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This chapter describes the power supplies and environmental sensing and reporting in Enterprise 3000 systems.

There are three types of power supplies:

- power/cooling module (PCM)
- peripheral power supply/AC input (PPS/AC [PPS 0])
- optional peripheral power supply (PPS [PPS 1])

Both the PCM and the peripheral power supply (PPS 1) are hot-pluggable. This feature allows you to physically remove the failed component despite it being “live,” or being supplied with electrical power. In addition, both may be inserted into a running system.

The PPS/AC (PPS 0) is not hot-pluggable because it incorporates an AC cord and circuit breaker for system input power.

Note - A functioning PPS/AC (PPS 0) provides electrical precharge that is required for the hot-plug of PCMs. The hot-plug replacement of the PPS (PPS 1) does not require electrical precharge. Use the `prtdiag (1M)` command to determine if electrical precharge is available.

Table 6-1 lists the power supply voltages, their uses, and the power supplies that generate them.

Table 6-1 Power Supply Summary

| Voltage | Supply | Use |
|----------------|---------------|--------------------------------------------------------------------------------------|
| 2.0V | PCM | Centerplane termination |
| 3.3V | PCM | CPU/Memory Board, I/O Board, Clock Board UltraSPARC Module (SRAMs, SDBs, CPU I/O) |
| 5V | PCM | SBus Card, Clock Board UltraSPARC Module power (via DC/DC converter) |
| 5V | PPS/AC, PPS | Peripherals (CD drive, tape drive) |
| 12V | PPS/AC, PPS | Peripherals (CD drive, tape drive) |

6.1 Safety Precautions

To protect both yourself and the equipment, any servicing of equipment should be performed by qualified personnel. Observe the precautions in Table 6-2.

Table 6-2 Safety Precautions

| Item | Problem | Precaution |
|---------------------|-------------------------------|--------------------------------------------------------------------------------------------------------|
| Wrist or foot strap | ESD | Wear a conductive wrist strap or foot strap when handling power supplies. |
| ESD mat | ESD | An approved ESD mat provides protection from static damage when used with a wrist strap or foot strap. |
| Cover panels | System damage and overheating | Re-install all cabinet cover panels after performing any service work on the system. |
| SBus slot covers | System damage and overheating | Install SBus slot covers in all unused SBus slots. |

6.2 Distribution

In the Enterprise 3000 system, there is at least one peripheral power supply and a PCM slot for each pair of board slots. There is a single alternating current (AC) power cord for the whole system. AC is then distributed to each of the PCMs within the chassis. The software monitors the status of the AC power source. Current sharing between power supplies provides redundant power.

6.3 Peripheral Power Supply

The PPS/AC (PPS 0) in Figure 6-1 and the PPS (PPS 1) in Figure 6-2 provide power to the peripheral subsystems, the remote console, and the drives. Both the PPS/AC (PPS 0) and PPS (PPS 1) incorporate current sharing to operate in redundant and parallel operations. The peripheral power supply/AC input provides three precharge outputs (3.3V, 5V, and 12V) to enable hot plug-in of system boards or PCMs into an active centerplane.

