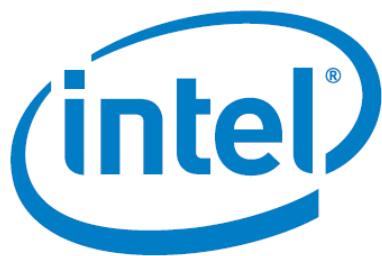


# **Intel® Rapid Storage Technology enterprise (RSTe) 4.5.6.1007 Hot Fix Customer Release Notes**

---

September, 2016

Revision 1.49



<b>1 Overview .....</b>	<b>7</b>
<b>2 Microsoft* OS Support .....</b>	<b>7</b>
<b>3 Support on Internet .....</b>	<b>7</b>
<b>4 Package Components and Versions .....</b>	<b>8</b>
4.1 Supported Configurations.....	10
<b>5 Supported Platforms .....</b>	<b>10</b>
5.1 Intel® RSTe 4.5.6.1007 Hot Fix PV Release Documentation	10
5.2 Support.....	11
<b>6 General Notes: RSTe 4.5.6.1007 Hot Fix PV Release Package .....</b>	<b>12</b>
6.1 Features Introduced in this release .....	12
This Hot Fix driver supports for and resolve S4 power issues found when using Windows* 10 RS1. ....	
6.2 Features Introduced in the 4.5.0.1333 Release.....	12
6.3 Features Introduced in the 4.3.0.1223 Release.....	12
6.4 Features Introduced in the 4.2.0.1143 Release.....	13
6.5 Features Introduced in the 4.1.0.1047 Release.....	14
6.6 Features Introduced in the 4.0.0.1045 Release.....	14
6.7 Features Introduced in the 3.8.0.1113 Release.....	15
6.8 Features Introduced in the 3.7.0.1093 Release.....	16
6.9 Features/Configuration Restrictions.....	18
6.10 Intel® C600 series chipset Firmware Limitations.....	18
6.11 Additional Chipset Configuration Information .....	19
<b>7 Specific Known Issues .....</b>	<b>20</b>
7.1 Errata.....	20

7.2	Known Issues Being Worked.....	28
7.3	Issues Resolved in the Hot Fix Release of 4.5.6.1007 .....	33
7.4	Issues Resolved in the Release of 4.5.0.1333.....	34
7.5	Issues Resolved in the Release of 4.3.0.1223.....	36
7.6	Issues Resolved in the Release of 4.2.0.1143.....	48
7.7	Issues Resolved in the Release of 4.1.0.1047.....	52
7.8	Issues Resolved in the Release of 4.0.0.1040.....	60
7.9	Issues Resolved in the Maintenance Release 3.8.0.1111 .....	63
7.10	Issues Resolved in the Maintenance Release 3.7.0.1093 .....	66
<b>8</b>	<b><i>Intel® OEM Parameters and INT15 API .....</i></b>	<b><i>72</i></b>
8.1	Intel® C600 series chipset OEM Parameters .....	72
8.2	BCFS Bit Settings .....	80
8.3	Recommended Location in SPI Flash.....	81
8.4	OEM Parameter and SPI Flash Tools .....	83
8.5	Required BIOS Services to Support INT 15 API .....	85
8.6	Required BIOS Service to Support OEM Parameters .....	85
8.7	Required BIOS Service to Support OEM Parameters .....	87
<b>9</b>	<b><i>Hardware Compatibly .....</i></b>	<b><i>90</i></b>
9.1	External Hardware Compatibility.....	90
9.2	Reference Documentation .....	94
<b>10</b>	<b><i>Copyright Notice .....</i></b>	<b><i>95</i></b>

## ***Legal Disclaimer***

This document is a compilation of software and software documentation defects, and software specification clarifications, updates, and changes. It is intended for hardware system manufacturers and software developers of applications, operating systems, or tools.

Except as expressly provided in Intel's standard terms and conditions of sale for the Intel software product or in the Intel software license agreement accompanying the Intel software product, the Intel software product is provided "as is," without warranty of any kind, whether express, implied or statutory, including but not limited to a warranty of merchantability, non-infringement of intellectual property, or fitness for any particular purpose.

This document is provided "as is" without any express, implied, or statutory warranty of any kind including but not limited to warranties of merchantability, non-infringement of intellectual property, or fitness for any particular purpose. Intel does not warrant or assume responsibility for the accuracy, completeness or utility of any information contained herein. Intel may make changes to these materials, or to the Intel products described therein, at any time without notice. Intel makes no commitment to update these materials.

Independent companies manufacture the third-party products that are mentioned in this document. Intel is not responsible for the quality or performance of third-party products and makes no representation or warranty regarding such products. The third-party supplier remains solely responsible for the design, manufacture, sale and functionality of its products.

Intel and the Intel logo are trademarks or registered trademarks of Intel Corporation or its subsidiaries in the United States and other countries.

\*Other names and brands may be claimed as the property of others.

*Copyright © 2016, Intel Corporation. All rights reserved.*

## 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 Gbps 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
February, 2016	1.44	RSTe 4.5 PV Release 4.5.0.1333
May, 2016	1.49	RSTe 4.5 Hot Fix PV Release 4.5.6.1007

# 1 Overview

Intel® RSTe 4.5.6.1007 Production Validation (PV) Hot Fix 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

The release of this 4.5.6.1007 Hot Fix PV package addresses an issue when running S4 power management on a platform with Windows\* 10 RS1.

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

## 2 Microsoft\* OS Support

The release of this 4.5.6.1007 Hot Fix PV package will only support the following Microsoft\* OSs:

- Windows\* 7 - 64bit
- Windows\* 10 RS1 – 64 bit

## 3 Support on Internet

Support for Intel® RSTe 4.5.5.1026 Hot Fix PV release package 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.

---

\* Other brands and names may be claimed as the property of others.

## 4 Package Components and Versions

Intel® RSTe 4.5.6.1007 Hot Fix PV release package 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 4.5.6.1007 Release Notes
  - RSTe Technical Product Specification 1.12
  - Readme.txt files and other pertinent documentation
  - RSTe\_4.5.6.1007\_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-4.5\_PV\_Pre-OS\_readme.txt
  - PreOS-1012.zip
    - Intel® RSTe 4.5.0.1012 SATA Legacy RAID Option ROM image
    - Intel® RSTe 4.5.0.1012 SATA DOS\* based RAID Configuration utility
    - Intel® RSTe 4.5.0.1012 SATA DOS\* based RAID Comply utility
    - Intel® RSTe 4.5.0.1012 sSATA Legacy RAID Option ROM image
    - Intel® RSTe 4.5.0.1012 sSATA DOS\* based RAID Configuration utility
    - Intel® RSTe 4.5.0.1012 sSATA DOS\* based RAID Comply utility
    - Intel® RSTe 4.5.0.1012 SCU Legacy RAID Option ROM image
    - Intel® RSTe 4.5.0.1012 SCU DOS\* based RAID Configuration utility
    - Intel® RSTe 4.5.0.1012 SCU DOS\* based RAID Comply utility
    - Intel® RSTe 4.5.0.1012 UEFI SATA RAID driver
    - Intel® RSTe 4.5.0.1012 UEFI based SATA RAID Comply utility (Secure Boot must be disabled to use this tool)
    - Intel® RSTe 4.5.0.1012 UEFI based SATA RAID Command Line Interface (CLI) utility (Secure Boot must be disabled to use this tool)
    - Intel® RSTe 4.5.0.1012 UEFI based SATA SGPIO/LED Test Command Line Interface (CLI) utility (Secure Boot must be disabled to use this tool)



- Intel® RSTe 4.5.0.1012 UEFI sSATA RAID driver
- Intel® RSTe 4.5.0.1012 UEFI based sSATA RAID Comply utility (Secure Boot must be disabled to use this tool)
- Intel® RSTe 4.5.0.1012 UEFI based sSATA RAID Command Line Interface (CLI) utility (Secure Boot must be disabled to use this tool)
- Intel® RSTe 4.5.0.1012 UEFI based sSATA SGPIO/LED Test Command Line Interface (CLI) utility (Secure Boot must be disabled to use this tool)
- Intel® RSTe 4.5.0.1012 UEFI SCU RAID driver
- Intel® RSTe 4.5.0.1012 UEFI based SCU RAID Comply utility (Secure Boot must be disabled to use this tool)
- Intel® RSTe 4.5.0.1012 UEFI based SCU CLI utility (Secure Boot must be disabled to use this tool)
- RSTe f6 Drivers (drivers and utilities)
  - RSTe\_4.5.6.1007\_F6-Drivers.zip
  - Intel® RSTe 4.5.6.1007 F6 Win7 OS SCU Installation Drivers
    - iaStorS.free.win7.32bit 4.5.6.1004
    - iaStorS.free.win7.64bit 4.5.6.1004
  - Intel® RSTe 4.5.6.1007 F6 Win7 OS AHCI Installation Drivers
    - iaStorA.free.win7.32bit 4.5.6.1004
    - iaStorA.free.win7.64bit 4.5.6.1004
  - Intel® RSTe 4.5.6.1007 F6 **Windows\* 8.1/Server 2012 R2/Windows\* 10** OS SCU Installation Drivers
    - iaStorS.free.win8.32bit 4.5.6.1004
    - iaStorS.free.win8.64bit 4.5.6.1004
  - Intel® RSTe 4.5.6.1007 F6 **Windows\* 8.1/Server 2012 R2/Windows\* 10** OS AHCI Installation Drivers
    - iaStorA.free.win8.32bit 4.5.6.1004
    - iaStorA.free.win8.64bit 4.5.6.1004
- RSTe CLI Staging
  - RSTe CLI Specifications-1.2.pdf
  - RSTe\_4.5.6.1007\_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 4.5.6.1007 Hot Fix 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 4.5.6.1007 Hot Fix PV Release Documentation**

It is strongly recommended that all documentation provided with this release package be reviewed prior to installing the Intel® RSTe 4.5.6.1007 Windows\* driver package.

