

Chapter 38

Monitoring Redundant Power Supplies

You monitor and maintain redundant power supplies to ensure that power is distributed to the router components without interruption. (See Table 111.)

Table 111: Checklist for Monitoring Redundant Power Supplies

Monitor Redundant Power Supply Tasks	Command or Action
Understanding Redundant Power Supplies on page 508	
M5/M10 Router Redundant Power Supplies on page 508	
M7i Router Redundant Power Supplies on page 509	
M10i Router Redundant Power Supplies on page 510	
M20 Router Redundant Power Supplies on page 511	
M40 Router Redundant Power Supplies on page 512	
M40e Router Power Supplies nand Location on page 513	
M160 Router Redundant Power Supplies on page 515	
M320 Router Redundant Power Supplies on page 516	
T320 Router Redundant Power Supplies on page 517	
T640 Routing Node Redundant Power Supplies on page 518	
Displaying Redundant Power Supplies Installed In The Router on page 519	show chassis hardware
Checking the Redundant Power Supply Status on page 521	For more information about monitoring power supplies, see “Checking the Power Supply Status” on page 230.
Checking for Power Supply Alarms on page 521	For more information about checking for power supply alarms, see “Checking for Power Supply Alarms” on page 235.
Verifying Power Supply Failure on page 521	
Getting Power Hardware Information on page 521	For more information about removing a power supply, see “Replacing the Power Supplies” on page 250.
Replacing a Power Supply on page 521	

See Also Monitoring Power Supplies on page 217

Understanding Redundant Power Supplies

Purpose Inspect redundant power supplies to ensure that they distribute power to the other router components according to their voltage requirements.

What Are Redundant Power Supplies With redundant power supplies, two power supplies are installed in a router and perform load sharing during normal operation. When one power supply fails or is switched off, the other power supply immediately and automatically assumes the entire electrical load. Table 112 lists some router characteristics for each M-series router platform type.

The power supplies are internally connected to the midplane, which delivers the power input from the circuit breaker box and distributes the different output voltages produced by the power supplies to the router's components, depending on their voltage requirements.

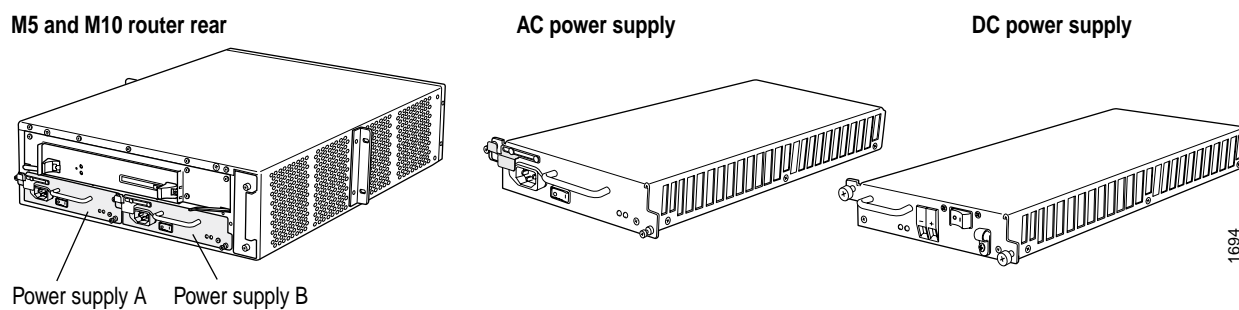
Table 112: Router Power Supply Characteristics Per Routing Platform

Power Supply Characteristic	M5/ M10	M7i/ M10i	M20	M40	M40e	M160	M320	T320	T640
Number. of power supplies	2	2/4	2	2	2	2	4	2	2
Watts per AC/DC power supply	434 W	AC 293 W DC DC 293 W	750 W	1500 W	AC 2900 W DC 3000 W	DC original 2600 W DC enhanced 3200 W	AC 1750 W DC 2000 W	3200 W DC enhanced 3200 W	6500W DC enhanced 3200 W
Supports both AC and DC power supplies	Yes	Yes	Yes	Yes	Yes	No; original or enhanced DC only	Yes	No DC only	No DC only

M5/M10 Router Redundant Power Supplies

Two load-sharing, isolated power supplies are located at the bottom rear of the M5 and M10 router chassis. The routers use either AC or DC power. Figure 199 shows the M5 and M10 router power supplies and where they are installed in the chassis.

Figure 199: M5 and M10 Router Redundant Power Supplies



When the power supplies are installed and operational, they automatically share the electrical load. If a power supply stops functioning for any reason, the remaining power supply instantly begins providing all the power the router needs for normal functioning and can provide full power indefinitely.



NOTE: Mixing AC and DC power supplies is not supported. The two power supplies must be either both AC or both DC.

When two power supplies are installed, at least one Routing Engine and one FPC must also be installed for both power supplies to power on. In the absence of this minimum load, only one power supply starts. (The router powers on and operates correctly with one power supply, but without the redundancy benefit of having a second power supply installed.)

