

Troubleshoot Power Supplies on Catalyst 9000 Switches

Contents

[Introduction](#)

[Prerequisites](#)

[Requirements](#)

[Components Used](#)

[Physical Troubleshooting](#)

[Common Verification Commands](#)

[Catalyst 9300](#)

[Verification Commands](#)

[Special Considerations](#)

[Catalyst 9500](#)

[Verification Commands](#)

[Catalyst 9400 and 9600](#)

[Power Supplies Configuration Modes](#)

[Combined Mode](#)

[Redundant Mode N+1](#)

[Redundant Mode N+N](#)

[Verification Commands](#)

[Special Considerations](#)

[COMMON Variable SINGLE_SUP_CHASSIS](#)

[Power Budget Mode Dual Sup](#)

[Software Defects](#)

[Related Information](#)

Introduction

This document describes common methods to troubleshoot power supplies on Catalyst 9000 Series Switches.

Prerequisites

Requirements

Cisco recommends that you have knowledge of these topics:

- Catalyst 9000 Series Switches architecture.

Components Used

The information in this document is based on these software and hardware versions:

- C9300
- C9500
- C9400
- C9600

The information in this document was created from the devices in a specific lab environment. All of the devices used in this document started with a cleared (default) configuration. If your network is live, ensure that you understand the potential impact of any command.

Physical Troubleshooting

1. Verify what color on the PS LED is displayed (green/amber/red/off).

LED status	Signification
Off	No AC power is present in any power supplies.
Green	This power supply operates properly in main power mode.
Solid Amber	Indicates one of the following: <ul style="list-style-type: none">• No output power available• AC/DC input is under the range of operation• Over voltage/over current/over temperature conditions• Over-temperature protection (OTP) due to fan failure
Blinking Amber	Indicates warning events such as a power supply module that continues to operate in high temperature or high power and a fan that runs slow and so on.
Red	Power supply failure.

