Sun Fire™ V20z and Sun Fire V40z Servers

Troubleshooting Techniques and Diagnostics Guide

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Contents

Preface

The *Sun Fire V20z and Sun Fire V40z Servers—Troubleshooting Techniques and Diagnostics Guide* provides information about and solutions for system problems that customers might encounter. It includes instructions for use of the diagnostics tests and detailed explanations of all system events. This document is written for technicians, system administrators, authorized service providers (ASPs), and users who have advanced experience troubleshooting and replacing hardware.

Before You Read This Document

Some troubleshooting procedures require the removal and replacement of system components. Therefore, it is important that you review the safety guidelines and component removal and replacement procedures in these documents:

■ *Sun Fire V20z and Sun Fire V40z Servers Safety and Compliance Guide*

■ *Sun Fire V20z and Sun Fire V40z Servers User Guide*

Using UNIX Commands

This document might not contain information about basic UNIX® commands and procedures such as shutting down the system, booting the system, and configuring devices. Refer to the following for this information:

■ Software documentation that you received with your system

■ Solaris™ Operating System documentation, which is at:

   http://docs.sun.com

Typographic ConventionsRelated

Typeface*	Meaning	Examples
AaBbCc123	The names of commands, files, and directories; on-screen computer output	Edit your `.login` file. Use `ls -a` to list all files. `% You have mail.`
AaBbCc123	What you type, when contrasted with on-screen computer output	`% `**`su`** `Password:`
AaBbCc123	Book titles, new words or terms, words to be emphasized. Replace command-line variables with real names or values.	Read Chapter 6 in the *User's Guide*. These are called *class* options. You *must* be superuser to do this. To delete a file, type `rm` *filename*.

* The settings on your browser might differ from these settings.

Documentation

The documents listed as online are available at:

`http://www.sun.com/products-n-solutions/hardware/docs/Servers/Workgroup_Servers/Sun_Fire_V20z/index.html`

Application	Title	Part Number
Safety information	*Important Safety Information for Sun Hardware Systems*	816-7190-xx
Safety notices and international compliance certification statements	*Sun Fire V20z and Sun Fire V40z Servers—Safety and Compliance Guide*	817-5251-xx
Hardware and system software installation	*Sun Fire V20z and Sun Fire V40z Servers—Installation Guide*	817-5246-xx
Maintenance procedures and other information	*Sun Fire V20z and Sun Fire V40z Servers—User Guide*	817-5248-xx
Operating-system installation	*Sun Fire V20z and Sun Fire V40z Servers—Linux Operating System Installation Guide*	817-5250-xx

Application	Title	Part Number
Troubleshooting and diagnostics	*Sun Fire V20z and Sun Fire V40z Servers— Troubleshooting Techniques and Diagnositcs Guide*	817-7184-xx
Late-breaking information	*Sun Fire V20z and Sun Fire V40z Servers Release Notes*	817-1771-xx
Comparison of server models	*Differences Between Versions of the Sun Fire V20z and Sun Fire V4z Servers*	817-7185-xx

Documentation, Support, and Training

Sun Function	URL	Description
Documentation	http://www.sun.com/documentation/	Download PDF and HTML documents, and order printed documents
Support and Training	http://www.sun.com/supportraining/	Obtain technical support, download patches, and learn about Sun courses

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Sun Fire V20z and Sun Fire V40z Servers Troubleshooting Techniques and Diagnostics Guide, part number 817-7184-12

Preventive Maintenance

Many problems can be avoided with careful system setup, comprehensive change management, and adherence to established, repeatable procedures.

Guidelines for Success

Below are some guidelines that can help you prevent problems and simplify troubleshooting.

- Use uniform naming conventions for your servers, such as names that denote server locations.
- Use unique IDs or names for your devices to lessen the risk of competition for the same resource. Use the server setup utility to check for possible conflicts.
- Create a backup plan.
  - If data changes frequently, schedule backups to occur frequently.
  - Maintain a library of backups, based on your information restoration needs.
  - Periodically test your backups to ensure that your data is stored correctly.
- Use enterprise systems management tools to automate certain processes, or manually track this information:
  - Periodically check hard disk space. Ensure that each hard drive has a minimum of 15 percent free space.
  - Keep historical data. For example, a baseline record of initial CPU use levels ensures that you will be aware of significant increases. If problems occur, you can compare the baseline and current data. Other things you might track include user, bus, and power utilization rates.
  - Maintain a trend analysis to account for predictable changes. For example, if the CPU utilization rate always increases by 50 percent during late morning, you can assume that the increase is normal for that server.

- Create a problem resolution notebook. If a problem occurs, keep a log of the actions you took to resolve it. In the future, the information in the log can help you or someone else solve the same problem more quickly. This information also can ensure accuracy in any part replacement issue.

- Keep an updated network topology map in an accessible location. This map can help troubleshooting efforts for networking problems.

Managing Change

Most server problems occur after something in the server changes. When you make changes to your server, follow these guidelines:

- Document the system settings before the change.

- If possible, make one change at a time, in order to isolate potential problems. In this way, you can maintain a controlled environment and reduce the scope of troubleshooting.

- Take note of the results of each change. Include any errors or informational messages.

- Check for potential device conflicts before you add a new device.

- Check for version dependencies, especially with third-party software.

- To find and fix the cause of a server problem, collect information about:

  - Events that occurred prior to the failure.

  - Whether any hardware or software was modified or installed.

  - Whether the server recently was installed or moved.

  - How long the server exhibited symptoms.

  - The duration or frequency of the problem.

- After you assess the problem and note your current configuration and environment:

  - Visually inspect your system (see below).

  - Execute diagnostics tests (see "Diagnostics" on page 37).

Visually Inspecting Your System

Improperly set controls and loose or improperly connected cables are common causes of problems with hardware components. When you investigate a system problem, first check all the external switches, controls, and cable connections. If this does not resolve your problem, then visually inspect the system's interior hardware for problems such as a loose card, cable connector, or mounting screw.

See the *Sun Fire V20z and Sun Fire V40z Servers User Guide* for information about how to remove and replace hardware components.

External Visual Inspection

To perform a visual inspection of the external system:

1. **Inspect the status indicators that can indicate component malfunction. See "Lights, LCD, LED" on page 64.**

2. **Verify that all power cables are properly connected to the system, the monitor, and the peripherals, and check their power sources.**

3. **Inspect connections to any attached devices (network cables, keyboard, monitor, mouse) and any devices that are attached to the serial port.**

Internal Visual Inspection

> **Note –** Before you continue, read the instructions in the document *Important Safety Information about Sun Hardware Systems*, which is shipped with your system. Also review the instructions for removal and replacement of components in your *Sun Fire V20z and Sun Fire V40z Servers User Guide*.

You can use the System Status screen in the SM Console to identify status information of all system hardware components and sensors. This System Status screen simplifies the search for components that have problems or for failed components that must be replaced. The component images that display in the System Status screen represent the actual hardware components and their approximate locations and sizes. See the Systems Management Guide for more information.

1. **To perform a visual inspection of the internal system, power off the system.**

2. **Disconnect all power cables from electrical outlets. (Some servers have two power supplies and two power cables. Ensure that both are disconnected from electrical outlets.)**

Caution – When you unplug the AC power cords from the power supplies, system ground is also removed. To avoid electrostatic discharge damage to the machine, you must maintain an equal voltage potential to the machine. Ensure that you wear ESD protection, such as an ESD wrist strap, during all procedures in which you touch components in the system, and during removal and replacement procedures.

3. **Remove the server cover (follow the procedures in the user guide for your server).**

Caution – Some components can become hot during system operations. Allow components to cool before you touch them.

4. **Remove components, if necessary, and verify that sockets are clean.**

5. **Replace components and verify that they are firmly seated in their sockets or connectors.**

6. **Check all cable connectors inside the system to verify that they are firmly and correctly attached to their appropriate connectors.**

7. **Replace the server cover.**

8. **Reconnect the system and any attached peripherals to their power sources.**

9. **Power on the server and the attached peripherals.**

Troubleshooting Dump Utility

Note – The Troubleshooting Dump Utility also is discussed in the *Sun Fire V20z and Sun Fire V40z Servers—Server Management Guide*, including command syntax, arguments, and returns.

The Troubleshooting Dump Utility (TDU) captures important platform OS and service processors (SP) debug data. When you execute this command, this data is gathered and stored in the specified nfs directory in tar format or sent to stdout, depending on the command option you choose. Along with the log file, TDU creates

a summary log file that contains the detail of whether or not TDU successfully gathered each requested piece of information. The summary log file is included in the `tar` file.

Key TDU definitions are:

- GPR - General Purpose Registers.
- MCR - Machine Check Registers.
- MSR - Machine Status Registers, including the MCRs.
- SPR - Special Purpose Registers.
- CSR - PCI Configuration Space Registers.
- TCB - Trace Buffers from K-8.
- TMB - Trace Buffers (TCB) from DRAM

The following data is captured by default:

- SST data (5KB).
- Uncleared current events (120KB).
- Software Inventory (approximately 25KB).
- Hardware Inventory (approximately 25KB).
- `pstore` data:
    - Group file (approximately 0.5KB)
    - Event configuration file (`evcfg`, approximately 4KBb).
    - Security configuration file (`seccfg`, approximately 5KB).
    - Ethernet configuration file (`netifcfg2-eth0`, approximately 0.2KB).
- Current processes on the Service Processor (10KB).

Optionally, the TDU can capture the following data:

- K-8 registers (`-c|--cpuregs`), including GPRs, SPRs, MSRs, MCRs and TCB (19KB).
- All PCI configuration registers (`-p|--pciregs`) (25KB).
- TCB from DRAM (`--tmb`, 128KB by default or user-defined size up to1GB).

Note – Storage of 1 KB of TMB in text mode takes about 4K on disk. Storage of 32KB of default TMB takes 128 KB and storage of 128 MB of TMB takes about 1GB of disk space.

To run the Troubleshooting Dump Utility, use this command:

```
sp get tdulog
```

When you specify the -f option, the captured data is gathered and stored on the SP in a compressed tar file. The Troubleshooting Dump Utility can take up to 15 minutes to run. The system prompt displays when it is complete.

Every server management command returns a code when it completes. Below are two return codes, their IDs, and brief descriptions.

Return	ID	Definition
NWSE_Success	0	Command completed successfully.
NWSE_InvalidUsage	1	Invalid usage: bad parameter usage, conflicting options specified.

Note – Return code IDs are decimal numbers.

Diagnostics

Diagnostics are a set of tests that determine the health of the hardware in your Sun Fire V20z server or Sun Fire V40z server. The diagnostics tests that are included with the server check the platform and the SP.

Diagnostics tests:

- Test and verify hardware functionality. For example, "fan failed to reach target speed."
- Indicate and isolate device failures. For example: "device not present."
- Isolate hardware or software problems as diverse as voltage levels or the SP's read and write flash files.
- Identify replaceable parts. (Instructions for removing and replacing parts are in the Hardware Components and Service document.)

You can run diagnostics tests in either of two ways.

- SP-based diagnostics, detailed below, run via the SP.
- CD-based diagnostics, explained on page 9, run via a diagnostics CD.

Note – While you run diagnostics on your server, do not interact with the SP through the command-line interface of IPMI. The values returned by the sensors are not reliable in this case. Sensor commands that are issued while diagnostics are loaded might result in the logging of false critical events in the events log.

Specific tests are designed to run on the SP and other tests are designed to run on the platform OS. See "Diagnostics Modules" on page 14, for more information.

SP-based Diagnostics

You can run diagnostics tests from the SP. The diagnostics files are included in the Network Share Volume (NSV) directory. If you choose to run SP-based diagnostics tests:

- You can run tests on either the SP or on the platform. (See Table 3-1, "Diagnostics Modules" on page 45 for more information.)
- You can run tests on the SP, only.
- You can run the tests remotely.
- You can save test results in the external (NSV) location, if the NSV is mounted.

See the *Sun Fire V20z and Sun Fire V40z Servers—Installation Guide* for information about how to set up the SP, how to install and configure the NSV software, and how to use SSH scripting. See the *Sun Fire V20z and Sun Fire V40z Servers—Server Management Guide* for information about how to update the diagnostics tests.

Note – The diagnostics version that is in the NSV must be the same as the version that is installed on the SP.

How to Start SP-based Diagnostics

1. **To enable both SP and platform diagnostic tests, execute the command,** `diags start`**. This command reboots the platform into diagnostics mode. Wait at least two or three minutes before you attempt to run the tests.**

   or

   To enable only SP diagnostics tests without rebooting the platform, execute the command diags start –n.

Note – For CD-based diagnostics, the `-n` argument specifies: Do not load the SP with diagnostics.

---

2. **To determine if the diagnostics tests are available to run, execute the command** `diags get state`**. The command returns one of these states:**

Success Text Message

```
The SP and the platform diagnostics systems are available to receive
test requests.
```

or

Error Text Message

```
The platform diagnostics system is not available.
```

See "Diagnostics Modules" on page 14, for a table of diagnostics modules and the types of tests that they contain. The table indicates whether each test module runs on the SP or on the platform.

CD-Based Diagnostics

Note – It is possible to run platform-only tests on a previous release of the NSV (earlier than 2.x.x.x), but the user must manually disable interleaving to run memory tests. It is not possible to run SP tests from the CD with these earlier releases of the NSV.

- You can run diagnostics tests from a CD. These options are available:
- You can run tests on either the SP or on the platform.
- You can run tests on the platform, only.
- After you boot the CD, you can run the tests remotely—use SSH to log on to the diagnostics tests.
- You can save test results to a USB stick or a floppy disk.

Installing and Running CD-Based Diagnostics

BIOS does not, by default, boot into diagnostics mode. If the CD is installed in the server when the system boots and if the CD drive is first in the boot order, BIOS detects the CD and reboots in diagnostics mode. To accomplish this, follow the instructions, below.

BIOS Version 2.2.0.0 and Later

In BIOS versions 2.2.0.0 and later, you can set up BIOS to boot into the diagnostics mode. Then, during boot, the CD detects the BIOS setting and reboots the machine into diagnostics mode, if necessary. This is an option in the BIOS Advanced Menu. See the BIOS Configuration information in the *Sun Fire V20z and Sun Fire V40z Servers—User Guide*, for information about how to suppress the reboot.

Earlier BIOS Versions

If your BIOS version cannot boot in diagnostic mode (this information is detected on boot), the system displays a set of steps that the user can follow to configure the BIOS settings and to successfully run the memory tests. (If the settings are incorrect, the memory tests print warnings.)

Installation of CD-Based Diagnostics

To ensure that the CD boots automatically, it must be first in your server's boot sequence. The boot sequence is established in the BIOS Boot menu. You can alter the sequence as noted, below:

■ In the BIOS Boot menu, use the plus (+) or minus (-) to move the CD-ROM drive to the top of the list. For more information, see the *Sun Fire V20z and Sun Fire V40z Servers—User Guide*.

■ If the server boots from the hard disk drive, remove the HDD.

■ If the server boots from a PXE server, disconnect the Ethernet cables.

1. **See your system vendor for the location of the ISO image:**

   ```
   cd_diags.iso
   ```

2. **Burn the ISO image onto a CD.**

3. **Insert the CD into the drive and boot the platform. (The CD drive must be first on the boot list, in order for this to occur automatically. See the bullet points, above, to ensure this.)**

   When the CD has booted, the platform IP address displays:

   ```
   Welcome to CD Diagnostics <version displayed>.
   Platform eth0 connected for SSH sessions at <ipaddr>
   Platform eth1 connected for SSH sessions at <ipaddr>
   ```

   You can use this IP address if you want to SSH remotely. See "Remote Access to CD-Based Diagnostics" on page 43. You are logged on automatically as the user diagUser.

As soon as the CD boot process is complete, you are logged on and the CD diagnostics menu displays on your screen. You can use the menu options to run tests and capture system information, or you can use the command line.

Running CD-Based Diagnostics from the Options Menu

The options menu simplifies the process of running a full set of diagnostics tests and capturing system information on a floppy or USB storage device.

Menu Options

1. View Documentation - Use this option to open the documentation. This online documentation explains:

   - all the menu options
   - helpful tips
   - known issues
   - commands you can run from the command line
   - instructions for using SSH from a remote machine
   - other important information

2. Create script run_commands.sh – Use this option to run tests and save system information in a log file. This option opens a series of three prompts. When you select the prompts, a script is created and stored in the same location as the saved log file. You can use it to run operations on multiple machines.

3. Run script run_commands.sh - Use this option to run a script that you saved to a floppy disk.

4. Go to Command Line Interface - Use this option to go to the command line interface. See the *Sun Fire V20z and Sun Fire V40z Servers—Server Management Guide* for more information.

5. Shutdown System - Use this option to terminate diagnostics tests and shut down the OS.

Note – For detailed information, select `View Documentation`.

Remote Access to CD-Based Diagnostics

Remote access requires the prior creation of a manager-level user on the platform. See the *Sun Fire V20z and Sun Fire V40z Servers—Server Management Guide* for instructions.

To use a remote command-line interface for CD-based diagnostics tests, via SSH network access:

1. **SSH to the platform IP address as the user: setup.**

   If you already created a manager-level user on the SP, you are prompted for a username and password to create a new account. You can use any username except one of these:

   ```
   diagUser
   setup
   root
   ```

   When your username and password are validated, you are logged off.

2. **Now use your user name and password to SSH to the platform.**

3. **To enable only platform diagnostics tests without loading the SP tests, execute the command diags start –n.**

   For SP-based diagnostics, the –n argument specifies: "Do not boot the platform with diagnostics."

   or

   To enable both SP and platform diagnostic tests, execute the command, diags start. This command reboots the platform into diagnostics mode.

   Wait at least two or three minutes before you attempt to run the tests.

   or

   Implement one of the following in shell or Perl:

   ```
   diags start
   sleep 240
   rc = diags get state
   if (rc ==0)
   then
       # run desired tests using diags run tests command
   else
       echo "Diagnostics not loaded in expected time. rc = $rc"
   ```

```
fi
```

or

```
rc = diags get state
timer = 0
while (rc == 25 (device error)) and (timer < MAX_WAIT)
do
    sleep SLEEP_TIME
    timer=time+SLEEP_TIME
    rc = diags get state
done
if (timer < MAX_WAIT)
then
   # run desired tests using diags run tests command
else
  echo "Error loading platform diagnostics. rc = $rc"
fi
```

4. **To determine if the diagnostics tests are available to run, you can execute the command diags get state.**

The command returns one of these states:

■ Success Text message

```
The SP and the platform diagnostics systems are available to receive
test requests.
```

   or

■ Error Text Message

```
The platform diagnostics system is not available.
end
if re == 0
diags run tests -a
```

Note – See "Running Diagnostic Tests," below, for command-line arguments. See the *Sun Fire V20z and Sun Fire V40z Servers—Server Management Guide* for more information about commands and the use of scripts for systems management.