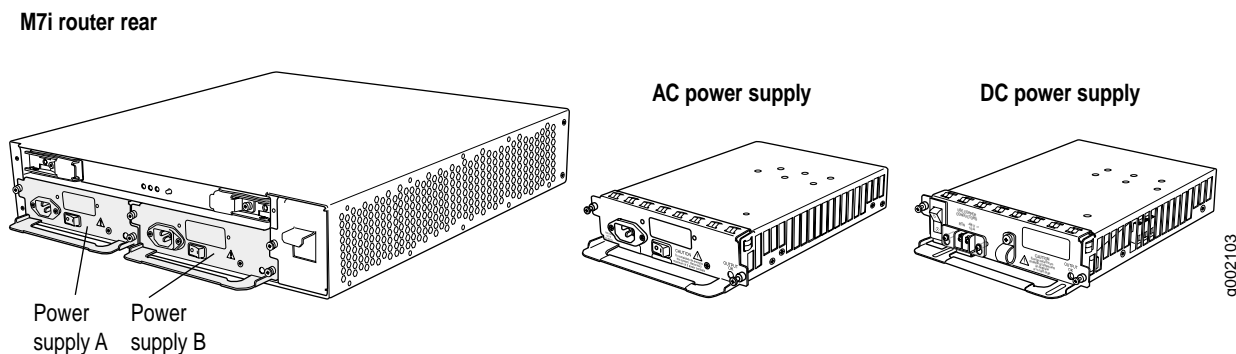
M7i Router Redundant Power Supplies

Two load-sharing, isolated power supplies are located at the bottom rear of the M7i router chassis. The router uses either AC or DC power. Figure 200 shows the M7i router power supplies and where they are installed in the chassis.

When the power supplies are installed and operational, they automatically share the electrical load.

For full redundancy, two power supplies are required. If a power supply stops functioning for any reason, the second power supply instantly begins providing all the power the router needs for normal functioning. The second power supply can provide full power indefinitely.

Figure 200: M7i Router Redundant Power Supplies



NOTE: When two power supplies are installed, at least one Routing Engine and one FPC must also be installed for both power supplies to power on. In the absence of this minimum load, only one power supply starts. (The router powers on and operates correctly with one power supply, but without the redundancy benefit of having a second power supply installed.)

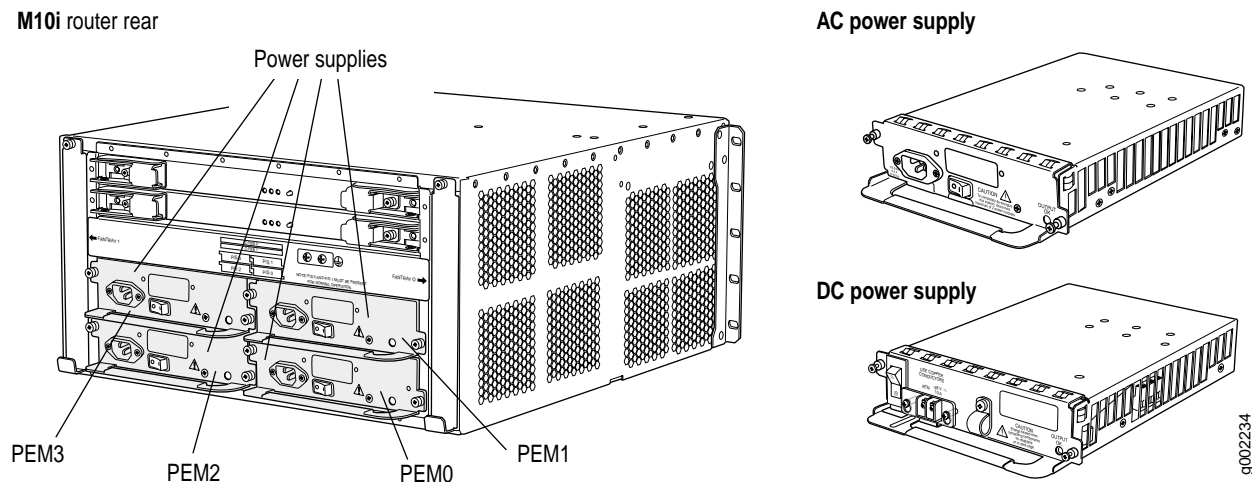
M10i Router Redundant Power Supplies

The M10i router uses either AC or DC power. You can install up to four load-sharing power supplies at the bottom rear of the chassis. Figure 201 shows the M10i router power supplies and where they are installed in the chassis.

The AC power supplies are fully redundant. If one power supply fails or is removed, the remaining power supplies instantly assume the entire electrical load. Two power supplies can provide full power for as long as the router is operational. Three power supplies are required for redundancy. Power supplies must be present in slots P/S 0 and P/S 1 for the router to operate.

