



Intel[®] Server Board Diagnostics

Installation and Operating Instructions

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Revision History		
Date	Rev	Modifications
07/07/00	1.0	Initial Release
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Introduction

The Intel® Server Board diagnostics package provides a method to determine if an Intel based server system is correctly assembled and functioning properly. The package provides tests for the onboard resources that can be run without user intervention. Reporting of results is directed to field replaceable units (FRUs), such as the installed processor modules, the server board, disks, and memory. There are three test suites in the package: the Quick Test, Comprehensive Test, and a continuous loop of the Comprehensive Test. The diagnostics probes for the hardware present at the start of each test and reports the identified components. In this way, the diagnostics will indirectly identify many assembly and cabling errors (cables broken or improperly seated, etc.) when installed components are not reported.

Conventions

In this document, user input is indicated by bold and underlined text (for example: **a\testmenu**). Also, keys that have multiple character labels are enclosed in brackets (for example: **<ENTER>**). Combinations of keys that must be pressed together are enclosed in brackets with a plus (+) between the keys (for example **<CTRL+ALT+DEL>**).

Assumptions

It is assumed that the integrator has configured a server with an Intel based server board with the following minimum components. The Intel server board integrated in an approved chassis, a minimum of one Intel processor, a processor terminator card, at least one memory module selected from the tested memory list for that particular board, a floppy disk drive, and one hard disk drive. Refer to the server board tested memory document and the supported Hardware and Operating System document for Intel tested components. These documents can be found at the Intel Corporation support website

<http://support.intel.com/support/motherboards/server/>

Installing the Intel Server Board Diagnostic Archive

The diagnostic program files are available on the software CD which accompanied the board they are intended to be used with. Updates to this manual can be downloaded from the Intel support website at: <http://support.intel.com/support/motherboards/server>.

WARNING: Each board has it's own specific diagnostics package. Do not attempt to run the wrong diagnostics package on the wrong board. This could cause unreliable results and could damage components on the board itself.

1. Insert a blank formatted diskette in floppy disk drive a.
2. Run the ****DIAG.exe (where **** refers to the code for a particular board) program downloaded from the web, this will cause the bootable disk image to be copied onto a diskette.
3. Insert the diskette into the Intel based server system and boot to the floppy.
4. You will be asked to agree to a licensing agreement prior to the actual file expansion occurring. The agreement is the file LEGAL.TXT.
5. The ROM DOS operating system creates a ramdrive into which the diagnostic tests are copied.
6. When the copy process is complete, you will be presented with a menu of five options. These menu options are discussed in greater detail below.

Summary of Available Tests

Quick Tests

The quick test suite runs a small subset of available tests. It identifies the processor type, speed, and the number present. Additionally, the base and total memory sizes, external L2 cache size, and the attached hard disks are also identified. For the quick test, you should verify that the configuration displayed after the probe includes all the hard disks, memory and processors you have installed in the system. The system will identify drives attached to any SCSI controllers in the system, not just the onboard controller. It will not identify any other SCSI devices (CDROM, Tape, etc.). If the configuration does not identify all the processors, memory and hard disks you have installed, exit by pressing <CTRL+BREAK> and review the troubleshooting section later in this document.

The test duration is dependent upon the number of processors and the amount of memory installed. With a 800MHz processor and 64 MB of memory the quick test takes about 1 minute. Each additional 64 MB of memory adds about 1 minute to the test time.

On completion of the test and after the test results are displayed, the program returns to the main menu.

Comprehensive Tests

The comprehensive test probes for the same items as the Quick Test, but in greater depth. In addition, it identifies the keyboard and mouse, the COM1 and COM2 ports, the LPT port, memory, the floppy drive, and the onboard video controller with its memory. The tests executed are a superset of the quick tests. The processor floating point unit (FPU) is tested and more extensive tests are run on the memory and cache. Extensive tests are also run on the onboard peripheral controllers, integrated components and the chipset.

You should verify that the displayed configuration after the probe includes all the disks, memory and processors you have installed in the system. The system will identify drives attached to any SCSI controllers in the system, not just the onboard controller. If it does not, exit by pressing <CTRL+BREAK> and begin at the troubleshooting section later in this document. An example of a comprehensive test configuration is shown below in the *Using the Intel Server Board Diagnostics* section.

The test duration is dependent on the number of processors and the amount of memory installed. With a 800MHz processor and 64 MB of memory the comprehensive test takes about 2.5 minutes and each additional 64 MB adds about 2 minutes to the test time (due to much more extensive testing). The video tests drive the monitor with varying resolutions and patterns that may not appear sensible.

On completion of the test and after the test results are displayed, the program returns to the main menu.

