Troubleshooting Overview

This chapter gives a brief overview of the *Cisco ONS 15530 Troubleshooting Guide* as well as a troubleshooting overview of the various areas that might require troubleshooting. This chapter includes the following sections:

Basic troubleshooting processes, such as troubleshooting Ethernet connections, that are not specific to the Cisco ONS 15530 are not described in this document. This information is found online in other troubleshooting guides such as the *Cisco IOS Internetwork Troubleshooting Guide.*

1.1 Overview

The Cisco ONS 15530 is a modular and scalable optical switching and aggregation platform designed to supplement the Cisco ONS 15540 ESP and Cisco ONS 15540 ESPx. With the Cisco ONS 15530, users can take advantage of the availability of dark fiber to build a common infrastructure that supports data, SAN (storage area network), and TDM (time-division multiplexing) traffic.

The Cisco ONS 15530 uses DWDM (dense wavelength-division multiplexing) to transport up to 32 wavelengths on a single fiber pair, and Cisco ONS 15530 systems can be stacked together for expansion and aggregation.

The Cisco ONS 15530 transports a wide variety of traffic including SONET/SDH and ATM at OC-3/STM-1, OC-12/STM-4, and OC-48/STM-16; Fast Ethernet and Gigabit Ethernet for data networking; and ESCON, Fiber Connectivity (FICON), and Fibre Channel for storage networking. Wavelengths carrying disparate traffic types can be multiplexed together onto a single fiber pair providing multiservice transport. See Figure 1-1.

Figure 1-1   Cisco ONS 15530
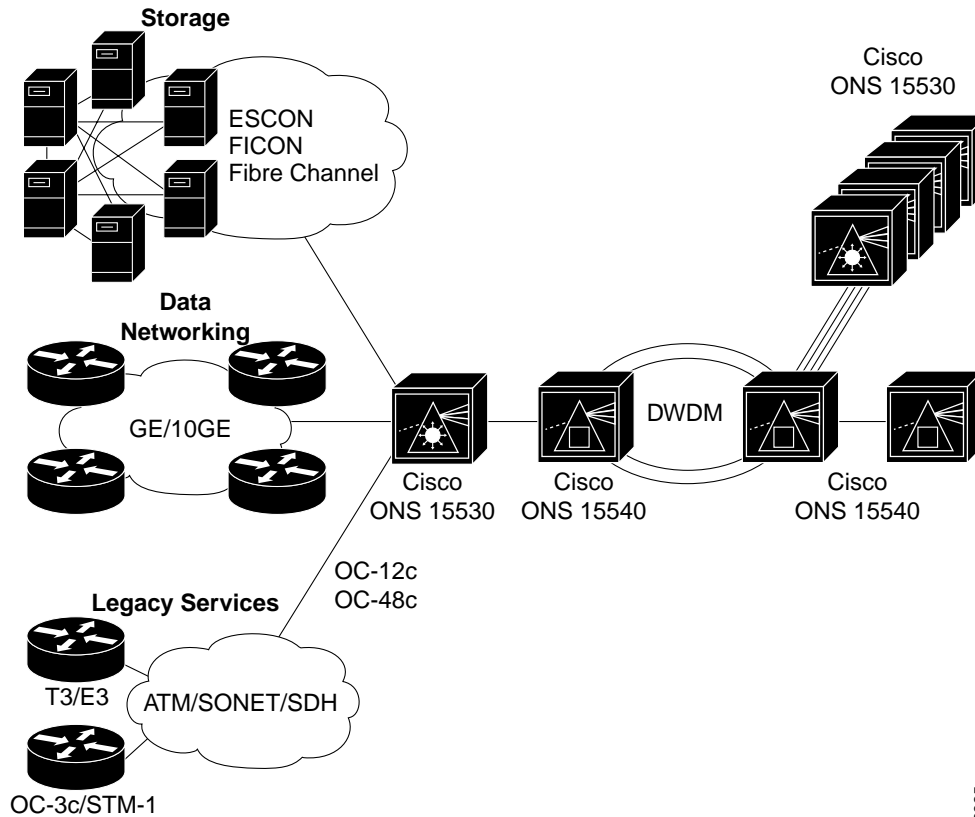
The flexibility of the Cisco ONS 15530 and the variety of applications it is used in can make troubleshooting system problems difficult. This guide provides information on basic troubleshooting, various troubleshooting tools and diagnostics available, and specific symptom related troubleshooting procedures.

The general problem solving model, your network and system information, along with the numerous troubleshooting tools presented in this chapter, take much of the difficulty out of troubleshooting the Cisco ONS 15530.