The DC power supplies are fully redundant. The DC power supplies in slots P/S 0 and P/S 1 can provide full power to the router. Likewise, the DC power supplies in slots P/S 2 and P/S 3 can also provide full power. The DC power supplies in slots P/S 2 and P/S 3 jointly serve as the backup to the DC power supplies in slots P/S 0 and P/S 1. Power supplies must be present in slots P/S 0 and P/S 1 for the router to operate.

Figure 201: M10i Router Redundant Power Supplies



NOTE: AC and DC power supplies are required in slots P/S 0 and P/S 1 for the router to operate.

The DC power supplies in slots P/S 0 and P/S 1 must be powered by dedicated power feeds derived from feed A, and the DC power supplies in slots P/S 2 and P/S 3 must be powered by dedicated power feeds derived from feed B. This configuration provides the commonly deployed A/B feed redundancy for the system.

M20 Router Redundant Power Supplies

Two load-sharing, isolated power supplies are located at the bottom rear of the M20 router chassis. The router uses either AC or DC power. Figure 202 shows the M20 router power supplies and where they are installed in the chassis.

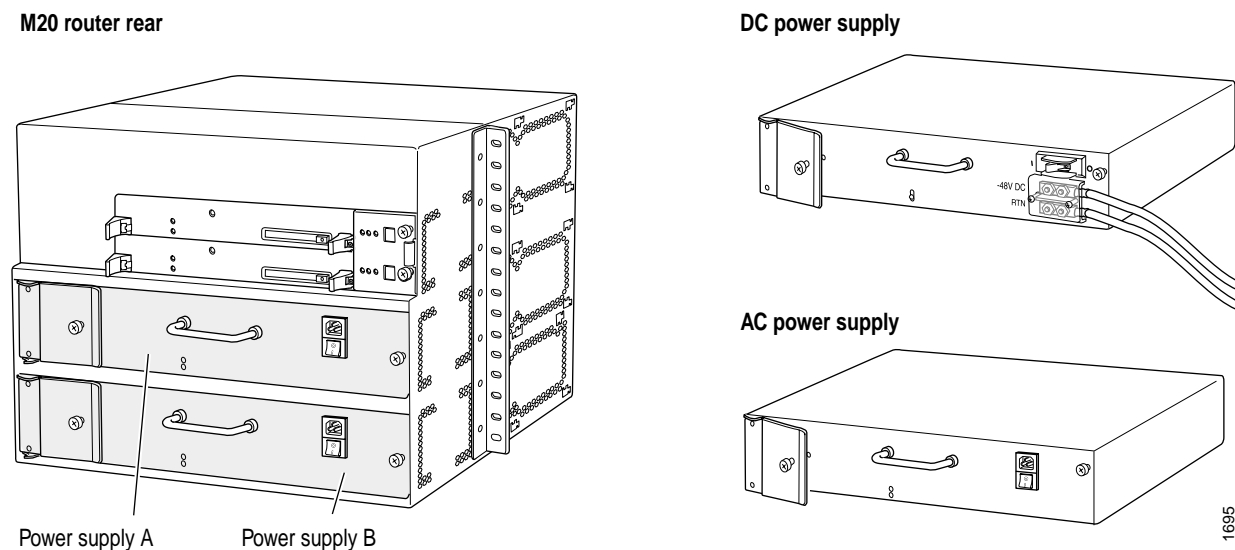
When the power supplies are installed and operational, they automatically share the electrical load. If a power supply stops functioning for any reason, the remaining power supplies instantly begin providing all the power the router needs for normal functioning, and can provide full power indefinitely.



NOTE: Mixing AC and DC power supplies is not supported. The two power supplies must be either both AC or both DC.

When two power supplies are installed, at least one Routing Engine and one FPC must also be installed for both power supplies to power on. In the absence of this minimum load, only one power supply starts. (The router powers and on and operates correctly with one power supply, but without the redundancy benefit of having a second power supply installed.)

Figure 202: M20 Router Redundant Power Supplies



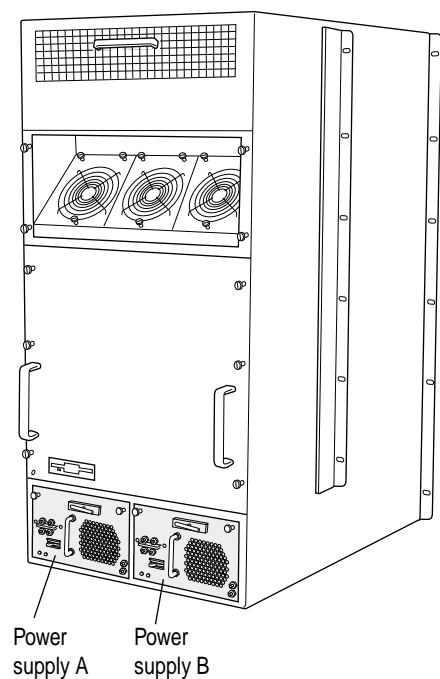
M40 Router Redundant Power Supplies

The M40 router can use either AC or DC power. Two load-sharing power supplies install into the bays located at the bottom rear of the chassis. As viewed from the rear of the chassis, the supply on the left is referred to as supply A and the supply on the right as supply B. Figure 203 shows the M40 router power supplies and where they are installed in the chassis.