---

\* Other brands and names may be claimed as the property of others.

## **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.

## **6 General Notes: RSTe 4.5.6.1007 Hot Fix PV Release Package**

### **6.1 Features Introduced in this release**

This Hot Fix driver supports for and resolve S4 power issues found when using Windows\* 10 RS1.

### **6.2 Features Introduced in the 4.5.0.1333 Release**

The release of RSTe 4.5.0.1333 kit introduces support for suppressing UEFI warning messages. Prior to this release the Intel® RSTe PreOS UEFI driver would print out a message when a RAID volume that either “Degraded” or “Failed” was encountered. With this release, the RSTe UEFI driver now follows the UEFI Specification:

Section pertaining to Driver-Specific Elements

...

2. If a driver requires configuration information, the driver must use the EFI\_HII\_DATABASE\_PROTOCOL. A driver should not otherwise display information to the user or request information from the user.

...

17. If a driver follows the driver model of this specification, and the driver wants to produce warning or error messages for the user, then the EFI\_DRIVER\_HEALTH\_PROTOCOL must be used to produce those messages. The Boot Manager may optionally display the messages to the user.

For a platform BIOS that includes this RSTe UEFI driver, it will need to support these protocols as well. This will allow warning messages generated by the RSTe UEFI driver to be displayed on the screen.

### **6.3 Features Introduced in the 4.3.0.1223 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.

#### **6.3.1 Support for Windows\* 10**

As of the RSTe 4.3.0.1223 production package release, Windows\* 10 is supported. To install Windows\* 10 from scratch, it is recommended that drivers included in the 4.3.0.1223 package be used. To properly upgrade from the current OS to Windows\* 10, it is 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 the 4.3.0.1223 package.

**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 that package will not in stall on Windows\* 8 or Windows\* Server 2012.

### **6.3.2 RSTe Pre-OS RAID Volume Rebuild Drive Identification**

As of 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.

### **6.3.3 RSTe PCH 8 Port Support**

As of 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.

## **6.4 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.

## **6.5 Features Introduced in the 4.1.0.1047 Release**

### **6.5.1 SCSI Pass-Thru Support**

The release of RSTe 4.1 introduces the support for Extended SCSI Pass-through 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/sATA - 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.

## **6.6 Features Introduced in the 4.0.0.1045 Release**

### **6.6.1 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).

### **6.6.2 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.

### **6.6.3 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 use 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.

## **6.7 Features Introduced in the 3.8.0.1113 Release**

### **6.7.1 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 on 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)

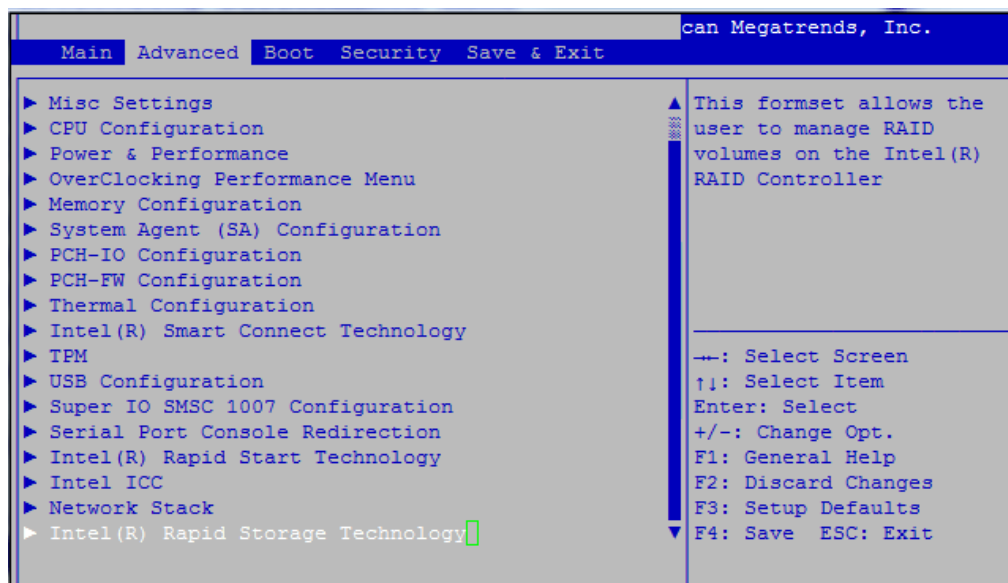
Z – disk number on PHY (in case of an expander)

## 6.8 Features Introduced in the 3.7.0.1093 Release

### 6.8.1 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

### **6.8.2 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.

### **6.8.3 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.

### **6.8.4 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.

### **6.8.5 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.

### **6.8.6 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.

## 6.9 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 Gbps
- 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.

## 6.10 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

## **6.11 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 4.5.6.1007 Hot Fix PV release package.

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*

<b>Problem Description</b>	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.
<b>Resolution/Status</b>	No plan to resolve this issue in the RSTe 3.x product baseline.

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

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

<b>Title#</b>	<b>RSTe 3.0 GUI May Show the Port of a Hot-plugged Drive as Unknown</b>
<b>Reference</b>	3236248

<b>Product</b>	Intel® RSTe 3.0
<b>Version</b>	3.0.0.3002
<b>Operating System</b>	Win7
<b>Problem Description</b>	When hot-plugging drives, the RSTe 3.0 GUI information bubble may randomly show the port of the hot plugged device as unknown.
<b>Resolution</b>	No plan to resolve this issue in the RSTe 3.x product baseline.

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

<b>Title#</b>	<b>Flashing Cursor May Be Seen When Booting With the RSTe SCU Legacy OROM</b>
<b>Reference</b>	4159273
<b>Product</b>	Intel® RSTe 3.0
<b>Version</b>	3.1.0.1068
<b>Operating System</b>	Windows*
<b>Problem Description</b>	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.
<b>Resolution</b>	No plan to resolve this issue in the RSTe 3.x product baseline.

<b>Title#</b>	<b>RSTe 3.8 May Not Properly Support Upgrading from Win7 to Win8 on the AHCI Controller</b>
<b>Reference</b>	4936753
<b>Product</b>	Intel® RSTe 3.0
<b>Version</b>	3.7.0.1093
<b>Operating System</b>	Windows*
<b>Problem Description</b>	<p>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.</p> <p>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.</p> <p>Do to this limitation DO NOT migrate an OS if the boot volume is larger than 2TB.</p>
<b>Resolution</b>	No plan to resolve this issue.

<b>Title#</b>	<b>System May Become Unresponsive Under Certain Stress Testing</b>
<b>Reference</b>	CCG0100297804
<b>Product</b>	Intel® RSTe 3.0
<b>Version</b>	3.1.0.1068
<b>Operating System</b>	Windows*
<b>Problem Description</b>	<p>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.</p>

	<p>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.</p> <p>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 where 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.</p> <p>Workaround: Go into the registry and change the value of PerformanceOptimizationsEnable from 0 to 1. Exit the registry edit tool and reboot the system.</p>
<b>Resolution</b>	No plan to resolve this.

<b>Title#</b>	<b>Rapid Hot-Plugging of an Expander Can Result in the RSTe UI Becoming Unresponsive</b>
<b>Reference</b>	CCG0100467978/4160879
<b>Product</b>	Intel® RSTe 3.0
<b>Version</b>	3.2.0.1135
<b>Operating System</b>	Windows*
<b>Problem Description</b>	<p>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.</p> <p>Work around: Closing and reopening the RSTe UI usually resolved the issue.</p>



<b>Resolution</b>	No plan to resolve this issue.
-------------------	--------------------------------

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

<b>Title#</b>	<b>RSTe Installer Does Not Look For RAID Metadata</b>
<b>Reference</b>	CCG0100616963
<b>Product</b>	Intel® RSTe 3.0
<b>Version</b>	3.2.0.1135
<b>Operating System</b>	Windows*
<b>Problem Description</b>	<p>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.</p> <p>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.</p> <p><b>Workaround:</b> 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.</p>
<b>Resolution</b>	No plan to resolve this issue.

