

# Intel® Rapid Storage Technology (Intel® RST) 18.4.0.1000– Production Version Release

12 May 2021

**Intel Confidential**

---

**DISCLAIMER:** Information in this document is provided in connection with Intel products. No license, express or implied, by estoppels or otherwise, to any intellectual property rights is granted by this document. Except as provided in Intel's Terms and Conditions of Sale for such products, Intel assumes no liability whatsoever, and Intel disclaims any express or implied warranty relating to sale and/or use of Intel products, including liability or warranties relating to fitness for a particular purpose, merchantability or infringement of any patent, copyright or other intellectual property right. Intel products are not intended for use in medical, lifesaving, or life-sustaining applications.

Intel may make changes to specifications and product descriptions at any time, without notice.

Contact your local Intel sales office or your distributor to obtain the latest specifications and before placing your product order.

\* Other names and brands may be claimed as the property of others.  
Copyright © Intel Corporation 2000-2020

---

## Supported Operating Systems

**Microsoft Windows 10 Redstone 20H2 x64\***

**Microsoft Windows 10 Redstone 19H2 x64\***

## Revision History

Date	Driver Revision	Build Number
12 May 2021	18.4.0.1000 PV release	1000
19 April 2021	18.3.0.1003 PV release	1003
24 March 2021	18.3.0.1003 release	1003
20 February 2021	18.2.0.1006 release	1006
4 February 2021	18.2.0.1001 release	1001
25 January 2021	18.1.3.1036 PV release	1036
14 January 2021	18.1.3.1036 release	1036
8 January 2021	18.1.2.1034 PV release	1034
16 December 2020	18.1.2.1034 release	1034
1 December 2020	18.1.1.1033 release	1033
20 November 2020	18.1.0.1028 release	1028
11 November 2020	18.1.0.1027 release	1027
19 October 2020	18.1.0.1023 release	1023
2 October 2020	18.1.0.1016 release	1016

Intel Confidential

2 September 2020	18.1.0.1015 release	1015
25 August 2020	18.1.0.1014 release	1014
29 July 2020	18.1.0.1012 release	1012

#### Notes:

1. Known Issue is defined as a potential Intel® RST issue that has been replicated internally by the Intel® RST team but has not been root caused to be an Intel® RST defect.
2. New features for Intel® RST 18.4 release
  - Support for Gen2 Firmware Update on Intel drives through Windows Update
3. The RAID UEFI version for this release is 18.1.1.5201(VMD)/18.31.1.5256(non-VMD), the driver and user interface version is 18.4.0.1000(VMD)/18.34.0.1000(non VMD) and Intel® Optane™ Memory and Storage Management (HSA) driver version 18.1.1015.0. For Intel® RST Premium features (e.g. RAID, Intel® Optane™ memory, CPU Attached Storage), it is recommended that both the Intel® RST pre-OS and Intel® RST OS driver components are updated. Please contact your CE for further details.
4. For more information on these features and supported platform details, please refer to 617171\_Intel\_RST\_OEM\_SG\_Rev1p2 or later on CDI doc# [617171](#)

## Resolved Issues

### Resolved Issues in 18.4.0.1000 Release

ID	Title	Operating System	Component
NA	BSOD 0x7E seen intermittently with RAID0+5 when running some S4 tests during "Add disk" migration	windows.20h2_vibranium.x64	Driver
18014051012	[APST][Nvme] APST does not get disabled on certain NVMe drives when Power Options is set to high performance	windows.20h2_vibranium.x64	Driver

### Resolved Issues in 18.3.0.1003 Release

ID	Title	Operating System	Component
----	-------	------------------	-----------

18014539261	Create two RAID volume process to RAID 0+5 occur black screen if let system into S4/S5	windows.20h2_vibranium.x64	Driver
18015315972	BSOD D1 seen sporadically during stress test	windows.20h2_vibranium.x64	Driver
18015296605	[RKL-S] BSOD upon reboot in safe mode	windows.20h2_vibranium.x64	Driver
1308448523	Internal empty port text has different styling	windows.20h2_vibranium.x64	HSA
18014809926	Intel Optane Memory and Storage Management icon shows abnormally	windows.20h2_vibranium.x64	HSA

