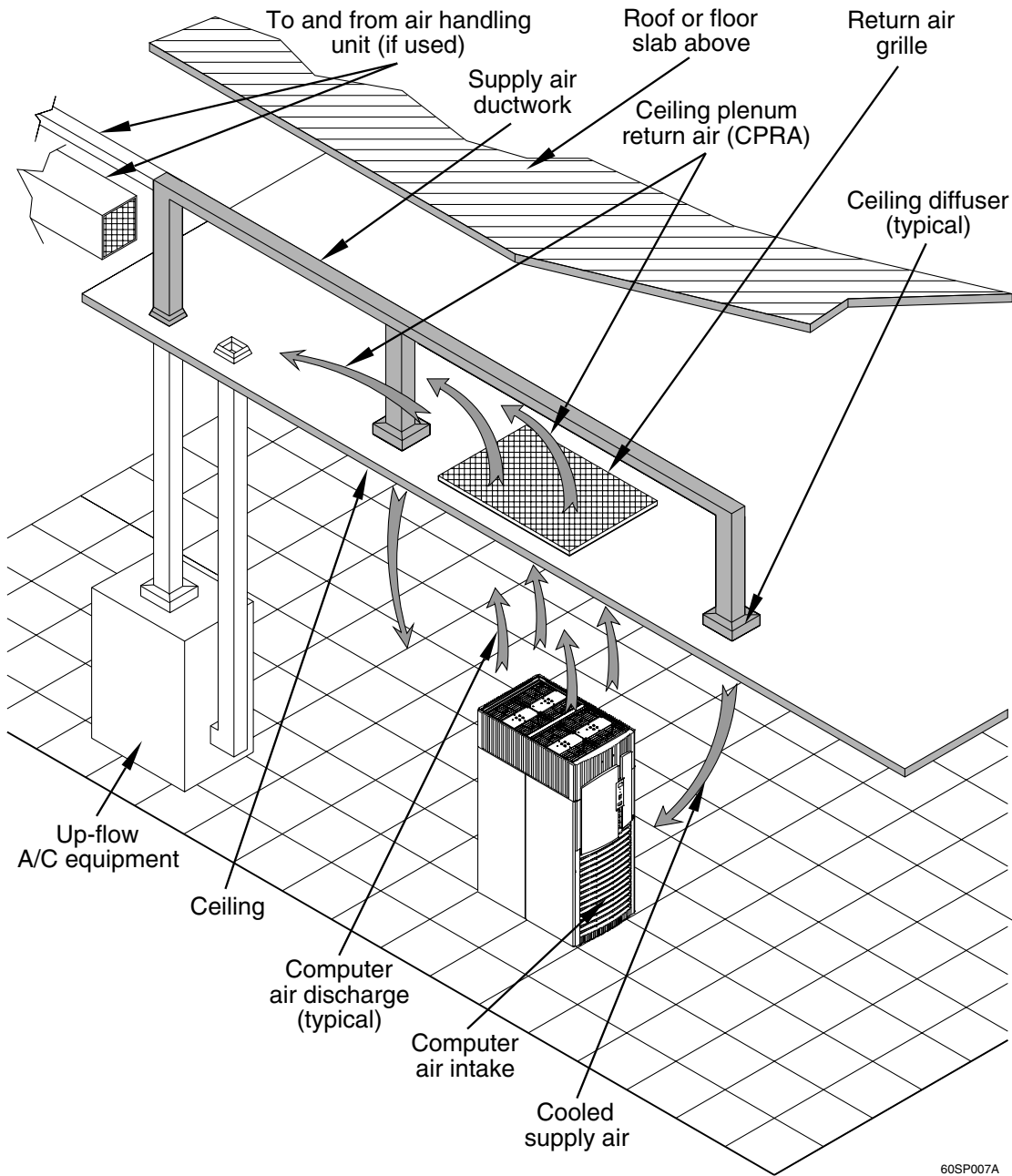
**Figure 1-17 Typical Superdome Room Space Return Air Cooling System**



**Figure 1-18 Typical Superdome Ducted Return Air Cooling System**



**Figure 1-19 Typical Superdome Ceiling Plenum Return Air Cooling System**





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## **2 Electrical and Environmental Guidelines**

This chapter provides guidelines for planning and preparing the site. Careful site planning and preparation ensures trouble-free installation and reliable operation of Superdome servers. Factors that may contribute to less than optimal equipment operation are also highlighted.

- “Electrical Factors” on page 39 discusses computer room safety, electrical load requirements, power quality, distribution hardware, and system installation guidelines.

- “Environmental Elements” on page 44 discusses computer room preparation, cooling and humidity requirements, dust and pollution control, electrostatic discharge prevention, and acoustics.

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## Electrical Factors

Proper design and installation of a power distribution system for a Superdome server requires specialized skills. Those responsible for this task must have a thorough knowledge and understanding of appropriate electrical codes and the limitations of the power systems for computer and data processing equipment.

In general, a well-designed power distribution system exceeds the requirements of most electrical codes. A good design, when coupled with proper installation practices, produces the most trouble-free operation.

A detailed discussion of power distribution system design and installation is beyond the scope of this document. However, electrical factors relating to power distribution system design and installation must be considered during the site preparation process.

The electrical factors discussed in this section are:

- Computer room safety
- Electrical load requirements (circuit breaker sizing)
- Power quality
- Distribution hardware
- System installation guidelines

### Computer Room Safety

Inside the computer room, fire protection and adequate lighting (for equipment servicing) are important safety considerations. Federal and local safety codes govern computer installations.

#### Fire Protection

The National Fire Protection Association's Standard for the Protection of Electronic Computer Data Processing Equipment, NFPA 75, contains information on safety monitoring equipment for computer rooms.

Most computer room installations are equipped with the following fire protection devices:

- Smoke detectors
- Fire and temperature alarms
- Fire extinguishing system

Additional safety devices are:

- Circuit breakers
- An emergency power cutoff switch
- Devices specific to the geographic location, i.e., earthquake protection

#### Lighting Requirements for Equipment Servicing

Adequate lighting and utility outlets in a computer room reduce the possibility of accidents during equipment servicing. Safer servicing is also more efficient and, therefore, less costly.

For example, it is difficult to see cable connection points on the hardware if there is not enough light. Adequate lighting reduces the chances of connector damage when cables are installed or removed.

## Electrical Factors

The minimum recommended illumination level is 70 foot-candles (756 lumens per square meter) when the light level is measured at 30 inches (76.2 cm) above the floor.

## Power Quality

This equipment is designed to operate over a wide range of voltages and frequencies. It has been tested and shown to comply with EMC Specification EN50082. However, damage can occur if these ranges are exceeded. Severe electrical disturbances can exceed the design specifications of the equipment.

### Sources of Electrical Disturbances

Electrical disturbances, glitches, affect the quality of electrical power. Common sources of these disturbances are:

- Fluctuations occurring within the facility's distribution system
- Utility service low-voltage conditions (such as sags or brownouts)
- Wide and rapid variations in input voltage levels
- Wide and rapid variations in input power frequency
- Electrical storms
- Large inductive sources (such as motors and welders)
- Faults in the distribution system wiring (such as loose connections)
- Microwave, radar, radio, or cell phone transmissions

### Power System Protection

Computer systems can be protected from the sources of many of these electrical disturbances by using:

- A Protective Earth (PE) connection with a wire diameter of at least equal to the current carrying conductors. The neutral conductor must not be used for the PE connection. (The PE wire is GREEN with a YELLOW stripe.)
- A dedicated power distribution system
- Power conditioning equipment
- Over- and under-voltage detection and protection circuits
- Screening to cancel out the effects of undesirable transmissions
- Lightning arresters on power cables to protect equipment against electrical storms

Every precaution has been taken during power distribution system design to provide immunity to power outages of less than one cycle. However, testing cannot conclusively rule out loss of service. Therefore, adherence to the following guidelines provides the best possible performance of power distribution systems for Superdome server equipment:

- Dedicated power source—Isolates server power distribution system from other circuits in the facility.
- Missing-phase and low-voltage detectors—Shuts equipment down automatically when a severe power disruption occurs. For peripheral equipment, these devices are recommended but optional.
- Online uninterruptable power supply (UPS)—Keeps input voltage to devices constant and should be considered if outages of one-half cycle or more are common. Refer to qualified contractors or consultants for each situation.

## Distribution Hardware

This section describes wire selection and the types of raceways (electrical conduits) used in the distribution system. Wire size is dictated by circuit breaker sizing and local safety codes.

### Wire Selection

Use copper conductors instead of aluminum, as aluminum's coefficient of expansion differs significantly from that of other metals used in power hardware. Because of this difference, aluminum conductors can cause connector hardware to work loose, overheat, and fail.

### Raceway Systems (Electrical Conduits)

Raceways (electrical conduits) form part of the protective ground path for personnel and equipment. Raceways protect the wiring from accidental damage and also provide a heat sink for the wires.

Any of the following types may be used:

- Electrical metallic tubing (EMT) thin-wall tubing
- Rigid (metal) conduit
- Liquidtight with RFI strain relief (most commonly used with raised floors)
- Plenum-grade cables

### Building Distribution

All building feeders and branch circuitry should be in rigid metallic conduit with proper connectors (to provide ground continuity). Conduit that is exposed and subject to damage should be constructed of rigid galvanized steel.

The IOX and Superdome are safety grounded through the green (ground) wire in each AC power cord. In the IOX, this ground passes through the AC power cord entry into the XPC and connects internally to the XPC chassis. The XUC chassis and each ICE chassis are grounded through their respective DC power cords from the XPC. Additional safety grounding must be provided for networking equipment.

### Power Routing

Power drops and interface cables from the equipment are routed down from the power panel, through a grommet-protected opening (beneath the floor level), and under the floor panels.

## Grounding Systems

Superdome servers require two methods of grounding:

- Power distribution safety grounding
- High frequency intercabinet grounding

### Power Distribution Safety Grounding

The power distribution safety grounding system consists of connecting various points in the power distribution system to earth ground using green (green/yellow) wire ground conductors. Having these ground connections tied to metal chassis parts that may be touched protects computer room personnel against shock hazard from current leakage and fault conditions.

Power distribution systems consist of several parts. Hewlett-Packard recommends that these parts be solidly interconnected to provide an equipotential ground to all points.

## Electrical Factors

**Main Building Electrical Ground** The main electrical service entrance equipment should have an earth ground connection, as required by applicable codes. Connections such as a grounding rod, building steel, or a conductive type cold water service pipe provide an earth ground.

**Electrical Conduit Ground** To provide a continuous grounding system, all electrical conduits should be made of rigid metallic conduit that is securely connected together or bonded to panels and electrical boxes.

**Power Panel Ground** Each power panel should be grounded to the electrical service entrance with green (green/yellow) wire ground conductors. The green (green/yellow) wire ground conductors should be sized per applicable codes (based on circuit over current device ratings).

---

**NOTE** The green wire ground conductor mentioned above may be a black wire marked with green tape.

---

**Computer Safety Ground** Ground all computer equipment with the green (green/yellow) wire included in the branch circuitry. The green (green/yellow) wire ground conductors should be connected to the appropriate power panel and should be sized per applicable codes (based on circuit over current device ratings).

Superdome was approved by regulatory agencies around the world, and therefore requires a ground/protective earth. there are no exclusions to this regulatory approval.

High-frequency grounding between IOX and Superdome is provided by the cabinet-to-cabinet signal cabling. Whenever an IOX is connected to a Superdome cabinet, low-frequency grounding between these two cabinets is provided by a ground strap. This ground strap is shipped with each IOX. Refer to the *I/O Expansion Cabinet Guide* for more detail.

**Network-connected Equipment Ground** The installation must provide a ground connection for the network equipment. This statement is translated into the following two languages as required:

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**WARNING** Sweden: Apparaten skall anslutas till jordat uttag, när den ansluts till ett nätverk.

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**WARNING** Denmark: Før tilslutning af de øvrige ledere, se medfølgende installationsvejledning.

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## System Installation Guidelines

This section contains information about installation practices. Some common pitfalls are highlighted. Both power cable and data communications cable installations are discussed.

### Wiring Connections

Expansion and contraction rates vary among different metals. Therefore, the integrity of an electrical connection depends on the restraining force applied. Connections that are too tight compress or deform the hardware and causes it to weaken. This usually leads to high impedance causing circuit breakers to trip.

---

**CAUTION** Connections that are too loose have a high resistance that cause serious problems, such as erratic equipment operation. A high resistance connection overheats and sometimes causes fire or high temperatures that can destroy hard-to-replace components such as distribution panels or system bus bars.

---

Wiring connections must be properly torqued. Many equipment manufacturers specify the proper connection torque values for their hardware.

Ground connections must only be made on a conductive, nonpainted surface. Lockwashers must be used on all connections to prevent connection hardware from working loose.

### **Data Communications Cables**

Power transformers and heavy foot traffic create high energy fields. Route data communications cables away from these areas. Use shielded data communications cables that meet approved industry standards to reduce the effects of external fields. Data cables that are run externally to a metal fire enclosure must have a minimum fire rating of VW-1 or VW-4 or better.

## Environmental Elements

The following environmental elements can affect a Superdome server installation:

- Computer room preparation
- Cooling requirements
- Humidity level
- Air conditioning ducts
- Dust and pollution control
- Electrostatic discharge (ESD) prevention
- Acoustics (noise reduction)
- Zinc whisker control

### Computer Room Preparation

The following guidelines are recommended when preparing a computer room for a Superdome server system:

- Locate the computer room away from the exterior walls of the building to avoid the heat gain from windows and exterior wall surfaces.
- When exterior windows are unavoidable, use windows that are double- or triple-glazed and shaded to prevent direct sunlight from entering the computer room.
- Maintain the computer room at a positive pressure relative to surrounding spaces.
- Use a vapor barrier installed around the entire computer room envelope to restrain moisture migration.
- Caulk and vapor seal all pipes and cables that penetrate the envelope.
- Use at least a 12-inch raised floor system for the most favorable room air distribution system (underfloor distribution).
- Ensure a minimum ceiling height of 12 inches between the top of the server and the ceiling. Ensure all ceiling clips are in place.

### Cooling Requirements

Air conditioning equipment requirements and recommendations are described in the following sections.

#### Basic Air Conditioning Equipment Requirements

The cooling capacity of the installed air conditioning equipment for the computer room should be sufficient to offset the computer equipment dissipation loads, as well as any space envelope heat gain. This equipment should include:

- Air filtration
- Cooling or dehumidification
- Humidification
- Reheating
- Air distribution



- System controls adequate to maintain the computer room within the operating ranges listed in Table 2-1.

**Table 2-1 Computer Room Environment**

Parameter	Operating Range	Recommended Range	Maximum Rate of Change (per hour)
Temperature <sup>a, b</sup>	68° to 86° F (20° to 30° C)	68 to 72 °F (20° to 23° C)	9° F repetitive, 36° F nonrepetitive (5° C repetitive, 20° C nonrepetitive)
Humidity	15% - 80% with no condensation (40% - 55% recommended)		6%

- a. At altitudes up to 3,000 (9,842) meters.
- b. System also requires 2400 CFM airflow.

