Xserve G5

Using Xserve Remote Diagnostics

Includes instructions for using the remote diagnostics tool

Using Xserve Remote Diagnostics Software

You can use the Xserve Remote Diagnostics tool to test your server's hardware.

The Xserve G5 system's diagnostic tool, Xserve Remote Diagnostics, performs several tests of the server hardware and creates a test report. You use a remote admin computer to control the diagnostic tool and to run the tests on an Xserve G5 system.

Xserve Remote Diagnostics has a standard set of quick tests (the default set) and a more extensive long set of tests. In addition, you can use a copy of the test files as a template and modify those files to customize tests. See "Creating a Custom Set of Diagnostic Tests" on page 6 for more information.

Overview of Using Xserve Remote Diagnostics

To run the diagnostics tool, you need the following resources:

- An Xserve G5 system on which to perform the tests; the server must be running Mac OS X Server v10.3 or a later version. (If the server is not able to run Mac OS X, see "Example 2: Using Diagnostics on a Server That Is in an Unknown State" on page 5 for instructions.)
- A remote admin computer (or server) running Mac OS X 10.3 or later that is on the same subnet as the server to be tested
- A working NetBoot environment (a server running Mac OS X Server 10.3.2 or a later version, and configured for NetBoot, with DHCP running)

Note: The remote admin computer and the NetBoot server can be the same system. If the NetBoot server is also the remote admin computer, you must set up the server's boot volume as a NetBoot environment before installing Xserve Remote Diagnostics. See "Preparing the NetBoot Server" on page 4 for more information.

The procedure for using the diagnostic tool has the following steps. Each step is explained later in this document.

Step 1: **Download and install the software**
See "Installing Xserve Remote Diagnostics" on page 3 for details.

Step 2: **Set up the NetBoot server by designating the ports and volumes to use**
See "Preparing the NetBoot Server" on page 4 for instructions on setting up a NetBoot server.

Step 3: **Use Terminal to launch the diagnostic tool on a remote admin computer**
See "Running Diagnostics Tests on a Server" on page 4 for details on using the tool.

Step 4: **Use the front panel of the server to put the system into diagnostic mode (needed if server does not start up normally)**
See "Initiating Diagnostics Mode From the System's Front Panel" on page 5 for details on putting a server that is not working in diagnostics mode.

The remote admin computer controls the tests and receives the output of test results.

Installing Xserve Remote Diagnostics

Xserve Remote Diagnostics is available for downloading from the Apple support website at www.info.apple.com. On the support site, click the Downloads button and search downloads or check the list for Xserve items.

After you download the software, you must install Xserve Remote Diagnostics in two places:

- The remote admin computer
- The NetBoot server

If you are installing Xserve Remote Diagnostics on a server, be sure to set up the server as a NetBoot environment. See "Preparing the NetBoot Server" on page 4 for instructions.

- Double-click the Xserve Remote Diagnostics icon to begin the installation process.

Also go through any "Read Me" document that accompanies the software.

Preparing the NetBoot Server

You need a NetBoot server to assist with the diagnostic tests. In addition to installing Xserve Remote Diagnostics on this server, you should make certain that it is set up for NetBoot use.

To set up the NetBoot server:

1. Open Server Admin and select NetBoot in the Computers & Servers list.
2. Click the Settings button, then click General.
3. Click Enable next to the network ports you want to use for serving images.
4. Click the boot volume in the Images column of the Volume list to choose where to store images.
5. Click the boot volume in the Client Data column of the Volume list to specify the storage location for shadow files used by Mac OS 9 clients and Mac OS X diskless clients.
6. Click Save.

Running Diagnostics Tests on a Server

When you've installed the software on the remote admin computer and a NetBoot server, you can begin running diagnostic tests on the Xserve G5 system. The examples below provide instructions for using the diagnostics tool on a working server and on a server that does not start up normally (or does not have Mac OS X Server installed on it).

To see a brief explanation of the diagnostic tool and its commands, you can display the man page by typing:

```
man xrdiags
```

Example 1: Using Diagnostics on a Server That Is Able to Run Mac OS X Server

To run diagnostic tests on an Xserve G5 system that is functioning and able to start up, you use a remote admin computer on the same subnet to begin the tests.

To begin tests on a working server:

1. Alert any clients using the server that it will be unavailable during testing.
2. On the remote admin computer, open Terminal.
3. Open Xserve Remote Diagnostics and initiate testing by typing:

   ```
   xrdiags -user <name:password> -remote <ip_address> | <dns_name>
   ```

   For example, with the user-supplied information, this command might read

   ```
   xrdiags -user Admin:mysecretpassword -remote 10.201.42.74
   ```

The server restarts and the tests are downloaded to it from the remote admin computer. As the tests proceed, test information is displayed on the remote admin computer.

If no information appears on the remote admin computer's screen, the server probably has not located the NetBoot image.