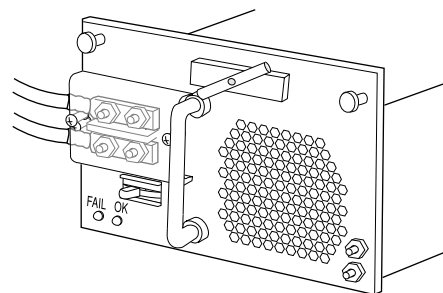
The power supplies are fully redundant. When both power supplies are operational, they automatically share the electrical load. If one power supply stops functioning for any reason, the remaining power supply instantly begins providing all the power the router needs for normal functioning, and can provide full power indefinitely.

Figure 203: M40 Router Redundant Power Supplies

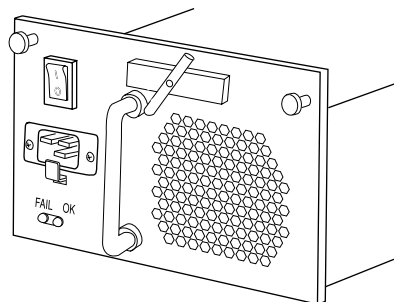
M40 router



DC power supply



AC power supply



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M40e Router Power Supplies and Location

The M40e router uses either AC or DC power. Two load-sharing, pass-through power supplies are located at the bottom rear of the chassis. Figure 204 on page 514 shows the M40e router power supplies and where they are installed in the chassis.

When the power supplies are installed and operational, they automatically share the electrical load. If a power supply stops functioning for any reason, the remaining power supplies instantly begin providing all the power the router needs for normal functioning, and can provide full power indefinitely.

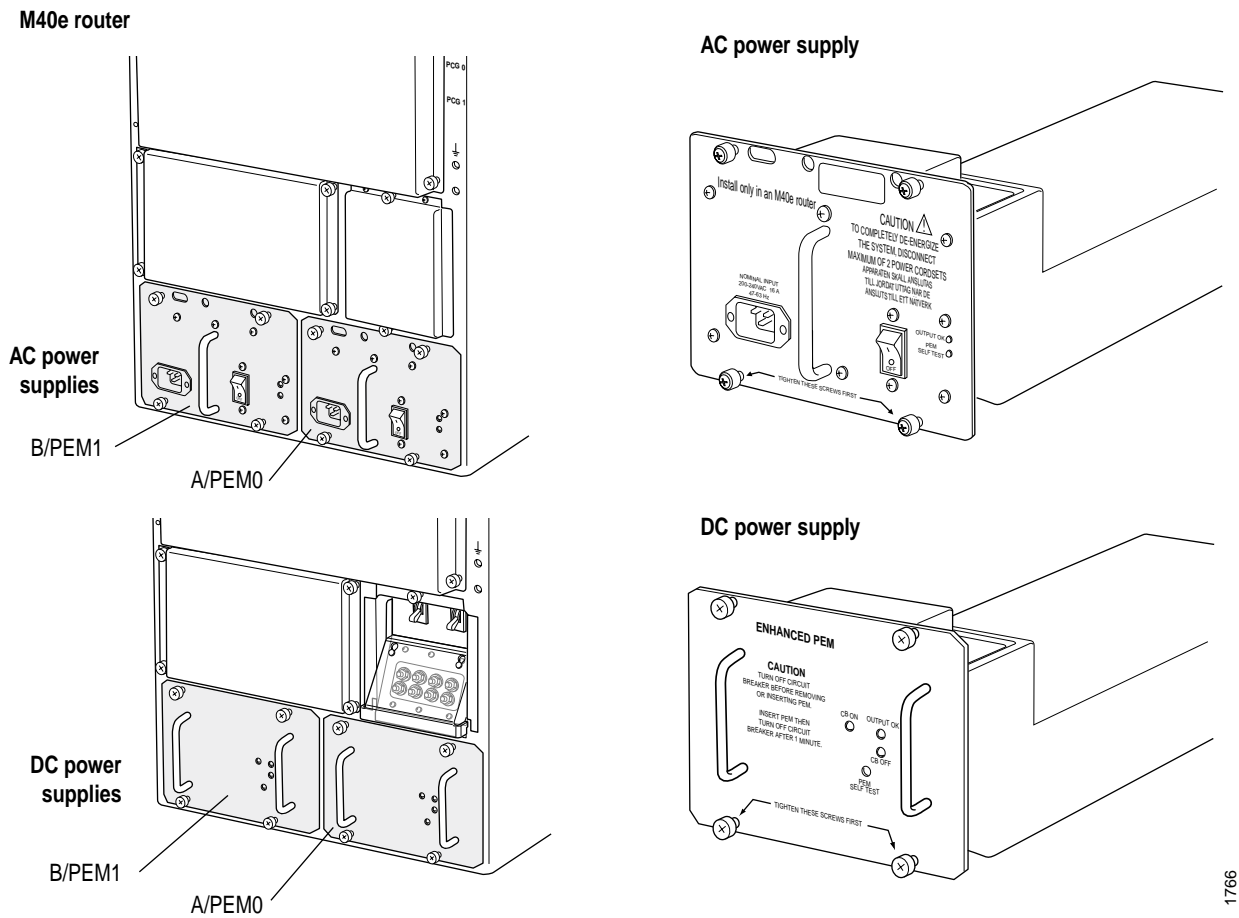


NOTE: Mixing AC and DC power supplies is not supported and prevents the router from booting. If two power supplies are installed, they must be either both AC or both DC.