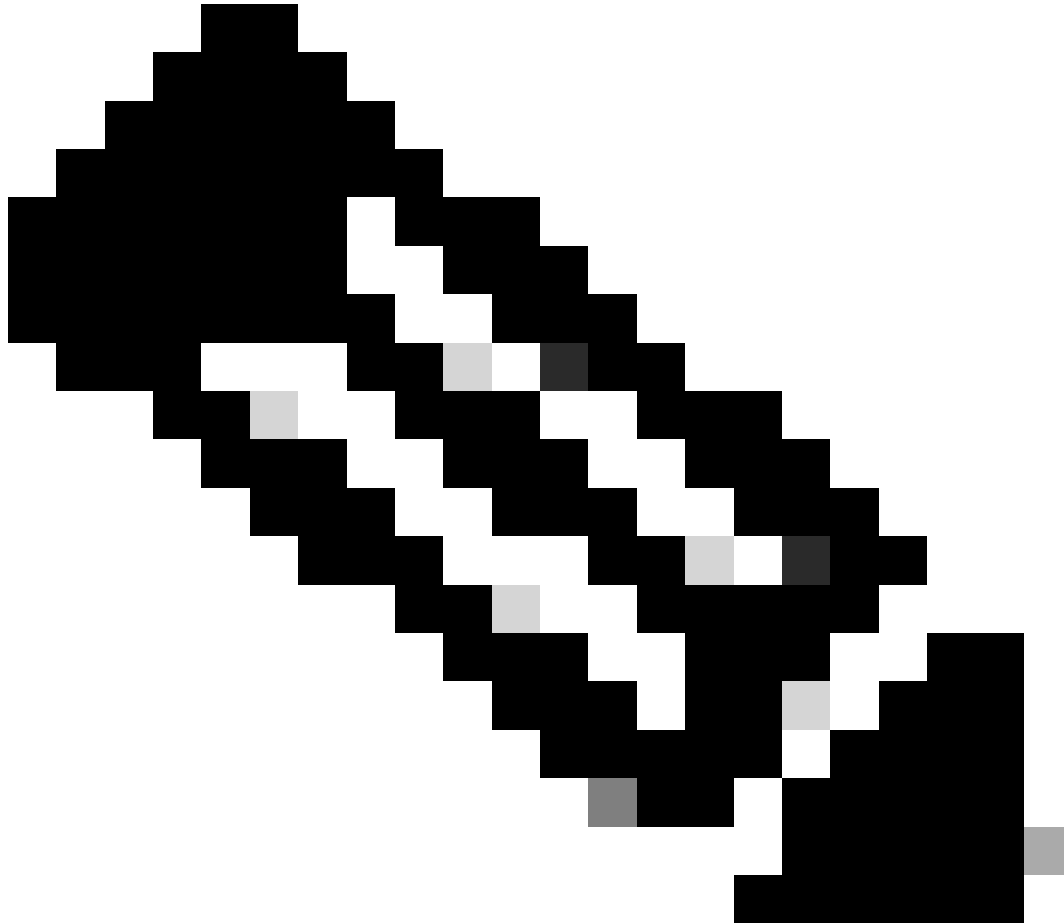


Note: Consult specific hardware installation guide for each platform, meaning of LED color can vary from platform to platform.

2. If LED color is other than green, try the next tests:

Test	Steps
Reset the power supply	<ul style="list-style-type: none">• Remove the PS from it slot.• Wait a couple of minutes.• Re-insert the PS to its slot.
Reset the power cord	<ul style="list-style-type: none">• Remove the power cord from the affected PS.• Wait a couple of minutes.• Re-insert the power cord back to the PS.
Swap components	<ul style="list-style-type: none">• Try to use a well-known working power cord.

- Try to use a well-known working power outlet.
- Try a spare power supply on the same slot.
- Try the same faulty PS in a well-known working slot.
- Try the same faulty PS in a different switch.



Note: If applicable, ensure there are no cable tie or any other object that can block the PS fan.

Common Verification Commands

Command	How to use
Switch#show inventory	Verify power supply is detected in the inventory.
Switch#show post	Verify all the tests are in passed status.

```
Switch#show log
```

Look for any error message related with with the issue.

Catalyst 9300

Verification Commands

Use `show environment power` privilege EXEC command to verify PS status and budget.

```
Switch#show env power
SW  PID                Serial#      Status      Sys Pwr  PoE Pwr  Watts
--  -
2A  PWR-C1-1100WAC      <snip>      OK          Good     Good     1100
2B  Not Present
```

Use `show power inline` privilege EXEC command to verify power budget available for PoE is properly allocated base on the power supplies installed.

```
Switch#show power inline
Module  Available      Used      Remaining
        (Watts)      (Watts)   (Watts)
-----
2       595.0         0.0      595.0
```

Use `show stack-power detail` privilege EXEC command (applies only to devices configured as stack power) to verify stack power mode, power allocation, stack power ports status and so on.

```
Switch#show stack-power detail
Power Stack          Stack  Stack  Total  Rsvd  Alloc  Sw_Avail  Num  Num
Name                Mode   Topolgy Pwr(W) Pwr(W) Pwr(W)   Pwr(W)  SW   PS
-----
power-stack-1       SP-PS  Ring    6600   30    1695   4875     3   6
power-stack-1-1     SP-PS  Ring    4400   30    1193   3177     2   4
```

```
Power stack name: power-stack-1
Stack mode: Power sharing
Stack topology: Ring
Switch 4:
  Power budget: 2043
  Power allocated: 434
  Low port priority value: 22
  High port priority value: 13
  Switch priority value: 4
  Port 1 status: Connected
  Port 2 status: Shut
  Neighbor on port 1: Switch 3 - <snip>
  Neighbor on port 2: 0000.0000.0000
```

```
Switch 2:
```

Power budget: 2375
Power allocated: 919
Low port priority value: 21
High port priority value: 12
Switch priority value: 3
Port 1 status: Shut
Port 2 status: Connected
Neighbor on port 1: 0000.0000.0000
Neighbor on port 2: Switch 3 - <snip>

Switch 3:

Power budget: 2043
Power allocated: 342
Low port priority value: 23
High port priority value: 14
Switch priority value: 5
Port 1 status: Connected
Port 2 status: Connected
Neighbor on port 1: Switch 2 - <snip>
Neighbor on port 2: Switch 4 - <snip>

Power stack name: power-stack-1-1

Stack mode: Power sharing

Stack topology: Ring

Switch 5:

