



## CHAPTER 59

# Performing Diagnostics

---

You can use diagnostics to test and verify the functionality of the hardware components of your system (chassis, supervisor engines, modules, and ASICs) while your Catalyst 4500 series switch is connected to a live network. Diagnostics consists of packet-switching tests that test hardware components and verify the data path and control signals.

Online diagnostics are categorized as bootup, on-demand, schedule, or health-monitoring diagnostics. Bootup diagnostics run during bootup; on-demand diagnostics run from the CLI; scheduled diagnostics run at user-designated intervals or specified times when the switch is connected to a live network; and health-monitoring runs in the background.

This chapter consists of these sections:

- [Configuring Online Diagnostics, page 59-1](#)
- [Performing Diagnostics, page 59-3](#)
- [Power-On Self-Test Diagnostics, page 59-8](#)



### Note

For complete syntax and usage information for the switch commands used in this chapter, look at the *Cisco Catalyst 4500 Series Switch Command Reference* and related publications at this location:

<http://www.cisco.com/en/US/products/hw/switches/ps4324/index.html>

If the command is not found in the Catalyst 4500 Command Reference, it will be found in the larger Cisco IOS library. Refer to the *Cisco IOS Command Reference* and related publications at this location:

<http://www.cisco.com/en/US/products/ps6350/index.html>

## Configuring Online Diagnostics

These sections describe how to configure online diagnostics:

- [Configuring On-Demand Online Diagnostics, page 59-2](#)
- [Scheduling Online Diagnostics, page 59-2](#)

## Configuring On-Demand Online Diagnostics

You can run on-demand online diagnostic tests from the CLI. You can set the execution action to either stop or continue the test when a failure is detected, or to stop the test after a specific number of failures occur with the failure count setting. The iteration setting allows you to configure a test to run multiple times.

To schedule online diagnostics, perform this task:

Command	Purpose
Switch# <b>diagnostic ondemand</b> {iteration <i>iteration_count</i> }   {action-on-error {continue   stop} [error_count]}	Configures on-demand diagnostic tests to run, how many times to run (iterations), and what action to take when errors are found.

This example shows how to set the on-demand testing iteration count:

```
Switch# diagnostic ondemand iterations 3
Switch#
```

This example shows how to set the execution action when an error is detected:

```
Switch# diagnostic ondemand action-on-error continue 2
Switch#
```

## Scheduling Online Diagnostics

You can schedule online diagnostics to run at a designated time of day or on a daily, weekly, or monthly basis. You can schedule tests to run only once or to repeat at an interval. Use the **no** form of this command to remove the scheduling.

To configure online diagnostics, perform this task:

Command	Purpose
Switch(config)# <b>diagnostic schedule module</b> <i>number</i> <b>test</b> { <i>test_id</i>   <i>test_id_range</i>   <b>all</b> } [ <b>port</b> { <i>num</i>   <i>num_range</i>   <b>all</b> } { <b>on</b> <i>mm dd yyyy hh:mm</i> }   { <b>daily</b> <i>hh:mm</i> }   { <b>weekly</b> <i>day_of_week hh:mm</i> }]	Schedules on-demand diagnostic tests on the specified module for a specific date and time, how many times to run (iterations), and what action to take when errors are found.

This example shows how to schedule diagnostic testing on a specific date and time for a specific port on module 6:

```
Switch(config)# diagnostic schedule module 6 test 2 port 3 on may 23 2009 23:32
Switch(config)#
```

This example shows how to schedule diagnostic testing to occur daily:

```
Switch(config)# diagnostic schedule module 6 test 2 port 3 daily 12:34
Switch(config)#
```

This example shows how to schedule diagnostic testing to occur weekly:

```
Switch(config)# diagnostic schedule module 6 test 2 port 3 weekly friday 09:23
Switch(config)#
```

## Performing Diagnostics

After you configure online diagnostics, you can start or stop diagnostic tests or display the test results. You can also see which tests are configured and what diagnostic tests have already run.

These sections describe how to run online diagnostic tests after they have been configured:

- [Starting and Stopping Online Diagnostic Tests, page 59-3](#)
- [Displaying Online Diagnostic Tests and Test Results, page 59-4](#)
- [Line card Online Diagnostics, page 59-6](#)
- [Troubleshooting with Online Diagnostics, page 59-7](#)



### Note

Before you enable any online diagnostics tests, enable the logging console or monitor to observe all warning messages.



### Note

When running disruptive tests, only run them when you are connected through the console. When disruptive tests complete, a warning message on the console will recommend that you reload the system to return to normal operation. Strictly follow this warning.

## Starting and Stopping Online Diagnostic Tests

After you configure diagnostic tests, you can use the **start** and **stop** keywords to begin or end a test.

To start or stop an online diagnostic command, perform one of these tasks:

Command	Purpose
Switch# <b>diagnostic start module</b> <i>number</i> <b>test</b> { <i>test_id</i>   <i>test_id_range</i>   <b>minimal</b>   <b>complete</b>   <b>basic</b>   <b>per-port</b>   <b>non-disruptive</b>   <b>all</b> } [ <b>port</b> { <i>num</i>   <i>port#_range</i>   <b>all</b> }]	Starts a diagnostic test on a port or range of ports on the specified module.
Switch# <b>diagnostic stop module</b> <i>number</i>	Stops a diagnostic test on the specified module.