A circuit breaker box must be installed on a DC-powered router, while a circuit breaker is incorporated into each AC power supply. Converting the router from AC to DC power or vice versa involves removing or installing the circuit breaker box. Only authorized service personnel should perform the conversion; this manual does not include instructions.

When two power supplies are installed, at least one Routing Engine and one FPC must also be installed for both power supplies to power on. In the absence of this minimum load, only one power supply starts. (The router powers on and operates correctly with one power supply, but without the redundancy benefit of having a second power supply installed.)

Figure 204: M40e Router Redundant Power Supplies

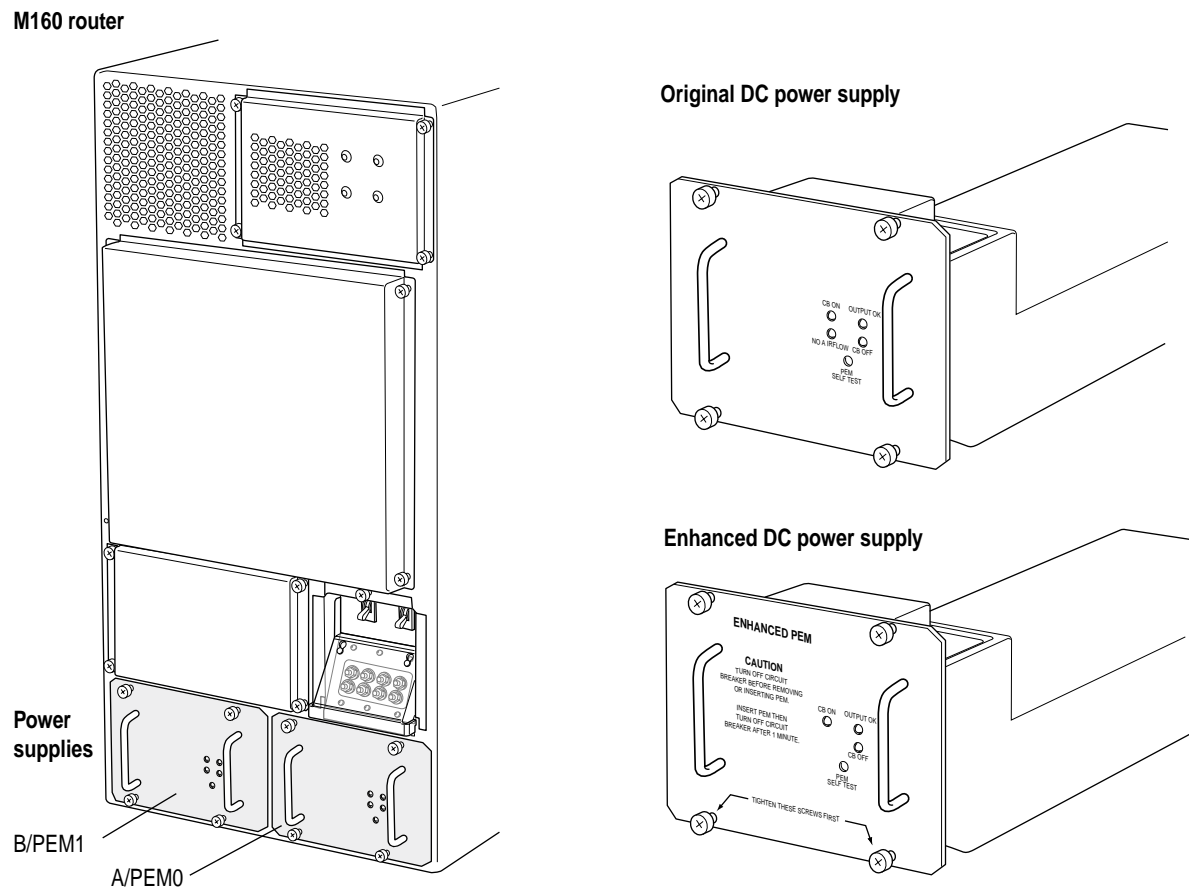


M160 Router Redundant Power Supplies

The M160 router uses DC power. Two load-sharing, pass-through power supplies are located at the bottom rear of the chassis. Figure 205 shows the M160 router power supplies and where they are installed in the chassis.

When the power supplies are installed and operational, they automatically share the electrical load. If a power supply stops functioning for any reason, the remaining power supplies instantly begin providing all the power the router needs for normal functioning, and can provide full power indefinitely.