1.2 General Model of Problem Solving

When troubleshooting the Cisco ONS 15530 in a network environment, define the specific symptoms, identify all potential problems that could be causing the symptoms, and then systematically eliminate each potential problem (from most likely to least likely) until the symptoms disappear.

Figure 1-2 illustrates the general problem-solving model. This process is not a rigid outline for troubleshooting. It is a foundation on which you can build a problem-solving process for your environment.

Figure 1-2   General Model of Problem Solving

The following steps detail the problem-solving process outlined in Figure 1-2:

Step 1   Analyze the problem and create a clear problem statement. Define symptoms and potential causes.

Step 2   Gather the facts you need to help isolate possible causes.

Step 3   Consider possible causes based on the facts you gathered.

Step 4   Create an action plan based on those causes. Begin with the most likely problem and devise a plan in which you manipulate only *one* variable.

Step 5   Implement the action plan, performing each step carefully while testing to see whether the symptom disappears.

Step 6   Analyze the results to determine whether the problem is resolved.

Step 7   Terminate the process if the process is resolved.

Step 8   Create an action plan based on the next most probable cause on your list if the problem is not resolved. Return to Step 4 and repeat the process until the problem is solved.

Make sure that you undo anything you changed while implementing your action plan. Remember that you want to change only one variable at a time.

Note   If you exhaust all the common causes and actions (either those outlined in this publication or others that you have identified in your environment), contact customer service. See Appendix A, "Technical Support," for additional information.

1.3 Maintaining Network Information

Maintaining the following details about your system configuration and network helps with troubleshooting your system:

- Maintain an accurate physical and logical map of your internetwork that outlines the physical location of all of the devices on the network and how they are connected, as well as a logical map of network addresses, network numbers, and subnetworks.

- List all network protocols implemented in your network as well as a list of the network numbers, subnetworks, zones, and areas that are associated with them.

- Note which protocols are being routed and what the correct, up-to-date configuration information is for each protocol.

- Document all the points of contact to external networks, including any connections to the Internet. For each external network connection, note what routing protocol is being used.

- Document normal network behavior and performance so that you can compare current problems with a baseline.

1.4 Network and System Management

This section describes the network management tools available for the Cisco ONS 15530. CiscoWorks 2000 supports a suit of network management applications of which the following are supported on the Cisco ONS 15530:

- 1.4.1 CiscoView
- 1.4.2 CTM
- 1.4.3 DFM

1.4.1 CiscoView

CiscoView is a device management application providing dynamic status, monitoring, and configuration information for a range of Cisco internetworking products including the Cisco ONS 15530. CiscoView displays a physical view of a device chassis, with color-coding of modules and ports for at-a-glance status. Monitoring capabilities display performance and other statistics. Configuration capabilities allow changes to devices if security privileges are granted.

Cisco ONS 15530 is supported by Embedded CiscoView and server based CiscoView. Online help for CiscoView is available for the server based CiscoView.

1.4.2 CTM

CTM (Cisco Transport Manager) is the EMS (element management system) for the Cisco ONS 15530. CTM provides standard fault, configuration, performance, and security management capabilities across the element and network management layers of the TMN (Telecommunications Management Network) reference architecture. The robust client/server-based platform easily scales to manage up to 100 simultaneous client (user) sessions and up to 1000 NEs (network elements).

1.4.3 DFM

DFM (Device Fault Manager) reports faults that occur on Cisco devices, often identifying fault conditions before users of network services realize that the condition exists. DFM analysis technology differs from the traditional rules-based approach to event analysis. DFM analysis uses a top-down approach that starts by identifying the fault conditions that affect managed systems. Because the event information necessary to diagnose fault conditions is present in the analysis model, DFM monitors only the events necessary to diagnose the condition. DFM can operate as an independent management system or can integrate with existing management applications to add fault management to the functionality already in place.

1.5 Third-Party Troubleshooting Tools

In many situations, third-party troubleshooting tools can be helpful. For example, attaching an optical analyzer to a network is less intrusive than using the **debug** commands, which are CPU switch module intensive.

Here are some typical third-party tools used for troubleshooting internetworks:

- Optical cleaning kit—Keeps your optical cable connections clean. This should be in every tool kit that has anything to do with optical equipment. Several problems you encounter will typically be associated with dirty cables.

- Optical power meter—Measures the optical power coming from and going into a piece of equipment. This is the standard operating procedure for installing and troubleshooting optical equipment. Your optical power meter must be able to measure signals at 850 nm and 1310 nm.

> Note   Optical power meters need to be recalibrated once per year.

