

Intel[®] Integrated RAID Controller SRCU31A

Specification Update

December 2002

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Revision History

Date	Version	Description
12/13/02	012	No changes.
11/15/02	011	No changes.
10/15/02	010	No changes.
09/12/02	009	Added specification clarification #4. and #5.
08/13/02	008	Added Errata #13.
06/26/02	006	Updated the " Software Version Identification Matrix " to include data for build IIR-1.3.2e.

		Added Errata #12. Changed product name from BNU31 to SRCU31A.
04/17/02	004	Added Errata #9., #10. and #11. Added Specification clarification #3. Added Documentation change #6.
03/20/02	003	Added Errata #8. Added Specification clarification #2. Added Documentation change #5.
01/16/01	002	Added Errata #4., 5., 6. and #7. Added Documentation changes #2., 3. and 4.
12/19/01	001	This is the new specification update document.

Preface

This document is an update to the specifications contained in the Affected Documents/Related Documents table below. This document is a compilation of product and documentation errata, specification clarifications and changes. It is intended for hardware system manufacturers and software developers of applications, operating systems, or tools.

Information types defined in Nomenclature are consolidated into the specification update and are no longer published in other documents.

This document may also contain information that was not previously published.

Affected Documents/Related Documents

Title	Order
Intel® Integrated RAID Controller SRCU31A Technical Product Specification	273371
Intel® Integrated RAID Installation Quick Start Guide	273477
SRCU31A Hardware Installation and User's Guide	273639
Intel® Integrated RAID Software Installation and User's Guide	273479

Nomenclature

Errata are design defects or errors. These may cause the RAID controller's behavior to deviate from published specifications.

Specification Changes are modifications to the current published specifications. These changes will be incorporated in any new release of the specification.

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 any new release of the specification.

Documentation Changes include typos, errors, or omissions from the current published specifications including all end-user documentation. These will be incorporated in any new release of the specification and/or documentation..

Note: Errata remain in the specification update throughout the product's lifecycle, or until a particular stepping is no longer commercially available. Under these circumstances, errata removed from the specification update are archived and available upon request. Specification changes, specification clarifications and documentation changes are removed from the specification update when the appropriate changes are made to the appropriate product specification or user documentation (datasheets, manuals, etc.).

Summary Table of Changes

The following table indicates the errata, specification changes, specification clarifications, or documentation changes which apply to the RAID controller product. Intel may fix some of the errata in future firmware or driver releases, and account for the other outstanding issues through documentation or specification changes as noted. This table uses the following notations:

Codes Used in Summary Table

Stepping

X: Errata exists in the global build version indicated.

(No mark)

or (Blank box): This erratum is fixed in the listed global build version or specification change does not apply to the listed global build version.

Reference

(Number): IBD tracking number.

Page

(Page): Page location of item in this document.

Status

Doc: Document change or update will be implemented.

Fix: This erratum is intended to be fixed in a future update of the product.

Fixed: This erratum has been previously fixed.

NoFix: There are no plans to fix this erratum.

Eval: Plans to fix this erratum are under evaluation.

Errata

No.	Global Build Version			Ref	Page	Status	Errata
	1.3.1c	1.3.2e					
1.	x			51	15	Eval	The controller cache setting resets to the default value (On) after reboot
2.	x			297	15	Eval	Unable to install Linux from SCSI CD-ROM connected to SCSI channel A or channel B
3.	x			449	15	Eval	GDTH Linux driver does not install on 440GX chipset based systems
4.	x			86	15	Eval	Pulling Hot Fix Drive Not Detected By Storage Console
5.	x			519	16	Eval	Apparent 16 Disk Limitation with FreeBSD
6.	x			530	16	Eval	Unable to Open NWPA.NLM File During Netware 5.0 Installation
7.	x			536	16	Eval	Unable to Load HAM Driver for Netware 4.2
8.	x			518	17	Eval	Firmware Update from DOS is not allowed after interrupting a firmware update
9.		x		646	17	Eval	Unable to repair RAID 1 Host Drive when member drive is removed from a powered-down system
10.		x		659	17	Eval	Migrated RAID Volumes not recognized by new Host Operating System
11.		x		656	18	Eval	PCI Hot Plug not responding to system call fails on W2K
12.		x		833	18	Eval	The 'Repair Array Drives' Wizard does not detect a failed RAID10 array as FAILED and will not repair the array.
13.		x		527	19	Eval	RAID levels 4 and 5 are non-redundant in some cases during the array expansion process.

Specification Changes

No.	Global Build Version			Ref	Page	Specification Changes
						None for this revision of this specification update.