Lighting and personnel must also be included. For example, a person dissipates about 450 BTUs per hour while performing a typical computer room task.

At altitudes above 10,000 feet (3048 m), the lower air density reduces the cooling capability of air conditioning systems. If your facility is located above this altitude, the recommended temperature ranges may need to be modified. For each 1000 feet (305 m) increase in altitude above 10,000 feet (up to a maximum of 15,000 feet), subtract 1.5° F (0.83° C) from the upper limit of the temperature range listed in Table 1-14 on page 31.

### Air Conditioning System Guidelines

The following guidelines are recommended when designing an air conditioning system and selecting the necessary equipment:

- The air conditioning system serving the computer room should be capable of operating 24 hours a day, 365 days a year. It should also be independent of other systems in the building.
- Consider the long-term value of computer system availability, redundant air conditioning equipment, or capacity.
- The system should be capable of handling any future computer system expansion.
- Air conditioning equipment air filters should have a minimum rating of 45% (based on “ASHRA Standard 52-76, Dust Spot Efficiency Test”).
- Introduce only enough outside air into the system to meet building code requirements (for human occupancy) and to maintain a positive air pressure in the computer room.

### Air Conditioning System Types

The following three air conditioning system types are listed in order of preference:

- Complete self-contained package unit(s) with remote condenser(s). These systems are available with u, or down discharge and are usually located in the computer room.
- Chilled water package unit with remote chilled water plant. These systems are available with up or down discharge and are usually located in the computer room.
- Central station air handling units with remote refrigeration equipment. These systems are usually located outside the computer room.

## Basic Air Distribution Systems

A basic air distribution system includes supply air and return air.

An air distribution system should be zoned to deliver an adequate amount of supply air to the cooling air intake vents of the computer system equipment cabinets. Supply air temperature should be maintained within the following parameters:

- Ceiling supply system—From 55° F (12.8° C) to 60° F (15.6° C)
- Floor supply system—At least 60° F (15.6° C)

If a ceiling plenum return air system or a ducted ceiling return air system is used, the return air grille(s) in the ceiling should be located directly above the computer equipment cabinets.

The following three types of air distribution system are listed in order of recommendation:

- Underfloor air distribution system—Downflow air conditioning equipment located on the raised floor of the computer room uses the cavity beneath the raised floor as plenum for the supply air.

Return air from an underfloor air distribution system can be ducted return air (DRA) above the ceiling, as shown in Figure 2-2 on page 48.

Perforated floor panels (available from the raised floor manufacturer) should be located around the perimeter of the system cabinets. Supply air emitted through the perforated floor panels is then available near the cooling air intake vents of the computer system cabinets.

- Ceiling plenum air distribution system—Supply air is ducted into the ceiling plenum from upflow air conditioning equipment located in the computer room or from an air handling unit (remote).

The ceiling construction should resist air leakage. Place perforated ceiling panels (with down discharge air flow characteristics) around the perimeter of the system cabinets. The supply air emitted downward from the perforated ceiling panels is then available near the cooling air intake vents of the computer system cabinets.

Return air should be ducted back to the air conditioning equipment through the return air duct above the ceiling.

- Above ceiling ducted air distribution system—Supply air is ducted into a ceiling diffuser system from upflow air conditioning equipment located in the computer room or from an air handling unit (remote).

Return air from an above ceiling ducted air distribution system may be ducted return air (DRA) above the ceiling, as shown in Figure 2-4 on page 50, or ceiling plenum return air (CPRA), as shown in Figure 2-3 on page 49.

Adjust the supply air diffuser system grilles to direct the cooling air downward around the perimeter of the computer system cabinets. The supply air is then available near the cooling air intake vents of the computer system cabinets.

## Air Conditioning System Installation

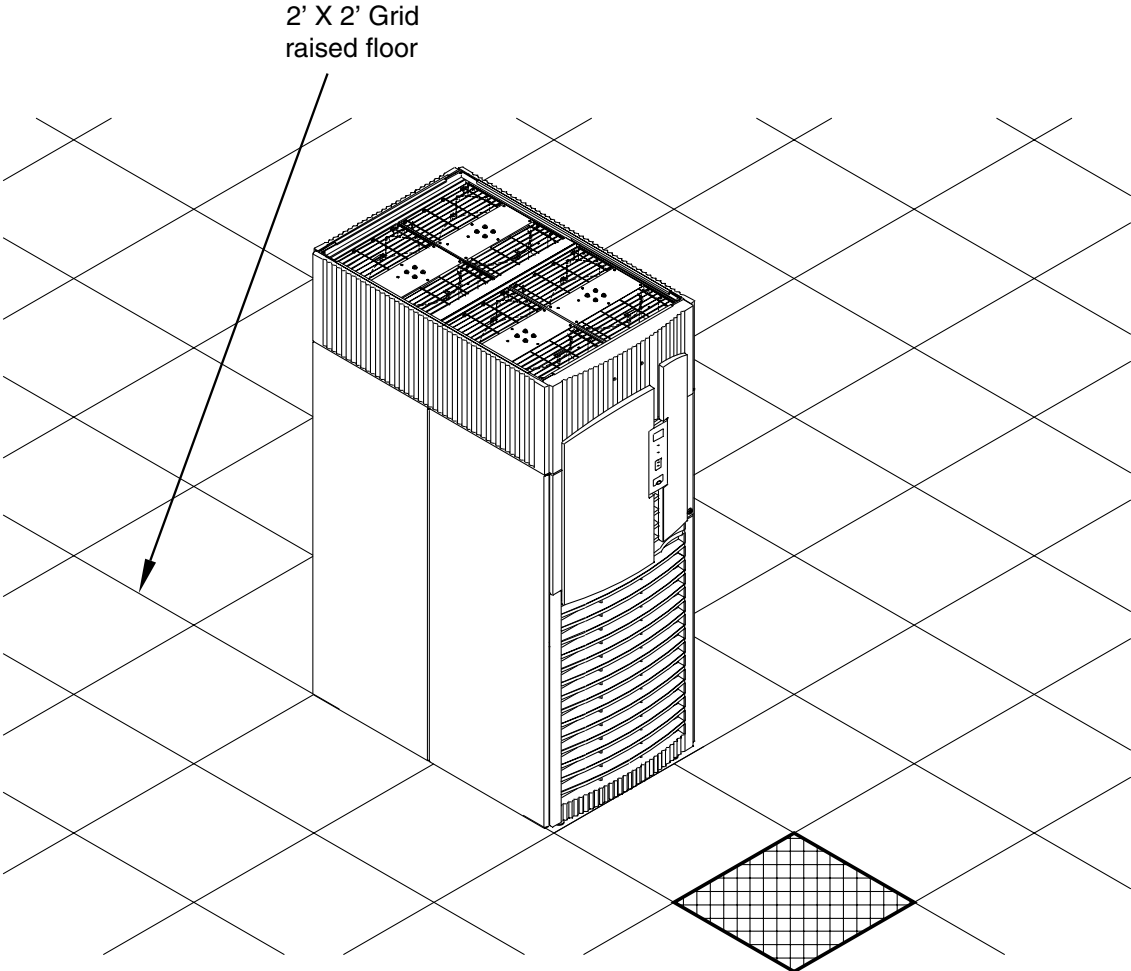
All air conditioning equipment, materials, and installation must comply with any applicable construction codes. Installation of the various components of the air conditioning system must also conform to the air conditioning equipment manufacturer's recommendations.

Figure 2-2 on page 48 illustrates a typical computer room underfloor air distribution system (DRA).

Figure 2-3 on page 49 illustrates a typical computer room ceiling plenum air distribution system (CPRA).

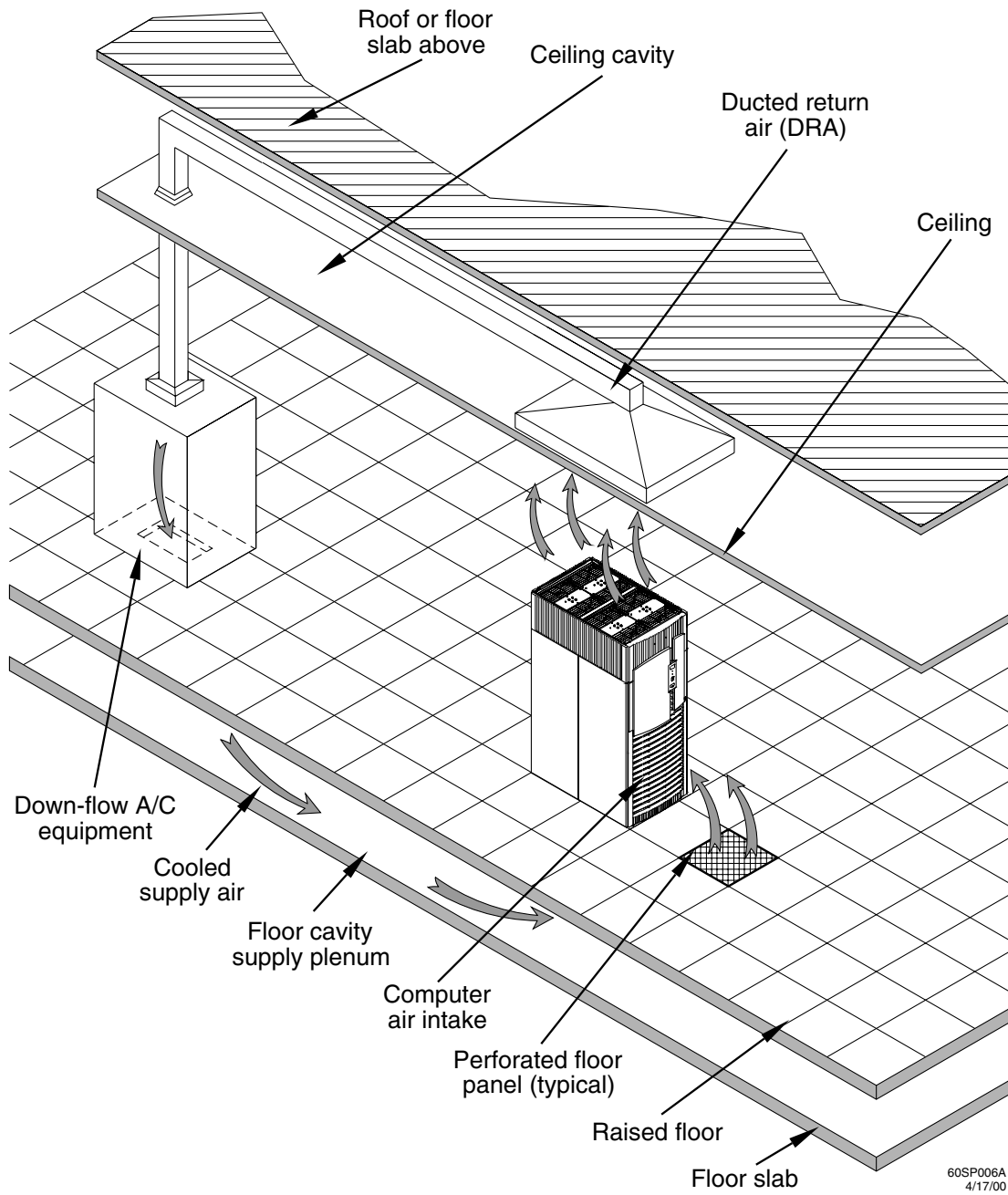
Figure 2-4 on page 50 illustrates a typical computer room above ceiling ducted air distribution system (DRA).

**Figure 2-1 Typical Computer Room Raised Floor Layout**

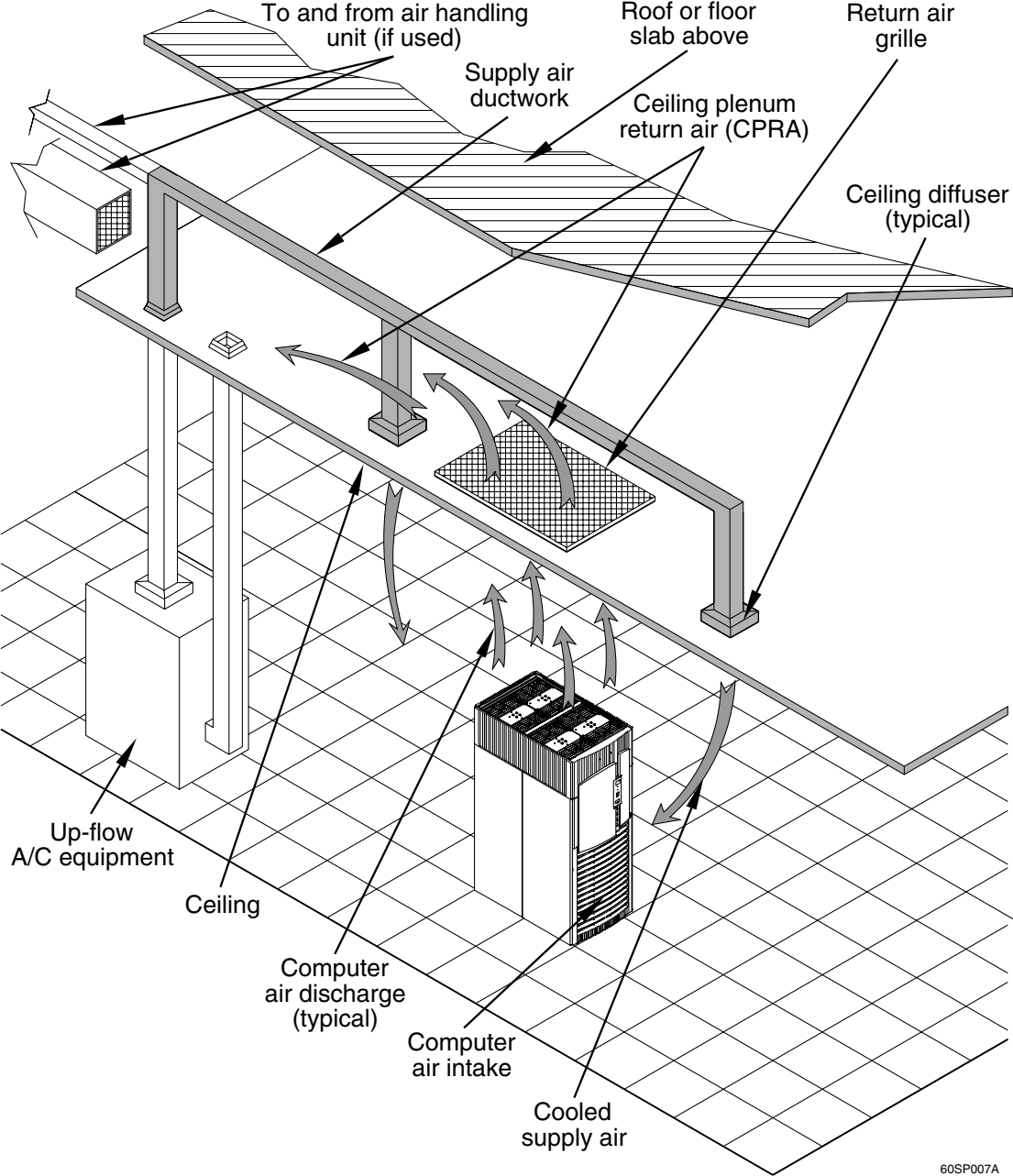


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**Figure 2-2 Underfloor Air Distribution System**