Example 2: Using Diagnostics on a Server That Is in an Unknown State

To run diagnostic tests on an Xserve G5 system that is not able to start up normally or does not have Mac OS X Server installed on it, you use the front panel of the server to put it into diagnostics mode and then initiate the tests from a remote admin computer on the same subnet.

To begin tests on a server that is not working correctly:

1. Use light 8 on the Xserve G5 system's front panel to put the server into diagnostics mode.

   See "Initiating Diagnostics Mode From the System's Front Panel" on page 5 for complete details of this procedure.

2. On the remote admin computer, open the Terminal application.

3. Initiate testing on the server by typing:

   ```
   xrdiags -d
   ```

   This command launches the diagnostic tool and instructs it to discover any system that is in diagnostics mode. As the tests proceed, diagnostic information is displayed on the remote admin computer.

Initiating Diagnostics Mode From the System's Front Panel

You can use the system identifier button on the server's front panel to put the server into diagnostic test mode. This operation is essential if the server will not start up normally and you want to use the diagnostics tools to help determine the problem. You put the server into diagnostic mode by using a combination of the system identifier button and light 8 on the front panel.

Note: If Open Firmware Security is turned on for the system, front panel mode is not available. In this situation, the two rows of lights on the front panel flash twice when you try to enter a boot command with the system identifier. Then the system resumes its regular startup sequence.

Follow these steps to initiate diagnostics mode from the server's front panel:

1. With the power off, hold in the system identifier button while you press the on/standby button.
2. Continue holding in the system identifier button until the top row of blue lights blinks sequentially.
3. Release the system identifier button. The rightmost light in the bottom row turns on. Press the button to light the next light in the bottom row, moving from right to left. Press the button again to change lights until the leftmost light (number 8) turns on.
4. With light 8 on, hold in the system identifier button for at least 2 seconds, until all lights in the top row are on.
5. Release the button.

Advanced Diagnostic Features

You can use the test files installed as part of the diagnostic tool as templates and modify them to create special test sets.

To see a list of all available tests, type the command:

```
xrdiags -f
```

To display the man page for the diagnostic tool, type:

```
man xrdiags
```

Creating a Custom Set of Diagnostic Tests

A copy of the test files is installed in the following location:
/Users/<short name>/Library/Application Support/xrdiags

Each test file has the extension "tdf" in its name. You can use a text editor to open each tdf file, study the comments to determine that test's contents, and modify the test if desired. The text in these files is tab-delimited.

Summary of Diagnostic Commands

The diagnostic tool provides a core set of commands that you can enter when initiating a test in the Terminal application. These commands include:

- - h[elp]—displays a summary of available test commands and options
- - V[ersion]—displays the tools' version number and exits
- - v[erbose] [options]—verbose mode; specified options control the level of messages
- -q[uick]—initiates the quick tests (the default set)
- -e[xtended]—initiates the extended set of tests
- -f[ile] <testfile name>—initiates the custom set of tests in the specified testfile name; for example, -f memory.tdf runs a custom set of tests you've created to test memory only
- -o[ut] <outfile>—sends the test results to the specified file

- -l[oop] count—loops the testing the specified number of times; for example, -l 7 loops the specified test 7 times
- -p[rogress]—displays the progress of testing
- -r[estart]—when tests are complete, restarts the Xserve G5 system being tested
- -s[hutdown]—when tests are complete, shuts down the Xserve G5 system being tested
- -t[est] [options]—initiates testing with the specified options to control testing
- - u[ser] <name>[:password]—uses the specified user name and optional password to communicate with a remote Xserve G5 system
- -d[iscover]—discovers Xserve G5 systems that have initiated testing
- -remote [<ip_address> | <dns_name>]—runs the diagnostic tests on specified remote systems

Summary of Diagnostic Tests

Xserve Remote Diagnostics provides the following tests:

- quick.tdf—a thorough but quick set of hardware tests that take about 5 minutes to complete
- extended.tdf—a long set of hardware tests that take 15 to 20 minutes to complete

  Times for the quick and extended tests are approximate. Actual test times depend on the configuration being tested.

All tests provided in Xserve Remote Diagnostics are listed in the tables below.

Logic board tests

Command	Test	Description
CPU	Simple FPU test	Performs a simple FPU test
CPU	CPU slewing verification test	Performs CPU voltage/frequency slewing verification test
MLB.ROM	ROM Checksum	Performs ROM checksum of block, main, and recovery images
Sensor.Ammeter	Ammeter reading within alarm limits	Checks to ensure that the ammeter reads within operating range
Sensor.Thermometer	Thermometer reading within operating range	Checks to ensure that thermometer reads within operating range
Sensor.Voltmeter	Voltmeter reading within alarm limits	Checks to ensure that the voltmeter reads within operating range
Fan	Quick fan test	System turns on fan and quickly verifies that the fan is on
Fan	Turn on automatically	System turns on fan and verifies that the fan is on