<b>Title#</b>	<b>The RSTe GUI May Report an Error When Attempting to Delete a RAID Volume</b>
<b>Reference</b>	43457
<b>Product</b>	Intel® RSTe 3.0
<b>Version</b>	3.7.0.1093
<b>Operating System</b>	Windows* 7 – 32bit
<b>Problem Description</b>	When running in a RAID5 configuration, if the BIOS has RAID 5 support disabled, the RSTe GUI may not properly start.
<b>Resolution</b>	No plan to resolve this issue.

<b>Title#</b>	<b>The RSTe GUI May Not Properly Show the Strip Size Help Bubble</b>
<b>Reference</b>	43464
<b>Product</b>	Intel® RSTe 3.0
<b>Version</b>	3.7.0.1093
<b>Operating System</b>	Windows*
<b>Problem Description</b>	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.
<b>Resolution</b>	No plan to resolve this issue.

<b>Title#</b>	<b>The RSTe GUI System Report May Not Report Out ATAPI Information</b>
<b>Reference</b>	43574
<b>Product</b>	Intel® RSTe 3.0
<b>Version</b>	3.7.0.1093
<b>Operating System</b>	Windows*
<b>Problem Description</b>	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.

<b>Resolution</b>	No plans to resolve this issue.
-------------------	---------------------------------

<b>Title#</b>	<b>The Device Manufacturer and Model Numbers May Not Be Properly Reported in the RSTe System Report</b>
<b>Reference</b>	43582
<b>Product</b>	Intel® RSTe 3.0
<b>Version</b>	4.0.0.1013
<b>Operating System</b>	Windows*
<b>Problem Description</b>	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.
<b>Resolution</b>	No plans to resolve this issue.

<b>Title#</b>	<b>RSTe GUI May Encounter an Error Message When Attempting to Increase a RAID Volume Size</b>
<b>Reference</b>	43595
<b>Product</b>	Intel® RSTe 3.0
<b>Version</b>	3.7.0.1087
<b>Operating System</b>	Windows*
<b>Problem Description</b>	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.
<b>Resolution</b>	No plan to resolve this issue.

<b>Title#</b>	<b>RSTe GUI May Stop Working After A RAID Volume Completes Initializing</b>
<b>Reference</b>	43599
<b>Product</b>	Intel® RSTe 3.0
<b>Version</b>	3.7.0.1087

<b>Operating System</b>	Windows*
<b>Problem Description</b>	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.
<b>Resolution</b>	No plan to resolve this issue.

<b>Title#</b>	<b>UEFI RAID Configuration Tools (rcfgxxxx.efi) May Not Properly Show the RAID Volume size</b>
<b>Reference</b>	43829
<b>Product</b>	Intel® RSTe 3.0
<b>Version</b>	4.1.0.1019
<b>Operating System</b>	Windows*
<b>Problem Description</b>	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.
<b>Resolution</b>	No plan to resolve this issue.

## 7.2 Known Issues Being Worked

The following issues are being actively worked.

<b>Title#</b>	<b>Attempting to Reset a Failed Disk Back to Normal May Result in a System Failure</b>
<b>Reference</b>	43523
<b>Product</b>	Intel® RSTe 3.0
<b>Version</b>	3.7.0.1093
<b>Operating System</b>	Windows*
<b>Problem Description</b>	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.

<b>Resolution</b>	Issue to be resolved in a future release.
-------------------	---

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

<b>Title#</b>	<b>System May Not Boot From a Locked Password Protected Drive</b>
<b>Reference</b>	43578
<b>Product</b>	Intel® RSTe 3.0
<b>Version</b>	4.0.0.1013
<b>Operating System</b>	Windows*
<b>Problem Description</b>	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.
<b>Resolution</b>	Issue to be resolved in a future release.

<b>Title#</b>	<b>Performing a UEFI Installation in Legacy OROM Mode May Fail</b>
<b>Reference</b>	43583
<b>Product</b>	Intel® RSTe 3.0
<b>Version</b>	4.0.0.1013
<b>Operating System</b>	Windows*

<b>Problem Description</b>	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.
<b>Resolution</b>	Issue to be resolved in a future release.

<b>Title#</b>	<b>RSTe GUI May Display Invalid RAID Volumes After Multiple S3 and S4 Cycles.</b>
<b>Reference</b>	43603
<b>Product</b>	Intel® RSTe 3.0
<b>Version</b>	3.7.0.1087
<b>Operating System</b>	Windows*
<b>Problem Description</b>	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.
<b>Resolution</b>	Issue to be resolved in a future release.

<b>Title#</b>	<b>Migrating a System Disk to a RAID Volume May Encounter a System Failure</b>
<b>Reference</b>	43632
<b>Product</b>	Intel® RSTe 3.0
<b>Version</b>	4.1.0.1046
<b>Operating System</b>	Windows*
<b>Problem Description</b>	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.
<b>Resolution</b>	Issue to be resolved in a future release.

<b>Title#</b>	<b>UEFI Driver May Not Report Failed/Degraded Volume Status When Booting</b>
---------------	--

<b>Reference</b>	43823
<b>Product</b>	Intel® RSTe 3.0
<b>Version</b>	4.1.0.1019
<b>Operating System</b>	Windows*
<b>Problem Description</b>	When booting in UEFI mode, if a RAID volume is degraded/failed, the status indicting a problem may not be displayed.
<b>Resolution</b>	Issue to be resolved in a future release.

<b>Title#</b>	<b>RSTe May Loop the Rebuilding Process If a four drive RAID 5 is Being Rebuilt with the Hot Spare.</b>
<b>Reference</b>	51996
<b>Product</b>	RSTe 4.0
<b>Version</b>	RSTe 4.2.0.1143
<b>Operating System</b>	Windows*
<b>Problem Description</b>	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.
<b>Resolution</b>	Issue to be resolved in a future release.

<b>Title#</b>	<b>The RSTe Installer May Not Properly Remove All of the Files When Uninstalling the Driver</b>
<b>Reference</b>	52000
<b>Product</b>	RSTe 4.0
<b>Version</b>	RSTe 4.2.0.1143
<b>Operating System</b>	Windows*
<b>Problem Description</b>	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.
<b>Resolution</b>	Issue to be resolved in a future release.

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

<b>Title#</b>	<b>Attempting to Delete RAID Volume During a Stress Test May Result in an “Unknown error” Message Being Displayed</b>
<b>Reference</b>	56593
<b>Product</b>	RSTe 4.0
<b>Version</b>	RSTe 4.2.0.1143
<b>Operating System</b>	Windows*
<b>Problem Description</b>	When attempting to delete a RAID volume during a stress test, the RSTe GUI may encounter an “Unknown errors” message being displayed.
<b>Resolution</b>	Issue to be resolved in a future release.

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

<b>Title#</b>	<b>The RSTe GUI Help Link in Email Preferences May Not Work Properly</b>
<b>Reference</b>	59970
<b>Product</b>	RSTe 4.0



<b>Version</b>	RSTe 4.2.0.1143
<b>Operating System</b>	Windows*
<b>Problem Description</b>	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.
<b>Resolution</b>	Issue to be resolved in a future release.

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

### ***7.3 Issues Resolved in the Hot Fix Release of 4.5.6.1007***

The following issue has been resolved in the Intel® RSTe 4.5.6.1007 Hot Fix PV release package.

<b>Title#</b>	<b>RSTe May Encounter a System Failure When Performing S4 Power Management on Windows* 10 RS1</b>
<b>Reference</b>	94136
<b>Product</b>	Intel® RSTe 4.0
<b>Version</b>	4.5.0.1333
<b>Operating System</b>	Windows* 10 RS1
<b>Problem Description</b>	When attempting to perform S4 power management activates on a platform running Windows* 10 RS1 my result in a system crash.
<b>Resolution</b>	Issue resolved in the 4.5.6.1007 release.

## 7.4 Issues Resolved in the Release of 4.5.0.1333

The following issues have been resolved in the Intel® RSTe 4.5.0.1333 PV release package.

<b>Title#</b>	<b>Migrating a System Disk to a RAID Volume May Encounter a System Failure</b>
<b>Reference</b>	64721
<b>Product</b>	Intel® RSTe 4.0
<b>Version</b>	4.1.0.1046
<b>Operating System</b>	Windows*
<b>Problem Description</b>	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.
<b>Resolution</b>	Issue resolved in the 4.5.0.1333 release.

<b>Title#</b>	<b>Windows Event 129 may Occur When Collecting Smart Events</b>
<b>Reference</b>	4938425 / 72424
<b>Product</b>	Intel® RSTe 4.0
<b>Version</b>	4.2.0.1143
<b>Operating System</b>	Windows* 7
<b>Problem Description</b>	Running on Windows 7 64 bit version, the OS may log event ID 129 when attempting to capture/collect SMART events
<b>Resolution</b>	Issue resolved in the 4.5.0.1333 release.