- TDR (time domain reflectometer)—Locates open circuits, short circuits, crimps, kinks, sharp bends, impedance mismatches, and other defects in metallic cables. A TDR reflects a signal off the end of the cable. Opens, shorts, and other problems reflect back the signal at different amplitudes, depending on the problem. A TDR measures the time it takes for the signal to reflect and calculates the distance to a fault in the cable. TDRs can also measure the length of a cable, and some TDRs can calculate the rate of propagation based on a configured cable length.

- OTDR (optical time domain reflector/reflectometer)—Checks end-to-end loss and detects fiber breaks, splice points in the optical fiber, and fiber attenuation. This tool is essential for initial network startup and later troubleshooting fiber breaks.

- BERT (bit error rate tester)—Tests OC-3, OC-12, and OC-48 ports for end connectivity of the wavelength if the client equipment is not yet available. BERT usually has a built-in power meter to test optical power of the circuit.

- Fiber microscope—Checks the fiber interface for dirt or anything else that could degrade the optical connection.

- Patch cables— Loops back the trunk side. You should keep an assortment of multimode and single-mode patch cables with you, including 1550 nm SM trunk side cables with MU-to-SC interfaces and SC-to-SC coupler. Use attenuators as needed.

- Fixed attenuators—Adds fixed attenuation levels to connections. Five attenuators with 5 dB at 1310 nm and five with 10 dB at 1310 nm, are a good start.

- Spectrum analyzer—Views the channel spectrum or analyzes light according to wavelength. It is useful when you suspect channel cross talk and for certifying equipment and performing periodic laser tests for stability.

- Network monitors—Tracks packets crossing a network, providing an accurate picture of network activity. Network monitors do not decode the contents of frames. They are useful for creating a baseline of normal performance. Monitors collect information such as packet sizes, the number of packets, error packets, overall usage of a connection, the number of hosts and their MAC addresses, and details about communications between hosts and other devices. This data can be used to create profiles of LAN traffic and assist in locating traffic overloads, planning for network expansion, detecting intruders, and distributing traffic more efficiently.

1.6 Using General Diagnostic Commands

You can use the **show**, **debug**, **ping**, and **traceroute** commands to monitor and troubleshoot your internetwork.

1.6.1 show Commands

You can use the **show** commands to perform many functions such as the following:

- Monitors the behavior of your Cisco ONS 15530 during initial installation

- Monitors normal network operation

- Isolates problem interfaces, nodes, media, or applications

- Determines when a network is congested

- Determines the status of servers, clients, or other neighbors

Table 1-1 lists some of the most commonly used **show** commands:

Table 1-1   Useful Diagnostic Commands

Command	Purpose
show interfaces *interface*	Displays statistics for the interfaces.
show controllers *interface*	Displays statistics for CPU switch module interface controllers.
show running-config	Displays the currently running configuration.
show startup-config	Displays the configuration stored in NVRAM (nonvolatile RAM).
show flash	Displays the layout and content of Flash memory.
show buffers	Displays statistics for the buffer pools on the Cisco ONS 15530.
show memory	Shows statistics about the Cisco ONS 15530 memory, including free pool statistics.
show processes	Displays information about the active processes on the Cisco ONS 15530.

Table 1-1   Useful Diagnostic Commands (continued)

Command	Purpose
show stacks	Displays information about the stack utilization of processes and interrupt routines, and the reason for the last system reboot.
show version	Displays the configuration of the system hardware, the software version, the names and sources of configuration files, and the boot images.

For more information about **show** commands, refer to the *Cisco ONS 15530 Command Reference* and the *Cisco IOS Configuration Fundamentals Command Reference* publication.

1.6.2 debug Commands

The **debug** privileged EXEC commands provide information about the traffic on (or *not* seen) on an interface, error messages generated by nodes on the network, protocol-specific diagnostic packets and cells, and other useful troubleshooting data.

⚠
Caution   Be careful when using **debug** commands. Many of these commands are CPU switch module intensive and can cause serious network problems (such as degraded performance or loss of connectivity) if they are enabled on an already heavily loaded system. When you finish using a **debug** command, remember to disable it with its specific **no debug** command (or use the **no debug all** command to turn off all debugging).

In many situations, third-party diagnostic tools can be more useful and less intrusive than using **debug** commands. See the "1.5 Third-Party Troubleshooting Tools" section on page 1-5.

1.6.3 ping Command

To check host reachability and network connectivity, use the **ping** user EXEC or privileged EXEC command. This command can be used to confirm basic network connectivity on IP networks.

For IP, the **ping** command sends ICMP (Internet Control Message Protocol) echo messages. If a station receives an ICMP echo message, it sends an ICMP echo reply message back to the source.

Using the extended command mode of the **ping** privileged EXEC command, you can specify the supported IP header options, which allow the Cisco ONS 15530 to perform a more extensive range of test options. To enter **ping** extended command mode, enter the **ping** command at the command prompt followed by a return.