Command	Test	Description
CPU.G5	CPUID EEPROM checksum verify	Verifies both the upper and lower portions of the CPU ID EEPROM
CPU.G5	CPU slot number verify	Verifies that the CPU slot number in the CPU ID EEPROM matches the physical MLB slot number
PCI.OHCIFireWire	Register test	Performs "walking 1s" test across selected registers
PCI.OHCIFireWire	Set/clear register test	Performs set/clear test across selected registers
PCI.OHCIFireWire	PHY register test	Performs "walking 1s" test across selected PHY chip registers
PCI.OHCIUSB	USB register test	Performs "walking 1s" test across selected USB registers
PCI.BroadcomEnet	Verify Broadcom 570X card presence	Verifies if there is a Broadcom 570X Ethernet card present in the device tree
PCI.BroadcomEnet	BCM570X register test	"Bit walking" Ethernet register test
PCI.BroadcomEnet	Verify EEPROM/flash checksum	Verifies EEPROM or buffered flash checksum (data range: 0x74-0xFB)
MLB.VSP	Local memory test	Uses various algorithms to test vsp local memory for each veo and report failure on mismatch
MLB.VSP	Instruction cache data RAM test	Uses various algorithms to test vsp instruction cache data RAM for each veo and reports failure on mismatch
MLB.VS	Instruction cache tag RAM test	Uses various algorithms to test vsp instruction cache tag RAM for each veo and reports failure on mismatch

Mass storage tests

Command	Test	Description
Storage.Fixed	Device simple test	Runs a simple test on the device
Storage.Fixed	PIO read single block	Reads using PIO the first block for 1 block on the device
Storage.Fixed	PIO read many blocks	Reads using PIO starting at the first block for 100 blocks
Storage.Fixed	PIO 4-corner read test	Reads using PIO at the start, middle, and end of the device for 100 blocks
Storage.Fixed	Device simple test	Runs a simple test on the device
Storage.Fixed	PIO read single block	Reads using PIO the first block for 1 block on the device
Storage.Fixed	PIO read many blocks	Reads using PIO starting at the first block for 100 blocks
Storage.Fixed	PIO 4-corner read test	Reads using PIO at the start, middle, and end of the device for 100 blocks
Storage.Fixed	DMA read single block	Reads using DMA the first block for 1 block on the device
Storage.Fixed	DMA read many blocks	Reads using DMA starting at the first block for 100 blocks
Storage.Fixed	DMA 4-corner read test	Reads using DMA at the start, middle, and end of the device for 100 blocks
Storage.Fixed	DMA random multiblock read	Tests random multi-block DMA reads on the device
Storage.Fixed	SMART test result status	SMART threshold exceeded limits results
Storage.Remove	Device simple test	Runs a simple test on the device

Memory tests

Command	Test	Description
Memory	Address as data test, caches on	Tests memory using address as data and !address (the inverse) as data, caches on
Memory	Patterns test, caches on	Tests memory using different data patterns, caches on
Memory	Marching 1s and 0s test, caches on	Tests memory using marching 1s and 0s, caches on
Memory	Knaizuk Hartmann test, caches on	Tests memory using the Knaizuk Hartmann algorithm, caches on
Memory	MOD3 test, caches on	Tests memory using the MOD3 data patterns, caches on
Memory	Address as data test	Tests memory using address as data and !address (the inverse) as data
Memory	Patterns test	Tests memory using different data patterns
Memory	Marching 1 and 0s test	Tests memory using marching 1s and 0s
Memory	Knaizuk Hartmann test	Tests memory using the Knaizuk Hartmann algorithm
Memory	MOD3 test	Tests memory using the MOD3 data patterns
Memory	ECC SCRUB patterns test	Tests memory using different data patterns using the ECC scrub mechanism
MLB	Address as data test on Memory < 2GB	Tests MLB memory < 2GB using address/!address (the inverse) as data algorithm

Display Tests

Command	Test	Description
PCI.ATI	Frame buffer address as data test	Tests the frame buffer using address as data and !address (the inverse) as data
PCI.ATI	Frame buffer patterns test	Tests the frame buffer using different data patterns
PCI.ATI	Frame buffer marching 1s and 0s test	Tests the frame buffer using marching 1s and 0s
PCI.ATI	Frame buffer Knaizuk Hartmann test	Tests the frame buffer using the Knaizuk Hartmann algorithm
PCI.ATI	Frame buffer MOD3 test	Tests the frame buffer using MOD3 patterns
PCI.Nvidia	Frame buffer address as data test	Tests the frame buffer using address as data and !address (the inverse) as data
PCI.Nvidia	Frame buffer patterns test	Tests the frame buffer using different data patterns
PCI.Nvidia	Frame buffer marching 1s and 0s test	Tests the frame buffer using marching 1s and 0s
PCI.Nvidia	Frame buffer Knaizuk Hartmann test	Tests the frame buffer using the Knaizuk Hartmann algorithm
PCI.Nvidia	Frame buffer MOD3 test	Tests the frame buffer using MOD3 patterns
Display	EDID checksum test	Verifies EDID checksum vs. calculated