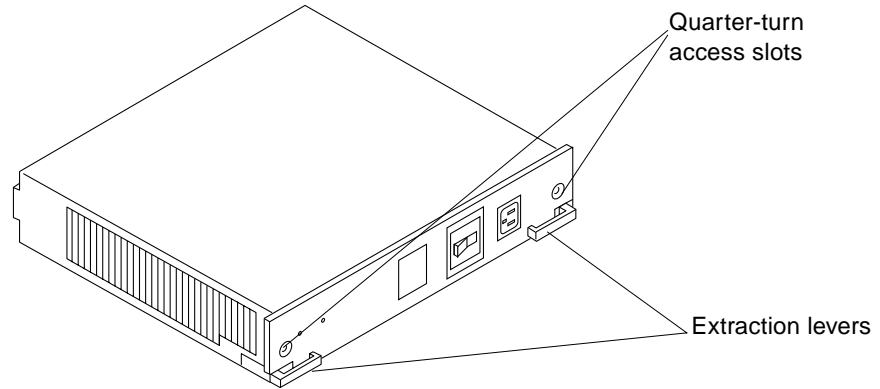


Figure 6-1 Peripheral Power Supply/AC Input

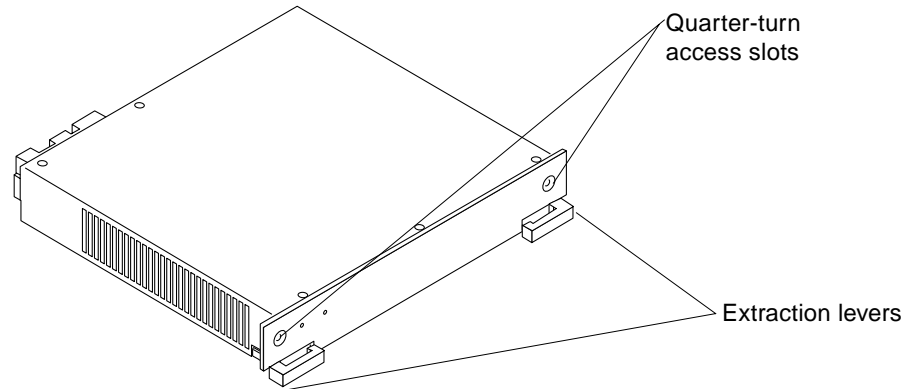


Figure 6-2 Peripheral Power Supply

6.3.1 Troubleshooting a Peripheral Power Supply

A green LED is lit on the power supply when it is operational. When a peripheral power supply fails, a yellow LED is lit on the power supply.

See Chapter 9, “Flow Diagrams for Troubleshooting,” for more information.

6.3.2 Replacing a Peripheral Power Supply



Caution – Remove and replace the peripheral power supply (PPS 1) in a running system (and not in the low power mode). In low power mode, the front panel and board LEDs are all off, while the yellow LEDs are lit on the power supplies.

Replacing the PPS (PPS 1) during low power mode will cause the system to power on immediately.

1. **If you are replacing the peripheral power supply (PPS 1), skip to Step 3. If you are replacing the PPS/AC (PPS 0), completely power off the Enterprise 3000 system.**

See the power off instructions in Chapter 11, “Powering Off and On.”

2. **Disconnect the AC power cord from the power inlet.**

3. **Mechanically release the power supply from the system chassis by inserting a Phillips #1 screwdriver into each quarter-turn access slot and then turning to the unlocked position.**

See Figure 6-3.

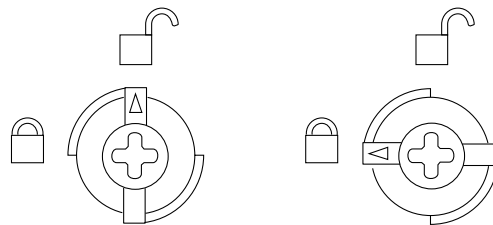


Figure 6-3 Unlocking and Locking Quarter-turn Access Slots

4. **Pull the ends of the extraction levers outward to release the power supply from the centerplane.**

5. Pull out the power supply.

If you are replacing the PPS (PPS 1), you will see a message similar to the following example on your system console:

```
NOTICE: Peripheral Power Supply 1 Removed
```

See Figure 6-4.