Power budget: 1964
Power allocated: 342
Low port priority value: 24
High port priority value: 15
Switch priority value: 6
Port 1 status: Not connected
Port 2 status: Connected
Neighbor on port 1: 0000.0000.0000
Neighbor on port 2: Switch 1 - <snip>

Switch 1:

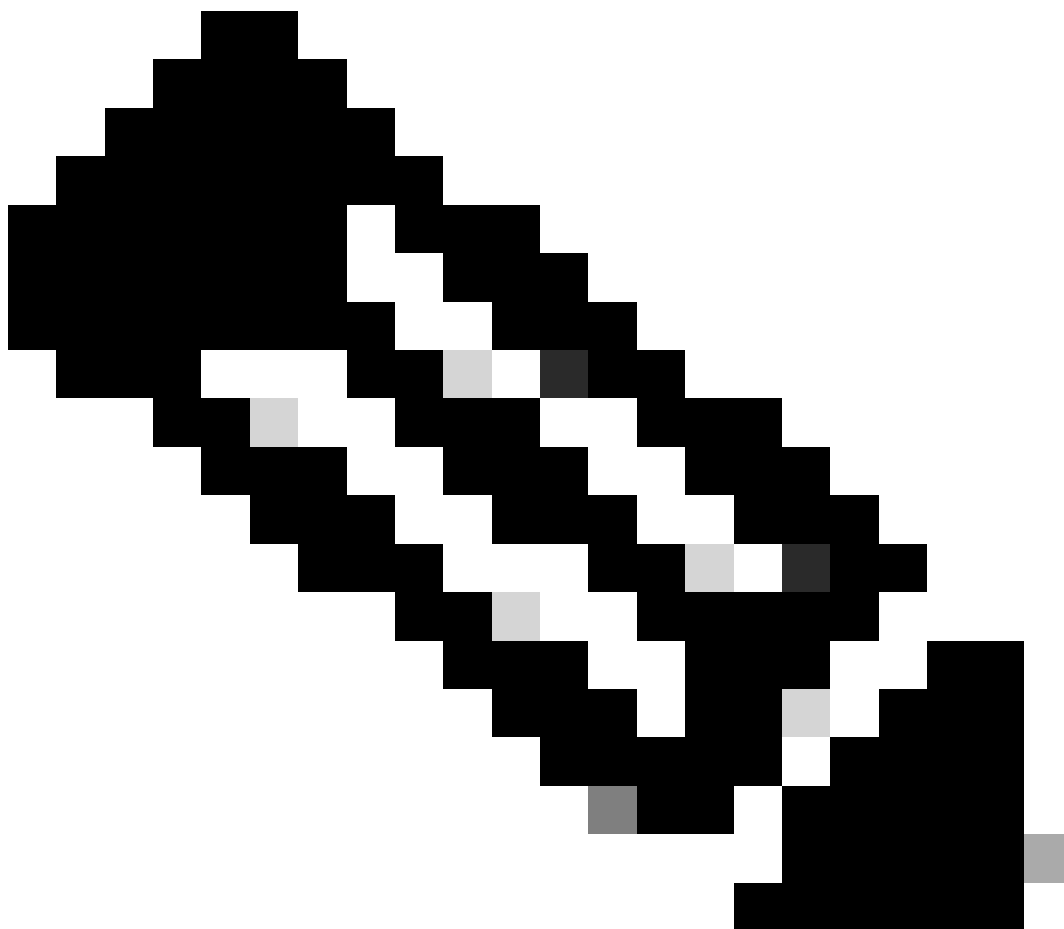
Power budget: 2375
Power allocated: 851
Low port priority value: 20
High port priority value: 11
Switch priority value: 2
Port 1 status: Connected
Port 2 status: Not connected
Neighbor on port 1: Switch 5 - <snip>
Neighbor on port 2: 0000.0000.0000

Special Considerations

- Consult hardware installation guide for PoE budget available on each model. Some models have low PoE budget, such as C9300-48UXM that has a PoE budget of 490 W with 1100 WAC power supply, this can be misinterpreted as hardware failure.
- It has been seen some scenarios where a second power supply is inserted but PoE budget remains as budget from one single PS. When a switch does not detect PoE budget for a second PS and power supplies are detected on Good status, you can try to perform a full power cycle as workaround.

