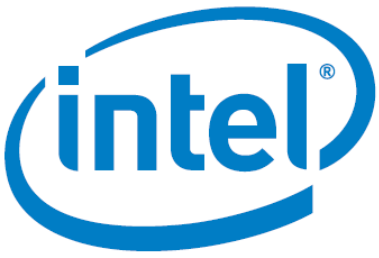
Intel® Rapid Storage Technology enterprise (RSTe) 4.3.0.1223

Customer Release Notes

Aug, 2015

Revision 1.43



2

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Document Revision History

Date	Version	Description
17 June, 2010	1.0	Initial pre-Beta release
September 2010	1.1	Initial RSTe 3.0 pre-Beta release
November 2010	1.2	RSTe 3.0 pre-Beta release 3.0.0.1040
December 2010	1.3	RSTe 3.0 pre-Beta release 3.0.0.1045
February 2011	1.4	RSTe 3.0 Beta 1 release 3.0.0.1047
February 2011	1.5	RSTe 3.0 Beta 1 release 3.0.0.1052
March 2011	1.6	RSTe 3.0 Beta 1 release 3.0.0.1059
April 2011	1.7	RSTe 3.0 Beta release 3.0.0.1065
June 2011	1.8	RSTe 3.0 Beta release 3.0.0.1080
June 2011	1.9	RSTe 3.0 Pre-PC release 3.0.0.1086
August 2011	1.10	RSTe 3.0 Pre-PC release 3.0.0.1111
September 2011	1.12	RSTe 3.0 Pre-PC release 3.0.0.1112
October 2011	1.14	RSTe 3.0 Pre-PC release 3.0.0.3002
December 2011	1.15	RSTe 3.0 PC Release 3.0.0.3016
December 2011	1.16	RSTe 3.0 PV Release 3.0.0.3020
March 2012	1.18	RSTe 3.1 Maintenance Release 3.1.0.1069
April 2012	1.19	RSTe 3.1 Maintenance Release 3.1.0.1085
July 2012	1.20	RSTe 3.2 Maintenance Release 3.2.0.1135
July 2012	1.21	Add errata for 6 Gps HDD's
August 2012	1.22	Added RX recipe change included in 3.2.0.1135 release, also removed a few sighting that were inadvertently added.
August 2012	1.23	Adding support for Windows 8 and Windows Server 2012
November 2012	1.25	RSTe 3.6 Maintenance Release 3.6.0.1093
March 2013	1.27	RSTe 3.7 Maintenance Release 3.7.0.1093. Removed all resolved issues prior to the release of 3.2 maintenance release.

Sept 2013	1.31	RSTe 3.8 Maintenance Release 3.8.0.1111
November 2013	1.32	RSTe 3.8 Maintenance Release 3.8.0.1113
December 2013	1.33	RSTe 4.0 Release 4.0.0.1040
May 2014	1.35	RSTe 4.1 PC Release 4.1.0.1046
June 2014	1.36	RSTe 4.1 PV Release 4.1.0.1047
January, 2015	1.40	RSTe 4.2 PV Release 4.2.0.1143
June, 2015	1.41	RSTe 4.3 PV Release 4.3.0.1199
July, 2015	1.42	RSTe 4.3 PV Repackage Release 4.3.0.1219
August, 2015	1.43	RSTe 4.3 PV Repackage Release 4.3.0.1223

1 Overview

Intel® RSTe 4.3.0.1223 Production Validation (PV) release package contains the PV release version of the RSTe Windows* drivers, Pre-OS components and utilities to support platforms built with the Intel® C600/C610/C620/C220 and C230 series chipsets. It provides support for:

- Intel® C600 series chipset
  - 1 Advanced Host Controller Interface (AHCI)/SATA
  - 1 Storage Controller Unit (SCU)
- Intel® C610 series chipset
  - 1 Advanced Host Controller Interface (AHCI)/SATA
  - 1 secondary Advanced Host Controller Interface (AHCI)/sSATA
- Intel® C620 series chipset
  - 1 Advanced Host Controller Interface (AHCI)/SATA
  - 1 secondary Advanced Host Controller Interface (AHCI)/sSATA
- Intel® C220 series chipset
  - 1 Advanced Host Controller Interface (AHCI)/SATA
- Intel® C230 series chipset
  - 1 Advanced Host Controller Interface (AHCI)/SATA

NOTE: Due to the multiple driver configurations in this release, upgrading from Windows 7/Server 2008 R2 to Windows* 8, Windows* Server 2012 will require the following steps to be taken:

1. Run the 3.5, 4.1, 4.2 or 4.3 install executable
2. Perform the Windows* 8 (or Server 2012) upgrade process
3. Upon successful upgrade, the installation executable must be re-run.

NOTE: Upgrading from Windows 7 to Windows 8 on the AHCI Controller is not supported. Please reference the Errata section below for additional information.

The release of this 4.3.0.1223 Production Validation package replaces and supersedes 4.3.0.1219 Production Validation package. There was a mistake in the process of creating the 4.3.0.1219 package and as a result, the User Account Control pop-up window that appears when initiating the RSTe installation process will display the publisher as “Unknown”. The release of the 4.3.0.1223 Production Validation package includes a fix to display the correct publisher during the installation process.

This document covers the package contents, supported hardware configurations, credits, support, known issues and resolved issues.

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2 Microsoft* OS Support

Intel® RSTe will support both 32 and 64 bit versions of the following Microsoft* OSs:

- Intel® RSTe will no longer provide updated drivers for the for the following Operating Systems (Intel will only address critical/show stopping issues filed against these OSs):
    - Windows* Vista (Support/Updates conclude with 4.1.0.1047 – Release Kit 101981)
    - Windows* Server 2003 (Support/Updates conclude with 4.0.0.1045 – Release Kit 101981)
    - Windows* Server 2008 SP2 (Support/Updates conclude with 4.0.0.1045 – Release Kit 101981)
    - Windows* 8 (Support/Updates conclude with 4.2.0.1143 – Release Kit 105946)
    - Windows* Server 2012 (Support/Updates conclude with 4.2.0.1143 – Release Kit 105946)
- Windows* 7
- Windows* Server 2008 R2 (64 bit only)
- Windows* PE 3.0
- Windows* 8.1
- Windows* Server 2012 R2
- Windows* 10

3 Support on Internet

Support for Intel® RSTe 4.3.0.1223 is provided via the Intel® Validation Internet Portal https://platformsw.intel.com/.

For answers to your Intel® C600/C610/C620/C220 and C230 series chipsets questions and to obtain other technical collateral, please contact your local Intel FAE.

4 Package Components and Versions

Intel® RSTe 4.3.0.1223 PV release is the production release package to support the C600/C610/C620/C220 and C230 series chipset based platforms. It is available on Intel® Validation Internet Portal as a kit. The contents of this kit include the following components:

- Rapid Storage Technology enterprise Installation
    - RSTe 4.3.0.1223 Release Notes

  - RSTe Technical Product Specification 1.12
  - Readme.txt files and other pertinent documentation
  - RSTe_4.3.0.1223_Install.zip Install package includes drivers and user applications (GUI) for all supported OS's as well as both AHCI and SCU controllers
    - IATA_CD.exe
    - IATA_ENU.exe
    - IATA_ALL.zip
    - IATA_CD.zip
    - IATA_ENG.zip
- RSTe Pre-OS component images and utilities
  - RSTe-4.3_PV_Pre-OS_readme.txt
  - PreOS-1018.zip
    - Intel® RSTe 4.3.0.1018 SATA Legacy RAID Option ROM image
    - Intel® RSTe 4.3.0.1018 SATA DOS* based RAID Configuration utility
    - Intel® RSTe 4.3.0.1018 SATA DOS* based RAID Comply utility
    - Intel® RSTe 4.3.0.1018 sSATA Legacy RAID Option ROM image
    - Intel® RSTe 4.3.0.1018 sSATA DOS* based RAID Configuration utility
    - Intel® RSTe 4.3.0.1018 sSATA DOS* based RAID Comply utility
    - Intel® RSTe 4.3.0.1018 SCU Legacy RAID Option ROM image
    - Intel® RSTe 4.3.0.1018 SCU DOS* based RAID Configuration utility
    - Intel® RSTe 4.3.0.1018 SCU DOS* based RAID Comply utility
    - Intel® RSTe 4.3.0.1018 UEFI SATA RAID driver
    - Intel® RSTe 4.3.0.1018 UEFI based SATA RAID Comply utility (Secure Boot must be disabled to use this tool)
    - Intel® RSTe 4.3.0.1018 UEFI based SATA RAID Command Line Interface (CLI) utility (Secure Boot must be disabled to use this tool)
    - Intel® RSTe 4.3.0.1018 UEFI based SATA SGPIO/LED Test Command Line Interface (CLI) utility (Secure Boot must be disabled to use this tool)
    - Intel® RSTe 4.3.0.1018 UEFI sSATA RAID driver
    - Intel® RSTe 4.3.0.1018 UEFI based sSATA RAID Comply utility (Secure Boot must be disabled to use this tool)
    - Intel® RSTe 4.3.0.1018 UEFI based sSATA RAID Command Line Interface (CLI) utility (Secure Boot must be disabled to use this tool)

        - Intel® RSTe 4.3.0.1018 UEFI based sSATA SGPIO/LED Test Command Line Interface (CLI) utility (Secure Boot must be disabled to use this tool)
        - Intel® RSTe 4.3.0.1018 UEFI SCU RAID driver
        - Intel® RSTe 4.3.0.1018 UEFI based SCU RAID Comply utility (Secure Boot must be disabled to use this tool)
        - Intel® RSTe 4.3.0.1018 UEFI based SCU CLI utility (Secure Boot must be disabled to use this tool)
- RSTe f6 Drivers (drivers and utilities)
    - RSTe_4.3.0.1223_F6-Drivers.zip
    - Intel® RSTe 4.3.0.1198 F6 Win7 OS SCU Installation Drivers
        - iaStorS.free.win7.32bit 4.3.0.1198
        - iaStorS.free.win7.64bit 4.3.0.1198
    - Intel® RSTe 4.3.0.1198 F6 Win7 OS AHCI Installation Drivers
        - iaStorA.free.win7.32bit 4.3.0.1198
        - iaStorA.free.win7.64bit 4.3.0.1198
    - Intel® RSTe 4.3.0.1198 F6 Windows* 8.1/Server 2012 R2/Windows* 10 OS SCU Installation Drivers
        - iaStorS.free.win8.32bit 4.3.0.1198
        - iaStorS.free.win8.64bit 4.3.0.1198
    - Intel® RSTe 4.3.0.1198 F6 Windows* 8.1/Server 2012 R2/Windows* 10 OS AHCI Installation Drivers
        - iaStorA.free.win8.32bit 4.3.0.1198
        - iaStorA.free.win8.64bit 4.3.0.1198
- RSTe CLI Staging
    - RSTe CLI Specifications.pdf
    - RSTe_4.3.0.1223_CLI.zip
        - Win32\Rstcli.exe (32-bit version)
        - X64\Rstcli64.exe
- RSTe CIM Staging
    - CIM_Readme.txt
    - setupCIM.exe
    - setupCIM_win8.exe

4.1 Supported Configurations

4.1.1 Intel® C600 series chipsets Silicon Stepping

- C0 (driver and firmware)
- C1 (driver and firmware)

4.1.1.1 SKUs:

All SKUs are supported (-A, -B, -D and –T) from an operational standpoint but not all of the specific SKU features have been fully implemented.

4.1.2 Intel® C220/C230 series chipsets Silicon Stepping

The C1 stepping of the Intel® C220 series chipset (both AHCI Mode and RAID Mode) is supported.

The D0/D1 stepping of the Intel® C230 series chipset (both AHCI Mode and RAID Mode) is supported.

5 Supported Platforms

This Intel® RSTe 4.3.0.1223 PV release package is intended to be used on customer platforms that are based off

- Intel® C600 series chipset
- Intel® C610 series chipset
- Intel® C620 series chipset
- Intel® C220 series chipset
- Intel® C230 series chipset

Please contact your Intel FAE for up to date information related to Romley platform components.

5.1 Intel® RSTe 4.3.0.1129 PV Release Documentation

It is strongly recommended that all documentation provided with this release package be reviewed prior to installing the Intel® RSTe 4.3.0.1223 Windows* driver package.

5.2 Support

With this release, Intel will accept and process issues reported by customers. Intel makes no commitment to provide a driver update prior to the next scheduled release.

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6 General Notes: RSTe 4.3.0.1223 PV Release Package

6.1 New Features Introduced in this Release

The release of RSTe 4.3.0.1223 introduces support for Windows* 10 and Pre-OS identification of a rebuilding drive that is part of a degraded RAID volume.

6.1.1 Support for Windows* 10

With the release of RSTe 4.3.0.1223 production package, Windows* 10 is now supported. To install Windows* 10 from scratch, it is recommended that drivers included in this package be used. To properly upgrade from the current OS to Windows* 10, it strongly recommended that the platform be updated to this driver version (4.3.0.1223) before attempting the upgrade process. However, upgrading to Windows* 10 can also be accomplished by the following steps:

1) Install/Upgrade to RSTe 4.2.0.1143.

   NOTE: Lower versions of RSTe are known to have problems upgrading to Windows* 10 resulting in a system crash (specifically on the SCU controller)

2) Start the Windows* 10 upgrade process

3) After successfully upgrading, immediately install the driver provided in this package (4.3.0.1223).

   NOTE: For upgrading from Windows* 7, this step is mandatory.

   NOTE: For upgrading from Windows* 8 and Windows* Server 2012 these steps are also mandatory due to the fact the support for these OS's concluded with 4.2. The drivers included in this package will not in stall on Windows* 8 or Windows* Server 2012.

6.1.2 RSTe Pre-OS RAID Volume Rebuild Drive Identification

With the release of RSTe 4.3.0.1223 production package, the RSTe Pre-OS user interfaces will begin to show drives in a RAID Rebuild state as "Online member" is a yellow colored text. This will be seen in both the RSTe Legacy Option ROM as well as the RSTe UEFI drivers.

6.1.3 RSTe PCH 8 Port Support

With the release of RSTe 4.3.0.1223 production package, RSTe increases support for PCH SATA ports up to 8 ports. This support can be utilized with the introduction of systems with the Intel® C230 series chipset.

NOTE: On platforms that contain Intel® C230 series chipset SKUs supporting 8 ports, it is important to note that the Microsoft RAID inbox driver does not support configurations with 8 ports. As a result, attempting to use the inbox driver to install the OS may result in a failure to install.

6.2 Features Introduced in the 4.2.0.1143 Release

The release of RSTe 4.2.0.1143 includes the added support for manually ejecting drives under Windows* 7.

6.3 Features Introduced in the 4.1.0.1047 Release

6.3.1 SCSI Pass-Thru Support

The release of RSTe 4.1 introduces the support for Extended SCSI Passthru commands. Specifically, RSTe 4.1 enables support for the following:

- EFI_EXT_SCSI_PASS_THRU_PROTOCOL protocol as per Unified Extensible Firmware Interface Specification v2.3.1, Errata D. The protocol allows SCSI request packets and ATAPI command blocks to be sent to a device on the following controllers:
  - SCU - only physical disk devices supported
  - SATA/sSATA - only ATAPI devices supported
- Enabled support for EFI_DEVICE_PATH_PROTOCOL for physical disk devices on SCU controller as per Unified Extensible Firmware Interface Specification v2.3.1, Errata D. The protocol allows a physical device behind the handle object to be identified.
- Enabled support for EFI_SCSI_IO_PROTOCOL for physical disk devices on SCU controller as per Unified Extensible Firmware Interface Specification v2.3.1, Errata D. The protocol allows basic operations to be performed on SCSI devices.