Specification Clarifications

No.	Global Build Version			Reference	Page	Specification Clarifications
	1.3.1c					
1.	x			118	21	Additional attempts to update firmware are unsuccessful after an interruption of a previous firmware update
2.	x			447	21	State of the array drive during expansion and failure
3.				518	21	Replaces errata "Firmware Update from DOS is not allowed after interrupting a firmware update" in previously published specification updates
4.				456	21	Replaces errata "System lock up when attempting Hot Replace of SRCU31A" in previously published specification updates
5.				203	21	Replaces errata "FreeBSD does not mount the file system to the onboard SCSI drive" in previously published specification updates

Documentation Changes

No.	Document Revision			Reference	Page	Documentation Changes
	1.0.8	1.1	1.1.3			
1.	x			N/A	23	Correction to Firmware Update Procedure in Hardware Guide
2.		x		546	23	Intel® Integrated RAID Software Installation and User's Guide, Section B.1, Chaining
3.		x		536	23	Intel® Integrated RAID Software Installation and User's Guide, Section 5.2.1, New Installation of NetWare 4.20 with the SRCRX.HAM Driver
4.		x		530	24	Intel® Integrated RAID Software Installation and User's Guide, Section 5.2.2, New Installation of NetWare 5.0 with the SRCRX.HAM Driver
5.			x	621	25	Addition to Intel® Integrated RAID Software Installation and User's Guide regarding Error State Messages and Patching to a Failed State
6.			x	447	26	Intel® Integrated RAID Software Installation and User's Guide, Version 1.1.4, Section 9.5.4.1, Array Drive Menu for Existing Array Drives - Expand Array Drive

Identification Information

Software Version Identification Matrix

This matrix identifies the various software module version numbers for a given global build version. It is possible that a new release may not affect all software modules. It is also possible that a new module can be released individually without a release revision.

Global Build Contents

SRCU31A	Global Build Version				
	IIR-1.2.6j	IIR-1.3.2e			
Item Description	Version	Version	Version	Version	Version
ASPI Drivers					
DOS	3.00	3.00			

SRCX000 Drivers					
DOS	4.00a	4.03a			
Utilities					
rawrite.exe	2.00	2.00			
fru.exe	4.16	4.17			
genno.exe	1.0.0	1.0.0			
sleep.exe	1.0.0	1.0.0			
autorun.exe (DemoShield)	6.3.16.0	6.03			
setup.exe (InstallShield)	2.11.15.0	1.10.00			
install.exe (menu)	1.0.0	1.0.0			
Firmware Flash Image					
SRC_RXFW	2.32.00-R016	2.33.01-R01B			
Controller BIOS	1.33.0	1.38.0			
Host BIOS	6.05c	6.08B			
STORCON					
Win2K	2.02	2.09			
WinNT	2.02	2.09			
WinXP		2.09			
UnixWare 7.1	2.02	2.09			
LINUX	2.02	2.09			
DOS	2.02	2.09			
Netware	2.02	2.09			
STORCON+					
WIN2K/WINNT	3.00	3.01			

RAIDMAIL UTILITY					
WINXP/WIN2K/WINNT	2.0.0.1	2.01			
SNMPDLL					
WINXP/WIN2K/WINNT	3.00	3.01			
SRCD					
Netware	1.10	1.11			
LINUX	1.10	1.11			
UnixWare 7.11		1.11			
OpenServer		1.11			
RCSSERVICE					
WINXP/WIN2K/WINNT		2.00			
RAIDSRC.SYS					
WINXP/WIN2K/WINNT	3.01	3.01			
srch.o Driver					
UnixWare 7.1	2.30	2.31			
GDTH Driver					
LINUX	2.03	2.04			

Module Identification Methods

Release Version Identification

A "Release" is provided on a CD-ROM from Intel Corporation. The release version is listed on the CD-ROM label in the following format:

w.xx.yy-Rzzz

Where:

w.xx = Major Version

yy-Rzzz = Minor Version

The release version is not identifiable in software.

Adapter Firmware Version Identifier

There are two methods for identifying the firmware version installed on the RAID adapter.