To see how the command works under normal conditions, use the **ping** command when the network is functioning properly. When you are troubleshooting, you can then see the difference between normal and abnormal operation.

For detailed information about using the **ping** and extended **ping** commands, refer to the *Cisco IOS Configuration Fundamentals Command Reference* publication.

1.6.4 traceroute Command

The **traceroute** user EXEC command discovers the routes packets follow when traveling to their destinations. With the **traceroute** privileged EXEC command, the supported IP header options are specified, and the Cisco ONS 15530 can perform a more extensive range of test options.

The **traceroute** command works by using the error message generated by a Cisco ONS 15530 when a datagram exceeds its TTL (Time-To-Live) value. First, probe datagrams are sent with a TTL value of one. This causes the first Cisco ONS 15530 to discard the probe datagrams and send back `time exceeded` error messages. The **traceroute** command then sends several probes, and displays the round-trip time for each. After every third probe, the TTL increases by one.

Each outgoing packet can result in one of two error messages. A `time exceeded` error message indicates that an intermediate Cisco ONS 15530 has seen and discarded the probe. A `port unreachable` error message indicates that the destination node has received the probe and discarded it because it could not deliver the packet to an application. If the timer goes off before a response comes in, the **traceroute** command displays an asterisk (*).

The **traceroute** command terminates when the destination responds, when the maximum TTL is exceeded, or when the user interrupts the **traceroute** command with the escape sequence.

To see how the command works under normal conditions, use the **traceroute** command when the network is functioning properly. When you are troubleshooting, you can then see the difference between normal and abnormal operation.

For detailed information about using the **traceroute** command, refer to the *Cisco ONS 15530 Configuration Guide*. For additional information on using **debug** commands refer to the *Cisco IOS Debug Command Reference.*

1.7 Online Diagnostics

This section describes the online diagnostics available for troubleshooting your Cisco ONS 15530. Online diagnostics provide the following types of tests:

*   Accessibility tests between the CPU switch module and the modules.
*   OIR (online insertion and removal) diagnostic tests.

The Cisco ONS 15530 displays an error message on the console when it detects a hardware failure or problem.

Note   Online diagnostic tests only run on the active CPU switch module.

1.7.1 Accessibility Test

The accessibility tests ensure connectivity, at a configurable interval, between the following:

*   OADM modules
*   Transponder line cards
*   Carrier motherboards
*   Active CPU switch module
*   Standby CPU switch module, if it is present

- 2.5-Gbps ITU trunk cards
- 10-Gbps ITU trunk cards
- 10-Gbps ITU tunable trunk cards
- 10-Gbps uplink cards
- ESCON aggregation cards
- 8-port FC/GE aggregation cards

1.7.2 OIR Test

OIR tests check the functioning of the CPU switch module and interfaces on a per-port basis. The CPU switch module performs these tests when the system boots up and when you insert a module or motherboard into a slot. The OIR test sends a packet to the interface loopback and expects to receive it within a certain time period. If the packet does not reach the port within the expected time period, or the received packet is corrupted, an error is registered and the port is changed to an administratively down state. Packets that are 1000 bytes in size are used in the test.

1.8 Configuring Online Diagnostics

To configure online diagnostics, use the following global configuration commands:

Command	Purpose
[**no**] **diag online**	Enables or disables online diagnostic tests on all components on the shelf.
[**no**] **diag online slot** *slot*	Enables or disables online diagnostic tests only on the components in a chassis slot.
[**no**] **diag online subslot** *slot/subcard*	Enables or disables online diagnostic tests only on the components in a chassis subslot.
[**no**] **debug diag online** [**background** | **online-insertion-removal** | **redundancy**]	Enables debugging of online diagnostic tests.

Examples

The following example shows how to enable all online diagnostic tests:

```
Switch# diag online
```

The following example shows how to enable online diagnostic tests for the components in slot 3:

```
Switch# diag online slot 3
```

The following example shows how to enable debugging for online diagnostics:

```
Switch# debug diag online
```

1.8.1 Displaying the Online Diagnostics Configuration and Results

To display the online diagnostics configuration and results, use the following EXEC command:

Command	Purpose
show diag online [[**detail**	**oir**]| **slot** *slot*]	Displays information about the online diagnostic tests and the test results.