This example shows how to start a diagnostic test on module 6:

```
Switch# diagnostic start module 6 test 2
Diagnostic[module 6]: Running test(s) 2 Run interface level cable diags
Diagnostic[module 6]: Running test(s) 2 may disrupt normal system operation
Do you want to continue? [no]: yes
Switch#
*May 14 21:11:46.631: %DIAG-6-TEST_RUNNING: module 6: Running online-diag-tdr{ID=2} ...
*May 14 21:11:46.631: %DIAG-6-TEST_OK: module 6: online-diag-tdr{ID=2} has completed
successfully
Switch#
```

This example shows how to stop a diagnostic test on module 6:

```
Switch# diagnostic stop module 6
Diagnostic[module 6]: Diagnostic is not active.
```

The message indicates no active diagnostic on module 6

## Displaying Online Diagnostic Tests and Test Results

You can display the configured online diagnostic tests and check the results of the tests with the **show diagnostic** command.

To display the configured diagnostic tests, perform this task:

Command	Purpose
Switch# <b>show diagnostic</b> { <b>bootup</b>   <b>cns</b>   <b>content</b> [module num]   <b>description</b> [module num]   <b>events</b> [module num] [event-type event-type]   <b>ondemand</b>   <b>result</b> [module num] [ <b>detail</b> ]   <b>schedule</b> [module num]   <b>simulation</b>   <b>status</b> }	Displays the test results of online diagnostics and lists supported test suites.

This example shows how to display the online diagnostics configured on module 1:

```
Switch# show diagnostic content module 6
module 6:
Diagnostics test suite attributes:
  M/C/* - Minimal bootup level test / Complete bootup level test / NA
  B/* - Basic ondemand test / NA
  P/V/* - Per port test / Per device test / NA
  D/N/* - Disruptive test / Non-disruptive test / NA
  S/* - Only applicable to standby unit / NA
  X/* - Not a health monitoring test / NA
  F/* - Fixed monitoring interval test / NA
  E/* - Always enabled monitoring test / NA
  A/I - Monitoring is active / Monitoring is inactive
  cable-tdr/* - Interface cable diags / NA
  o/* - Ongoing test, always active / NA
Test Interval   Thre-
ID   Test Name                               Attributes      day hh:mm:ss.ms  shold
====  =====
  1) linecard-online-diag -----> M**D***I**      not configured  n/a
  2) online-diag-tdr -----> **PD***Icable- not configured  n/a
```

This example shows how to display the test description for a given test on a module:

```
Switch# show diagnostic description module 6 test 1

linecard-online-diag :
  Linecard online-diagnostics run after the system boots up but
  before it starts passing traffic. Each linecard port is placed in
  loopback, and a few packets are injected into the switching fabric
  from the cpu to the port. If the packets are successfully
  received by the cpu, the port passes the test. Sometimes one port
  or a group of ports sharing common components fail. The linecard
  is then placed in partial faulty mode. If no ports can loop back
  traffic, the board is placed in faulty state.
```

Switch#

This example shows how to display the online diagnostic results for module 6:

```
Switch# show diagnostic result module 6
```

```

Current bootup diagnostic level: minimal

module 6:   SerialNo : JAB0815059L

Overall Diagnostic Result for module 6 : PASS
Diagnostic level at card bootup: minimal

Test results: (. = Pass, F = Fail, U = Untested)

  1) linecard-online-diag -----> .
  2) online-diag-tdr:

Port  1  2  3  4  5  6  7  8  9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
-----
      U  U  .  U  U  U  U  U  U  U  U  U  U  U  U  U  U  U  U  U  U  U  U  U
    
```

Switch#

This example shows how to display the online diagnostic results details for module 6:

Switch# **show diagnostic result module 6 detail**

```

Current bootup diagnostic level: minimal

module 6:   SerialNo : JAB0815059L

Overall Diagnostic Result for module 6 : PASS
Diagnostic level at card bootup: minimal

Test results: (. = Pass, F = Fail, U = Untested)
    
```

```

1) linecard-online-diag -----> .

      Error code -----> 0 (DIAG_SUCCESS)
      Total run count -----> 1
      Last test testing type -----> n/a
      Last test execution time ----> Jun 01 2009 11:19:36
      First test failure time -----> n/a
      Last test failure time -----> n/a
      Last test pass time -----> Jun 01 2009 11:19:36
      Total failure count -----> 0
      Consecutive failure count ---> 0
    
```

Slot	Ports	Card Type	Diag Status	Diag Details
6	24	10/100/1000BaseT (RJ45)V, Cisco/IEEE	Passed	None

Detailed Status

```

-----
. = Pass           U = Unknown
L = Loopback failure  S = Stub failure
P = Port failure
E = SEEPROM failure  G = GBIC integrity check failure
    
```

```

Ports 1  2  3  4  5  6  7  8  9  10 11 12 13 14 15 16
      .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .

Ports 17 18 19 20 21 22 23 24
      .  .  .  .  .  .  .  .
    
```

---

```
2) online-diag-tdr:
```

```
Port 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
-----
      U U . U U U U U U U U U U U U U U U U U U U U U
```

```
Error code -----> 0 (DIAG_SUCCESS)
Total run count -----> 1
Last test testing type -----> OnDemand
Last test execution time ----> Jun 03 2009 05:39:00
First test failure time ----> n/a
Last test failure time -----> n/a
Last test pass time -----> Jun 03 2009 05:39:00
Total failure count -----> 0
Consecutive failure count ---> 0
```

```
Detailed Status
```

```
-----
Interface Speed Local pair Cable length Remote channel Status
Gi6/3      1Gbps   1-2      N/A      Unknown   Terminated
           3-6      N/A      Unknown   Terminated
           4-5      N/A      Unknown   Terminated
           7-8      N/A      Unknown   Terminated
```

---

```
Switch#
```

## Line card Online Diagnostics

A line card online diagnostic test verifies that all ports on a line card are working correctly. The test can detect whether the path to the front panel port on the line card is broken. The test cannot indicate where along the path that the problem occurred.