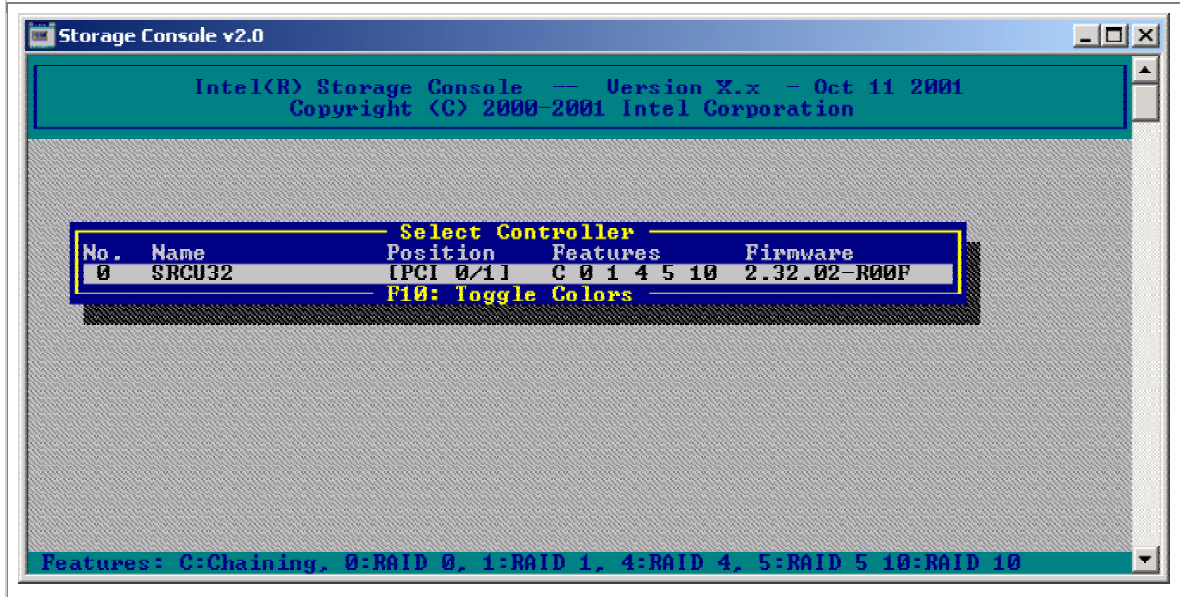
- While the system is booting, the RAID controller firmware initializes and displays version information on the screen (see [Figure 1](#)). The firmware version is displayed next to the words "FW-Version".
- An alternative method is to use Storage Console for identifying the adapter firmware version. Within Storage Console, select the applicable controller and locate its version under the *Firmware* column on the Select Controller screen (see [Figure 2](#)).

Figure 1. Firmware Version Displayed During System Boot

```
PCI          Storage RAID Controller BIOS          Version 6.00b
Copyright (C) 1991-2001 by Intel Corporation      Jul 19 2001
All rights reserved!
BIOS at 0x0000C9000-0x0000CE7FF
1 Controller(s) found, Selftests OK, scanning SCSI Bus ...
I PCI 7/14] DPMEM (B) at 0xFA000000-0xFA003FFF, INT A = IRQ 11.
I PCI 7/14] SRCU32 - HWL0 - 64 MB SDRAM/ECC - 2048kB Flash-RAM
I PCI 7/14] SN 00FE2211 - Clust. Firmware-FW-Version 2.32.00-R002 - Jul 18 2001..
I PCI 7/14] ECC support enabled.
I PCI 7/14] SCSI-B ID:1 LUN:0 -- QUANTUM ATLAS_U__9_SCA 160MB/s.
I PCI 7/14] SCSI-B ID:2 LUN:0 -- QUANTUM ATLAS_U__9_SCA 160MB/s
I PCI 7/14] SCSI-B ID:3 LUN:0 -- QUANTUM ATLAS_10K_9SCA 160MB/s
I PCI 7/14] SCSI-B ID:4 LUN:0 -- QUANTUM ATLAS_10K_9SCA async
I PCI 7/14] SCSI-B ID:5 LUN:0 -- QUANTUM ATLAS_IV_9_SCA async..
I PCI 7/14] Private RAID-5 Host Drive 0 installed (ready) _

>>> Press <Ctrl><G> to enter Intel(R) Storage Console <<<
```

**Figure 2. Firmware Version and Application Version Displayed in Storage Console
Storage Console Version Identifier**



Storage Console (StorCon) is a full-featured monitoring and configuration utility with a text-based user interface. StorCon manages all aspects of the RAID subsystem as well as many features of the RAID adapter.

There are two methods for running the StorCon program. As part of the IIR controller's Expansion ROM (XROM), it can be loaded at system boot level by pressing <Ctrl>+<G> when prompted. StorCon can also be launched as an application within a host OS.

