

The first step on getting a switch integrated into a network is to get it powered up. There are several options for getting power to your switch, but the most common is the universal power cords used on enterprise products — the same power cord you find on your IT equipment and computers.

Some switches have power switches, whereas many switches are fixed to power up as soon as the power plug is attached to the system.

When you power up your switch, several things happen, and the status lights on the front of the unit tell you what is going on. (They are similar to the lights that show up briefly on your dashboard when you start your car to let you know what is working.) Every LED lights temporarily and then goes out.

The system (SYST) LED turns to amber, as do all the switch ports that have devices connected. Then the Power On Self Test (POST) process takes place, which may require some time if you are dealing with a large switch. You may see LEDs flash during the POST process, but this is normal.

When the switch successfully completes the POST process, the SYST and status (STAT) LEDs become green. Switch ports that have devices remain amber for a period because Spanning Tree Protocol (STP), which is enabled by default, is in *Learning* mode on those ports before they transition to green and allow forwarding of traffic. After these lights transition to green, your switch will be fully up and running.

Typically, a group of LEDs with a Mode selector button is on the left side of the Cisco switch. Press the button, and you see that the mode LEDs cycle through STAT, UTIL, DUPLX, and SPEED. With the change in the mode LED, you may see a change in the switch port LEDs.



- **SYST:** If SYST is off, the switch is off; if green, the switch is operating normally; if amber, the switch is not functioning properly, which is the case during the boot process.
- **RPS:** If RPS is off, a Redundant Power Supply (RPS) has not been installed or is turned off. If solid green, an RPS is connected and ready to provide power in the event of a failure of the main power supply.

If flashing green, the RPS is connected but currently unavailable because of powering another device. If solid amber, the RPS has a fault or is in standby mode. If flashing amber, the RPS is functioning, and the main power supply in the switch has failed.

- **STAT:** When STAT is selected, you see the status of the actual switch ports. If the switch port is off, there is no link. If the switch port is solid green, a link is present. If the switch port is flashing green, there is activity on the port. If the switch port is alternating green and amber, there is a link problem, such as excessive errors.

If the switch port is solid amber, the port has been disabled. A port may be disabled automatically by a policy, manually by the administrator, or because of Spanning Tree Protocol (STP).

After you bring a port up, it could be amber for up to 30 seconds because of Spanning Tree Protocol (STP).

- **UTIL:** When UTIL is selected, you see the status of the actual switch ports. This one is a little complicated. When using this mode, all of the switch ports on the front of your switch are used like a big bar graph using a logarithmic scale. The green lights represent current backplane utilization.

If the lights are amber, you are looking at the maximum backplane utilization since the switch was powered on. So, typically, a few amber LEDs might follow the green LEDs. If the LEDs are green and amber, the current utilization is greater than the maximum, and the maximum is being updated as you watch the LEDs.

- **DUPLX:** When DUPLX is selected, you see the status of the actual switch ports. If the switch port is off, the port is running in Half Duplex mode; if the switch port is green, the port is running in Full Duplex mode. You want as many ports as possible running in Full Duplex mode, especially if they are inter-switch links or trunk ports between switches.
- **SPEED:** When SPEED is selected, you see the status of the actual switch ports. If the switch port is off, the port is running at 10 Mbps; if the switch port is green, the port is running at 100 Mbps; if the switch port is flashing green, the port is running at 1000 Mbps.

If you press the Mode button on a switch for three seconds and all the mode LEDs start to blink in unison, the switch has already completed Express Setup mode.

If you have attached a rollover cable to the console port, you will see that the boot process is as follows:

```
C2950 Boot Loader (C2950-HBOOT-M) Version 12.1(11r)EA1, RELEASE SOFTWARE (fc1)
Compiled Mon 22-Jul-02 18:57 by antonino
WS-C2950-12 starting...
Base ethernet MAC Address: 00:06:d6:ab:a0:40
Xmodem file system is available.
Initializing Flash...
flashfs[0]: 328 files, 5 directories
flashfs[0]: 0 orphaned files, 0 orphaned directories
flashfs[0]: Total bytes: 7741440
flashfs[0]: Bytes used: 6682624
flashfs[0]: Bytes available: 1058816
flashfs[0]: flashfs fsck took 8 seconds.
...done initializing flash.
Boot Sector Filesystem (bs:) installed, fsid: 3
Parameter Block Filesystem (pb:) installed, fsid: 4
Loading "flash:c2950-i6q4l2-mz.121-22.EA13.bin"...#####
#####
#####
#####
File "flash:c2950-i6q4l2-mz.121-22.EA13.bin" uncompressed and installed, entry poi
nt: 0x80010000
executing...
```