Example

The following example shows how to display detailed access test information:

```
Switch# show diag online
---------------------------------------------------
Online Diagnostics Current Summary Information
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
On ACTIVE CPU card Slot: 5
CPU Uptime: 1d02h

 Slot        CardType        Enabled     Bootup/     Periodic     Previous
                                         Insertion   Background   Failures
                                         tests       tests

 ~~~~~~   ~~~~~~~~~~~~~~     ~~~~~~~   ~~~~~~~~~   ~~~~~~~~~~~   ~~~~~~~~
 0/ 0/* PROTO-HAMPTONS-MUX    Yes  Disabled       Pass          No
 0/ 1/* PROTO-HAMPTONS-MUX    Yes  Disabled       Pass          No
 5/*/*        15530-CPU=      Yes  Disabled       Pass          No
 6/*/*        15530-CPU=      Yes  Disabled       Pass          No
```

Example

The following example shows how to display diagnostic test status and details:

```
Switch# show diag online details

-----------------------------------------------------
Online Diagnostics was DISABLED at 0 minutes
This information is the LAST status before disabling
Specific Slots maybe configured as enabled
-----------------------------------------------------

Online Diagnostics Detailed Information
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
On ACTIVE CPU card Slot: 5
CPU Uptime:    1 day, 1 hour, 8 minutes

_____

Slot[0]

Online Insertion Tests
 Slot        CardType        TestType    Status    LastRunTime   LastFailTime
 ~~~~~~   ~~~~~~~~~~~~~~     ~~~~~~~~~   ~~~~~~   ~~~~~~~~~~~   ~~~~~~~~~~~~~~
 0/ 0/* PROTO-HAMPTONS-MUX   idpromAcc  Disabled          nev           nev
 0/ 1/* PROTO-HAMPTONS-MUX   idpromAcc  Disabled          nev           nev

Online Background Tests
 Slot        CardType        TestType    Status    LastRunTime   LastFailTime
 ~~~~~~   ~~~~~~~~~~~~~~     ~~~~~~~~~   ~~~~~~   ~~~~~~~~~~~   ~~~~~~~~~~~~~~
 0/ 0/* PROTO-HAMPTONS-MUX   idpromAcc  Disabled          nev           nev
 0/ 1/* PROTO-HAMPTONS-MUX   idpromAcc  Disabled          nev           nev
```

```
_____
Slot[5]

Online Insertion Tests
 Slot          CardType         TestType      Status    LastRunTime    LastFailTime
 ~~~~~~    ~~~~~~~~~~~~~~~    ~~~~~~~~~    ~~~~~~    ~~~~~~~~~~~    ~~~~~~~~~~~~~
 5/*/*         15530-CPU=     srcStatus   Disabled          nev            nev
                             IdpromAcc   Disabled

Online Background Tests
 Slot          CardType         TestType      Status    LastRunTime    LastFailTime
 ~~~~~~    ~~~~~~~~~~~~~~~    ~~~~~~~~~    ~~~~~~    ~~~~~~~~~~~    ~~~~~~~~~~~~~
 5/*/*         15530-CPU=     srcStatus   Disabled          nev            nev
                             IdpromAcc   Disabled
_____
Slot[6]
Online Insertion Tests
 Slot          CardType         TestType      Status    LastRunTime    LastFailTime
 ~~~~~~    ~~~~~~~~~~~~~~~    ~~~~~~~~~    ~~~~~~    ~~~~~~~~~~~    ~~~~~~~~~~~~~
 6/*/*         15530-CPU=     srcStatus   Disabled          nev            nev
                             IdpromAcc   Disabled

Online Background Tests
 Slot          CardType         TestType      Status    LastRunTime    LastFailTime
 ~~~~~~    ~~~~~~~~~~~~~~~    ~~~~~~~~~    ~~~~~~    ~~~~~~~~~~~    ~~~~~~~~~~~~~
 6/*/*         15530-CPU=     srcStatus   Disabled          nev            nev
                             IdpromAcc   Disabled
```

1.9 Power-On Diagnostics

Power-on diagnostics test the accessibility and basic functionality of the components and isolates the faults to FRU level on the Cisco ONS15530. All power-on diagnostic tests are enabled by default. All power-on diagnostic tests can be disabled and monitored by using the following commands.

Note   All the power-on diagnostic tests will be run from the primary CPU switch module. Only CPU switch module related and basic line card access tests are done from the secondary CPU switch module . Power-on diagnostic test results will be displayed for the cards which are present at the time of system bootup. Any removal or insertion of cards will not change the output of this command.

1.9.1 Configuring Power-On Diagnostics

All power-on diagnostic tests are enabled by default. To enable the power-on diagnostic tests, use the following global configuration commands in configuration mode, use the **no** form of the command to disable the power-on diagnostic tests:

Command	Purpose
[**no**] **diag power-on**	Enables or disables power-on diagnostic tests on all components on the shelf.
[**no**] **diag power-on 2gfc**	Enables or disables power-on diagnostic tests for 4-port 1-Gbps/2-Gbps FC aggregation cards.

Command	Purpose
[no] **diag power-on carrier-mb** *slot-number*	Enables or disables power-on diagnostic tests for carrier motherboards.
[no] **diag power-on cpu**	Enables or disables power-on diagnostic tests for CPU switch modules.
[no] **diag power-on escon-10p**	Enables or disables power-on diagnostic tests for the 10-port ESCON multiplexing line card.
[no] **diag power-on fcge-8p**	Enables or disables power-on diagnostic tests for the 8-port FC/GE aggregation card.
[no] **diag power-on itu2**	Enables or disables power-on diagnostic tests for the 10-Gbps ITU trunk card.
[no] **diag power-on itu2-tun**	Enables or disables power-on diagnostic tests for the 10-Gbps ITU tunable trunk card.
[no] **diag power-on itu3**	Enables or disables power-on diagnostic tests for the 2.5-Gbps ITU trunk card.
[no] **diag power-on mdx idprom subslot**	Enables or disables power-on diagnostic tests for the OADM modules.
[no] **diag power-on oscm**	Enables or disables power-on diagnostic tests for the OSC modules.
[no] **diag power-on psm**	Enables or disables power-on diagnostic tests for the PSM.
[no] **diag power-on tsp1**	Enables or disables power-on diagnostic tests for the transponder line cards.
[no] **diag power-on voa**	Enables or disables power-on diagnostic tests for the VOA modules.
show diag power-on	Displays the power-on diagnostic tests results for the entire system or a specific slot.

Example

The following example shows how to enable all power-on diagnostic tests:

```
Switch(config)# diag power-on
```

Refer to the *Cisco ONS 15530 Command Reference* for more information on the power-on diagnostic commands.

1.9.2 Displaying the Power-On Diagnostic Test Results

To display the power-on diagnostic test results, use the following EXEC command:

Command	Purpose
show diag power-on	Displays the summarized power-on diagnostic results.

Command	Purpose
show diag power-on detail	Displays the results of the power-on diagnostic tests for the entire system.
show diag power-on slot [*slot*]	Displays the results of the power-on diagnostic tests for the specified slot.

Example

The following example shows how to display the summarized power-on diagnostic results.

```
Switch# show diag power-on
--------------------------------------------------------------------------------
                     Power-on Diagnostics: Version 1.0
System-wide result: PASSED
Ran on: Mon Mar 13 2000       At: 03:45:13 UTC            CPU was: Primary
--------------------------------------------------------------------------------

Slot/Subslot    Card-type        Result
~~~~~~~~~~~~    ~~~~~~~~~        ~~~~~~
    0/1          mdx             Passed
    1/*          tsp1            Passed
    3/*          itu2            Passed
    4/*          tsp1            Passed
    6/*          cpu             Passed
    7/*          tsp1            Passed
    8/*          carrier-mb      Passed
    8/0          oscm            Passed
    8/1          oscm            Passed
    9/*          escon-10p       Passed
   10/*          tsp1            Passed
```

Example

The following example shows how to display detailed access test information:

```
Switch# show diag power-on detail

--------------------------------------------------------------------------------
                     Power-on Diagnostics: Version 1.0
System-wide result: FAILED
Ran on: Mon Mar 13 2000       At: 03:45:13 UTC            CPU was: Primary
--------------------------------------------------------------------------------
Subslot: 0/1       mdx                                  Result: Passed
H/w Ver: 1.0       FPGA func ver: N/A        Versions compatible: N/A

Test-name              Result        Cause-code
~~~~~~~~~              ~~~~~~        ~~~~~~~~~~
idprom                 Passed          -
--------------------------------------------------------------------------------
   Slot: 1/*        tsp1                                 Result: Passed
H/w Ver: 5.10      FPGA func ver: 3.12       Versions compatible: Yes

Test-name              Result        Cause-code
~~~~~~~~~              ~~~~~~        ~~~~~~~~~~
jtag-access            Passed          -
lrc-access             Passed          -
backplane-eth-lb       Passed          -
aps-msg-int-bus        Passed          -
hudjr-access           Passed          -
hudjr-ingress-inter    Passed          -
hudjr-ingress-serde    Passed          -
hudjr-egress-intern    Passed          -
```

```
hudjr-egress-serdes    Passed       -
-------------------------------------------------------------------------------
Slot: 3/*         itu2                                   Result: Passed
H/w Ver: 4.9      FPGA func ver: 2.31      Versions compatible: Yes

Test-name               Result      Cause-code
~~~~~~~~~               ~~~~~~      ~~~~~~~~~~
jtag-access             Passed       -
lrc-access              Passed       -
backplane-eth-lb        Passed       -
aps-msg-int-bus         Passed       -
component-access        Passed       -
sii-memory              Passed       -
qphy-fabric-lb          Passed       -
om-fifo                 Passed       -
-------------------------------------------------------------------------------
   Slot: 4/*         tsp1                                Result: Passed
H/w Ver: 5.8      FPGA func ver: 3.12      Versions compatible: Yes