Remove the power cords from both PS to turn off the switch then:

1. Remove PS1.
 2. Remove PS2.
 3. Wait couple minutes.
 4. Re-insert PS1
 5. Re-insert PS2
 6. Connect power cord to PS1
 7. Connect power cord to PS2.
-



Note: In case of a stack, all members affected need to be power cycled.

Catalyst 9500

Verification Commands

Use `show power detail` privilege EXEC command to verify power supply status, you can also use this command to check power supply capacity and model.

```
Switch#show power detail
```

```
Switch:1
```

Power Supply	Model No	Type	Capacity	Status	Fan States	
					0	1
PS0	C9K-PWR-650WAC-R	AC	650 W	ok	good	N/A
PS1	Not Present	N/A	N/A	N/A	N/A	N/A

Fan Tray	Status	Fan States			
		0	1	2	3
FM0	ok	good	good	good	good
FM1	ok	good	good	good	good

```
Switch:2
```

```
<snip>
```

Use `show platform hardware chassis power-supply detail switch [switch number] all` privilege EXEC command to verify input and output values are under proper ranges (This command also works for C9600 platform).

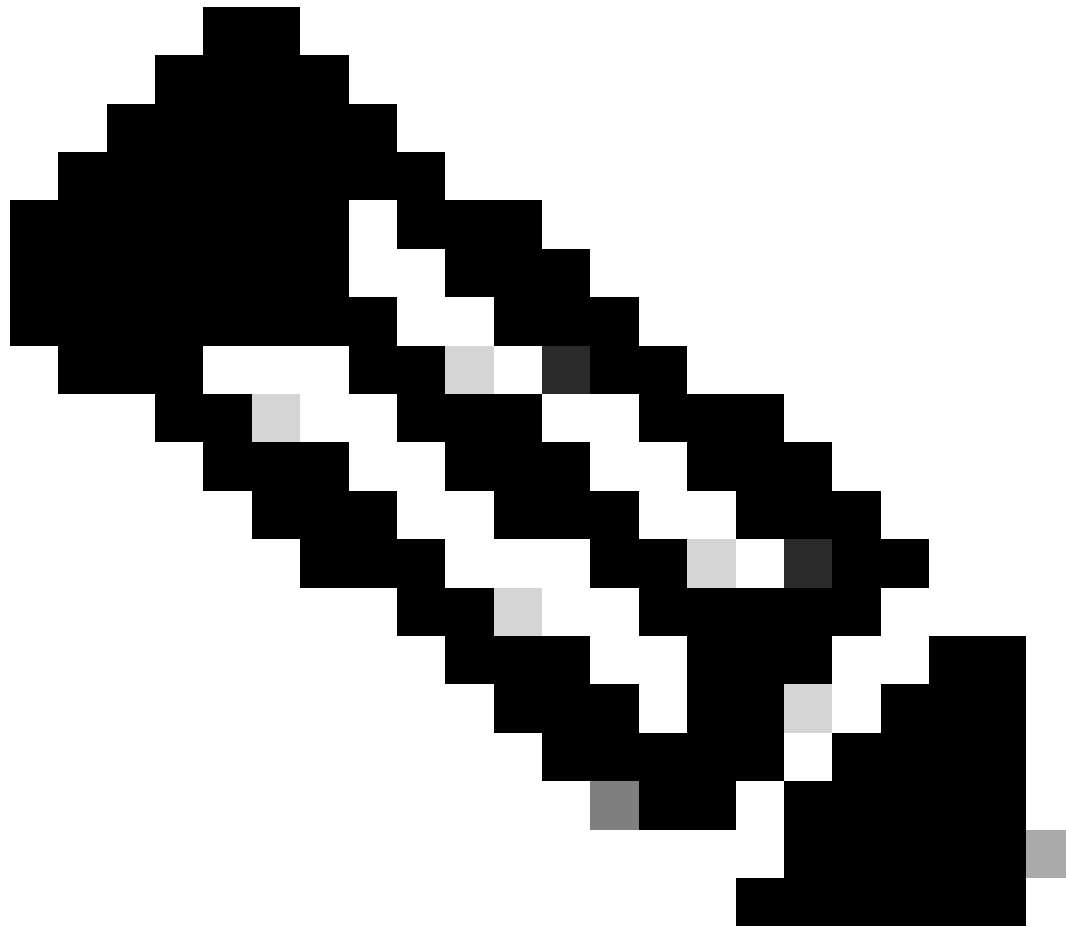
```
Switch#show platform hardware chassis power-supply detail switch 1 all
```

```
PS1:
```

```
Input Voltage   :    200.0000 V
Output Voltage  :    12.0480 V
Input Current   :     0.6800 A
Output Current  :     9.7500 A
Input Power     :    131.0000 W
Output Power    :    118.0000 W
Temperature 1   :     23.0000 C
Temperature 2   :     29.0000 C
Temperature 3   :     28.0000 C
Fan Speed 1    :   10176.0000 RPM
```

```
PS2:
```

```
<snip>
```