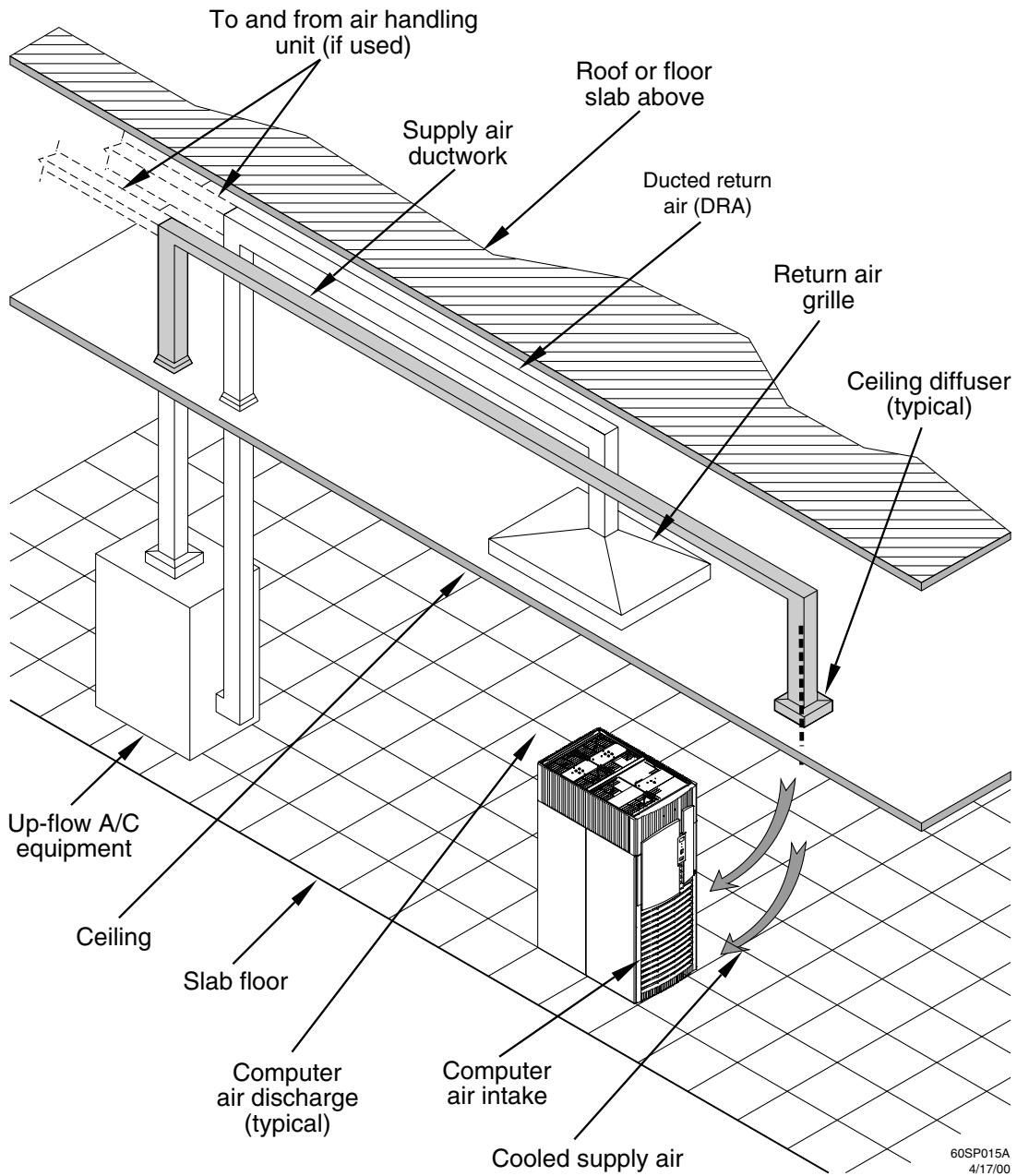


**Figure 2-3** Ceiling Plenum Air Distribution System



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**Figure 2-4 Above Ceiling Ducted Air**



## Humidity Level

Maintain proper humidity levels. High humidity causes galvanic actions to occur between some dissimilar metals. This eventually causes a high resistance between connections, leading to equipment failures. High humidity can also have an adverse affect on some magnetic tapes and paper media.

---

**CAUTION** Low humidity contributes to undesirably high levels of electrostatic charges. This increases the electrostatic discharge (ESD) voltage potential. ESD can cause component damage during servicing operations. Paper feed problems on high-speed printers are usually encountered in low-humidity environments.

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Low humidity levels are often the result of the facility heating system and occur during the cold season. Most heating systems cause air to have a low humidity level, unless the system has a built-in humidifier.

## Air Conditioning Ducts

Use separate computer room air conditioning duct work. If it is not separate from the rest of the building, it might be difficult to control cooling and air pressure levels. Duct work seals are important for maintaining a balanced air conditioning system and high static air pressure. Adequate cooling capacity means little if the direction and rate of air flow cannot be controlled because of poor duct sealing. Also, the ducts should not be exposed to warm air, or humidity levels may increase.

## Dust and Pollution Control

Computer equipment can be adversely affected by dust and microscopic particles in the site environment.

Specifically, disk drives, tape drives, and some other mechanical devices can have bearing failures resulting from airborne abrasive particles. Dust may also blanket electronic components like printed circuit boards causing premature failure due to excess heat and/or humidity build up on the boards. Other failures to power supplies and other electronic components can be caused by metallically conductive particles. These metallic particles are conductive and can short circuit electronic components. Use every effort to ensure that the environment is as dust and particulate free as possible.

Smaller particles can pass through some filters and, over a period of time, possibly cause problems in mechanical parts. Small dust particles can be prevented from entering the computer room by maintaining its air conditioning system at a high static air pressure level.

Other sources of dust, metallic, conductive, abrasive, and/or microscopic particles can be present. Some sources of these particulates are:

- Subfloor shedding
- Raised floor shedding
- Ceiling tile shedding

These pollutants are not always visible to the naked eye. A good check to determine their possible presence is to check the underside of the tiles. The tile should be shiny, galvanized, and free from rust.

The computer room should be kept clean. The following guidelines are recommended:

- Smoking—Establish a no-smoking policy. Cigarette smoke particles are eight times larger than the clearance between disk drive read/write heads and the disk surface.
- Printer—Locate printers and paper products in a separate room to eliminate paper particulate problems.
- Eating or drinking—Establish a no-eating or drinking policy. Spilled liquids can cause short circuits in equipment such as keyboards.
- Tile floors—Use a dust-absorbent cloth mop rather than a dry mop to clean tile floors.

**Environmental Elements**

Special precautions are necessary if the computer room is near a source of air pollution. Some air pollutants, especially hydrogen sulfide (H<sub>2</sub>S), are not only unpleasant but corrosive as well. Hydrogen sulfide damages wiring and delicate sound equipment. The use of activated charcoal filters reduces this form of air pollution.

**Zinc Particulate Contamination**

Metallic particulates can be especially harmful around electronic equipment. This type of contamination may enter the data center environment from a variety of sources, including but not limited to raised floor tiles, worn air conditioning parts, heating ducts, rotor brushes in vacuum cleaners or printer component wear. Because metallic particulates conduct electricity, they have an increased potential for creating short circuits in electronic equipment. This problem is exaggerated by the increasingly dense circuitry of electronic equipment.

Over time, very fine whiskers of pure metal can form on electroplated zinc, cadmium, or tin surfaces. If these whiskers are disturbed, they may break off and become airborne, possibly causing failures or operational interruptions. For over 50 years, the electronics industry has been aware of the relatively rare but possible threat posed by metallic particulate contamination. During recent years, a growing concern has developed in computer rooms where these conductive contaminants are formed on the bottom of some raised floor tiles.

Although this problem is relatively rare, it may be an issue within your computer room. Since metallic contamination can cause permanent or intermittent failures on your electronic equipment, Hewlett-Packard strongly recommends that your site be evaluated for metallic particulate contamination before installation of electronic equipment.

**Electrostatic Discharge (ESD) Prevention**

Static charges (voltage levels) occur when objects are separated or rubbed together. The voltage level of a static charge is determined by the following factors:

- Types of materials
- Relative humidity
- Rate of change or separation

Table 2-2 lists charge levels based on personnel activities and humidity levels.

**Table 2-2 Effect of Humidity on ESD Charge Levels**

Personnel Activity <sup>a</sup>	Humidity <sup>b</sup> and Charge Levels (volts) <sup>c</sup>			
	26%	32%	40%	50%
Walking across a linoleum floor	6,150	5,750	4,625	3,700
Walking across a carpeted floor	18,450	17,250	13,875	11,100
Getting up from a plastic chair	24,600	23,000	18,500	14,800

- a. Source: B.A.Unger, Electrostatic Discharge Failures of Semiconductor Devices (Bell Laboratories,1981)
- b. For the same relative humidity level, a high rate of airflow produces higher static charges than a low airflow rate.
- c. Some data in this table has been extrapolated.



### **Static Protection Measures**

Follow these precautions to minimize possible ESD-induced failures in the computer room:

- Install conductive flooring (conductive adhesive must be used when laying tiles).
- Use conductive wax (if waxed floors are necessary).
- Ensure that all equipment and flooring are properly grounded and are at the same ground potential.
- Use conductive tables and chairs.
- Use a grounded wrist strap (or other grounding method) when handling circuit boards.
- Store spare electronic modules in antistatic containers.
- Maintain recommended humidity level and airflow rates in the computer room.

### **Acoustics**

Computer equipment and air conditioning blowers cause computer rooms to be noisy. Ambient noise level in a computer room can be reduced as follows:

- Dropped ceiling—Cover with a commercial grade of fire-resistant, acoustic rated, fiberglass ceiling tile.
- Sound deadening—Cover the walls with curtains or other sound deadening material.
- Removable partitions—Use foam rubber models for most effectiveness.



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## **3 Facility Guidelines**

This chapter describes facility characteristics and provides guidelines for preparing the computer room.

- “Facility Characteristics” on page 57 discusses architectural issues.
- “Space Requirements” on page 60 discusses the amount of floor space required by the components.

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**NOTE** Refer to Appendix C for templates to aid in locating caster contact area and caster/leveling foot centers. Templates are also provided to locate required cutouts for cable routing.

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## Facility Characteristics

This section contains information about facility characteristics that must be considered for the installation or operation of a Superdome server. Facility characteristics are:

- Floor loading
- Windows
- Altitude effects

### Floor Loading

The computer room floor must be able to support the total weight of the installed computer system as well as the weight of the individual cabinets as they are moved into position.

Floor loading is usually not an issue in non-raised-floor installations. The information presented in this section is directed toward raised-floor installations.

**NOTE** Any floor system under consideration for a Superdome server installation should be verified by an appropriate floor system consultant.

### Raised-Floor Loading

Raised-floor loading is a function of the manufacturer's load specification and the positioning of the equipment relative to the raised-floor grid. While Hewlett-Packard cannot assume responsibility for determining the suitability of a particular raised-floor system, information and illustrations are provided for the customer or local agencies to determine installation requirements.

The following guidelines are recommended:

- Because many raised-floor systems do not have grid stringers between floor stands, the lateral support for the floor stands depends on adjacent panels being in place. To avoid compromising this type of floor system while gaining under floor access, remove only one floor panel at a time.
- Larger floor grids (bigger panels) are generally rated for lighter loads.

**CAUTION** Do not install any raised-floor system until you have carefully examined it to verify that it is adequate to support the appropriate installation.

### Floor-Loading Terms

Table 3-1 defines floor-loading terms.

**Table 3-1 Floor-Loading Terms**

Term	Definition
Dead load	Weight of the raised-panel floor system, including the understructure. Expressed in lb/ft <sup>2</sup> (kg/m <sup>2</sup> ).
Live load	Load the floor system can safely support. Expressed in lb/ft <sup>2</sup> (kg/m <sup>2</sup> ).

**Table 3-1 Floor-Loading Terms (Continued)**

Term	Definition
Concentrated load	Load a floor panel can support on a 1-in <sup>2</sup> (6.45 cm <sup>2</sup> ) area at the panel's weakest point (typically the center of the panel), without the surface of the panel deflecting more than a predetermined amount.
Ultimate load	Maximum load (per floor panel) the floor system can support without failure. Failure expressed by floor panel(s) breaking or bending.  Ultimate load is usually stated as load per floor panel.
Rolling load	Load a floor panel can support (without failure) when a wheel of specified diameter and width is rolled across the panel.
Average floor load	Computed by dividing total equipment weight by the area of its footprint. This value is expressed in lb/ft <sup>2</sup> (kg/m <sup>2</sup> ).

**Average Floor Loading**

The average floor load value, defined in Table 3-2, is not appropriate for addressing raised-floor ratings at the floor grid spacing level. However, it is useful for determining floor-loading at the building level, such as the area of solid floor or span of raised-floor tiles covered by the Superdome server footprint.

**Typical Raised-Floor Site**

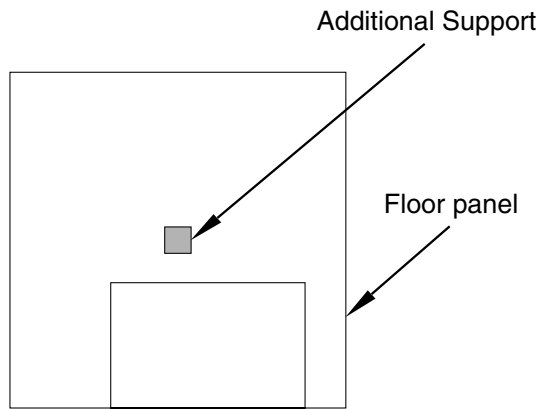
This section contains an example of a computer room raised-floor system that is satisfactory for the installation of a Superdome server.

Based on specific information provided by Hewlett-Packard, Tate Access Floors has approved its Series 800 all-steel access floor with bolt-together stringers and 24 in. (61.0 cm) by 24 in. (61.0 cm) floor panels.

Due to the large amount of floor panel material that must be removed for the purpose of routing cables, this particular floor must be braced as shown in Figure 3-1.

In the event that the flooring is being replaced or a new floor is being installed, Tate Access Floors recommends its Series 1250 all-steel access floor with bolt-together stringers and 24 in. (61.0 cm) by 24 in. (61.0 cm) floor panels be used to support the Superdome installation.

**Figure 3-1 Tate Series 800 Floor Bracing**



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**NOTE** If the specific floor being evaluated or considered is other than a Tate Series 800 floor, the specific floor manufacturer must be contacted to evaluate the floor being used.