Figure 205: M160 Router Redundant Power Supplies

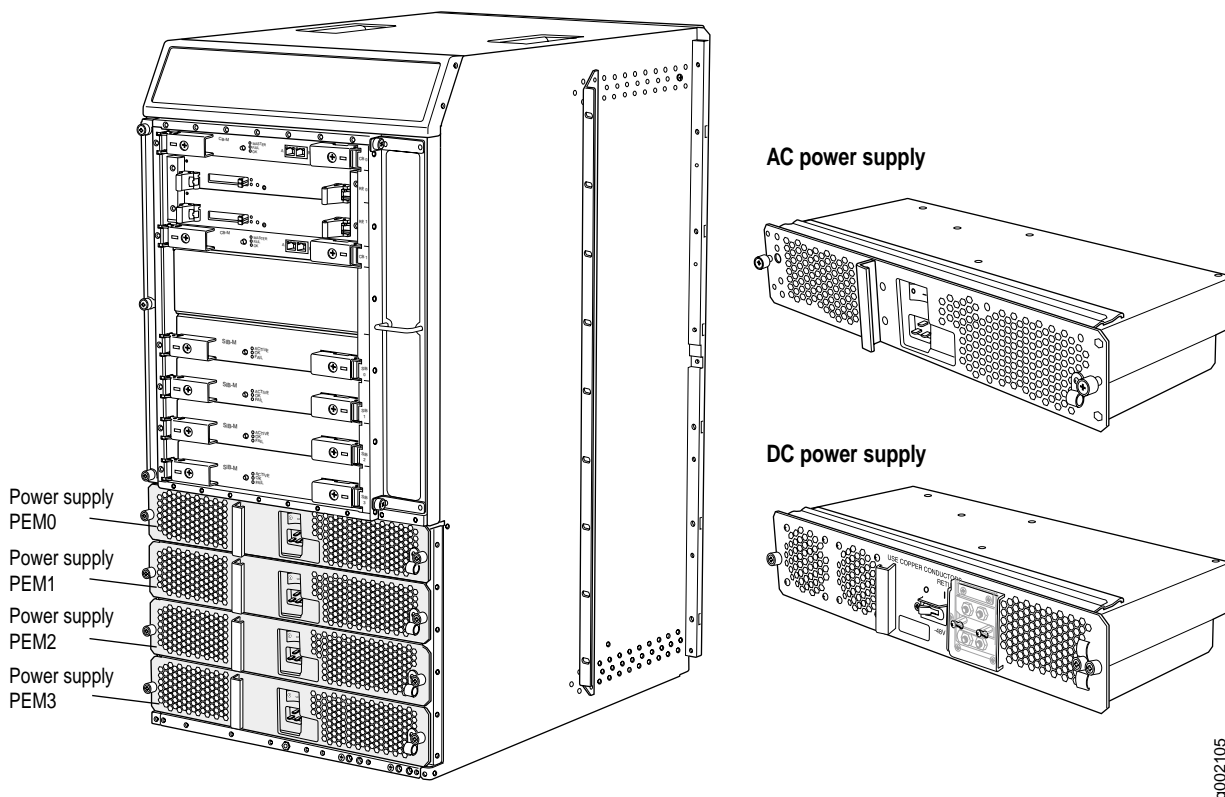


M320 Router Redundant Power Supplies

The M320 router uses either AC or DC power. Figure 206 shows the M320 router power supplies and where they are installed in the chassis.

Figure 206: M320 Router Redundant Power Supplies

M320 router rear



The M320 router supports four power supplies. The AC power supplies are fully redundant. If one power supply fails or is removed, the remaining power supplies instantly assume the entire electrical load. Three power supplies can provide full power for as long as the router is operational.

In the M320 router DC power supply configuration, the router has four DC power supplies, located at the lower rear of the chassis in slots PEM0 through PEM3 (top to bottom). The DC power supplies in slots PEM0 and PEM2 are load-sharing and provide power to the Flexible PIC Concentrators (FPCs) in slots FPC3 through FPC7. The DC power supplies in slots PEM1 and PEM3 are load-sharing and provide power to the FPCs in slots FPC0 through FPC2, Switch Interface Boards (SIBs), Control Boards, and Routing Engines. All DC power supplies provide power to the fan trays.



NOTE: The DC power supplies in slots PEM0 and PEM1 must be powered by dedicated power feeds derived from feed A, and the DC power supplies in slots PEM2 and PEM3 must be powered by dedicated power feeds derived from feed B. This configuration provides the commonly deployed A/B feed redundancy for the system.



