Intel® Server System SC5400RA

Specification Update

Intel Order Number D82932-005

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Enterprise Platforms and Services Marketing

Revision History

Date	Modifications
11/13//06	Initial release. Added Errata 1-10.
02/14/07	Updated erratum 8.
04/18/07	Added erratum 11.
09/14/07	Updated erratum 3, 4, 8, 9, and 10. Added erratum 12-23.
01/11/08	Updated erratum 21-23. Added erratum 24.

Disclaimers

The Intel® Server System SC5400RA may contain design defects or errors known as errata that may cause the product to deviate from the published specifications. Current characterized errata are documented in this Specification Update.

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Contents

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Preface

This document is an update to the specifications contained in the *Intel® Server System SC5400RA Technical Product Specification* (D41763). It is intended for hardware system manufacturers and software developers of applications, operating systems, or tools. It will contain specification changes, specification clarifications, errata, and document changes.

Refer to the *Dual-Core Intel® Xeon® Processor 5000 Series Specification Update* (Order Number 313065) for specification updates concerning the Dual-Core Intel® Xeon® processor 5000 Series. Items contained in the *Dual-Core Intel® Xeon® processor 5000 Series Specification Update* that either do not apply to the Intel® Server System SC5400RA or have been worked around are noted in this document. Otherwise, it should be assumed that any processor errata for a given stepping are applicable to the Printed Board Assembly (PBA) revisions(s) associated with that stepping.

Refer to the *Dual-Core Intel® Xeon® processor 5100 Series Specification Update* (Order Number 313356) for specification updates concerning the Dual-Core Intel® Xeon® Processor 5100 Series processors. Items contained in the *Dual-Core Intel® Xeon® processor 5100 Series Specification Update* that either do not apply to the Intel® Server System SC5400RA or have been worked around are noted in this document. Otherwise, it should be assumed that any processor errata for a given stepping are applicable to the Printed Board Assembly (PBA) revisions(s) associated with that stepping.

Refer to the *Intel® 5000 Series Chipset Memory Controller Hub (MCH) Specification Update* (Order Number 313069) for specification updates concerning the *Intel® 5000 Series Chipset Memory Controller Hub (MCH)*. Items contained in the *Intel® 5000 Series Chipset Memory Controller Hub (MCH) Specification Update* that either do not apply to the Intel® Server System SC5400RAor have been worked around are noted in this document. Otherwise, it should be assumed that any chipset errata for a given stepping are applicable to the Printed Board Assembly (PBA) revisions(s) associated with that stepping.

Refer to the *Intel® 631xESB/632xESB I/O Controller Hub - Specification Update* (Order Number 313075) for specification updates concerning the Intel® 631xESB/632xESB I/O Controller Hub. Items contained in the *Intel® 631xESB/632xESB I/O Controller Hub - Specification Update* that either do not apply to the Intel® Server System SC5400RA or have been worked around are noted in this document. Otherwise, it should be assumed that any chipset errata for a given stepping are applicable to the Printed Board Assembly (PBA) revisions(s) associated with that stepping.

Nomenclature

- **Specification Changes** are modifications to the current published specifications for Intel® server boards. These changes will be incorporated in the next release of the specifications.
- **Specification Clarifications** describe a specification in greater detail or further highlight a specification's impact to a complex design situation. These clarifications will be incorporated in the next release of the specifications.

- **Documentation Changes** include typos, errors, or omissions from the current published specifications. These changes will be incorporated in the next release of the specifications.
- **Errata** are design defects or errors. Errata may cause the server board behavior to deviate from published specifications. Hardware and software designed to be used with any given processor stepping must assume that all errata documented for that processor stepping are present on all devices.

Product Scope

Below are the specific boards, BIOS and components covered by this update.

Product Code	Baseboard PBA Revision	BIOS Revision	BMC Revision	FRU / SDR Revision
SC5400RA	D25296-301	S5000.86B.04.00.0065	54	40
SC5400RA	D25296-301	S5000.86B.07.00.0079	59	42
SC5400RA	D25296-301	S5000.86B.10.00.0081	59	43

Summary Tables of Changes

The following tables indicate the errata and the document changes that apply to the Intel® Server System SC5400RA. Intel intends to fix some of the errata in a future stepping of components, and to account for the other outstanding issues through documentation or specification changes as noted. The tables use the following notations:

Doc: Intel intends to update the appropriate documentation in a future revision.

Fix: Intel intends to fix this erratum in a future release of the component.

Fixed: This erratum has been previously fixed.

No Fix: There are no plans to fix this erratum.