6.4 Features Introduced in the 4.0.0.1045 Release

6.4.1 Support for Platforms with Intel® C610 series chipset sSATA Controller

The release of 4.0.0.1045, introduces support for platforms with Intel® C610 series chipset. This chipset contains two SATA controllers that can be

configured for either AHCI mode or RAID mode. The first SATA controller is a six 6 Gigabits per second port controller. The second (sSATA controller) will provide an additional four - 6 Gigabits per second ports. These two controllers are treated as two separate and independent controllers. As such, the RSTe driver included in the release does not support spanning RAID volumes across the two controllers.

When running on these platforms, the customer will see two instances of the RSTe driver installed (one for each controller). To support these two controllers, the platform BIOS will need to contain two RAID Legacy OROM and/or two RAID EFI drivers (one image for each of the SATA controller).

6.4.2 Windows* 8.1 and Server 2012 R2 Support

The release of 4.0.0.1045 introduces support for Windows* 8.1 and Windows* Server 2012 R2 operating systems. These new operating systems will contain an "inbox" driver that will support the SATA controllers for the Intel® C600 and C610 series chipset Platform Controller Hub (PCH) when configured for RAID mode. It is strongly recommended that the RSTe 4.0.0.1040 F6 drivers be used instead of the available "inbox" driver. The provided "inbox" driver is intended only for those customers who may not have the RSTe 4.0.0.1040 F6 drivers readily available and ONLY for installing to a single drive (NOT to a RAID volume). Once the OS is installed, it is strongly recommended that the RSTe 4.0.0.1045 package be installed immediately. At that point, it will be safe to migrate the system disk into a RAID Volume (using the RSTe GUI).

When upgrading the existing operating system to Windows* 8.1 or Windows* Server 2012 R2, it is strongly recommended that the RSTe driver be updated to the RSTe 4.0.0.1045 package prior to the OS upgrade.

6.4.3 RSTe INF File Split

The release of 4.0.0.1045 introduces support for those customers who need to dynamically install either the 32-bit or 64-bit versions of the RSTe driver in a manufacturing environment. Now a single manufacturing environment utility can be used to install either the 32-bit or the 64-bit version of the RSTe 4.0.0.1040 driver. There is also the introduction of "Legacy" F6 installation drivers. The drivers are directed at supporting the installation of the following Microsoft* Operating Systems:

- Windows* Server 2003 (32bit and 64bit)
- Windows* Server 2008 (32bit and 64bit)
- Windows* Vista

Customers installing Windows* 8/8.1/Server 2012/Server2012 R2 will used the Windows* 8 F6 installation drivers. All other OS installations should use the "Win7" F6 installation drivers.

These "Legacy" changes to the F6 driver directory structure is a result of updated WHQL requirements.

6.5 Features Introduced in the 3.8.0.1113 Release

6.5.1 Device Information Display in UEFI

The release of 3.8.0.1113 introduces the support of the UEFI driver reporting the physical port a device is connected to. In previous releases of the RSTe UEFI driver, the device information provided (i.e. to the UEFI shell environment) was based off of the enumeration values created during the discovery of the devices attached. To support a manufacturing environment that relies of this information to identify the physical port the device is connected too, the UEFI driver now reports out the physical port value instead of the enumerated value. The data is displayed as a set of 3 values in the following order: X-Y-Z

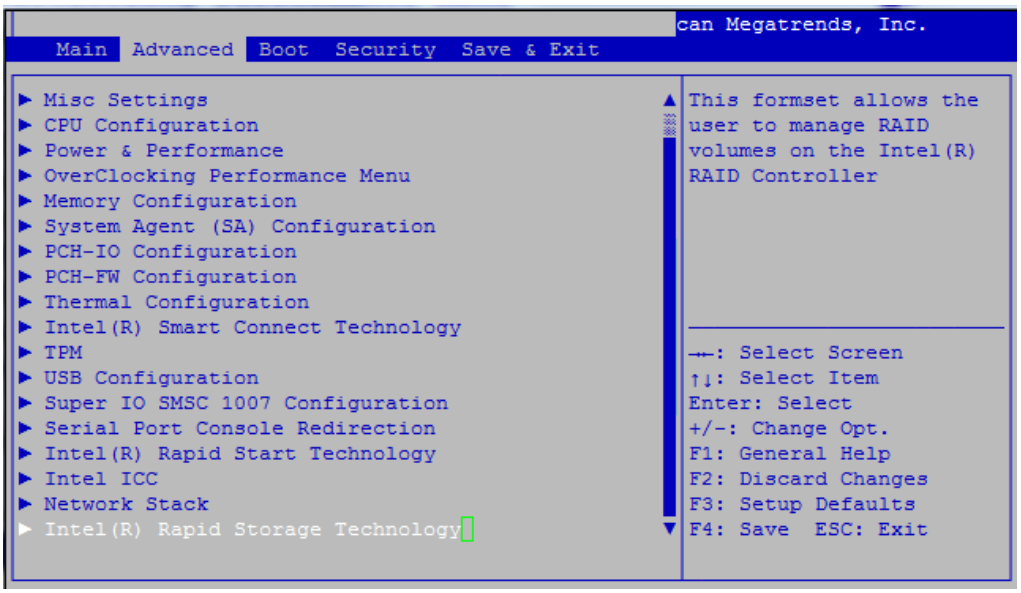
X – 0: passthru disk, 1: volume
Y– PHY number: 1 (phy0), 2 (phy1), 4 (phy3), 8 (phy3), 16 (phy4), 32 (phy6), 64 (phy7)
Z – disk number on PHY (in case of an expander)

6.6 Features Introduced in the 3.7.0.1093 Release

6.6.1 Human Interface Infrastructure (HII) support

With the release 3.7.0.1093, customers will be able to configure RAID volumes using Intel® RSTe UEFI Human Interface Infrastructure (HII). HII is a simple "Walk Up and Use" interface that allows users to create, delete, and manage RSTe RAID Volumes within the BIOS Setup Menu.

The UEFI driver will provide an entry point which can be called to invoke the HII interface. The entry point can be called from any place in the BIOS UI that an IBV chooses.



The BIOS must support the 2.3.1 UEFI Specification. In addition, the following protocols must be supported for the RSTe UEFI HII to be used in the BIOS Setup Screen:

- EFI HII PROTOCOLS
- Form Browser 2 Protocol
- Config Routing Protocol
- HII String Protocol
- HII Database Protocol

6.6.2 Expander Exposed to Device Manager

With the release of RSTe 3.7 driver, the RSTe driver now supports exposing expanders that are connected to the Storage Controller Unit (SCU). So, when the Device Manager is opened, the expander will be seen.

6.6.3 Trim on RAID0, RAID1 and RAID 10

With the release of RSTe 3.7 driver, the RSTe driver now supports TRIM on RAID1 and or RAID10 volumes. This feature is automatic and nothing is required to enable this functionality.

6.6.4 RSTe UEFI Command Line Tool to support Supports Testing SGPIO

With the release of RSTe 3.7 driver, a new RSTe UEFI CLI utility (LedTool.efi) is being introduced to support the issuing of SGPIO commands to an SGPIO enabled backplane. The purpose is to ensure that the platform SGPIO functionality is working properly in a factory environment. As before, the platform has to be booted into a UEFI Shell and LedTool.efi needs to be copied

to a USB key in order to utilize this feature. Please reference the help option available in the utility for detailed instructions.

6.6.5 RSTe GUI Supports Showing SAS Link Width

With the release of RSTe 3.7 driver, the RSTe GUI now provides support for showing the SAS Link Width. This information can be obtained by viewing the System Report.

6.6.6 SCU Controller Legacy Option ROM Splash Screen Timing Adjustment

With the release of RSTe 3.7 driver, the RSTe SCU Legacy OROM splash screen display duration is now adjustable. To utilize this feature, a change must be made to the OEM Parameter field in SPI Flash. Please reference the section **8.2 BCFS Bit Settings** for detailed information.

NOTE: If no changes are made to the OEM Parameter field, there will be no change in the behavior of the SCU Legacy OROM splash screen behavior.

6.7 Features/Configuration Restrictions

The following configurations and test scenarios are not supported in this release, and as such, any issues reported against these configurations will not be accepted:

- MPIO Load Balancing in RAID Mode is unsupported
- A SAS Wide port spanning SCU0 and SCU1 is not supported.
    - The SCU0 and SCU1 are independent units and are thus unable to combine the buffers necessary to create a combined port. Consequently, plugging both SCU's into the same SAS topology will create a multi-path IO scenario (which is unsupported). Setting up this configuration is not a valid RSTe use case. If connected in this configuration, any redundant objects will not be reported to OS upper layers.
- The SCU PHY's maximum speed is limited to 3 Gbs
- Intel® C610/C620 series chipset (Grantley Platforms) RAID Spanning across the two AHCI controllers is not supported
- Windows* 8/Windows* Server 2012 "inbox" driver limitations
    - With Windows* 8 and Windows* Server 2012, the "inbox" driver included does not support installing to a RAID volume. It only supports installing to a single drive. It is recommended that the RSTe F6 driver be used.
    - With Windows* 8 and Windows* Server 2012, the "inbox" driver included does not support installing to a drive greater than 2

Terabytes. The drive size reported during installation may be smaller than the actual size of the drive. It is recommended that the RSTe F6 driver be used

- Windows* 8.1/Windows* Server 2012 R2 “inbox” driver limitations
  - With Windows* 8.1 and Windows* Server 2012 R2, the “inbox” driver included does not support installing to a RAID volume. It only supports installing to a single drive. It is recommended that the RSTe F6 driver be used.
- Upgrading to Windows* 10 from any RSTe driver other than 4.1, 4.2 and 4.3
- Windows* 10 Server (not yet available)

NOTE: It is highly recommended that the Platform BIOS be updated with the Pre-OS images contained in this release.

6.8 Intel® C600 series chipset Firmware Limitations

The SCU Legacy OROM supports the following configurations:

- Recommended to be the last OROM loaded
- BIOS will need to load both SATA RAID Legacy RAID OROM and SCU RAID Legacy RAID OROM or both SATA EFI and SCU EFI drivers
  - This is to ensure that the OEM Parameters are loaded and the SCU Controller is properly configured
- POST messages are displayed only if more than one drive is attached to the SCU
- BIOS MUST support the INT15 function call to obtain the OEM Parameter information that MUST be programmed into SPI Flash
  - Please contact you FAE for additional information

6.9 Additional Chipset Configuration Information

The RAID PCI Device IDs supported are as follows:

- Intel® C600 series chipset
  - 1 Advanced Host Controller Interface (AHCI)/SATA - 0x2826
  - 1 Storage Controller Unit (SCU) – Please review the RSTe Technical Product Specification included in this release.
    NOTE: It is Intel’s recommendation that the PCHSTRP16 strapping be left to the default –T SKU value. Please reference CDI/IBL Document No. 454672 for information on properly configuring the PCHSTRP16 strap in BIOS. In order to program the controller to report this ID, it is necessary to set a reserved bit in the SATA Clock General Configuration Register (SCLKGC, as referenced by the latest PCH EDS). The register is in the memory mapped region of bus 0, device 31, function 2, at offset 9Ch-9Fh, bit position 9. The bit is R/WO,

following the usage semantics of the Alternate ID Enable (AIE) bit. Please reference the platform External Design Specification documentation for exact detail on how this needs to be accomplished.

- Intel® C610/C620 series chipset
  - 1 Advanced Host Controller Interface (AHCI)/SATA – 0x2826
  - 1 secondary Advanced Host Controller Interface (AHCI)/sSATA – 0x2827
- Intel® C220/C320 series chipset
  - 1 Advanced Host Controller Interface (AHCI)/SATA – 0x2826

7 Specific Known Issues

This section outlines the known issues with the Intel® RSTe 4.3.0.1223.

Note: This is neither a complete nor comprehensive list.

The known issues are broken down into two sub sections. The first outlines those issues that are being worked on or are planned to be corrected in a future release. The second outlines those issues that are considered permanent erratum.

KEY:

Title	**Brief description of the issue to assist in identifying whether it affects the reader's application or no**
Reference #	Used to reference Intel's internal database for further follow-up on inquiry
Product	Identifies which products are affected by this issue
Version	Identified which release set versions area affected by this issue
Operating System	Where applicable, identifies which operations systems are affected by this issue
Problem Description	Additional information to help the reader determine if this issue affects their application
Resolution/Status	Provides either the current status of the issue or the targeted release for a fix

7.1 Errata

The following is a list of issues that RSTe has no current plans for resolving.

Title#	**SATA PHY Power Management Idle Timers May Not Be Properly Managed**
Reference #	3006800
Product	Intel® RSTe 3.0
Version	3.0.0.1065
Operating System	Windows*
Problem Description	Running heavy I/O to a HIPM capable drive, on a platform that has Power Management enabled, may result in a failure

	condition. Workaround: Avoid running with Power Management enabled when HIPM capable drives attached.
Resolution/Status	No plan to resolve this issue in the RSTe 3.x product baseline.

Title#	**RSTe driver version may appear to be older than Intel(R) C600 series chipset driver version**
Reference	3235327
Product	Intel® RSTe 3.0
Version	3.0.0.1111
Operating System	Windows*
Problem Description	When installing the RSTe driver on Intel(R) C600 series chipset based platform (after the chipset drivers have been installed), the installation process my report that the chipset driver version is newer then the RSTe driver version.
Resolution	No plan to resolve this issue in the RSTe 3.x product baseline

Title#	**Hot-plug an Expander While IO is Running May Result in the Disks Going Offline**
Reference	3235625
Product	Intel® RSTe 3.0
Version	3.0.0.3002
Operating System	Windows* 2003 64-bit
Problem Description	Hot-plugging an expander while I/O is being performed may result in the disks not being rediscovered and going offline.
Resolution	No plan to resolve this issue.

Title#	**RSTe 3.0 GUI May Show the Port of a Hot-plugged Drive as Unknown**
Reference	3236248
Product	Intel® RSTe 3.0
Version	3.0.0.3002

Operating System	Win7
Problem Description	When hot-plugging drives, the RSTe 3.0 GUI information bubble may randomly show the port of the hot plugged device as unknown.
Resolution	No plan to resolve this issue in the RSTe 3.x product baseline.

Title#	**WHQL Audio Fidelity Test fails with HDD or SSD boot/data disks on Intel controllers**
Reference	3236685
Product	Intel® RSTe 3.0
Version	3.0.0.3002
Operating System	Windows*
Problem Description	WHQL Audio Fidelity Test fails with HDD or SSD boot/data disks on Intel controllers
Resolution	Issue root caused to Microsoft WHQL test. Please refer to latest updates on this issue @winqual.microsoft.com.

Title#	**Flashing Cursor May Be Seen When Booting With the RSTe SCU Legacy OROM**
Reference	4159273
Product	Intel® RSTe 3.0
Version	3.1.0.1068
Operating System	Windows*
Problem Description	When booting from the SCU controller using the RSTe SCU Legacy OROM UI may result in a flashing cursor when the focus changes from one menu option to the next.
Resolution	No plan to resolve this issue in the RSTe 3.x product baseline.