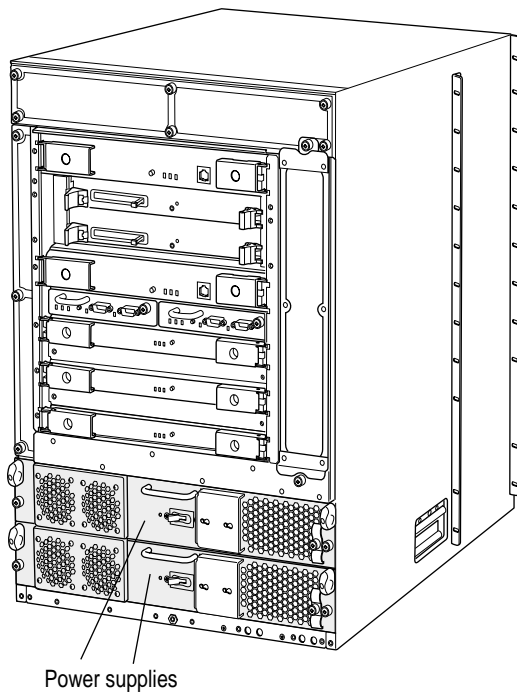
NOTE: Each power supply must be connected to a dedicated AC power feed and a dedicated 15 A (250 VAC) circuit breaker.

T320 Router Redundant Power Supplies

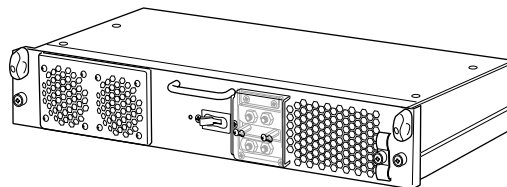
Figure 207 shows the T320 router power supplies and where they are installed in the chassis.

Figure 207: T320 Router Redundant Power Supplies Location

T320 router rear



DC power supply

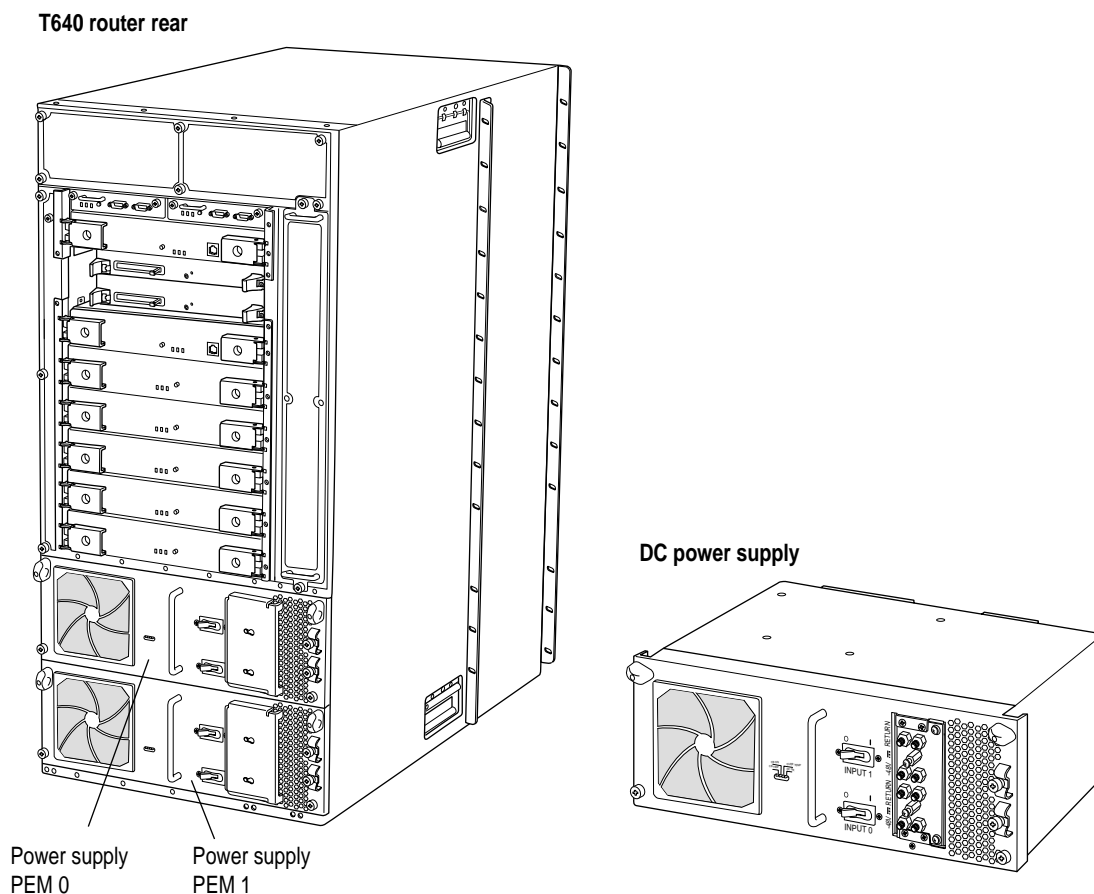


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T640 Routing Node Redundant Power Supplies

Figure 208 shows the T640 routing node power supplies and where they are installed in the chassis.