Shaded: This erratum is either new or has been modified from the previous specification update.

Table 1. Errata Summary

No.	Plans	Description of Errata
1.	No Fix	Password on boot not supported
2.	Fix	IPMI over Serial direct connect not supported
3.	Fixed	Intermittent beep code 1-5-2-1 when booting with dual processors
4.	Fixed	Fans may run faster than expected after exiting BIOS setup
5.	Fix	System fault LED may report incorrect status for some events
6.	Fix	Power supply redundancy state is misleading when only one power supply is installed
7.	No Fix	PCI-X slots 1 and 2 do not meet the letter of the Server System Infrastructure (SSI) Entry-Level Electronics Bay (EEB) Specification revision 3.61
8.	Fixed	Serial ATA (SATA) HDD's may be marked offline when populated behind a second Serial Attached SCSI (SAS) expander based drive enclosure
9.	Fixed	The SMBIOS entry point may not be visible under certain hardware configurations
10.	Fixed	Fans occasionally running too fast after BIOS reset
11.	Fix	RAID Web Console 2 Utility displays "Unexpected Sensor" warning message in Microsoft Windows* operating system
12.	Fixed	PS2 Keyboards and Mice may stop functioning after Red Hat Enterprise Linux is installed
13.	Fix	HSC and LCP updates may take a long time
14.	No Fix	SuSE* Linux Enterprise Server may not install successfully with Intel® Embedded Server RAID Technology II enabled.
15.	No Fix	Red Hat* Enterprise Linux 4 and BIOS setup display a different L2 cache size for the Quad-Core Intel® Xeon® Processor 5300 Series
16.	Fixed	Change Logo Utility causes BIOS corruption
17.	Fixed	POST screen may generate "NMI has been received – System Halted" message after the system reboots
18.	No Fix	SuSE* Linux Enterprise Server unable to boot after basic installation
19.	No Fix	Red Hat* Enterprise Linux may report the wrong processor speed

No.	Plans	Description of Errata
20.	Fixed	A kernel panic is likely to be observed with Red Hat* Enterprise Linux 4 or SuSE* Linux Enterprise Server 9 when SpeedStep is disabled in BIOS menu
21.	Fixed	Microsoft Windows* operating systems without service pack will exhibit blue screen with BIOS R0079 and R0081.
22.	Fixed	Fails PXE boot from on-board NIC 2 and neither on-board NIC works under DOS with BIOS R0079 and R0081.
23.	Fixed	Sluggish system performance may be experienced with BMC60.
24.	Fix	Microsoft Windows Server 2003* R2 SP2 may exhibit blue screen during an operating system boot or shutdown with a specific version of I/OAT driver.

Table 2. Documentation Changes

No.	Plans	Description of Documentation Change
1.		None

Following are in-depth descriptions of each erratum / documentation change indicated in the tables above. The errata and documentation change numbers below correspond to the numbers in the tables.

Errata

1. Password on boot not supported

Problem If an ‘admin’ or ‘user’ password is set in BIOS setup, this will be required before the user can enter into BIOS Setup. There is no option to configure a password during POST before the server will boot.

Implication Users will not be able to create and require a password on boot.

Status Intel does not intend to fix this erratum

Workaround None

2. IPMI over Serial direct connect not supported

Problem Dual-Core Intel Xeon Processor Based server boards list support for IPMI access via serial direct connect. Serial access to the BMC is not supported at this time.

Implication Users should use the IPMI over LAN interface to connect to the BMC. This only affects serial and terminal mode access to the BMC. This does not affect BIOS console redirection via serial, and OS redirection via serial.

Status This erratum may be fixed in a future firmware revision and hardware revision

Workaround None.

3. Intermittent beep code 1-5-2-1 when booting with dual processors

Problem During POST, the system may pause at POST code 0x13 (SMM Intialization). This may result in a 1-5-2-1 beep code and a processor event in the System Event Log (SEL) if dual processors are installed

Implication The system may log erroneous errors in the SEL or via beep code and under some conditions the system my halt at 0x13 and require an AC cycle.

Status This erratum is fixed in BMC firmware release 47 and later releases.

Workaround If an error is encountered, AC cycle the system and the system should run normally.

4. Fans may run faster than expected after exiting BIOS setup

Problem Some system fans may run faster after exiting BIOS setup using the 'save and exit' option.

Implication The system may generate more fan noise than normal.

Status This erratum was fixed in BMC firmware revision 49

Workaround The system must be AC cycled, or allowed to boot to the OS and then reset to restore fans to their normal speeds.