Title#	**RSTe 3.8 May Not Properly Support Upgrading from Win7 to Win8 on the AHCI Controller**
Reference	4936753

Product	Intel® RSTe 3.0
Version	3.7.0.1093
Operating System	Windows*
Problem Description	When attempting to upgrade Windows* 7 to Windows* 8 (Windows* Server 2012) using RSTe 3.7.0.1093 may not upgrade properly. With Windows* 7, RSTe provides what is called a filter driver that works in conjunction with the actual RSTe driver. Windows* 8 removed the requirement for a filter driver and no longer allows filter drivers. When migrating from Windows* 7 to Windows* 8, the Windows* 8 installer selects the inbox driver as the best suitable driver before it checks the HW ID. In this case, the inbox driver selected is RST 8.2. The Windows* 8 installer appears ignore the INF information of the loaded driver. Do to this limitation DO NOT migrate an OS if the boot volume is larger than 2TB.
Resolution	No plan to resolve this issue.

Title#	**System May Become Unresponsive Under Certain Stress Testing**
Reference	CCG0100297804
Product	Intel® RSTe 3.0
Version	3.1.0.1068
Operating System	Windows*
Problem Description	With the 3.1.0.1068 maintenance release, some performance modifications/improvements have been implemented. One modification was the addition of a performance specific registry key (PerformanceOptimizationsEnable) in the INF file. The default setting (established in the 3.1.0.1068 release) improves the performance of installations of the OS and other applications such as Windows* Live Essentials. On systems configured with 5 or more high performance SAS drives connected to the SCU controller, running specific small

	block I/O heavy stress tests (e.g. IOMeter 512 Byte Sequential READs) may result in the system becoming unresponsive. This unresponsiveness can become more pronounced with more drives attached and (the corresponding) heavier stress load placed on the system. Under some conditions, if stopping the I/O test does not recover, a system reboot may be required. It is believed that this issue will only be encountered with 5 or more high performance SAS drives running IOMeter 512B Sequential READs stress test. The architecture of IOmeter in conjunction with the RSTe optimizations create a potential scenario were the CPU's (that are processing the I/Os) are 100% utilized and the system becomes unresponsive. It is possible that a custom kernel based (not application) stress tool may potentially encounter this issue. Application based stress tools will not encounter this issue. Workaround: Go into the registry and change the value of PerformanceOptimizationsEnable from 0 to 1. Exit the registry edit tool and reboot the system.
Resolution	No plan to resolve this.

Title#	**Rapid Hot-Plugging of an Expander Can Result in the RSTe UI Becoming Unresponsive**
Reference	CCG0100467978/4160879
Product	Intel® RSTe 3.0
Version	3.2.0.1135
Operating System	Windows*
Problem Description	When attempting to perform a (or series) of rapid hot-plugs (remove and quickly re-insert) expanders connected to the SCU controller can result in the RSTe UI becoming unresponsive. Work around: Closing and reopening the RSTe UI usually resolved the issue.
Resolution	No plan to resolve this issue.

Title#	**RSTe RAID Volume May Become Degraded with Multiple Bad Blocks**
Reference	CCG0100466365/4160877
Product	Intel® RSTe 3.0
Version	3.2.0.1135
Operating System	Windows*
Problem Description	When running in a configuration where an RSTe RAID Volume resides on drives that have multiple Bad Blocks, the RAID Volume may become degraded.
Resolution	Extreme corner case condition, No Plan to resolve this issue.

Title#	**RSTe Installer Does Not Look For RAID Metadata**
Reference	CCG0100616963
Product	Intel® RSTe 3.0
Version	3.2.0.1135
Operating System	Windows*
Problem Description	When running in a configuration with the AHCI Controller is in AHCI Mode and the OS installed using the Microsoft Inbox driver (on a drive attached to the AHCI Controller), running the RSTe installer may result in the system becoming unbootable with no recovery method. This corner case condition will only happen if the drive used to install the OS was previously part of an RSTe RAID0 volume and that drive was not properly cleaned prior to OS installation. **Workaround**: Ensure that all system installations are performed on a new drive. If that is not possible use the latest rcfgsata.exe (or.efi) utility to remove any RAID metadata that may exists on the drive before using.
Resolution	No plan to resolve this issue.

Title#	**The RSTe GUI May Report an Error When Attempting to Delete a RAID Volume**

Reference	43457
Product	Intel® RSTe 3.0
Version	3.7.0.1093
Operating System	Windows* 7 – 32bit
Problem Description	When running in a RAID5 configuration, if the BIOS has RAID 5 support disabled, the RSTe GUI may not properly start.
Resolution	No plan to resolve this issue.

Title#	**The RSTe GUI May Not Properly Show the Strip Size Help Bubble**
Reference	43464
Product	Intel® RSTe 3.0
Version	3.7.0.1093
Operating System	Windows*
Problem Description	When attempting to use the RSTe GUI to view the RAID volume strip size help bubbles, the GUI may not properly show the bubble for a second RAID volume.
Resolution	No plan to resolve this issue.

Title#	**The RSTe GUI System Report May Not Report Out ATAPI Information**
Reference	43574
Product	Intel® RSTe 3.0
Version	3.7.0.1093
Operating System	Windows*
Problem Description	When running in a configuration where there is an ATAPI device connected to Port 5, the RSTe GUI System Report may not properly report the information about the ATAPI device.
Resolution	No plans to resolve this issue.

Title#	**The Device Manufacturer and Model Numbers May Not Be Properly Reported in the RSTe System Report**
Reference	43582
Product	Intel® RSTe 3.0
Version	4.0.0.1013
Operating System	Windows*
Problem Description	When reviewing the device manufacturing and model number information, the RSTe GUI may report different information in the System Report then what is seen in the device properties window.
Resolution	No plans to resolve this issue.

Title#	**RSTe GUI May Encounter an Error Message When Attempting to Increase a RAID Volume Size**
Reference	43595
Product	Intel® RSTe 3.0
Version	3.7.0.1087
Operating System	Windows*
Problem Description	When running in a configuration where the RAID volume does not consume all of the available space, using the RSTe GUI to increase the volume size may result in an error message window being displayed. Work around: Restarting the RSTe GUI resolves the issue.
Resolution	No plan to resolve this issue.

Title#	**RSTe GUI May Stop Working After A RAID Volume Completes Initializing**
Reference	43599
Product	Intel® RSTe 3.0
Version	3.7.0.1087
Operating System	Windows*

Problem Description	When running in a configuration where the RAID volume is created and initialized, the RSTe GUI may stop working after the volume completes initializing. Work around: Restarting the RSTe GUI resolves the issue.
Resolution	No plan to resolve this issue.

Title#	**UEFI RAID Configuration Tools (rcfgxxxx.efi) May Not Properly Show the RAID Volume size**
Reference	43829
Product	Intel® RSTe 3.0
Version	4.1.0.1019
Operating System	Windows*
Problem Description	When using the UEFI RAID Configuration Tools (rcfgxxxx.efi) with the /ST option, the tool may not report the volume size. The entry to report the “Size” may be missing from the report.
Resolution	No plan to resolve this issue.

7.2 Known Issues Being Worked

The following issues are being actively worked.

Title#	**Attempting to Reset a Failed Disk Back to Normal May Result in a System Failure**
Reference	43523
Product	Intel® RSTe 3.0
Version	3.7.0.1093
Operating System	Windows*
Problem Description	When encountering a condition where a RAID volume has failed, attempting to reset the failed drive(s) back to normal may result in a system failure with a 0xD1 error code.
Resolution	Issue to be resolved in a future release.

Title#	**The RSTe GUI May Not Properly Start When RAID 5 Support is Disabled in the BIOS**
Reference	43562
Product	Intel® RSTe 3.0
Version	4.1.0.1047
Operating System	Windows*
Problem Description	When running in a RAID5 configuration, if the BIOS has RAID 5 support disabled, the RSTe GUI may not properly start.
Resolution	Issue to be resolved in a future release.

Title#	**System May Not Boot From a Locked Password Protected Drive**
Reference	43578
Product	Intel® RSTe 3.0
Version	4.0.0.1013
Operating System	Windows*
Problem Description	When the system is configured to boot in UEFI mode, attempting to boot a system with a locked password protected drive may result in an EFI Assert error 1654.
Resolution	Issue to be resolved in a future release.

Title#	**Performing a UEFI Installation in Legacy OROM Mode May Fail**
Reference	43583
Product	Intel® RSTe 3.0
Version	4.0.0.1013
Operating System	Windows*
Problem Description	When the system is configured to boot using the Legacy OROM, attempting to perform a UEF OS installation may result in the system becoming unresponsive.
Resolution	Issue to be resolved in a future release.

Title#	**RSTe GUI May Display Invalid RAID Volumes After Multiple S3 and S4 Cycles.**
Reference	43603
Product	Intel® RSTe 3.0
Version	3.7.0.1087
Operating System	Windows*
Problem Description	When creating and initializing a RAID volume, running multiple S3 and S4 power cycles while the volume is initializing may result in the RSTe GUI displaying erroneous RAID volumes. Clicking on one of these erroneous RAID volumes may cause the RSTe GUI to become unresponsive.
Resolution	Issue to be resolved in a future release.

Title#	**Migrating a System Disk to a RAID Volume May Encounter a System Failure**
Reference	43632
Product	Intel® RSTe 3.0
Version	4.1.0.1046
Operating System	Windows*
Problem Description	When attempting to migrate a single System OS drive to a RAID volume, the system may encounter a system failure condition. Intel recommends that the system OS does not reside on a RAID 0 volume.
Resolution	Issue to be resolved in a future release.

Title#	**RSTe CLI May Not Properly Show Disk Model Information**
Reference	43633
Product	Intel® RSTe 3.0
Version	4.1.0.1046
Operating System	Windows*

Problem Description	When using the RSTe CLI utility to gather the information of the devices attached, the utility may not properly report the device model information.
Resolution	Issue to be resolved in a future release.

Title#	**UEFI Driver May Not Report Failed/Degraded Volume Status When Booting**
Reference	43823
Product	Intel® RSTe 3.0
Version	4.1.0.1019
Operating System	Windows*
Problem Description	When booting in UEFI mode, if a RAID volume is degraded/failed, the status indicting a problem may not be displayed.
Resolution	Issue to be resolved in a future release.

Title#	**RSTe May Loop the Rebuilding Process If a four drive RAID 5 is Being Rebuilt with the Hot Spare.**
Reference	51996
Product	RSTe 4.0
Version	RSTe 4.2.0.1143
Operating System	Windows*
Problem Description	When attempting to perform a rebuild of a 4 drive RAID5 using the pre-configured spare disk, may reset and start over once the rebuild process reaches 98% complete.
Resolution	Issue to be resolved in a future release.

Title#	**The RSTe Installer May Not Properly Remove All of the Files When Uninstalling the Driver**
Reference	52000
Product	RSTe 4.0
Version	RSTe 4.2.0.1143

Operating System	Windows*
Problem Description	When attempting to use the integrated uninstaller (in the proper configuration) to remove RSTe from the system, the RSTe installer may not properly remove all of the files.
Resolution	Issue to be resolved in a future release.

Title#	**System May Fail Performing a Hot Plug on a Greater Than 2TB Drive Attached to the SCU Controller**
Reference	55212
Product	RSTe 4.0
Version	RSTe 4.2.0.1143
Operating System	Windows
Problem Description	Attempting to perform a Hot Plug and a drive that is greater than 2 TB when it is attached to the SCU of the Intel® C600 series chipset may result in the system failing.
Resolution	Issue to be resolved in a future release.

Title#	**Multiple RSTe Initialization Process May Encounter an "Unknown error" Message**
Reference	56313
Product	RSTe 4.0
Version	RSTe 4.2.0.1143
Operating System	Windows*
Problem Description	When attempting to initiate the initialization process on multiple RAID volumes at the same time may result in an "Unknown error" message being displayed.
Resolution	Issue to be resolved in a future release.

Title#	**Attempting to Delete RAID Volume During a Stress Test May Result in an "Unknown error" Message Being Displayed**
Reference	56593
Product	RSTe 4.0
Version	RSTe 4.2.0.1143
Operating System	Windows*
Problem	When attempting to delete a RAID volume during a stress test,

Description	the RSTe GUI may encounter an “Unknown errors” message being displayed.
Resolution	Issue to be resolved in a future release.

Title#	**Attempting to Create a fourth RAID 1 Volume May Encounter an “Unknown error” Message Being Displayed**
Reference	57529
Product	RSTe 4.0
Version	RSTe 4.2.0.1143
Operating System	Windows*
Problem Description	When attempting to create a fourth RAID 1 volume, the RSTe GUI may encounter “Unknown errors” message being displayed.
Resolution	Issue to be resolved in a future release.

Title#	**The RSTe GUI Help Link in Email Preferences May Not Work Properly**
Reference	59970
Product	RSTe 4.0
Version	RSTe 4.2.0.1143
Operating System	Windows*
Problem Description	When attempting to view the “More help on this page” link in Email Preferences, the RSTe GUI may not properly show the help information requested.
Resolution	Issue to be resolved in a future release.

Title#	**Running Tests Using “smartctl.exe” May Cause a Disk to**
Reference	59975
Product	RSTe 4.0
Version	RSTe 4.2.0.1143
Operating System	Windows*
Problem Description	Running certain tests with smartctl.exe may result in the drive resetting do to a command timeout. Ex. smartctl.exe /dev/sda -d scsi -ax
Resolution	Issue to be resolved in a future release.

Title#	**The RSTe Command Line Interface (CLI) Tool May Cause the RSTe GUI to Fail**
Reference	60130
Product	RSTe 4.0
Version	RSTe 4.2.0.1143
Operating System	Windows*
Problem Description	When attempting to use the RSTe CLI tool with incorrect parameters, The RSTe GUI and services may fail.
Resolution	Issue to be resolved in a future release.

Title#	**RSTe May Report a Drive Plugged into an eSATA Port as Unknown**
Reference	4937706
Product	Intel® RSTe 3.0
Version	4.1.0.1047
Operating System	Windows* Server 2012 R2
Problem Description	RSTe GUI may report an eSATA configured port as unknown when a hard drive is attached to that port.
Resolution	Issue to be resolved in a future release.

Title#	**System May Not Properly Resume From Hibernation**
Reference	4937839
Product	Intel® RSTe 3.0
Version	4.1.0.1047
Operating System	Windows* Server 2012
Problem Description	Running in a system with the system OS on a RAID 10 connected to the sSATA Controller (of the C610 series chipset), the system may not properly resume from a hibernation. The issue is likely to only occur on Windows Server 2012.
Resolution	Issue to be resolved in a future release.

Title#	**RAID10 Volume May Become Degraded During the Verify and Repair Process Following a Dirty Shutdown**
Reference	4938074
Product	RSTe 4.0
Version	RSTe 4.2.0.1143
Operating System	Windows*
Problem Description	When running in a configuration with the system OS on a RAID 10, the RAID volume may become degraded during the Verify and Repair process following a system dirty shutdown condition.
Resolution	Issue to be resolved in a future release.

7.3 Issues Resolved in the Release of 4.3.0.1223

The following issues have been resolved in the Intel® RSTe 4.3.0.1223 PV release package.

Title#	**RSTe GUI May Show 64 KB Strip Size for RAID 1 Volume Created in OROM**
Reference	45538
Product	Intel® RSTe 3.0
Version	4.2.0.1062
Operating System	Windows* 8
Problem Description	Running with RAID 1 Volume created in OROM, RSTe GUI may show 64 KB strip size instead of N/A.
Resolution	Issue resolved in the 4.3.0.1199 release.

Title#	**The RSTe GUI May Not Show the Correct Balloon Tip During Volume Initialization**
Reference	49336
Product	RSTe 4.0
Version	RSTe 4.2.0.1143

Operating System	Windows*
Problem Description	When attempting to initialize a RAID volume, the RSTe GUI may show “Rebuilding” balloon tip instead of “initializing”.
Resolution	Issue resolved in the 4.3.0.1199 release.