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Table 3-2 lists specifications for the Tate Access Floors Series 800 raised-floor system.

**Table 3-2 Tate Series 800 Raised-Floor Tile Specifications**

Item	Rating
Dead load	7 lb/ft <sup>2</sup> (34.2 kg/m <sup>2</sup> )
Live load	313 lb/ft <sup>2</sup> (1528.3 kg/m <sup>2</sup> )
Concentrated load <sup>a</sup>	1250 lb (567 kg)
Ultimate load	4000 lb (1814 kg) per panel
Rolling load	400 lb (181 kg)
Average Tile load	500 lb (227 kg)

a. With 0.08 in (0.2 cm) of span maximum deflection

## Windows

Avoid housing computers in a room with windows. Sunlight entering a computer room may cause problems. Magnetic tape storage media is damaged if exposed to direct sunlight. Also, the heat generated by sunlight places an additional load on the cooling system.

## Space Requirements

This section contains information about space requirements for a Superdome server. This data should be used as the basic guideline for space plan developments. Other factors, such as airflow, lighting, and equipment space requirements, must also be considered.

### Delivery Space Requirements

There should be enough clearance to move equipment safely from the receiving area to the computer room. Permanent obstructions, such as pillars or narrow doorways, can cause equipment damage.

Delivery plans should include the possible removal of walls or doors. The physical dimensions for applicable computers and peripheral equipment are summarized in Appendix A.

### Operational Space Requirements

Other factors must be considered along with the basic equipment dimensions. Reduced airflow around equipment causes overheating, which can lead to equipment failure. Therefore, the location and orientation of air conditioning ducts, as well as airflow direction, are important. Obstructions to equipment intake or exhaust airflow must be eliminated.

The location of lighting fixtures and utility outlets affects servicing operations. Plan equipment layout to take advantage of lighting and utility outlets. Do not forget to include clearance for opening and closing equipment doors.

Clearance around and above the cabinets must be provided for proper cooling airflow through the equipment.

The service area space requirements, outlined in Appendix C, are minimum dimensions. If other equipment is located so that it exhausts heated air near the cooling air intakes of the computer system cabinets, larger space requirements are needed to keep ambient air intake to the computer system cabinets within the specified temperature and humidity ranges.

Space planning should also include the possible addition of equipment or other changes in space requirements. Equipment layout plans should also include provisions for the following:

- Channels or fixtures used for routing data cables and power cables
- Access to air conditioning ducts, filters, lighting, and electrical power hardware
- Power conditioning equipment
- Cabinets for cleaning materials
- Maintenance area and spare parts

### Floor Plan Grid

The floor plan grid is used to plan the location of equipment in the computer room. In addition to its use for planning, the floor plan grid should also be used when planning the locations of the following items:

- Air conditioning vents
- Lighting fixtures
- Utility outlets
- Doors



- Access areas for power wiring and air conditioning filters
- Equipment cable routing

Copies of the floor plan grid are located in Appendix C.

### **Equipment Footprint Templates**

Equipment footprint templates are provided in Appendix C to show basic equipment dimensions and space requirements for servicing. Be sure to use the appropriate templates for the equipment that is to be installed.

The service areas shown on the template drawings are lightly shaded.

Removable copies of the equipment footprint templates are located in Appendix C. They should be used with the floor plan grid to define the location of the equipment that will be installed in your computer room.

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**NOTE** Photocopying typically changes the scale of drawings copied. If any templates are copied, then all templates and floor plan grids must also be copied.

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## 4 Pre-Installation Survey

This chapter provides a site survey information packet consisting of an information form and checklists to be used to evaluate a computer facility. The checklists information sheets and information forms should be filled out by the customer and a Hewlett-Packard representative.

- “Pre-Installation Survey Content” on page 65 describes the contents of the site survey information packet.

- “Typical Installation Schedule” on page 66 describes the proposed schedule of installation events.
- “Site Inspection” on page 67 provides a sample of the on-site inspection checklist.
- “Delivery Survey” on page 71 provides the delivery or installation requirement forms.

## **Pre-Installation Survey Content**

The site pre-installation survey information is designed to identify problems that might occur before, during, or after the installation of the system. It contains the following items:

- Pre-installation checklists—Verify the customer site is ready for the equipment installation.
- Pre-installation survey information sheets—List customer name, address, and corresponding Hewlett-Packard sales personnel.
- Pre-installation survey information forms—List delivery information and special instructions.

## Typical Installation Schedule

The following schedule lists the sequence of events for a typical system installation:

- 60 days before installation
  - Floor plan design completed and mailed to Hewlett-Packard
- 30 days before installation
  - Primary power and air conditioning installation completed
  - Telephone and data cables installed
  - Fire protection equipment installed
  - Major facility changes completed
  - Special delivery requirements defined
  - Site inspection survey completed
  - Delivery survey completed
  - Signed copy of the site inspection and delivery survey mailed to Hewlett-Packard
  - Site inspection and pre-delivery coordination meeting arranged with a Hewlett-Packard representative to review the inspection checklist and arrange an installation schedule.
- 7 days before installation
  - Final check made with a Hewlett-Packard customer engineer to resolve any last-minute problems

## Site Inspection

Table 4-1 contains a sample of the Customer and Hewlett-Packard information required.

Table 4-2 contains a sample site inspection checklist.

**IMPORTANT** Ensure that the customer is aware of the iCOD email requirements. That is, each bootable partition requires a connection to the internet to send email to notify Hewlett-Packard that the customer has allocated additional CPUs beyond the amount initially purchased. Each bootable partition must be configured to perform this operation.

For more details, go to <http://superdome.hp.com> and click on the iCOD link.

**NOTE** Table 4-1 and Table 4-2 are provided as examples only. To ensure use of the current information specific to your site preparation, refer to the Site Readiness Review Section of the Deployment Manager's Handbook.

**Table 4-1 Customer and Hewlett-Packard Information**

Customer Information	
Name:	Phone No:
Street Address:	City or Town:
State or Province:	Country
Zip or postal code:	
Primary customer contact:	Phone No.:
Secondary customer contact:	Phone No.:
Traffic coordinator:	Phone No.:
Hewlett-Packard information	
Sales representative	Order No:
Representative making survey	Date:
Scheduled delivery date	

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**NOTE** To ensure compliance with item 10 of Table 4-2, provide a copy of Appendix D to the customer to use a worksheet to identify required names and addresses for the LAN.

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**Table 4-2 Site Inspection Checklist**

Please check either Yes or No. If No, include comment or date				Comment or Date
Computer room				
No.	Area or condition	Yes	No	
1.	Is there a completed floor plan?			
2.	Is there adequate space for maintenance needs? Front 42 in (106 cm) min., 48 in (121 cm) recommended. Rear 32 in (81 cm) min., 36 in (91cm) recommended			
3.	Is access to the site or computer room restricted?			
4.	Is the computer room structurally complete? Expected date of completion?			
5.	Is a raised floor installed and in good condition? What is the floor to ceiling height? [7.5 ft (228 cm) minimum]			
6.	Is the raised floor adequate for equipment loading?			
7.	Are there channels or cutouts for cable routing?			
8.	Is there a remote console telephone line available with an RJ11 jack?			
9.	Is a telephone line available?			
9a.	Is the customer aware of the iCOD email requirements?  Each bootable partition requires a connection to the internet to send email to notify Hewlett-Packard that the customer has allocated additional CPUs beyond the amount initially purchased. Each bootable partition must be configured to perform this operation.  For more details, go to <a href="http://superdome.hp.com">http://superdome.hp.com</a> and click on the iCOD link.			
10.	Are customer supplied peripheral and LAN cables available and of the proper type?			



**Table 4-2 Site Inspection Checklist (Continued)**

Please check either Yes or No. If No, include comment or date				Comment or Date
11.	Are floor tiles in good condition and properly braced?			
12.	Metallic particulate test required.			
Power and lighting				
No.	Area or condition	Yes	No	
13.	Are lighting levels adequate for maintenance?			
14.	Are there ac outlets available for servicing needs? (i.e. vacuuming)			
15.	Does the input voltage correspond to equipment specifications?			
15A	Is dual source power used? If so, identify type(s) and evaluate grounding.			
16	Does the input frequency correspond to equipment specifications?			
17.	Are lightning arrestors installed inside the building?			
18.	Is power conditioning equipment installed?			
19.	Is there a dedicated branch circuit for equipment?			
20.	Is the dedicated branch circuit less than 250 feet (72.5 meters)?			
21.	Are the input circuit breakers adequate for equipment loads?			
Safety				
No.	Area or condition	Yes	No	
22.	Is there an emergency power shut-off switch?			
23.	Is there a telephone available for emergency purposes?			
24.	Is there a fire protection system in the computer room?			
25.	Is antistatic flooring installed?			

**Table 4-2 Site Inspection Checklist (Continued)**

Please check either Yes or No. If No, include comment or date				Comment or Date
26.	Are there any equipment servicing hazards (loose ground wires, poor lighting, etc.)?			
<b>Cooling</b>				
No.	Area or condition	Yes	No	
27.	Can cooling be maintained between 68° and 86° (20° and 30° C)?			
28.	Can temperature changes be held to 9° (5 ° C) per hour?			
29.	Can humidity level be maintained between 40% and 55%?			
30.	Are air conditioning filters installed and clean?			
<b>Storage</b>				
No.	Area or condition	Yes	No	
31.	Are cabinets available for tape and disc media?			
32.	Is shelving available for documentation?			
<b>Training</b>				
No.	Area or Condition			
33	Are personnel enrolled in the System Administrator's Course?			
34	Is on-site training required?			



## Delivery Survey

The delivery survey form shown in Figure 4-1 on page 72 and Figure 4-2 on page 73 lists delivery or installation requirements. If any of the items on the list apply, enter the appropriate information in the areas provided on the form.

Special instructions or recommendations should be entered on the Special Instructions or Recommendations form. Following are examples of special instructions or issues:

- Packaging restrictions at the facility, such as size and weight limitations
- Special delivery procedures
- Special equipment required for installation, such as tracking or hoists
- What time the facility is available for installation (after the equipment is unloaded)
- Special security requirements applicable to the facility, such as security clearance

**Figure 4-1 Delivery Survey (Part 1)**

<b>DELIVERY CHECKLIST</b>	
<b>DOCK DELIVERY</b>	
Is dock large enough for a semitrailer? Yes _____ No _____	
Circle the location of the dock and give street name if different than address.	
	
<b>STREET DELIVERY</b>	
Circle the location of access door and list street name if different than address.	
	
List height _____ and width _____ of access door.	
List special permits (if required) for street delivery.	
Permit type:	Agency obtained from:
_____	_____
_____	_____

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**Figure 4-2**      **Delivery Survey (Part 2)**

**ELEVATOR**

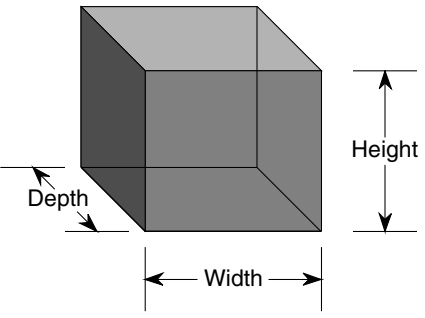
Fill in the following information if an elevator is required to move equipment.

Capacity (lb or kg) \_\_\_\_\_

Depth \_\_\_\_\_

Height \_\_\_\_\_

Width \_\_\_\_\_



**STAIRS**

Please list number of flights and stairway dimensions.

Number of flights \_\_\_\_\_

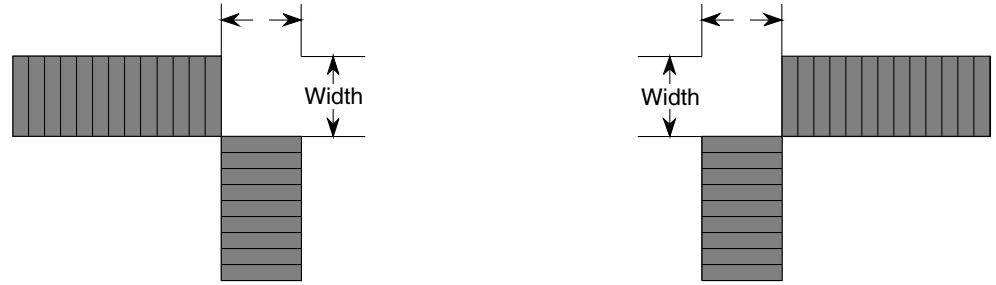
Width \_\_\_\_\_

Width \_\_\_\_\_

Number of flights \_\_\_\_\_

Width \_\_\_\_\_

Width \_\_\_\_\_



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## **A System Weights**

## Weight

To determine overall weight, follow the examples in Table A-1, then complete the entries in Table A-2.

**Table A-1 Example Weight Summary**

Component	Quantity	Multiply By	Weight (kg)
Chassis <sup>a</sup>	1	745.17 lbs (338.10)	745.17 lbs (338.10)
Cell Boards	4	41.00 lbs (18.60)	164.00 lbs (74.40)
DIMMs	128	.2 lbs (.09)	25.60 (11.60)
I/O Cardcages	4	36.5 lbs (16.56)	146 lbs (66.24)
I/O Cards	12	.45 lbs (.225)	5.4 lbs (2.45)
PDCA	2	26.00lbs (23.59)	104.00 lbs (47.18)
Bulk Power Supply (BPS)	6	23.00 lbs (11.81)	138.00 lbs (62.64)
Total weight			1328.17lbs (517.35)

a. The listed weight for a chassis includes the weight of all components not listed in Table A-1.

**Table A-2 Weight Summary**

Component	Quantity	Multiply By	Weight (kg)
Chassis <sup>a</sup>		745.17 lbs (338.10)	745.17 lbs (338.10)
Cell Boards		41.00 lbs (18.60)	lbs
DIMMs		.2 lbs (.09)	lbs
I/O Cardcages		36.5 lbs (16.56)	lbs
I/O Cards		.45 lbs (.225)	lbs



**Table A-2 Weight Summary (Continued)**

<b>Component</b>	<b>Quantity</b>	<b>Multiply By</b>	<b>Weight (kg)</b>
PDCA		26.00lbs (23.59)	lbs
Bulk Power Supply (BPS)		23.00 lbs (11.81)	lbs
		Total weight	lbs

a. The listed weight for a chassis includes the weight of all components not listed in Table A-2.

System Weights  
**Weight**

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## **B Conversion Factors**

The conversion factors provided in this appendix are intended to ease data calculation for systems that do not conform specifically to the configurations listed in this Site Preparation Guide.

Listed below are the conversion factors used in this document, as well as additional conversion factors that may be helpful in determining those factors required for site planning.