Figure 208: T640 Routing Node Redundant Power Supplies



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See Also Monitoring Power Supplies on page 217

Displaying Redundant Power Supplies Installed In The Router

Action To display hardware information about the redundant power supplies installed in a router, use the following JUNOS software command-line interface (CLI) command:

```
user@host> show chassis hardware
```

Sample Output For M5, M10, M20, M40, and M40e routers:

```
user@host> show chassis hardware
Hardware inventory:
Item      Version  Part number  Serial number  Description
Chassis           2003        M20
Backplane    REV 07  710-001517  AA7940
Power Supply A  Rev 02  740-001465  000497        AC
Power Supply B  Rev 01  740-001465  000001        AC
```

For M7i routers:

```
user@host> show chassis hardware

user@host> show chassis hardware
Hardware inventory:
Item      Version  Part number  Serial number  Description
Chassis           19127        M7i
Midplane    REV 02  710-008761  CA0201
Power Supply 1 Rev 04  740-008537  PD10284        AC
[...Output truncated...]
```

For M10i routers:

```
user@host> show chassis hardware
Hardware inventory:
Item      Version  Part number  Serial number  Description
Chassis           M10i
Midplane    REV 02  710-008920  CA0353
Power Supply 0 Rev 04  740-008537  PE18594        AC
Power Supply 1 Rev 04  740-008537  PE18611        AC
Power Supply 2 Rev 04  740-008537  PE18617        AC
Power Supply 3 Rev 04  740-008537  PE18633        AC
[...Output truncated...]
```

For M160 routers:

```
user@host> show chassis hardware
Item      Version  Part number  Serial number  Description
Chassis           47          M160
Midplane    REV 02  710-001245  AB4113
FPM CMB     REV 01  710-001642  AA9721
FPM Display REV 01  710-001647  AA2995
CIP         REV 02  710-001593  AA9886
PEM 0       Rev 01  740-001243  KJ35782        DC
PEM 1       Rev 01  740-001243  kj35756        DC
[...Output truncated...]
```

For M320 routers:

```
user@host> show chassis hardware
Hardware inventory:
Item      Version  Part number  Serial number  Description
Chassis           19206        M320
Midplane    REV 01   710-009120   RA1277
FPM GBUS     REV 02   710-005928   HL7863
FPM Display  REV 01   710-009351   HP8406
CIP          REV 02   710-005926   BE1813
PEM 0
PEM 1      Rev X1   740-009148   0000005
Routing Engine 0 REV 01   740-008883   212047100102   RE-4.0
Routing Engine 1 REV 01   740-008883   212047100107   RE-4.0
CB 0        REV 01   710-009115   HK0109
CB 1        REV 01   710-009115   HK0110
FPC 0        REV 01   710-008994   HP1418          FPC Type 1
CPU          REV 01   710-009141   HL7870
PIC 0        REV 04   750-001894   HE5409          1x G/E, 1000 BASE-SX
PIC 1        REV 01   750-010240   CB5373          1x G/E SFP, 1000 BASE
SFP 0        REV 01   740-007326   P11EAW5         SFP-SX
PIC 3        REV 02   750-002332   AG1661          1x COC12, SMIR
SIB 0        REV 03   750-004762   HL9370          SIB-I-M
SIB 1        REV 03   710-009184   HP8459          SIB-I-M
```

For T320 routers:

```
user@host> show chassis hardware
Hardware inventory:
Item      Version  Part number  Serial number  Description
Chassis           27714        T320
Midplane    REV 07   710-004339   BF3538
FPM GBUS     REV 04   710-004461   BF5649
FPM Display  REV 04   710-002897   BE9730
CIP          REV 06   710-002895   BF0739
PEM 1      Rev 01   740-004359   NB12576         Power Entry Module
```

For T640 routing nodes:

```
user@host> show chassis hardware
Hardware inventory:
Item      Version  Part number  Serial number  Description
Chassis           55056        T640
Midplane    REV 01   710-005608   BE0888
FPM GBUS     REV 08   710-002901   RA0151
FPM Display  REV 04   710-002897   RA0135
CIP          REV 06   710-002895   HF8317
PEM 0      Rev 06   740-002595   NM17794         Power Entry Module
PEM 1      Rev 04   740-002595   NE15421         Power Entry Module
[...Output truncated...]
```

What It Means For all routers except the M160 router, T320 router, and T640 routing node, the command output displays the power supply slot number, revision level, part number, serial number, and the power supply type.

For the M160 router, T320 router, and the T640 routing node, the command output displays the power supply or Power Entry Module (PEM) slot number, revision level, part number, serial number, and power supply type. When facing the back of the router, PEM0 is located on the right and PEM1 is located on the left.

Checking the Redundant Power Supply Status

Action For more information about monitoring power supplies, see “Checking the Power Supply Status” on page 230.

Checking for Power Supply Alarms

Action For more information about checking for power supply alarms, see “Checking for Power Supply Alarms” on page 235.

Verifying Power Supply Failure

Action For more information about verifying power supply failure, see “Verifying Power Supply Failure” on page 239.

Getting Power Hardware Information

Action For more information about displaying power supply hardware information, see “Getting Power Supply Hardware Information” on page 241.

Replacing a Power Supply

Action For more information about replacing a power supply, see “Replacing a Power Supply” on page 521