5. System fault LED may report incorrect status for some events

Problem The system fault LED may report incorrect status for some events. The proper LED state is described in the server board TPS, but some events may not reflect the states described in the TPS.

Implication The user may receive incorrect indication via the system fault LED. The user should verify the system state by looking at the SEL. No event is reported as a less severe status than expected, but may appear with a higher severity status.

Status This erratum will be fixed in a future firmware version.

Workaround None

6. Power supply redundancy state is misleading when only one power supply is installed

Problem If a single power supply is installed in a chassis that supports redundant power supplies, the BMC will indicate the power supply redundancy state as 'redundant'.

Implication In a single power supply configuration, the redundancy sensor should be ignored. Redundant chassis with fully redundant power supplies will accurately reflect the redundancy status.

Status This erratum may be fixed in a future firmware revision

Workaround None.

7. PCI-X slots 1 and 2 do not meet the letter of the Server System Infrastructure (SSI) Entry-level Electronics Bay (EEB) Specification revision 3.61

Problem PCI-X slots 1 and 2 have been placed physically on the board 0.25 mm away from the specified dimension called out in the SSI EEB Specification revision 3.61 due to trace routing considerations.

Implication The SSI EEB Specification revision 3.61, Figure 2 denotes the reference pin 1 location at 31.12 mm aft of the reference datum. Current location of the PCI-X slots 1 and 2 are 31.37 mm aft of the reference datum. Due to the many variables in board and chassis design this small deviation is expected to have little or no customer impact.

Status This erratum will not be fixed.

Workaround None.

8. Serial ATA (SATA) HDD's may be marked offline when populated behind a second Serial Attached SCSI (SAS) expander based drive enclosure

Problem When utilizing dual-expander SAS based drive enclosures, SATA drives may become marked offline in the second expander drive enclosure.

Implication Users who implement more than one fully populated SAS expander drive enclosure, while using SATA disk drives, may experience intermittent drive failures during operation.

Status This issue was fixed in HSC firmware revision 2.02.

Workaround None.

9. The SMBIOS entry point may not be visible under certain hardware configurations

Problem The server BIOS maintains an area in memory to act as an entry point to locate the SMBIOS area. This entry point includes the anchor string "_SM_", memory pointers and information about the SMBIOS area as required by the SMBIOS specification. This information is dynamically created by the BIOS during POST and is placed in a required memory range between 000F0000h-000FFFFFh. Hardware configurations which require large amounts of memory at POST (option ROM space or I/O configuration space) could fill up this memory range and the SMBIOS entry point cannot be created correctly.

Implication This problem manifests as an inability for software to locate the SMBIOS records. This can affect management software, and also some Intel provided update utilities, including: BIOS update utilities and FRUSDR update utilities. An error may also appear in the BIOS error manager. Intel update utilities will generate an error and abort before performing an update.

Status This erratum is fixed in BIOS release R0060 and later release.

Workaround If a specific hardware configuration experiences this issue, remove add-in PCI and PCIe cards to reduce the amount of add-in card resource space used. Perform the system update (BIOS, FRUSDR) and replace the add-in cards.

10. Fans occasionally running too fast after BIOS reset

Problem From BIOS setup screen, when you hit F10 to save and reset, the PWM will often come up at 30hz instead of 23kHz. Fan are running too fast in this mode. Hitting the Reset button will cause the fan speed to return to normal.

Implication If users do not perform a hard reset from the front panel, the fans in the system may run too fast and cause unnecessary noise.

Status This erratum is fixed in BMC Revision 49 and later releases.

Workaround In order to work around this issue, a hard reset from the front panel will need to be executed. This resets the PWM circuitry back to the correct frequency.

11. RAID Web Console 2 Utility Displays “Unexpected Sensor” Warning Message in Microsoft Windows* Operating System

Problem The warning message of “unexpected sensor” might be displayed in RAID Web Console 2 Utility, while there seems no functional issues for system.

Implication This warning message is only seen in Windows operating system. Old version RAID firmwares (before v.89) used not to support any communication to the SEP (Storage Enclosure Processor) on backplanes. When the firmware was modified to increase its capabilities and support of all the SEP devices out in the world, S5000PAL board related chassis backplane is one of the few that do not respond as expected to the inquiry command, so the error is rolled up and captured in the log. This is a harmless message against the backplane SEP device and will not cause any problems with the array or the drives.

Status This erratum may be fixed in a future firmware revision.

Workaround None.

12. PS2 keyboards and mice may stop functioning after Red Hat* Enterprise Linux is installed

Problem After installing Red Hat* Enterprise Linux on a system with BIOS release R0045, the PS2 keyboard and mouse stop working, however USB keyboards and mice will work fine.