## Conversion Factors

- Refrigeration
  - 1 watt = .86 kcal/h
  - 1 watt = 3.413 Btu/h
  - 1 watt = 2.843-4 tons
  - 1 ton = 200 Btu/min
  - 1 ton = 12,000 Btu/h
  - 1 ton = 3,517.2 W
- Metric equivalents
  - 1 centimeter = 0.3937 in
  - 1 meter = 3.28 ft
  - 1 meter = 1.09 yds
  - 1 in. = 2.54 cm
  - 1 ft = 0.305 m
  - 1 CFM = 1.7m<sup>3</sup>/h
- kVA conversions, three  $\phi$   
kVA =  $V \times A \times \sqrt{3} / 1000$
- kVA conversion, single  $\phi$   
kVA =  $V \times A / 1000$

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## **C Templates**

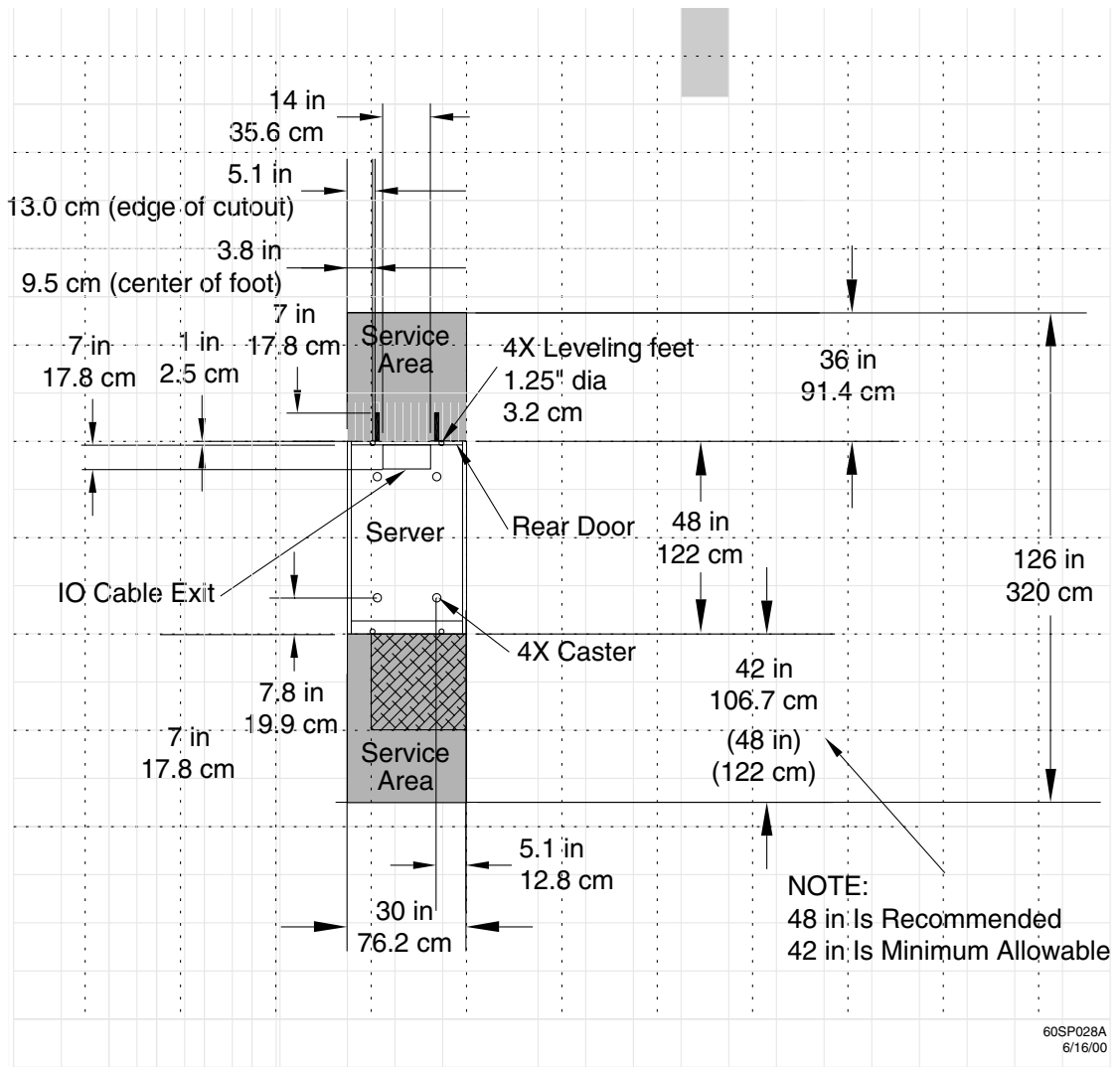
This appendix contains blank floor plan grids and equipment templates. Combine the necessary number of floor plan grid sheets to create a scaled version of the computer room floor plan.

Figure C-1 illustrates the locations required for the cable cutouts.

Figure C-2 on page 83 illustrates the overall dimensions required for a Superdome 32 Way system.

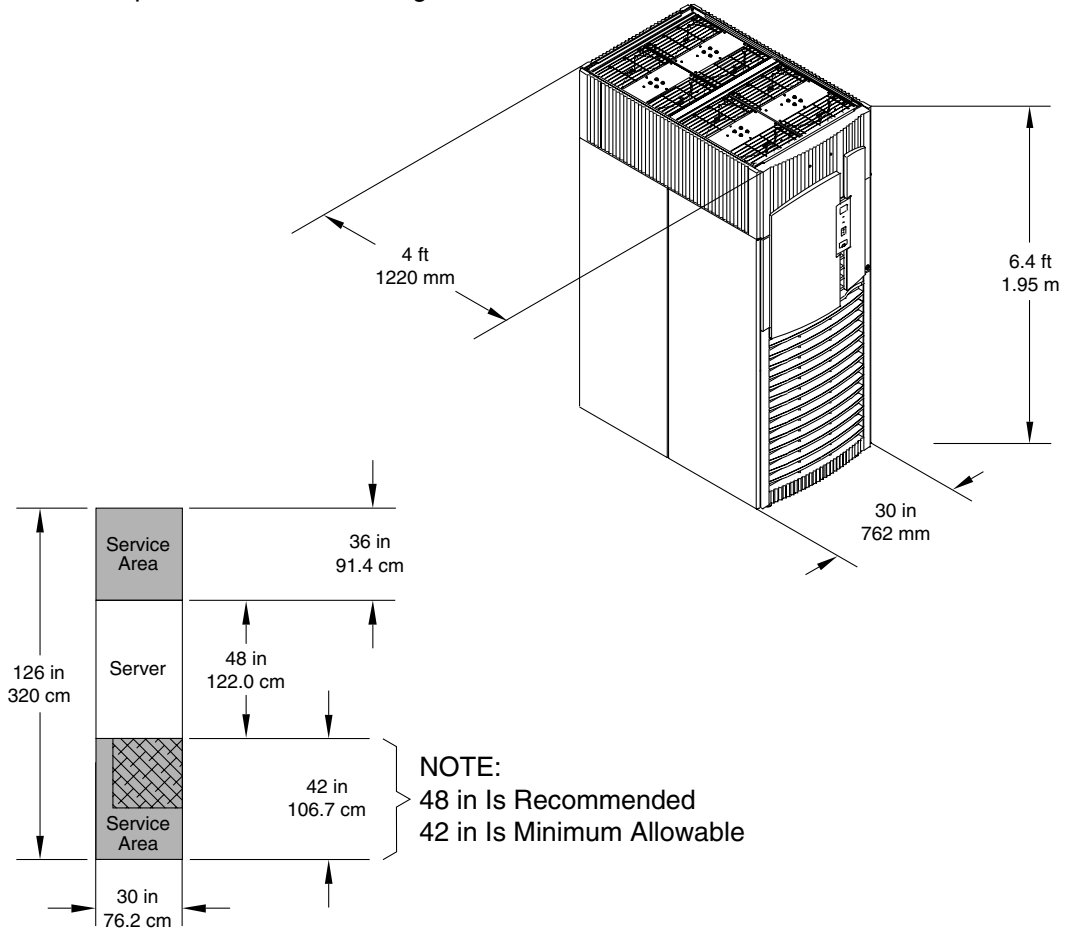
Figure C-3 on page 84 illustrates the overall dimensions required for a Superdome 64 Way system.

**Figure C-1 Cable Cutouts and Caster Locations**



**Figure C-2 Superdome 16 Way/Superdome 32 Way Space Requirements**

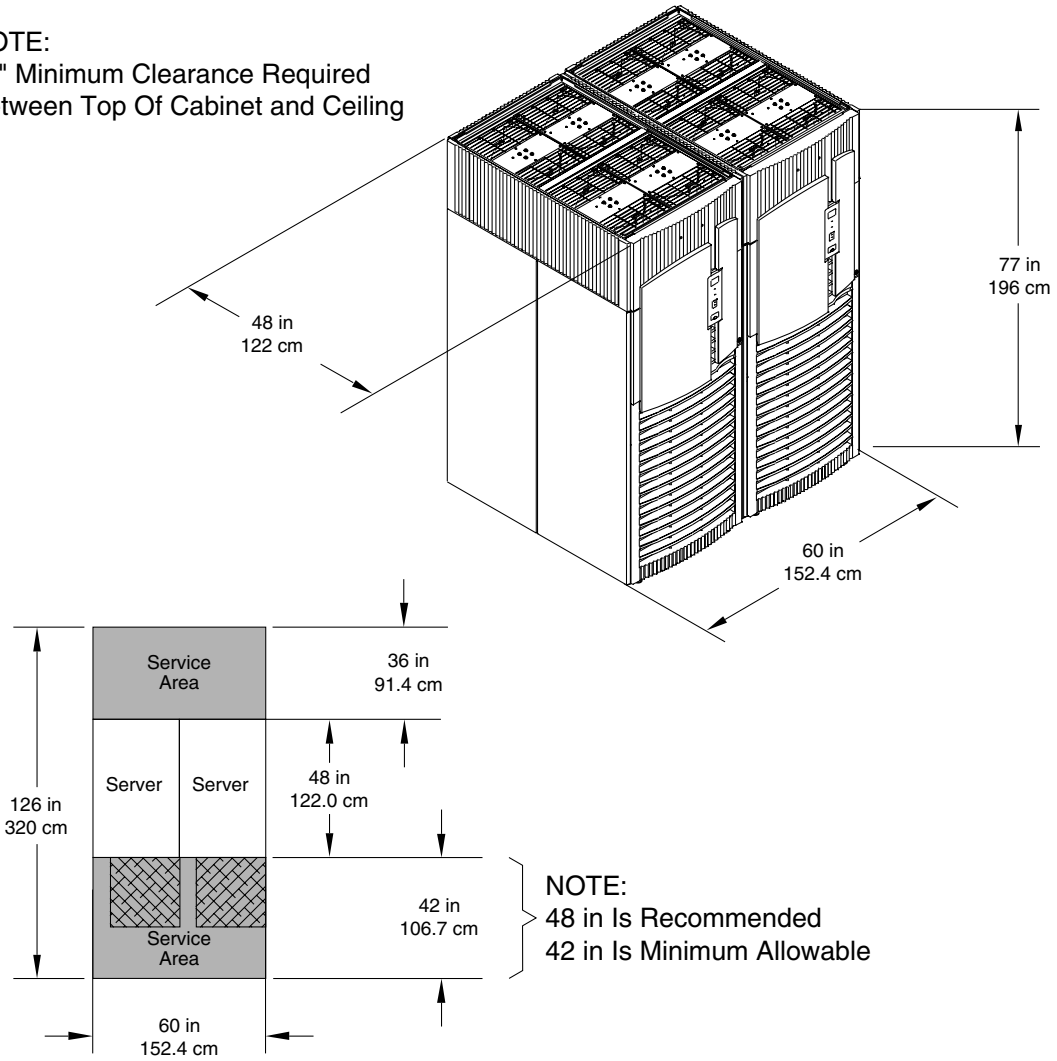
NOTE:  
12" Minimum Clearance Required  
Between Top Of Cabinet and Ceiling



60SP021A  
4/18/00

**Figure C-3 Superdome 64 Way Space Requirements**

NOTE:  
12" Minimum Clearance Required  
Between Top Of Cabinet and Ceiling



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4/28/00



## Equipment Footprint Templates

Equipment footprint templates are drawn to the same scale as the floor plan grid (1/4 inch = 1 foot). These templates are provided to show basic equipment dimensions and space requirements for servicing.

The service areas shown on the template drawings are lightly shaded.

The equipment templates should be used with the floor plan grid to define the location of the equipment that will be installed in your computer room.

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**NOTE** Photocopying typically changes the scale of copied drawings. If any templates are copied, then all templates and floor plan grids must also be copied.

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## Computer Room Layout Plan

Use the following procedure to create a computer room layout plan:

- Step 1.** Remove several copies of the floor plan grid.
- Step 2.** Cut and join them together (as necessary) to create a scale model floor plan of your computer room.
- Step 3.** Remove a copy of each applicable equipment footprint template.
- Step 4.** Cut out each template selected in Step 3; then place it on the floor plan grid created in Step 2.
- Step 5.** Position pieces until the desired layout is obtained; then fasten the pieces to the grid. Mark locations of computer room doors, air-conditioning floor vents, utility outlets, and so on.

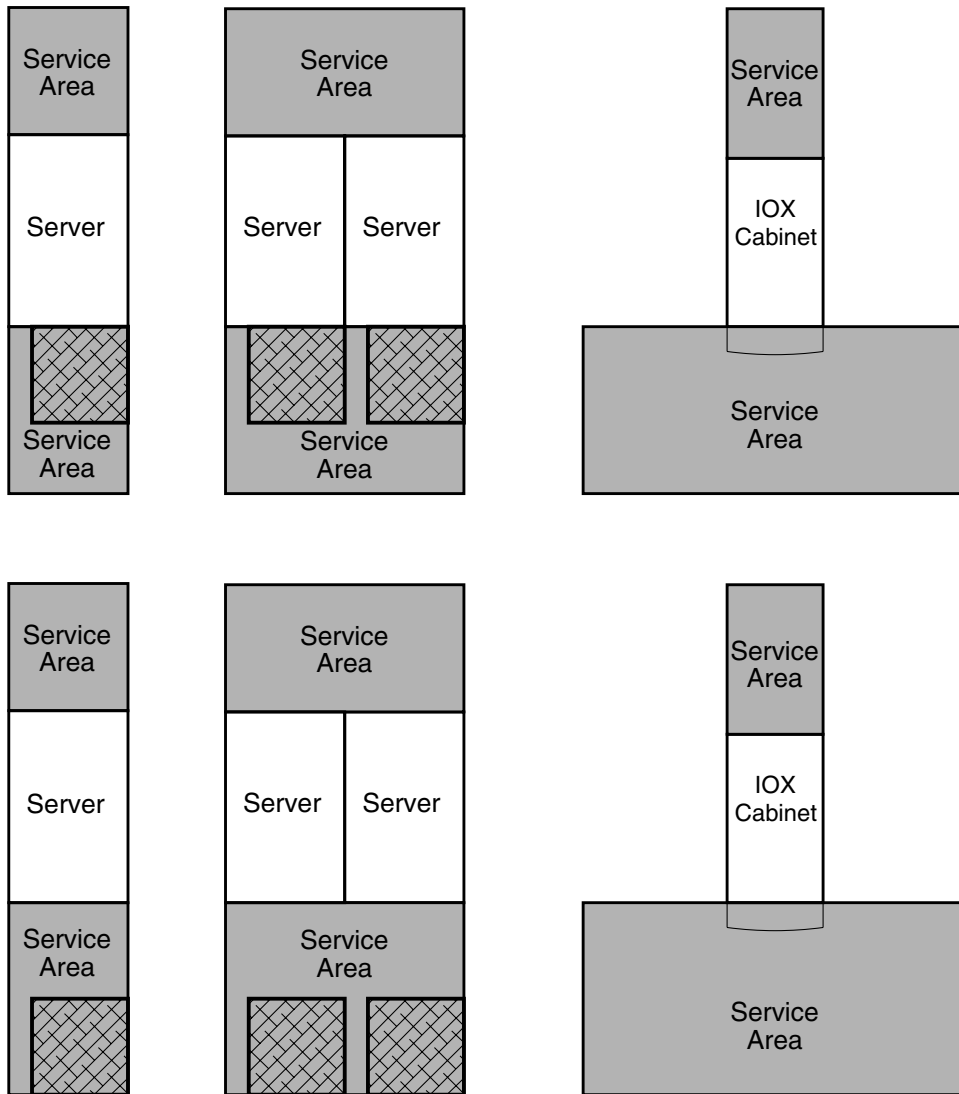
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**NOTE** Attach a reduced copy of the completed floor plan to the site survey located in Chapter 4, “Pre-installation Survey.” Hewlett-Packard field engineers use this floor plan during equipment installation.