Note: Consult data sheet for power supply specifications.

Catalyst 9400 and 9600

Power Supplies Configuration Modes

Combined Mode

This is the default power supply mode. All available power supplies are active, those share power and can operate at up to 100 percent capacity. Available power in the combined mode is the sum of the individual power supplies.

If there is other power supply mode configured, you can use `power redundancy-mode combined` command to return to default mode:

```
Switch(config)#power redundancy-mode switch 1 combined
```

Redundant Mode N+1

For this mode n number of power supply modules are active (n can be one to seven power supply modules) +1 is the power supply module reserved for redundancy.

The default standby power supply slot is PS8. Specify a standby slot with the `power redundancy-mode redundant n+1 [standby-PS-slot]` command.

In the next example, power supply inserted in slot 5 is configured as standby:

```
Switch(config)#power redundancy-mode switch 1 redundant N+1 5
```

Redundant Mode N+N

For this mode n number of power supplies are active and n number of power supply modules are configured as standby. The default standby slots for this mode are PS5 through PS8. Specify the standby slots with the `power redundancy-mode redundant n+n [standby-PS-slots]` command.

In the next example, power supplies inserted in slots 2, 3 and 4 are configured as standby:

```
Switch(config)#power redundancy-mode switch 1 redundant N+N 2 3 4
```

Verification Commands

Use `show environment status` privilege EXEC command to verify power supply status, PS Current Configuration Mode and PS Current Operating State.

```
Switch#show environment status
Switch:1
```

Power Supply	Model No	Type	Capacity	Status	Fan States	
					1	2
PS1	C9400-PWR-3200AC	ac	3200 W	active	good	good
PS2	C9400-PWR-3200AC	ac	3200 W	active	good	good

```
PS Current Configuration Mode : Combined
PS Current Operating State    : Combined
```

```
Power supplies currently active    : 2
Power supplies currently available : 2
<snip>
Switch 1:
Fantray : good
Power consumed by Fantray : 540 Watts
Fantray airflow direction : side-to-side
Fantray beacon LED: off
Fantray status LED: green
SYSTEM : GREEN
```

With `show power detail` privilege EXEC command, you can also verify the amount of power consumed or reserved for each line card, supervisor and even for the Fan Tray. Additionally, you can verify the power budget mode, it can be either **Single Sup** or **Dual Sup**.

```
Switch#show power detail
Switch:1
```

Power Supply	Model No	Type	Capacity	Status	Fan States	
					1	2
PS1	C9400-PWR-3200AC	ac	3200 W	active	good	good
PS2	C9400-PWR-3200AC	ac	3200 W	active	good	good

```
PS Current Configuration Mode : Combined
PS Current Operating State    : Combined
```

```
Power supplies currently active    : 2
Power supplies currently available : 2
```

```
Switch:2
```

```
<snip>
```

```
Switch:1
```

Power Summary (in Watts)	Used	Maximum Available
System Power	1670	1670
Inline Power	0	4730
Total	1670	6400

```
Switch:2
```

```
<snip>
```

```
Switch:1
```

```
Automatic Linecard Shutdown : Enabled
Power Budget Mode           : Dual Sup
```

Mod	Model No	autoLC Priority	Power State	Budget	Instantaneous	Peak	Out of Reset	In Reset
1	C9400-LC-24XS	0	accepted	200	94	96	200	10
2	C9400-LC-48U	1	accepted	65	32	33	65	5
3	C9400-SUP-1XL	0	accepted	400	239	252	400	130
4	C9400-SUP-1XL	0	---	400	239	252	0	130
5	C9400-LC-48H	2	accepted	65	31	32	65	5
--	Fan Tray	0	accepted	540	--	--	540	--
Total	1670							

Note: When power budget mode is Dual Sup, it automatically reserves power for a second supervisor even when there is no second supervisor installed.