Title#	**The RSTe GUI May Show an Outdated RAID Array Information**
Reference	49619
Product	Intel® RSTe 3.0
Version	4.1.0.1047
Operating System	Windows*
Problem Description	When running in a configuration where the RAID Arrays/Volumes on frequently changed (added, deleted, recreated, etc.), the RSTe GUI may not properly display the RAID Array information. In some cases, the RAID array may be empty but the GUI may retain the information from the previous configuration. Work around: Restarting the system generally clears this up.
Resolution	Issue resolved in the 4.3.0.1199 release.

Title#	**RSTe GUI Online Support Link May Be Incorrect**
Reference	43822
Product	Intel® RSTe 3.0
Version	4.0.0.1041
Operating System	Windows*
Problem Description	When attempting to access the Online Support link in the RSTe GUI, the link may be incorrect. The Link should take the user to: https://downloadcenter.intel.com/SearchResult.aspx?lang=eng&ProductFamily=Software+Products&ProductLine=Chipset+Software&ProductProduct=Intel%C2%AE+Rapid+Storage+Technology+enterprise+(Intel%C2%AE+RSTe)&ProdId=3449&LineId=1090&FamilyId=42

Resolution	Issue resolved in the 4.3.0.1199 release.

Title#	**RSTe GUI Volume Properties May Show a DATA RAID Volume as a System Volume**
Reference	49923
Product	Intel® RSTe 3.0
Version	4.2.0.1116
Operating System	Windows*
Problem Description	When running in a configuration with a data RAID volume, the RSTe GUI may inadvertently show that volume as a System volume in the Volume Properties pane.
Resolution	Issue resolved in the 4.3.0.1199 release.

Title#	**The RSTe GUI May Fail While Initializing a RAID Volumes.**
Reference	52059
Product	RSTe 4.0
Version	RSTe 4.2.0.1143
Operating System	Windows 8.1 / Windows 7
Problem Description	While attempting to initialize a RAID volume, RSTe GUI may fail while. The initializing itself isn't impacted and completes without any issues.
Resolution	Issue resolved in the 4.3.0.1199 release.

Title#	**The RSTe GUI May Shows "Unknown error" When switching "Disk data cache" on an Array During RAID Initialization**
Reference	55522
Product	RSTe 4.0
Version	RSTe 4.2.0.1143
Operating System	Windows*
Problem	When attempting to change the "Disk data cache" option during a RAID volume initialization, an "Unknown error"

Description	message may be displayed.
Resolution	Issue resolved in the 4.3.0.1199 release.

Title#	**Attempting to Start the RSTe GUI May Encounter an Unknown Error**
Reference	56343
Product	RSTe 4.0
Version	RSTe 4.2.0.1143
Operating System	Windows 7 32bits
Problem Description	When running in a configuration with multiple drives attached to the both SATA and SCU controllers of the Intel® C600 series chipset, attempting to start the RSTe GUI may result in an Unknown Error message being displayed.
Resolution	Issue resolved in the 4.3.0.1199 release.

Title#	**The RSTe GUI May Not Proper Initialize the RAID Volume After Expanding**
Reference	56689
Product	RSTe 4.0
Version	RSTe 4.2.0.1143
Operating System	Windows*
Problem Description	When attempting to initialize a RAID volume after expanding the volume, the initialization may begin at the end of the original RAID volume instead of initializing the entire volume.
Resolution	Issue resolved in the 4.3.0.1199 release.

Title#	**The RSTe GUI Element May Disappear After Reconnecting with Remote Desktop Access.**
Reference	56694
Product	RSTe 4.0
Version	RSTe 4.2.0.1143
Operating	Windows*

System	
Problem Description	When attempting to reconnect to a system running RSTe, using remote desktop access, the RSTe GUI may not run or diplay properly on the remote desktop.
Resolution	Issue resolved in the 4.3.0.1199 release.

Title#	**The RSTe GUI May Not Properly Manage RAID Level Creating For RAID Roaming Volumes**
Reference	56696
Product	RSTe 4.0
Version	RSTe 4.2.0.1143
Operating System	Windows*
Problem Description	When attempting to create a RAID volume on a RAID Array roamed from a different controller/platform (created on a different controller/platform), The RSTe GUI may not properly handle creating a Matrix RAID volume on the remaining available disk space.
Resolution	Issue resolved in the 4.3.0.1199 release.

Title#	**The RSTe GUI May Not Properly Display More than Two Running Operations**
Reference	56700
Product	RSTe 4.0
Version	RSTe 4.2.0.1143
Operating System	Windows*
Problem Description	When attempting to start multiple simultaneous operation, The RSTe GUI may not properly display the information in the information tab.
Resolution	Issue resolved in the 4.3.0.1199 release.

Title#	**The RSTe GUI May Shows Duplicate RAID Levels When Creating Additional Volumes**

Reference	57551
Product	RSTe 4.0
Version	RSTe 4.2.0.1143
Operating System	Windows*
Problem Description	When attempting to select an array to view the properties and then select 'Create additional volume', the RSTe GUI may show duplicate RAID level options.
Resolution	Issue resolved in the 4.3.0.1199 release.

Title#	**Entering into an S4 State While RAID Volume is Migrating May Cause the Volume to Fail**
Reference	58044
Product	RSTe 4.0
Version	RSTe 4.2.0.1143
Operating System	Windows*
Problem Description	When attempting to enter into a S4 state while a RAID volume is actively migrating may result in the RSTe GUI showing two failed RAID volumes.
Resolution	Issue resolved in the 4.3.0.1199 release.

Title#	**RSTe GUI May not Properly Manage Supported RAID Migration Options**
Reference	58085
Product	RSTe 4.0
Version	RSTe 4.2.0.1143
Operating System	Windows*
Problem Description	When attempting to Perform a RAID migration, the RSTe GUI may allow migration options that are not supported.
Resolution	Issue resolved in the 4.3.0.1199 release.

Title#	**The RSTe GUI May Not Properly Display the Option to Increase the Size for RAID10 Volumes**
Reference	58381
Product	RSTe 4.0
Version	RSTe 4.2.0.1143
Operating System	Windows*
Problem Description	When attempting to expand the volume size of a RAID 10 to the maximum size available by using the RSTe GUI to select the option "increase size" in Volume Properties pane, the option may not be shown.
Resolution	Issue resolved in the 4.3.0.1199 release.

Title#	**Running Heavy I/O to a Degraded RAID 5 Volume May Encounter a Data Integrity Issue**
Reference	59509
Product	RSTe 4.0
Version	RSTe all version prior to 4.3.0.1199
Operating System	Windows*
Problem Description	When running continuous heavy I/O to a degraded RAID 5 volume for long periods of time, may result in data being corrupted. The window of opportunity for this data integrity issue only occurs when the RAID 5 is in a degraded state. The window is closed when the volume enters into a rebuild state. **Workaround**: When a RAID 5 goes into a degraded state, stop all I/O and repair/replace affected drives and begin the RAID rebuild process as quickly as possible.
Resolution	Issue resolved in the 4.3.0.1199 release.

Title#	**The RSTe GUI May Prompt to Keep Data For All Drives with GPT Partitions.**
Reference	59821
Product	RSTe 4.0

Version	RSTe 4.2.0.1143
Operating System	Windows*
Problem Description	When attempting to create a RAID volume with drives with GPT partitions, the RSTe GUI may display "Do you want to keep data from one of the selected disks?" for each disk selected to be part of the volume.
Resolution	Issue resolved in the 4.3.0.1199 release.

Title#	**RSTe May Consume More Memory After Running For a Long Time**
Reference	59908
Product	RSTe 4.0
Version	RSTe 4.2.0.1143
Operating System	Windows*
Problem Description	When running a platform with RSTe for long periods of time, RSTe components may continue to consume memory as it runs.
Resolution	Issue resolved in the 4.3.0.1199 release.

Title#	**RSTe IAStorIcon May Fail When Restarting the System**
Reference	4937729
Product	Intel® RSTe 3.0
Version	4.1.0.1047
Operating System	Windows* Server 2012 R2
Problem Description	When performing system restart, the RSTe IAStorIcon may encounter a failure while the system is going down.
Resolution	Issue resolved in the 4.3.0.1199 release.

Title#	**Potential Installation Conflict Between RSTe and the C610 series chipset Platform Drivers**
Reference	4937660

Product	Intel® RSTe 3.0
Version	4.1.0.1047
Operating System	Windows*
Problem Description	When running on a C610 series chipset platform, installing RSTe after the chipset drivers are installed may result in the sSATA driver not being properly installed. Work around: To avoid this issue, install RSTe prior to the chipset drivers
Resolution	Issue resolved with the 4.3.0.1199 release.

Title#	**Windows Server Essentials Management Service May Not Properly Start**
Reference	4937838
Product	Intel® RSTe 3.0
Version	4.1.0.1047
Operating System	Windows* Server 2012 R2
Problem Description	Running in a system with Windows Server Essentials Management running, after the system reboots the service for Windows Sever Essentials Management may not properly restart. This issue is encountered most often when the system image is on a RAID volume with the backup disk being a single drive (not part of a RAID volume).
Resolution	Issue resolved in the 4.3.0.1199 release as a third party issue, not RSTe.

Title#	**RSTe May Not Properly Spin Down a Drive Under Windows 8.1**
Reference	4937952
Product	Intel® RSTe 3.0
Version	4.1.0.1047
Operating System	Windows* 8.1

Problem Description	Running on Windows 8.1 with Driver Power Down enabled, RSTe may not properly spin down the drive(s).
Resolution	Issue resolved in the 4.3.0.1199 release.

Title#	**RSTe Pre-OS UI May Report a RAID 10 Volume a Failed with a Single HDD Marked as Failed**
Reference	4938191
Product	Intel® RSTe 3.0
Version	4.1.0.1047
Operating System	Windows*
Problem Description	When running in a configuration with the system OS on a RAID 10 Volume, if a system crash occurs during a volume rebuild process the Pre-OS UI may show the RAID volume as FAIL while showing only on drive in a failed state.
Resolution	Issue resolved in the 4.3.0.1199 release. The Pre-OS UI will now show the drive being rebuilt as “Online member” in yellow text.

Title#	**Bootable file systems May Not be Available if EFI driver is ODD is on SATA0 or sSATA0**
Reference	4938186
Product	Intel® RSTe 3.0
Version	4.2.0.1043
Operating System	Windows*
Problem Description	When running with the system configured to boot in UEFI mode, running with the PreOS package from 4.2.0.1043 may result in the system not being able to boot if there is an ODD on SATA0 or sSATA0.
Resolution	Issue resolved in the 4.3.0.1199 release.

Title#	**A System Crash May Be Encountered While running S3/S4 stress testing**

Reference	4938208
Product	Intel® RSTe 3.0
Version	4.2.0.1043
Operating System	Windows* 8.1
Problem Description	While running S3/S4 stress testing with the OS on the sSATA controller of the Intel® C610 series chipset, a system crash may be encountered with a 0xD1 error code.
Resolution	Issue resolved in the 4.3.0.1199 release.

Title#	**RSTe IAStorIcon May Fail When Restarting the System**
Reference	4937729
Product	Intel® RSTe 3.0
Version	4.2.0.1043
Operating System	Windows* 8.1
Problem Description	While attempting to restart the system, the RSTe IAStorIcon my fail while the system is shutting down for the restart process.
Resolution	Issue resolved in the 4.3.0.1199 release.

7.4 Issues Resolved in the Release of 4.2.0.1143

The following issues have been resolved with the Intel® RSTe 4.2.0.1143 PV release package.

Title#	**System May Hang During a Hibernate Resume With a Degraded RAID Volume**
Reference	4937409
Product	Intel® RSTe 3.0
Version	3.7.0.1046
Operating System	Windows*
Problem	When running in a configuration where the OS is installed to a RAID Volume, the system may hang when resuming from an

Description	hibernate if the RAID volume is degraded.
Resolution	Issue resolved in the 4.2.0.1143 release.

Title#	**RSTe rcfgsata.efi May Not Work Properly to Create a Matrix RAID Configuration**
Reference	4937599
Product	Intel® RSTe 3.0
Version	4.1.0.1047
Operating System	Windows*
Problem Description	When using the rcfgsata.efi tool to create a Matrix RAID configuration (two RAID Volumes on a single RAID Array) may encounter an error condition that prevents the task from completing.
Resolution	Issue resolved in the 4.2.0.1143 release.

Title#	**Using the F6 Drivers to Install a Windows OS onto the sSATA Controller May Not Work Properly**
Reference	4937606
Product	Intel® RSTe 3.0
Version	4.1.0.1047
Operating System	Windows*
Problem Description	When attempting to install a Windows OS onto the sSATA Controller, may result in the installation failing.
Resolution	Issue resolved in the 4.2.0.1143 release.

Title#	**Attempting to Execute setup.exe with the -uninstall Option May Not Work Properly**
Reference	4937609
Product	Intel® RSTe 3.0
Version	3.8.0.1111
Operating System	Windows*

Problem Description	When attempting to execute the setup.exe utility with the -uninstall option, the following error message may be displayed: "R6034. Error R6034: An application has made an attempt to load the C runtime library incorrectly."
Resolution	Issue resolved in the 4.2.0.1143 release.

Title#	**RSTe May Not Properly Detect a Protocol Timeout Error**
Reference	4937639
Product	Intel® RSTe 3.0
Version	3.8.0.1111
Operating System	Windows*
Problem Description	RSTe may not properly detect a protocol timeout error resulting in the system becoming unresponsive.
Resolution	Issue resolved in the 4.2.0.1143 release.

Title#	**RSTe Email Alert Function May Not Send Emails**
Reference	4937642
Product	Intel® RSTe 3.0
Version	3.8.0.1113
Operating System	Windows*
Problem Description	When running in a configuration where email notification is properly configured, the RSTe email notification process may not operate properly if the system is powered down, a drive removed and the system powered back on (forcing a degraded RAID volume).
Resolution	Issue resolved in the 4.2.0.1143 release.

Title#	**RSTe RAID Migration May Take a Long Time on a C610 series chipset Platform**
Reference	4937664
Product	Intel® RSTe 3.0
Version	4.1.0.1047

Operating System	Windows*
Problem Description	When running on a C610 series chipset platform, migrating a RAID volume that was generated in the PreOS environment to another RAID volume may take a very long time to complete.
Resolution	Issue resolved in the 4.2.0.1143 release.

Title#	**RSTe May Not Be Properly Setting the Security Frozen Bit When Resuming From S3.**
Reference	4937704
Product	Intel® RSTe 3.0
Version	4.1.0.1047
Operating System	Windows*
Problem Description	When resuming from an S3, the RSTe driver may not properly set the Security Frozen bit as defined through ACPI _GTF methodology.
Resolution	Issue resolved in the 4.2.0.1143 release.

Title#	**RSTe GUI May Report Parity Errors on RAID 0, 1 and 10 Volumes**
Reference	4937760
Product	Intel® RSTe 3.0
Version	4.1.0.1047
Operating System	Windows*
Problem Description	When running in a configuration with RAID0, RAID1 or RAID10 volumes, the RSTe GUI may incorrectly report Parity Errors on these volumes. Parity Errors on RAID volumes other than RAID 5 is invalid.
Resolution	Issue resolved in the 4.2.0.1143 release.