<b>Title#</b>	<b>Creating RAID Volume Including the OS disk May cause System Crash</b>
<b>Reference</b>	73735
<b>Product</b>	Intel® RSTe 4.0

<b>Version</b>	4.2.0.1143
<b>Operating System</b>	Windows* 7
<b>Problem Description</b>	Using the RSTe GUI, in a configuration where by creating an RAID volume using disks attached to the sSATA controller and including the operating system disk as a member of that RAID volume, the system may crash with a BSOD during the process.
<b>Resolution</b>	Issue resolved in the 4.5.0.1333 release.

<b>Title#</b>	<b>BSOD may Occur When running specific IOmeter</b>
<b>Reference</b>	71999
<b>Product</b>	Intel® RSTe 4.0
<b>Version</b>	4.3.0.1198
<b>Operating System</b>	Windows*
<b>Problem Description</b>	When running in a configuration that includes a RAID 5 data volume spanned across 6 or 7 drives, running IOmeter performance testing set to 32KB sequential writes, a BSOD may occur.
<b>Resolution</b>	Issue resolved in the 4.5.0.1333 release.

<b>Title#</b>	<b>Attempting to Get Disk Info May Result in an Error</b>
<b>Reference</b>	69945
<b>Product</b>	Intel® RSTe 4.0
<b>Version</b>	4.3.0.1198
<b>Operating System</b>	Windows* 7
<b>Problem Description</b>	When running in a configuration that includes 1 or more data RAID arrays, attempting to get disk info using a command line utility may result in a failure.
<b>Resolution</b>	Issue resolved in the 4.5.0.1333 release.

<b>Title#</b>	<b>Running "DiskSpd" Utility may Render System Unresponsive</b>
---------------	---

<b>Reference</b>	68608
<b>Product</b>	Intel® RSTe 4.0
<b>Version</b>	4.3.0.1198
<b>Operating System</b>	Windows*
<b>Problem Description</b>	Attempting to run Microsoft utility “DiskSpd” may render the system unresponsive.
<b>Resolution</b>	Issue resolved in the 4.5.0.1333 release.

<b>Title#</b>	<b>UEFI RAID Configuration Tools (rcfgxxxx.efi) May Show RAID types Possible Despite RAID 0, 1, 5 and 10 Disabled in the BIOS</b>
<b>Reference</b>	70298
<b>Product</b>	Intel® RSTe 4.0
<b>Version</b>	4.3.0.1198
<b>Operating System</b>	Windows*
<b>Problem Description</b>	Disabling RAID 0, 1, 5 and 10 in the BIOS may not remove the option to create these RAID volume types in the UEFI RAID Configuration Tools (rcfgxxxx.efi).
<b>Resolution</b>	Issue resolved in the 4.5.0.1333 release.

## 7.5 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.

<b>Title#</b>	<b>RSTe GUI May Show 64 KB Strip Size for RAID 1 Volume Created in OROM</b>
<b>Reference</b>	45538
<b>Product</b>	Intel® RSTe 3.0
<b>Version</b>	4.2.0.1062
<b>Operating System</b>	Windows* 8

<b>Problem Description</b>	Running with RAID 1 Volume created in OROM, RSTe GUI may show 64 KB strip size instead of N/A.
<b>Resolution</b>	Issue resolved in the 4.3.0.1199 release.

<b>Title#</b>	<b>The RSTe GUI May Not Show the Correct Balloon Tip During Volume Initialization</b>
<b>Reference</b>	49336
<b>Product</b>	RSTe 4.0
<b>Version</b>	RSTe 4.2.0.1143
<b>Operating System</b>	Windows*
<b>Problem Description</b>	When attempting to initialize a RAID volume, the RSTe GUI may show “Rebuilding” balloon tip instead of “initializing”.
<b>Resolution</b>	Issue resolved in the 4.3.0.1199 release.

<b>Title#</b>	<b>The RSTe GUI May Show an Outdated RAID Array Information</b>
<b>Reference</b>	49619
<b>Product</b>	Intel® RSTe 3.0
<b>Version</b>	4.1.0.1047
<b>Operating System</b>	Windows*
<b>Problem Description</b>	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.
<b>Resolution</b>	Issue resolved in the 4.3.0.1199 release.

<b>Title#</b>	<b>RSTe GUI Online Support Link May Be Incorrect</b>
<b>Reference</b>	43822
<b>Product</b>	Intel® RSTe 3.0

<b>Version</b>	4.0.0.1041
<b>Operating System</b>	Windows*
<b>Problem Description</b>	When attempting to access the Online Support link in the RSTe GUI, the link may be incorrect. The Link should take the user to: <a href="https://downloadcenter.intel.com/SearchResult.aspx?lang=eng&amp;ProductFamily=Software+Products&amp;ProductLine=Chipset+Software&amp;ProductProduct=Intel%C2%AE+Rapid+Storage+Technology+enterprise+(Intel%C2%AE+RSTe)&amp;ProdId=3449&amp;LineId=1090&amp;FamilyId=42">https://downloadcenter.intel.com/SearchResult.aspx?lang=eng&amp;ProductFamily=Software+Products&amp;ProductLine=Chipset+Software&amp;ProductProduct=Intel%C2%AE+Rapid+Storage+Technology+enterprise+(Intel%C2%AE+RSTe)&amp;ProdId=3449&amp;LineId=1090&amp;FamilyId=42</a>
<b>Resolution</b>	Issue resolved in the 4.3.0.1199 release.

<b>Title#</b>	<b>RSTe GUI Volume Properties May Show a DATA RAID Volume as a System Volume</b>
<b>Reference</b>	49923
<b>Product</b>	Intel® RSTe 3.0
<b>Version</b>	4.2.0.1116
<b>Operating System</b>	Windows*
<b>Problem Description</b>	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.
<b>Resolution</b>	Issue resolved in the 4.3.0.1199 release.

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

<b>Title#</b>	<b>The RSTe GUI May Shows “Unknown error” When switching “Disk data cache” on an Array During RAID Initialization</b>
<b>Reference</b>	55522
<b>Product</b>	RSTe 4.0
<b>Version</b>	RSTe 4.2.0.1143
<b>Operating System</b>	Windows*
<b>Problem Description</b>	When attempting to change the “Disk data cache” option during a RAID volume initialization, an “Unknown error” message may be displayed.
<b>Resolution</b>	Issue resolved in the 4.3.0.1199 release.

<b>Title#</b>	<b>Attempting to Start the RSTe GUI May Encounter an Unknown Error</b>
<b>Reference</b>	56343
<b>Product</b>	RSTe 4.0
<b>Version</b>	RSTe 4.2.0.1143
<b>Operating System</b>	Windows 7 32bits
<b>Problem Description</b>	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.
<b>Resolution</b>	Issue resolved in the 4.3.0.1199 release.

<b>Title#</b>	<b>The RSTe GUI May Not Proper Initialize the RAID Volume After Expanding</b>
<b>Reference</b>	56689
<b>Product</b>	RSTe 4.0
<b>Version</b>	RSTe 4.2.0.1143
<b>Operating System</b>	Windows*

<b>Problem Description</b>	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.
<b>Resolution</b>	Issue resolved in the 4.3.0.1199 release.

<b>Title#</b>	<b>The RSTe GUI Element May Disappear After Reconnecting with Remote Desktop Access.</b>
<b>Reference</b>	56694
<b>Product</b>	RSTe 4.0
<b>Version</b>	RSTe 4.2.0.1143
<b>Operating System</b>	Windows*
<b>Problem Description</b>	When attempting to reconnect to a system running RSTe, using remote desktop access, the RSTe GUI may not run or display properly on the remote desktop.
<b>Resolution</b>	Issue resolved in the 4.3.0.1199 release.

<b>Title#</b>	<b>The RSTe GUI May Not Properly Manage RAID Level Creating For RAID Roaming Volumes</b>
<b>Reference</b>	56696
<b>Product</b>	RSTe 4.0
<b>Version</b>	RSTe 4.2.0.1143
<b>Operating System</b>	Windows*
<b>Problem Description</b>	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.
<b>Resolution</b>	Issue resolved in the 4.3.0.1199 release.

<b>Title#</b>	<b>The RSTe GUI May Not Properly Display More than Two Running Operations</b>
<b>Reference</b>	56700



<b>Product</b>	RSTe 4.0
<b>Version</b>	RSTe 4.2.0.1143
<b>Operating System</b>	Windows*
<b>Problem Description</b>	When attempting to start multiple simultaneous operation, The RSTe GUI may not properly display the information in the information tab.
<b>Resolution</b>	Issue resolved in the 4.3.0.1199 release.