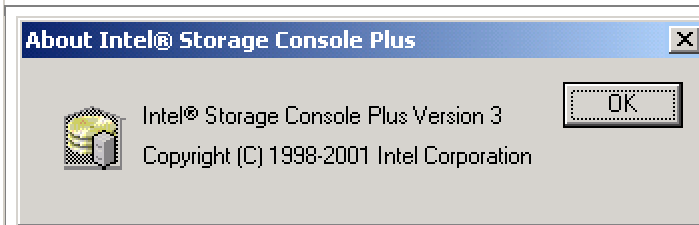
The StorCon version is displayed on the top middle area of the StorCon window (see [Figure 2](#)).

Storage Console Plus Version Identifier

Storage Console Plus (StorCon+) is a graphical user interface implementation of StorCon. StorCon+ has similar features and functionality to StorCon, with few exceptions. However, StorCon+ runs on Microsoft Windows-based systems only.

The StorCon+ version is displayed in StorCon+ About window. See [Figure 3](#).

Figure 3. StorCon+ and Application Version Displayed in Storage Console Window



Compatibility

1. The following products have demonstrated the inability to co-exist in the same system as the RAID Controller

Product: SCB2 Platform

Problem: The SCB2 platform will not boot when the SRCU31A adapter is installed and the system BIOS has legacy USB support enabled.

Workaround: Disable the legacy USB support in the SCB2 platform. The USB mouse is still usable with legacy USB disabled.

Errata

1. The controller cache setting resets to the default value (On) after reboot

OS: Windows NT 4.0

Problem: If no host drive is present on the adapter, the adapter's cache setting cannot be set to 'Off' via the Configure Controller menu in StorCon.

Implication: When the adapter's write cache is not turned off before a Windows NT installation, the installation will not complete correctly. This issue appears ONLY during the migration to NTFS. If the write back is enabled, the system will go into an endless loop because the NTFS information is not written to disk before the reboot (it is still in cache).

Workaround: Create a host drive before attempting to change the adapter's write cache setting in StorCon..

Status: Eval. See the "[Summary Table of Changes](#)".

2. Unable to install Linux from SCSI CD-ROM connected to SCSI channel A or channel B

OS: UnixWare 7.1.1, Red Hat Linux 6.2 SBE2, Red Hat Linux 7.1

Problem: When host drives are detected on one channel of the adapter, the SCSI CD-ROM located on the other channel of the adapter is not detected during OS installation.

Implication: The OS installation CD will not boot from a SCSI CD-ROM connected on either channel A or B, and as a result, the OS cannot be installed from the SCSI CD-ROM.

Workaround: Use a boot floppy disk or CD in an IDE CD-ROM drive to install the OS.

Status: Eval. See the "[Summary Table of Changes](#)".

3. GDTH Linux driver does not install on 440GX chipset based systems

OS: Red Hat Linux 7.1

Problem: The Red Hat Linux 7.1 installation fails on a 440GX chipset based system installed with an SRCU31A adapter. When a system with this configuration tries to load the GDTH driver, the system hangs.

Implication: OS installation is unsuccessful for this scenario.

Workaround: The workaround (including the boot disk) is publicly and freely available from the Red Hat web site URL, <http://www.redhat.com/support/docs/gotchas/7.1/gotchas-71.html>.

Status: Eval. See the "[Summary Table of Changes](#)".

4. Pulling Hot Fix Drive Not Detected By Storage Console

OS: ALL

Problem: If a Hot Fix drive fails or is pulled from the system, there is no indication by StorCon that a drive has failed.

Implication: It is expected behavior that a hot fix drive could be replaced without action by the controller. The controller waits for a manual action from the user and/or if a drive is required (in the event of an array drive failure).

Workaround: To prevent this behavior, uninstall the Hot Fix and then reassign it to the drive once the disk has been replaced. If the Hot Fix is missing when an array fails, the failed disk must be replaced before a Hot Fix drive can be placed into the system.

Status: Eval. See the "[Summary Table of Changes](#)".

5. Apparent 16 Disk Limitation with FreeBSD

OS: FreeBSD

Problem: When booting to the OS, the system only shows 16 devices available.

Implication: FreeBSD does not have a limitation on the number of drives. This behavior occurs because the default installation of FreeBSD has 16 device files (i.e. /dev/da0 to /dev/da15) created in /dev/directory. Without additional device nodes created, accessing the Host Drives beyond da15 is not possible.

Workaround: After the system boots up, create the nodes using the following procedure:

1. From the command line, type, `cd /dev' and press <Enter>.
2. From the command line, type: `type: sh MAKEDEV da##' (where ## > 15, e.g. da18) and press <Enter>.
3. Repeat the step for any additional devices. To check the number of devices in the system, use the command "dmesg | more".
4. Once you have created the required device nodes, bring up the /stand/sysinstall application and go to configure -> Fdisk. The screen correctly displays all the drives in the system.