Implication Users will be unable to use the Linux operating system if a PS2 keyboard and mouse are installed

Status This erratum is fixed in BIOS release R0054 and later release.

Workaround If the user goes into BIOS setup and disables port 60/64 emulation, PS2 keyboards and mic will continue to work. The user should enable port 60/64 emulation if USB keyboards and mice are used.

13. HSC and LCP updates may take a long time

Problem The Hot Swap Controller (HSC) and Intel® Local Control Panel (LCP) updates may take a long time. The time to complete each update may exceed 30 minutes.

Implication Updating HSC and LCP may teak a long time.

Status This erratum may be fixed in a future firmware revision.

Workaround None.

14. SuSE* Linux Enterprise Server may not install successfully with Intel® Embedded Server RAID Technology II enabled

Problem If SuSE* Linux Enterprise Server is being installed with Intel® Embedded Server RAID Technology II enabled, the RAID array may not be detected after the driver has been loaded, which results in an installation failure. .

Implication The AHCI module inside the operating system is loaded prior to the third party driver, and therefore may take control of the RAID controller. This will result in an installation failure.

Status Users cannot load a third party RAID driver and the AHCI driver simultaneously in SuSE* Linux Enterprise Server; doing so may cause installation failures.

Workaround The “brokenmodule-ahci” command can prevent AHCI from loading during installation. At the very first install screen, press F6 to load a driver. In the text tab, type `brokenmodules=ahci`; this will allow the installation to complete successfully.

15. Red Hat* Enterprise Linux 4 and BIOS setup display a different L2 cache size for the Quad-Core Intel® Xeon® Processor 5300 Series

Problem In Red Hat* Enterprise Linux 4, the Quad-Core Intel® Xeon® Processor 5300 Series L2 cache size is displayed as 4MB, while in BIOS setup the cache size

is displayed as 8MB

Implication In BIOS setup, the system reports the total L2 cache size as 8MB due to the 4MB + 4MB structure of the processor. The Quad-Core Intel® Xeon® processor 5300 Series is similar to a package of two sets, each with a 4MB L2 cache size. In each set, the two cores share the 4MB cache. Red Hat* Enterprise Linux 4 views the processor per logical CPU thread. Each logical thread (each set) has access to only 4MB cache, and Red Hat* Enterprise Linux 4 reports it as such.

Status The different L2 chache size display is due to the different cache size reporting mechanisms of Red Hat* Enterprise Linux 4 and BIOS setup, an is not an incorrect display by the operationg system.

Workaround None.

16. Change Logo Utility causes BIOS corruption

Problem Any board flashed with a version of BIOS release R0064 edited with the Change Logo Utility will no longer boot. The board will hang with “Off-Off-Red-Green” shown on the Post Code LEDs at the rear of the board.

Implication The Change Logo Utility cannot be used with BIOS release R0064.

Status This erratum is fixed in BIOS release R0066 and later releases.

Workaround None.

17. POST screen may generate “NMI has been received – System Halted” message after the system reboots

Problem POST screen may generate "NMI has been received - System Halted" message after the system reboots.

Implication Along with this error, sometimes “Bus Uncorrectable Error” might also be recorded to System Event Log (SEL)

Status This erratum is fixed in BIOS release R0066 and later releases

Workaround Reboot the system again.

18. SuSE* Linux Enterprise Server unable to boot after basic installation

Problem During SuSE* Linux Enterprise Server installation, if a USB floppy drive is used to load the mass storage driver, SuSE* Linux Enterprise Server may not able to

boot after basic installation. The following message may appear:

```
resume device /dev/sdb1 not found (ignoring)

waiting for device /dev/sdb2 to
appear.............................not found -- exiting
to /bin/sh

$
```

Implication During installation, the USB floppy device is recognized as sda, and the mass storage is recognized as sdb. After reboot, the mass storage is now recognized as sda, but SuSE* Linux Enterprise Server still tries to load system files from sdb. To resolve this problem, the grub menu list file and the fstab file need to be modified.

Status No Fix.

Workaround http://support.intel.com/support/motherboards/server/sb/CS-025446.htm describes this problem and its workaround

19. Red Hat* Enterprise Linux may report the wrong processor speed

Problem In Red Hat* Enterprise Linux, the operating system may report the wrong processor speed. Example: Processor speed is 3.0GHz, the operating system shows it as 3300MHz.

Implication This symptom is operating system related. Although it doesn't reflect the processor speed correctly, this is only a report; It is harmless to the system, and it can be ignored.