---

### Note

This test is run only for line cards that have stub chips.

---

Line card online diagnostics runs only once, when the line cards boot. This situation can happen when you insert a linecard or power up a chassis.

Line card online diagnostics are performed by sending a packet from the CPU to every port on the line card. Because this packet is marked loopback, the CPU expects to see this packet return from the port. The packet first traverses the ASICs on the supervisor engine card, then travels via the chassis backplane and the stub chip on the line cards to the PHYs. The PHY sends it back down the same path.




---

### Note

The packet does not reach or exit the front panel port.

---

## Troubleshooting with Online Diagnostics

A faulty line card occurs if any of the following conditions occurs.

- All ports fail
- All ports on a stub chip fail
- Only one port fails

For all of these situations, the output of the **show module** command would display the status of the line card as faulty:

```
Switch# show mod
Chassis Type : WS-C4507R
Power consumed by backplane : 40 Watts

Mod Ports Card Type                               Model                               Serial No.
-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
 1      6  Sup II+10GE 10GE (X2), 1000BaseX (SFP) WS-X4013+10GE  JAB091502G0
 2      6  Sup II+10GE 10GE (X2), 1000BaseX (SFP) WS-X4013+10GE  JAB091502FC
 3     48  100BaseX (SFP)                               WS-X4248-FE-SFP JAB093305RP
 4     48  10/100BaseTX (RJ45)V                             WS-X4148-RJ45V  JAE070717E5
 5     48  10/100BaseTX (RJ45)V                             WS-X4148-RJ45V  JAE061303U3
 6     48  10/100BaseTX (RJ45)V                             WS-X4148-RJ45V  JAE061303WJ
 7     24  10/100/1000BaseT (RJ45)V, Cisco/IEEE WS-X4524-GB-RJ45V JAB0815059Q

M MAC addresses                                Hw Fw                               Sw                               Status
-----+-----+-----+-----+-----+-----+-----+-----+-----+
 1 000b.5f27.8b80 to 000b.5f27.8b85 0.2 12.2(27r)SG( 12.2(37)SG Ok
 2 000b.5f27.8b86 to 000b.5f27.8b8b 0.2 12.2(27r)SG( 12.2(37)SG Ok
 3 0005.9a80.6810 to 0005.9a80.683f 0.4                                     Ok
 4 000c.3016.aae0 to 000c.3016.ab0f 2.6                                     Ok
 5 0008.a3a3.4e70 to 0008.a3a3.4e9f 1.6                                     Ok
 6 0008.a3a3.3fa0 to 0008.a3a3.3fcf 1.6                                     Faulty
 7 0030.850e.3e78 to 0030.850e.3e8f 1.0                                     Ok

Mod Redundancy role      Operating mode      Redundancy status
-----+-----+-----+-----+-----+-----+-----+-----+
 1  Active Supervisor    SSO                 Active
 2  Standby Supervisor   SSO                 Standby hot
```

To troubleshoot a faulty line card, do the following:

### Step 1 Enter the command **show diagnostic result module 3**.

If a faulty line card was inserted in the chassis, it will fail the diagnostics and the output will be similar to the following:

```
Current bootup diagnostic level: minimal

module 3:  SerialNo : JAB093305RP

Overall Diagnostic Result for module 3 : MAJOR ERROR
Diagnostic level at card bootup: minimal

Test results: (. = Pass, F = Fail, U = Untested)

 1) linecard-online-diag -----> F

Switch#
```

Issue an RMA for the line card, contact TAC, and skip steps 2 and 3.

The output may display the following:

```
module 3:

  Overall diagnostic result: PASS

  Test results: (. = Pass, F = Fail, U = Untested)

  1) linecard-online-diag -----> .
```

The message indicates that the line card passed online diagnostics either when it was inserted into the chassis the last time or when the switch was powered up (as reported by the “.”). You need to obtain additional information to determine the cause.

**Step 2** Insert a different supervisor engine card and reinsert the line card.

If the linecard passes the test, it suggests that the supervisor engine card is defective.

Issue an RMA for the supervisor engine, contact TAC, and skip step 3.

Because online diagnostics does not run on the supervisor engine card, you cannot use the **#show diagnostic module 1** command to test whether the supervisor engine card is faulty.

**Step 3** Reinsert the linecard in a different chassis.

If the linecard passes the test, the problem is associated with the chassis.

Issue an RMA for the chassis and contact TAC.

## Power-On Self-Test Diagnostics

The following topics are discussed:

- [Overview, page 59-8](#)
- [Sample POST Results, page 59-9](#)
- [Power-On Self-Test Results for Supervisor Engine V-10GE, page 59-13](#)
- [Troubleshooting the Test Failures, page 59-19](#)

### Overview

All Catalyst 4500 series switches have power-on self-test (POST) diagnostics that run whenever a supervisor engine boots. POST tests the basic hardware functionality for the supervisor switching engine, its associated packet memory and other on-board hardware components. The results of the POST impacts how the switch boots, because the health of the supervisor engine is critical to the operation of the switch. The switch might boot in a marginal or faulty state.