Status: No Fix. See the "[Summary Table of Changes](#)".

6. Unable to Open NWPA.NLM File During Netware 5.0 Installation

OS: NetWare 5.0

Problem: The described behavior occurs if NWPA.NLM cannot be copied successfully to the server boot directory during NW5.0 installation. This can happen if NWPA.NLM was loaded from another driver.

Implication: HAM driver is not loaded after reboot.

Workaround: NWPA.NLM has to be updated in the server boot directory after the first part of the installation is completed. The solution is to remove all entries from the storage driver list during installation and to reinsert them with the SRCRX.HAM at the first position. This will cause the installation process to first copy the NWPA.NLM file from our installation disk to the server boot directory before loading it. See 'Documentation Changes' later in this document for details on this procedure.

Status: No Fix. See the ["Summary Table of Changes"](#).

7. Unable to Load HAM Driver for Netware 4.2

OS: NetWare 4.2

Problem: The described behavior occurs if NWPA.NLM cannot be copied successfully to the server boot directory. This may happen because the user choose an incorrect driver directory for driver installation or if the installation was aborted or if another storage driver is installed prior to the IIR driver being installed.

Implication: HAM driver is not loaded.

Workaround: The solution is to remove all entries from the storage driver list during installation and to reinsert them with the SRCRX.HAM at the first position on the driver list. This will cause the installation process to copy the NWPA.NLM file from our installation disk to the server boot directory before loading it. See 'Documentation Changes' later in this document for details on this procedure.

Status: No Fix. See the ["Summary Table of Changes"](#).

8. Firmware Update from DOS is not allowed after interrupting a firmware update

OS: MS-DOS

Problem: After interrupting a firmware update, the RAID controller will not update firmware from a bootable DOS disk but instead displays a number of error messages.

Implication: Unable to update the firmware.

Workaround: After an interrupted firmware update, if subsequent attempts to flash the firmware fail, use the following DOS command: fru -o

Status: No Fix. See the ["Summary Table of Changes"](#).

Status: No Fix. See the ["Summary Table of Changes"](#).

9. Unable to repair RAID 1 Host Drive when member drive is removed from a powered-down system

OS: POST

Problem: The failure to repair an array occurs when a drive is removed from a previously configured drive array while the server is powered off.

Implication: When a server is booted from a powered down state, the server containing the array is in a FAIL state because an array drive member is MISSING. The repair wizard will not work for RAID 1 arrays where the drive is detected as MISSING. The information for a missing RAID 1 array is available if the RAID 1 component failed during the uptime of the controller. Auto Hot Plug does not start when this information is missing.

Workaround: Procedure for workaround:

1. Start StorCon and observe that the RAID 1 Host Drive is in FAIL state.
2. Insert the drive back into the slot and scan the bus.
3. Go to the `Configure Array Drives' menu, select a working drive (not the missing drive), and select the `Add RAID 1 component' option.

Status: Eval. See the ["Summary Table of Changes"](#).

10. Migrated RAID Volumes not recognized by new Host Operating System

OS: Windows 2000, Windows XP

Problem: When migrating (roaming) a Host Drive from host system A to Host system B, the Operating System on Host system B does not recognize the migrated drive array.

Implication: The migrated Host Drive is unusable.

Workaround: For a migrated RAID array to be recognized by the new host operating system, the host system must first be rebooted.

Status: Eval. See the ["Summary Table of Changes"](#).

11. PCI Hot Plug not responding to system call fails on W2K

OS: Windows 2000

Problem: When attempting to `hot remove' an IIR controller on a PCI Hot Plug capable system, the RAID SNMP service agent will not allow the controller to be removed.

Implication: Hot Remove function cannot be performed safely.

Workaround: If after shutting down Storcon/Storcon+, the system responds with the message: 'The device RAID Controller cannot be stopped because a program is running'. When hot removing, the RAID SNMP service agent may need to be stopped. To do this complete the following procedure:

1. Right mouse click on My Computer and select Manage.
2. From Computer Management double click on Services and Applications.
3. In the right pane of Computer Management, double click on Services and find the RAID SNMP service.
4. Right click on the RAID SNMP service and select stop.
5. Once the service has stopped it should now be possible to hot remove the controller.

Status: Eval. See the "[Summary Table of Changes](#)".