Available Diagnostics Tests and Modules

To list the available modules and the tests they contain, execute the command: `diags get tests`.

The table below lists the available diagnostics modules and indicates whether the module runs on the platform OS or on the SP. Each module contains one or more individual tests.

TABLE 2-1   Diagnostics Modules

Module Name (command)	Runs on	Description of Test
Memory (memory)	Platform	Identify memory errors, address decoding faults, and dataline faults
Network Controllers (nic)	Platform	Test the platform NIC interfaces, using an internal loopback test.
Storage (storage)	Platform	Invoke self-tests on the SCSI drive.
Fans (fan)	SP	Verify that each fan is rotating and that the RPM is within the specified ranges.
Flash (flash)	SP	Read and write flash files.
LED (led)	SP	Verify the correct operation of the LED drive circuitry. (Non-interactive tests.)
Operator Panel (oppanel)	SP	Verify the memory of the Operator Panel. Indicates values and locations of any errors.
Power (power)	SP	Verify that the power backplane and power supplies are functioning properly. (Not available for all systems.)
Temperature (temp)	SP	Verify that each of the temperature sensors is functional and that the temperature is within the specified ranges.
Voltage (voltage)	SP	Verify the derived (generated by various VRMs in the system) and bulk voltages.

Running Diagnostic Tests

Note – When you launch diagnostics on the platform OS, the system attempts to mount the floppy drive and returns this error: `mount : Mounting /dev/fd0 on /mnt/floppy failed. No such device`. You can safely ignore this error message.

If you run tests from the command-line interface, you can choose to execute all tests, tests for a specific module (fans, memory, voltage, temperature, and so on), specific tests within a module, or any combination of these options. You specify these options when you execute the `diags run tests` command.

- Run tests individually or collectively.

  - Use the `-a` option to run all tests.

  - Use the `-m` module option to run one or more test modules.

  - Use the `-n test_name` option to run one or more individual tests.

  - Use both `-m module` and `-n test_name` options to run one or more test modules and one or more individual tests.

For example, to run the Operator Panel diagnostics module, the command is:

`diags run tests –m oppanel`.

- Test modules always run in order, by name.

- Individual tests run in the sequence you specify on the command line.

- View status messages about the success of the tests.

Note – You can write scripts for additional control over the timing of the tests. For example, you can write a shell script to repeat a test a specified number of times. See the *Sun Fire V20z and Sun Fire V40z Servers—Server Management Guide* for details.

Test Results

After a test is complete, the status is returned. If a test detects an error, the software reports details about the error and continues to run any remaining tests that were submitted.

Note – Specify the -v | --verbose option to display details for all tests, including successes. For example, details might include high, normal, and low values.

The following data is generated for all diagnostics tests.

■ Submitted Test Name

■ Test Handle (This is a unique identifier that can be used when you cancel a test from another shell window.)

■ Test Result (Passed, Failed)

■ Details (Failure Details, Tests Details, and so on.)

Note – See "Diags Test Results" on page 51, for examples of output for all diagnostics tests.

To locate a component that is identified by a diagnostics test see the System Status window of the SM Console, which enables you to view a representative display of system components and related sensors. For more information about the SM Console, see the *Sun Fire V20z and Sun Fire V40z Servers—Server Management Guide.* For illustrations of the system and component labels, see the *Sun Fire V20z and Sun Fire V40z Servers—User Guide* and the *Sun Fire V20z and Sun Fire V40z Servers—Installation Guide.*

Sample Output

This section contains output that could be returned if you start diags in no-platform mode, with the power on, and with the `--verbose` argument. For example:

```
diags start -n
platform set power state on -f
diags run tests -a -v
```

Typical output is included below:

```
Submitted Test Name              Test Handle
speed.allFans                         1


Results
Submitted Test Name              Test Handle   Test Result
speed.allFans                         1                       Passed
    Test Details:
        fan1.tach        Passed
            Controller:   fan-ctrl
            High Rated:   13000
            High Actual:  13740
            High Delta:   +5.39%
            High Limits:  -10/+35%
            Low Setpoint: 10010
            Low Expected: 10580
            Low Actual:   11100
            Low Delta:    4.69%
            Low Limits:   -/+15%
            Sensor:       Fan 1 measured speed (ID=fan1.tach)
            Component(s): Fan 1  (ID=NA)
        fan2.tach        Passed
            Controller:   fan-ctrl
            High Rated:   13000
            High Actual:  13920
            High Delta:   +6.61%
            High Limits:  -10/+35%
            Low Setpoint: 10010
            Low Expected: 10718
            Low Actual:   11100
            Low Delta:    3.44%
            Low Limits:   -/+15%
            Sensor:       Fan 2 measured speed (ID=fan2.tach)
            Component(s): Fan 2 (ID=NA)
        fan3.tach        Passed
            Controller:   fan-ctrl1
            High Rated:   13000
```

```
      High Actual:  13860
      High Delta:   +6.20%
      High Limits:  -10/+35%
      Low Setpoint: 10010
      Low Expected: 10672
      Low Actual:   11040
      Low Delta:    3.33%
      Low Limits:   -/+15%
      Sensor:       Fan 3 measured speed (ID=fan3.tach)
      Component(s): Fan 3 (ID=NA)       fan4.tach          Passed
      Controller:   fan-ctrl1
      High Rated:   13000
      High Actual:  13920
      High Delta:   +6.61%
      High Limits:  -10/+35%
      Low Setpoint: 10010
      Low Expected: 10718
      Low Actual:   11100
      Low Delta:    3.44%
      Low Limits:   -/+15%
      Sensor:       Fan 4 measured speed (ID=fan4.tach)
      Component(s): Fan 4 (ID=NA)
fan5.tach         Passed
      Controller:   fan-ctrl2
      High Rated:   13000
      High Actual:  13980
      High Delta:   +7.01%
      High Limits:  -10/+35%
      Low Setpoint: 10010
      Low Expected: 10765
      Low Actual:   11100
      Low Delta:    3.02%
      Low Limits:   -/+15%
      Sensor:       Fan 5 measured speed (ID=fan5.tach)
      Component(s): Fan 5 (ID=NA)
fan6.tach         Passed
      Controller:   fan-ctrl2
      High Rated:   13000
      High Actual:  14160
      High Delta:   +8.19%
      High Limits:  -10/+35%
      Low Setpoint: 10010
      Low Expected: 10903
      Low Actual:   11340
      Low Delta:    3.85%
      Low Limits:   -/+15%
      Sensor:       Fan 6 measured speed (ID=fan6.tach)
      Component(s): Fan 6 (ID=NA)
```

Saving Test Results

SP-based Diagnostics

To save SP-based diagnostic test results, save the output as a network share volume file. For example, to save results of all the tests that you run in diags.log1, use:

```
diags run tests -all > /mnt/log/diags.log1
```

CD-Based Diagnostics Tests

To save CD-Based diagnostic test results, mount a USB stick or a floppy drive and save the results.

- To mount a USB stick use this command:

```
mount /usbstorage
```

Note – Mounting usbstorage works only if you have a single disk drive in your system.

- To mount a floppy, use this command:

```
mount /floppy
```

- To remove the device, use this command:

```
umount /<usbstorage | floppy>
```

Stopping Tests

- To cancel one or more individual tests, run this command:

```
diags cancel tests {-t|--test} TEST HANDLE {-a|--all}
```

- To stop all tests, press **Ctrl+C** from within the shell in which you started the tests.
- To terminate all diagnostics tests and end the session, run the diags terminate command.

Troubleshooting Topics

This chapter contains troubleshooting instructions and references for a variety of issues. Information is organized alphabetically, according to general topics, is cross-referenced as necessary, and is indexed in the last section of this document.

BIOS

This section describes possible causes and suggested troubleshooting steps for systems management events that are related to BIOS.

Note – See the *Sun Fire V20z and Sun Fire V40z Servers—Server Management Guide* and the SM Console Online Help for information about how to update the BIOS. See "Update Failed" on page 83, to troubleshoot BIOS updates.

BIOS Error or Warning Events

The errors listed in the table below are returned by the `sp get events` command. The possible causes and suggested actions to take in order to resolve each problem (in order of probability, based on experience) are listed below.

Note – See the *Sun Fire V20z and Sun Fire V40z Servers—Server Management Guide* for more information about the `sp get events` command.

TABLE 3-1 BIOS Error Messages

Error	Solution or Reference
[CPU ID Error]	Possible cause of this error is unmatched CPU Revs. Determine the Rev of each CPU. If they are not the same, replace with consistent Rev CPUs.
[Date and Time Setting Error]	This error usually indicates that the battery failed. To remedy this problem replace the battery, run setup, set time and date, cycle power with a five-minute delay in off state, and check to see if the error recurs.
[Diag Failed Memtest]	To remedy this problem, replace the reported DIMM, then reboot.If other DIMMs fail, replace them and repeat the test.If the same DIMM fails, replace entire set of DIMMs with known good DIMMs, and run the tests again. See "DIMM Faults" on page 26.
[Diagnostic Load Failure]	During loading of the diagnostics from the SP to the platform, the load operation failed. Retry.
[DMA Test Failed], [Software NMI Failed], [Fail-Safe Timer NMI Failed]	You are unlikely to see this message as the probability of its occurrence is extremely low. If you do receive this message, try rebooting the server.
[Fixed Disk Failure]	If all HDDs in a multiple-HDD system have failed, the power supply is the likely source of the problem. The power supply is a possible source of the problem in a single-HDD system, also. But check the other possibilities listed below, first.The HDD data cable might be connected improperly or the backplane connector mating might be skewed. Ensure that the connector is securely connected to the backplane. A drive might not be inserted completely. Pull out the drive, inspect it, reinsert it, and verify that the mating is smooth and complete. Drive electronics or interface failed. If possible, insert the drive into a different slot in the same system.If possible, insert the drive into a different slot in the same system. If the drive works in the other system, return the drive to the server that experienced the initial problem.If the drive fails in the other system also, try a different drive in the original system, if possible.If the second drive works in the second system, but not in the first system, return the first system.If the drive that worked in the second system does not work in the first system and the drive from the first system does not work in the second system, the drive electronics and backplane might be bad. Return the system.
[Flash Image Validation Error]	The BIOS Image that is used in the BIOS Update command is corrupted, or was not a BIOS image (wrong filename), or the transfer of the image to the platform failed. Retry the operation. If it still fails, check that the file is actually a valid BIOS image file.

TABLE 3-1   BIOS Error Messages *(Continued)*

Error	Solution or Reference
[Flash Process Failure]	This error probably indicates that the flash chip is defective. To remedy the problem, replace the flash chip. If the problem persists, it might indicate a problem that is not serviceable by the user. Contact the Support Center.
[Incorrect BIOS image file]	The BIOS Image provided to the BIOS update command is a BIOS for a different platform. Obtain the correct BIOS image for your platform.
[IP Failure]	An internal communication error occurred between BIOS and the SP. Retry the operation.
[Memory Mismatched]	Pairs of DIMMs must match. Determine if DIMMs in each pair match, and reconfigure, if necessary. See "DIMM Faults" on page 26.
[Operating System not found]	Possible causes of this error are: Empty drive or media (contains no boot block).Intended boot device is not in the BIOS setup boot settings.Floppy disk was left in floppy drive.Media is damaged or corrupted. (Usually this is caught under fixed drive failure, if booting from the hard drive.)
[Parity Error (Memory)], [Extended Memory Truncation]	BIOS probably would report a bad DIMM mapped out. If either of these errors occurs intermittently, run memory tests. See "Diagnostics" on page 7, and "Memory" on page 59.
[Real-Time Clock Error]	This error can indicate a South bridge failure, a BIOS failure, a bad crystal, or a bad oscillator. Possible solutions are to re-flash the BIOS or to replace the battery.
[Shadow RAM Failed], [System RAM Failed], [Extended RAM Failed]	These errors indicate a general memory DIMM error. The first two indicate that the failure occurred below the first MG of RAM. See "DIMM Faults" on page 26, for details.If you are unable to boot the diagnostics kernel, replace all DIMMs with known good DIMMs. If this is successful, then use diagnostics to identify the bad DIMMs.
[System Timer Error]	This is a legacy error. It can indicate a South bridge failure or a BIOS failure. The most likely cause is a corrupted BIOS. To remedy this, re-flash the BIOS.
Received [early] fatal error from BIOS: [Unable to do anything]	BIOS can detect some hardware errors before enough of the system is working to report a more specific error code. If known good CPUs are installed, contact the Support Center for help.

TABLE 3-2 BIOS Warning Messages

Warning	Solution or Reference
[CMOS Checksum Failure], [CMOS Settings do not match hardware configuration], [CMOS Invalid]	To remedy these problems re-run setup (see "BIOS Configuration" in the Software Installation and Configuration Guide), save, exit, and cycle power. If one of the errors occurs again, replace the battery, run setup, set time and date cycle power with a five-minute delay in off state.If the problem recurs, contact the Support Center.
[PCI-X Slot disabled for 8131 Errata 56]	During setup (see "BIOS Configuration" in the Software Installation and Configuration Guide), ensure that in the Advanced menu, you set the option to allow the card to be recognized. Do this only if you are certain that the card will not cause data corruption, or are willing to take the risk. The card was powered off to prevent data corruption. For more information, see the *Sun Fire V20z and Sun Fire V40z Servers—Release Notes*.
Received warning from BIOS: [CMOS Battery Failure]	This error probably indicates a battery failure. To remedy this problem replace the battery, run setup, set time and date, cycle power with a five-minute delay in off state.If the problem recurs, contact the Support Center.

BIOS POST Codes

If hardware or configuration errors occur, the BIOS displays warning or error messages on the video display, if one is attached. However, some errors can be so severe that the BIOS cannot initialize the video or halts immediately. In these cases, you can determine the last Power On Self Test (POST) task that the BIOS executed. It is indicated by the value written to port 80.

- The `sp get port80` command - For information about how to use this command to retrieve the last port 80 post code, see the SM Console Online Help or the *Sun Fire V20z and Sun Fire V40z Servers—Server Management Guide*.

- Last 10 POST codes - For information about how to use the Operator Panel to retrieve the last 10 port 80 POST codes, see the *Sun Fire V20z and Sun Fire V40z Servers—Server Management Guide*.

- POST codes and definitions - "POST Codes" on page 103, provides a list of POST codes and brief definitions.

- BIOS Error or Warning Events - The section above includes information about the problems that produce the most frequently reported POST codes, with tips for problem resolution.

The most common POST codes that are reported on the Sun Fire V20z and Sun Fire V40z servers and suggested troubleshooting actions are listed in the table, below.

TABLE 3-3   Common POST Codes

POST Code	Reference or Solution
00	Indicates that no BIOS executed far enough to write any POST codes. This usually is caused by failure to power on, fatal CPU, or a fatal BIOS flash part issue.
C0	Indicates that an operating system was not detected.
28	Indicates that the SPDs on a DIMM did not read correctly. Probably indicates a bad DIMM. See "DIMM Faults" on page 26.
2C	An address or a data error caused by a bad DIMM, VRM, or CPU. See "DIMM Faults" on page 26.
49	PCI config space error. Remove PCI boards to find offending board, shuffle order, replace, or use other brand as needed.

Boot Issues

For information about boot problems that are associated with the platform OS, see "Platform OS Does not Boot" on page 36. For boot problems that are associated with the SP, see "Service Processor" on page 41.

Clear CMOS Jumper

In some troubleshooting procedures, it is necessary to clear the CMOS jumper. Instructions for this procedure are below.

- In the Sun Fire V20z Server, the CMOS jumper is J110.
- In the Sun Fire V40z Server, the CMOS jumper is J125.

1. **Power down the server.**

2. **Disconnect the AC power cord. If you have two power supplies, disconnect both AC power cords.**

3. Remove the system cover as instructed in the Hardware Components and Service document.

4. Locate the appropriate jumper. Facing the server from the front panel:

   ■ In the Sun Fire V20z Server, J110 is located on the left rear area of the motherboard.

   ■ In the Sun Fire V40z Server, J125 is located right of the middle area of the motherboard.

5. Move the jumper to the parked position (away from the dot) so that the CMOS clears on the next boot.

6. Replace the system cover and reconnect the AC power.

7. Reboot the server and press F2 during the boot, to go into the BIOS setup.

8. Press F9 to set defaults.

9. Press F10 to save changes.

10. Power down the server, disconnect the AC power cord(s), and remove the system cover.

11. Move the jumper back to the active position (closer to the dot) so that the CMOS retains setting on the next boot.

12. Replace the system cover, reconnect the AC power, and reboot the server.

DIMM Faults

Note – To enable DIMM fault reporting, you must install the NSV software on your system, as detailed in the *Sun Fire V20z and Sun Fire V40z Servers—Installation Guide*. Although these drivers are available in the NSV, it is not necessary to mount the NSV to the SP in order to enable this functionality.

The system fault LED blinks and identifies uncorrectable DIMM faults or correctable faults that exceed the threshold. Faults also are reported in the event log, the SM Console, and diags memory tests. (See "ECC Errors" on page 27, for an example of diags output that reports a DIMM fault.) The system might continue to operate normally, depending on the type of failure, the location of the failure, and the robustness of the platform operating system.

IPMI System Event Log (SEL) records are generated for both correctable and uncorrectable DIMM ECC errors. To determine the type of error, examine the sensor-specific offset in Event Data 1. The CPU (memory bank) and DIMM numbers are located in the high and low nibbles of the Event Data 3 field, respectively.

■ If the error is uncorrectable, shut down the system and replace the DIMM.

■ If the error is correctable, clear the initial, correctable DIMM errors, then monitor the system to determine if the problem recurs. You can continue to clear the correctable errors and monitor the system, but be aware that repetitive correctable errors might eventually cause uncorrectable errors.

Note – See the Operator Panel's server menu options in the *Sun Fire V20z and Sun Fire V40z Servers—Server Management Guide.* These errors also appear in the system events log. See "System Events" on page 79.