Comprehensive Test with Continuous Looping

This test is identical to the comprehensive test, but it continuously loops through the tests until the user presses <CTRL+BREAK>. This mode of operation is intended to allow identification of an intermittent failure in a Field Replaceable Unit for replacement. The normal comprehensive test result summary is displayed, but the status reflects the sum of all tests. Thus, if a test failed one or more times during the run, it will be reported as failing. The number of times the test cycle was repeated is displayed in the result summary screen.

Using the Intel Server Board Diagnostics

To start the diagnostics boot the server from the bootable diskette described above. The system should display the following menu (Note: the **** in the title of the screen will be replaced by the name of the actual board being tested).

**** Diagnostics. Ver 1.0

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Server Diagnostic Options

Quick Test

Comprehensive Test (DEFAULT)

Comprehensive Test with continuous looping

Display Help Text

EXIT

Highlight your selection using Cursor UP/DOWN and press ENTER

On entry the “Comprehensive Test” option is highlighted, as the default.

Selecting any of the first three options results in the test system probing the hardware to determine which tests in the suite are applicable to the current hardware configuration. If the system under test is not supported by the diagnostics package being used, the message “This motherboard is not supported by these diagnostics. Press any key to exit” will appear.

Selecting the “Display Help Text” option results in a display of the help text file for the test options.

Selecting the “EXIT” option saves the test results in a RESULT.LOG file and returns you to the DOS prompt. Typing “testmenu” (without the quotes) at the prompt will restart the menu system.

Select the test desired with the cursor and press <ENTER>. The hardware configuration test will begin and upon completion, a configuration summary will be displayed.

Below is an example of the hardware configuration results for the “Comprehensive “Test.” The results for the “Quick Test” are similar, yet not as detailed.

Hardware Configuration results for a "Comprehensive Test:" (Results will vary depending on the system configuration)

Hardware Test Configuration

Base Memory Size: 640 KB
CPU Type: A Pentium® Xeon™ III microprocessor
CPU Speed: 800 MHz
CPU SMP #0: Present
CPU SMP #1: Present
NUMBER_OF_SCSI_CHANNELS: 2
KEYBOARD_TYPE: 101_KEY
RTC RAM SIZE: 128
PC97317 Found
COM1 at Port Address: 3F8 is enabled
COM2 at Port Address: 2F8 is enabled
LPT1 Ox378
Floppy cfg.Drive A: 1.4Mb (3.5 Inch)
Hard Drive 0 Cylinders: 1023 Heads: 64 Sectors: 63 Total Size: 2014MB
External Cache size: 256 KB
Video Subsystem: VGA-compatible controller, 256KB Ram
Video Controller: Any ATI Controller Config_Chip_AD 0X7A004756
Video Bios: Vesa 2.0 ATI Mach64
Video Memory: 4MB

If configuration is correct press ENTER to continue or CTRL+BREAK to quit

Pressing <ENTER> will start the diagnostics and a scrolling display of test details will be seen. In this display, white entries are for information only (tests starting, test progress, internal messages, etc.), green entries indicate successful completion of the test and red entries indicate test failures. You can generally ignore this display, except as a progress indicator, since a summary is displayed at the end of the run. An excerpt of the progress log follows.

An example of tests in progress:

```
CACHE.PERFORMANCE-RATIO PASSED
MEMORY.ADDRESS-PATTERNS (1-17-00 18:49:09)
MEMORY.ADDRESS-PATTERNS PASSED
MEMORY.ADDRESS RIPPLE (1-17-00 18:52:17)
MEMORY.ADDRESS RIPPLE PASSED
MEMORY.RANDOM-PATTERNS (1-17-00 18:52:18)
MEMORY.RANDOM PATTERNS PASSED
MEMORY.CACHE -RANDOM PATTERNS (1-17-00 18:55:38)
MEMORY.CACHE -RANDODCPATTERNS PASSED
MEMORY.CACHE -PSEUDO - RANDOM PATTERNS (1-17-00 18:55:55)
MEMORY.CACHE -PSEUDO - RANDOM-PATTERNS PASSED
MEMORY.CACHE -CHECKERBOARD PATTERNS (1-17-00 18:57:19)
MEMORY.CACHE -CHECKERBOARD-PATTERNS PASSED
MEMORY.CACHE -ADDRESS-PATTERNS (1-17-00 18:57:53)
MEMORY.CACHE -ADDRESS PATTERNS PASSED
MEMORY.CACHE - 32KB ACCESS (1-17-00 18:58:01)
MEMORY.CACHE - 32KB ACCESS PASSED
```

The test results summary uses similar conventions with the FRUs listed in bright green for passing (with submodules listed in darker green) and red for failures

An example of the test results summary for a “Quick Test.”: *(Results will vary depending on the system configuration)*