POST is currently supported on the following supervisor engines:

- WS-X4014
- WS-X4515
- WS-X4516
- WS-X4516-10GE
- WS-X4013+



- WS-X4013+TS
- WS-X4013+10GE
- WS-C4948G
- WS-C4948G-10GE
- ME-4924-10GE
- WS-X45-SUP6-E
- WS-X45-SUP6L-E

The POST results are indicated with a period (.) or a Pass for Pass, an F for a Fail and a U for Untested.

## Sample POST Results

For all the supervisor engines, POST performs CPU, traffic, system, system memory, and feature tests.

For CPU tests, POST verifies appropriate activity of the supervisor SEEPROM, temperature sensor, and Ethernet end-of-band channel (EOBC), when used.

The following example illustrates the output of a CPU subsystem test on all supervisor engines except the WS-X4013+TS:

```
[..]
Cpu Subsystem Tests ...
seeprom: . temperature_sensor: . eobc: .
[..]
```

The following example illustrates the output of a CPU subsystem test on a WS-X4013+TS supervisor engine.

```
[..]
Cpu Subsystem Tests ...
seeprom: . temperature_sensor: .
[..]
```

For traffic tests, POST sends packets from the CPU to the switch. These packets loop several times within the switch core and validate the switching, the Layer 2 and the Layer 3 functionality. To isolate the hardware failures accurately, the loop back is done both inside and outside the switch ports.

The following example illustrates the output of a Layer 2 traffic test at the switch ports on the supervisor engines WS-X4516, WS-X4516-10GE, WS-X4013+10GE, WS-C4948G-10GE:

```
Port Traffic: L2 Serdes Loopback ...
0: . 1: . 2: . 3: . 4: . 5: . 6: . 7: . 8: . 9: . 10: . 11: .
12: . 13: . 14: . 15: . 16: . 17: . 18: . 19: . 20: . 21: . 22: . 23: .
24: . 25: . 26: . 27: . 28: . 29: . 30: . 31: . 32: . 33: . 34: . 35: .
36: . 37: . 38: . 39: . 40: . 41: . 42: . 43: . 44: . 45: . 46: . 47: .
```

The following example illustrates the output of a Layer 2 traffic test at the switch ports on the supervisor engines WS-X4013+TS, WS-X4515, WS-X4013+, WS-X4014, WS-C4948G:

```
Port Traffic: L2 Serdes Loopback ...
0: . 1: . 2: . 3: . 4: . 5: . 6: . 7: . 8: . 9: . 10: . 11: .
12: . 13: . 14: . 15: . 16: . 17: . 18: . 19: . 20: . 21: . 22: . 23: .
24: . 25: . 26: . 27: . 28: . 29: . 30: . 31:
```

POST also performs tests on the packet and system memory of the switch. These are numbered dynamically in ascending order starting with 1 and represent different memories.

The following example illustrates the output from a system memory test:

```
Switch Subsystem Memory ...
 1: . 2: . 3: . 4: . 5: . 6: . 7: . 8: . 9: . 10: . 11: . 12: .
13: . 14: . 15: . 16: . 17: . 18: . 19: . 20: . 21: . 22: . 23: . 24: .
25: . 26: . 27: . 28: . 29: . 30: . 31: . 32: . 33: . 34: . 35: . 36: .
37: . 38: . 39: . 40: . 41: . 42: . 43: . 44: . 45: . 46: . 47: . 48: .
49: . 50: . 51: . 52: . 53: . 54: . 55: .
```

POST also tests the NetFlow services card (Supervisor Engine IV and Supervisor Engine V) and the NetFlow services feature (Supervisor Engine V -10GE). Failures from these tests are treated as marginal, as they do not impact functionality of the switch (except for the unavailability of the NetFlow features):

```
Netflow Services Feature ...
se: . cf: . 52: . 53: . 54: . 55: . 56: . 57: . 58: . 59: . 60: . 61: .
62: . 63: . 64: . 65: .
```



**Note**

Supervisor Engine VI-E retains most of the previous supervisor engines' POST features including the CPU subsystem tests, Layer 3 and Layer 2 traffic tests, and memory tests. Redundant ports on redundant systems are not tested. All POST diagnostics are local to the supervisor engine running the tests.

The following example shows the output for a WS-X4516 supervisor engine:

```
Switch# show diagnostic result module 2 detail

module 2:

  Overall diagnostic result: PASS

  Test results: (. = Pass, F = Fail, U = Untested)

-----

  1) supervisor-bootup -----> .

      Error code -----> 0 (DIAG_SUCCESS)
      Total run count -----> 1
      Last test execution time -----> Jul 20 2005 14:15:52
      First test failure time -----> n/a
      Last test failure time -----> n/a
      Last test pass time -----> Jul 20 2005 14:15:52
      Total failure count -----> 0
      Consecutive failure count -----> 0

Power-On-Self-Test Results for ACTIVE Supervisor

Power-on-self-test for Module 2: WS-X4516
Port/Test Status: (. = Pass, F = Fail, U = Untested)
Reset Reason: PowerUp RemoteDebug

Cpu Subsystem Tests ...
seeprom: . temperature_sensor: . eobc: .

Port Traffic: L2 Serdes Loopback ...
 0: . 1: . 2: . 3: . 4: . 5: . 6: . 7: . 8: . 9: . 10: . 11: .
12: . 13: . 14: . 15: . 16: . 17: . 18: . 19: . 20: . 21: . 22: . 23: .
24: . 25: . 26: . 27: . 28: . 29: . 30: . 31: . 32: . 33: . 34: . 35: .
36: . 37: . 38: . 39: . 40: . 41: . 42: . 43: . 44: . 45: . 46: . 47: .
```

```

Port Traffic: L2 Asic Loopback ...
 0: . 1: . 2: . 3: . 4: . 5: . 6: . 7: . 8: . 9: . 10: . 11: .
12: . 13: . 14: . 15: . 16: . 17: . 18: . 19: . 20: . 21: . 22: . 23: .
24: . 25: . 26: . 27: . 28: . 29: . 30: . 31: . 32: . 33: . 34: . 35: .
36: . 37: . 38: . 39: . 40: . 41: . 42: . 43: . 44: . 45: . 46: . 47: .