Special Considerations

ROMMON Variable SINGLE_SUP_CHASSIS

By default, the system reserves power for both supervisors to ensure high availability. Some C9600 can be configured with ROMMON variable `SINGLE_SUP_CHASSIS="0"` or `SINGLE_SUP_CHASSIS="1"`. When this variable is set to 0 it indicates the power budget mode is for Dual Sup, when it is set to 1 it indicates power budget mode is Single Sup. You can verify if this variable is configured with `show romvar` `privilege EXEC` command.

```
Switch#show romvar | in SUP
MODEL_NUM="C9600-SUP-1"
SINGLE_SUP_CHASSIS="0"
```

When ROMMON variable SINGLE_SUP_CHASSIS is set to 1, it is not reflected in command show power detail, it can still show power budget mode as Dual Sup, however, the reserved power for a second supervisor reflects 0.

Power Budget Mode : Dual Sup

Mod	Model No	Power State	Budget	Instantaneous	Peak	Out of Reset	In Reset
1	C9600-LC-48YL	accepted	230	0	0	230	10
2	C9600-LC-24C	accepted	200	0	0	200	10
3	C9600-SUP-1	accepted	775	0	0	775	202
4	C9600-SUP-1	---	0	--	--	0	0
FM1	C9606-FAN	accepted	450	--	--	450	--

Although the ROMMON variable indicates single sup mode, when a second supervisor is inserted, that supervisor consumes the proper power budget if there is enough power available. If you need the switch to reserve power for second supervisor even when there is no second supervisor installed, you can set ROMMON variable SINGLE_SUP_CHASSIS to 0, for this you need to enter to ROMMON mode.

Note: If you want to install a second supervisor, always remember to have the proper number of power supplies installed.

Power Budget Mode Dual Sup

When there is only one supervisor installed and there are not enough power supplies installed, the default power budget mode can trigger a scenario where the line cards are prevented to receive power and show power deny status.

Mod	Model No	State	Budget	Instantaneous	Peak	Reset	Reset
1	C9600-LC-48YL	denied	10	0	0	230	10
2	C9600-LC-24C	denied	10	0	0	200	10
3	C9600-SUP-1	accepted	775	0	0	775	202
4	C9600-SUP-1	---	775	--	--	775	0
FM1	C9606-FAN	accepted	450	--	--	450	--
Total allocated power:			2020				
Total required power:			2430				

In order to solve this, you can configure the power budget mode for Single Sup. This power budget mode allows the switch to use the reserved power for the second supervisor to enable the line cards.