#### Resolved Issues in 18.2.0.1006 Release

ID	Title	Operating System	Component
18014648066	[CML][TG]: 'BSOD 0x9F' /system hang up intermittently when run Restart, Standby, and Hibernate Stress with TG	windows.20h2_vibranium.x64	Driver
18014750358	System will occur black screen/BSOD and can't enter OS after resume from S4 & set wrong password for HDD.	windows.20h2_vibranium.x64	Driver
18014267862	[ODD]When try to erase the DVD-RW data on Windows Explorer, sometimes erase process fails	windows.20h2_vibranium.x64	Driver
18014283796	F6 driver cause system crash when you hot-plug SATA device	windows.20h2_vibranium.x64	Driver
18015093701	[PG] PG stuck in MT2-like performance even after temperature dropped to MT0 with RST during D3/Sx resume	windows.20h2_vibranium.x64	Driver
18014809926	Intel Optane Memory and Storage Management icon shows abnormally.	windows.20h2_vibranium.x64	HSA
18013639181	"Intel Optane Memory and Storage Management" doesn't full screen after rotating	windows.20h2_vibranium.x64	HSA
18014061843	HSA shows unsupported RRT option, causing UI crash when clicked	windows.20h2_vibranium.x64	HSA
18014521514	Update HSA copyright date to 2021	windows.20h2_vibranium.x64	HSA

#### Resolved Issues in 18.2.0.1001– Release

ID	Title	Operating System	Component
18014541564	Logo screen flickering when running setupRST.exe	windows.20h2_vibranium.x64	Installer
18014542640	[HSA Installer] Can't check output from installer process after using switch -help	windows.20h2_vibranium.x64	Installer

18014200016	[RKLS-TGP] BSOD 0xB50D_VRF_iaStorAC BSOD during CS & S4 power cycles intermittently on RAID volumes with ACPID3Cold disabled	windows.20h2_vibranium.x64	Driver
18014595286	Certain screen app will affect VMD driver initial time (increase 1~3 sec fast startup time)	windows.20h2_vibranium.x64	Driver
18014061843	Recovery mode actions shown when not supported causing HSA UI crash	windows.20h2_vibranium.x64	Driver
18014175425	[ICL] BSOD(code:09f) intermittently occurred during resuming from MS with TG	windows.20h2_vibranium.x64	Driver

#### Resolved Issues in 18.1.3.1036– Release

ID	Title	Operating System	Component
18014063292	rstcli64 returns error with "-l -v" parameter if the system doesn't have Optane or RAID volume	windows.20h2_vibranium.x64	Driver
18013638364	BSOD(7E) occurred intermittently when enabling TG optane via CLI w/ DVDRW on ICL platform	windows.20h2_vibranium.x64	Driver
18013713200	BSOD seen with idle during MS when HDD idle timer is set to less than 30 sec and D3 is supported	windows.20h1_vibranium.x64	Driver

#### Resolved Issues in 18.1.2.1034 – Release

ID	Title	Operating System	Component
18014074200	[PG] Bugcheck IRQL_NOT_LESS_OR_EQUAL(a) intermittently seen with Thermal throttle enabled	windows.20h1_vibranium.x64	Driver
18013713200	[PG] Intermittent BSOD CRITICAL_PROCESS_DIED (ef) during MS	windows.20h1_vibranium.x64	Driver
18013809909	BSOD(0x50) occurred with "What failed: iaStorAC.sys" when re-connect the original disk (that is a member of a RAID volume) and power on system.	windows.20h1_vibranium.x64	Driver
1809628901	Optane Volume Name is not populated into CSMI_SAS_RAID_CONFIG.bReserved[20] field	windows.20h1_vibranium.x64	Driver
18013983826	[Brazil]Sentence translation incorrect during driver installation process.	windows.20h1_vibranium.x64	HSA
18014206069	[RKL-S] RAID support mistakenly enabled with B560 and is disabled in this version to align with POR	windows.20h1_vibranium.x64	PreOS