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Superdome 32 Way, Superdome 64 Way, and I/O Expansion Cabinet Templates

Scale: 1/4 inch = 1 foot

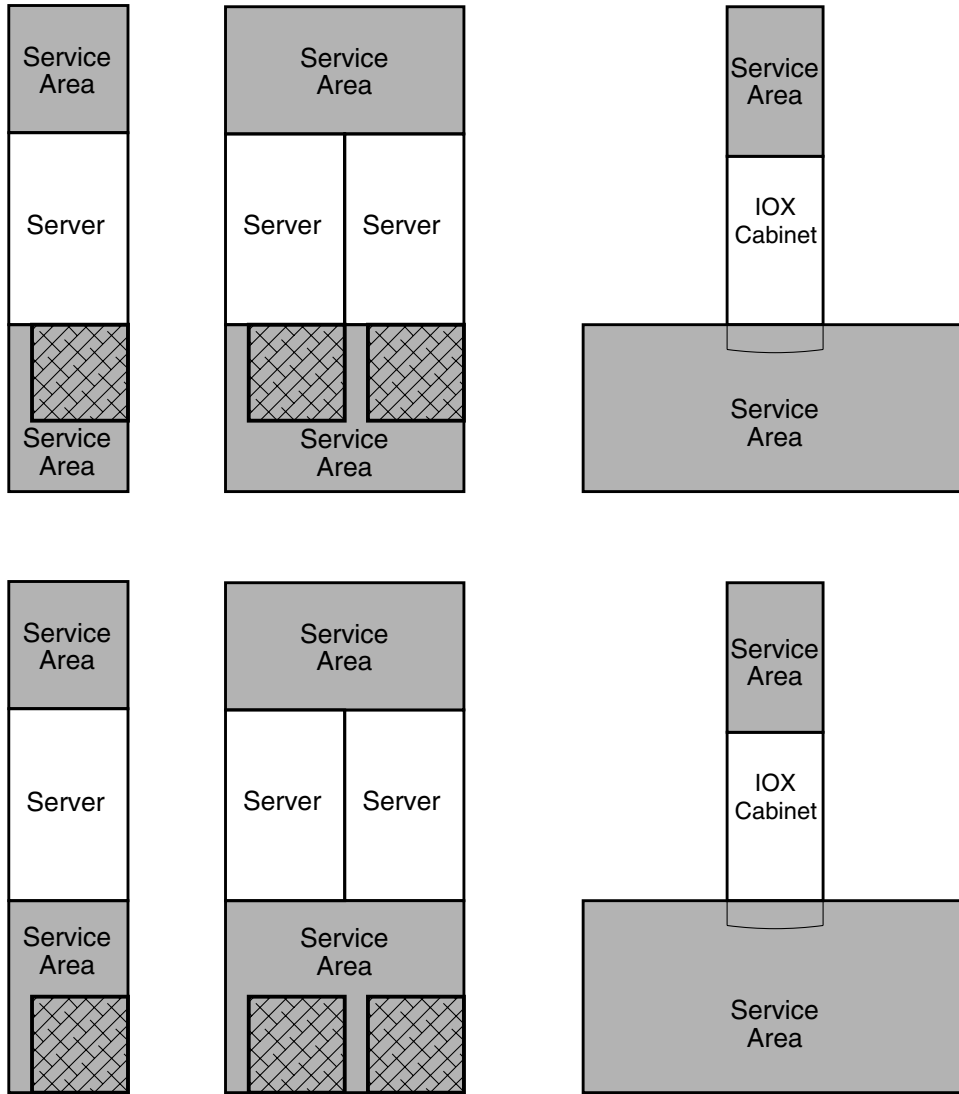


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Templates  
Computer Room Layout Plan

Superdome 32 Way, Superdome 64 Way, and I/O Expansion Cabinet Templates

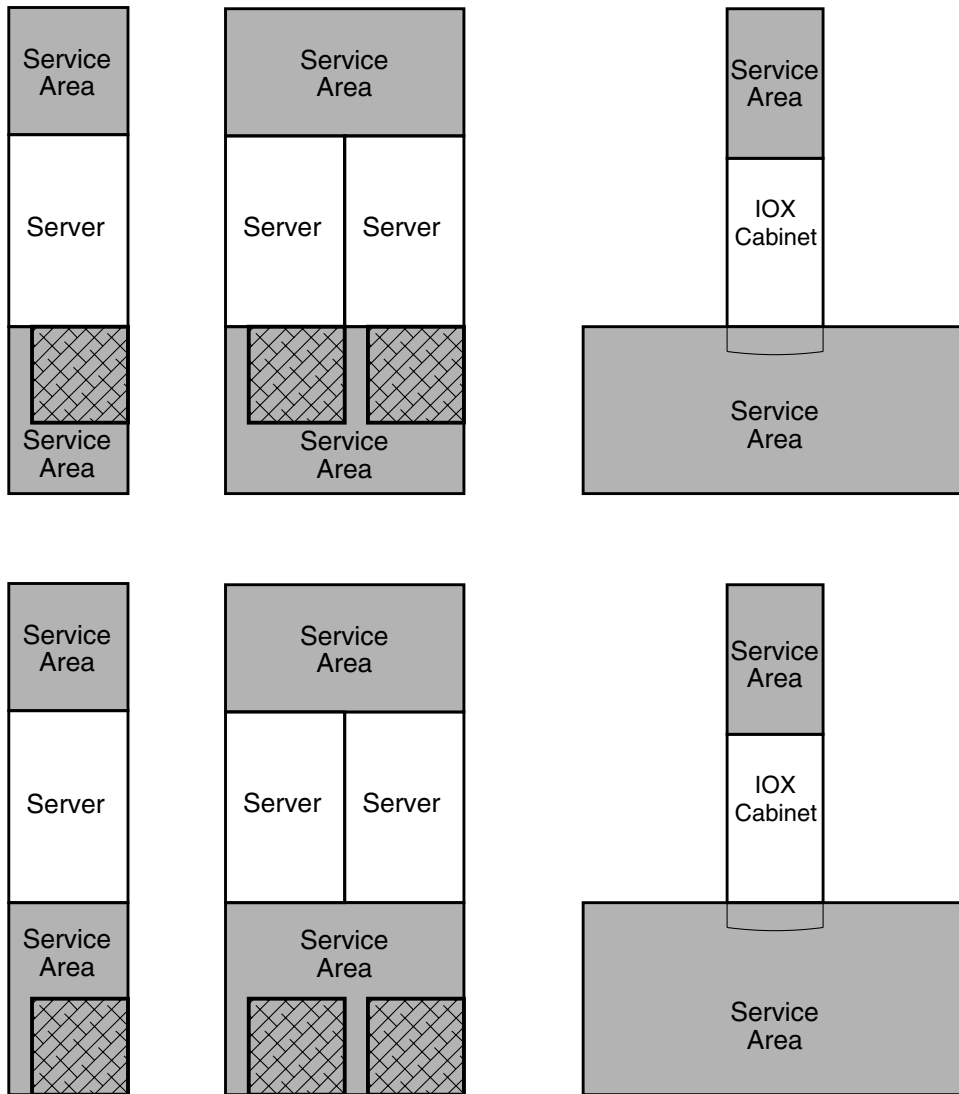
Scale: 1/4 inch = 1 foot



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Superdome 32 Way, Superdome 64 Way, and I/O Expansion Cabinet Templates

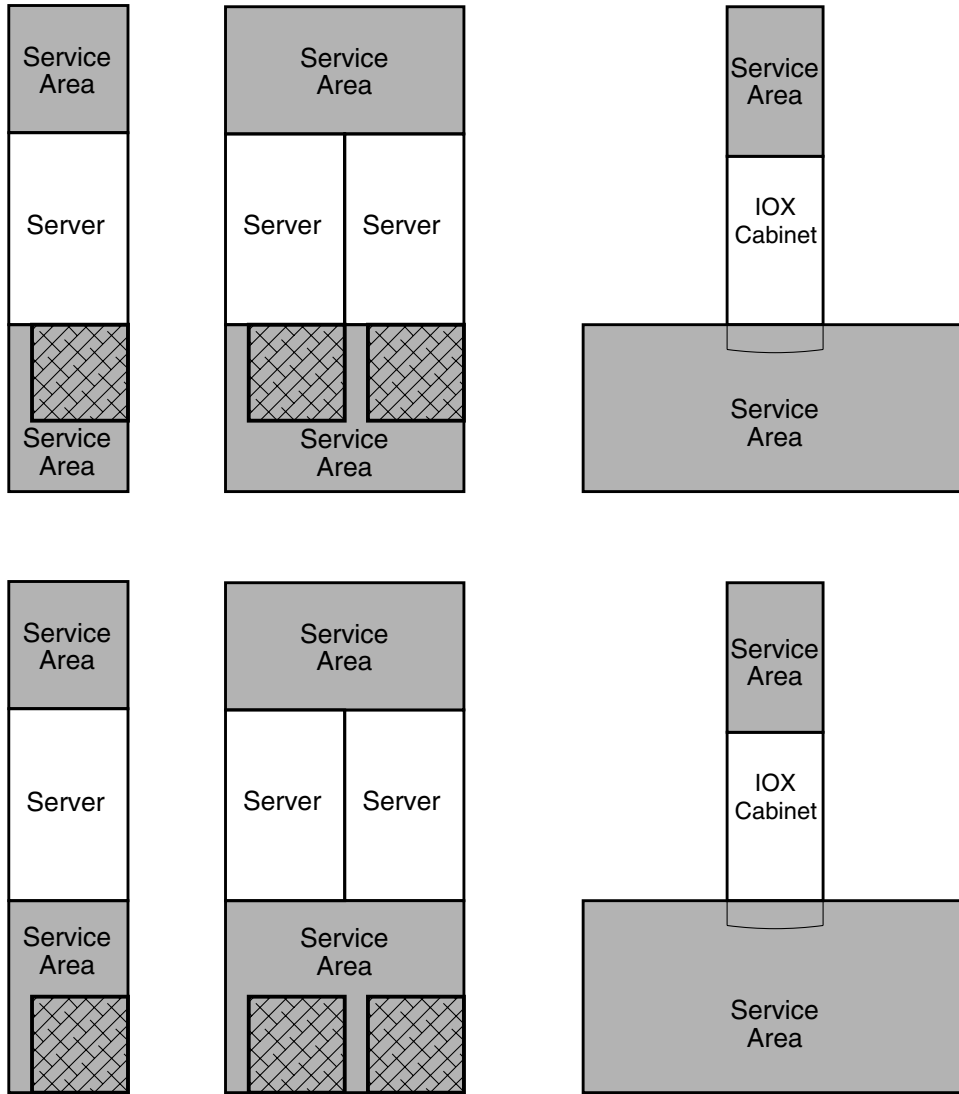
Scale: 1/4 inch = 1 foot



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Superdome 32 Way, Superdome 64 Way, and I/O Expansion Cabinet Templates

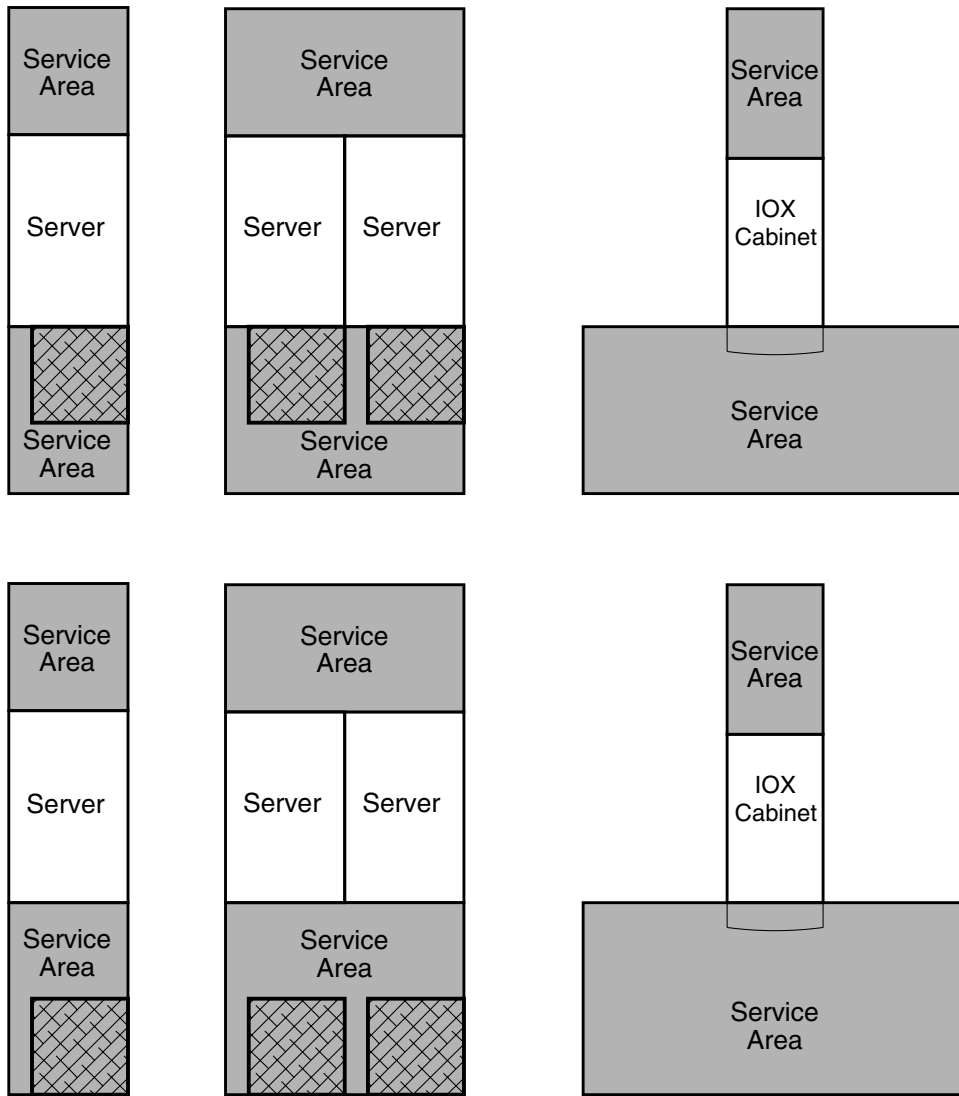
Scale: 1/4 inch = 1 foot



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Superdome 32 Way, Superdome 64 Way, and I/O Expansion Cabinet Templates