Title#	**RSTe RAID Volume Rebuild Process May Become Unresponsive**

Reference	4937789
Product	Intel® RSTe 3.0
Version	4.1.0.1047
Operating System	Windows*
Problem Description	The RSTe RAID volume rebuild process may become unresponsive if a protocol communication error occurs (between one of the RAID volume drives and the controller) while the RAID volume is rebuilding.
Resolution	Issue resolved in the 4.2.0.1143 release.

Title#	**RSTe UEFI HII May Hang When Deleting a RAID Volume**
Reference	CCG0100742498
Product	Intel® RSTe 3.0
Version	3.8.0.1113
Operating System	PreOS - UEFI
Problem Description	When attempting to delete a RAID Volume from the RSTe UEFI-HII interface, the system may become unresponsive, requiring a system reboot to recover.
Resolution	Issue resolved in the 4.2.0.1143 release.

7.5 Issues Resolved in the Release of 4.1.0.1047

The following issues have been resolved with the Intel® RSTe 4.1.0.1047 PV release package.

Title#	**RSTe UI May Not Show Whole FW of HDD attached**
Reference	3236733
Product	Intel® RSTe 3.0
Version	3.0.0.3002
Operating System	Windows*
Problem Description	When reviewing device Manufacturer and Model Number, the information displayed in the RSTe GUI may not match what is

	shown in the RSTe System Report.
Resolution	Issue resolved in the RSTe 4.1.0.1046 release as working properly. The ATA specification outlines that the FW revision is 8 characters long. For disks connected to AHCI Controller, the RSTe driver will pass all the characters to the UI and therefore it is displayed correctly. However, the SCSI-ATA translation specification outlines that there are only 4 characters taken (first or last ones) into translation. This is where the differences occur. Moreover, for disk drives connected to the SCU Controller, the FW version information is passed using the SCSI inquiry structure that contains only 4 characters.

Title#	**RSTe Legacy RAID option ROMs May Conflict and Prevent Other option ROMs From Running Properly**
Reference	4159230
Product	Intel® RSTe 3.0
Version	3.0.0.3020
Operating System	Windows*
Problem Description	When booting a system using RSTe Option ROMs a memory conflict may occur, causing problems with other vendor Option ROMS in the system and prevent them from running properly.
Resolution	Issue resolved in the RSTe 4.1.0.1046 release. Please review Section 7 (Appendix C) of the RSTe TPS version 1.8 for information on what must be done in the BIOS to help resolve this issue.

Title#	**Installing/Upgrading to Windows* 8.1/Server 2012 R2 on the AHCI Controller in RAID Mode May Not Work Properly**
Reference	CCG0100697083
Product	Intel® RSTe 3.0
Version	3.7.0.1093
Operating	Windows* 8.1/Server 2012 R2

System	
Problem Description	When running in a configuration where the Intel® C600/C610 series chipset has its AHCI Controller in RAID Mode, installing (or upgrading to) Windows* 8.1/Server 2012 R2 may not install (or upgrade) properly. With the release of Windows* 8.1/Server 2012 R2, Microsoft has included a third party vendors inbox driver that includes support for the Device ID reserved for Intel's RSTe AHCI/SATA RAID mode driver. The inclusion of these reserved ID's within the (third party) inbox driver may prevent customer from being able to use the RSTe driver to install (or updated to) the latest Microsoft's OSes. For new installations, the attached devices will not show up, prompting the use of the F6 load driver option. During the loading of the RSTe driver, Windows will make the determination that the existing (third party) inbox drive is the better, more appropriate driver to use and will install that driver. Windows does not install the RSTe driver. This results in no drives showing up, so the OS cannot be installed. For upgrades on platforms that are running Windows* 8.0/Server 2012 with RSTe, running the OS upgrade process will result in the (third party) inbox driver over writing the RSTe driver, rendering the system unbootable and unrecoverable. The systems that are impacted will contain the following Subsystem IDs (as part of their Device ID identification): 11B61734, 28228086. 72708086, 04811014, 04851014, 047D1014, 201019E5, 201219E5, 201319E5, 201519E5, 201619E5, 201B19E5, 201D19E5, 201F19E5, 306E1054
Resolution	Issue resolved in the 4.1.0.1046 release.

Title#	**RSTe May Not Properly Support Installing an OS on 4 SSDs**
Reference	4630477
Product	Intel® RSTe 3.0
Version	3.7.0.1093
Operating	Windows*

System	
Problem Description	When running on a system with 4 SSDs configured in a 4 drive RAID 0 Volume, the RSTe may not properly support installing an OS to the RAID Volume. The installation process may report a failure and not successfully install the OS.
Resolution	Issue resolved in the 4.1.0.1046 release.

Title#	**Removing the USB Drive Used to After Loading the RSTe Driver for an F6 OS Installation May Cause the OS Installation to Fail.**
Reference	4936653
Product	Intel® RSTe 3.0
Version	3.7.0.1093
Operating System	Windows*
Problem Description	When using a USB drive to F6 load the RSTe drivers while installing an OS, if the USB drive is removed after the RSTe driver is loaded the OS installation may fail.
Resolution	Issue resolved in the 4.1.0.1046 release as a 3rd party issue. Microsoft has published an official KB artical. http://support.microsoft.com/kb/2931031

Title#	**Upgrading from Windows 7 to Windows 8.1 (Server 2012 R2) May Not Upgrade Properly on the AHCI Controller**
Reference	4936755
Product	Intel® RSTe 3.0
Version	3.7.0.1093
Operating System	Windows*
Problem Description	When attempting to upgrade Windows 7 to Windows 8.1 (Windows Server 2012 R2) using RSTe 3.7.0.1093 may not upgrade properly. With Windows 7, RSTe provides what is called a filter driver that works in conjunction with the actual RSTe driver. Windows 8 removed the requirement for a filter driver and no longer allows filter drivers.

	With the release of Windows 8.1, RSTe include support for installing without the use of the F6 installation method for single drive configurations. The driver used is the Intel® Rapid Storage Technology 12.0.1 driver. When using the latest RSTe driver and upgrading to Windows 8.1, instead of maintaining the version installed, the upgrade process fails to upgrade and reverts back to Windows 7.
Resolution	Issue resolved in the 4.1.0.1046 release.

Title#	**Upgrading from Windows 7 to Windows 8 (Server 2012) May Not Upgrade Properly on the SCU Controller**
Reference	4936756
Product	Intel® RSTe 3.0
Version	3.7.0.1093
Operating System	Windows*
Problem Description	When attempting to upgrade Windows 7 to Windows 8 (Server 2012) using RSTe 3.7.0.1093 may not upgrade properly. With Windows 7, RSTe provides what is called a filter driver that works in conjunction with the actual RSTe driver. Windows 8 removed the requirement for a filter driver and no longer allows filter drivers. When using the latest RSTe driver and upgrading to Windows 8, instead of maintaining the version installed, the upgrade process fails and reverts back to Windows 7. Workaround: Before upgrading to Windows 8, downgrade the RSTe driver to RSTe 3.5. That driver is setup so Windows 8 use the installed driver to perform the upgrade.
Resolution	Issue resolved in the 4.1.0.1046 release.

Title#	**Upgrading from Windows 7 to Windows 8.1 (Server 2012 R2) May Not Upgrade Properly on the SCU Controller**
Reference	4936760
Product	Intel® RSTe 3.0
Version	3.7.0.1093

Operating System	Windows*
Problem Description	When attempting to upgrade Windows 7 to Windows 8.1 (Windows Server 2012 R2) using RSTe 3.7.0.1093 may not upgrade properly. With Windows 7, RSTe provides what is called a filter driver that works in conjunction with the actual RSTe driver. Windows 8 removed the requirement for a filter driver and no longer allows filter drivers. When using the latest RSTe driver and upgrading to Windows 8.1, instead of maintaining the version installed, the upgrade process fails to upgrade and reverts back to Windows 7.
Resolution	Issue resolved in the 4.1.0.1046 release.

Title#	**System May Become Unresponsive When Copying/Pasting a large File On a Degraded RAID Volume**
Reference	4936809
Product	Intel® RSTe 3.0
Version	3.8.0.1113
Operating System	Windows*
Problem Description	When copying/pasting a very large file (approximately 4GB), the system may become unresponsive if the OS is installed onto a RAID Volume and that RAID Volume is in a degraded state.
Resolution	Issue resolved in the 4.1.0.1046 release.

Title#	**RSTe Disk Removed/Connected Events May Be Missing Disk Information in RSTe CLI and GUI**
Reference	4936853
Product	Intel® RSTe 3.0
Version	3.8.0.1113
Operating System	Windows*
Problem Description	RSTe driver events may show a “disk removed” followed by a “disk detected” after multiple hibernation cycles. If these events occur, the RSTe CLI and GUI may not properly show the

	disk information (e.g. the disk size may be reported as 0MB)
Resolution	Issue resolved in the 4.1.0.1046 release.

Title#	**RSTe Process May Consume Memory as it Continues to Run**
Reference	4937077
Product	Intel® RSTe 3.0
Version	3.8.0.1113
Operating System	Windows*
Problem Description	When running the RSTe GUI, the RSTe process "IAStorDataMgrSvc.exe" may continually consume memory (approximately 3K per day).
Resolution	Issue resolved in the 4.1.0.1046 release.

Title#	**Migrating a RAID Volume With Some SSDs May Result in an Error Message Being Reported**
Reference	4937132
Product	Intel® RSTe 3.0
Version	4.0.0.1045
Operating System	UEFI
Problem Description	When using the RSTe GUI to migrate a RAID volume (on some SSDs), a message window stating “An unknown error occurred during the volume creation progress. Please try creating the volume again" may be displayed while the RAID volume migration process properly completes.
Resolution	Issue resolved in the 4.1.0.1046 release.

Title#	**RSTe EFI Drivers for Intel® C610 series chipset May Demonstrate Erratic Behavior**
Reference	4937159
Product	Intel® RSTe 3.0
Version	4.0.0.1045

Operating System	UEFI
Problem Description	When using the RSTe HII on an Intel® C610 series chipset based system, switching back and forth between the SATA and sSATA Controllers may exhibit some erratic/inconsistent behavior in what information is displayed.
Resolution	Issue resolved in the 4.1.0.1046 release.

Title#	**Installing Windows* Server 2012 R2 With Two RSTe Legacy OROMs Loaded May Result in the Installation Failing**
Reference	4937263
Product	Intel® RSTe 3.0
Version	4.0.0.1045
Operating System	UEFI
Problem Description	When attempting to install Windows* Server 2012 R2 with two RSTe Legacy OROMs being loaded (splash screens being displayed) may result in the installation failing. The Windows* Server 2012 R2 bootloader inadvertently is overwriting some of the RSTe Legacy OROM data causing the installation process to fail.
Resolution	Issue resolved as not an RSTe issue. Please reference the RSTe Technical Product Specification (version 1.8) included in the 4.1 Release Kit (Appendix C) for instruction on how to work around this issue. Specifically review sections 7.6.1.2 and 7.7.1.

Title#	**Rcmpsata.exe and Rcmpssata.exe May Return the Same Results**
Reference	CCG0100711059
Product	Intel® RSTe 3.0
Version	4.0.0.1040
Operating System	DOS*

Problem Description	When running the DOS RAID compatibilities tools (rcmpsata.exe and rcmpssata.exe) on a Intel® C610 series chipset based platform may return identical information (back from the sSATA Controller).
Resolution	Issue resolved in the 4.1.0.1046 release.

Title#	**RSTe SATA/sSATA EFI Driver May Be Loaded in Legacy Mode**
Reference	CCG0100742151
Product	Intel® RSTe 3.0
Version	4.0.0.1040
Operating System	DOS*
Problem Description	When a platform based on the Intel® C610 series chipset is configured to boot using Legacy OROM, the RSTe EFI driver may also be loaded..
Resolution	Issue resolved in the 4.1.0.1046 release.

7.6 Issues Resolved in the Release of 4.0.0.1040

The following issues have been resolved with the Intel® RSTe 4.0.0.1040 release package.

Title#	**RSTe does not support Hot Swap of the devices**
Reference	4628501
Product	Intel® RSTe 4.0
Version	4.0.0.1040
Operating System	Windows*
Problem Description	Support for Hot-Swap to safely remove storage devices
Resolution	Issue resolved in the 4.0.0.1040 release.

Title#	**RSTe 3.8.0.1111 installer installs incorrect drivers**
Reference	4630524
Product	Intel® RSTe 4.0

Version	3.8.0.1111
Operating System	Windows*
Problem Description	Setup.exe in 3.8.0.1111 may install the version of the driver that was already on the system
Resolution	Issue resolved in the 4.0.0.1040 release.

Title#	**Long RAID rebuild time on Western Digital 512e drives on C600 chipset**
Reference	4629096
Product	Intel® RSTe 4.0
Version	3.6.0.1093
Operating System	Windows*
Problem Description	on a platform with C600 chipset during RAID1 mirroring process if power to one of the drives is removed, shutdown and reboot the chipset will attempt to complete the mirror during boot and may take upto 10 min to boot.
Resolution	Issue resolved in the 4.0.0.1040 release.

Title#	**Formatting Intel SSD Pro 1500 Series in RAID1 configuration on 6G AHCI may results in hang and BSOD 0x1E.**
Reference	4630046
Product	Intel® RSTe 4.0
Version	3.7.3.1002
Operating System	Windows 7-64
Problem Description	Formatting Intel SSD Pro 1500 Series in RAID1 configuration on 6G AHCI results in hang and BSOD 0x1E.
Resolution	Issue resolved in the 4.0.0.1040 release.

Title#	**When requesting Last LBA on a SATA disk on SCU controller may result in error**
Reference	4630523
Product	Intel® RSTe 4.0
Version	3.7.0.1093

Operating System	Pre-OS
Problem Description	Request to get Last LBA in HDD by API: ReadBlocks() in [EFI_BLOCK_IO_PROTOCOL], may result in error code with Status Code:EFI_INVALID_PARAMETER This problem occurs only when Secure Boot Control is Enabled, if Secure Boot Control is Disabled, return Status Code as EFI_SUCCESS
Resolution	Issue resolved in the 4.0.0.1040 release.

Title#	**Inconsistent Manufacturer and Model number display in UI**
Reference	4630413
Product	Intel® RSTe 4.0
Version	3.7.1.1010
Operating System	Pre-OS
Problem Description	In some of the places in GUI, Manufacturer and Model number show as decimal instead of Hex
Resolution	Issue resolved in the 4.0.0.1040 release.

Title#	**RSTe Running S4 Cycles May Encounter A System Crash With mSATA SSDs**
Reference	4629999
Product	Intel® RSTe 3.0
Version	3.7.0.1093
Operating System	Windows*
Problem Description	When running in a configuration with mSATA SSDs, running S4 cycle testing may encounter a system crash with a 0x7A bug check code.
Resolution	Issue resolved in the 3.8.1.1009 release.

Title#	**SCU HDD Activity LED May Not Work Properly**
Reference	4630000
Product	Intel® RSTe 3.0
Version	3.7.0.1093
Operating System	Windows*
Problem	The signal used to generate the general SCU HDD activity signal may

Description	not be properly activated during disk I/O.
Resolution	Issue resolved in the 3.8.1.1009 release.

7.7 Issues Resolved in the Maintenance Release 3.8.0.1111

The following issues have been resolved with the release of the Intel® RSTe 3.0 PV driver version 3.8.0.1111 maintenance release package.

Title#	**RSTe May Not Properly Handle TRIM On Win8/Server2012 Systems**
Reference	4628968
Product	Intel® RSTe 3.0
Version	3.0.0.3002
Operating System	Windows*
Problem Description	When installing RSTe onto a system running Windows* 8 or Windows Server 2012, TRIM commands may not be processes properly to SSD attached to the system. One symptom would be that the SSD may not be properly reported to the Windows* device manager, which may show up as an HDD.
Resolution	Issue resolved in the 3.8.0.1111 release.