Test-name               Result      Cause-code
~~~~~~~~~               ~~~~~~      ~~~~~~~~~~
jtag-access             Passed       -
lrc-access              Passed       -
backplane-eth-lb        Passed       -
aps-msg-int-bus         Passed       -
hudjr-access            Passed       -
hudjr-ingress-inter     Passed       -
hudjr-ingress-serde     Passed       -
hudjr-egress-intern     Passed       -
hudjr-egress-serdes     Passed       -
-------------------------------------------------------------------------------
Slot: 6/*         cpu                                    Result: FAILED
H/w Ver: 4.6      FPGA func ver: 1.43      Versions compatible: Yes

Test-name               Result      Cause-code
~~~~~~~~~               ~~~~~~      ~~~~~~~~~~
cpu-l1-cache            Passed       -
cpu-l2-cache            Passed       -
gt-pci0                 Passed       -
iofpga-access           Passed       -
nvram                   Passed       -
system-tod              Passed       -
bootflash               Passed       -
src-access              Passed       -
src-timer               Passed       -
sw-fabric-config        Passed       -
bcom-sw-access          Passed       -
bcom-sw-config          Passed       -
gt-mii0-internal-lb     Passed       -
gt-mii1-internal-lb     Passed       -
gt-mpsc-internal-lb     Passed       -
bp-idprom-test          FAILED       1
power-supply0           FAILED       3
power-supply1           Passed       -
temp-sensor             Passed       -
gt-interrupt            Passed       -
interrupt0              Passed       -
interrupt2              Passed       -
interrupt3              Passed       -
interrupt7              Passed       -
interrupt8              Passed       -
-------------------------------------------------------------------------------
   Slot: 7/*         tsp1                                Result: Passed
H/w Ver: 5.8      FPGA func ver: 3.12      Versions compatible: Yes
```

```
Test-name              Result      Cause-code
~~~~~~~~~              ~~~~~~      ~~~~~~~~~~
jtag-access            Passed       -
lrc-access             Passed       -
backplane-eth-lb       Passed       -
aps-msg-int-bus        Passed       -
hudjr-access           Passed       -
hudjr-ingress-inter    Passed       -
hudjr-ingress-serde    Passed       -
hudjr-egress-intern    Passed       -
hudjr-egress-serdes    Passed       -
--------------------------------------------------------------------------------
   Slot: 8/*        carrier-mb                             Result: Passed
H/w Ver: 4.2        FPGA func ver: 1.37      Versions compatible: Yes

Test-name              Result      Cause-code
~~~~~~~~~              ~~~~~~      ~~~~~~~~~~
jtag-access            Passed       -
lrc-access             Passed       -
backplane-eth-lb       Passed       -
aps-msg-int-bus        Passed       -
--------------------------------------------------------------------------------
Subslot: 8/0         oscm                                  Result: Passed

Test-name              Result      Cause-code
~~~~~~~~~              ~~~~~~      ~~~~~~~~~~
hudjr-access           Passed       -
idprom                 Passed       -
hudjr-internal-lb      Passed       -
serdes-lb              Passed       -
--------------------------------------------------------------------------------
Subslot: 8/1         oscm                                  Result: Passed

Test-name              Result      Cause-code
~~~~~~~~~              ~~~~~~      ~~~~~~~~~~
hudjr-access           Passed       -
idprom                 Passed       -
hudjr-internal-lb      Passed       -
serdes-lb              Passed       -
--------------------------------------------------------------------------------
   Slot: 9/*        escon-10p                              Result: Passed
H/w Ver: 3.4        FPGA func ver: 2.36      Versions compatible: Yes

Test-name              Result      Cause-code
~~~~~~~~~              ~~~~~~      ~~~~~~~~~~
jtag-access            Passed       -
lrc-access             Passed       -
backplane-eth-lb       Passed       -
aps-msg-int-bus        Passed       -
component-access       Passed       -
encap-lb               Passed       -
qphy-lb                Passed       -
fabric-lb              Passed       -
--------------------------------------------------------------------------------
   Slot: 10/*       tsp1                                   Result: Passed
H/w Ver: 5.9        FPGA func ver: 3.12      Versions compatible: Yes

Test-name              Result      Cause-code
~~~~~~~~~              ~~~~~~      ~~~~~~~~~~
jtag-access            Passed       -
lrc-access             Passed       -
backplane-eth-lb       Passed       -
aps-msg-int-bus        Passed       -
```