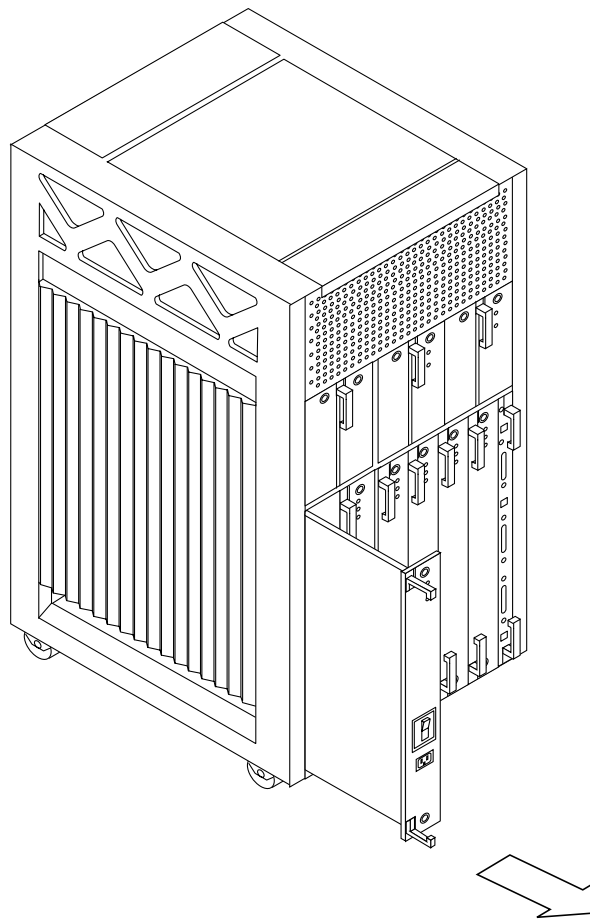


Figure 6-4 Replacing the Peripheral Power Supply/AC Input

6. Carefully insert the replacement power supply in the proper slot using the guide slots.

Ensure that both extraction levers are in the outward position. The power supply will not seat fully unless the levers are in this starting position.

7. Slide the power supply toward the centerplane.

Ensure that the arrows in the quarter-turn access slots point to the unlocked position. See Figure 6-3.



Caution – DO NOT FORCE the power supply into a slot; this can cause damage to the power supply and system.

The power supply should insert and seat smoothly. If it binds, remove it, and inspect the slot for any obvious obstructions. Do not damage the springfingers at the bottom of the power supply.

8. Use the extraction levers to seat the power supply.

Simultaneously swing both levers inward to the locked position. Do not press on the front panel of the power supply to seat it—doing so will damage the connector pins.

9. Mechanically lock the power supply to the system chassis by inserting a Phillips #1 screwdriver into each quarter-turn access slot and then turning to the locked position.

10. If you replaced the PPS/AC (PPS 0), connect the AC cord and power on the Enterprise 3000 system.

See the power on instructions in Chapter 11, “Powering Off and On.”

11. Be sure the green LED is lit.

If the green LED is not lit, the power supply may not be seated properly. Check to see if it is seated properly by repeating Step 6 to Step 11. If the green LED is still not lit, see Chapter 9, “Flow Diagrams for Troubleshooting,” for more information.

If you replaced the PPS (PPS 1), you will see a message similar to the following example on your system console:

```
NOTICE: Peripheral Power Supply 1 Installed
NOTICE: Peripheral Power Supply 1 OK
```

6.4 Power/Cooling Module (PCM)

The PCM in Figure 6-5 provides sufficient power to the system for two boards. In addition, it provides power to two fans that cool the two boards.