Test Result Summary		
FRU= CPU CPU Module	PASSED PASSED SMP Processor 0	PASSED
FRU= BASEBOARD Power On Self Test	PASSED PASSED CACHE Controller and memory	PASSED
FRU= MEMORY DIMM MEMORY Controller, SIMM, DIMM	PASSED PASSED Extended Memory Controller, Dimm	PASSED
FRU= HARD DISK DRIVES Hard Disk Drive 0	PASSED PASSED	

Press Any Key to Continue <DONE>

An example of the test results summary for a “Comprehensive Test.”: *(Results will vary depending on the system configuration)*

Test Result Summary			Pass Count = 1
FRU= CPU CPU Module	PASSED PASSED Math Coprocessor (FPU)		PASSED
FRU= BASEBOARD Power On Self Test Keyboard Controller PCI Bus Controller Direct Memory Access Controller AIC78xx SCSI Controller COMM2 INS8250 Serial Controller ATI Video Controller VGA Video Adapter	PASSED PASSED Primary Interrupt Controller PASSED Real Time Clock PASSED Programmable Interval Timer PASSED SIO308 Super I/O Controller PASSED COMM1 INS8250 Serial Controller PASSED Parallel Port 1 Controller PASSED CACHE Controller and Memory PASSED		PASSED PASSED PASSED PASSED PASSED PASSED PASSED
FRU= MEMORY DIMM MEMORY Controller, SIMM, DIMM	PASSED PASSED MEMORY Cont, SIMM, DIMM stress		PASSED
FRU= Hard Disk Stress Hard Disk Drive 0	PASSED PASSED		

Press Any Key to Continue

Upon completion of the test and after the test results are displayed, the program returns to the main menu. When the EXIT option is selected, the most recent test results are saved to the RESULT.LOG file in the current directory, or floppy drive a:, if the program is running from a ramdrive. For ease in viewing, copy the RESULT.LOG file to another diskette and open with a text editor. It is important to save the test results because after each subsequent test run, the RESULT.LOG is overwritten.

Troubleshooting

1. This section is not intended to be a tutorial on repair and system troubleshooting. It is intended to provide hints for the technician. If the problem system has just been assembled, a first step should be to check the system against the assembly procedures in the printed Server Board “Quick Start Guide,” and the electronic Server Board Product Guide. Both guides are provided on the Server Resource CD in the Server Board kit, and on the Intel Corporation’s support website. In addition, a troubleshoot guide is available on the CD and on the support website.
<http://support.intel.com/support/motherboards/server/>

Trouble Shooting Information	
Problem	Possible Solution
System fails to boot	<p>General: Check power. Check cabling, connectors and socketed components are properly seated. Remove all components except minimal memory and a processor and reboot. If possible check individual components (especially processors and memory) in a known good system.</p> <ol style="list-style-type: none"> 1. Check for processor termination card in the empty secondary processor slot. 2. Check for approved memory DIMM modules. See the tested memory list at: http://support.intel.com/support/motherboards/server/ 3. Check to assure that the power supply connector is correctly attached to the 24 pin (ATX 20pin +4) power connector. Intel Server Chassis use a 24 pin SSI compliant power connector, but most third party chassis use 20 pin ATX power connectors. Refer to the printed "Quick Start Guide" or the electronic product guide also available on the CD that ships with the product. For further information, both of these documents are also available on the Intel Customer Support Website (see URL below). 4. If applicable, verify the 3.3v sense (2x5pin) power connector is attached to the power supply signal connector located next to the serverboard power connector. 5. Ensure the power supply being used is at least 800mA of +5V standby current to support WOL and is required for proper operation.
System will not boot from the server board resource CDROM	Incorrect BIOS Boot priority order. Press <F2> during the server's POST and configure in BIOS set-up under the Boot drop down menu.
"motherboard is not supported" message at test start	Each server board has a unique diagnostic package. Ensure you have downloaded and are using the proper version of the diagnostic for the particular board you are installing. Additionally, ensure you have updated the board with the latest version of BIOS and firmware before running the diagnostics. To locate the latest versions of all the software, visit the support website at http://support.intel.com/support/motherboards/server/ . If problem persists, replace baseboard.
Probe did not identify all expected devices	Check power. Check cabling, connectors and socketed components are properly seated. Check individual components (especially processors, disks and memory) in a known good system.
Diagnostics hang during probe process	If probe hangs during probe for processors, memory or disk, remove/replace the device. Otherwise, replace server board.
Diagnostics hang during test execution	Note most recent test start message to determine FRU (Field Replaceable Unit) failing. Unless test is specifically for processors, memory or disk, probable cause is baseboard failure. Replace the failing FRU.
Other	For further support information, check http://support.intel.com/support/motherboards/server/