```
hudjr-access            Passed        -
hudjr-ingress-inter     Passed        -
hudjr-ingress-serde     Passed        -
hudjr-egress-intern     Passed        -
hudjr-egress-serdes     Passed        -
-------------------------------------------------------------------------------
```

Example

The following example shows how to display detailed test information for a specific slot:

```
Switch# show diag power-on slot 5
Power-on Diagnostics:Version 1.0
System-wide result:Passed
Ran on:Fri Dec 13 2002      At:22:29:11 UTC              CPU was:Primary
-------------------------------------------------------------------------------
    Slot:5/*         cpu                                    Result:
Passed
H/w Ver:6.1        FPGA func ver:1.43          Versions compatible:Yes

Test-name              Result        Cause-code
~~~~~~~~               ~~~~~~        ~~~~~~~~~~
cpu-l1-cache           Passed        -
cpu-l2-cache           Passed        -
gt-pci0                Passed        -
iofpga-access          Passed        -
nvram                  Passed        -
system-tod             Passed        -
bootflash              Passed        -
src-access             Passed        -
src-timer              Passed        -
sw-fabric-config       Passed        -
bcom-sw-access         Passed        -
bcom-sw-config         Passed        -
gt-mii0-internal-lb    Passed        -
gt-mii1-internal-lb    Passed        -
gt-mpsc-internal-lb    Passed        -
bp-idprom-test         Passed        -
power-supply0          Passed        -
power-supply1          N/A           -
temp-sensor            Passed        -
gt-interrupt           Passed        -
interrupt0             Passed        -
interrupt2             Passed        -
interrupt3             Passed        -
interrupt7             Passed        -
interrupt8             Passed        -
-------------------------------------------------------------------------------
```

1.10 Checking Release Notes for Workarounds

There are two methods you can use to check for Cisco IOS software bugs (defect tracking tool numbers [DDTs]) in your version of the Cisco IOS software. You can use the Bug Navigator II or check the release notes. Often, your problems with the Cisco ONS 15530 have been fixed or a workaround has been determined in a more recent version of software.

1.10.1 Using Bug Toolkit

Bug Toolkit is a tool to search for known bugs based on software version, feature set, and keywords. The resulting matrix shows when each bug was integrated, or fixed if applicable.

You can access Bug Navigator II on the World Wide Web at http://www.cisco.com/cgi-bin/Support/Bugtool/launch_bugtool.pl. Then follow these steps:

Step 1   Enter your user name and password at the login prompt if you are not already logged in to Cisco.com.

Step 2   Read the Bug Navigator II Help instructions.

Step 3   Select your hardware from the Cisco Hardware list. The Bug Navigator search tool replaces Bug Navigator II Help (in the right frame of the page).

Step 4   Select the following from the drop-down menus:

- Version
- Revision
- Severity

✎
Note   As an option, you can enter words or phrases (separated by commas) in the data entry field to limit your search.

Step 5   Click the **Search** button.

The entire window is replaced with a Bug Search Results window with a list of DDTS containing your search criteria. Look at the Bug reports listed in the titles column. An existing bug entry that describes the problem you are having may have been fixed in a more recent version of the Cisco IOS software. Look in the Fixed-in column for a later version of the Cisco IOS software. All you might have to do to solve your problem is upgrade your software.

If a software upgrade is not listed as a way to solve your problem, double-click on the bug title and read the DDTS details; a workaround might be listed there.

1.10.2 Checking Cisco IOS Release Notes

Release notes describe the features and caveats for Cisco IOS software releases. The release notes are listed by both product and Cisco IOS release number.

The "Caveats" section of the release notes lists known caveats by tracking the DDTS number and the release number, and indicates whether the caveat has been corrected.

The "Caveat Symptoms and Workarounds" section summarizes caveat symptoms and suggested workarounds. You can also search through this section online, using either a word string or the DDTS number.

1.11 Initial Troubleshooting Checklist

Before you start the troubleshooting process, confirm that the network and client connections were designed correctly using the information in the *Cisco ONS 15530 Planning Guide* and the interfaces were configured correctly using the information in the *Cisco ONS 15530 Configuration Guide and the Cisco ONS 15530 Command Reference*.

Next confirm the integrity of the hardware and its installation by performing the following:

- Reseat the cable.

- Clean the cable, connectors, couplers, and attenuators.

- Confirm that the Tx and Rx fiber optic connections are not mixed.

- Confirm all modules and motherboards are completely seated and the captive screws are tightened securely to completely mate the optical fiber connectors to the backplane.

- Check the signal level at each input and output to check for too much or too little attenuation.

- Verify that all line cards, modules, and carrier motherboards are properly seated in the slots.