```

```

Port Traffic: L3 Asic Loopback ...
 0: . 1: . 2: . 3: . 4: . 5: . 6: . 7: . 8: . 9: . 10: . 11: .
12: . 13: . 14: . 15: . 16: . 17: . 18: . 19: . 20: . 21: . 22: . 23: .
24: . 25: . 26: . 27: . 28: . 29: . 30: . 31: . 32: . 33: . 34: . 35: .
36: . 37: . 38: . 39: . 40: . 41: . 42: . 43: . 44: . 45: . 46: . 47: .

```

```

Switch Subsystem Memory ...
 1: . 2: . 3: . 4: . 5: . 6: . 7: . 8: . 9: . 10: . 11: . 12: .
13: . 14: . 15: . 16: . 17: . 18: . 19: . 20: . 21: . 22: . 23: . 24: .
25: . 26: . 27: . 28: . 29: . 30: . 31: . 32: . 33: . 34: . 35: . 36: .
37: . 38: . 39: . 40: . 41: . 42: . 43: . 44: . 45: . 46: . 47: . 48: .
49: . 50: . 51: . 52: . 53: . 54: . 55: .

```

Module 2 Passed

---

```

2) packet-memory-bootup -----> U

Error code -----> 0 (DIAG_SUCCESS)
Total run count -----> 0
Last test execution time -----> n/a
First test failure time -----> n/a
Last test failure time -----> n/a
Last test pass time -----> n/a
Total failure count -----> 0
Consecutive failure count -----> 0
packet buffers on free list: 64557 bad: 0 used for ongoing tests: 979

```

Exhaustive packet memory tests did not run at bootup.  
 Bootup test results:5  
 No errors.

---

```

3) packet-memory-ongoing -----> U

Error code -----> 0 (DIAG_SUCCESS)
Total run count -----> 0
Last test execution time -----> n/a
First test failure time -----> n/a
Last test failure time -----> n/a
Last test pass time -----> n/a
Total failure count -----> 0
Consecutive failure count -----> 0
packet buffers on free list: 64557 bad: 0 used for ongoing tests: 979

```

```

Packet memory errors: 0 0
Current alert level: green
Per 5 seconds in the last minute:
  0 0 0 0 0 0 0 0 0 0
  0 0
Per minute in the last hour:
  0 0 0 0 0 0 0 0 0 0
  0 0 0 0 0 0 0 0 0 0
  0 0 0 0 0 0 0 0 0 0
  0 0 0 0 0 0 0 0 0 0
  0 0 0 0 0 0 0 0 0 0
  0 0 0 0 0 0 0 0 0 0
Per hour in the last day:
  0 0 0 0 0 0 0 0 0 0
  0 0 0 0 0 0 0 0 0 0
  0 0 0 0
Per day in the last 30 days:
  0 0 0 0 0 0 0 0 0 0
  0 0 0 0 0 0 0 0 0 0
  0 0 0 0 0 0 0 0 0 0
Direct memory test failures per minute in the last hour:
  0 0 0 0 0 0 0 0 0 0
  0 0 0 0 0 0 0 0 0 0
  0 0 0 0 0 0 0 0 0 0
  0 0 0 0 0 0 0 0 0 0
  0 0 0 0 0 0 0 0 0 0
  0 0 0 0 0 0 0 0 0 0
Potential false positives: 0 0
  Ignored because of rx errors: 0 0
  Ignored because of cdm fifo overrun: 0 0
  Ignored because of oir: 0 0
  Ignored because isl frames received: 0 0
  Ignored during boot: 0 0
  Ignored after writing hw stats: 0 0
  Ignored on high gigaport: 0
Ongoing diag action mode: Normal
Last 1000 Memory Test Failures:
Last 1000 Packet Memory errors:
First 1000 Packet Memory errors:

```

---

Switch#

The following example shows the output for a WS-X45-SUP6-E supervisor engine:

Switch# **show diagnostic result module 3 detail**

module 3: SerialNo : XXXXXXXXXXXX

Overall diagnostic result: PASS

Test results: (. = Pass, F = Fail, U = Untested)

---

```

1) supervisor-bootup ----->
   Error code -----> 0 (DIAG_SUCCESS)
   Total run count -----> 1
   Last test execution time ----> Oct 01 2007 17:37:04
   First test failure time ----> n/a
   Last test failure time -----> n/a
   Last test pass time -----> Oct 01 2007 17:37:04

```

```

Total failure count -----> 0
Consecutive failure count ---> 0
Power-On-Self-Test Results for ACTIVE Supervisor
prod: WS-X45-SUP6-E part: XXXXXXXXXX serial: XXXXXXXXXX
Power-on-self-test for Module 3: WS-X45-SUP6-E
Test Status: (. = Pass, F = Fail, U = Untested)