ECC Errors

In both the Sun Fire V20z Server and the Sun Fire V40z Server, each CPU can support four DIMMs.

■ For each CPU, the four DIMM slots are grouped into two banks (bank 0 and bank 1), each with two DIMM slots.

■ You must install the DIMMs in matched pairs, one bank at a time. The two DIMMs in a given bank must be of the same size, type and vendor.

■ Each CPU can support two banks of DIMMs. Although each bank must contain a pair of matching DIMMs, it is not necessary that the size and vendor of the DIMMs between bank 0 and bank 1 match.

If your log files report an ECC error or a problem with a memory DIMM, complete the steps below.

Note – See "Log Files" on page 30, for a summary of log files that are available with your server.

In the example below, the log file reports an error with the DIMM in CPU0, bank 0, slot 1.

1. **Power down your server and remove the cover.**

2. **Remove the DIMMs that were indicated in the log file and label them.**

3. **Visually inspect the DIMMs for physical damage, dust, or any other contamination on the connector.**

4. **Visually inspect the DIMM slots for physical damage. Look for cracked or broken plastic on the slot.**

5. **Dust off the DIMMs, clean the contacts, and reseat them. (You can leave the labels on the DIMMs.)**

6. **Reboot the system. If the problem persists, continue to Step 7.**

7. **Power down the server again and remove the cover.**

8. **Remove the DIMMs that were identified in the log file.**

9. **Exchange the individual DIMMs between the two slots of a given bank. Ensure that they are inserted correctly, with latches secured.**
   - This step can isolate the problem to one of the DIMMs, or confirm that it is due to some other cause, such as a bad slot on the motherboard.
   - In this example, remove both DIMMs from bank 0 for CPU0 and switch the DIMMs between the slots.

10. **Power on the server and run the process that caused the DIMM error.**

11. **Review the log file. (See "ECC Failure" on page 96, for sample output.)**

12. **If the error now appears in CPU0, bank 0, slot 0 (opposite to the original error), the problem is related to the individual DIMM that is now in slot 0.**

    or

    If the error still appears in CPU0, bank 0, slot 1 (as the original error did), the problem is not related to an individual DIMM. Instead, it might be caused by CPU0 or by the DDR VRM for CPU0.

13. **If you have a Sun Fire V20z Server with a single CPU, you cannot independently troubleshoot the problem any further. A replacement part might be necessary.**

    or

    If you have a server with at least two CPUs, continue with Step 14.

14. **Label, then exchange the memory VRMs between the two CPUs.**
    - This step can isolate the problem to the memory VRM for CPU0 or confirm that it is due to some other cause.
    - In this example, remove the VRMs for CPU0 and CPU1, then switch the DDR VRMs between the CPUs.

15. **Power on the server and run the process that caused the DIMM error.**

16. **Review the log file.**

17. **If the error now appears on CPU1 (a different CPU from the original error), the problem is related to the DDR VRM that originally was seated for CPU0. A replacement part might be necessary.**

   or

   If the error still appears in CPU0, bank 0, slot 1 (as the original error did), the problem is not related to the memory VRM. It might be due to CPU0 or the motherboard. A replacement part might be necessary.

Inventory

Use the `inventory get all`, `inventory get hardware`, and `inventory get software` commands to view a list of field-replaceable hardware components or current software components and versions. See the *Sun Fire V20z and Sun Fire V40z Servers—Server Management Guide* for details about these commands.

If you have an NSV version 2.2 or earlier, and you add a newer NSV version to the same location, the `inventory get software` command, with the `[{-a|--all}]` argument, might time out. If this is the case, follow the instructions, below.

1. **Move and unzip any newer NSV versions to a different location from the location of your 2.2 NSV.**

   or

   Review the older NSV and remove folders for operating systems that you no longer need.

2. **Try the command again.**

Lights, LCD, LED

TABLE 3-4   Lights on the Front Panel

Problem	Solution or Reference
Locate light blinks	The Locate Light can be illuminated (or extinguished) by pressing the Locate Light button beside it. The system administrator turns the Locate Light on in order to simplify the task of locating a specific server. A blinking Locate Light does not indicate a problem.
System Fault LED is illuminated	The System Fault LED (Machine Check Error) light is illuminated when a variance occurs. For troubleshooting tips, see "Machine Check Error" on page 31, "System Events" on page 47, and "System Events" on page 79 for more information.
Platform Power State Indicator light is not illuminated	Check power connection to AC. On the Sun Fire V20z Server, check the AC Power Switch and the AC Present Indicator on the back panel.
Operator Panel LCD is not illuminated	Check power connection to AC. On the Sun Fire V20z Server, check the AC Power Switch and the AC Present Indicator on the back panel. See also various SP boot issues and solutions in "Service Processor" on page 41.
LCD displays "SP booting," then hangs	Use the SP Reset button to reboot the SP. (The SP Reset button is on the back panel.)

Log Files

Depending on the functions and features you use, your server can produce these log files:

- IPMI event log - See the Systems Management Guide for more information about IPMI functionality. When the IPMI log is full, it rejects new entries.

- SP Event Log - See "System Events" on page 79, and "Service Processor, ResourceAllocation" on page 96 for more information.

- Diagnostics log files - See "Diags Test Results" on page 51 for more information.

- TDU log files - See "Troubleshooting Dump Utility" on page 4 and see the Systems Management Guide for more information.

Machine Check Error

This section describes possible causes of events that are related to Machine Checks, and provides suggested troubleshooting steps.

If a Machine Check error occurs, the System Fault LED is illuminated. Machine Check errors indicate EEC errors (see "ECC Errors" on page 27) or VRM Crowbar events (see "VRM Crowbar Assertions" on page 49). These errors are reported in the system event log (see "System Events" on page 79).

TABLE 3-5   Machine Check Errors

Error	Solution or Reference
[Bus Unit]	This error indicates a bad CPU. To remedy the problem, replace the CPU.
[Correctable ECC error.]	This error indicates memory ECC errors, with ECC on. See "ECC Errors" on page 27. See "DIMM Faults" on page 26.
[Detected on a scrub.]	Raw data: <data>. This error should occur with a CPU error or a memory error. See "DIMM Faults" on page 26.
Error detected in [Data Cache]	This error indicates a bad CPU. To remedy the problem, replace the CPU.
[Error IP Valid.]	This error indicates a bad CPU. To remedy the problem, replace the CPU.
[Error not corrected]	This error indicates a bad CPU. To remedy the problem, replace the CPU.
[Error occurred at address <address>.]	See "DIMM Faults" on page 26.
[Error reporting disabled.]	The machine check feature has been turned off. For maximum system reliability, leave this option on.
[InstructionCache]	This error indicates a bad CPU. To remedy the problem, replace the CPU.
[Invalid bank reached]	This error indicates a bad CPU. To remedy the problem, replace the CPU.
[Load/Store unit]	This error indicates a bad CPU. To remedy the problem, replace the CPU.
Machine Check error detected on cpu <CPU>	This error indicates a bad CPU. To remedy the problem, replace the CPU.

TABLE 3-5 Machine Check Errors *(Continued)*

Error	Solution or Reference
[Machine Check in Progress.]	This error indicates a bad CPU. To remedy the problem, replace the CPU.
[Misc. register contains more info.]	This error indicates a bad CPU. To remedy the problem, replace the CPU.
[North Bridge]	This error indicates a bad CPU. To remedy the problem, replace the CPU.
[Processor state may have been corrupted]	Any specific details that are included with this error message, such as addresses, might be inaccurate, and are unreliable for further troubleshooting.
[Restart IP Valid.]	This error indicates a bad CPU. To remedy the problem, replace the CPU.
[Second error detected.]	This error indicates a bad CPU. To remedy the problem, replace the CPU.
[Un-correctable ECC error.]	This error indicates memory ECC errors. See "ECC Errors" on page 27. See "DIMM Faults" on page 26.

Network Connectivity

Note – Review the *Sun Fire V20z and Sun Fire V40z Servers—Installation Guide* and the *Sun Fire V20z and Sun Fire V40z Servers—Server Management Guide* for detailed information about network connectivity.

- If you are unable to ping the SP ethernet port, use the Operator Panel to reset the IP address.
- If you are using DHCP, ensure that your DHCP server is up.

Network Share Volume

> **Note –** For detailed information about how to install, upgrade, and manage the Network Share Volume (NSV), see the *Sun Fire V20z and Sun Fire V40z Servers—Installation Guide, the Sun Fire V20z and Sun Fire V40z Servers—Server Management Guide* and the SM Console Online Help. See also "Restore Default Settings" on page 38.

Operating System

For information about installing and updating your server's operating system, see the *Sun Fire V20z and Sun Fire V40z Servers—Linux Operating System Installation Guide*, the *Sun Fire V20z and Sun Fire V40z Servers—Guide for Pre-installed Solaris 10 Operating System*, or other operating system vendor-supplied documentation.

- For information about ECC errors, see "ECC Errors" on page 27.
- For information about OS boot hangs, see "DIMM Faults" on page 26.

Operator Panel

> **Note –** For detailed information about the use of the Operator Panel buttons and other controls, see the *Sun Fire V20z and Sun Fire V40z Servers—Server Management Guide*.

This section provides troubleshooting ideas for problems with the Operator Panel LCD display.

Illuminated, Readable Text, Non-working Buttons

If the LCD is illuminated and readable text displays, but the buttons do not appear to work, there could be a problem with DHCP settings. It is possible that the SP cannot find a DHCP server.

1. **Use the SM Console or SM commands to ensure that the SP network is set to DHCP.**

2. **Reboot the SP.**

Note – For solutions to SP problems that cause this symptom, see the SP boot issues in "Service Processor" on page 41.

Illuminated, Unreadable Text

If the LCD is illuminated, but the text is unreadable, check and reseat the cables. If the problem persists, it might indicate that the motherboard is faulty. Replace the motherboard.

Illuminated, No Text

If the LCD is illuminated, but no text displays, one of the following might be the cause.

- If you performed a PIC Update, this symptom indicates that the boot mode probably has been altered and must be reset to defaults before the SP can boot. To accomplish this, see "Failure to Boot" on page 43, and "Failure to Boot after Downgrade" on page 45.

- If you updated PPCBoot, this symptom indicates that the update damaged the system. The system must be replaced.

- If you attempted to update PRS, this symptom indicates that the process did not complete, and that the system was damaged. The system must be replaced.

- If you did not perform any updates, the problem might be with the Operator Panel assembly. Replace the Operator Panel Assembly.

No Illumination

As noted in "Lights, LCD, LED" on page 30, if the panel is not illuminated, check the cable connections. If all cables are securely seated, other possible causes of this symptom include problems with the LCD, with the Operator Panel assembly, or with the motherboard.

PCI or PCI-X Hot-plugs

If a PCI or PCI-X card malfunctions, follow these guidelines, below.

Drivers and OS support for PCI or PCI-X hot-plug functionality - If you have problems with PCI or PCI-X hot-plug functionality, ensure that you have the proper drivers and operating system support on your server, and that you follow the requirements that are described in your server-specific documentation.

Errors with cards in hot-plug slots - If errors occur with cards in hot-plug slots, be sure that you use the AMD HotPlug Control Utility to remove power to the slot before you add or remove any PCI hot-plug devices.

Downloads and installations - Download the latest firmware, Option ROM (OPROM, Option BIOS), and device drivers for your operating system from the card manufacturer's Web site. Install the card's firmware first, then its OPROM, then the drivers.

OPROM enabled - If you install a SCSI card that should display a prompt to press **Ctrl-A** (or **Ctrl-C**, or **Ctrl-S**, or **Ctrl-any** key) to run the OPROM-based configuration utility, but the prompt never appears during boot time, ensure that the OPROM is not disabled. This problem might be caused by a jumper setting on the board. Press **F2** while you boot to run the BIOS Setup utility. From the Advanced menu, select PCI Configuration. Ensure that the OPROM scan is enabled for the card in question. You might receive an error such as:

```
Expansion ROM not initialized -PCI Mass Storage Controller in slot 3
Bus:3, Device:02, Function:01
```

This message indicates that the OPROM is enabled, but the initial size of the OPROM image is too large to fit in the standard OPROM shadow area. This means you cannot boot from the card, and if the card has a boot-time setup utility, you cannot use that functionality. If you disable other OPROMs (in order to free more OPROM shadow space), you might be able to load it. To do this, select PCI Configuration on the Advanced menu of the BIOS Setup utility.

Note – See the BIOS configuration information in the *Sun Fire V20z and Sun Fire V40z Servers—User Guide*.

Each OPROM image has an initial size when it is first loaded, but is later reduced to a smaller residual size. It might be possible to fit additional OPROMs, if you first load cards with larger initial sizes. To determine initial sizes, see the manufacturer's documentation.

OPROMs are scanned in this order:

1. On-board devices (Video, NICs, SCSI)

2. Physical Slot 1

3. Physical Slot 2

4. Physical Slot 3

5. Physical Slot 6

6. Physical Slot 7

7. Physical Slot 4

8. Physical Slot 5

Note – You can change the boot order from the Boot menu of the BIOS Setup utility, but you cannot change the order of OPROM scans.

Platform OS Does not Boot

This issue can result from poor cable connections or poorly seated hardware. If your platform OS does not boot, follow the steps below.

1. **Verify that AC power is available and that the AC power cord is connected securely to the AC connector on the server's power supply. If you have a server with two power supplies, ensure that both are connected securely. If you have a 2100 server, ensure that the AC switch on the back of the server is in the "on" position.**

2. **If you have power to the SP but not the platform, power down your server, unplug the AC connector from the wall, and remove the system cover. See the Hardware Components and Service document for instructions about how to remove the system cover.**

   a. **Ensure that the SCSI signal cable, SCSI power cable, and other internal cables are attached securely.**

   b. **Ensure that all DIMMs, DDR VRMs, and CPU VRMs are seated firmly in their respective slots.**

   c. **Remove all PCI option cards from the server.**

3. **Replace the system cover, reconnect the AC power, and reboot the server.**

   ■ If the platform does not boot, go to Step 7.

or

- If the platform boots without incident and you removed any PCI option cards as instructed in Step 2, go to Step 4.

4. **Power down the server, disconnect the AC power, and remove the system cover.**

5. **Re-install one of the PCI option cards.**

6. **Replace the system cover, reconnect the AC power, and reboot the server.**

- If the platform boots without incident, repeat Step 4, Step 5, and Step 6, until all PCI options cards are re-installed.

or

- If, after you re-install any PCI option card, the platform does not boot, you have isolated the problem to an individual PCI option card.

7. **Clear the server's CMOS jumper. Follow the procedure outlined in "Clear CMOS Jumper" on page 25.**

8. **Reboot the server.**

- If the platform boots without incident and you removed any PCI option cards, replace them, as instructed in Step 5 and Step 6, in order to isolate the option card that might have caused the problem.

or

- If the platform does not boot, it might be necessary to replace the motherboard.

Note – In versions 2.3 and later, you can set an IPMI boot option parameter to clear the CMOS. This eliminates the need to remove the system cover and move the jumper from the active position to the parked position.

PPCBoot - Bad CRC Error

This error message does **not** indicate a critical error. The situation that triggers this message occurs only when you connect via the Serial Port, perform a flash update, and disconnect or reset the SP before PPCBoot update completes.

Immediately after the "Bad CRC Error" message displays, the system retrieves the necessary environmental variables and writes them into the appropriate partition. On the next reboot, the error message does not display, unless you once again reset the SP before the PPCBoot update is complete.

Restore Default Settings

Note – Related material is included in "Failure to Retain User Accounts and Settings" on page 45.

If you experience general problems with the SP (or simply wish to restore its original settings), you can use the `sp reset to default-settings` command to restore selected settings.

Note – You also can use the LCD buttons on the Operator Panel to restore default settings. See the *Sun Fire V20z and Sun Fire V40z Servers—Server Management Guide* for details.

The SP configuration files are stored in a persistent file system in the `/pstore` directory. When the SP boots, it checks these files for existing configuration information. By default, the SP will reboot 60 seconds after the `sp reset to default-settings` command executes, unless you specify the `--nowait` option, in which case the reboot occurs immediately. A message displays every 20 seconds to indicate that the reboot will occur.

```
sp reset to default-settings {-a|--all}

[{-c|--config}] [{-n|--network}] [{-s|--ssh}]

[{-u|--users}] [{-W|--nowait}]
```

For example:

```
sp reset to default-settings {-a|--all}
```

The `--all` option resets all SP settings to their default configurations, including events and IPMI settings (files are deleted immediately).

Note – To reset IPMI settings only, do not use the SP command. Instead, use the IPMI command: `ipmi reset`. See the *Sun Fire V20z and Sun Fire V40z Servers—Server Management Guide* for more information about IPMI and about all commands.

SCSI Configuration Utility

Note – For detailed information about how to use the SCSI Configuration Utility that is included with your server, see the *Sun Fire V20z and Sun Fire V40z Servers—User Guide*.

RAID Properties Menu Item Disabled

To resolve this problem, check these points:

- Is the adapter in the boot adapter list?
- Does the LSI adapter have Integrated Mirroring firmware?
- Is an IM volume already created on each Fusion-MPT adapter in the system?
- Is "Disable Integrated RAID" set to Yes in the Global Properties screen?
- Are there at least two disks on the selected SCSI bus?

IM Volume Uses Extra SCSI ID

In this situation, the IM volume with two mirrored disks uses an extra SCSI ID off the bus—none of the physical disks of the IM volume has the same SCSI ID as the IM volume—and the configuration utility will not allow the disk at the ID that is currently defined as the volume ID to be configured.

To change the IM volume configuration so that it does not use an extra SCSI ID, but also keeps the same volume ID:

1. **Go to the RAID Properties screen. Determine which SCSI ID the primary disk is using and which SCSI ID the volume is using. Also determine the SCSI IDs of the remaining disks of the IM volume.**

2. **Set the IM volume disks to "No" and save the configuration—break the volume.**

3. **Return to the RAID Properties screen and reconfigure the IM volume in this manner:**
   - Primary disk at same ID as before.
   - Secondary disk at ID used previously by the volume.
   - Hot spare at SCSI ID used previously by the secondary disk.

4. To save the configuration, press Esc and follow the on-screen instructions. This creates the IM volume and triggers an automatic resync.