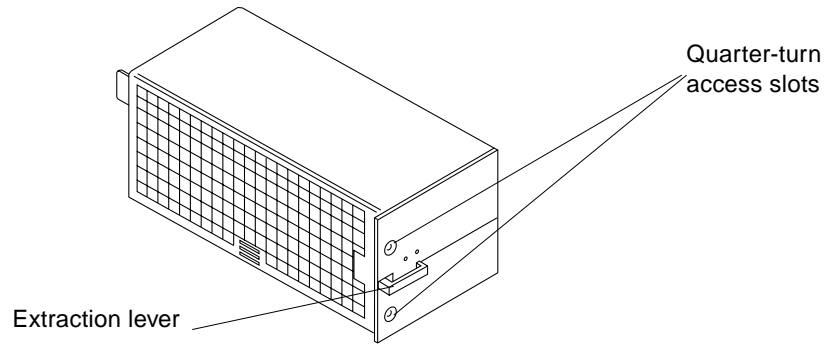


Figure 6-5 PCM

The PCM incorporates an AC inrush limit circuit and two precharge inputs (3.3V and 5V) that enable it to be hot-pluggable into a live centerplane. A current sharing scheme on the 2.0V, 3.3V, and 5V outputs enable the PCM to operate in a parallel redundant mode. A maximum of three PCMs are used together in the redundant current sharing.

6.4.1 Power Requirements

If a PCM fails, the system boards will continue to be powered and cooled by the other power supplies, provided redundancy (an additional power supply) is present. For example, if an Enterprise 3000 system needs a minimum of two PCMs and three are present, then the system has redundancy. See Table 6-3.

Note – The presence of an additional (extra) PCM in the system provides redundancy and allows hot plug-in of PCMs.

Table 6-3 Minimum and Redundant Power Supply Requirements

| Number of Boards | Enterprise 3000 System | |
|------------------|--------------------------------|----------------------------------------|
| | Minimum Number of Working PCMs | Redundant Working PCMs (Hot-pluggable) |
| 1-2 | 1 | 2 |
| 3-4 | 2 | 3 |

Failed power supplies must be replaced as soon as practical. Otherwise, the Enterprise 3000 system will lose its redundancy and result in an outage at the next PCM failure.

6.4.2 Cooling Requirements

Note – In the Enterprise 3000 system, all boards must be adjacent to a PCM. The fans in the PCM cool the boards. The minimum configuration is one PCM for every two adjacent boards.

The PCMs incorporate redundant bulk fan power so that the fans continue to operate in a failed power supply via the redundant fan power from the peripheral power supply.

Note – A PCM or an auxiliary fan tray must be working in PCM slot 5. The fans cool the peripheral power supply/AC input.

6.4.3 Troubleshooting a PCM

A green LED is lit on the power supply when it is operational. When a PCM fails, a yellow LED is lit on the PCM.

You will see a message similar to the following example on your system console when a PCM fails:

```
WARNING: Core Power Supply 3 Failing
WARNING: Redundant power lost
```

See Chapter 9, “Flow Diagrams for Troubleshooting,” for more information.

6.4.4 Replacing a PCM



Caution – Remove and replace a PCM in a running system. Do not replace a PCM while the system is in the low power mode. In the low power mode, the front panel and board LEDs are all off while the yellow LEDs are lit on the power supplies.

Replacing a PCM during low power mode causes the PCM to power on immediately and result in a severe overload condition for that PCM (the other PCMs remain in the low power mode).



Caution – Replace the PCM within several minutes or risk overheating the board(s) cooled by the fans in that power supply.

Note – Remember the following when attempting the hot-plug replacement of a PCM:

- The peripheral power supply/AC input (PPS 0) is providing precharge.
- There is (power) redundancy in the system.

Use the `printdiag (1M)` command to determine if precharge current is present.

1. **Mechanically release the power supply from the system chassis by inserting a Phillips #1 screwdriver into each quarter-turn access slot and then turning to the unlocked position.**
See Figure 6-6.

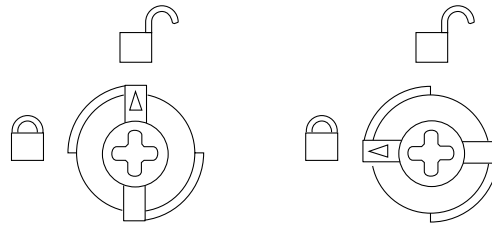


Figure 6-6 Unlocking and Locking Quarter-turn Access Slots

2. **Pull the end of the extraction lever outward to release the power supply from the centerplane.**
3. **Pull out the power supply.**
You will see a message similar to the following example on your system console:

```
NOTICE: Core Power Supply 5 Removed
```

See Figure 6-7.