<b>Title#</b>	<b>The RSTe GUI May Shows Duplicate RAID Levels When Creating Additional Volumes</b>
<b>Reference</b>	57551
<b>Product</b>	RSTe 4.0
<b>Version</b>	RSTe 4.2.0.1143
<b>Operating System</b>	Windows*
<b>Problem Description</b>	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.
<b>Resolution</b>	Issue resolved in the 4.3.0.1199 release.

<b>Title#</b>	<b>Initiating S3 or S4 Power States may not be Successful</b>
<b>Reference</b>	57842
<b>Product</b>	RSTe 4.0
<b>Version</b>	RSTe 4.2.0.1143
<b>Operating System</b>	Windows* 10
<b>Problem Description</b>	In a configuration where 4 disks are connected to the sSATA controller, the controller mode is set to "RAID" and RSTe is installed, if the system initiates an S3 (sleep) or an S4 (hibernate) power state, the system may instead restart.
<b>Resolution</b>	Issue resolved in the 4.3.0.1199 release.

<b>Title#</b>	<b>Entering into an S4 State While RAID Volume is Migrating May Cause the Volume to Fail</b>
<b>Reference</b>	58044
<b>Product</b>	RSTe 4.0
<b>Version</b>	RSTe 4.2.0.1143
<b>Operating System</b>	Windows*
<b>Problem Description</b>	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.
<b>Resolution</b>	Issue resolved in the 4.3.0.1199 release.

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

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

<b>Resolution</b>	Issue resolved in the 4.3.0.1199 release.
-------------------	---

<b>Title#</b>	<b>Running Heavy I/O to a Degraded RAID 5 Volume May Encounter a Data Integrity Issue</b>
<b>Reference</b>	59509
<b>Product</b>	RSTe 4.0
<b>Version</b>	RSTe all version prior to 4.3.0.1199
<b>Operating System</b>	Windows*
<b>Problem Description</b>	<p>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.</p> <p><b>Workaround:</b> 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.</p>
<b>Resolution</b>	Issue resolved in the 4.3.0.1199 release.

<b>Title#</b>	<b>The RSTe GUI May Prompt to Keep Data For All Drives with GPT Partitions.</b>
<b>Reference</b>	59821
<b>Product</b>	RSTe 4.0
<b>Version</b>	RSTe 4.2.0.1143
<b>Operating System</b>	Windows*
<b>Problem Description</b>	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.
<b>Resolution</b>	Issue resolved in the 4.3.0.1199 release.

<b>Title#</b>	<b>RSTe May Consume More Memory After Running For a Long Time</b>
---------------	---

<b>Reference</b>	59908
<b>Product</b>	RSTe 4.0
<b>Version</b>	RSTe 4.2.0.1143
<b>Operating System</b>	Windows*
<b>Problem Description</b>	When running a platform with RSTe for long periods of time, RSTe components may continue to consume memory as it runs.
<b>Resolution</b>	Issue resolved in the 4.3.0.1199 release.

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

<b>Title#</b>	<b>Potential Installation Conflict Between RSTe and the C610 series chipset Platform Drivers</b>
<b>Reference</b>	4937660
<b>Product</b>	Intel® RSTe 3.0
<b>Version</b>	4.1.0.1047
<b>Operating System</b>	Windows*
<b>Problem Description</b>	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
<b>Resolution</b>	Issue resolved with the 4.3.0.1199 release.

<b>Title#</b>	<b>RSTe May Report a Drive Plugged into an eSATA Port as Unknown</b>
<b>Reference</b>	4937706
<b>Product</b>	Intel® RSTe 3.0
<b>Version</b>	4.1.0.1047
<b>Operating System</b>	Windows* Server 2012 R2
<b>Problem Description</b>	RSTe GUI may report an eSATA configured port as unknown when a hard drive is attached to that port.
<b>Resolution</b>	Issue resolved in the 4.3.0.1199 release.

<b>Title#</b>	<b>Windows Server Essentials Management Service May Not Properly Start</b>
<b>Reference</b>	4937838
<b>Product</b>	Intel® RSTe 3.0
<b>Version</b>	4.1.0.1047
<b>Operating System</b>	Windows* Server 2012 R2
<b>Problem Description</b>	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).
<b>Resolution</b>	Issue resolved in the 4.3.0.1199 release as a third party issue, not RSTe.

<b>Title#</b>	<b>System May Not Properly Resume From Hibernation</b>
<b>Reference</b>	4937839
<b>Product</b>	Intel® RSTe 3.0
<b>Version</b>	4.1.0.1047
<b>Operating System</b>	Windows* Server 2012

<b>Problem Description</b>	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 hibernation. The issue is likely to only occur on Windows Server 2012.
<b>Resolution</b>	Issue resolved in the 4.3.0.1199 release.

<b>Title#</b>	<b>RSTe May Not Properly Spin Down a Drive Under Windows 8.1</b>
<b>Reference</b>	4937952
<b>Product</b>	Intel® RSTe 3.0
<b>Version</b>	4.1.0.1047
<b>Operating System</b>	Windows* 8.1
<b>Problem Description</b>	Running on Windows 8.1 with Driver Power Down enabled, RSTe may not properly spin down the drive(s).
<b>Resolution</b>	Issue resolved in the 4.3.0.1199 release.

<b>Title#</b>	<b>RAID10 Volume May Become Degraded During the Verify and Repair Process Following a Dirty Shutdown</b>
<b>Reference</b>	4938074
<b>Product</b>	RSTe 4.0
<b>Version</b>	RSTe 4.2.0.1143
<b>Operating System</b>	Windows*
<b>Problem Description</b>	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.
<b>Resolution</b>	Issue resolved in the 4.3.0.1199 release.

<b>Title#</b>	<b>RSTe Pre-OS UI May Report a RAID 10 Volume a Failed with a Single HDD Marked as Failed</b>
<b>Reference</b>	4938191
<b>Product</b>	Intel® RSTe 3.0

<b>Version</b>	4.1.0.1047
<b>Operating System</b>	Windows*
<b>Problem Description</b>	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.
<b>Resolution</b>	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.

<b>Title#</b>	<b>Bootable file systems May Not be Available if EFI driver is ODD is on SATA0 or sSATA0</b>
<b>Reference</b>	4938186
<b>Product</b>	Intel® RSTe 3.0
<b>Version</b>	4.2.0.1043
<b>Operating System</b>	Windows*
<b>Problem Description</b>	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.
<b>Resolution</b>	Issue resolved in the 4.3.0.1199 release.

<b>Title#</b>	<b>A System Crash May Be Encountered While running S3/S4 stress testing</b>
<b>Reference</b>	4938208 / 59013
<b>Product</b>	Intel® RSTe 3.0
<b>Version</b>	4.2.0.1043
<b>Operating System</b>	Windows* 8.1
<b>Problem Description</b>	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.

<b>Resolution</b>	Issue resolved in the 4.3.0.1199 release.
-------------------	---

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

## 7.6 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.

<b>Title#</b>	<b>System May Hang During a Hibernate Resume With a Degraded RAID Volume</b>
<b>Reference</b>	4937409
<b>Product</b>	Intel® RSTe 3.0
<b>Version</b>	3.7.0.1046
<b>Operating System</b>	Windows*
<b>Problem Description</b>	When running in a configuration where the OS is installed to a RAID Volume, the system may hang when resuming from hibernate if the RAID volume is degraded.
<b>Resolution</b>	Issue resolved in the 4.2.0.1143 release.

<b>Title#</b>	<b>RSTe rcfgsata.efi May Not Work Properly to Create a Matrix RAID Configuration</b>
<b>Reference</b>	4937599
<b>Product</b>	Intel® RSTe 3.0
<b>Version</b>	4.1.0.1047



<b>Operating System</b>	Windows*
<b>Problem Description</b>	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.
<b>Resolution</b>	Issue resolved in the 4.2.0.1143 release.

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

<b>Title#</b>	<b>Attempting to Execute setup.exe with the -uninstall Option May Not Work Properly</b>
<b>Reference</b>	4937609
<b>Product</b>	Intel® RSTe 3.0
<b>Version</b>	3.8.0.1111
<b>Operating System</b>	Windows*
<b>Problem Description</b>	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."
<b>Resolution</b>	Issue resolved in the 4.2.0.1143 release.

<b>Title#</b>	<b>RSTe May Not Properly Detect a Protocol Timeout Error</b>
<b>Reference</b>	4937639

<b>Product</b>	Intel® RSTe 3.0
<b>Version</b>	3.8.0.1111
<b>Operating System</b>	Windows*
<b>Problem Description</b>	RSTe may not properly detect a protocol timeout error resulting in the system becoming unresponsive.
<b>Resolution</b>	Issue resolved in the 4.2.0.1143 release.

<b>Title#</b>	<b>RSTe Email Alert Function May Not Send Emails</b>
<b>Reference</b>	4937642
<b>Product</b>	Intel® RSTe 3.0
<b>Version</b>	3.8.0.1113
<b>Operating System</b>	Windows*
<b>Problem Description</b>	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).
<b>Resolution</b>	Issue resolved in the 4.2.0.1143 release.