Configuration Utility Disables Selection of Disk

In this situation, the configuration utility does not allow a disk to be selected for an IM volume.

To determine why the disk cannot be selected, press **F4** on the RAID Properties screen. The diagnostic codes for each disk display in the **Size** column. Code definitions are in the table below.

TABLE 3-6 Diagnostic Codes for Disks

Code	Definition
0	Status is good.
1	Could not get serial number from disk.
2	Cannot confirm that disk has SMART capability.
3	Maximum disks have been configured for volume already.
4	Inquiry data that was returned says disk does not support wide, qtags, disconnects, or sector size is not 512 bytes.
5	User disabled qtags or disconnects for disk on device properties screen.
6	Partitions on disk exceed size that can be mirrored by an already selected secondary or hot spare disk.
7	Disk is not large enough to mirror partitions that are contained on selected primary disk.
8	Hot spare was detected while no IM volume exists. You must delete hot spare and save that configuration.
9	Disk partition uses some of all of the last 32 sectors of the disk (16 Kbytes). The last 32 sectors are required for IR (Integrated RAID) internal processing.
10	Disk has sector size other than 512 bytes.
11	Device is not a compatible device type; must be a non-removable disk.
12	Hot spare is too small to mirror volume.
13	Maximum disks already are configured for volume.

Service Processor

This section contains information about problems that are associated with the SP.

Note – For detailed information about how to set up, update, and use the SP, see the *Sun Fire V20z and Sun Fire V40z Servers—Installation Guide* and the *Sun Fire V20z and Sun Fire V40z Servers—Server Management Guide*.

'Booting SP . . . ' Displays on Operator Panel

If the SP image becomes corrupted, the SP fails to boot and the Operator Panel LCD continuously displays the message: 'Booting SP.' If left for a number of minutes, the fault light starts to blink and the SP reset button and the front buttons become inoperable. As a result of this issue, you will be unable to access or configure the SP via the Operator Panel, and the SP cannot monitor or manage the system.

A recovery operation is required. This operation is performed through the Operator Panel after an AC power reset.

1. **Setup the Java Update Server according to the procedures in the** *Server Management Guide***. Record the IP address of the server and the port number.**

2. **Disconnect the system from AC power.**

3. **Reconnect the system to AC power. The SP will start to boot and the following will be displayed on the front panel:**

   ```
   SP Boot: <3..2..1> secAny Key for menu
   ```

4. **Within three (3) seconds, press the Select (center) button on the Operator Panel to interrupt the SP boot process. After you do this, the Operator Panel LCD displays the following:**

   ```
   Menu:
   Update SP?
   ```

5. **Press the Select button to select the update operation. The following displays in the Operator Panel's LCD:**

   ```
   SP's IP addr:
   0.0.0.0
   ```

6. **Use the buttons on the Operator Panel to specify and enter the SP's IP address, Netmask, and Gateway address, according to the procedures outlined in the Systems Management Guide. After you specify the SP's network information, the following is displayed:**

```
Update from IP:
0.0.0.0
```

7. **Specify the IP address and port number of the Java Update Server you set up in Step 1, using the front panel buttons as described above.**

8. **Confirm the update with the Select (center) button.**

The SP update proceeds. You will be able to monitor the update process on the Update Server, as well as on the Operator Panel.

Note – If you do not see output from the Update Server or if the Operator Panel returns to the 'Booting SP' state, the SP could not reach the Update Server. Check your network connections and settings and try again.

When the update is complete, the SP should be fully operational.

Continuous Boot of SP

A failure to initialize is usually caused by networking problems that are related to either DHCP addressing or to the NSV server.

■ If configured for DHCP and the DHCP server is non-responsive or very slow to respond, the SP can take too long to initialize and be reset by the PRS chip. If this is the case, either repair the problem with the DHCP server or switch to static addressing.

■ A non-responsive or slow-to-respond NSV server can also cause initialization to fail. In this case, repair the problem with the NSV server, or use the sp delete mount command to remove the NSV mount from the SP.

Networking issues or general connectivity issues (if external access is enabled) usually cause loss of heartbeat. It can also be caused by intermittent problems on the SP, such as sensor lockup or application failure.

■ Verify that the SP network settings are still valid (for example, DHCP/Static IP addresses) and, if used, that the NSV mount point is valid and available.

■ Reboot the SP and see if the problem persists.

■ If it does, an AC power cycle of the system might be necessary to correct the problem.

- If possible, attempt to reload the SP software with the sp update flash all command from a known good image.

Note – For SP boot hangs, press the SP Reset button on the server's back panel. Also see "'Booting SP . . . ' Displays on Operator Panel" on page 41.

Failure to Boot

The boot mode probably has been altered. Reset the boot defaults. To accomplish this, first either:

- Log on to the SP with a Manager or Service account.

or

- Attach a PC to the Serial Port.

Via the SP

1. **Power down the server, disconnect the AC power cord(s), and remove the system cover.**

2. **Place a jumper on TH84 pin set, which is located at the end of the 66 MHz PCI-X slot. (Use the CMOS jumper for this purpose—from J110 or J125—if necessary.)**

3. **Establish an SSH session to the SP. Create an initial manager account as required, according to the procedures in the** *Sun Fire V20z and Sun Fire V40z Servers—Installation Guide***.**

4. **To create a service-level account, enter:**

   ```
   access add user -g service -u s -p s3.
   ```

5. **To su (super user) to the service account, enter:**

   ```
   su s
   ```

6. **To enable the root account, enter:**

   ```
   sp set root on
   ```

7. **Specify the service account password and new root account password, in response to the prompt. At the $ type prompt, to su to the root account, enter:**

   ```
   su -
   ```

8. **Specify the root account password you set in Step 5, in response to the next prompt. At the # type prompt, enter:**

   ```
   setenv uboot 0
   ```

9. **Power down the server, disconnect the AC power, and remove the system cover.**

10. **Remove jumper TH84.**

11. **Replace the system cover, reconnect the AC power, and power on the server.**

    The SP boot should succeed and the LCD should display appropriate text.

Via a PC Attached to the Serial Port

1. **Power down the server, disconnect the AC power cord(s), and remove the system cover.**

2. **Place a jumper on TH84 pin set, which is located at the end of the 66 MHz PCI-X slot. (Use the CMOS jumper for this purpose—from J110 or J125—if necessary.)**

3. **Move the jumper at J19 to set the SP output to the Serial Port.**

4. **Attach a PC to the Serial Port.**

5. **Replace the system cover and reconnect the AC power cord(s).**

6. **Power on the server. The Serial Power displays:**

   ```
   Hit any Key to Stop Autoboot = 0.
   ```

7. **Immediately press the space bar (within the first three seconds of the boot).**

8. **At the prompt => type:**

   saveenv

9. **Power down the server, disconnect the AC power cord(s), and remove the system cover.**

10. **Remove the jumper you placed on pin set TH84.**

11. **Replace the system cover, reconnect the AC power cord(s), and power on the server.**

    The SP boot should succeed and the LCD should display appropriate text.

Failure to Boot after Downgrade

If this problem occurs immediately after the SP starts booting, use the Operator Panel to update the flash. Details are in the *Sun Fire V20z and Sun Fire V40z Servers—Installation Guide* and the *Sun Fire V20z and Sun Fire V40z Servers—User Guide*.

Note – The `sp update flash all` command does not update `pstore` data.

Details about the `sp update flash all` command are in the *Sun Fire V20z and Sun Fire V40z Servers—Server Management Guide*.

Failure to Retain User Accounts and Settings

A corruption of the flash partition that is used to retain SP state information might cause the failure to retain user accounts and settings across an SP reboot or AC power reset. As a result of this issue you must reset desired settings after every SP reboot. This can occur even though the SP is operational and accessible.

To identify this issue, log on to the SP and enter the mount command. An entry for `/pstore` will not be present.

```
localhost $ mount
/dev/rd/0 on / type ext2 (rw)
none on /dev type devfs (rw)
proc on /proc type proc (rw)
localhost $
```

If you experience this problem, perform the following recovery operation through an SSH session.

1. **Establish an SSH session to the SP. Create an initial manager account as required, according to the procedures in the** *Server Management Guide***.**

2. **To create a service-level account, enter:**

   ```
   access add user -g service -u s -p s3
   ```

3. **To su to the service account, enter:**

   ```
   su s
   ```

4. **To enable the root account, enter:**

   ```
   sp set root on
   ```

5. **Specify the service account password and new root account password, in response.**

6. **To su to the root account, enter:**

   ```
   su -
   ```

7. **Specify the root account password set in Step 5, in response.**

8. **To erase the flash partition intended to contain SP state information, enter:**

   ```
   eraseall /dev/mtd/flashfs
   ```

9. **To reboot the SP, enter:**

   ```
   sp reboot
   ```

   After the reboot, the SP should be fully operational.

Mount to Network Share Volume

If you receive a permission error when you attempt to add the SP mount to the NSV, ensure that the remote mount has been granted read/write permission.

Persistent Storage Issues

If you monitor system events via any of the methods available with your server, you might receive error messages about persistent storage issues. It is unusual for the persistent storage area to become full during normal operations. If becomes full, and if root access was used to place other files into this space, remove them. Then remove configuration files, as appropriate. For example, use `access delete trust`, `access delete public key`, `sensor set -R`, `sp delete event`, and so on.

See "System Events" on page 79, for a list of system events and troubleshooting suggestions.

See the *Sun Fire V20z and Sun Fire V40z Servers—Server Management Guide* for information about all the available event-monitoring methods.

SSH Script Hangs

When you use SSH in a script to execute a console command, the `{-W|--nowait}` option applies as a parameter to SSH, rather than to the command you want to execute. To ensure that SSH returns immediately after the command is executed, use the `{-n|--no platform}` and the `{-f|--forced}` SSH options with the `{-W|--nowait}` option.

For example:

```
ssh -n -f manager@10.10.20.30 "platform set os state update-bios -i
10.10.100.200 -p 5555 -r LATEST -W"
```

Update Failed

If you attempted to update the SP, but the update failed, verify that the update server has been loaded, and that you have specified the correct IP and the correct port number.

If you attempted to update the BIOS, but the update failed, ensure that you have the correct version of the BIOS image.

Note – See the *Sun Fire V20z and Sun Fire V40z Servers—Server Management Guide* for detailed information about how to use the update server.

System Events

System events can yield important information about problems or potential problems in the system. You can use any of these methods to monitor system events:

- Use the sp get events command. See the *Sun Fire V20z and Sun Fire V40z Servers—Server Management Guide* or the SM Console Online Help for more information about this and other commands.

- Use the SM Console. All events that display in the SM Console also appear in the system events log. See the *Sun Fire V20z and Sun Fire V40z Servers—Server Management Guide* for information about the Web-based SM console.

- Use the Operator Panel. All events that display in the Operator Panel or that trigger the system fault light also appear in the system events log. See the *Sun Fire V20z and Sun Fire V40z Servers—Server Management Guide* for information about the Operator Panel.

- Use Simple Network Management Protocol (SNMP). You can configure SNMP to issue notifications when certain events occur. See the *Sun Fire V20z and Sun Fire V40z Servers—Server Management Guide* for information about SNMP integration.
- Use Intelligent Platform Management Interface (IPMI). The IPMI system events log records some types of system events. See the *Sun Fire V20z and Sun Fire V40z Servers—Server Management Guide* for more information about IPMI systems management and the IPMI systems events log.

The system provides information that you can use to evaluate the problem. The format and types of information that the system returns vary slightly among the four monitoring methods that are listed above. This information can include:

- Name of the component
- Type of component (software update, hardware machine check, and so on)
- Severity of the event
- Brief message that describes the event
- Detailed message that describes the event

View events - When a system event occurs, the system fault LED on the front panel blinks. To view the critical event that caused the alert, run the command `sp get events`.

Reset system fault LED - To reset the system fault LED, you must delete critical events from the SP event log or clear the log, completely.

Clear - To clear the entire event log, run the command `sp delete event -a`.

Delete specific events - To delete selected events from the log, run the command `sp delete event event-id-number`.

Note – Appendix B, "System Events" provides additional event details and specific troubleshooting steps for all possible system events.

Thermal Trip Events

When your CPU experiences a thermal trip, an event is issued that indicates that the platform has been shut down. For example:

```
CPU 0 has thermally tripped and shut down. Powering off System.
```

When this condition occurs, the system fault LED on the front panel blinks. To fix this condition:

1. **Correct the airflow problem that caused the thermal trip (fan failure, environment became too hot, cover was off too long, and so on).**

2. **After the system cools, remove all AC power to the system (remove the plug on both power supplies) for 30 seconds.**

3. **Plug the system in again.**

4. **Boot the system normally.**

VRM Crowbar Assertions

VRM crowbar assertions occur when a CPU or a DDR VRM detects a voltage condition or a temperature condition that exceeds the threshold. When this occurs, either the SP or the PRS forcefully shuts down the system. (Usually, the PRS shuts the system down, since the crowbar signal usually causes the VRM to stop confirmation of the "power good" signal).

When the condition clears, the system is allowed to resume power. While the crowbar is asserted, the system fault LED blinks and the front panel power button, the `platform set power` command and the `platform os state` command are disabled.

Note – See "System Events" on page 79 for more information about power supply and power good signal events. See "Machine Check Error" on page 31 for more information about all machine check errors.

Diags Test Results

This section provides additional details about the diagnostics tests that might help to determine the cause of the problems. The details include annotated output of the tests, descriptions of the test algorithms, possible test failure cases, and additional troubleshooting suggestions.

Test Descriptions

This appendix describes the steps that a diagnostics test performs, and the components that might trigger a failure.

- The platform must be off before you start diagnostics, unless you use the –n argument.
- Starting diagnostics applies power to the platform, starts the non-standby fans, and begins loading the platform diagnostic system.
- Starting diagnostics in no-platform mode (diags start –n command) keeps the current platform state "as is" and allows execution of only the SP diagnostic modules. Memory, storage, and NIC test modules are unavailable in this mode.

Voltage

The voltage limits test verifies that each voltage is within the high and low limits that are defined for that voltage.

Voltage Trimming

Note – If a given voltage supports trimming, the trimming function is exercised.

The voltage trim failure criteria is plus or minus 2 percent from the reading at nominal trim, with the exception of the low trim on the Bulk 3.3V S5 which is trimHi > trimNom > trimLo.

The limits test reads the initial trim setting that is associated with the voltage that is tested, before it reads the voltage from the analog-to-digital conversion (ADC).

If the voltage is within limits, the diagnostic reads the voltage again, with the trim set to nominal, then high, and finally low, and saves the value of each reading as a variable. The actual codes for nominal, low, and high settings vary among VRMs, the CPUs and the power supplies.

Voltage Read

If the nominal values of the monitored voltages is greater than 2.0 volts each, they are normalized to 2.0 volts by a divider network, before they are applied to the inputs of the ADC. The input range of the ADC is 0.0 to 2.5 Volts. The voltage calculation is:

```
Voltage  = reading *  2.5 / 4096
```

The result then is scaled, based on the nominal voltage of the net that is tested. For example,for VCC_120_S0 (12 volts); the voltage (V) would be multiplied by 6.0. (The voltage was divided by 6 in the divider network to obtain the nominal 2.0 volts input.)

The voltage is read 5 (five) times and the result is the average of the 5 (five) readings.

Test Results

Non-Trim Voltage Passed

```
limits.bulk.v2_5-s0          88              Passed
    Test Details:
        Actual:              2.485
        Nominal:             2.500
        Maximum Limit:       2.625
        Minimum Limit:       2.375
        Sensor:              Bulk 2.5V S0 voltage (ID=bulk.v2_5-s0)
        Component(s):        Motherboard (ID=planar.vpd)
```

Trim Voltage Passed

```
limits.bulk.v3_3-s0          91              Passed
    Test Details:
        Actual Trim High:   3.400
        Actual Trim Nominal: 3.321
        Actual Trim Low::    3.237
        Nominal:             3.300
        Maximum Limit:       3.465
        Minimum Limit:       3.135
        Sensor:              Bulk 3.3V S0 voltage (ID=bulk.v3_3-s0)
        Component(s):        Motherboard (ID=planar.vpd)
```

Voltage Exceeds Limit Failure

```
limits.bulk.v1_8-s5          46              FAILED
    Failure Details:
        Failure:             Voltage exceeds maximum limit.
        Actual:              1.932
        Nominal:             1.800
        Maximum Limit:       1.890
        Minimum Limit:       1.710
        Sensor:              Bulk 1.8V S5 voltage (ID=bulk.v1_8-s5)
        Component(s):        Motherboard (ID=planar.vpd)
```

Hardware Failure

```
limits.bulk.v1_8-s5            46                 FAILED

    Failure Details:

        Failure:                Unable to set voltage trim.  No such
device or address.

        Sensor:                 Bulk 1.8V S5 voltage (ID=bulk.v1_8-s5)

        Component(s):           Motherboard (ID=planar.vpd)
```

Fan

This test verifies that the maximum speed of the fan is within spec and that the fan speed can be controlled.

At the start of the test, all fans are set to full on. This bypasses the internal control loop to drive the fans to full speed as rapidly as possible. When the fans have settled at the target speed for 24 seconds, the maximum speed is recorded. Next, the fans are set to run at the low speed. When the fans have settled at the target speed for 24 seconds, the low speed is recorded. The speed readings are compared to the upper and lower limits, to determine if the test failed.

The fans sometimes will approach the set-point asymptotically and hover slightly outside of the desired range. The tandem fans (fan0,1 fan2,3 fan 4,5) exhibit a characteristic increase in speed on the order of 1000 RPM in the downwind fan (fans1,3,5). Each fan controller has an internal clock that is specified at +/-(plus or minus) 10 percent, plus variations for temperature and voltage.

The allowable tolerances for determination of pass/fail currently allow a deviation of -10/+35% (minus 10 to plus 35 percent) for the high limits and -/+15% (minus 15 to plus 15 percent) for the low limits.

Fan Controller Programming

Before it manipulates the fan controller, the test saves the initial state of the fan controller, in order to restore this initial state after completion of the test.

Each controller manages two fans, a primary and a secondary. Each fan has a tachometer output that produces 2 (two) pulses-per-revolution. The master fan's tachometer output (tach0) is the feedback signal for the internal control loop of the controller. The slave fan's tachometer output (tach1) is used only for reading the speed of the slave fan. The controller supports open loop or closed-loop operation, as well as full on and off control.