Status Ignore the processor speed in Red Hat* Enterprise Linux.

Workaround None.

20. A kernel panic is likely to be observed with Red Hat* Enterprise Linux 4 or SuSE* Linux Enterprise Server 9 when SpeedStep is disabled in BIOS menu

Problem A kernel panic along with Blue Screen is likely to be observed with Red Hat* Enterprise Linux 4 or SuSE* Linux Enterprise Server 9 when SpeedStep is disabled in BIOS menu.

Implication This will make OS installation or system boot halt with a kernel panic warning message.

Status This erratum is fixed in BIOS Release R0079 and later releases.

Workaround None.

21. Microsoft Windows* operating systems without service pack will exhibit blue screen with BIOS R0079 and R0081

Problem If a user attempts to install Microsoft Windows* without an integrated service pack, it will blue screen during the installation process if BIOS R0079 or BIOS R0081 is on the Intel Server Board. Conversely, if a user upgrades the system BIOS to BIOS R0079 or R0081 *prior* to installing the appropriate service pack, the system will blue screen. Starting in BIOS R0079, support for enhanced sleep states was added. This addition to the BIOS requires that the Microsoft Service Pack be integrated into the operating system installation process to understand the extended sleep state support.

The following is a list of Microsoft* operating systems and required service packs:

Microsoft Windows Server 2003* 32-bit and 64-bit requires Service Pack 1
Microsoft Windows SBS 2003* requires Service Pack 1

Implication Users cannot install Microsoft Windows* or upgrade the system BIOS to BIOS R0079 or R0081 without the required service pack integrated into the operating system installation process or install the required service pack before the BIOS update.

Status This erratum was fixed in BIOS R0084. Users need to upgrade BIOS to R0084 or a later version, then disable Deep C-state Support in BIOS setup (Advanced BIOS menu -> Processor submenu) before installing or booting a Microsoft Windows* operating system without the required service pack.

Workaround Users need to remain on BIOS R0076, use a Microsoft Windows* installation process that includes the service pack integrated into the installation, or install Microsoft Windows* and service pack prior to updating to BIOS R0079 or R0081. Additionally, the Release 2 versions of Microsoft Windows Server 2003* do not exhibit this issue. Use of this version of Microsoft Windows*, if possible, is also another valid workaround.

22. Fails PXE boot from on-board NIC 2 and neither on-board NIC works under DOS with BIOS R0079 and R0081

Problem With BIOS R0079 or R0081 installed on the Intel® Server Boards S5000PSL/S5000XSL/S5000XVN, it fails PXE boot from on-board NIC 2 and neither on-board NIC works under DOS.

Implication The server fails to connect PXE server via on-board NIC 2, and on-board NICs

don't work under DOS.

Status This erratum was fixed with BIOS R0084.

Workaround None.

23. Sluggish system performance may be experienced with BMC60

Problem An issue with BMC 60 is causing incorrect interpretation of the user selected BIOS Setup Open Loop Thermal Throttling (OLTT) options. Advanced BIOS Setup contains OLTT selections for Performance Mode and Acoustic Mode. BMC 60 is recognizing a Performance Mode selection in BIOS setup as Acoustic mode request. Acoustic Mode selection in BIOS setup is being disregarded and fail safe defaults for Fan Profiles are enforced. This misinterpretation can manifest the BIOS/BMC interaction causing a throttling condition slowing down the system performance significantly.

Implication Systems set to Performance Mode are incorrectly being configured in Acoustics Mode which could make the system more susceptible to overheating, especially in 1U chassis, or performance degradation may be seen due to memory throttling rather than fan boosts being used to cool the memory. Systems being configured to Acoustics Mode in the BIOS are actually being set up in fail safe state.

Status This erratum was fixed in BMC 62.

Workaround None.

24. Microsoft Windows Server 2003* R2 SP2 may exhibit blue screen during an operating system boot or shutdown with a specific version of I/OAT driver

Problem Microsoft Windows Server 2003* R2 SP2 may exhibit blue screen during an operating system boot or shutdown. The issue happens only with Ver.1.2.78.6 of the I/OAT driver, and only if I/OAT is enabled in BIOS Setup. This symptom has been seen with the I/OAT driver in Intel NIC driver package Ver 12.3.

Implication In the recent I/OAT driver, Microsoft* has changed a structure in their NetDMA API. It is not backward compatible with the previous version of the API.

Status Intel may fix this erratum in a future I/OAT driver release.

Workaround I/OAT driver version 1.2.66.0, included in NIC driver package Ver 12.0, has the previous structure definition for NetDMA 1.0 usage and doesn't show this symptom.