Title#	**LUN Reset Request on System Time Change**
Reference	100671322
Product	Intel® RSTe 3.0
Version	3.8.0.1106
Operating System	Windows*
Problem Description	If the system clock change occurs while an IO is in progress, the IO appears to exceed a timeout period and the SATA link is reset. Under heavy IO load, the disk appears to become unresponsive.
Resolution	Issue resolved in the 3.8.1111 release.

Title#	**RSTe May Not Operate Properly When TRIM is Enabled**
Reference	4629372
Product	Intel® RSTe 3.0
Version	3.8.0.1106/3.6.0.1086
Operating System	Windows* 7 (32 bit and 64 bit)
Problem Description	When operating in a system with SSDs, running heavy I/O to the drives while enabling TRIM may result in the system running out of memory.
Resolution	Issue resolved in the 3.8.0.1111 release.

Title#	**After install RSTe v3.6, The System May Not Be Able To Install Other Drivers**
Reference	4161418
Product	Intel® RSTe 3.0
Version	3.6.0.1086
Operating System	Windows*
Problem Description	When installing (or updating) a system using RSTe 3.6, the system may be able to install other drivers.
Resolution	Issue resolved in the 3.8.0.1111 release.

Title#	**RSTe GUI May Fail to Create a RAID Volume Using the System Disk**
Reference	4628601
Product	Intel® RSTe 3.0
Version	3.7.0.1093
Operating System	Windows*
Problem Description	When running in a system configured with the OS installed onto a GPT partition, creating a RAID volume that includes the system disk may encounter a condition where the RSTe GUI may not have a “Create” option. In some other cases, the

	"Create" option is available, but the RAID creation will fail with the following error message: An unknown error occurred during the volume creation process. Please try creating the volume again" This is because a GPT partition allows more of the disk space to be used by the OS than is utilized on MBR partition. As a result, RSTe may not have enough disk space to store the required RSTe metadata. When this happens, the RSTe GUI will not be able to create a RAID volume utilizing the system disk.
Resolution	When installing the OS, manually create the partition leaving at least 5MB of space unallocated. If the system is already operational a few extra manual steps are required to make "Create From Source Disk" available when creating a RAID volume. The strategy is simply to shrink the GPT partition of the Source Disk to approximately 5MB less than the capacity of the Source Disk itself. To shrink the GPT partition by 5MB there must be at least 5MB of unused capacity in the GPT partition and the GPT partition may need to be defragmented so that the 5MB of unused capacity can be neatly removed from the GPT partition. Therefore the user must take the following steps in Win7* to make Create From Source Disk available: 1. Open the Windows* Disk Management Utility and view how much Unallocated Space is at the end of the disk. If the Unallocated Space is >= 4.209MBs then the Create From Source Disk option should be available. If not then continue to step 2 2. Open the Windows* Disk Properties and in the General tab press the Disk Clean-up button. When the clean-up is completed then read the Free Space. If the Free Space is >= ~8MB then go to step 4 3. Delete some files until the Free Space is ~8MB. Empty the Recycle Bin. Go back to step 2. 4. In the Windows* Disk Properties Tools tab press the Defragment Now button. 5. In the Windows* Disk Management Utility right-click on the partition closest to the end of the disk and choose Shrink Volume. Shrink the Volume. On the "Enter the amount of space

	to shrink in MBs" line, enter 5MBs. Go to step 1.

7.8 Issues Resolved in the Maintenance Release 3.7.0.1093

The following issues have been resolved with the release of the Intel® RSTe 3.0 PV driver version 3.7.0.1093 maintenance release package.

Title#	**Parity Errors May be Encountered During the Verifying Process Following a Volume Expansion**
Reference	3236922
Product	Intel® RSTe 3.0
Version	3.0.0.3002
Operating System	Windows*
Problem Description	Using the RSTe OROM to create a two drive RAID1 volume at 50% capacity and then using the RSTe GUI to increase the volume capacity, a parity error may be encountered during the verification process.
Resolution	Issue resolved in the 3.7.0.1093 release.

Title#	**System May Not Properly Resume with the Boot Drive on AHCI Controller After RAID Failure on the SCU Controller**
Reference	4159245
Product	Intel® RSTe 3.0
Version	3.1.0.1068
Operating System	Windows*
Problem Description	When running in a configuration where the boot drive is on the AHCI Controller and there is a RAID volume on the SCU Controller; resuming from hibernation may fail if the RAID volume (on the SCU Controller) is in a failed state at the time of the system hibernation.
Resolution	Issue resolved as a third party issue, not with RSTe.

Title#	**RSTe GUI May Not Provide a "change type" Option for Migrating a 4-Drive RAID10**
Reference	4160488
Product	Intel® RSTe 3.0
Version	3.5.0.1096
Operating System	Windows*
Problem Description	When running in a configuration with the system OS installed onto a 4-drive RAID10, attempting to migrate the RAID10 system volume to another (supported) RAID volume by not be properly supported in the RSTe GUI. The option for "change type" may not be available.
Resolution	Issue resolved in the RSTe 3.7.0.1093 release.

Title#	**Intel RSTe GUI Mapping of Alphabet Characters in the Glossary to Sections in the Glossary May not Function Properly**
Reference	4160499
Product	Intel® RSTe 3.0
Version	3.1.0.1068
Operating System	Windows*
Problem Description	Intel RSTe GUI Mapping of alphabet characters in the glossary to sections in the glossary may not function properly for non-English characters. For example clicking the Ø in a non-English alphabet at the top does not navigate to the Ø section.
Resolution	Issue resolved in the RSTe 3.7.0.1093 release.

Title#	**RSTe GUI May Not Be Able To Generate Test Email Messages**
Reference	CCG0100460438
Product	Intel® RSTe 3.0
Version	3.2.0.1135
Operating System	Windows*

Problem Description	When attempting to send a test email message, from the RSTe UI, may not complete and a pop up message indicating a failure may appear.
Resolution	Issue resolved as expected behavior.

Title#	**System May Become Unresponsive With an Expander**
Reference	CCG0100283502
Product	Intel® RSTe 3.0
Version	3.0.0.3020
Operating System	SCU Legacy OROM
Problem Description	When running in a configuration with the boot drive directly attached to SCU0 and an expander attached to SCU1, the system may become unresponsive during boot.
Resolution	Issue resolved in the 3.7.0.1093 release.

Title#	**Attempting to Create a RAID Volume on Disk with a SMART Event May Complete Successfully**
Reference	CCG0100467974/4160878
Product	Intel® RSTe 3.0
Version	3.2.0.1135
Operating System	Windows*
Problem Description	When attempting to create a RAID Volume on a Disk with a SMART Event may complete successfully. Work around: The RSTe UI should be reporting the SMART event, so avoid creating a RAID Volume on a drive with a reported SMART event.
Resolution	Issue resolved as expected behavior.

Title#	**System Crash May Occur with a RAID Volume Name Greater Than 16 Characters**
Reference	CCG0100471412/4160881

Product	Intel® RSTe 3.0
Version	3.2.0.1135
Operating System	Windows*
Problem Description	When creating a RAID Volume and attempting to name that volume with more the 16 characters may result in a system failure with an error code of 0xD1. Work around: Please keep all RAID volume names less than 16 characters.
Resolution	Issue resolved in the 3.7.0.1093 release.

Title#	**RSTe May Not Properly Support Performing a "Copy Disc" Function**
Reference	4161481
Product	Intel® RSTe 3.0
Version	3.2.0.1134
Operating System	Windows*
Problem Description	When attempting to perform a "Copy Disc" function from one CD-RW to another CD-RW, the RSTe driver may not properly support this functionality.
Resolution	Issue resolved in the RSTe 3.7.0.1093 release.

Title#	**RSTe May Not Support Increasing a System Volume Beyond 2TB.**
Reference	41628178
Product	Intel® RSTe 3.0
Version	3.5.0.1101
Operating System	Windows*
Problem Description	When running in a configuration where the system RAID volume needs to expand beyond 2TB (generally in a GPT partition), the RSTe GUI may not properly support that

	functionality.
Resolution	Issue resolved in the RSTe 3.7.0.1093 release.

Title#	**RSTe May Not Support Installing the OS on a >3TB Volume on the SCU Controller**
Reference	CCG0100643146
Product	Intel® RSTe 3.0
Version	3.5.0.1101
Operating System	Windows*
Problem Description	When attempting to run in a configuration with RAID volumes greater than 3TB on the SCU Controller, rebooting may result in some of the drives not showing of or showing up as non-raid disks.
Resolution	Issue resolved in the RSTe 3.7.0.1093 release (PreOS package).

Title#	**RSTe May Not Properly support Migrating From a 2-Disk RAID1 to 3 or More Disk RAID0**
Reference	4628173
Product	Intel® RSTe 3.0
Version	3.6.0.1093
Operating System	Windows*
Problem Description	When running in a configuration with 4 or more SAS drives attached to the SCU Controller, the RSTe GUI may not properly support migrating a 2-disk RAID 1 volume to a 3 or more driver RAID0 volume.
Resolution	Issue resolved in the RSTe 3.7.0.1093 release.

Title#	**RSTe GUI May Not Properly Support Expanding a System RAID Volume**
Reference	4628175
Product	Intel® RSTe 3.0
Version	3.6.0.1093

Operating System	Windows*
Problem Description	When attempting to expand a system RAID volume, the RSTe GUI may not properly support this capability.
Resolution	Issue resolved in the RSTe 3.7.0.1093 release.

Title#	**Events May Not Be Logged Into Event Log If a RAID Volume Is Degraded Before IAStorDataMgrSvc Service Starts**
Reference	4627716
Product	Intel® RSTe 3.7
Version	3.6.0.1093
Operating System	Windows*
Problem Description	Create a RAID data volume. Power off the system and remove a drive as OS is loading before IAStorMgrSvc started. Notice that event about degraded volume is not logged into the Event log.
Resolution	Issue resolved in the 3.7.0.1093 release.

Title#	**RSTe UI may crash when coming out of S4 and S3**
Reference	4628499
Product	Intel® RSTe 3.6.0.1093
Version	3.7.0.1093
Operating System	Windows*
Problem Description	Create a RAID data volume. Boot into OS and open the RSTe UI. Put the system in S3 or S4. Wait until the system goes into power state completely. Wake up the system and repeat the cycle few times and you may see the UI crash and the event “Application Error” logged into event log.
Resolution	Issue resolved in the 3.7.0.1093 release.

Title#	**Tray Icon State May Not Reflect the Current State Of the Raid Volume**
Reference	4628661

Product	Intel® RSTe 3.0
Version	3.6.0.1093
Operating System	Windows*
Problem Description	Create an RAID volume in Pre-OS. Boot to OS and see that the tray icon shows a green check. Log off and remove a drive from the RAID volume and Log on. Observe that the tray Icon still shows green check until UI is launched.
Resolution	Issue resolved in the 3.7.0.1093 release.

8 Intel® OEM Parameters and INT15 API

8.1 Intel® C600 series chipset OEM Parameters

The Storage Controller Unit (SCU) complies with the Serial Attached SCSI (SAS) Specification's Physical and Link Layer definitions. However, when it comes to actually implementing motherboard designs, OEMs often encounter challenges that pit high-frequency design best-practices against form factor and trace lengths. Therefore, SCU provides a mechanism for OEMs to tweak its PHY parameters to find the most optimal settings for a given platform. Once determined, the OEM can capture these settings to a binary file that is placed into the platform's Serial Peripheral Interconnect (SPI) flash. If the OEM has multiple motherboard platforms using the Intel® C600 series chipset, each platform could have its own unique PHY parameter settings if needed.

SAS is a connection based protocol. Thus, the SCU requires that a valid SAS address be assigned to each of its controllers. The OEM registers these addresses through a proper naming authority. So, in addition to the PHY settings, SAS addresses are placed in the OEM parameter block as well.

SAS addresses are not unique to platforms as are the PHY settings. They are unique to each SCU controller in an individual Inte® C600 series chipset unit (i.e. SKU) similar to the way MAC addresses are unique to each LAN controller.

Since the OEM parameters are unique to platforms and chipset SKUs, they are set once at manufacturing time. OEM parameters will have been validated by OEMs with their respective platforms. Therefore, end users should not be allowed to change these settings for fear of system compatibility problems.

The remaining subsections discuss the details of the OEM parameter block and the requirements they place on the BIOS.

8.1.1 Structure of OEM Parameter Block

The OEM parameter block is 512 bytes total in size and an unpacked, unpadded binary block. It is partitioned into a header and up to two SCU controller element structures. Figure 1 shows this structure.

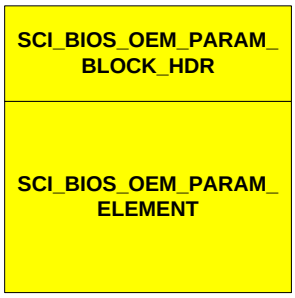


Figure 1: Structure of OEM Parameter Block

The following is the C programming language definition of the OEM parameter block. The comments give a full description of each field.

```
// For Intel Storage Controller Unit OEM Block
#define SCI_OEM_PARAM_SIGNATURE    "ISCUOEMB"

#define SCI_PREBOOT_SOURCE_INIT          (0x00)
#define SCI_PREBOOT_SOURCE_OROM    (0x80)
#define SCI_PREBOOT_SOURCE_EFI           (0x81)

#define SCI_OEM_PARAM_VER_1_0            (0x10)  // Initial Release Versoin
#define SCI_OEM_PARAM_VER_1_1            (0x11)  //Enhanced SSC Settings
#define SCI_OEM_PARAM_VER_1_4            (0x14)  // BCFS Support


// current version
#define SCI_OEM_PARAM_VER_CUR     SCI_OEM_PARAM_VER_1_4

// port configuration mode
#define SCI_BIOS_MODE_MPC   (0)
#define SCI_BIOS_MODE_APC   (1)


#ifndef SCI_MAX_PHYS
#define SCI_MAX_PHYS (4)
#endif
```

```
#ifndef SCI_MAX_PORTS
#define SCI_MAX_PORTS (4)
#endif


/**
 * @struct SCI_BIOS_OEM_PARAM_BLOCK_HDR
 *
 * @brief This structure defines the OEM Parameter block header.
 */
typedef struct SCI_BIOS_OEM_PARAM_BLOCK_HDR
{
   /**
    * This field contains the OEM Parameter Block Signature which is
    * used by BIOS and driver software to identify that the memory location
    * contains valid OEM Parameter data.  The value must be set to
    * SCI_OEM_PARAM_SIGNATURE which is the string "ISCUOEMB" which
    * stands for Intel Storage Controller Unit OEM Block.
    */
   U8 signature[8];
   /**
    * This field contains the size in bytes of the complete OEM
    * Parameter Block, both header and payload hdr_length +
    * (num_elements * element_length).
    */
   U16 total_block_length;
   /**
    * This field contains the size in bytes of the
    * SCI_BIOS_OEM_PARAM_BLOCK_HDR. It also indicates the offset from
    * the beginning of this data structure to where the actual
    * parameter data payload begins.
    */
   U8 hdr_length;
   /**
    * This field contains the version info defining the structure
    * of the OEM Parameter block.
    */
   U8  version;
   /**
    * This field contains a value indicating the preboot initialization
    * method (Option ROM or UEFI driver) so that after OS transition,
    * the OS driver can know the preboot method. OEMs who build a single
    * flash image where the preboot method is unknown at manufacturing
    * time should set this field to SCI_PREBOOT_SOURCE_INIT.  Then
    * after the block is retrieved into host memory and under preboot
    * driver control, the OROM or UEFI driver can set this field
    * appropriately (SCI_PREBOOT_SOURCE_OROM and SCI_PREBOOT_SOURCE_EFI,
    * respectively).
    */
   U8 preboot_source;
```

```
   /**
    * This field contains the number of parameter descriptor elements
    * (i.e. controller_elements) following this header.  The number of
    * elements corresponds to the number of SCU controller units contained
    * in the platform:
    *  controller_element[0] = SCU0
    *  controller_element[1] = SCU1
    */
   U8 num_elements;
   /**
    * This field contains the size in bytes of the descriptor element(s)
    * in the block.
    */
   U16 element_length;

   /**
   * This field contains the BIOS Controlled Feature Set  and allows
   * BIOS vendors to enable/disable specific RSTe product features.
    */
   U16 BCFS;
```