Test Results

All results are from a Sun Fire V40z Server. A Sun Fire V20z Server has similar output, with fewer fan groups.

Fans Passed

```
speed.allFans                   2               Passed
    Test Details:
        fan1.tach         Passed
            Controller:   fan-ctrl2
            High Rated:   8000
            High Actual:  7920
            High Delta:   -1.01%
            High Limits:  -10/+35%
            Low Setpoint: 6160
            Low Expected: 6098
            Low Actual:   6780
            Low Delta:    10.05%
            Low Limits:   -/+15%
            Sensor:       Fan 1 measured speed (ID=fan1.tach)
            Component(s): Fan 1 (ID=NA)
        fan2.tach         Passed
            Controller:   fan-ctrl2
            High Rated:   8000
            High Actual:  8580
            High Delta:   +6.76%
            High Limits:  -10/+35%
            Low Setpoint: 6160
            Low Expected: 6607
            Low Actual:   7320
            Low Delta:    9.75%
            Low Limits:   -/+15%
            Sensor:       Fan 2 measured speed (ID=fan2.tach)
            Component(s): Fan 2 (ID=NA)
        fan3.tach         Passed
            Controller:   fan-ctrl3
```

```
                High Rated:   8000
                High Actual:  8100
                High Delta:   +1.23%
                High Limits:  -10/+35%
                Low Setpoint: 6160
                Low Expected: 6237
                Low Actual:   6900
                Low Delta:    9.61%
                Low Limits:   -/+15%
                Sensor:       Fan 3 measured speed (ID=fan3.tach)
                Component(s): Fan 3 (ID=NA)
        fan4.tach         Passed
                Controller:   fan-ctrl3
                High Rated:   8000
                High Actual:  8760
                High Delta:   +8.68%
                High Limits:  -10/+35%
                Low Setpoint: 6160
                Low Expected: 6745
                Low Actual:   7320
                Low Delta:    7.85%
                Low Limits:   -/+15%
                Sensor:       Fan 4 measured speed (ID=fan4.tach)
                Component(s): Fan 4 (ID=NA)
```

High Speed Failure

```
speed.allFans                    1              FAILED
    Failure Details:
        fan1.tach         FAILED
                Failure:      fan1 is excessively fast at high speed
setting; inlet air path may be obstructed.
                Controller:   fan-ctrl2
                High Rated:   8000
                High Actual:  10900
                High Delta:   +36.25%
                High Limits:  -10/+35%
```

```
              Low Setpoint: 6160
              Low Expected: 6329
              Low Actual:   6900
              Low Delta:    8.27%
              Low Limits:   -/+15%
              Sensor:       Fan 1 measured speed (ID=fan1.tach)
              Component(s): Fan 1 (ID=NA)


speed.allFans                    2              FAILED
    Test Details:
        fan1.tach       FAILED
              Failure:      fan1 is too fast at low setting.
              Controller:   fan-ctrl2
              High Rated:   8000
              High Actual:  7920
              High Delta:   -1.01%
              High Limits:  -10/+35%
              Low Setpoint: 6160
              Low Expected: 6098
              Low Actual:   7200
              Low Delta:    16.88%
              Low Limits:   -/+15%
              Sensor:       Fan 1 measured speed (ID=fan1.tach)
              Component(s): Fan 1 (ID=NA)
```

Low Speed Failure

```
speed.allFans                    1              FAILED
    Failure Details:
        fan1.tach       FAILED
              Failure:      fan1 is too slow at low setting.
              Controller:   fan-ctrl2
              High Rated:   8000
              High Actual:  8760
              High Delta:   +8.68%
              High Limits:  -10/+35%
```

```
                Low Setpoint: 6160
                Low Expected: 6329
                Low Actual:   5200
                Low Delta:    -18.46%
                Low Limits:   -/+15%
                Sensor:       Fan 1 measured speed (ID=fan1.tach)
                Component(s): Fan 1 (ID=NA)


        speed.allFans                   2               FAILED
            Failure Details:
                fan1.tach         FAILED
                    Failure:      fan1 is too slow at high setting.
                    Controller:   fan-ctrl2
                    High Rated:   8000
                    High Actual:  7000
                    High Delta:   -14.28%
                    High Limits:  -10/+35%
                    Low Setpoint: 6160
                    Low Expected: 6098
                    Low Actual:   6780
                    Low Delta:    10.05%
                    Low Limits:   -/+15%
                    Sensor:       Fan 1 measured speed (ID=fan1.tach)
                    Component(s): Fan 1 (ID=NA)
```

Memory

The memory tests are implemented as a loadable kernel module and a user-space component. The kernel module implements ioctl functions that actually perform most of the tests.

Note – For versions earlier than 2.x.x.x, ensure that interleaving is disabled in BIOS setup before you run the memory tests. For 2.x.x.x and higher versions, do not disable interleaving in BIOS.

March Test

Data is written to memory from bottom to top. First it writes all 0x0. Then, as it reads and checks the 0x0, it writes 0x5. As it reads and checks the 0x5, it writes 0x0. Then it starts reading from the top, moving toward the bottom. As it reads and checks for 0x0, it writes 0x5. As it reads and checks 0x5, it writes 0x0. Then it reads and checks the 0x0. This entire process is repeated, but 0x5 is replaced with 0xa.

RandAddr Test

Data is written to memory starting from the bottom, moving toward the top. The location of the memory data is written in the address space. Then, the test performs a random check on an address space. If the space does not contain data that is the same as the address, the test fails.

Retention Test

Data is written to memory starting from the bottom, moving toward the top. The test fills the memory, alternating between 0x5 and 0xa, to achieve a checkerboard layout in memory. It pauses for 100 ms, then reads and checks the memory for 0x5 and 0xa.

Test Results

Memory Tests Passed

```
march.allDimms                    PF3              Passed
     Test Details:
          Memory Configuration: Total: 3072Mb
          CPU0-1024Mb CPU1-2048Mb
          CPU0: Width[128] Addr 0 - 3fffffff
           DIMM 0   256Mb Addr 0000000000 - 001fffffff Even Quad Word
           DIMM 1   256Mb Addr 0000000000 - 001fffffff Odd Quad Word
           DIMM 2   256Mb Addr 0020000000 - 003fffffff Even Quad Word
           DIMM 3   256Mb Addr 0020000000 - 003fffffff Odd Quad Word


randaddr.allDimms                 PF4              Passed
     Test Details:
          Memory Configuration: Total: 3072Mb
          CPU0-1024Mb CPU1-2048Mb
          CPU0: Width[128] Addr 0 - 3fffffff
           DIMM 0   256Mb Addr 0000000000 - 001fffffff Even Quad Word
           DIMM 1   256Mb Addr 0000000000 - 001fffffff Odd Quad Word
           DIMM 2   256Mb Addr 0020000000 - 003fffffff Even Quad Word
           DIMM 3   256Mb Addr 0020000000 - 003fffffff Odd Quad Word


retention.allDimms                PF5              Passed
     Test Details:
          Memory Configuration: Total: 3072Mb
          CPU0-1024Mb CPU1-2048Mb
          CPU0: Width[128] Addr 0 - 3fffffff
           DIMM 0   256Mb Addr 0000000000 - 001fffffff Even Quad Word
           DIMM 1   256Mb Addr 0000000000 - 001fffffff Odd Quad Word
           DIMM 2   256Mb Addr 0020000000 - 003fffffff Even Quad Word
           DIMM 3   256Mb Addr 0020000000 - 003fffffff Odd Quad Word
```

Service Failure

```
retention.allDimms          PF1            FAILED
    Failure Details:
        Failure: Unable to load services.
```

ECC Failure

```
march.allDimms                1             FAILED
    Test Details:
        Failure: ECC ERROR @ Address:0x01a000e700:CPU1, DIMM - 2
CPU 1 DIMM 2 (ID=cpu1.mem2.vpd)
        Correctable, Syndrome 0x18, Multiple Errors Occurred
        CPU1 Function 3 ECC Registers:
00          MCA NB STAT LOW: 85080a13  MCA NB STAT HIGH: 85080a13
        Memory Configuration: Total: 7680Mb
        CPU0-2560Mb CPU1-5120Mb
        CPU0: Width[128] Addr 0 - 9fffffff
         DIMM 0 0256Mb Addr 0080000000 - 009fffffff Even Quad Word
         DIMM 1  256Mb Addr 0080000000 - 009fffffff Odd Quad Word
         DIMM 2 1024Mb Addr 0000000000 - 007fffffff Even Quad Word
         DIMM 3 1024Mb Addr 0000000000 - 007fffffff Odd Quad Word
        CPU1: Width[128] Addr a0000000 - 1dfffffff
         DIMM 0 2048Mb Addr 00a0000000 - 019fffffff Even Quad Word
         DIMM 1 2048Mb Addr 00a0000000 - 019fffffff Odd Quad Word
        *DIMM 2  512Mb Addr 01a0000000 - 01dfffffff Even Quad Word
         DIMM 3  512Mb Addr 01a0000000 - 01dfffffff Odd Quad Word
```

BIOS Setting Failure

```
march.allDimms                1             FAILED
    Test Details:
        Failure: Need to disable interleaving in BIOS setup before
running memory tests.
Data Comparison Failure
march.allDimms                1             FAILED
    Test Details:
        Failure: Data Miscompare @ Addr 0x1a0000008, CPU 1 DIMM 3
```

```
        Expected   : [5555555555555555]
        Observed   : [5555555555505555]
        Difference : [50000]

        Memory Configuration: Total: 7168Mb
        CPU0-2560Mb CPU1-4608Mb
        CPU0: Width[128] Addr 0 - 9fffffff
         DIMM 0  256Mb Addr 0080000000 - 009fffffff Even Quad Word
         DIMM 1  256Mb Addr 0080000000 - 009fffffff Odd Quad Word
         DIMM 2 1024Mb Addr 0000000000 - 007fffffff Even Quad Word
         DIMM 3 1024Mb Addr 0000000000 - 007fffffff Odd Quad Word
        CPU1: Width[128] Addr a0000000 - 1bffffff
         DIMM 0 2048Mb Addr 00a0000000 - 019fffffff Even Quad Word
         DIMM 1 2048Mb Addr 00a0000000 - 019fffffff Odd Quad Word
         DIMM 2  256Mb Addr 01a0000000 - 01bfffffff Even Quad Word
        *DIMM 3  256Mb Addr 01a0000000 - 01bfffffff Odd Quad Word

   randaddr.allDimms            2              Passed
      Test Details:
        Memory Configuration: Total: 7168Mb
        CPU0-2560Mb CPU1-4608Mb
        CPU0: Width[128] Addr 0 - 9fffffff
         DIMM 0  256Mb Addr 0080000000 - 009fffffff Even Quad Word
         DIMM 1  256Mb Addr 0080000000 - 009fffffff Odd Quad Word
         DIMM 2 1024Mb Addr 0000000000 - 007fffffff Even Quad Word
         DIMM 3 1024Mb Addr 0000000000 - 007fffffff Odd Quad Word
        CPU1: Width[128] Addr a0000000 - 1bffffff
         DIMM 0 2048Mb Addr 00a0000000 - 019fffffff Even Quad Word
         DIMM 1 2048Mb Addr 00a0000000 - 019fffffff Odd Quad Word
         DIMM 2  256Mb Addr 01a0000000 - 01bfffffff Even Quad Word
         DIMM 3  256Mb Addr 01a0000000 - 01bfffffff Odd Quad Word

   retention.allDimms           3              FAILED
      Test Details:
        Failure: Data Miscompare @ Addr 0x1a0000008, CPU 1 DIMM 3
        Expected   : [5555555555555555]
```

```
          Observed   : [5555555555505555]
          Difference : [50000]


          Memory Configuration: Total: 7168Mb
          CPU0-2560Mb CPU1-4608Mb
          CPU0: Width[128] Addr 0 - 9fffffff
           DIMM 0  256Mb Addr 0080000000 - 009fffffff Even Quad Word
           DIMM 1  256Mb Addr 0080000000 - 009fffffff Odd Quad Word
           DIMM 2 1024Mb Addr 0000000000 - 007fffffff Even Quad Word
           DIMM 3 1024Mb Addr 0000000000 - 007fffffff Odd Quad Word
          CPU1: Width[128] Addr a0000000 - 1bffffff
           DIMM 0 2048Mb Addr 00a0000000 - 019fffffff Even Quad Word
           DIMM 1 2048Mb Addr 00a0000000 - 019fffffff Odd Quad Word
           DIMM 2  256Mb Addr 01a0000000 - 01bfffffff Even Quad Word
          *DIMM 3  256Mb Addr 01a0000000 - 01bfffffff Odd Quad Word
```

NIC

The NIC phyLoop test performs a loopback test at the PHY. To accomplish this, the test sets the PHY loopback mode in the NIC device driver, initializes a 1500-byte data buffer with an incrementing byte pattern [0x00,0x01,0x02…0xff], and writes the data to the NIC. Next, the test initializes a second buffer with a fixed 0xe5 pattern and read 1500 bytes from the NIC. The test compares the data that is written from that read. Finally, the test sets the loopback mode off.

Test Results

NIC Passed

```
phyLoop.Nic.0                  PF1           Passed
    Test Details:
        Component(s): Motherboard (ID=planar.vpd)
phyLoop.Nic.1                  PF2           Passed
    Test Details:
        Component(s): Motherboard (ID=planar.vpd)
```

Service Failure

```
Unable to load the driver bcm5700.
phyLoop.Nic.0                    PF1            FAILED
    Failure Details:
        Failure:      Unable to load service.
        Component(s): Motherboard (ID=planar.vpd)
```

Link Down Failure

```
The link status of the device is down.
phyLoop.Nic.0                    PF1            FAILED
    Failure Details:
        Failure:      Link is down.
        Component(s): Motherboard (ID=planar.vpd)
```

Link Setting Mismatch Failure

```
The link status of the device is mismatched.
phyLoop.Nic.0                    PF1            FAILED
    Failure Details:
        Failure:      Link setting mismatch.
        Component(s): Motherboard (ID=planar.vpd)
```

Link Status Unknown Failure

```
The link status of the device is unknown.
phyLoop.Nic.0                    PF1            FAILED
    Failure Details:
        Failure:      Link status unknown.
        Component(s): Motherboard (ID=planar.vpd)
```

Loopback Failure

```
The loopback is off.
phyLoop.Nic.0                    PF1            FAILED
    Failure Details:
        Failure:      Loopback is off.
```

```
                      Component(s): Motherboard (ID=planar.vpd)
```

Write Failure

```
Unable to write to loopback device.
phyLoop.Nic.0                     PF1              FAILED
     Failure Details:
         Failure:     Write error. Tried to write <X> bytes, only
wrote <Y>.
         Component(s): Motherboard (ID=planar.vpd)
```

Read Failure

```
Unable to read the loopback device.
phyLoop.Nic.0                     PF1              FAILED
     Failure Details:
       Failure:     Read error. Tried to read <X> bytes, only read <Y>.
         Component(s): Motherboard (ID=planar.vpd)
```

Comparison Failure

A reading from the device is different from what was just written. The offset of the
failure is the hex offset from the beginning of the data buffer. Expected and actual
are the first hex byte that mismatched.

```
phyLoop.Nic.1                     PF2              FAILED
     Failure Details:
        Failure:     Compare error. At offset 343 expected 43, got bc.
         Component(s): Motherboard (ID=planar.vpd)
```

Storage

The storage tests issue self-test commands to SCSI devices. There are both long and short forms of the self-test command. The execution time of the tests is a function of the device itself.

If the device is present, a SCSI subsystem control block that contains either the short or the long form of the Send Diagnostic command is passed to the SCSI driver for execution.

Test Results

Storage Passed

```
long.SCSI_0                    PF1              Passed
    Test Details:
        Device: SEAGATE  ST336607LC
        Version: 0004
        Serial number: 3JA0KJF6000073248EGM
        Device type: disk
        Component(s): Hard disk drive 0 (ID=NA)
```

Device Does Not Recognize Self-test Command Failure

```
The device does not recognize the self-test command.
short.SCSI_1                  PF2              FAILED
    Failure Details:
       Failure:    Error starting DST background short test: Illegal
Request
        Component(s): Hard disk drive 1 (ID=NA)
```

Device Cannot Process Self-test Command Failure

```
The device is unable to accept and process self-test commands. The
output includes the  SCSI sense key.
short.SCSI_1                   PF2              FAILED
    Failure Details:
        Failure:     SCSI command failed: Sense Key[3]: Not Ready
        Component(s): Hard disk drive 1 (ID=NA)
```

```
The following is the list of sense keys.
No Sense
Recovery Data
Not Ready
Medium Error
Hardware Error
Illegal Request
Unit Attention
Data Protect
Blank Check
Vendor Specific
Copy Aborted
Volume Overflow
Miscompare
Reserved
```

Self-test Failure

The self-test command fails. The "Address of first failure" represents which segment of the vendor's test failed.

```
short.SCSI_1                    PF2              FAILED
    Failure Details:
        Failure:      Test failed (Failing segment) Address of first
failure{0x0}.
        Component(s): Hard disk drive 1 (ID=NA)
```

Self-test Corruption Failure

This self-test command returned garbage.

```
short.SCSI_1                    PF2              FAILED
    Failure Details:
      Failure:      Invalid Self-Test Results Page Returned by System.
        Component(s): Hard disk drive 1 (ID=NA)
```

Flash Memory

The flash memory diagnostic verifies that the SP flash memory can be written. Each iteration of the diagnostic flips 2 bits (1 in each chip) from their initial erased state (1) to a 0. Eventually, all of the "1" bits in the diagnostic area of the flash are "used up" and the diagnostic sector of the flash is erased during the test, before it writes the 2 bits.

Test Results

Most of the possible failures are related to difficulties accessing the flash part through the MTD driver. These are unlikely to occur and most likely point to a software problem. If these persist, the first attempt at remediation is to erase and re-program the entire flash of the Service Processor. See the Systems Management Guide for information about how to update the Service Processor.