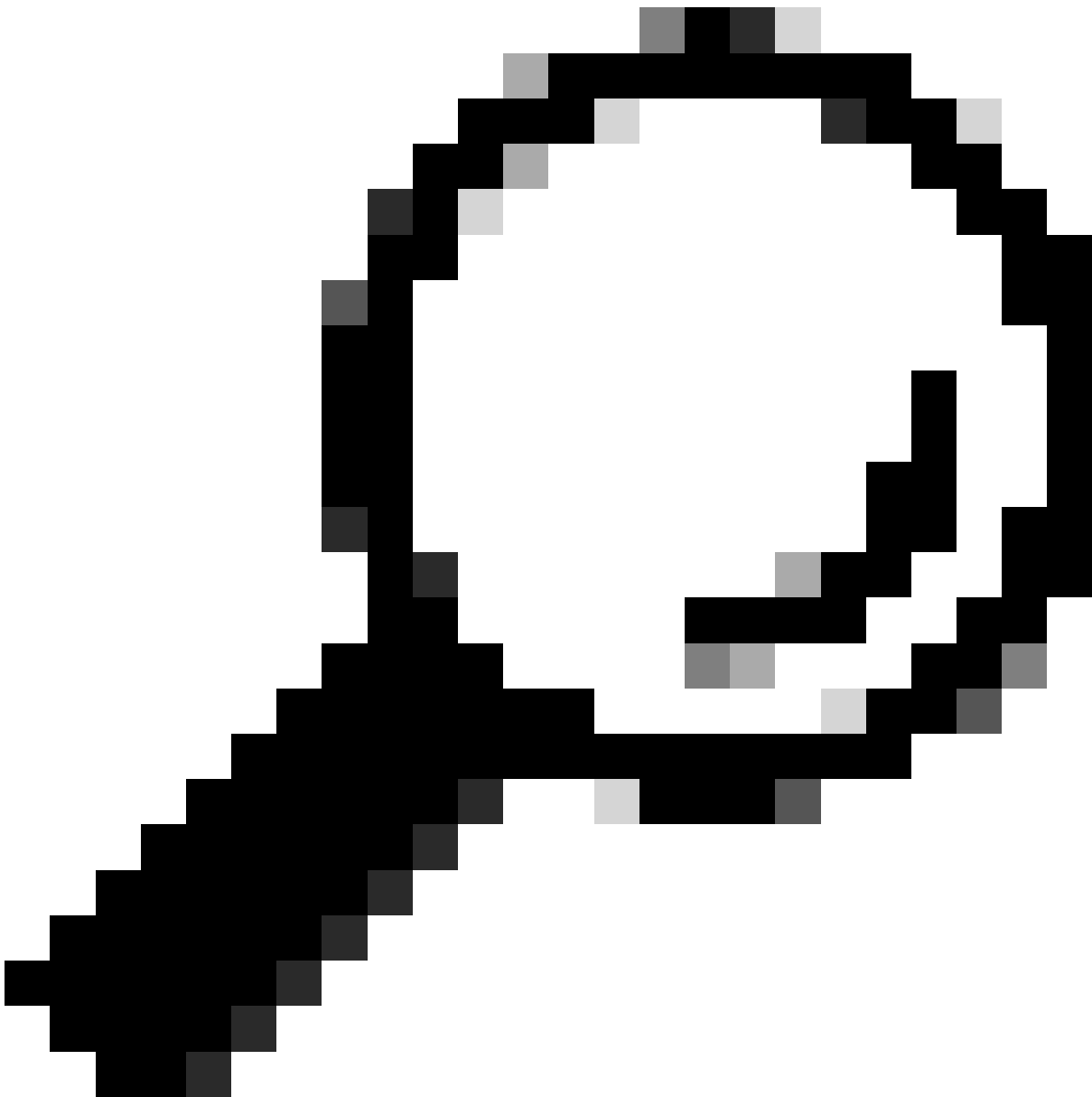
```
Switch(config)#power budget mode single-sup
```

If you need to install a second supervisor in some point, remember to configure the switch back to Dual Sup and to install the proper number of power supplies needed to meet the power requirements.

```
Switch(config)#no power budget mode single-sup
```



Warning: If you do not configure the switch back to power budget mode Dual Sup and you do not install the proper number of PS, this can trigger a low power condition where the system can shut down.



Tip: Cisco Power Calculator is an educational resource that can help you as a starting point to plan your power requirements.

Software Defects

- Cisco bug ID [CSCwc87761](#) - C9300L PWR-C1-350WAC-P power supply can turn off requiring power cable OIR
- Cisco bug ID [CSCvk48435](#) - Faulty PS on Cat9500 series switches PWR-C4-950WAC-R=
- Cisco bug ID [CSCvx30283](#) - CAT 9400 | 16.9.x and 16.12.x | LiteON PSU in standby slot goes to faulty state after some time
- Cisco bug ID [CSCvz62847](#) - CAT 9400 | 17.3.x | LiteON PSU in standby slot goes to faulty state after some time



Note: Only registered Cisco users can access internal bug information and tools.

Related Information

- [Cisco Power Calculator](#)
- [Cisco Catalyst 9600 Series Switches Hardware Installation Guide](#)
- [Cisco Catalyst 9300 Series Switches Hardware Installation Guide, Product Overview](#)
- [Cisco Catalyst 9500 Series Switches Data Sheet](#)
- [Cisco Technical Support & Downloads](#)