#### Resolved Issues in 18.1.1.1033 – Release

ID	Title	Operating System	Component
----	-------	------------------	-----------

18011179191	Intel® RST Middleware reported Optane volume disable error 0xA0070027	windows.20h1_vibranium.x64	For brazil
18013894311	Froze on Startup Loading Splash Screen Circle Cycle 619/1000	windows.20h1_vibranium.x64	Driver
18012111695	BSOD during S3StatePwrTest & S4StatePwrTest on RAID matrix	windows.20h1_vibranium.x64	Driver
18013270675	send STOP UNIT to NVME passthrough drive to power down it in UnitControl (ScsiUnitPowerD3) call	windows.20h1_vibranium.x64	Driver
18013772954	No warning pops up in the system tray when unplug the device from RAID volume with the system off (Notifications settings is Enabled).	windows.20h1_vibranium.x64	Driver
18013728605	Black screen then five minutes later BSOD occurred during system restart if remove one HDD/SSD on SATA RAID1 config.	windows.20h1_vibranium.x64	Driver
18013772662	Device drivers does not show platform name	windows.20h1_vibranium.x64	Driver
14012975700	In RAID 1, While waking from S3 system is getting Hung and Sporadically SUT asking for password.	NA	PreOS
18013715121	BIOS can't inform the SATA ODD information by UEFI Protocol tool	NA	PreOS
22011476003	When HddPwdPeim driver uses AtaPassThruPpi to get port by GetNextPort() with 0xFFFF, it will return EFI_INVALID_PARAMETER	NA	PreOS
18012823326	After waking from S3 observing system Hung and Sporadically SUT asking for password in RAID 1	NA	PreOS
18012641847	RAID0 trim not working on VMD	NA	PreOS
18012490317	System cannot boot up due to restart loop by RstVmdPeim.efi	NA	PreOS
18013987959	[RKL-S] SATA and NVMe can't be detected with RAID mode on B560 Pre-QS PCH.	NA	PreOS

#### Resolved Issues in 18.1.0.1028 – Release

ID	Title	Operating System	Component
18011179191	Intel® RST Middleware reported Optane volume disable error 0xA0070027	windows.20h1_vibranium.x64	Driver

#### Resolved Issues in 18.1.0.1027 – Release

ID	Title	Operating System	Component
----	-------	------------------	-----------

18012667970	[TG]System hangs while running DVD stress test intermittently	windows.20h1_vibranium.x64	Driver
18013442238	FC BSOD issue reported by MS telemetry	windows.20h1_vibranium.x64	Driver
18012955603	[RKL_S + TGP-H] [TGP-H B0-PO[Storage]RAID Creation/Deletion doesn't work from RST HSA APP/CLI but works in BIOS	windows.20h1_vibranium.x64	Driver
18013562882	CDM7 random read performance regression	windows.20h1_vibranium.x64	Driver
18013575731	APST – redundant code removed	NA	Driver
16011777819	[HSA] Unable to enable Intel Optane Memory with prior HSA Version to 18.1 if Legacy (RST or Optane Memory) application is previously installed and removed. Toast pops up 0xA0070020	NA	HSA
18013454210	TG/PG-Optane SSD show offline in Intel Optane Memory and Storage Management GUI.	windows.20h1_vibranium.x64	HSA
18013192052	Pop you must restart your computer after click 'Link Power Management' disable button via HSA with NVMe drives	windows.20h1_vibranium.x64	HSA

#### Resolved Issues in 18.1.0.1023 – Release

ID	Title	Operating System	Component
18013404628	RST Thermal Throttle - RST disengaging when CB exits MT2 after Sx cycles or D3 Hot TT is not triggered	windows.20h1_vibranium.x64	Driver
18012858837	BSOD 0XD1 when run Modern standby stress test on non-TG system	windows.20h1_vibranium.x64	Driver
1306035484	Bitlocker Performance regression with hybrid drives	windows.20h1_vibranium.x64	Driver
18012722490	INTERNAL_POWER_ERROR (a0) during hybrid S3/S4 with Optane enabled on PG drive with driver verifier enabled	windows.20h1_vibranium.x64	Driver
18013022828	BSOD issue during idle with DAPST	windows.20h1_vibranium.x64	Driver
18012952464	No warning pops up in the system tray when unplug the device from RAID volume with the system up and running (Notifications settings is Enabled).	windows.20h1_vibranium.x64	Driver
18012849010	Intermittent BSOD D1 seen with TG during I/O stress test	windows.20h1_vibranium.x64	Driver