12. The 'Repair Array Drives' Wizard does not detect a failed RAID10 array as FAILED and will not repair the array.

OS: All

Problem: In some instances, Storage Console correctly reports a RAID10 host drive in the FAIL state; however the 'Repair Array Drives' Wizard does not detect the RAID10 host drive as FAILED and will not repair the array. Two instances that this is known to happen are:

- If a RAID10 host drive is in the FAIL state when the computer is booted up and the RAID controller does not detect the failed component in the system (e.g., the failed hard disk drive is not in the system and is detected as missing).
- If the 'Repair Array Drives' wizard is used to repair one of the failed mirrors in a RAID10 array where multiple mirrors have experienced a failed component (e.g. drive #1 in mirror 1 and drive #1 in mirror 2 have failed). Once the first failed mirror is repaired, all remaining failed mirrors will no longer be detected as FAILED by the 'Repair' wizard.

Implication: The 'Repair Array Drives' wizard, located in the Storage Console, cannot be used to repair the FAILED RAID10 array. The array must be repaired manually.

Workaround: If the Storage Console reports a RAID10 host drive in the FAIL state, but the Repair Array Drives option does not list any failed arrays, then follow this procedure to manually repair the failed array:

1. From the Storage Console main menu, press F4 to display the Advanced Menu.
2. Select 'Configure Host Drives'.

3. Press the up/down arrows until the RAID10 host drive is selected.
4. Press F4 to display the `Array/Logical Drive' window.
5. Press F4 again to display the RAID 1/Logical Drive(s) window.
6. One of the entries in this menu will be of type `Disk'. Make a note of the number for this entry. See the left column to get the number.
7. Press ESC three times.
8. Select `Configure Logical Drives' from the Advanced Menu.
9. Press the up/down arrows until the logical drive noted in step 6 is selected, then press Enter.
10. Select `Add RAID-1 Component'.
11. Either select one of the disks shown, or hot-plug a new disk.
12. Wait for the RAID-1 component to finish building. Afterwards, the RAID10 array will be in the READY state.

Status: Eval. See the ["Summary Table of Changes"](#).

13. RAID levels 4 and 5 are non-redundant in some cases during the array expansion process.

OS: All

Problem: When expanding a RAID 5 or RAID 4 array to unused space on the existing drives (using extra space on the drives that are already part of the array), the array will change to a non-redundant state until the expansion process has completed. This means that if a drive fails during this type of expansion, data may be lost.

Note the following:

- This does NOT affect expansion to space on new drives. The array does NOT change to a non-redundant state during an expansion when expanding the array to space on a new drive or new drives.
- This does NOT affect arrays that were initially setup to use the entire capacity of the drives used in the array (default).
- After successfully expanding a RAID 4 or 5 array, the array will be redundant in all cases.
- RAID 4 arrays are partially redundant in the errata case described. A RAID 4 array can withstand the loss of the parity drive (and only the parity drive) during an expansion to unused space on the existing drives.

Implication: A redundant array becomes non-redundant during the time period of the expansion. If a hard drive fails or becomes inaccessible during the expansion process, the entire array may be lost.

Workaround: Only expand arrays to space on new drives. Do not expand arrays to space on existing drives in the array without ensuring that a valid, current backup exists.

Status: Eval. See the "[Summary Table of Changes](#)".

Specification Changes

There are no Specification Changes in this Specification Update.

Specification Clarifications

1. Additional attempts to update firmware are unsuccessful after an interruption of a previous firmware update

There are 2 options for programming the firmware, Firmware Update or Firmware Recovery. When the current firmware is intact and functional, you would use Firmware Update to overwrite the existing firmware with a new image. However, if a previous firmware update is interrupted accidentally, the firmware becomes unusable, resulting in errors. Reprogram the firmware by using the Firmware Recovery Utility (FRU) instead of Firmware Update. Refer to the Hardware Guide for detailed instructions on using FRU.

2. State of the array drive during expansion and failure

In the *Expand Array Drive* section in the Software Installation and User's Guide it states:

"To migrate or expand a RAID 4/5 array drive, the state must be ready. The data on the array drive remains intact and is not affected by the expansion. The additional capacity is introduced as a new host drive. If a logical drive fails during the expansion, the expansion process continues until the expansion is finished and the array drive changes into the fail state."

The Array Drive enters the BUILD state if the Array Drive is expanded using free space and enters the IDLE state if a drive failure occurs during expansion.

3. Replaces errata "Firmware Update from DOS is not allowed after interrupting a firmware update" in previously published specification updates

After having interrupted a firmware update, the RAID controller will not update firmware from a bootable DOS but instead displays a number of error messages. In this mode, a firmware update of this product is not possible. After an interrupted firmware upgrade, if subsequent attempts to flash the firmware fail, use the following command: fru -o

4. Replaces errata "System lock up when attempting Hot Replace of SRCU31A" in previously published specification updates

On NetWare 5.x, the system may lock up when attempting a hot replace of SRCU31A.