<b>Title#</b>	<b>RSTe RAID Migration May Take a Long Time on a C610 series chipset Platform</b>
<b>Reference</b>	4937664
<b>Product</b>	Intel® RSTe 3.0
<b>Version</b>	4.1.0.1047
<b>Operating System</b>	Windows*
<b>Problem Description</b>	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.
<b>Resolution</b>	Issue resolved in the 4.2.0.1143 release.

<b>Title#</b>	<b>RSTe May Not Be Properly Setting the Security Frozen Bit When Resuming From S3.</b>
---------------	--

<b>Reference</b>	4937704
<b>Product</b>	Intel® RSTe 3.0
<b>Version</b>	4.1.0.1047
<b>Operating System</b>	Windows*
<b>Problem Description</b>	When resuming from an S3, the RSTe driver may not properly set the Security Frozen bit as defined through ACPI _GTF methodology.
<b>Resolution</b>	Issue resolved in the 4.2.0.1143 release.

<b>Title#</b>	<b>RSTe GUI May Report Parity Errors on RAID 0, 1 and 10 Volumes</b>
<b>Reference</b>	4937760
<b>Product</b>	Intel® RSTe 3.0
<b>Version</b>	4.1.0.1047
<b>Operating System</b>	Windows*
<b>Problem Description</b>	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.
<b>Resolution</b>	Issue resolved in the 4.2.0.1143 release.

<b>Title#</b>	<b>RSTe RAID Volume Rebuild Process May Become Unresponsive</b>
<b>Reference</b>	4937789
<b>Product</b>	Intel® RSTe 3.0
<b>Version</b>	4.1.0.1047
<b>Operating System</b>	Windows*
<b>Problem Description</b>	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.

<b>Resolution</b>	Issue resolved in the 4.2.0.1143 release.
-------------------	---

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

## 7.7 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.

<b>Title#</b>	<b>RSTe UI May Not Show Whole FW of HDD attached</b>
<b>Reference</b>	3236733
<b>Product</b>	Intel® RSTe 3.0
<b>Version</b>	3.0.0.3002
<b>Operating System</b>	Windows*
<b>Problem Description</b>	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.
<b>Resolution</b>	<p>Issue resolved in the RSTe 4.1.0.1046 release as working properly.</p> <p>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</p>

	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.
--	--

<b>Title#</b>	<b>RSTe Legacy RAID option ROMs May Conflict and Prevent Other option ROMs From Running Properly</b>
<b>Reference</b>	4159230
<b>Product</b>	Intel® RSTe 3.0
<b>Version</b>	3.0.0.3020
<b>Operating System</b>	Windows*
<b>Problem Description</b>	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.
<b>Resolution</b>	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.

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

	<p>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.</p> <p>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.</p> <p>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):</p> <p>11B61734, 28228086, 72708086, 04811014, 04851014, 047D1014, 201019E5, 201219E5, 201319E5, 201519E5, 201619E5, 201B19E5, 201D19E5, 201F19E5, 306E1054</p>
<b>Resolution</b>	Issue resolved in the 4.1.0.1046 release.

<b>Title#</b>	<b>RSTe May Not Properly Support Installing an OS on 4 SSDs</b>
<b>Reference</b>	4630477
<b>Product</b>	Intel® RSTe 3.0
<b>Version</b>	3.7.0.1093
<b>Operating System</b>	Windows*
<b>Problem Description</b>	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.
<b>Resolution</b>	Issue resolved in the 4.1.0.1046 release.

<b>Title#</b>	<b>Removing the USB Drive Used to After Loading the RSTe Driver for an F6 OS Installation May Cause the OS Installation to Fail.</b>
<b>Reference</b>	4936653
<b>Product</b>	Intel® RSTe 3.0
<b>Version</b>	3.7.0.1093
<b>Operating System</b>	Windows*
<b>Problem Description</b>	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.
<b>Resolution</b>	Issue resolved in the 4.1.0.1046 release as a 3 <sup>rd</sup> party issue. Microsoft has published an official KB article. <a href="http://support.microsoft.com/kb/2931031">http://support.microsoft.com/kb/2931031</a>

<b>Title#</b>	<b>Upgrading from Windows 7 to Windows 8.1 (Server 2012 R2) May Not Upgrade Properly on the AHCI Controller</b>
<b>Reference</b>	4936755
<b>Product</b>	Intel® RSTe 3.0
<b>Version</b>	3.7.0.1093
<b>Operating System</b>	Windows*
<b>Problem Description</b>	<p>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.</p> <p>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.</p> <p>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.</p>

<b>Resolution</b>	Issue resolved in the 4.1.0.1046 release.
-------------------	---

<b>Title#</b>	<b>Upgrading from Windows 7 to Windows 8 (Server 2012) May Not Upgrade Properly on the SCU Controller</b>
<b>Reference</b>	4936756
<b>Product</b>	Intel® RSTe 3.0
<b>Version</b>	3.7.0.1093
<b>Operating System</b>	Windows*
<b>Problem Description</b>	<p>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.</p> <p>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.</p> <p>Workaround: Before upgrading to Windows 8, downgrade the RSTe driver to RSTe 3.5. That driver is setup so Windows 8 uses the installed driver to perform the upgrade.</p>
<b>Resolution</b>	Issue resolved in the 4.1.0.1046 release.

<b>Title#</b>	<b>Upgrading from Windows 7 to Windows 8.1 (Server 2012 R2) May Not Upgrade Properly on the SCU Controller</b>
<b>Reference</b>	4936760
<b>Product</b>	Intel® RSTe 3.0
<b>Version</b>	3.7.0.1093
<b>Operating System</b>	Windows*
<b>Problem Description</b>	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



	<p>RSTe driver. Windows 8 removed the requirement for a filter driver and no longer allows filter drivers.</p> <p>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.</p>
<b>Resolution</b>	Issue resolved in the 4.1.0.1046 release.

<b>Title#</b>	<b>System May Become Unresponsive When Copying/Pasting a large File On a Degraded RAID Volume</b>
<b>Reference</b>	4936809
<b>Product</b>	Intel® RSTe 3.0
<b>Version</b>	3.8.0.1113
<b>Operating System</b>	Windows*
<b>Problem Description</b>	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.
<b>Resolution</b>	Issue resolved in the 4.1.0.1046 release.

<b>Title#</b>	<b>RSTe Disk Removed/Connected Events May Be Missing Disk Information in RSTe CLI and GUI</b>
<b>Reference</b>	4936853
<b>Product</b>	Intel® RSTe 3.0
<b>Version</b>	3.8.0.1113
<b>Operating System</b>	Windows*
<b>Problem Description</b>	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)
<b>Resolution</b>	Issue resolved in the 4.1.0.1046 release.

<b>Title#</b>	<b>RSTe Process May Consume Memory as it Continues to Run</b>
<b>Reference</b>	4937077

<b>Product</b>	Intel® RSTe 3.0
<b>Version</b>	3.8.0.1113
<b>Operating System</b>	Windows*
<b>Problem Description</b>	When running the RSTe GUI, the RSTe process "IAStorDataMgrSvc.exe" may continually consume memory (approximately 3K per day).
<b>Resolution</b>	Issue resolved in the 4.1.0.1046 release.

<b>Title#</b>	<b>Migrating a RAID Volume With Some SSDs May Result in an Error Message Being Reported</b>
<b>Reference</b>	4937132
<b>Product</b>	Intel® RSTe 3.0
<b>Version</b>	4.0.0.1045
<b>Operating System</b>	UEFI
<b>Problem Description</b>	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.
<b>Resolution</b>	Issue resolved in the 4.1.0.1046 release.

<b>Title#</b>	<b>RSTe EFI Drivers for Intel® C610 series chipset May Demonstrate Erratic Behavior</b>
<b>Reference</b>	4937159
<b>Product</b>	Intel® RSTe 3.0
<b>Version</b>	4.0.0.1045
<b>Operating System</b>	UEFI
<b>Problem Description</b>	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.

<b>Resolution</b>	Issue resolved in the 4.1.0.1046 release.
-------------------	---

<b>Title#</b>	<b>Installing Windows* Server 2012 R2 With Two RSTe Legacy OROMs Loaded May Result in the Installation Failing</b>
<b>Reference</b>	4937263
<b>Product</b>	Intel® RSTe 3.0
<b>Version</b>	4.0.0.1045
<b>Operating System</b>	UEFI
<b>Problem Description</b>	<p>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.</p> <p>The Windows* Server 2012 R2 boot loader inadvertently is overwriting some of the RSTe Legacy OROM data causing the installation process to fail.</p>
<b>Resolution</b>	<p>Issue resolved as not an RSTe issue.</p> <p>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.</p>

<b>Title#</b>	<b>Rcmpsata.exe and Rcmpssata.exe May Return the Same Results</b>
<b>Reference</b>	CCG0100711059
<b>Product</b>	Intel® RSTe 3.0
<b>Version</b>	4.0.0.1040
<b>Operating System</b>	DOS*
<b>Problem Description</b>	When running the DOS RAID compatibilities tools (rcmpsata.exe and rcmpssata.exe) on an Intel® C610 series chipset based platform may return identical information (back from the sSATA Controller).
<b>Resolution</b>	Issue resolved in the 4.1.0.1046 release.