18012731189	Smart data not available on SATA raid0	windows.20h1_vibr anium.x64	Driver
18013031443	IOCTL NvmePassThroughCommandTimestamp does not work	N/A	Driver
18011985110	"Error Code: 0x20000001" happens if click [Reboot] button for twice or more times.	windows.20h1_vibr anium.x64	HSA
18012803862	Pinning files size are not the same in Intel Optane Memory and Storage Management and file explorer	windows.20h1_vibr anium.x64	HSA
18013103322	[RKL-S][Optane][Pyrite]: Pyrite Password is prompted for both KH and CB while waking up from Sleep(S3)	N/A	Pre-OS
18013131500	[PreOS] RaidDriver.efi writes to address 0 at EfiDriverBindingSupported function	N/A	Pre-OS
22011476003	[TGL-UP3][RstVmd] When HddPwdPeim driver uses AtaPassThruPpi to get port by GetNextPort() with 0xFFFF, it will return EFI_INVALID_PARAMETER	N/A	VMD Pre-OS

#### Resolved Issues in 18.1.0.1016 – Release

ID	Title	Operating System	Component
18012254779	Wrong notification order during Optane™ rebuild	windows.20h1_vibr anium.x64	HSA
18011912187	Files disappear after pin the DUP driver to the Optane™ memory in IRST UI.	windows.20h1_vibr anium.x64	HSA
18012823326	After waking from S3 observing system Hung and Sporadically SUT asking for password in RAID 1	windows.20h1_vibr anium.x64	PreOS
18012641847	RAID0 trim not working on VMD	windows.20h1_vibr anium.x64	PreOS
18012490317	System cannot boot up due to restart loop by RstVmdPeim.efi	windows.20h1_vibr anium.x64	PreOS
18012385881	Optane™ on TG is not properly detected and wrong last LBA value by PEIM VMD Driver	windows.20h1_vibr anium.x64	PreOS
1809632909	Call connect controller for devices with SSCP installed at end of DXE Start	windows.20h1_vibr anium.x64	PreOS
18012239088	BIOS cannot send identify command successfully by gEdkiiPeiNvmExpressPassThruPpiGuid which is installed by Intel® RST PEIM.	windows.20h1_vibr anium.x64	PreOS

#### Resolved Issues in 18.1.0.1015 – Release

ID	Title	Operating System
----	-------	------------------

18012604474	Intel® RST DAPST - incorrect ITPTs for H20 when FW bits are set incorrectly	N/A
18012446112	Intel® RST Thermal Throttle - configuration IOCTL shows failure	N/A
18011763700	System hang observed intermittently STORAGE_BUS_RESET_IOCTL during IO on OS drive.	N/A

#### Resolved Issues in 18.1.0.1014 – Release

ID	Title	Operating System
18012506631	Optane™ Memory H10 does not support thermal threshold during enumeration	N/A
18012506631	Intel® Optane™ Memory H10 enumeration is not finished if temperature threshold is set during enumeration	N/A
18012345422	BSOD DRIVER_IRQL_NOT_LESS_OR_EQUAL (d1) observed sporadically during Modern Standby flow	windows.20h1_vibranium.x64
18012195128	Could not load file or assembly 'PsiData.dll' or one of its dependencies. The specified module could not be found.	windows.20h1_vibranium.x64
18012185862	HSA error: 0xA00B0003 after toggling Link Power Management switch	N/A

#### Resolved Issues in 18.1.0.1012 – Release

ID	Title	Operating System
18011846480	[CLI] Driver version is not displayed with RSTCLI	windows.20h1_vibranium.x64
1408133213	Intel® Optane™ Memory H10 shows performance issue with high transfer sizes over 128K	N/A
18011402633	Exception during RAID volume creation with an error code 0xA0000002	N/A
18010891634	Intel® RST CDM performance lower for Random R/W Q32T1 workloads	N/A

## Known Issues

#### Known Issues in 18.4.0.1004– Release

ID	Title	Operating System
18015806505	BSOD 154/A0/50 sporadically observed during S4 with RAID volume	windows.20h1_vibranium.x64
18013267674	[WHQL][20H1] C4 BSOD from " module during HLK tests for Intel NVMe Controller (Ronin)	windows.20h1_vibranium.x64
18011754113	[18.1][PG][RKL] Pyramid Glacier disk is reported as TG in TPV menu	windows.20h2_vibranium.x64