Flash Memory Passed

```
write.flash                 2              Passed
    Test Details:
        Component(s): Motherboard (ID=planar.vpd)
```

Open System Failure

Unable to open the flash sector for read/write access.

```
write.flash                 1              FAILED
    Failure Details:
        Failure:     Unable to open flash driver: <errno string>
        Component(s): Motherboard (ID=planar.vpd)
```

Read System Failure

Unable to read the flash sector.

```
write.flash                 1              FAILED
    Failure Details:
        Failure:     Unable to read flash memory: <errno string>
        Component(s): Motherboard (ID=planar.vpd)
```

Access Device Failure

Unable to determine the size of the flash sector.

```
write.flash                    1              FAILED
    Failure Details:
       Failure:      Can't determine erase size of device: <errno
string>
       Component(s): Motherboard (ID=planar.vpd)
```

Write System Failure

Unable to write to the flash sector.

```
write.flash                    1              FAILED
    Failure Details:
       Failure:      Unable to write flash memory: <errno string>
       Component(s): Motherboard (ID=planar.vpd)
```

Erase Failure

Unable to erase the flash sector. This error could indicate a defective part or other hardware error.

```
write.flash                    1              FAILED
    Failure Details:
       Failure:      Erase operation failure: <errno string>
       Component(s): Motherboard (ID=planar.vpd)
```

Magic Number Failure

The magic number at offset 0x0 of the flash reserved partition is not correct. Expected value is 0x44494147 or 0xffffffff (erased). This could indicate that some process inadvertently wrote to the diagnostics area. Re-flash the Service Processor and re-test. See the Systems Management Guide for information about how to update the Service Processor.

```
write.flash                    1              FAILED
    Failure Details:
       Failure:      Magic number of diagnostics area incorrect,
Expected [0x44494147], Actual [0xNNNNNNNN].
       Component(s): Motherboard (ID=planar.vpd)
```

Data Comparison Failure

A reading of the flash sector is different from what was just written. This is probably a hardware failure. Re-flash the Service Processor and re-test. See the Systems Management Guide for information about how to update the Service Processor.

```
write.flash                    1              FAILED

    Failure Details:

        Failure:     Data Miscompare: Expected [0xNNNNNNNNN], Actual
[0xNNNNNNNNN].

        Component(s): Motherboard (ID=planar.vpd)
```

LED

This group of tests verifies functionality of the LED drivers. The test consists of reading the bit of interest in the I2C-connected LED driver chip, inverting the value of that bit, writing it to the chip, reading the new value, verifying that it is indeed toggled, writing the initial value and again verifying that it is correct. The LED does not change to indicate this behavior.

Test Results

The following examples are from a 4300 server. Although a 2100 server has fewer and different LED components, the test output is similar. The examples comprise a condensed version of the report.

LED Passed

```
toggleLED.allLeds              3              Passed

    Test Details:

        cd              Passed

            Sensor:     CDROM Light path location LED (ID=cd.lp)

            Component(s): CD ROM drive (ID=NA)

        cpu0            Passed

            Sensor:     CPU 0 Light path location LED (ID=cpu0.lp)

            Component(s): CPU 0 (ID=cpu0.vpd)

        cpu0.mem0       Passed

            Sensor:     CPU 0 Dimm 0 Light path location LED (ID=
cpu0.mem0.lp)

            Component(s): CPU 0 DIMM 0 (ID=cpu0.mem0.vpd)
```

```
cpu0.mem1          Passed
    Sensor:        CPU 0 Dimm 1 Light path location LED (ID=
cpu0.mem1.lp)
    Component(s): CPU 0 DIMM 1 (ID=cpu0.mem1.vpd)
cpu0.mem2          Passed
    Sensor:        CPU 0 Dimm 2 Light path location LED (ID=
cpu0.mem2.lp)
    Component(s): CPU 0 DIMM 2 (ID=cpu0.mem2.vpd)
cpu0.mem3          Passed
    Sensor:        CPU 0 Dimm 3 Light path location LED (ID=
cpu0.mem3.lp)
    Component(s): CPU 0 DIMM 3 (ID=cpu0.mem3.vpd)
cpu0.memvrm        Passed
    Sensor:        CPU 0 Memory VRM Light path location LED
(ID=cpu0.memvrm.lp)
    Component(s): CPU 0 memory VRM (ID=cpu0.memvrm.vpd)
cpu0.vrm           Passed
    Sensor:        CPU 0 VRM Light path location LED (ID=
cpu0.vrm.lp)
    Component(s): CPU 0 VRM (ID=cpu0.vrm.vpd)
cpuplanar          Passed
    Sensor:        Daughtercard Light path location LED (ID=
cpuplanar.lp)
    Component(s): CPU Daughter Card (ID=cpuplanar.vpd)
fault              Passed
    Sensor:        System Fault Indication (ID=faultswitch)
    Component(s): Fault light (ID=NA)
floppy             Passed
   Sensor:        Floppy Light path location LED (ID=floppy.lp)
    Component(s): Floppy disk drive (ID=NA)
oppanel            Passed
   Sensor:        LCD Light path location LED (ID=frontpanel.lp)
    Component(s): Front panel (ID=pic.vpd)
identify           Passed
    Sensor:        Identify switch (ID=identifyswitch)
    Component(s): Identify light (ID=NA)
front-fans         Passed
   Sensor:       Fan Board Light path location LED (ID=pcifan.lp)
```

```
              Component(s): Front Fan backplane (ID=NA)
        planar          Passed
            Sensor:     Motherboard Light path location LED (ID=
planar.lp)
            Component(s): Motherboard (ID=planar.vpd)
        disk-backplane  Passed
            Sensor:     SCSI Backplane Light path location LED (ID=
scsibp.lp)
            Component(s): SCSI backplane (ID=scsibp.vpd)
```

Device Not Present Warning

```
toggleLED.allLeds              3               Warning
    Test Details:
        cd              Not Present
            Sensor:     CDROM Light path location LED (ID=cd.lp)
            Component(s): CD ROM drive (ID=NA)
```

Read Failure

```
Unable to read the device.
toggleLED.allLeds              3               FAILED
    Test Details:
        planar          FAILED
            Failure:    Unable to read LED. <errno string>
            Sensor:     Motherboard Light path location LED (ID=
planar.lp)
            Component(s): Motherboard (ID=planar.vpd)
```

Write Failure

```
Unable to write to the device.
toggleLED.allLeds              3               FAILED
    Test Details:
        planar          FAILED
            Failure:    Unable to write to LED. <errno string>
            Sensor:     Motherboard Light path location LED (ID=
planar.lp)
            Component(s): Motherboard (ID=planar.vpd)
```

Temperature

Each temperature sensor is initialized and the current temperature is read from the device. The temperature then is compared against critical and warning thresholds. If a threshold is exceeded, a failure is indicated.

Use the SP command `sensor get` to view the current threshold settings for a given temperature.

```
localhost # sensor get -i cpu0.temp -cwWC

Identifier   Crit Low Warn Low Warn High Crit High

cpu0.memtemp NA       NA        68.00     70.00
```

Test Results

If the temperature is within allowable ranges, the reading is displayed in degrees Celsius.

Temperature Passed

```
read.cpu0.memtemp               1               Passed

    Test Details:

        Temperature:  67.3

        Sensor:       CPU 0 Memory temperature (ID=cpu0.memtemp)

        Component(s): Motherboard (ID=planar.vpd)
```

Reading Exceeds Warning Threshold Passed

The temperature reading is either above or below the warning threshold.

```
read.ambient.temp               2               Passed

    Test Details:

        Temperature:  26.8

        Warning:      Temperature exceeds the warning threshold of
22.0, but is still safe.

        Sensor:       Ambient air temp (ID=ambienttemp)

        Component(s): Box (enclosure) (ID=NA)
```

Device Not Present Warning

The device is not present.

```
Read.cpu0.memtemp                1                 Warning
    Failure Details:
        Failure:       Device not present.
        Sensor:        CPU 0 Memory temperature (ID=cpu0.memtemp)
        Component(s):  Motherboard (ID=planar.vpd)
```

Read Failure

Unable to read the device.

```
read.cpu0.memtemp                1                 FAILED
    Failure Details:
        Failure:     Unable to read device temperature.
        Sensor:        CPU 0 Memory temperature (ID=cpu0.memtemp)
        Component(s): Motherboard (ID=planar.vpd)
```

Reading Exceeds Critical Threshold Failure

The temperature reading is either above or below the critical threshold.

```
read.cpu0.temp                   2                 FAILED
    Test Details:
      Failure:     Sensor is below critical threshold: 29.2 < 30.0
        Sensor:        CPU 0 temperature (ID=cpu0.dietemp)
        Component(s): CPU 0 (ID=cpu0.vpd)


read.cpu1.temp                   23                FAILED
    Test Details:
      Failure:     Sensor exceeds critical threshold: 30.0 > 29.2
        Sensor:        CPU 0 temperature (ID=cpu1.dietemp)
        Component(s): CPU 0 (ID=cpu1.vpd)
```

Operator Panel

The Operator Panel test module reads and saves the current contents of the display buffer. Then it performs a write/read/compare of five different data patterns (0xFF 0xAA 0x55 0x66 0x99) to the display buffer. After the test is complete, the initial contents of the display are restored.

Test Results

OpPanel Passed

```
write.opPanel                    1              Passed
    Test Details:
        Sensor:      Operator Panel virtual device (ID=oppanel)
        Component(s): Front panel
```

Read Failure

Unable to read the display buffer.

```
write.opPanel                    2              FAILED
    Failure Details:
        Failure:     Unable to read OpPanel. <errno string>
        Sensor:      Operator Panel virtual device (ID=oppanel)
        Component(s): Front panel
```

Write Failure

Unable to write to the display buffer.

```
write.opPanel                    2              FAILED
    Failure Details:
        Failure:     Unable to write to OpPanel. <errno string>
        Sensor:      Operator Panel virtual device (ID=oppanel)
        Component(s): Front panel
```

Data Comparison Failure

Data in the display buffer is different from what was just written.

```
write.opPanel                   2                    FAILED
    Failure Details:
        Failure:      Compare failed at line 2, char 12. Expected AA
and got 23.
        Sensor:       Operator Panel virtual device (ID=oppanel)
        Component(s): Front panel
```

Power Supply

The power test module is only available on Sun Fire V40z Servers that have dual power supplies.

The power supply test verifies the presence of each power supply and reads the status register on the power back plane. If a supply is present, the enabled and power good status bits of the PRS are read. The VPD for that supply is read and the checksum is verified. For each supply, a pass status is determined by these criteria:

■ Supply is present.

■ Enabled bit is set in PRS.

■ Power good status is true.

■ VPD is readable (checksum error is not fatal).

If supply is not present, absence of alert status or presence of a power good status is considered an error. A missing power supply does not constitute a failure, but is a warning. Power supply status for each power supply is either "Passed," "FAILED," or "Warning." The NPUI (Net Power Usage Indicator) on the power supply motherboard is read to determine the present power consumption of each supply. Each supply produces an output signal. The voltage of this signal is proportional to the power consumption of that supply. This voltage is an input to a PCF8591 dual ADC on the power supply motherboard. The converted value is read from this and used to calculate the power consumption.

Test Results

Power Passed

```
read.allPowerSupplies           9                    Passed
    Test Details:
        Power Supply 1 Status:   Passed
            Presence Detect:     Present
```

```
        Enabled:              True
        Power Good:           True
        Part Number:          S00440
        ECN:                  A01
        Serial Number:        PM16768
        Manufacturer:         CHEROKEE
        Date of Manufacture: 12-24-03
        Component(s):         Power supply 1 (ID=ps1.vpd)
   Power Supply 2 Status:   Not Present
```

Power Good Failure

```
read.allPowerSupplies          9                FAILED
    Failure Details:
      Power Supply 1 Status:   Power good indicator is false.
        Presence Detect:      Present
        Enabled:              True
        Power Good:           False
        Part Number:          S00440
        ECN:                  A01
        Serial Number:        PM16768
        Manufacturer:         CHEROKEE
        Date of Manufacture: 12-24-03
        Component(s):         Power supply 1 (ID=ps1.vpd)
      Power Supply 2 Status:   Passed
        Presence Detect:      Present
        Enabled:              True
        Power Good:           True
        Part Number:          S00440
        ECN:                  A01
        Serial Number:        PM16769
        Manufacturer:         CHEROKEE
        Date of Manufacture: 12-24-03
        Component(s):         Power supply 2 (ID=ps2.vpd)
```

Read Failure

```
read.allPowerSupplies        9              FAILED
    Failure Details:
        Failure: Unable to read device. (Power supply 2)
```

System Events

Event Details

This appendix contains tables of details and troubleshooting suggestions for system events. The tables are organized in alphabetical order, by component and sub-type.

Note – You can view system events if you use the sp get events command, or if you open the System Events table in the SM Console. IPMI events usually provide information about sensors in the system. See the Systems Management Commands document for more information.

TABLE B-1   <comp id>, Voltage, Temp, or Fan:Sensor

In Field	Description
Component	<comp id>, Voltage, Temp, or Fan
Sub-type	Sensor:Voltage, Temp, or Fan
Severity	Critical, Warning, or Informational
Brief Description	Sensor threshold has been crossed.

TABLE B-1 <comp id>, Voltage, Temp, or Fan:Sensor *(Continued)*

In Field	Description
Message	Sensor <sensor> reports <value> <type> [[but should be [between A and B]	[greater than B]	[less than A]]]	[and has returned to normal]
Detailed Description	The systems management software monitors a variety of sensors including voltage, temperature, fan speed, and so on. Sensors have thresholds that define normal, warning, and critical ranges. When a sensor reading moves among these ranges, a system event is generated and persisted.
Steps	Sensor thresholds should not be modified. If they have been modified, reset them to their default settings.
	For a temperature sensor, verify that the site air conditioning is working properly and that there is proper airflow into the system. Ensure that there is no buildup of dust on any of the system components (especially fans, heat sinks and vent holes). Ensure that the CPU heat sinks are properly attached (screws tightened to specification, levers locked in position). Ensure that there is sufficient thermal grease between the CPU and the heat sink.
	For a fan sensor, ensure that there is no dust buildup on the fan. Ensure that no foreign matter is blocking the fan blades. Ensure that the fan is operating; if it is not, replace the fan. Exchange the fan with a known good fan to determine if the problem persists.
	For a voltage problem, ensure that the A/C voltage is correct. Determine if there have been any recent A/C fluctuations (sags, surges, brownouts). Ensure that the VRM modules are seated properly. If the voltage is derived from a pluggable VRM module, exchange the module with a known good module to determine if the problem persists.
	A return to normal is possible if the problem corrects itself or if you hotswap a hotpluggable component (fan or power supply). If you reboot the SP, the error state is reset to informational, unless the problem recurs.

TABLE B-2 CPU Planar, Configuration

In Field	Description
Component	CPU planar
Sub-type	Configuration
Severity	Warning
Brief Description	Incompatible planar and cpuplanar have been detected.

TABLE B-2 CPU Planar, Configuration *(Continued)*

In Field	Description
Message	CPU Planar card is a different revision from main Planar card. This configuration may not operate properly and is unsupported.
Detailed Description	There are two revisions of the CPU card which are both physically and electrically compatible with each other. The system only supports connecting version 1 of the card to a version 1 planar and version 2 of the card to a version 2 planar. This warning indicates that you have mixed the versions. The system will operate, but certain features might not work properly (revision E cpus, DDR 400 memory).
Steps	Replace the CPU card with one of the proper version.

TABLE B-3 CPU <X>, Configuration

In Field	Description
Component	CPU <X>
Sub-type	Configuration
Severity	Warning
Brief Description	Unknown SPU model has been installed in system.
Message	CPU Family <x>, Model <y>, Stepping <z> is unknown, Thermal offset may lead to erroneous shutdowns.
Detailed Description	The SP does not support the specific revision of CPU you have installed in the system.
Steps	Verify that the CPU you have installed is of the correct type for this system and is not an engineering sample.Update the SP software (and BIOS software, if necessary) to the latest revision, and retry. If the problem persists, contact your sales representative for further assistance.

TABLE B-4 CPU <X>, Heartbeat

In Field	Description
Component	CPU<X>
Sub-type	Heartbeat
Severity	Critical, Information

TABLE B-4 CPU <X>, Heartbeat *(Continued)*

In Field	Description
Brief Description	Heartbeat stopped or resumed: platform OS has stopped running or platform POCI driver has stopped.
Message	CPU<x> [has not sent a heartbeat in the last minute]	[has resumed sending heartbeats]	[Platform no longer running OS]
Detailed Description	The platform side drivers have stopped or resumed sending heartbeat signals to the SP, or the platform OS has been shut down while heartbeats were lost. During normal operation, with the appropriate platform drivers installed, the platform sends a periodic heartbeat signal to the SP to indicate it is alive. If the heartbeat signal is lost for more than a minute, the SP will issue the warning message. When it resumes, or when the system reboots, the corresponding message is sent.
Steps	This is usually caused by platform OS shutdown that is initiated from the platform side, since the SP cannot detect this event. (The shutdown might stop the platform drivers before the SP is notified of this event.) It also can be caused by reinstalling or upgrading the platform drivers. Finally, it can be caused by the platform OS crashing or hanging. In this last case, the remedy is to reboot the system.

TABLE B-5 CPU <X>, MachineCheck

In Field	Description
Component	CPU<X>
Sub-type	MachineCheck
Severity	Critical, Warning, Information
Brief Description	Incompatible planar and cpuplanar have been detected.
Message	A platform CPU has issued a machine check.
Detailed Description	Machine Check error detected on cpu <CPU>. [Machine Check in Progress.] [Error IP Valid.] [Restart IP Valid.] Error detected in [Data Cache]	[InstructionCache]	[Bus Unit]	[Load/Store unit]	[North Bridge]	[Invalid bank reached]. [Second error detected.] [Error not corrected] [Error reporting disabled.] [Misc. register contains more info.] [Error occurred at address <address>.] [Processor state may have been corrupted] [Correctable ECC error.] [Un-correctable ECC error.] [Detected on a scrub.] Raw data: <data>
Steps	See "Machine Check Error" on page 31.

TABLE B-6   CPU <X>, TempSensor

In Field	Description
Component	CPU<X>
Sub-type	TempSensor
Severity	Critical
Brief Description	CPU thermal trip has occurred.
Message	CPU thermal trip has occurred.
Detailed Description	A CPU has indicated a thermal trip event and the system has been shut down as a result.
Steps	This occurs when the temperature of a CPU reaches approximately 120C and is a fail-safe operation to help prevent damage to the processor. If this occurs, the only recourse is to A/C cycle the power to the system. See "Thermal Trip Events" on page 87.