NOTE: Please see the section 8.2 BCFS Bit Settings below for details on the allowed settings.

```
   /**
    * Reserve fields for future use.
    */
   U8 reserved[6];

} SCI_BIOS_OEM_PARAM_BLOCK_HDR_T;


/**
 * @struct SCIC_SDS_OEM_PARAMETERS
 *
 * @brief This structure delineates the various OEM parameters that must
 * be set for the Intel SAS Storage Controller Unit (SCU).
 */
typedef struct SCI_BIOS_OEM_PARAM_ELEMENT
{
   /**
    * Per SCU Controller Data
    */
   struct
   {
      /**
       * This field indicates the port configuration mode for
       * this controller:
       *   Automatic Port Configuration(APC) or
       *   Manual Port Configuration (MPC).
       *
```

```
 * APC means the Platform OEM expects SCI to configure
 * SAS Ports automatically according to the discovered SAS
 * Address pairs of the endpoints, wide and/or narrow.
 *
 * MPC means the Platform OEM manually defines wide or narrow
 * connectors by apriori assigning PHYs to SAS Ports.
 *
 * By default, the mode type is APC
 * in APC mode, if ANY of the phy mask is non-zero,
 *    SCI_FAILURE_INVALID_PARAMETER_VALUE will be returned
 *      from scic_oem_parameters_set AND the default oem
 *      configuration will be applied
 * in MPC mode, if ALL of the phy masks are zero,
 *    SCI_FAILURE_INVALID_PARAMETER_VALUE will be returned
 *      from scic_oem_parameters_set AND the default oem
 *      configuration will be applied
 */
U8  mode_type;

/**
 * This field specifies the maximum number of direct attached
 * devices the OEM will allow to have powered up simultaneously
 * on this controller.  This allows the OEM to avoid exceeding
 * power supply limits for this platform.  A value of zero
 * indicates there are no restrictions.
 */
U8  max_number_concurrent_device_spin_up;

  /**
 * This bitfield indicates the OEM's desired default Tx
 * Spread Spectrum Clocking (SSC) settings for SATA and SAS.
 * NOTE: Default SSC Modulation Frequency is 31.5KHz.
 *-----------------------------------------------------------*/
/**
 * NOTE: Max spread for SATA is +0 / -5000 PPM.
 * Down-spreading SSC (only method allowed for SATA):
 *  SATA SSC Tx Disabled                = 0x0
 *  SATA SSC Tx at +0 / -1419 PPM Spread    = 0x2
 *  SATA SSC Tx at +0 / -2129 PPM Spread    = 0x3
 *  SATA SSC Tx at +0 / -4257 PPM Spread    = 0x6
 *  SATA SSC Tx at +0 / -4967 PPM Spread    = 0x7
*/
U8 ssc_sata_tx_spread_level : 4;

/**
 * SAS SSC Tx Disabled                = 0x0
 *
 * NOTE: Max spread for SAS down-spreading +0 / -2300 PPM
 * Down-spreading SSC:
 *  SAS SSC Tx at +0 / -1419 PPM Spread     = 0x2
```

```
     *  SAS SSC Tx at +0 / -2129 PPM Spread     = 0x3
     *
     * NOTE: Max spread for SAS center-spreading +2300 / -2300 PPM
     * Center-spreading SSC:
     *  SAS SSC Tx at +1064 / -1064 PPM Spread  = 0x3
     *  SAS SSC Tx at +2129 / -2129 PPM Spread  = 0x6
     */
    U8 ssc_sas_tx_spread_level : 3;
    /**
     * NOTE: Refer to the SSC section of the SAS 2.x Specification
     * for proper setting of this field. For standard SAS Initiator
     * SAS PHY operation it should be 0 for Down-spreading.
     * SAS SSC Tx spread type:
     *  Down-spreading SSC      = 0
     *  Center-spreading SSC    = 1
     */
    U8 ssc_sas_tx_type : 1;
    /*--------------------------------------------------------------------------*/


    U8 reserved;

  } controller;

  /**
   * Per SAS Port data.
   */
  struct
  {
    /**
     * This field specifies the phys to be contained inside a port.
     * The bit position in the mask specifies the index of the phy
     * to be contained in the port.  Multiple bits (i.e. phys)
     * can be contained in a single port:
     *     Bit 0 = This controller's PHY index 0    (0x01)
     *     Bit 1 = This controller's PHY index 1    (0x02)
     *     Bit 2 = This controller's PHY index 2    (0x04)
     *     Bit 3 = This controller's PHY index 3    (0x08)
     *
     * Refer to the mode_type field for rules regarding APC and MPC mode.
     * General rule: For APC mode phy_mask = 0
     */
    U8 phy_mask;

  } ports[SCI_MAX_PORTS]; // Up to 4 Ports per SCU controller unit

  /**
   * Per PHY Parameter data.
   */
  struct
```

```
{
   /**
    * This field indicates the SAS Address that will be transmitted on
    * this PHY index.  The field is defined as a union, however, the
    * OEM should use the U8 array definition when encoding it to ensure
    * correct byte ordering.
    *
    * NOTE: If using APC MODE, along with phy_mask being set to ZERO, the
    * SAS Addresses for all PHYs within a controller group SHALL be the
    * same.
    */
   union
   {
      /**
       * The array should be stored in little endian order.  For example,
       * if the desired SAS Address is 0x50010B90_0003538D, then it
       * should be stored in the following manner:
       *    array[0] = 0x90
       *    array[1] = 0x0B
       *    array[2] = 0x01
       *    array[3] = 0x50
       *    array[4] = 0x8D
       *    array[5] = 0x53
       *    array[6] = 0x03
       *    array[7] = 0x00
       */
      U8 array[8];
      /**
       * This is the typedef'd version of the SAS Address used in
       * the SCI Library.
       */
      SCI_SAS_ADDRESS_T  sci_format;

   } sas_address;

   /**
    * These are the per PHY equalization settings associated with the the
    * AFE XCVR Tx Amplitude and Equalization Control Register Set
    * (0 thru 3).
    *
    * Operational Note: The following Look-Up-Table registers are engaged
    * by the AFE block after the following:
    *  - Software programs the Link Layer AFE Look Up Table Control
    *    Registers (AFE_LUTCR).
    *  - Software sets AFE XCVR Tx Control Register Tx Equalization
    *    Enable bit.
    */
   /**
    * AFE_TX_AMP_CTRL0.  This register is associated with AFE_LUTCR
    * LUTSel=00b. It contains the Tx Equalization settings that will be
```

```
        * used if a SATA 1.5Gbs or SATA 3.0Gbs device is direct-attached.
        */
       U32 afe_tx_amp_control0;

       /**
        * AFE_TX_AMP_CTRL1.  This register is associated with AFE_LUTCR
        * LUTSel=01b. It contains the Tx Equalization settings that will
        * be used if a SATA 6.0Gbs device is direct-attached.
        */
       U32 afe_tx_amp_control1;

       /**
        * AFE_TX_AMP_CTRL2.  This register is associated with AFE_LUTCR
        * LUTSel=10b. It contains the Tx Equalization settings that will
        * be used if a SAS 1.5Gbs or SAS 3.0Gbs device is direct-attached.
        */
       U32 afe_tx_amp_control2;

       /**
        * AFE_TX_AMP_CTRL3.  This register is associated with AFE_LUTCR
        * LUTSel=11b. It contains the Tx Equalization settings that will
        * be used if a SAS 6.0Gbs device is direct-attached (which will only run
       * at SAS 3.0Gbs ) .
        */
       U32 afe_tx_amp_control3;

   } phys[SCI_MAX_PHYS];  // 4 PHYs per SCU controller unit

} SCI_BIOS_OEM_PARAM_ELEMENT_T;


/**
 *  @struct SCI_BIOS_OEM_PARAM_BLOCK
 *
 * @brief This structure defines the OEM Parameter block as it will be stored
 *  in the last 512 bytes of the PDR region in the SPI flash.  It must be
 *  unpacked or pack(1).
 */
typedef struct SCI_BIOS_OEM_PARAM_BLOCK
{
   /**
    * OEM Parameter Block header.
    */
   SCI_BIOS_OEM_PARAM_BLOCK_HDR_T  header;

   /**
    * Per controller element descriptor containing the controller's
    * parameter data. The prototype defines just one of these descriptors,
    * however, the actual runtime number is determined by the num_elements
    * field in the header.
```

```
   */
   SCI_BIOS_OEM_PARAM_ELEMENT_T controller_element[1];

} SCI_BIOS_OEM_PARAM_BLOCK_T;
```

8.2 BCFS Bit Settings

BCFS bit number	Bit meaning	Values		Additional info
0	Enable/disable Raid0	Raid type disabled Raid type enabled	0x0 0x1	If you disable all raid levels – all BCFS settings will be set back to default and OROM UI delay will be set to 2seconds
1	Enable/disable Raid1	Raid type disabled Raid type enabled	0x0 0x1	
2	Enable/disable Raid10	Raid type disabled Raid type enabled	0x0 0x1	
3	Enable/disable Raid5	Raid type disabled Raid type enabled	0x0 0x1	
4	RESERVED			
5	Enable/disable UI	Feature disabled Feature enabled	0x0 0x1	If you set it to 0 (disable) bits 10-14 are ignored
6	Enable/disable Allow unlock of HDD in OS	Feature disabled Feature enabled	0x0 0x1	Not used
7	Enable/disable Allow LED SGPIO	Feature disabled Feature enabled	0x0 0x1	Not used
8	Enable/disable Only RRT	Feature disabled	0x0	Not used

	volumes to span internal/external	Feature enabled	0x1	
9	Dnable/disable RSTe caching	Feature disabled Feature enabled	0x0 0x1	Not used
10 11 12	Delay on UI splash screen	2 seconds 4 seconds 6 seconds 8 seconds 10 seconds 15 seconds 30 seconds 60 seconds	0x000 0x001 0x010 0x011 0x100 0x101 0x110 0x111	Default setting is 0x000: 2 seconds.
13 14	Mode of showing UI	Show if error or >=2 disks Show only if error Never show UI Show always	0x00 0x01 0x10 0x11	Default setting 0x00: show if there are 2 or more disks connected or error occured
15	RESERVED			

8.3 Recommended Location in SPI Flash

Figure 2 shows the recommended location where the OEM parameter block should be placed in SPI flash. Intel reference images will be formatted this way, and the FITC tool supplied by Intel for constructing SPI flash images is configured to take a formatted OEM parameter block and place it appropriately in the Platform Data Region (PDR) as shown in the figure. The OEM Parameter Block should be placed in the last 512 bytes of the PDR region aligned on a 32-bit boundary. There will be more discussion on this in section *8.4 OEM Parameter and SPI Flash Tools*.

Note: The recommended SPI flash format is descriptor mode.

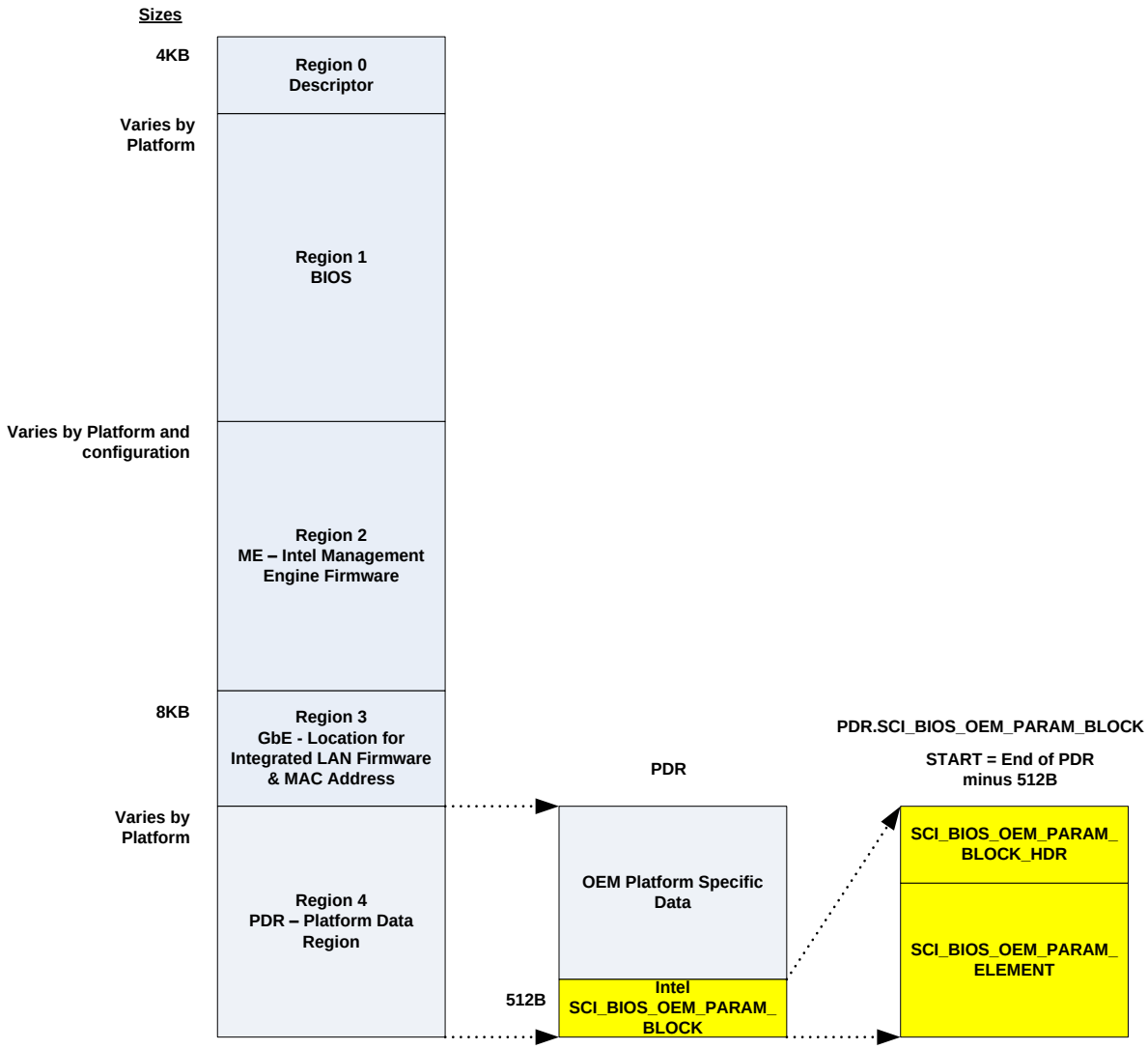


Figure 2 Recommended OEM Param Location in SPI Flash

As stated earlier, the above is the recommended layout for flash and OEM Parameter block placement. Third party BIOS vendors are not obligated to follow this recommendation. However, for the Romley platform if 3rd parties want Intel provided pre-OS drivers (legacy OROM and UEFI drivers) to boot their systems, they are required to provide a valid OEM Parameter block in flash somewhere. Further, they are required to implement the access services defined in section *8.5 Required BIOS Services* so that legacy OROM and/or a UEFI driver can retrieve these parameters and configure the SCU. These BIOS services abstract the Intel provided pre-OS drivers from having to know where the parameters actually reside in flash.