Scale: 1/4 inch = 1 foot

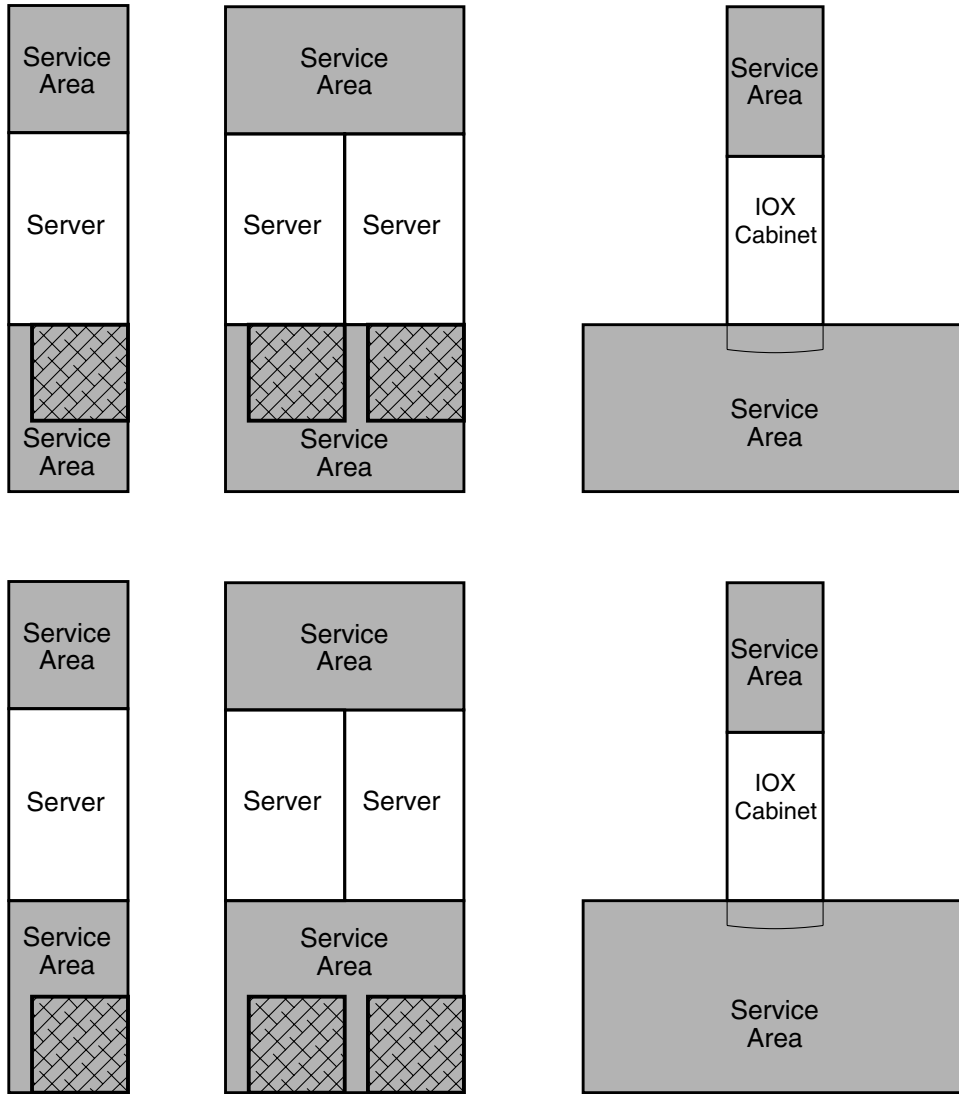


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Templates  
Computer Room Layout Plan

Superdome 32 Way, Superdome 64 Way, and I/O Expansion Cabinet Templates

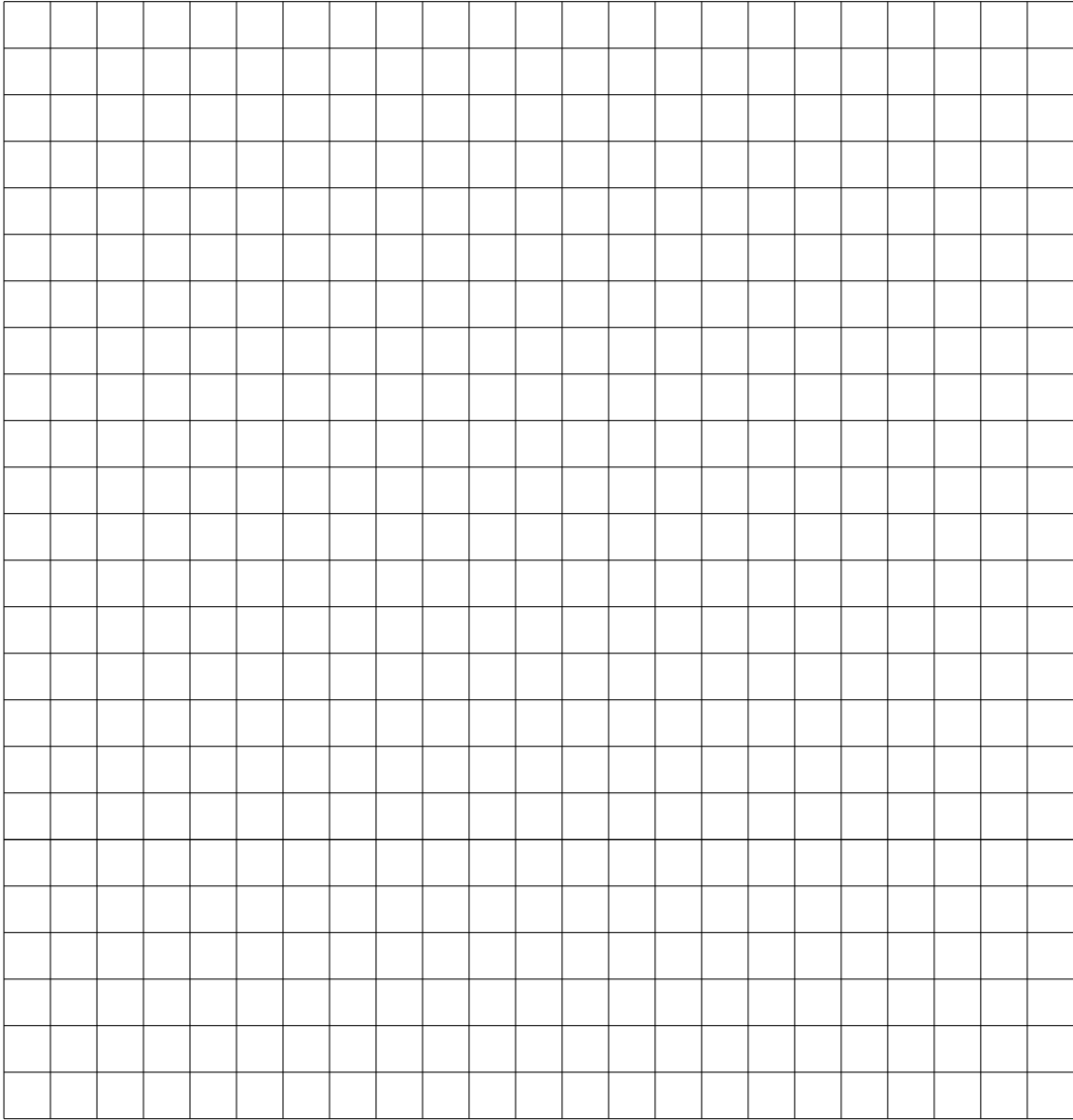
Scale: 1/4 inch = 1 foot



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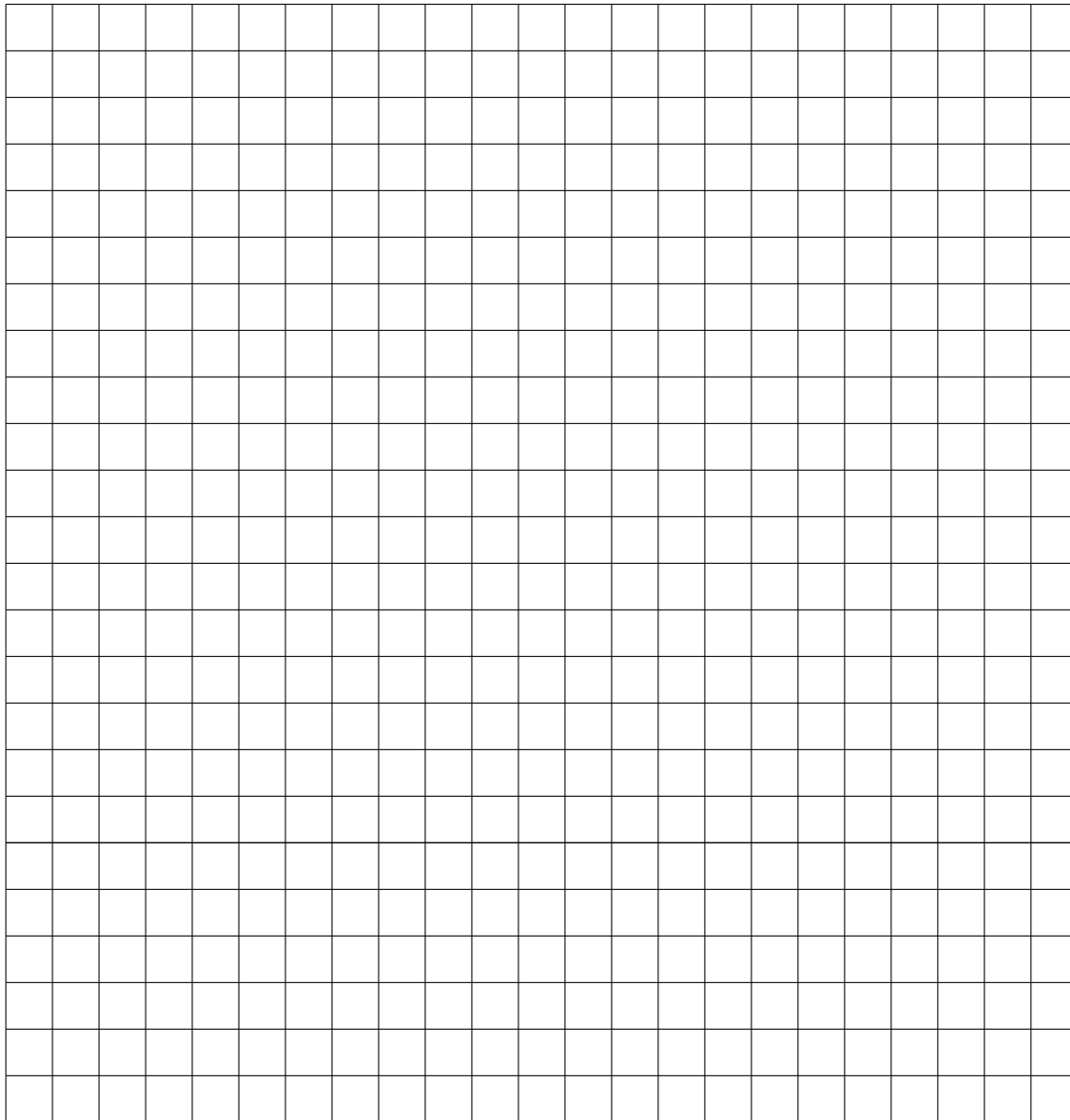
Scale: 1/4 inch = 1 foot