TABLE B-7   CPU <X>DIMM<X>, MachineCheck

In Field	Description
Component	CPU<X>DIMM<X>
Sub-type	MachineCheck
Severity	Critical, Warning, Information
Brief Description	DIMM error has occurred.
Message	[A [fatal | recoverable] machine check error occurred on cpu <cpu>: dimm <dimm>] | [Correctable error rate exceeded, consider replacing the dimm.]
Detailed Description	For the recoverable error case, a DIMM module is experiencing a high rate of correctable errors. This is affecting system performance and reliability. For the fatal case, a DIMM module has experienced an uncorrectable error. Data has been lost.
Steps	In both cases, replace the DIMM with a known good DIMM and see if the problem persists. If it does, inspect the DIMM connector area for debris (dust, metal shavings, and so on) and clean the connector area with compressed air to remove all foreign matter. Remove and inspect other DIMMs that are connected to the same memory controller and their connector areas. Ensure that the DIMM edge connector is clean and free from corrosion. Use only qualified memory in the system. After cleaning the connector area, replace the DIMM.

TABLE B-8   Planar, Crowbar

In Field	Description
Component	Planar
Sub-type	Crowbar
Severity	Critical, Information
Brief Description	Crowbar; fatal error in the power supply or the VRM modules has occurred.
Message	Sensor <sensor> reports that [crowbar failure has been detected - attempting to power system off]	[crowbar failure has been cleared].
Detailed Description	One of the VRM modules has indicated either an over-temperature condition, an over-current condition, or an inability to regulate voltage properly, or the condition has been cleared. This usually is an over-temperature error when the failure is detected.
Steps	See "Thermal Trip Events" on page 48.

TABLE B-9   Planar, Power

In Field	Description
Component	Planar
Sub-type	Power
Severity	Critical
Brief Description	Power supply fans have failed.
Message	Sensor <sensor> reports that the [fans have failed].
Detailed Description	The internal fans within a power supply have failed.
Steps	Replace the power supply.

TABLE B-10   Planar, Power

In Field	Description
Component	Planar
Sub-type	Power
Severity	Warning

TABLE B-10   Planar, Power *(Continued)*

In Field	Description
Brief Description	Power supply AC has been unplugged.
Message	<power supply> does not appear to be connected to AC power
Detailed Description	The power supply is plugged into the system but is not providing power.
Steps	Ensure that the AC line cord is plugged in. Ensure that there is AC power to the outlet to which it is not connected. Exchange it with a known good power supply.

TABLE B-11   Planar, Power

In Field	Description
Component	Planar
Sub-type	Power
Severity	Information
Brief Description	Power supply has been restored.
Message	<power supply> has resumed normal operation
Detailed Description	A power supply which had previously failed or been unplugged is now available and working normally.
Steps	N/A

TABLE B-12   Planar, Power

In Field	Description
Component	Planar
Sub-type	Power
Severity	Information
Brief Description	Power supply has been installed.
Message	<power supply> installed
Detailed Description	A new power supply has been plugged into the system and identified.
Steps	N/A

TABLE B-13   Planar, Power

In Field	Description
Component	Planar
Sub-type	Power
Severity	Information
Brief Description	Power supply has been removed.
Message	<power supply> removed
Detailed Description	One of the power supplies no longer can be accessed. It is assumed that it has been removed.
Steps	N/A

TABLE B-14   Planar, Power

In Field	Description
Component	Planar
Sub-type	Power
Severity	Information
Brief Description	Power supply fans have recovered from a failure.
Message	Sensor <sensor> reports that the fans have resumed normal operation.
Detailed Description	The internal fans within a power supply have recovered from a failure and now are working normally.
Steps	N/A

TABLE B-15   Planar, Power

In Field	Description
Component	Planar
Sub-type	Power
Severity	Critical
Brief Description	Power supply failure has occurred.

TABLE B-15 Planar, Power *(Continued)*

In Field	Description
Message	<power supply> has failed (or is not plugged in), now running in degraded condition
Detailed Description	A power supply has failed or has become unplugged.
Steps	Ensure that the AC line cord is plugged in. Ensure that there is AC power to the outlet to which it is not connected. Exchange it with a known good power supply.

TABLE B-16 Planar, PowerGood

In Field	Description
Component	Planar
Sub-type	PowerGood
Severity	Warning
Brief Description	Power-good failure has occurred.
Message	Power good failure detected - latched values are DDR: <x>, CPU, <X>, LTD: <x>, S0: <x>.
Detailed Description	The PRS chip has detected a failure in one of the power good signals and has shut down the system as a result. This usually occurs due to a bad voltage regulation module, due to a bad power supply, or due to an A/C sag or surge of sufficient duration. The DDR values indicate which DDR VRM caused the problem (numbered 3210 high bit to low in each nybble, both are associated with each VRM). CPU values indicate which CPU VRM caused the problem (high nybble indicates vrm module). The LDT values indicate which LDT regulator caused the problem. The S0 values indicate which of the miscellaneous regulators caused the problem (0x40 = A/C, 0x20 = Power Supply). Any failure indicated in the low nybble of the CPU value, any part of the LDT value, or bits 2-4 of the S0 value represents on-board regulators and are not replaceable.
Steps	If the failure indicates a pluggable module and is consistent, replace the module with a spare, if one is available. If the failure indicates a regulator on the planar and is consistent, the planar might require service. If the failure indicates a power supply or is inconsistent (moves from regulator to regulator), verify that the A/C power to the system is clean and of the proper voltage. If it is, ensure that both power supplies are installed, properly seated, plugged in, and functional (green LED is illuminated when platform power is on). If the problem persists, exchange the power supplies with spares, if they are available, one at a time.

TABLE B-17 Planar, TempSensor

In Field	Description
Component	Planar
Sub-type	TempSensor
Severity	Critical, Information
Brief Description	Power supply temperature is too high or has returned to normal.
Message	Sensor <sensor> reports that the [temperature has exceeded specification]	[temperature has returned to normal].
Detailed Description	The power supply temperature is too high or has returned to normal.
Steps	See "Thermal Trip Events" on page 48.

TABLE B-18 Platform BIOS, BIOS

In Field	Description
Component	Platform BIOS
Sub-type	BIOS
Severity	Critical
Brief Description	BIOS error has occurred.
Message	Received [early] fatal error from BIOS: [Unable to do anything]	[Fixed Disk Failure]	[Shadow RAM Failed]	[System RAM Failed]	[Extended RAM Failed]	[System Timer Error]	[Real-Time Clock Error]	[Date and Time Setting Error]	[CPU ID Error]	[DMA Test Failed]	[Software NMI Failed]	[Fail-Safe Timer NMI Failed]	[Operating System not found]	[Parity Error (Memory)]	[Extended Memory Truncation]	[Memory Mismatched]	[Flash Image Validation Error]	[Flash Process Failure]	[Diagnostic Load Failure]	[IP Failure]	[Diag Failed Memtest]	[Incorrect BIOS image file (wrong platform type?)], Post Code: <code>
Detailed Description	
Steps	See "BIOS Error or Warning Events" on page 21.

TABLE B-19 Platform BIOS, BIOS

In Field	Description
Component	Platform BIOS
Sub-type	BIOS'
Severity	Warning
Brief Description	BIOS reported a DIMM fault.
Message	Dimm Fault: CPU <cpu>, Dimm <dimm>, [Fault Detected]	[Paired with faulty Dimm]	[Unknown]
Detailed Description	The platform bios has detected an error in the DIMMs during memory configuration and initialization. It might or might not be possible to isolate the fault to a specific DIMM. (Certain configurations of memory do not allow for fault isolation across the paired DIMMs of a single memory channel.)
Steps	Run the memory diagnostics tests and see"DIMM Faults" on page 26.

TABLE B-20 Platform BIOS, BIOS

In Field	Description
Component	Platform BIOS
Sub-type	BIOS'
Severity	Warning
Brief Description	BIOS warning has occurred.
Message	Received warning from BIOS: [CMOS Battery Failure]	[CMOS Invalid]	[I20 Block Storage Device excluded from Boot Menu]	[CMOS Checksum Failure]	[CMOS Settings do not match hardware configuration]	[Memory truncated to valid functional memory]	[PCI-X Slot disabled for Golem Errata 56]	[Last Good Config Checksum Invalid]	[Last Good Config Invalid], Post Code: <code>
Detailed Description	
Steps	See "BIOS Error or Warning Events" on page 21.

TABLE B-21 Service Processor, Configuration

In Field	Description
Component	Service Processor
Sub-type	Configuration
Severity	Warning
Brief Description	User keys directory creation error has occurred.
Message	Error creating users' authorized_keys directories. It is likely that the persistent filesystem is full.
Detailed Description	An error occurred while saving the user key directories to the persistent storage on the SP.
Steps	See "Persistent Storage Issues" on page 46.

TABLE B-22 Service Processor, Configuration

In Field	Description
Component	Service Processor
Sub-type	Configuration
Severity	Warning
Brief Description	Add Trusted Host error has occurred.
Message	Error persisting user configuration. It is likely that the persistent filesystem is full.
Detailed Description	An error occurred while saving the trusted host configuration to the persistent storage on the SP.
Steps	"Persistent Storage Issues" on page 46.

TABLE B-23 Service Processor, Configuration

In Field	Description
Component	Service Processor
Sub-type	Configuration
Severity	Warning
Brief Description	ADS keytab error has occurred.

TABLE B-23 Service Processor, Configuration *(Continued)*

In Field	Description
Message	Error persisting user configuration. It is likely that the persistent filesystem is full.
Detailed Description	An error occurred while saving the NIS configuration to the persistent storage on the SP.
Steps	"Persistent Storage Issues" on page 46.

TABLE B-24 Service Processor, Configuration

In Field	Description
Component	Service Processor
Sub-type	Configuration
Severity	Warning
Brief Description	Delete Trusted Host error has occurred.
Message	Error persisting user configuration. It is likely that the persistent filesystem is full.
Detailed Description	An error occurred while saving the trusted host configuration to the persistent storage on the Service Processor.
Steps	See "Persistent Storage Issues" on page 46.

TABLE B-25 Service Processor, Configuration

In Field	Description
Component	Service Processor
Sub-type	Configuration
Severity	Warning
Brief Description	NIS config error has occurred.
Message	Error persisting user configuration. It is likely that the persistent filesystem is full.
Detailed Description	An error occurred while saving the NIS configuration to the persistent storage on the Service Processor.
Steps	See "Persistent Storage Issues" on page 46.

TABLE B-26 Service Processor, Configuration

In Field	Description
Component	Service Processor
Sub-type	Configuration
Severity	Warning
Brief Description	NIS Domain bind error has occurred.
Message	Unable to bind to NIS Domain <domain>, Server(s):<server(s)>
Detailed Description	The NIS configuration request could not be completed because of an error. Either the server list is invalid, the NIS server is non-responsive, or the domain is invalid.
Steps	Check all configuration parameters to ensure that they are correct and ensure that the NIS servers are functioning properly.

TABLE B-27 Service Processor, Configuration

In Field	Description
Component	Service Processor
Sub-type	Configuration
Severity	Warning
Brief Description	ADS Kerberos ticket cache generation error has occurred.
Message	Unable to generate Kerberos ticket cache with Active Directory Account:<account>, Domain:<domain>, Server(s):<server(s)>
Detailed Description	The ticket cache for the specified user, domain, and server(s) was not generated due to an error. Either the user account, domain, or server list is incorrect, or the servers are non-responsive.
Steps	Check that all configuration parameters are correct and that the Active Directory server(s) are functioning properly.

TABLE B-28 Service Processor, Configuration

In Field	Description
Component	Service Processor
Sub-type	Configuration
Severity	Warning

TABLE B-28   Service Processor, Configuration *(Continued)*

In Field	Description
Brief Description	Invalid SSL certificate exists.
Message	User supplied SSL certificate appears invalid. Reverting to factory default SSL certificate.
Detailed Description	The user-supplied SSL certificate appears to be invalid. The Service Processor will use the factory default SSL certificate.
Steps	Double-check the validity of the user-supplied certificate and try to reinstall to the Service Processor.

TABLE B-29   Service Processor, Configuration

In Field	Description
Component	Service Processor
Sub-type	Configuration
Severity	Information
Brief Description	Service Processor IP reconfigure has occurred.
Message	SP <hostname> IP [is now set to <ip_addr>]	[deconfigured].
Detailed Description	The IP address on the SP has been changed.
Steps	Verify that the new value is correct.

TABLE B-30   Service Processor, Configuration

In Field	Description
Component	Service Processor
Sub-type	Configuration
Severity	Information
Brief Description	Service Processor hostname has changed.
Message	SP hostname set to <hostname>, IP is [<ip_addr>]	[not configured.]
Detailed Description	The hostname on the SP has been changed.
Steps	Verify that the new value is correct.

TABLE B-31 Service Processor, Initialization

In Field	Description
Component	Service Processor
Sub-type	Initialization
Severity	Warning
Brief Description	Event deserialization error has occurred.
Message	Error deserializing events.
Detailed Description	The Event Manager Event Data storage has been corrupted and some event data has been lost. This usually occurs if the event manager shuts down improperly (application failure) or if the service processor is rebooted at an unexpected time (PRS or user reset).
Steps	System was shut down improperly. Lost data cannot be recovered. To prevent this problem, ensure that the system is shut down properly.

TABLE B-32 Service Processor, PlatformStateChange

In Field	Description
Component	Service Processor
Sub-type	PlatformStateChange
Severity	Information
Brief Description	Platform state change has occurred.
Message	[The platform has been powered off]	[The platform has been rebooted]	[The platform BIOS update has completed successfully]
Detailed Description	This message indicates that one of the various platform state changes has occurred.
Steps	N/A

TABLE B-33 Service Processor, Reboot

In Field	Description
Component	Service Processor
Sub-type	Reboot
Severity	Critical
Brief Description	SP has been rebooted by PRS due to lost heartbeat or failure of SP to initialize.
Message	SP Rebooted by PRS - reason is [SP Failed to Initialize]	[SP Heartbeat was lost]	[SP Failed Init and HB].
Detailed Description	The SP failed to boot properly and was reset by the platform power sequencing chip. A failure to initialize indicates that the SP failed to boot far enough, fast enough to indicate to PRS that it had completed initialzation. A loss of heartbeat indicates that either the SP failed to complete the boot process, or hung during normal operation.
Steps	See "DIMM Faults" on page 26.

TABLE B-34 Service Processor, Reboot

In Field	Description
Component	Service Processor
Sub-type	Reboot
Severity	Critical
Brief Description	SP has been rebooted by PRS due to lost heartbeat or failure of SP to initialize.
Message	SP Rebooted by PRS - reason is [SP Failed to Initialize]	[SP Heartbeat was lost]	[SP Failed Init and HB].
Detailed Description	The SP failed to boot properly and was reset by the platform power sequencing chip. A failure to initialize indicates that the SP failed to boot far enough, fast enough to indicate to PRS that it had completed initialzation. A loss of heartbeat indicates that either the SP failed to complete the boot process, or hung during normal operation.
Steps	See "DIMM Faults" on page 26.

TABLE B-35 Service Processor, ResourceAllocation

In Field	Description
Component	Service Processor
Sub-type	ResourceAllocation
Severity	Warning
Brief Description	Event log has been purged to low threshold.
Message	System event capacity exceeded. <num> events purged [<num> critical, <num> warning, <num> informational], <num> historical records purgedThe maximum number of active events was reached and old events were dropped.
Detailed Description	The system purges itself of the history for an event and then any clearable events before it removes any non-clearable events. Either the system has been running for a long time and has accumulated a large number of events (reboot or power off notifications, and so on) or there is a problem with the system that is causing a number of events to occur over time.
Steps	If the system has accumulated only informational messages (that the platform state has changed, and so on), consider using an automatic script to periodically clear the logs, in order to avoid this message. If the system has accumulated other types of warning or critical messages, follow the troubleshooting steps for those messages, to clear the problems.

TABLE B-36 Service Processor, ResourceAllocation

In Field	Description
Component	Service Processor
Sub-type	ResourceAllocation
Severity	Critical
Brief Description	Portmap Daemon died; SP was rebooted by spasm.
Message	Rebooted SP because of failed application: portmap
Detailed Description	Portmap is a critical application on the SP. If it fails, the SP must shut down and restart. Portmap must be started before all other SP applications are started.
Steps	N/A

TABLE B-37   Service Processor, ResourceAllocation

In Field	Description
Component	Service Processor
Sub-type	ResourceAllocation
Severity	Warning
Brief Description	(IPMI) SDRR write error has occurred.
Message	Error writing to SDRR.
Detailed Description	An error occurred while writing the content of the SDRR to persistent storage. This usually results when persistent storage is full.
Steps	See "Persistent Storage Issues" on page 46.

TABLE B-38   Service Processor, ResourceError

In Field	Description
Component	Service Processor
Sub-type	ResourceError
Severity	Critical
Brief Description	Application failure after 3 or more restarts within 90 seconds.
Message	Application respawning too rapidly, aborted: <app>
Detailed Description	An application is not operating properly and is exiting shortly after being started. This is probably caused by an intermittent hardware problem on the Service Processor (for example, one of the sensor devices has gone into an incorrect state and is causing problems). This also can be caused by a bad SP software load or by misconfigured network or file system settings.
Steps	See "DIMM Faults" on page 26.

TABLE B-39 Service Processor, SoftwareUpdate

In Field	Description
Component	Service Processor
Sub-type	SoftwareUpdate
Severity	Information
Brief Description	BIOS update was successful.
Message	BIOS Flash update completed successfully.
Detailed Description	The BIOS flash image has been updated successfully.
Steps	To verify the update, reboot the system and check the version on the boot screen. Alternatively, run the inventory get software command on the Service Processor, after the reboot.

TABLE B-40 Service Processor, SoftwareUpdate

In Field	Description
Component	Service Processor
Sub-type	SoftwareUpdate
Severity	Information
Brief Description	Diagnostics software has been updated successfully.
Message	Diagnostics software has been updated.
Detailed Description	The SP-Based diagnostics tests are installed on a separate NSV server and accessed via each SP using a mount. This message indicates that the /diags symbolic link on the SP has been changed to point to a different location within the NSV, on the external mount.
Steps	If the "diags start" command will not execute, verify that the /diags symbolic link is pointing to the desired diagnostics folder on the external mount. See the Systems Management Guide for details about how to install and use the NSV.