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Cisco Internetwork Operating System Software

IOS (tm) C2950 Software (C2950-I6Q4L2-M), Version 12.1(22)EA13, RELEASE SOFTWARE (fc2)

Technical Support: <http://www.cisco.com/techsupport>

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Compiled Fri 27-Feb-09 22:20 by amvarma

Image text-base: 0x80010000, data-base: 0x80570000

Initializing flashfs...

flashfs[1]: 328 files, 5 directories

flashfs[1]: 0 orphaned files, 0 orphaned directories

flashfs[1]: Total bytes: 7741440

flashfs[1]: Bytes used: 6682624

flashfs[1]: Bytes available: 1058816

flashfs[1]: flashfs fsck took 8 seconds.

flashfs[1]: Initialization complete.

Done initializing flashfs.

POST: System Board Test : Passed

POST: Ethernet Controller Test : Passed

ASIC Initialization Passed

POST: FRONT-END LOOPBACK TEST : Passedcisco WS-C2950-12 (RC32300) processor (revision B0) with 20957K bytes of memory.

Processor board ID FAB0535Q22L

Last reset from system-reset

Running Standard Image

12 FastEthernet/IEEE 802.3 interface(s)

32K bytes of flash-simulated non-volatile configuration memory.

Base ethernet MAC Address: 00:06:D6:AB:A0:40

Motherboard assembly number: 73-5782-08

Motherboard serial number: FAB0535BC1K

Model revision number: B0

Model number: WS-C2950-12

System serial number: FAB0535Q22L

Press RETURN to get started!

00:00:15: %SPANTREE-5-EXTENDED_SYSID: Extended SysId enabled for type vlan

```
00:00:17: %SYS-5-CONFIG_I: Configured from memory by console
00:00:17: %SYS-5-RESTART: System restarted --
Cisco Internetwork Operating System Software
IOS (tm) C2950 Software (C2950-I6Q4L2-M), Version 12.1(22)EA13, RELEASE SOFTWARE (fc2)
Technical Support: http://www.cisco.com/techsupport
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Compiled Fri 27-Feb-09 22:20 by amvarma
00:00:17: %SNMP-5-COLDSTART: SNMP agent on host Switch1 is undergoing a cold start
00:00:21: %LINK-3-UPDOWN: Interface FastEthernet0/3, changed state to up
00:00:21: %LINK-3-UPDOWN: Interface FastEthernet0/8, changed state to up
00:00:21: %LINK-3-UPDOWN: Interface FastEthernet0/10, changed state to up
00:00:21: %LINK-3-UPDOWN: Interface FastEthernet0/11, changed state to up
00:00:21: %LINK-3-UPDOWN: Interface FastEthernet0/12, changed state to up
00:00:21: %LINK-3-UPDOWN: Interface FastEthernet0/1, changed state to up
00:00:21: %LINK-3-UPDOWN: Interface FastEthernet0/2, changed state to up
00:00:21: %LINK-3-UPDOWN: Interface FastEthernet0/9, changed state to up
00:00:23: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/3, changed state to up
00:00:23: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/8, changed state to up
00:00:23: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/10, changed state to up
00:00:23: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/11, changed state to up
00:00:23: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/12, changed state to up
00:00:23: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up
00:00:23: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/2, changed state to up
00:00:23: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/9, changed state to up
00:00:53: %LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan1, changed state to up
```

Refer to the preceding boot process code, and notice these sections:

- Hardware initialization

- Boot loader and the selection of an IOS image
- System POST

After you see the Press ENTER message, the system has finished loading the IOS and completed the post. At this point, the switch loads its configuration into memory and enables all switch ports.

Because the switch ports have just come up, they must be treated as any newly connected switch port and adhere to Spanning Tree Protocol (STP) or any other feature that applies to a switch port. You will see that the link state on all connected ports is changed to *up*, and after the required wait time, the line protocol is brought to an *up* state as well.