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12/20/99

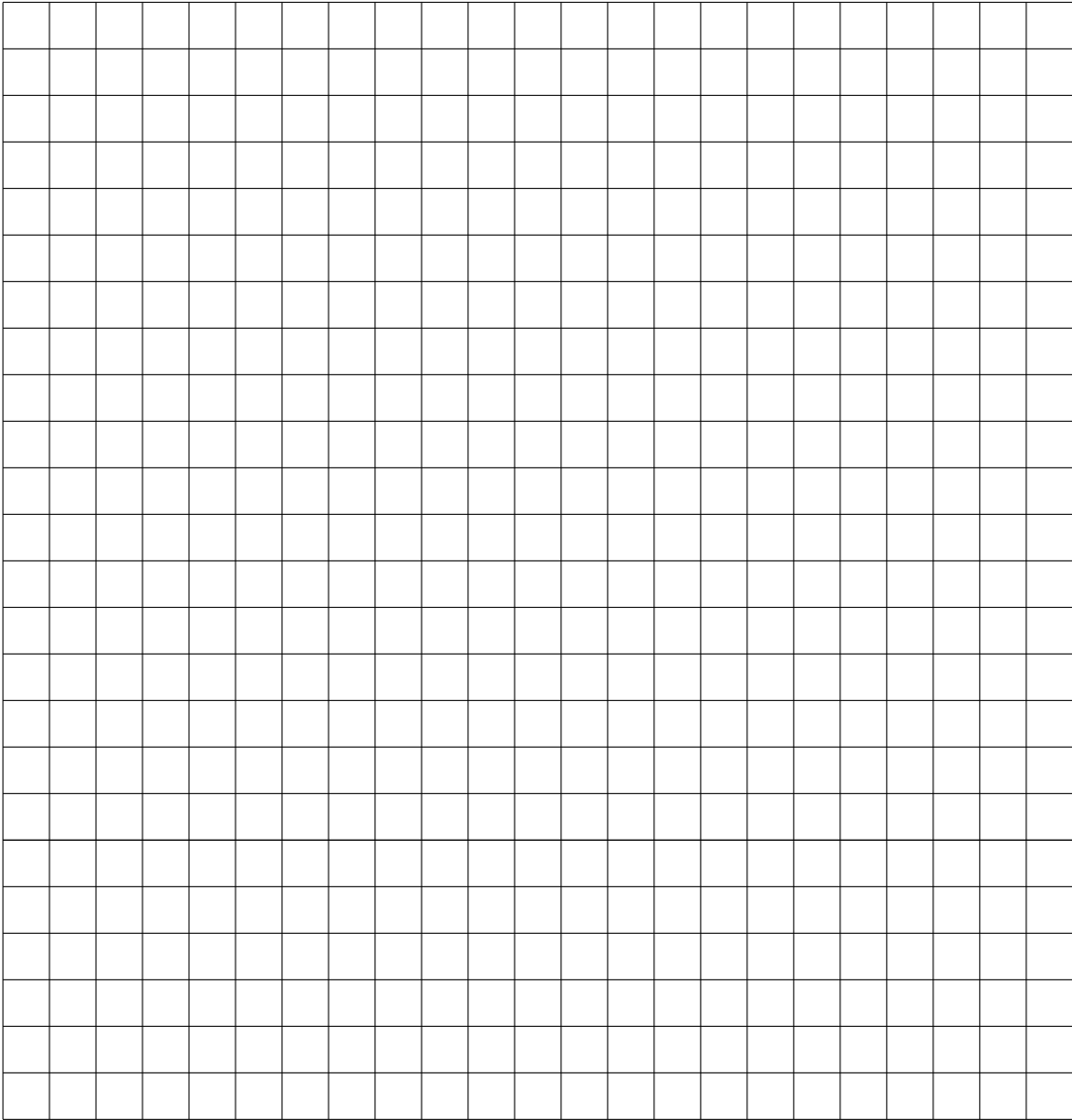
Templates  
Computer Room Layout Plan

Scale: 1/4 inch = 1 foot



V25U067  
10/2/98

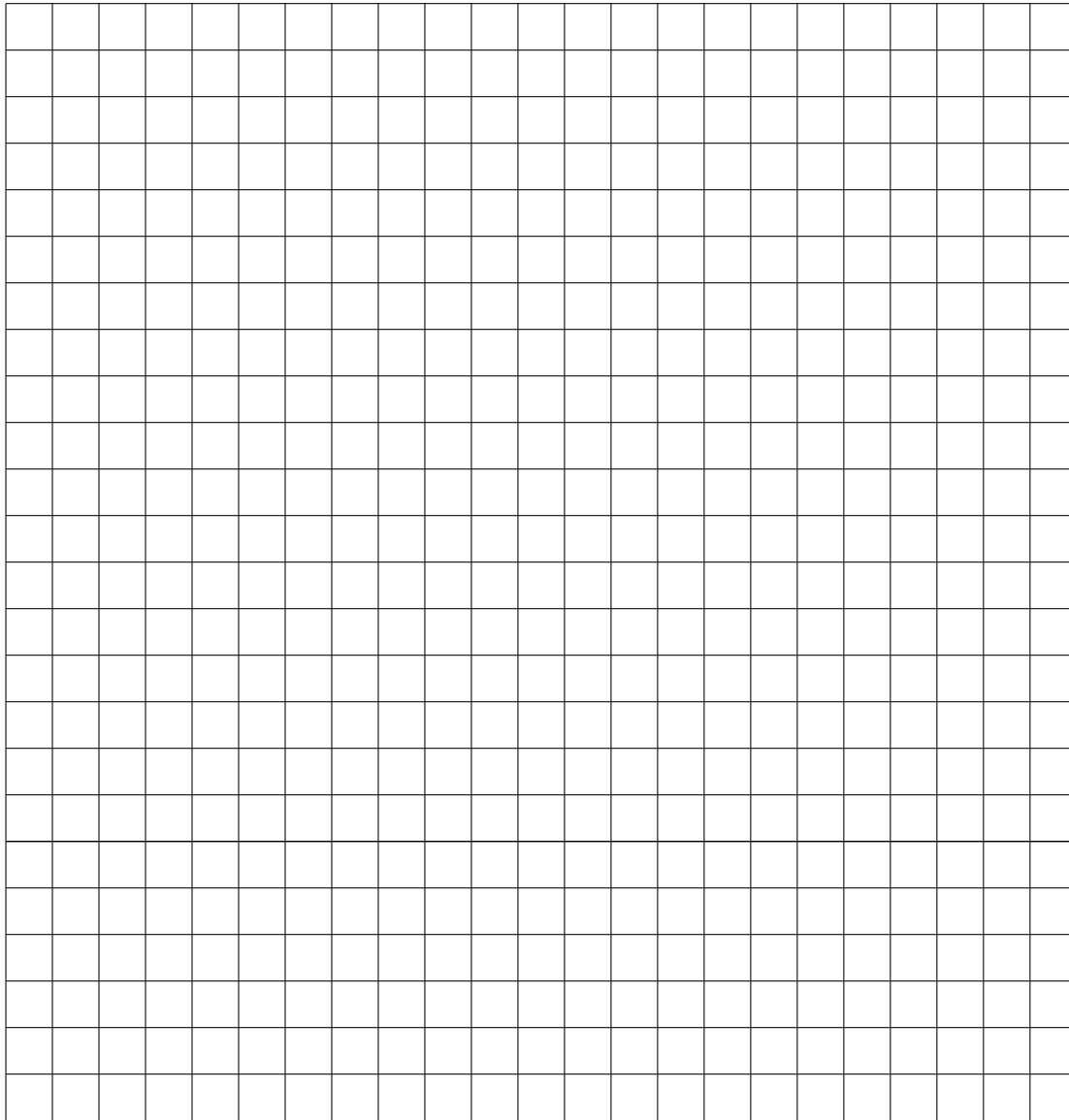
Scale: 1/4 inch = 1 foot



V25U067  
10/2/98

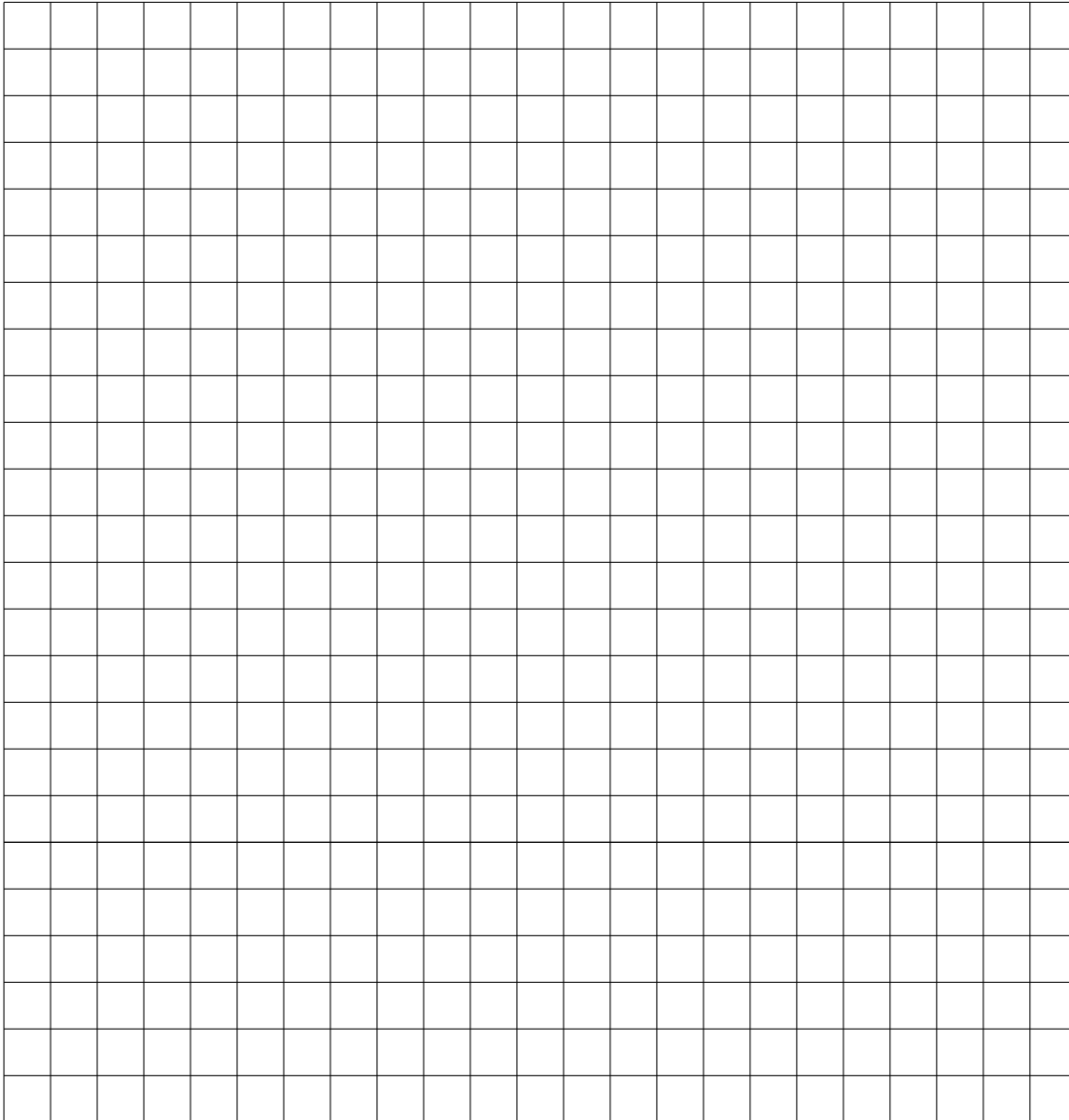
Templates  
Computer Room Layout Plan

Scale: 1/4 inch = 1 foot



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12/20/99

Scale: 1/4 inch = 1 foot



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10/2/98



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## **D Superdome LAN Interconnect Diagram**

Have the customer fill in Table D-1 on page 100 with LAN information. Use the following diagram to help correlate the LAN connection with the IP address.

You will need customer-supplied LAN information for:

- Customer port on GSP

- Console port on SMS
- Customer network interface on SMS (10/100 Base-T Port)
- Each network interface on each partition
- PC/Workstation console

**Table D-1 LAN Information**

<b>LAN Port:</b>	<b>Hostname (GSP Network Name)</b>	<b>IP Address</b>	<b>Subnet Mask</b>	<b>Gateway Address</b>
SD <sup>a</sup> GSP Private	Priv- <i>nn</i> (where <i>nn</i> is 01, 02, 03, ...)	192.168.2.1 <i>n</i> (where <i>n</i> is 1, 2, 3, ...)	255.255.255.0	192.168.2.1 <i>n</i> (where <i>n</i> is 1, 2, 3, ...)
SD Customer Port				
SMS <sup>b</sup> Customer Port (LAN 1, 10/100 BASE-T Port)				
SMS LAN Console				
SMS Private Port	Private <i>M</i>	192.168.2.10 <i>M</i> (where <i>M</i> is 1, 2, 3, ...)	255.255.255.0	192.168.2.10 <i>M</i> (where <i>M</i> is 1, 2, 3, ...)
PC/Workstation Console				
Partition 0 (Net Interface 1)				
Partition 0 (Net Interface 2)				
Partition 0 (Net Interface 3)				
Partition 1 (Net Interface 1)				
Partition 1 (Net Interface 2)				
Partition 1 (Net Interface 3)				
Partition 2 (Net Interface 1)				
Partition 2 (Net Interface 2)				
Partition 2 (Net Interface 3)				
Partition 3 (Net Interface 1)				
Partition 3 (Net Interface 2)				
Partition 3 (Net Interface 3)				
Partition 4 (Net Interface 1)				
Partition 4 (Net Interface 2)				
Partition 4 (Net Interface 3)				



**Table D-1 LAN Information (Continued)**

<b>LAN Port:</b>	<b>Hostname (GSP Network Name)</b>	<b>IP Address</b>	<b>Subnet Mask</b>	<b>Gateway Address</b>
Partition 5 (Net Interface 1)				
Partition 5 (Net Interface 2)				
Partition 5 (Net Interface 3)				

- a. Superdome
- b. Support Management Station



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## **E Superdome Configurations**

Table E-1 shows Superdome power requirements by configuration (i.e. number of cell boards, amount of memory per cell, and number of I/O chassis). This requirement applies to 32-way-capable systems with PA8600 or PA8700 processors.

There are two columns of power numbers (Watts). The Power Breaker column shows the power used to size the wall breaker at the installation site. The Typical Power column shows typical power. Typical power numbers are for PA8600 systems and may be used to assess average utility cost of cooling and electrical power. Expect these typical numbers to be about 18% less for PA8700 systems. Table E-1 also shows the recommended breaker sizes for 4-wire and 5-wire sources.

**Table E-1 Typical Superdome Configurations**

Cell Boards	Memory Per Cell Board	I/O Chassis Modules	Breaker Power <sup>a</sup>	Recommended 3-pole Breaker Size <sup>a,b</sup>	Recommended 4-pole Breaker Size <sup>a,c</sup>	Typical Power	Typical Cooling
Qty.	GBytes	Qty.	Watts	Amps (min.)	Amps (min.)	Watts	BTU/HR
8	16	4	10660	40	25	8460	28,850
8	16	2	9600	40	25	7780	26,530
8	8	4	9220	40	25	7340	25,030
8	8	2	8160	30	20	6660	22,710
8	4	4	8500	35	20	6780	23,120
8	4	2	7440	30	20	6100	20,800
6	16	4	9040	35	20	7140	24,350
6	16	2	7980	30	20	6460	22,030
6	8	4	7960	30	20	6300	21,480
6	8	2	6900	30	20	5620	19,160
6	4	4	7420	30	20	5880	20,050
6	4	2	6360	30	20	5200	17,730
4	16	4	7420	30	20	5820	19,850
4	16	2	6360	30	20	5140	17,530
4	8	4	6700	30	20	5260	17,940
4	8	2	5640	25	20	4580	15,620
4	4	4	6340	30	20	4980	16,980
4	4	2	5280	25	20	4300	14,660
2	16	2	4740	20	20	3820	13,030
2	8	2	4380	20	20	3540	12,070
2	4	2	4200	20	20	3400	11,600

a. These numbers are valid only for the specific configurations shown. Any upgrades may require a change to the breaker size. A 5-wire source utilizes a 4 pole breaker and a 4-wire source utilizes a 3 pole breaker. *The PE (Protective Earth) ground wire is not switched.*

- b. An input power source supplied from a 3-pole plus protective earth (PE), 4-wire system will always be wired as 240 volts phase-to-phase, no neutral or common, plus a PE ground. Three phase input voltage (240VAC) to the equipment is connected phase-to-phase. Examples of 4 wire: 200-volt phase-to-phase, 208-volt phase-to-phase, 240-volt phase-to-phase
- c. An input power source supplied from a 4-pole +PE, 5 wire system may be wired as either:
  - 208VAC phase-to-phase voltage with a common, plus a PE ground. Three phase input voltage (208VAC) to the equipment is connected phase-to-phase. The common is *not* connected to the PDCA neutral terminal.
  - 415VAC phase-to-phase voltage with a neutral return, plus a PE ground. Three phase input voltage (230-240VAC) to the equipment is connected phase-to-neutral. The neutral is connected to the PDCA neutral terminal. Examples of 5 wire: 208-volt phase-to-phase, 380-volt phase-to-phase, 415-volt phase-to-phase