```

```

CPU Subsystem Tests ...
  seeprom: Pass

```

```

Traffic: L3 Loopback ...
  Test Results: Pass

```

```

Traffic: L2 Loopback ...
  Test Results: Pass

```

```

Switching Subsystem Memory ...
  Packet Memory Test Results: Pass

```

```

Module 3 Passed

```

```

2) linecard-online-diag ----->
   Error code -----> 0 (DIAG_SUCCESS)
   Total run count -----> 1
   Last test execution time ----> Oct 01 2007 17:37:04
   First test failure time ----> n/a
   Last test failure time ----> n/a
   Last test pass time -----> Oct 01 2007 17:37:04
   Total failure count -----> 0
   Consecutive failure count ---> 0

```

Slot	Ports	Card Type	Diag Status	Diag Details
3	6	Sup 6-E 10GE (X2), 1000BaseX (SFP)	Skipped	Packet memory

```

Detailed Status
-----

```

```

. = Pass                U = Unknown
L = Loopback failure    S = Stub failure
P = Port failure
E = SEEPROM failure     G = GBIC integrity check failure

```

```

Ports 1  2  3  4  5  6
       .  .  .  .  .  .

```

```

Switch#

```

## Power-On Self-Test Results for Supervisor Engine V-10GE

For the Supervisor Engine V-10GE (WS-X4516-10GE), POST tests extra redundancy features on the 10-Gigabit ports.

The following topics are discussed:

- [POST on the Active Supervisor Engine, page 59-14](#)
- [Sample POST Results on an Active Supervisor Engine, page 59-14](#)
- [POST on a Standby Supervisor Engine, page 59-16](#)
- [Sample Display of the POST on a Standby Supervisor Engine, page 59-17](#)

## POST on the Active Supervisor Engine

The active supervisor engine tests the remote redundant 10-Gigabit ports on the standby supervisor engine if it is present when the active supervisor engine is booting. The status of the port is displayed as “Remote TenGigabit Port Status.” If no standby supervisor engine is present, the remote port status is always displayed as Untested. This situation persists even after a new standby supervisor engine is inserted. The remaining tests are conducted using only the Gigabit ports’ configuration.

After the active supervisor engine has completed the bootup diagnostics, if the standby supervisor engine is now removed, the remote port status is changed to Untested in the overall diagnostic results.

## Sample POST Results on an Active Supervisor Engine

```
Switch# show diagnostic result module 1 detail

module 1:

Overall diagnostic result: PASS

Test results: (. = Pass, F = Fail, U = Untested)

-----

1) supervisor-bootup -----> .

Error code -----> 0 (DIAG_SUCCESS)
Total run count -----> 1
Last test execution time -----> Jul 19 2005 13:28:16
First test failure time -----> n/a
Last test failure time -----> n/a
Last test pass time -----> Jul 19 2005 13:28:16
Total failure count -----> 0
Consecutive failure count -----> 0

Power-On-Self-Test Results for ACTIVE Supervisor

Power-on-self-test for Module 1: WS-X4516-10GE
Port/Test Status: (. = Pass, F = Fail, U = Untested)
Reset Reason: Software/User

Cpu Subsystem Tests ...
seeprom: . temperature_sensor: . eobc: .

Port Traffic: L3 Serdes Loopback ...
0: . 1: . 2: . 3: . 4: . 5: . 6: . 7: . 8: . 9: . 10: . 11: .
12: . 13: . 14: . 15: . 16: . 17: . 18: . 19: . 20: . 21: . 22: . 23: .
24: . 25: . 26: . 27: . 28: . 29: . 30: . 31: . 32: . 33: . 34: . 35: .
36: . 37: . 38: . 39: . 40: . 41: . 42: . 43: . 44: . 45: . 46: . 47: .

Local 10GE Port 62: .

Local 10GE Port 63: .
```

```
Port Traffic: L2 Serdes Loopback ...
 0: . 1: . 2: . 3: . 4: . 5: . 6: . 7: . 8: . 9: . 10: . 11: .
12: . 13: . 14: . 15: . 16: . 17: . 18: . 19: . 20: . 21: . 22: . 23: .
24: . 25: . 26: . 27: . 28: . 29: . 30: . 31: . 32: . 33: . 34: . 35: .
36: . 37: . 38: . 39: . 40: . 41: . 42: . 43: . 44: . 45: . 46: . 47: .
48: . 49: . 50: . 51: .
```

```
Port Traffic: L2 Asic Loopback ...
 0: . 1: . 2: . 3: . 4: . 5: . 6: . 7: . 8: . 9: . 10: . 11: .
12: . 13: . 14: . 15: . 16: . 17: . 18: . 19: . 20: . 21: . 22: . 23: .
24: . 25: . 26: . 27: . 28: . 29: . 30: . 31: . 32: . 33: . 34: . 35: .
36: . 37: . 38: . 39: . 40: . 41: . 42: . 43: . 44: . 45: . 46: . 47: .
48: . 49: . 50: . 51: .
```

```
Switch Subsystem Memory ...
 1: . 2: . 3: . 4: . 5: . 6: . 7: . 8: . 9: . 10: . 11: . 12: .
13: . 14: . 15: . 16: . 17: . 18: . 19: . 20: . 21: . 22: . 23: . 24: .
25: . 26: . 27: . 28: . 29: . 30: . 31: . 32: . 33: . 34: . 35: . 36: .
37: . 38: . 39: . 40: . 41: . 42: . 43: . 44: . 45: . 46: . 47: . 48: .
49: . 50: . 51: .
```

```
Netflow Services Feature ...
se: . cf: . 52: . 53: . 54: . 55: . 56: . 57: . 58: . 59: . 60: . 61: .
62: . 63: . 64: . 65: .
```