<b>Title#</b>	<b>RSTe SATA/sSATA EFI Driver May Be Loaded in Legacy Mode</b>
---------------	--

<b>Reference</b>	CCG0100742151
<b>Product</b>	Intel® RSTe 3.0
<b>Version</b>	4.0.0.1040
<b>Operating System</b>	DOS*
<b>Problem Description</b>	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.
<b>Resolution</b>	Issue resolved in the 4.1.0.1046 release.

## 7.8 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.

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

<b>Title#</b>	<b>RSTe 3.8.0.1111 installer installs incorrect drivers</b>
<b>Reference</b>	4630524
<b>Product</b>	Intel® RSTe 4.0
<b>Version</b>	3.8.0.1111
<b>Operating System</b>	Windows*
<b>Problem Description</b>	Setup.exe in 3.8.0.1111 may install the version of the driver that was already on the system

<b>Resolution</b>	Issue resolved in the 4.0.0.1040 release.
-------------------	---

<b>Title#</b>	<b>Long RAID rebuild time on Western Digital 512e drives on C600 chipset</b>
<b>Reference</b>	4629096
<b>Product</b>	Intel® RSTe 4.0
<b>Version</b>	3.6.0.1093
<b>Operating System</b>	Windows*
<b>Problem Description</b>	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 up to 10 min to boot.
<b>Resolution</b>	Issue resolved in the 4.0.0.1040 release.

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

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

<b>Operating System</b>	Pre-OS
<b>Problem Description</b>	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
<b>Resolution</b>	Issue resolved in the 4.0.0.1040 release.

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

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

<b>Title#</b>	<b>SCU HDD Activity LED May Not Work Properly</b>
<b>Reference</b>	4630000

<b>Product</b>	Intel® RSTe 3.0
<b>Version</b>	3.7.0.1093
<b>Operating System</b>	Windows*
<b>Problem Description</b>	The signal used to generate the general SCU HDD activity signal may not be properly activated during disk I/O.
<b>Resolution</b>	Issue resolved in the 3.8.1.1009 release.

## 7.9 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.

<b>Title#</b>	<b>RSTe May Not Properly Handle TRIM On Win8/Server2012 Systems</b>
<b>Reference</b>	4628968
<b>Product</b>	Intel® RSTe 3.0
<b>Version</b>	3.0.0.3002
<b>Operating System</b>	Windows*
<b>Problem Description</b>	When installing RSTe onto a system running Windows* 8 or Windows Server 2012, TRIM commands may not be processed 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.
<b>Resolution</b>	Issue resolved in the 3.8.0.1111 release.

<b>Title#</b>	<b>LUN Reset Request on System Time Change</b>
<b>Reference</b>	100671322
<b>Product</b>	Intel® RSTe 3.0
<b>Version</b>	3.8.0.1106
<b>Operating System</b>	Windows*

<b>Problem Description</b>	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.
<b>Resolution</b>	Issue resolved in the 3.8.1111 release.

<b>Title#</b>	<b>RSTe May Not Operate Properly When TRIM is Enabled</b>
<b>Reference</b>	4629372
<b>Product</b>	Intel® RSTe 3.0
<b>Version</b>	3.8.0.1106/3.6.0.1086
<b>Operating System</b>	Windows* 7 (32 bit and 64 bit)
<b>Problem Description</b>	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.
<b>Resolution</b>	Issue resolved in the 3.8.0.1111 release.

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

<b>Title#</b>	<b>RSTe GUI May Fail to Create a RAID Volume Using the System Disk</b>
<b>Reference</b>	4628601
<b>Product</b>	Intel® RSTe 3.0
<b>Version</b>	3.7.0.1093



<b>Operating System</b>	Windows*
<b>Problem Description</b>	<p>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:</p> <p>An unknown error occurred during the volume creation process. Please try creating the volume again"</p> <p>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.</p>
<b>Resolution</b>	<p>When installing the OS, manually create the partition leaving at least 5MB of space unallocated.</p> <p>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:</p> <ol style="list-style-type: none"> <li>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 <math>\geq 4.209</math>MBs then the Create From Source Disk option should be available. If not then continue to step 2</li> <li>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 <math>\geq \sim 8</math>MB then go to step 4</li> </ol>

	<p>3. Delete some files until the Free Space is ~8MB. Empty the Recycle Bin. Go back to step 2.</p> <p>4. In the Windows* Disk Properties Tools tab press the Defragment Now button.</p> <p>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.</p>
--	---

## 7.10 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.

<b>Title#</b>	<b>Parity Errors May be Encountered During the Verifying Process Following a Volume Expansion</b>
<b>Reference</b>	3236922
<b>Product</b>	Intel® RSTe 3.0
<b>Version</b>	3.0.0.3002
<b>Operating System</b>	Windows*
<b>Problem Description</b>	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.
<b>Resolution</b>	Issue resolved in the 3.7.0.1093 release.

<b>Title#</b>	<b>System May Not Properly Resume with the Boot Drive on AHCI Controller After RAID Failure on the SCU Controller</b>
<b>Reference</b>	4159245
<b>Product</b>	Intel® RSTe 3.0
<b>Version</b>	3.1.0.1068
<b>Operating System</b>	Windows*

<b>Problem Description</b>	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.
<b>Resolution</b>	Issue resolved as a third party issue, not with RSTe.

<b>Title#</b>	<b>RSTe GUI May Not Provide a "change type" Option for Migrating a 4-Drive RAID10</b>
<b>Reference</b>	4160488
<b>Product</b>	Intel® RSTe 3.0
<b>Version</b>	3.5.0.1096
<b>Operating System</b>	Windows*
<b>Problem Description</b>	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.
<b>Resolution</b>	Issue resolved in the RSTe 3.7.0.1093 release.

<b>Title#</b>	<b>Intel RSTe GUI Mapping of Alphabet Characters in the Glossary to Sections in the Glossary May not Function Properly</b>
<b>Reference</b>	4160499
<b>Product</b>	Intel® RSTe 3.0
<b>Version</b>	3.1.0.1068
<b>Operating System</b>	Windows*
<b>Problem Description</b>	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.
<b>Resolution</b>	Issue resolved in the RSTe 3.7.0.1093 release.

<b>Title#</b>	<b>RSTe GUI May Not Be Able To Generate Test Email Messages</b>
<b>Reference</b>	CCG0100460438
<b>Product</b>	Intel® RSTe 3.0
<b>Version</b>	3.2.0.1135
<b>Operating System</b>	Windows*
<b>Problem Description</b>	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.
<b>Resolution</b>	Issue resolved as expected behavior.

<b>Title#</b>	<b>System May Become Unresponsive With an Expander</b>
<b>Reference</b>	CCG0100283502
<b>Product</b>	Intel® RSTe 3.0
<b>Version</b>	3.0.0.3020
<b>Operating System</b>	SCU Legacy OROM
<b>Problem Description</b>	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.
<b>Resolution</b>	Issue resolved in the 3.7.0.1093 release.

<b>Title#</b>	<b>Attempting to Create a RAID Volume on Disk with a SMART Event May Complete Successfully</b>
<b>Reference</b>	CCG0100467974/4160878
<b>Product</b>	Intel® RSTe 3.0
<b>Version</b>	3.2.0.1135
<b>Operating System</b>	Windows*
<b>Problem Description</b>	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.
<b>Resolution</b>	Issue resolved as expected behavior.

<b>Title#</b>	<b>System Crash May Occur with a RAID Volume Name Greater Than 16 Characters</b>
<b>Reference</b>	CCG0100471412/4160881
<b>Product</b>	Intel® RSTe 3.0
<b>Version</b>	3.2.0.1135
<b>Operating System</b>	Windows*
<b>Problem Description</b>	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.
<b>Resolution</b>	Issue resolved in the 3.7.0.1093 release.

<b>Title#</b>	<b>RSTe May Not Properly Support Performing a "Copy Disc" Function</b>
<b>Reference</b>	4161481
<b>Product</b>	Intel® RSTe 3.0
<b>Version</b>	3.2.0.1134
<b>Operating System</b>	Windows*
<b>Problem Description</b>	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.
<b>Resolution</b>	Issue resolved in the RSTe 3.7.0.1093 release.

<b>Title#</b>	<b>RSTe May Not Support Increasing a System Volume Beyond 2TB.</b>
<b>Reference</b>	41628178

<b>Product</b>	Intel® RSTe 3.0
<b>Version</b>	3.5.0.1101
<b>Operating System</b>	Windows*
<b>Problem Description</b>	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.
<b>Resolution</b>	Issue resolved in the RSTe 3.7.0.1093 release.