8.4 OEM Parameter and SPI Flash Tools

As part of the SCU development kit, tools are provided to help Original Equipment Manufacturers (OEMs), System Integrators, and Value Added Resellers (VARs) tune SCU PHY parameters to a platform's motherboard design and mass produce SPI flash images for that platform. The names of the tools are as follows:

- PHY Tune Tool (part of SCU development kit)
- Sas Address Tool (part of SCU development kit)
- FITC Tool (part of SPI Flash Programming kit)

These tools can be found at by contacting your Intel FAE. Detailed user guides are provided in the respective kits. However, the following subsections do provide a brief overview of each tool.

Except for the PHY SAS Addresses, the OEM parameters are tuned and fixed for a given platform by the OEM. SAS Addresses, however, are unique to individual SCU SKUs similar to the MAC Address for LAN chips. The system OEM must provide valid SAS addresses that are registered to them. Refer back to section *8.1.1 Structure of OEM Parameter Block* for a detailed description of the PHY parameters.

8.4.1 PHY Tune Tool

PHY Tune is a Windows .Net 4.0 application. It provides a GUI front-end to display SCU PHY information on the console. It provides a back-end protocol that communicates with a special debug version of the Windows SCU driver to set and retrieve SCU PHY settings in real time. The application/debug-driver pair runs on Windows Server 2008 R2.

Note:	This debug driver comes with the development kit, but is not a production General Availability driver. It is NOT available in any OS inbox distribution either.

In addition, PHY Tune retrieves and displays special diagnostic information from the SCU. From this information, OEMs can determine which settings provide the most optimal PHY performance for that platform. Each individual PHY can have its own unique settings that best fit its situation. As indicated in section *8.1.1 Structure of OEM Parameter Block*, the main areas available for OEM adjustment are Tx Equalization to compensate for chip-to-connector trace lengths and spread spectrum clocking parameters.

Once the OEM determines the appropriate parameter settings for the platform, they can use a PHY Tune menu option to capture these settings. PHY Tune also allows the OEM to set initial values for the other fields in the OEM parameter block including the header fields and the PHY SAS Addresses. PHY Tune provides another menu option to export these settings to a properly formatted binary file. This block can then be loaded into the Intel FITC tool recognizes where to place this block in constructing a SPI flash image. If the OEM uses its own tools other than FITC to construct the flash image, then it just operates on the "raw" binary file.

Note: If FITC is used for flash image construction, it will place the block in the PDR region as described in section 8.3 Recommended Location in SPI Flash.
OEM fields initialized by PHY Tune that need to change per SKU (e.g. SAS Addresses) can be modified later by other manufacturing tools.

8.4.2 SAS Address Tool (sasaddresses.efi)

The developer kit includes a UEFI application providing a command line interface that can be used by a manufacturing script to update per SKU SAS addresses. The name of the application is ***sasaddresses.efi*** . Based on input parameters, the application will either work directly on an OEM block already in the PDR of SPI flash or it will operate on a properly formatted binary input file. In the case of the binary input file, it will modify the SAS Addresses in the binary image according to the SAS addresses on the command line and then overwrite the OEM section of PDR with the binary image.

8.4.3 FITC Tool

The FITC tool is part of the SPI Flash Programming kit. It is used to construct flash images and modify data at manufacturing using XML schema. The Intel FITC tool constructs a SPI flash image in descriptor mode containing the follow regions:

- Descriptor Region indicating how the flash is partitioned and where other regions begin and end.
- BIOS Region
- Intel Manufacturing Engine Region
- Gigabit Ethernet Region
- Platform Data Region

When using the FITC tool to construct a SPI flash image, FITC will place the OEM parameter block in the last 512 bytes of the Platform Data Region as described in section 8.3 Recommended Location in SPI Flash.

8.5 Required BIOS Services to Support INT 15 API

8.6 Required BIOS Service to Support OEM Parameters

System BIOS shall provide services to extract the OEM parameter block from SPI Flash and to identify the boot controller. As mentioned earlier, the recommended location for the OEM parameter block is in the last 512 bytes of the PDR region as described in section 8.3 Recommended Location in SPI Flash. The following subsections describe the necessary services according to the type of pre-boot driver environment whether legacy Option ROM or native UEFI.

8.6.1 Legacy OROM

Under legacy BIOS / OROM mode, the BIOS must provide the following software interrupt services.

8.6.1.1 Get RSTe OROM SCU OEM Parameter Block: INT 15, Function=F300h, Sub-Function=0001h

INT 15 / AX=F300h / BX=0001h (Get RSTe OROM SCU OEM Parameter Block)
Description:
Through this function, BIOS provides to the RSTe legacy OROM driver the OEM Parameter Block needed to initialize the SCU controller.
Inputs:
AX = F300h (Function)
BX = 0001h (Sub Function)
EAX = 0000F300h
EBX = 4F450001h ('OE') + Sub Function
EDX = 20534355h (' SCU')
ECX = size of data buffer in bytes
(512 Bytes = OEM header + Descriptor Elements)
EDI = 0000xxxxh (Upper 16bits are zero, lower 16bits defined below)
ES:DI = address of data buffer (Real mode address)

Normal Outputs:
CF = clear if successful
EAX = 20534355h (' SCU')
ES:DI = data buffer filled
ECX = actual transfer size in bytes (512 Bytes)

Data Format:

= char oem_params[512];
(512 Bytes of data as encoded by OEM or system integrator)

Error Outputs:

CF = set on error
AH = error code
= 86h Function Not Supported
= 87h OEM Block Not Present

8.6.2 UEFI

Under native UEFI mode, the BIOS must provide the following protocol.

```
//
// Define SCU Parameters protocol GUID
//
// EDK and EDKII have different GUID formats
//
#if !defined(EDK_RELEASE_VERSION) || (EDK_RELEASE_VERSION < 0x00020000)
#define EFI_PCH_SCU_PARAMETERS_PROTOCOL_GUID \
 { \
   0xe165e866, 0x6643 , 0x40b3, 0xb4, 0x35, 0x52, 0x6b, 0x47, 0x3f, 0x75, 0xc2 \
 }

#else
#define EFI_PCH_SCU_PARAMETERS_PROTOCOL_GUID \
 { \
   0xe165e866, 0x6643 , 0x40b3, \
   {0xb4, 0x35, 0x52, 0x6b, 0x47, 0x3f, 0x75, 0xc2} \
 }
#endif

#define SCU_PARMS_SIZE 512
//
// Protocol definition
//
struct _PCH_SCU_PARAMETERS_PROTOCOL {
  U8 SCUParameters[SCU_PARMS_SIZE];
};
```

8.7 Required BIOS Service to Support OEM Parameters

System BIOS shall provide services to identify the boot controller and provide that information to the RSTe RAID Legacy OROM images.

8.7.1 INT 15 / AX=F300h / BX=0002h (Get RSTe OROM Boot Info)

Description:
Through this function, BIOS provides user-settable RSTe boot information to the RSTe legacy OROM driver. These values are visible to the user through the BIOS Setup menus. The menu options should be linked to legacy OROM selections in the PCH-IO section.

Inputs:
AX = F300h (Function)
BX = 0002h (Sub Function)
EAX = 0000F300h
EBX = 4F450002h ('OE') + Sub Function
EDX = 424F4F54h ('BOOT')

Normal Outputs:
CF = clear if successful
EAX = 424F4F54h ('BOOT')
BL = legacy_orom_boot_controller_selection:
Due to limited shadow RAM and EBDA space, and the fact that a platform may require multiple OROMs be loaded for other functions, there might not be enough runtime space for both the RSTe SATA RAID controller OROM and the RSTe SCU RAID controller OROM to provide int13h support simultaneously. Even so, each RSTe OROM still needs to initialize so that it can configure each controller based on platform dependencies and store data needed by the OS drivers in the Shadow RAM area even if it does not provide full int13h runtime support. Thus, through this setup option BIOS can avoid the runtime space conflict by allowing the user to select the boot controller according to the following values:

0000h = No runtime space restrictions. BIOS indicates that both RSTe SATA and SCU runtime code should provide full int13h support for RSTe devices.

(NOTE: The BIOS should allow this option if it knows that there is room in shadow RAM for both OROMs' runtime code. If the BIOS can always guarantee this condition, then it does NOT need to make

Legacy OROM boot controller selection visible to the user in BIOS setup.)

0001h = The SCU controller is selected as boot controller. BIOS will load RSTe SATA OROM first, but the SATA OROM will only initialize and then leave pertinent RAID configuration information for the SATA OS RAID Driver in runtime space. The RSTe SCU OROM will initialize, relocate to runtime space, and provide full int13h support for SCU attached devices.

0002h = The SATA controller is selected as boot controller. BIOS will load RSTe SCU OROM first, but the SCU OROM will only initialize and then leave pertinent RAID configuration and SCU OEM parameter information for the SCU OS RAID Driver in runtime space. The RSTe SATA OROM will initialize, relocate to runtime space, and provide full int13h support for SATA controller attached devices.

0003h = Neither SATA nor SCU controller is selected as boot controller. Boot support is being provided by another device. BIOS will load both RSTe OROMs, but each will only initialize and leave pertinent RAID configuration and SCU OEM parameter information for the RSTe OS RAID Drivers in runtime space. There will NOT be int13h support for RSTe devices.

BH = scu_legacy_orom_max_disk_slots_enum:
For boot_controller_selection = {0000h or 0001h}, this option allows the user to set the maximum number of disk slots the SCU legacy OROM will enumerate. Its range will be between 1 and 8. The default value shall be 8.

For boot_controller_selection = {0002h or 0003h}, this field should not be settable by the user, and OROM will automatically assume a value of 0.

Error Outputs:

CF = set on error

AH = error code

= 86h Function Not Supported = (boot_controller_selection = 0000h assumed)

9 Hardware Compatibly

9.1 External Hardware Compatibility

The embedded file indicates the current list of external hardware used in validation and is subject to change without notice. Please contact your factory representative for questions on any specific hardware item.

Enterprise SAS Drives

Vendor	Family	Model Name/Number
Fujitsu	AL9Se Series (2.5")	MAY2036RC
Fujitsu	AL9LX Series (3.5")	MAX3036RC,
Fujitsu	AL10Se Series (2.5")	MBB2 Series
Seagate	SAS	Barracuda ES.2 7.2k rpm
Seagate	SAS	Cheetah 15k.6 ((3.5")
Seagate	SAS	Cheetah 15K.4 (3.5")
Seagate	SAS	Cheetah 15K.5 (3.5")
Seagate	SAS	Cheetah 15K.7
Seagate	SAS	Savvio 10K.1 (2.5")
Seagate	SAS	Savvio 10K.2 (2.5")
Seagate	SAS	Savvio 15K.1 (2.5")
Seagate	SAS	Cheetah NS
Hitachi	Ultrastar 15K147 3.5" (Viper A')	HUC101473CSS300,
Hitachi	Ultrastar 15K147 3.5" (Viper B)	HUS153014VLS300,HUS153073VLS300
Hitachi	Ultrastar C10K147 2.5" (Cobra B)	HUC101473CSS300,

Enterprise SATA Drives

Vendor	Family	Model Name/Number
Fujistu	A160 (2.5") 7200 RPM FDE Option Extended Duty	MHZ2080BK

Hitachi	Ultrastar A7k1000 (3.5") 7.2rpm	
Seagate	Barracuda 7200.10 Serial ATA	
Seagate	Barracuda 7200.11 Serial ATA	
Seagate	Barracuda ES	
Western Digital		WD1002FAEX
Western Digital		WD6000HLHX

Expanders and Enclosures

Vendor	Model Number
LSI	LSISAS2x36
LSI	LSISAS2x28
LSI	LSISAS2x24
PMC Sierra	PM8005 SXP
PMC Sierra	PM8004 SXP
LSI/Engenio	LCA Dx ESM JBOD (2u enclosure)
Adaptec	ASE-335 (Miramar)
Adaptec	SANbloc S50 (Enzo)
Adaptec	EVO
AIC	XJ1100
AIC	XJ1100
AIC	EM16-53C-01A2
AIC	EM24-54C-01A1
Dell	PowerVault MD1000
Dell	PowerVault MD1200
Dell	PowerVault MD1220

Dell	PowerVault MD3200
Dell	PowerVault MD3220
IBM	DS3500
Xyratex	RS1603X
Supermicro	CSE-M28E1
Supermicro	CSE-M28E2
Supermicro	SC836E1-R800V
ICY Dock	MB453SPF
ICY Dock	MB454SPF-B
ICY Dock	MB455SPF-B
HP	BK765A
HP	BK766A
HP	BK782A
HP	AW522A
HP	AJ940A
HP	BK766A
HP	StorageWorks D2600
HP	StorageWorks D2700
HP	AJ940-63002
ROHS	ARC8026 VER B
ROHS	ARC8026 VER B
ROHS	ARC8026 VER B
Xtore	XJ SAS26-224R
Xtore	XJ SAS24-316R (3G)
Xtore	XJSA12-316R
Xtore	XJSA12-316R
Startdom	ST8
ICY Dock	
USI	DES2122-P

Promise	Vtrack J310sVtrak E-Class E310
Promise	Vtrack J310sVtrak J-Class (J630S)
Promise	Vtrack J310s
Promise	Vtrack J630
Promise	Vtrack J630
EPSD	Scotch Valley
EPSD	Coyote Valley
LSI	LSI630J
LSI	LSI620J

9.2 Reference Documentation

Please refer to the following documentation for additional information:

CDI / IBL #	Title/Location
Reference Documents	
441979	**Intel® 6 Series Chipset/ Intel® C200 Series Chipset/ Patsburg Platform Controller Hub (PCH) BIOS Specification Update – NDA**
475122	**Intel Patsburg PhyTune Tool – RC Ver 2.0.0.3** **Note: This package contains the PhyTune tool along with the SASAddress efi utility. Please refer to the documentation included in the package for additional information.**
453321	**Intel® Server Platform Services Manageability Engine Firmware for Patsburg Chipset Product Line Firmware Startup Guide**
454672	**Patsburg Chipset SPI Programming Guide**
450911	**Patsburg Chipset External Design Specification (EDS)**
445721	**Patsburg Chipset External Design Specification (EDS) Specification Update - NDA**
458143	**Sandy Bridge-E Processor External Design Specification (EDS) - Volume One of Two**
458224	**Intel® RSTe 3.0 Technical Product Spec**
459924,	**Sandy Bridge-E Processor External Design Specification - Volume Two of Two**
30051	**RS – Intel® 6 Series Chipset/ Intel® C200 Series Chipset/ Patsburg Platform Controller Hub (PCH) BIOS Spec** ***Contact you Intel FAE to get access to this document through Anacapa***
Kit 33272	**Intel® Server Platform Services Alpha SPS_02.01.01.009.0** **Note: This package is the Intel® Server Platform Services Manageability Engine Firmware for Patsburg Product Line - Alpha Full Release and contains key tools such as FITc and fpt for the Intel® C600 series chipset** **This document can be downloaded from ARMS/VIP**

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