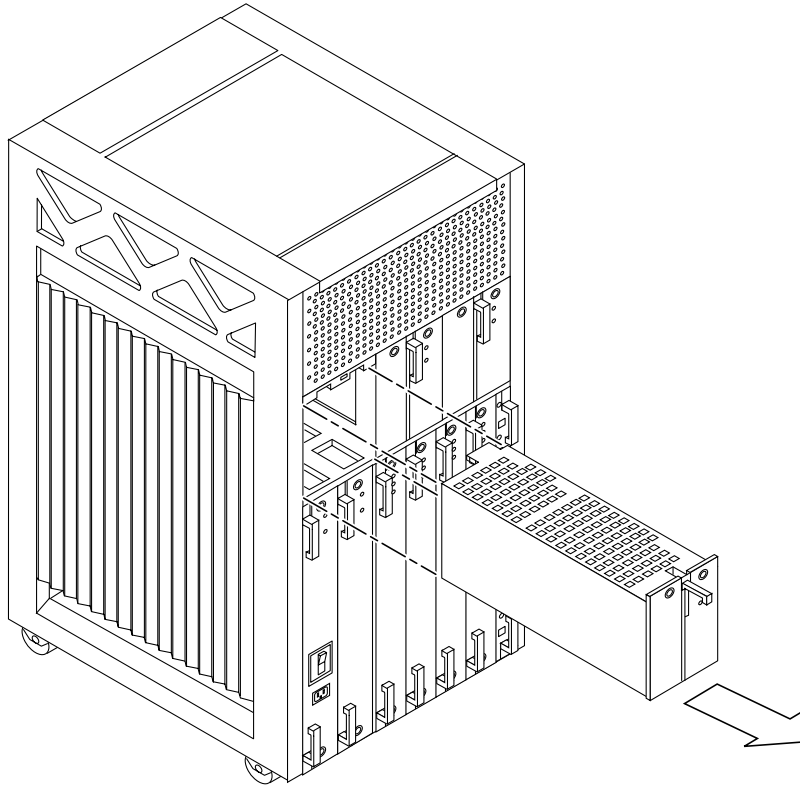


Figure 6-7 Replacing a PCM in the Enterprise 3000 System

4. Carefully insert the replacement power supply in the proper slot.

- Orient the PCM with the extraction lever on the outside edge of the Enterprise 3000 system.
- Ensure that the extraction lever is in the outward position. The power supply will not seat fully unless the lever is in this starting position.

5. Slide the power supply toward the centerplane.

Ensure that the arrows in the quarter-turn access slots point to the unlocked position. See Figure 6-6.



Caution – DO NOT FORCE the power supply into a slot; this can cause damage to the power supply and system.

The power supply should insert and seat smoothly. If it binds, remove it, and inspect the slot for any obvious obstructions. Do not damage the springfingers at the bottom of the power supply.

6. Use the extraction lever to seat the power supply.

Swing the lever inward to the locked position. Do not press on the front panel of the power supply to seat it—doing so will damage the connector pins.

7. Mechanically lock the power supply to the system chassis by inserting a Phillips #1 screwdriver into each quarter-turn access slot and then turning to the locked position.

See Figure 6-6.

8. Check to be sure the green LED is lit.

If the green LED is not lit, the power supply is not seated properly. Repeat Step 4 to Step 8. If the green LED is still not lit, see Chapter 9, “Flow Diagrams for Troubleshooting,” for more information.

If the green LED is lit, you will see a message similar to the following example on your system console:

```
NOTICE: Core Power Supply 5 Installed
NOTICE: Core Power Supply 5 OK
NOTICE: Redundant power available
```