Module 1 Passed

Remote TenGigabitPort status: Passed

---

```
2) packet-memory-bootup -----> U

Error code -----> 0 (DIAG_SUCCESS)
Total run count -----> 0
Last test execution time -----> n/a
First test failure time -----> n/a
Last test failure time -----> n/a
Last test pass time -----> n/a
Total failure count -----> 0
Consecutive failure count -----> 0
packet buffers on free list: 64557 bad: 0 used for ongoing tests: 979
```

```
Exhaustive packet memory tests did not run at bootup.
Bootup test results:5
No errors.
```

---

```
3) packet-memory-ongoing -----> U

Error code -----> 0 (DIAG_SUCCESS)
Total run count -----> 0
Last test execution time -----> n/a
First test failure time -----> n/a
Last test failure time -----> n/a
Last test pass time -----> n/a
```

```

Total failure count -----> 0
Consecutive failure count -----> 0
packet buffers on free list: 64557 bad: 0 used for ongoing tests: 979

```

```

Packet memory errors: 0 0
Current alert level: green
Per 5 seconds in the last minute:
  0 0 0 0 0 0 0 0 0 0
  0 0
Per minute in the last hour:
  0 0 0 0 0 0 0 0 0 0
  0 0 0 0 0 0 0 0 0 0
  0 0 0 0 0 0 0 0 0 0
  0 0 0 0 0 0 0 0 0 0
  0 0 0 0 0 0 0 0 0 0
  0 0 0 0 0 0 0 0 0 0
Per hour in the last day:
  0 0 0 0 0 0 0 0 0 0
  0 0 0 0 0 0 0 0 0 0
  0 0 0 0
Per day in the last 30 days:
  0 0 0 0 0 0 0 0 0 0
  0 0 0 0 0 0 0 0 0 0
  0 0 0 0 0 0 0 0 0 0
Direct memory test failures per minute in the last hour:
  0 0 0 0 0 0 0 0 0 0
  0 0 0 0 0 0 0 0 0 0
  0 0 0 0 0 0 0 0 0 0
  0 0 0 0 0 0 0 0 0 0
  0 0 0 0 0 0 0 0 0 0
  0 0 0 0 0 0 0 0 0 0
Potential false positives: 0 0
  Ignored because of rx errors: 0 0
  Ignored because of cdm fifo overrun: 0 0
  Ignored because of oir: 0 0
  Ignored because isl frames received: 0 0
  Ignored during boot: 0 0
  Ignored after writing hw stats: 0 0
  Ignored on high gigaport: 0
Ongoing diag action mode: Normal
Last 1000 Memory Test Failures:
Last 1000 Packet Memory errors:
First 1000 Packet Memory errors:

```

---

Switch#

## POST on a Standby Supervisor Engine

Ports 62 and 63 of the supervisor engine always remain Untested (U). Because the standby supervisor engine never tests the remote 10-Gigabit port on the active supervisor engine, the remote 10-Gigabit port status on the standby supervisor engine is always Untested. The supervisor engine performs the remaining tests using the Gigabit ports' configuration.



### Note

On a redundant chassis, concurrent POST is supported on supervisor engines that are already inserted. However, if a second supervisor engine is inserted while the first one is loading, you might boot the first supervisor engine in a faulty IOS state (POST will abort and some of the POST's tests will be bypassed).



This situation only happens during concurrent bootup of the supervisor engines. You should not insert any additional supervisor engines in the empty supervisor engine slot while an already seated supervisor engine is running POST. The POST sequence is completed when the “Exiting to ios...” message is displayed.

## Sample Display of the POST on a Standby Supervisor Engine

```
Switch# show diagnostic result module 2 detail

module 2:

Overall diagnostic result: PASS

Test results: (. = Pass, F = Fail, U = Untested)

-----

1) supervisor-bootup -----> .

Error code -----> 0 (DIAG_SUCCESS)
Total run count -----> 1
Last test execution time -----> Jul 19 2005 13:29:44
First test failure time -----> n/a
Last test failure time -----> n/a
Last test pass time -----> Jul 19 2005 13:29:44
Total failure count -----> 0
Consecutive failure count -----> 0

Power-On-Self-Test Results for ACTIVE Supervisor

Power-on-self-test for Module 2: WS-X4516-10GE
Port/Test Status: (. = Pass, F = Fail, U = Untested)
Reset Reason: OtherSupervisor Software/User

Cpu Subsystem Tests ...
seeprom: . temperature_sensor: . eobc: .

Port Traffic: L3 Serdes Loopback ...
0: . 1: . 2: . 3: . 4: . 5: . 6: . 7: . 8: . 9: . 10: . 11: .
12: . 13: . 14: . 15: . 16: . 17: . 18: . 19: . 20: . 21: . 22: . 23: .
24: . 25: . 26: . 27: . 28: . 29: . 30: . 31: . 32: . 33: . 34: . 35: .
36: . 37: . 38: . 39: . 40: . 41: . 42: . 43: . 44: . 45: . 46: . 47: .

Local 10GE Port 62: U

Local 10GE Port 63: U

Port Traffic: L2 Serdes Loopback ...
0: . 1: . 2: . 3: . 4: . 5: . 6: . 7: . 8: . 9: . 10: . 11: .
12: . 13: . 14: . 15: . 16: . 17: . 18: . 19: . 20: . 21: . 22: . 23: .
24: . 25: . 26: . 27: . 28: . 29: . 30: . 31: . 32: . 33: . 34: . 35: .
36: . 37: . 38: . 39: . 40: . 41: . 42: . 43: . 44: . 45: . 46: . 47: .
48: . 49: . 50: . 51: .
```