For example, a system is configured with Boot Drive connected to controller 1. When the system attempts to access SRCU31A, after performing PCI Hot Plug - Hot Replace, the system will lock up. The system is unusable in this state.

Before performing Hot Replace function, ensure that the boot drive is connected to controller 0 and that BIOS of Controller 1 and all subsequent controllers is disabled.

5. Replaces errata "FreeBSD does not mount the file system to the onboard SCSI drive" in previously published specification updates

After a system that has FreeBSD installed to an onboard SCSI disk drive is powered down, the system will boot normally. However, if an SRCU31A controller is installed and a host drive is created for this *product*, the operating system is not able to mount the file system. The system will boot to a "*mount root>*" prompt. If a controller is removed, the system is then able to boot normally again. This failure also occurs if the controller is already installed in the system during installation of the operating system.

This is expected behavior of FreeBSD and depends on how the host adapters are numbered by the operating system. In other words, this is a boot order problem (drivers are probed and attached in natural bus order, in the case of PCI, in ascending slot number order). Devices added/removed later may confuse the system's configuration.

When adding a controller to an already installed FreeBSD system, ensure that the newly created Host Drives are detected *after* the existing disks on the system, especially the disk with the root file system. Failure to do so might make the system unbootable. This may be accomplished by one of the following workarounds. (The exact workaround will depend on your particular system configuration. Please refer to FreeBSD documentation before changing any system configuration.)

- Ensure that the IIR driver loads after the other SCSI drivers have loaded. This can be accomplished by compiling the IIR driver as a Kernel module and specifying the load time in the /boot/loader.rc configuration file or by manually loading and unloading IIR Kernel Module using utilities like "kldload" and "kldunload" after the system has booted.
or
- Make changes to system configuration files like /etc/fstab. To do this, you will need to know the device filenames associated with all the disks in the system.

Documentation Changes

1. Correction to Firmware Update Procedure in Hardware Guide

The text in section A.2 of the Hardware Guide v1.0.8 should be replaced with section A.1, "Firmware Update Procedure via XROM StorCon," of the latest Hardware Guide. The latest Hardware Guide is posted on the web at <http://support.intel.com>.

2. Intel® Integrated RAID Software Installation and User's Guide, Section B.1, Chaining

The following replaces both warnings in section B.1. (SCR # 546)

Warning: Disk Chaining does not offer any form of data protection and can result in loss of data. It is recommended to not use logical drives of the type *chain* as components of array drives.

Affected Docs: Intel® Integrated RAID Software Installation and User's Guide, 273479-001

3. Intel® Integrated RAID Software Installation and User's Guide, Section 5.2.1, New Installation of NetWare 4.20 with the SRCRX.HAM Driver

The following replaces section 5.2.1. (SCR #536)

New Installation of NetWare 4.20 with the SRCRX.HAM Driver

1. Create a driver diskette from the RAID Software Suite CD-ROM. See Section 2.2, *Create the RAID Driver Installation Diskette* for instructions.
2. Start the OS installation from the NetWare CD-ROM. (NetWare 4.2x CD-ROMs are NOT bootable so you must have a bootable DOS partition installed on your target hard drive and have the appropriate DOS driver for your CD-ROM.)
3. At the driver summary menu select *modify drivers*.

4. Note all listed drivers (you will need these names later) and REMOVE ALL drivers from the list.
5. Insert the driver diskette into drive A:
6. Press <Enter> at the IIR driver list.
7. Press <Insert> at the IIR controller driver menu.
8. Press <F3> and change the path to A:\DRIVERS\4XX then press <Enter>.
9. Select the SRCRX.HAM driver.
10. Add back all drivers noted in step 4.
11. Continue the NetWare installation as normal by following the screen prompts.

Affected Docs: Intel® Integrated RAID Software Installation and User's Guide, 273479-001

4. Intel® Integrated RAID Software Installation and User's Guide, Section 5.2.2, New Installation of NetWare 5.0 with the SRCRX.HAM Driver

The following replaces section 5.2.2. (SCR #530)

New Installation of NetWare 5.0 with the SRCRX.HAM Driver

Important: The SRCRX.HAM driver depends on a later version of the NWPA.NLM than was shipped on the NetWare 5.0 CD. Without the NWPA.NLM update, the SRCRX.HAM driver will fail to load. The following procedure will allow you to upgrade the NWPA.NLM on the fly during OS installation.

