



SKA4 Server Board Diagnostics

Installation and Operating Instructions

*Revision 0.6
July 6, 2000*



Revision History		
Date	Rev	Modifications
06/13/00	0.5	Initial Draft
07/06/00	0.6	Edited Troubleshooting area

© Intel Corporation 2000

Information in this document is provided in connection with Intel products. No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document. Except as provided in Intel's Terms and Conditions of Sale for such products, Intel assumes no liability whatsoever, and Intel disclaims any express or implied warranty, relating to sale and/or use of Intel products including liability or warranties relating to fitness for a particular purpose, merchantability, or infringement of any patent, copyright or other intellectual property right. Intel products are not intended for use in medical, life saving, or life sustaining applications. Intel may make changes to specifications and product descriptions at any time, without notice.

The SKA4 may contain design defects or errors known as errata which may cause the product to deviate from published specifications. Current characterized errata are available on request.

Pentium is a registered trademark of the Intel Corporation. Xeon, Celeron & MMX are a trademark of Intel Corporation.

* Third-party brands and names are the property of their respective owners

CONTENTS

INTRODUCTION	1
CONVENTIONS	1
ASSUMPTIONS	1
INSTALLING THE SKA4 DIAGNOSTIC ARCHIVE.....	1
QUICK TESTS.....	2
COMPREHENSIVE TESTS.....	2
COMPREHENSIVE TEST WITH CONTINUOUS LOOPING.....	2
USING THE SKA4 DIAGNOSTICS	3
TROUBLESHOOTING.....	6

Introduction

The SKA4 diagnostics package provides a method to determine if a SKA4 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 Pentium® III 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 SKA4 based server system with the following minimum components. The SKA4 Server Board integrated in an approved chassis, a minimum of one Pentium III Xeon Processor, 3 processor termination cards, at least 4 Registered ECC DIMM modules from the tested memory list (in Bank A), a floppy disk drive, and one hard disk drive. Refer to the SKA4 tested memory document, and the supported Hardware and Operating System document for Intel approved components. These documents can be found at the Intel Corporation site

<http://support.intel.com/support/motherboards/server/SPKA4>

Installing the SKA4 Diagnostic Archive

The components of the SKA4 Diagnostics are available on the CD that is included with the boxed server board as the file SKA4DIAG.exe. It is a self-extracting archive that will create a bootable floppy containing the diagnostic program.

1. Insert a blank formatted diskette in floppy disk drive a.
2. Run the SKA4DIAG.exe program located on the CD, this will cause the bootable disk image to be copied onto a diskette.
3. Insert the diskette into the SKA4 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 SKA4 diagnostic tests are copied.
6. When the copy process is complete, you will be presented with a menu of five options.

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 600MHz processor and 512 MB of memory the quick test takes around 15 minutes. Additional memory extends this 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, the Real Time Clock, 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, the ICH (I/O Controller Hub), video controller, and the Adaptec* AIC-7899 SCSI Controller. Note that if the system includes a SCSI Host Adapter based on the AIC-7899 it will also be tested and identified as an additional SCSI Channel.

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 SKA4 Diagnostics* section.

The test duration is dependent on the number of processors and the amount of memory installed. This test takes considerably longer than the quick test. Additional memory and processors extend this time significantly. 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 SKA4 Diagnostics

To start the diagnostics boot the server from the bootable diskette described above. The system should display the following menu:

```
SKA4 Diagnostics. Ver 1.0
(c)Copyright 1998 Intel Corp. All Rights Reserved.
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 an SKA4, 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(R) III microprocessor
CPU Speed: 667 MHz
CPU SMP #0: Present
CPU SMP #1: Present
ACPI: DETECTED
NUMBER_OF_SCSI_CHANNELS: 2
KEYBOARD_TYPE: 101_KEY
RTC RAM SIZE: 128
USB Host Controller: found at I/O address 0x10c0 using IRQ 10
SMC's Super IO: Found
COM1 at Port Address: 3F8 is enabled
COM2 at Port Address: 2F8 is enabled
LPT1 0x378
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
Memory Size: 256 Meg
Video Subsystem: VGA-compatible controller, 2MB Ram

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 (note the white is shown below as black and the green is shown as gray):

An example of tests in progress:

```
CACHE.PERFORMANCE-RATIO PASSED
MEMORY.ADDRESS-PATTERNS (10-17-98 18:49:09)
MEMORY.ADDRESS-PATTERNS PASSED
MEMORY.ADDRESS RIPPLE (10-17-98 18:52:17)
MEMORY.ADDRESS RIPPLE PASSED
MEMORY.RANDOM-PATTERNS (10-17-98 18:52:18)
MEMORY.RANDOM PATTERNS PASSED
MEMORY.CACHE -RANDOM PATTERNS (10-17-98 18:55:38)
MEMORY.CACHE -RANDODCPATTERNS PASSED
MEMORY.CACHE -PSEUDO - RANDOM PATTERNS (10-17-98 18:55:55)
MEMORY.CACHE -PSEUDO - RANDOM-PATTERNS PASSED
MEMORY.CACHE -CHECKERBOARD PATTERNS (10-17-98 18:57:19)
MEMORY.CACHE -CHECKERBOARD-PATTERNS PASSED
MEMORY.CACHE -ADDRESS-PATTERNS (10-17-98 18:57:53)
MEMORY.CACHE -ADDRESS PATTERNS PASSED
MEMORY.CACHE - 32KB ACCESS (10-17-98 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	PASSED	
CPU Module	PASSED SMP Processor 0	PASSED
SMP Processor 1	PASSED	
FRU= BASEBOARD	PASSED	
Power On Self Test	PASSED CACHE Controller and memory	PASSED
FRU= MEMORY DIMM	PASSED	
MEMORY Controller, SIMM, DIMM	PASSED	
FRU= HARD DISK DRIVES	PASSED	
Hard Disk Drive 0	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	PASSED		
CPU Module	PASSED Math Coprocessor (FPU)		PASSED
SMP Processor 0	PASSED SMP Processor 1		PASSED
FRU= BASEBOARD	PASSED		
Power On Self Test	PASSED Primary Interrupt Controller		PASSED
Keyboard Controller	PASSED PCI Bus Controller		PASSED
Programmable Interval Timer	PASSED Universal Serial Bus Host Cont.		PASSED
Direct Memory Access Controller	PASSED SMC932 Super I/O Controller		PASSED
AIC78xx SCSI Controller	PASSED Base Memory Controller		PASSED
COMM1 INS8250 Serial Controller	PASSED COMM2 INS8250 Serial Controller		PASSED
Parallel Port 1 Controller	PASSED CACHE Controller and Memory		PASSED
VGA Video Adapter	PASSED Advanced Power Management		PASSED
FRU= MEMORY DIMM	PASSED		
MEMORY Controller, SIMM, DIMM	PASSED MEMORY Cont, SIMM, DIMM stress		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 SKA4 Server Board “Quick Start Guide,” and the electronic SKA4 Server Board Product Guide. Both guides are provided on the SKA4 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/SPKA4>

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"> 2. Check for processor termination card in any empty processor slots. 3. Check that at least 1 complete bank of 4 DIMM modules are populated. Also, check for approved memory DIMM modules. See the tested memory list at: http://support.intel.com/support/motherboards/server/SPKA4 4. Check to assure that the power supply connector is correctly attached to the SKA4 24 pin (ATX 20pin +4) power connector. The Intel SC7000 Server Chassis uses a 24 pin SSI compliant power connector, but most third party chassis use 20 pin ATX power connectors. In the case of an ATX 20 pin power connector, it plugs into the first 20 pins of the SKA4 24 pin power connector (the ones closest to the board edge). Refer to the printed SKA4 “Quick Start Guide” or the Electronic SKA4 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). 5. If you are using an SC7000 chassis or an SSI compliant power supply, you must attach the power supply 3.3 Volt sense connector to the Auxiliary Signal Connector located next to the serverboard power connector. 6. Ensure the Power Supply is providing at least 800mA of +5V standby current to support WOL.
System will not boot from the SKA4 Server Board Resource CDROM	Incorrect BIOS Boot priority order. Press <F2> during the server’s POST and configure in BIOS set-up.
“motherboard is not supported” message at test start	Update the board with the latest BIOS. http://support.intel.com/support/motherboards/server/SPKA4 If problem persists, replace the 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	7. For further support information, check http://support.intel.com/support/motherboards/server/SPKA4