## Terminology

Common Terms and Acronyms	Definition
AEN	Asynchronous Event Notification
AHCI	Advanced Host Controller Interface
ATA	Advanced Technology Attachment
ATAPI	Advanced Technology Attachment Packet Interface
BIOS	Basic Input / Output System
BUS PROTOCOL GROUP	A bus protocol group represents a set of bus protocols with similar performance characteristics. Bus Protocol Groups are listed here in descending order of speed: 1- PCIe* 2- SATA
Chipset	A term used to define a collection of The PNHCI components required to make a PC function.
CSMI	OEM Common Storage Management Interface for reporting RAID configurations and SMP, SSP, STP pass through.
DEVSLP	Serial ATA Device Sleep
DMA	Direct Memory Access
DOS	Disk Operating System
DIPM	Device Initiated Power Management
Disk's Write Cache	A memory device within a hard drive, which is allocated for the temporary storage of data before that data is copied to its permanent storage location.
GB	Giga-byte = 1024 <sup>3</sup> bytes
HDD	Hard Disk Drive
HIPM	Host Initiated Power Management
Hot Plug	A term used to describe the removal or insertion of a SATA disk while the system is powered on.
HSA	Hardware Supported App
ICH	Input / Output Controller Hub
InstantGo*	Microsoft Windows* 8.1 connected standby low-power state that features extremely low power consumption while maintaining Internet connectivity.
KB	Kilo-byte = 1024bytes
LPM	Link Power Management
M.2	Specification for internally mounted computer expansion cards and associated connectors. It replaces the mSATA standard. Formerly known as the Next Generation Form Factor (NGFF)
MB	Mega-bytes = 1024 <sup>2</sup> bytes

MEMORY GROUP	A memory group represents a set of backend storage media types with similar performance characteristics. Memory Groups are listed here in ascending order of speed: 1- Spindle Device (HDD) 2- NAND Spindle Hybrid Device 3- PCH SATA NAND Device (SSD) 4- PCIe* NAND Device (SSD) 5- PCIe* NAND Device (SXP)
mSATA	Computer bus interface that connects host bus adapters to mass storage devices such as hard disk drives and optical drives. Uses PCI Express Mini Card-like connector that is electrically SATA.
NAI	Notification Area Icon
NTFS	NT File System
NVC	Non-Volatile Cache
NVMe*	Non-Volatile Memory Express: Non-Volatile Memory Host Controller Interface Specification (NVMHCI), is a specification for accessing solid-state drives (SSDs) attached through the PCI Express (PCIe*) bus
OEM	Original Equipment Manufacturer
ODD	Optical Disk Drive
OROM	Option ROM
OS	Operating System
PCH	Platform Controller Hub
PCIe*	PCI Express (Peripheral Component Interconnect Express): is a high-speed serial computer expansion bus standard
Port	The point at which a SATA drive physically connects to the SATA controller.
PRD	Product Requirements Document
PUIS	Power Up In Standby - Drive feature that allows a spindle device to be powered up in standby mode without spinning the disk up.
RAID	Redundant Array of Independent Disks Matrix RAID: A configuration supporting two RAID levels by having two volumes in a single RAID array that use Intel® RST
RTD3	Runtime D3
RS2	Redstone2
SATA	Serial ATA
SIPM	Software Initiated Power Management
S.M.A.R.T.	Self-Monitoring, Analysis and Reporting Technology: an open standard for developing hard drives and software systems that automatically monitors a hard drive's health and reports potential problems.
SED	Self-Encrypting Drive
SRT	Intel® Smart Response Technology. Intel® RST's premium feature to use caching technology that enables caching of a device or volume using a faster device
SSD	Solid State Drive – non volatile memory used as storage media
SSHD	Solid-State Hybrid Drive
TB	Tera-byte = 1024 <sup>4</sup> bytes
UEFI	UEFI pre-OS driver

UI	User Interface
VC	Validation Candidate
ZPODD	Zero Power Optical Disk Drive