1. Create a driver diskette from the RAID Software Suite CD-ROM. See Section 2.1 for details to create this disk.
2. Start the OS installation from the NetWare bootable CD-ROM.
3. The NetWare installation will eventually display a "Welcome" screen asking you to verify the startup directory (C:\NWSERVER).
4. Press <Alt>+<F10> to exit the installation.
5. At the NetWare console prompt, type "down" and press <Enter> (the installation exits to the boot drive's DOS prompt).
6. Insert the driver diskette into drive A:.

7. If your NetWare startup directory is drive C:, then run A:\INSTALL\NWUPDATE.BAT, otherwise create a subdirectory named NWUPDATE at the root of your boot drive and copy all the files from A:\DRIVERS\5XX to the NWUPDATE subdirectory.
8. Leave the NetWare 5.0 bootable CD in place, but remove the driver diskette from drive A:.
9. Reboot the server. After rebooting the server, the NetWare 5.0 Install will start again.
10. Right after the Accept the License Agreement screen, select the "Continue with Existing Partition" option.

Note: If you chose to install a "New Server," you may encounter the following warning dialog box:

"Warning: A previously installed version of NetWare was detected in C:\NWSERVER. If you choose to install a new server, all data on the existing server will be lost. <Press ENTER to continue>"

If the warning dialog box appears, press <Enter>.

11. Continue the NetWare installation as normal by following the screen prompts.
12. During filecopy you may encounter the error message: File "C:\NWSERVER\NWPA.NLM" cannot be opened.
13. Ignore this error message, press <Enter> to continue and choose "Continue copying next file".
14. Complete the NetWare installation as normal by following the screen prompts.
15. When you are prompted for restarting the server choose "NO".
16. Go to the NetWare console prompt, type "down". Press <Enter> (the installation exits to the boot drive's DOS prompt).
17. Insert the driver diskette again into the A: drive.
18. Call A:\INSTALL\NWUPDATE.BAT with the path to your server startup directory as a parameter. e.g. A:\INSTALL\NWUPDATE C:\NWSERVER
19. Reboot your system.

Intel® Integrated RAID Software Installation and User's Guide, 273479-001

5. Addition to Intel® Integrated RAID Software Installation and User's Guide regarding Error State Messages and Patching to a Failed State

The User Documentation does not mention that an array in the error state can be patched at the time of boot up. The following information on patching arrays will be added to future revisions of the [Intel Integrated RAID Software Installation and User's Guide](#):

Error State Messages

If a RAID4 or a RAID5 array drive is in the error state and the firmware boots, the following messages are displayed (e.g. for RAID-5 array drive 1):

"RAID-5 Host Drive 1: Multiple drives have failed"
"Array is in ERROR state and read only"
"Check disks, cables, termination, termpower, LVDS operation, power supply, etc."

Patching to a Failed State

If the array drive can be patched to fail state (all member drives are available; only the one which failed first may be missing) the following messages are displayed:

"If the problem is resolved you can choose 'y' to patch the array to fail state (y/n)"

Entering "y" results in a patch to fail. The default behavior is performing the patch.

If the patch was successful, the array status is set to Fail/Patch and the following message is displayed:

"Patching the array drive was successful"

If the patch failed, the following message is displayed:

"Patching the array drive was not possible"

If the patch was not performed or if the patch failed, the following messages are displayed:

"Use the controller setup program to analyze the problem"
"Press RETURN to continue"

Affected Docs: [Intel® Integrated RAID Software Installation and User's Guide, 273479-001](#)

6. Intel® Integrated RAID Software Installation and User's Guide, Version 1.1.4, Section 9.5.4.1, Array Drive Menu for Existing Array Drives - Expand Array Drive

Intel® Integrated RAID Software Installation and User's Guide, Version 1.1.4, Section 9.5.4.1, Array Drive Menu for Existing Array Drives - Expand Array Drive should read as follows:

To migrate or expand a RAID 4/5 array drive, the state must be READY. The data on the array drive remains intact and is not affected by the expansion.

Warning: When starting an expand process, the unused capacity of the current array components (i.e. "*Use free Logical Drive space*") is activated. At this point the array is put in the non-redundant Build process. If during this process a disk fails, then the array changes to *Idle = not functioning*. Therefore it is very important to create a full backup before this process is started.

If a logical drive fails during the expansion, the expansion process continues until the expansion is finished and the array drive changes into the FAIL state. If the Array Drive is expanded using free space, the Array Drive enters a BUILD state. If a drive failure occurs during expansion the Array Drive enters an IDLE state.

Affected Docs: Intel® Integrated RAID Software Installation and User's Guide, 273479-001