TABLE B-41 Service Processor, SoftwareUpdate

In Field	Description
Component	Service Processor
Sub-type	SoftwareUpdate
Severity	Information
Brief Description	The Operator Panel PIC firmware has been updated.
Message	PIC firmware has been updated.
Detailed Description	Operator Panel PIC firmware update is done via a service-level utility. End users should not see this message.
Steps	Use inventory get software command to verify that the correct firmware version is now installed.

TABLE B-42 Service Processor, SoftwareUpdate

In Field	Description
Component	Service Processor
Sub-type	SoftwareUpdate
Severity	Information
Brief Description	Value-Add software has been updated successfully.
Message	SP Applications/Value-Add software has been updated.
Detailed Description	The SP firmware is flashed as two components, the Base (kernel and other software that rarely changes) and Value-Add (system management software that changes from release to release). This message indicates that both components have been updated (probably via the sp update flash applications command, the Operator Panel, or a platform-side application).
Steps	Use the inventory get software command to verify that the correct firmware version is now installed.

TABLE B-43   Service Processor, SoftwareUpdate

In Field	Description
Component	Service Processor
Sub-type	SoftwareUpdate
Severity	Information
Brief Description	Service Processor Base software has been updated successfully.
Message	SP Base and Value-Add software has been updated.
Detailed Description	The SP firmware is flashed as two components, the Base (kernel and other software that rarely changes) and Value-Add (system management software that changes from release to release). This message indicates that both components have been updated (probably via the 'sp update flash applications' command, the Operator Panel, or a platform-side application).
Steps	Use the inventory get software command to verify that the correct firmware version is now installed.

TABLE B-44   Service Processor, SoftwareUpdate

In Field	Description
Component	Service Processor
Sub-type	SoftwareUpdate
Severity	Information
Brief Description	Event log has been purged; first boot of SP firmware since update.
Message	SP firmware updated and event cache cleared
Detailed Description	Previous Event Log was purged when the first boot of the updated SP version 2.2 occurred. This is because the event format changed in version 2.2. Records with the previous format, even outstanding events known to the SP, are not migrated to the new event log, but are purged.
Steps	To avoid loss of outstanding event records when you update to SP 2.2, simply delay the reboot (when the update actually takes place) until you address the outstanding events.

TABLE B-45   TEST, TestEvent

In Field	Description
Component	TEST
Sub-type	TestEvent
Severity	Critical, Warning, Information
Brief Description	Testing configuration of <severity> event.
Message	Test events have been created.
Detailed Description	The three test events (critical, warning, informational) have been created. Use these to verify that system management clients (SNMP, IPMI, SMTP, custom) have been configured correctly and can receive events. If your management clients do not receive these events, verify their respective configurations.
Steps	See the *Sun Fire V20z and Sun Fire V40z Servers—Server Management Guide* for information about SNMP, IPMI, SMTP and scripting configuration.

POST Codes

POST Codes for Phoenix BIOS

Post Code	Description
02	Verify real mode
03	Disable non-maskable interrupt (NMI)
04	Get CPU type
06	Initialize system hardware
07	Disable shadow and execute code from the ROM
08	Initialize chipset with initial POST values
09	Set IN POST flag
0A	Initialize CPU registers
0B	Enable CPU cache
0C	Initialize caches to initial POST values
0E	Initialize I/O component
0F	Initialize the local bus IDE
10	Initialize power management
11	Load alternate registers with initial POST values
12	Restore CPU control word during warm boot
13	Initialize PCI bus mastering devices
14	Initialize keyboard controller

Post Code	Description
16	BIOS ROM checksum
17	Initialize cache before memory autosize
18	8254 programmable interrupt timer initialization
1A	8237 DMA controller initialization
1C	Reset programmable interrupt controller
20	Test DRAM refresh
22	Test 8742 keyboard controller
24	Set ES segment register to 4GB
26	Enable gate A20 line
28	Autosize DRAM
29	Initialize POST memory manager
2A	Clear 512KB base RAM
2C	RAM failure on address line xxxx
2E	RAM failure on data bits xxxx of low byte of memory bus
2F	Enable cache before system BIOS shadow
30	RAM failure on data bits xxxx of high byte of memory bus
32	Test CPU bus clock frequency
33	Initialize Phoenix Dispatch Manager
36	Warm start shut down
38	Shadow system BIOS ROM
3A	Autosize cache
3C	Advanced configuration of chipset registers
3D	Load alternate registers with CMOS values
41	Initialize extended memory for RomPilot
42	Initialize interrupt vectors
45	POST device initialization
46	Check ROM copyright notice
47	Initialize I20 support
48	Check video configuration against CMOS
49	Initialize PCI bus and devices
4A	Initialize all video adapters in system

Post Code	Description
4B	QuietBoot start (optional)
4C	Shadow video BIOS ROM
4E	Display BIOS copyright notice
4F	Initialize MultiBoot
50	Display CPU type and speed
51	Initialize EISA board
52	Test keyboard
54	Set key click if enabled
55	Enable USB devices
58	Test for unexpected interrupts
59	Initialize POST display service
5A	Display prompt "Press F2 to enter SETUP"
5B	Disable CPU cache
5C	Test RAM between 512KB and 640KB
60	Test extended memory
62	Test extended memory address lines
64	Jump to UserPatch1
66	Configure advanced cache registers
67	Initialize Multi Processor APIC
68	Enable external and CPU caches
69	Setup system management mode (SMM) area
6A	Display external L2 cache size
6B	Load custom defaults (optional)
6C	Display shadow area message
6E	Display possible high address for UMB recovery
70	Display error messages
72	Check for configuration errors
76	Check for keyboard errors
7C	Set up hardware interrupt vectors
7D	Initialize Intelligent System Monitoring
7E	Initialize coprocessor if present

Post Code	Description
80	Disable onboard super I/O ports and IRQ's
81	Late POST device initialization
82	Detect and install external RS232 ports
83	Configure non-MCD IDE controllers
84	Detect and install external parallel ports
85	Initialize PC compatible PnP ISA devices
86	Reinitialize onboard I/O ports
87	Configure motherboard configurable devices (optional)
88	Initialize BIOS data area
89	Enable non-maskable interrupts (NMI's)
8A	Initialize extended BIOS data area
8B	Test and initialize PS/2 mouse
8C	Initialize floppy controller
8E	Failure in BootBlock
8F	Determine number of ATA drives (optional)
90	Initialize hard disk controllers
91	Initialize local bus hard disk controllers
92	Jump to UserPatch2
93	Build MPTABLE for multi processor boards
95	Install CD ROM for boot
96	Clear huge ES segment register
97	Fixup multi processor table
98	Search for option ROM's
99	Check for SMART drive (optional)
9A	Shadow option ROM's
9C	Set up power management
9D	Initialize security engine (optional)
9E	Enable hardware interrupts
9F	Determine number of ATA and SCSI drives
A0	Set time of day
A2	Check key lock

Post Code	Description
A4	Initialize typematic rate
A8	Erase F2 prompt
AA	Scan for F2 key stroke
AC	Enter setup
AE	Clear boot flag
B0	Check for errors
B1	Inform RomPilot about the end of POST
B2	POST done - prepare to boot operating system
B4	One short beep
B5	Terminate QuietBoot (optional)
B6	Check password
B7	Initialize ACPI BIOS
B9	Prepare boot
BA	Initialize DMI parameters
BB	Initialize PnP option ROM's
BC	Clear parity checkers
BD	Display multiboot menu
BE	Clear screen
BF	Check virus and backup reminders
C0	Try to boot with interrupt 19
C1	Initialize POST Error Manager (PEM)
C2	Initialize error logging
C3	Initialize error display function
C4	Initialize system error handler
C5	PnP dual CMOS (optional)
C6	Initialize notebook docking (optional)
C7	Initialize notebook docking late
C8	Force check (optional)
C9	Extended checksum (optional)
CA	Redirect Int 15h to enable remote keyboard
CB	Redirect Int 13 to Memory Technologies Devices such as ROM, RAM, PCMCIA, and serial disk

Post Code	Description
CC	Redirect Int 10h to enable remote serial video
CD	Re-map I/O and memory for PCMCIA
CE	Initialize digitizer and display message
D2	Unknown interrupt

POST Codes for Boot Block in Flash ROM

Post Code	Description
E0	Initialize the chipset
E1	Initialize the bridge
E2	Initialize the CPU
E3	Initialize the system timer
E4	Initialize system I/O
E5	Check force recovery boot
E6	Checksum BIOS ROM
E7	Go to BIOS
E8	Set Huge Segment
E9	Initialize Multi Processor
EA	Initialize OEM special code
EB	Initialize PIC and DMA
EC	Initialize Memory type
ED	Initialize Memory size
EE	Shadow Boot Block
EF	System memory test
F0	Initialize interrupt vectors
F1	Initialize Run Time Clock
F2	Initialize video
F3	Initialize System Management Manager
F4	Output one beep
F5	Clear Huge Segment
F6	Boot to mini DOS
F7	Boot to Full DOS

Glossary

ADC   Analog-to-digital conversion - An electronic process in which a continuously variable (analog) signal is changed, without altering its essential content, into a multi-level (digital) signal.

ADS   Active Directory Service - Microsoft's directory service. Both local files and a remote ADS server authenticate users

Backplane   A circuit board (usually a printed circuit board) that connects several connectors in parallel to each other, so that each pin of each connector is linked to the same relative pin of all the other connectors, forming a computer bus. It is used as a backbone to connect several printed circuit board cards together to make up a complete computer system. A backplane is generally differentiated from a motherboard by the lack of on-board processing power where the CPU is on a plug-in card.

BMC   Baseboard Management Controller - Service Processor and its controlling firmware. In order to perform autonomous platform management functions, the Service Processor runs embedded software or firmware. Together, the Service Processor and its controlling firmware comprise the BMC, which is the core of the IPMI structure. The tight integration of IPMI BMC and management software with platform firmware provides a total management solution. The BMC is a Service Processor that is integrated into the motherboard design. It provides a management solution that is independent of the main processor. The monitored system can communicate with the BMC via one of three defined system interfaces which are based on a set of registers that are shared between the platform and the BMC.

CIFS   Common Internet File Server - A protocol that allows programs to make requests for files and services on remote computers on the Internet. CIFS uses the client/server programming model.

CMOS   See "RTC" on page 168.

CPU   Central Processing Unit - processor or microprocessor

DDR SDRAM   Double Data Rate Synchronous Dynamic RAM (Random Access Memory) - can theoretically improve memory clock speed to at least 200 MHz. It activates output on both the rising and falling edge of the system clock, rather than on only the rising edge. This potentially doubles output.

DDR VRM   Double Data Rate Voltage Regulator Module - See "DDR SDRAM" and "Universal Time Coordinated - the standard time common to every place in the world. Formerly and still widely called Greenwich Mean Time (GMT) and also World Time, UTC nominally reflects the mean solar time along the Earth's prime meridian.."

DHCP   Dynamic Host Configuration Protocol - a communications protocol that lets network administrators centrally manage and automate the assignment of Internet Protocol (IP) addresses in an organization's network.

DIMM   Dual In-line Memory Module - a double SIMM (single in-line memory module); a module that contains one or several random access memory (RAM) chips on a small circuit board with pins that connect it to the computer motherboard.

DMA   Direct Memory Access - a capability provided by some computer bus architectures that allows data to be sent directly from an attached device (such as a disk drive) to the memory on the computer's motherboard. The microprocessor is freed from involvement with the data transfer, thus speeding up overall computer operation.

DNS   Domain Name System - the way that Internet domain names are located and translated into Internet Protocol addresses.

DVD   An optical disc technology with a 4.7 gigabyte storage capacity on a single-sided, one-layered disk, which is enough for a 133-minute movie. DVDs can be single- or double-sided, and can have two layers on each side; a double-sided, two-layered DVD will hold up to 17 gigabytes of video, audio, or other information.

EBMC   Enhanced Baseboard Management Controller - the modular implementation of the SP; a superset of the BMC with additional intelligence and communication interfaces.

EIS   Enterprise Integration System - A computing system that is of "enterprise class." It offers a high quality of service, deals with large volumes of data, and is capable of supporting a large organization. An EIS is usually operated by professional system administrators, is deployed on dedicated servers, offers network connectivity, and provides services that support the operations of the enterprise.

Expansion Slot   An engineered technique for adding capability to a computer in the form of connection pinholes (typically, in the range of 16 to 64 closely-spaced holes) and a place to fit an expansion card containing the circuitry that provides some specialized capability, such as video acceleration, sound, or disk drive control.

FET   Field-effect Transistor - a type of transistor commonly used for weak-signal amplification (for example, for amplifying wireless signals). The device can amplify analog or digital signals. It can also switch DC or function as an oscillator.

HDD   Hard Disk Drive - the mechanism that controls the positioning, reading, and writing of the hard disk, which furnishes the largest amount of data storage for the PC. Although the hard disk drive (often shortened to "hard drive") and the hard disk are not the same thing, they are packaged as a unit and so either term is sometimes used to refer to the whole unit.

I2C   The I2C (Inter-IC) bus is a bi-directional two-wire serial bus that provides a communication link between integrated circuits (ICs). Phillips introduced the I2C bus 20 years ago for mass-produced items such as televisions, VCRs, and audio equipment..

ICMB   Integrated Circuit Management Bus

IOCTL   Unix function that manipulates the underlying device parameters of special files. In particular, many operating characteristics of character special files (for example, terminals) can be controlled with ioctl requests.

IPMB   Intelligent Platform Management Bus

IPMI   Intelligent Platform Management Interface - an industry-standard interface specification for hardware manageability. It provides an architecture that defines how many unique devices can communicate with the CPU in a standard way. It provides a standard set of interfaces to monitor and manage services. In this way, it simplifies frameworks for platform-side and remote systems management.

KCS Interface Keyboard Controller Style Interface

LUN   Logical Unit Number - a unique identifier used on a SCSI bus that enables it to differentiate between up to eight separate devices (each of which is a logical unit). Each LUN is a unique number that identifies a specific logical unit, which may be an end user, a file, or an application program.

Memory   The electronic holding place for instructions and data that your computer's microprocessor can reach quickly. When your computer is in normal operation, its memory usually contains the main parts of the operating system and some or all of the application programs and related data that are being used.

Motherboard A motherboard is the physical arrangement in a computer that contains the computer's basic circuitry and components. On the typical motherboard, the circuitry is imprinted or affixed to the surface of a firm planar surface and usually manufactured in a single step. The most common motherboard design in desktop computers today is the AT, based on the IBM AT motherboard. A more recent motherboard specification, ATX, improves on the AT design. In both the AT and ATX designs, the computer components included in the motherboard are: microprocessor, (optionally) coprocessors, memory, basic input/output system (BIOS), expansion slot, interconnecting circuitry.

Additional components can be added to a motherboard through its expansion slot. The electronic interface between the motherboard and the smaller boards or cards in the expansion slots is called the bus.

NFS   Network File System - a client/server application that lets a computer user view and optionally store and update files on a remote computer as though they were on the user's own computer.

NIC   Network Interface Card - a computer circuit board or card that is installed in a computer so that it can be connected to a network.

NIS   Network Information Service - A UNIX-originated solution to directory service. Both local files and a remote NIS server authenticate users.

ODM   Original Design Manufacturer - A company that designs products that are sold to the end user by a second company under the second company's name.

OID   Object Identifier - a numerical variable that identifies multiple of objects that are grouped together for easier reference.

OSI   Open Systems Interconnection - a seven-layer model defined by ISO as a reference for standardization of electronic communication systems.

PCB   Printed Circuit Board

PCBA   Printed Circuit Board Assembly

PCI   Peripheral Component Interconnect - an interconnection system between a microprocessor and attached devices in which expansion slots are spaced closely for high-speed operation.

PEF   Platform Event Filtering

PET   Platform Event Trap

PHY   Physical Layer - the physical layer of the OSI model that defines the physical connections over which data are transmitted.

RAM   Random Access Memory - memory is located on one or more microchips that are physically close to the microprocessor in your computer.

RTC   Real-time Clock - a battery-powered clock that is included in a microchip in a computer motherboard. This microchip is usually separate from the microprocessor and other chips and is often referred to simply as "the CMOS" (complementary metal-oxide semiconductor). A small memory on this microchip stores system description or setup values - including current time values stored by the real-time clock. The time values are for the year, month, date, hours, minutes, and seconds. When the computer is turned on, the Basic Input-Output Operating System (BIOS) that is stored in the computer's read-only memory (ROM) microchip reads the current time from the memory in the chip with the real-time clock.

SATA Serial Advanced Technology Attachment - a new standard for connecting hard drives into computer systems. As its name implies, SATA is based on serial signaling technology, unlike current IDE (Integrated Drive Electronics) hard drives that use parallel signaling.

SCSI Small Computer System Interface - a set of ANSI standard electronic interfaces that allow personal computers to communicate with peripheral hardware such as disk drives, tape drives, CD-ROM drives, printers, and scanners, quickly and flexibly.

SDRR Sensor Data Record Repository - the container for and interface from which you can access sensor data records.

SEL System Event Log - log of informational, warning, and critical events that occurred in the system.

Slot See "Expansion Slot."

SMS Short Message Service - service for sending messages of up to 160 characters.

SNMP Simple Network Management Protocol - the protocol that governs network management and monitoring of network devices and their functions. It is not necessarily limited to TCP/IP networks.

SOL Serial Over LAN - the specification of packet formats and protocols for the transmission of serial data over LAN using IPMI over LAN packets.

SPD Serial Presence Detect - information stored in an electrically erasable programmable read-only memory (EEPROM) chip on a synchronous dynamic random access memory (SDRAM) memory module that tells the basic input/output system (BIOS) the module's size, data width, speed, and voltage. This occurs during boot. The BIOS uses this information to configure the memory properly for maximum reliability and performance. If a memory module does not have SPD, the BIOS "assumes" the memory module's information. This does not cause problems with some memory. However, SDRAM memory usually requires SPD for the computer to boot. If it a computer with SDRAM memory boots without SPD, the "assumed" information can cause fatal exception errors.

UTC Universal Time Coordinated - the standard time common to every place in the world. Formerly and still widely called Greenwich Mean Time (GMT) and also World Time, UTC nominally reflects the mean solar time along the Earth's prime meridian.

VRM Voltage Regulator Module - an installable module that senses a computer's microprocessor voltage requirements and ensures that the correct voltage is maintained.

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