<b>Title#</b>	<b>RSTe May Not Support Installing the OS on a &gt;3TB Volume on the SCU Controller</b>
<b>Reference</b>	CCG0100643146
<b>Product</b>	Intel® RSTe 3.0
<b>Version</b>	3.5.0.1101
<b>Operating System</b>	Windows*
<b>Problem Description</b>	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 or showing up as non-raid disks.
<b>Resolution</b>	Issue resolved in the RSTe 3.7.0.1093 release (PreOS package).

<b>Title#</b>	<b>RSTe May Not Properly support Migrating From a 2-Disk RAID1 to 3 or More Disk RAID0</b>
<b>Reference</b>	4628173
<b>Product</b>	Intel® RSTe 3.0
<b>Version</b>	3.6.0.1093
<b>Operating System</b>	Windows*
<b>Problem Description</b>	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.

<b>Resolution</b>	Issue resolved in the RSTe 3.7.0.1093 release.
-------------------	--

<b>Title#</b>	<b>RSTe GUI May Not Properly Support Expanding a System RAID Volume</b>
<b>Reference</b>	4628175
<b>Product</b>	Intel® RSTe 3.0
<b>Version</b>	3.6.0.1093
<b>Operating System</b>	Windows*
<b>Problem Description</b>	When attempting to expand a system RAID volume, the RSTe GUI may not properly support this capability.
<b>Resolution</b>	Issue resolved in the RSTe 3.7.0.1093 release.

<b>Title#</b>	<b>Events May Not Be Logged Into Event Log If a RAID Volume Is Degraded Before IAStorDataMgrSvc Service Starts</b>
<b>Reference</b>	4627716
<b>Product</b>	Intel® RSTe 3.7
<b>Version</b>	3.6.0.1093
<b>Operating System</b>	Windows*
<b>Problem Description</b>	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.
<b>Resolution</b>	Issue resolved in the 3.7.0.1093 release.

<b>Title#</b>	<b>RSTe UI may crash when coming out of S4 and S3</b>
<b>Reference</b>	4628499
<b>Product</b>	Intel® RSTe 3.6.0.1093
<b>Version</b>	3.7.0.1093
<b>Operating System</b>	Windows*
<b>Problem Description</b>	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.
<b>Resolution</b>	Issue resolved in the 3.7.0.1093 release.

<b>Title#</b>	<b>Tray Icon State May Not Reflect the Current State Of the Raid Volume</b>
<b>Reference</b>	4628661
<b>Product</b>	Intel® RSTe 3.0
<b>Version</b>	3.6.0.1093
<b>Operating System</b>	Windows*
<b>Problem Description</b>	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.
<b>Resolution</b>	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 Intel® 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, unpadding binary block. It is partitioned into a header and up to two SCU controller element structures. Figure 1 shows this structure.

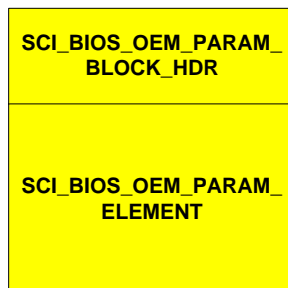


Figure 1: Structure of OEM Parameter Block

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 Version
#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	0x0	If you disable all raid levels – all BCFS settings will be set back to default and OROM UI delay will be set to 2seconds
		Raid type enabled	0x1	
1	Enable/disable Raid1	Raid type disabled	0x0	
		Raid type enabled	0x1	
2	Enable/disable Raid10	Raid type disabled	0x0	
		Raid type enabled	0x1	
3	Enable/disable Raid5	Raid type disabled	0x0	
		Raid type enabled	0x1	
4	RESERVED			
5	Enable/disable UI	Feature disabled	0x0	If you set it to 0 (disable) bits 10-14 are ignored
		Feature enabled	0x1	
6		Feature disabled	0x0	Not used



	Enable/disable Allow unlock of HDD in OS	Feature enabled	0x1	
7	Enable/disable Allow LED SGPIO	Feature disabled  Feature enabled	0x0  0x1	Not used
8	Enable/disable Only RRT volumes to span internal/external	Feature disabled  Feature enabled	0x0  0x1	Not used
9	Enable/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 occurred
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.

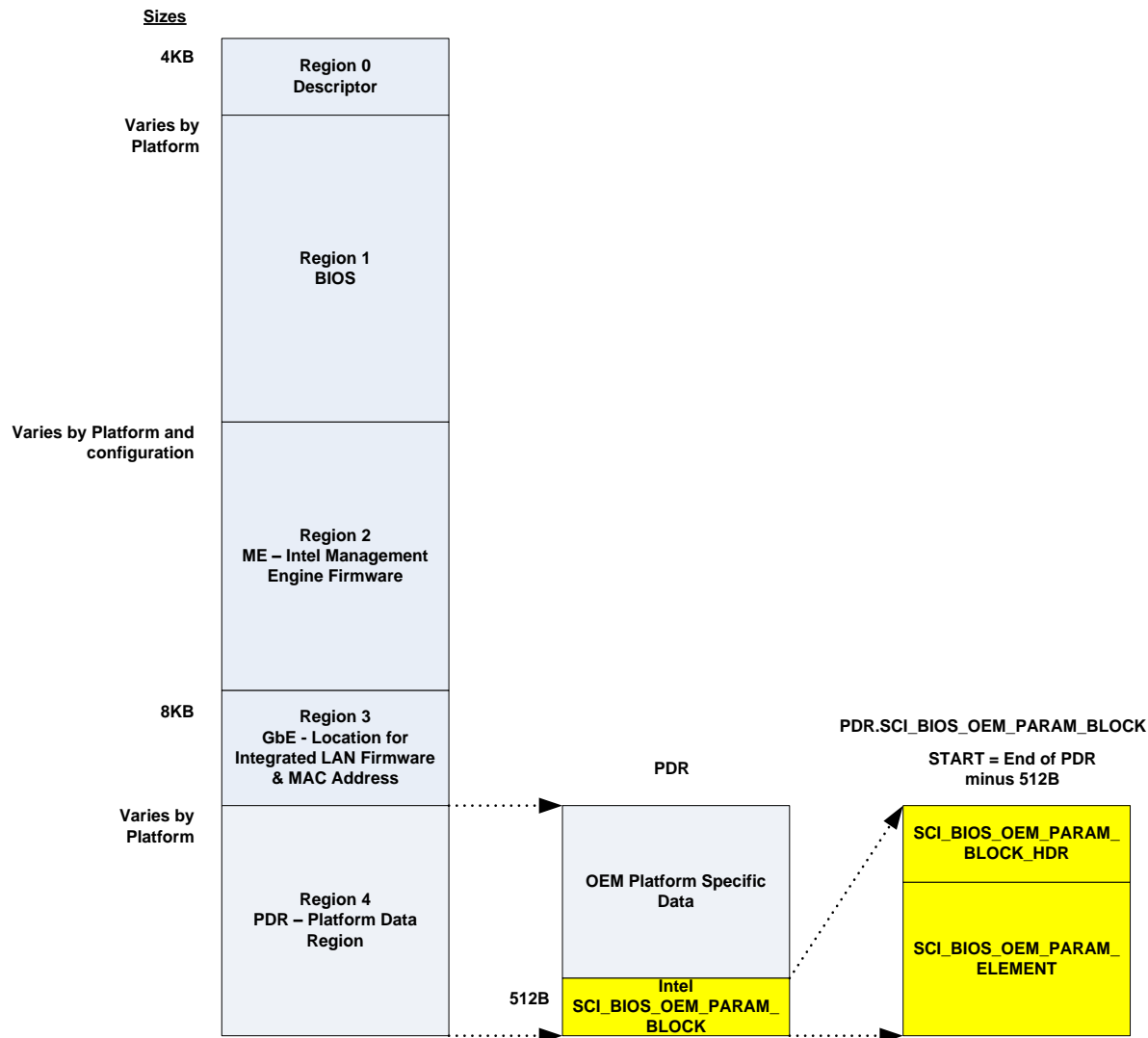


Figure 2 Recommended OEM Param Location in SPI Flash

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 3<sup>rd</sup> 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 adjustments 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\_om\_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\_orm\_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 Compatibility

### 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
Fujitsu	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
<b>Reference Documents</b>	
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  <i>Contact you Intel FAE to get access to this document through Anacapa</i>
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

## **10 Copyright Notice**

Copyright © 2016, Intel Corporation. All rights reserved.

These Release Notes as well as the software described in it is furnished under license and may only be used or copied in accordance with the terms of the license. The information in this manual is furnished for informational use only, is subject to change without notice, and should not be construed as a commitment by Intel Corporation. Intel Corporation assumes no responsibility or liability for any errors or inaccuracies that may appear in this document or any software that may be provided in association with this document.

Except as permitted by such license, no part of this document may be reproduced, stored in a retrieval system, or transmitted in any form or by any means without the express written consent of Intel Corporation.