Port Traffic: L2 Asic Loopback ...

```
0: . 1: . 2: . 3: . 4: . 5: . 6: . 7: . 8: . 9: . 10: . 11: .
12: . 13: . 14: . 15: . 16: . 17: . 18: . 19: . 20: . 21: . 22: . 23: .
24: . 25: . 26: . 27: . 28: . 29: . 30: . 31: . 32: . 33: . 34: . 35: .
36: . 37: . 38: . 39: . 40: . 41: . 42: . 43: . 44: . 45: . 46: . 47: .
48: . 49: . 50: . 51: .
```

Switch Subsystem Memory ...

```
1: . 2: . 3: . 4: . 5: . 6: . 7: . 8: . 9: . 10: . 11: . 12: .
13: . 14: . 15: . 16: . 17: . 18: . 19: . 20: . 21: . 22: . 23: . 24: .
25: . 26: . 27: . 28: . 29: . 30: . 31: . 32: . 33: . 34: . 35: . 36: .
37: . 38: . 39: . 40: . 41: . 42: . 43: . 44: . 45: . 46: . 47: . 48: .
49: . 50: . 51: .
```

Netflow Services Feature ...

```
se: . cf: . 52: . 53: . 54: . 55: . 56: . 57: . 58: . 59: . 60: . 61: .
62: . 63: . 64: . 65: .
```

Module 2 Passed

Remote TenGigabitPort status: Untested

---

2) packet-memory-bootup -----> U

```
Error code -----> 0 (DIAG_SUCCESS)
Total run count -----> 0
Last test execution time -----> n/a
First test failure time -----> n/a
Last test failure time -----> n/a
Last test pass time -----> n/a
Total failure count -----> 0
Consecutive failure count -----> 0
```

packet buffers on free list: 64557 bad: 0 used for ongoing tests: 979

Exhaustive packet memory tests did not run at bootup.

Bootup test results:5

No errors.

---

3) packet-memory-ongoing -----> U

```
Error code -----> 0 (DIAG_SUCCESS)
Total run count -----> 0
Last test execution time -----> n/a
First test failure time -----> n/a
Last test failure time -----> n/a
Last test pass time -----> n/a
Total failure count -----> 0
Consecutive failure count -----> 0
```

packet buffers on free list: 64557 bad: 0 used for ongoing tests: 979

```

Packet memory errors: 0 0
Current alert level: green
Per 5 seconds in the last minute:
  0 0 0 0 0 0 0 0 0 0
  0 0
Per minute in the last hour:
  0 0 0 0 0 0 0 0 0 0
  0 0 0 0 0 0 0 0 0 0
  0 0 0 0 0 0 0 0 0 0
  0 0 0 0 0 0 0 0 0 0
  0 0 0 0 0 0 0 0 0 0
  0 0 0 0 0 0 0 0 0 0
Per hour in the last day:
  0 0 0 0 0 0 0 0 0 0 0
  0 0 0 0 0 0 0 0 0 0
  0 0 0 0
Per day in the last 30 days:
  0 0 0 0 0 0 0 0 0 0
  0 0 0 0 0 0 0 0 0 0
  0 0 0 0 0 0 0 0 0 0
Direct memory test failures per minute in the last hour:
  0 0 0 0 0 0 0 0 0 0
  0 0 0 0 0 0 0 0 0 0
  0 0 0 0 0 0 0 0 0 0
  0 0 0 0 0 0 0 0 0 0
  0 0 0 0 0 0 0 0 0 0
  0 0 0 0 0 0 0 0 0 0
Potential false positives: 0 0
  Ignored because of rx errors: 0 0
  Ignored because of cdm fifo overrun: 0 0
  Ignored because of oir: 0 0
  Ignored because isl frames received: 0 0
  Ignored during boot: 0 0
  Ignored after writing hw stats: 0 0
  Ignored on high gigaport: 0
Ongoing diag action mode: Normal
Last 1000 Memory Test Failures:
Last 1000 Packet Memory errors:
First 1000 Packet Memory errors:

```

---

Switch#

---

**Note**

To ensure that the maximum number of ports are tested, ensure that both supervisor engines are present on power-up.

---

## Troubleshooting the Test Failures

A failure of any of the POST tests reflects a problem with the hardware on the supervisor engine. Cisco IOS boots the supervisor engine with limited functionality, allowing the user to evaluate and display the diagnostic test results. To determine the failure cause, do one of the following:

- Evaluate whether the hardware failure is persistent by power cycling the supervisor engine to rerun the POST tests.
- Remove and reinsert the supervisor engine into the chassis to ensure that the seating is correct.

Please call the Cisco Systems customer support team for more information.

**Note**

---

On a redundant chassis, concurrent POST is supported on supervisor engines that are already inserted. However, if a second supervisor engine is inserted while the first one is loading, you might boot the first supervisor engine in a faulty Cisco IOS state (POST will abort, and some of the POST's tests will be bypassed). This situation only happens during concurrent bootup of the supervisor engines. You should not insert any additional supervisor engines in the empty supervisor engine slot while an already seated supervisor engine is running POST. The POST sequence is completed when the "Exiting to ios..." message is displayed.

---