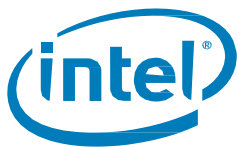


Intel® Solid State Drive Data Center Tool Release Notes

February 2017
Software Version 3.0.3



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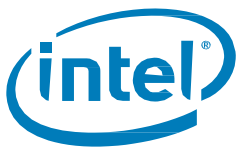
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Tool Revision History

Revision	Date	Version	Description
016	February 2017	3.0.3	<p>This release of the tool includes a firmware update for the Intel® SSD DC D3700, DC D3600, DC P3700, DC P3600, DC P3608, and DC P3500 Series products. The latest firmware revision is 8DV101H0. The latest bootloader revision is 8B1B0133.</p> <p>This release of the tool also includes a firmware update for the Intel® SSD DC S3710 and DC S3610 Series products. The latest firmware revision is G2010160.</p> <p>Additionally, this release also includes the following feature changes:</p> <ul style="list-style-type: none"> • Optimization to timeout during NVMe* format feature • Fixes to delete feature – corrected SATA behavior not performing the delete and the NVMe behavior of not checking if drive has partitions. • Added compatibility with Linux Kernel 4.7 and on. • Various additional bug fixes
015	August 2016	3.0.2	<p>This release of the Intel® SSD Data Center Tool includes enhancements to the log pages with additional support for NVMe IO queue metrics. All details have been documented in the User Guide.</p> <p>This release of the tool also includes a firmware and bootloader update for the Intel® SSD DC P3700, DC P3600, DC P3608, and DC P3500 Series products. The latest firmware revision is 8DV101F0. The latest bootloader revision is 8B1B0133</p> <p>There is a firmware update available for the Intel® SSD DC S3100 Series products. This release of the Intel® SSD Data Center Tool will detect if user's drive is eligible for the firmware update and directs them to use the Intel® SSD Firmware Update Tool.</p> <p>The latest firmware revision is 036D.</p>
014	April 2016	3.0.0	<p>Documentation Update only</p> <p>This release of the Intel® SSD Data Center Tool includes support for the Intel® SSD DC S3100, DC P3320, DC D3700 and DC D3600 Series products.</p>



Revision	Date	Version	Description
013	March 2016	3.0.0	<p>This release of the Intel® SSD Data Center Tool includes support for ESXi 5.5 and 6.0 as well as enhancements to the syntax including new/modified Targets and Properties. All details have been documented in the User Guide.</p> <p>This release of the tool also includes a firmware update for the Intel® SSD DC S3700, DC S3500, DC S3710, DC S3610 and DC S3510 Series products.</p> <p>For the Intel SSD DC S3700 Series, the latest firmware revision is 5DV12270.</p> <p>For the Intel SSD DC S3500 M.2 and DC S3500 HD Series, the latest firmware revision is G2010150.</p> <p>For the Intel SSD DC S3500 Series, the latest firmware revision is D2012370.</p> <p>For the Intel SSD DC S3710, DC S3610 and DC S3510 Series, the latest firmware revision is G2010150.</p>
012 011	December 2015	2.3.1	<p>The release of tool version 2.3.1 includes a firmware update for the Intel® SSD DC P3500 Series products. The latest firmware revision is 8DV10174. The latest bootloader revision is 8B1B0131 (no change).</p> <p>The tool also includes a firmware update for the Intel® SSD 750 Series products. The latest firmware revision is 8EV10174. The latest bootloader revision is 8B1B0131 (no change).</p> <p>Additionally this tool version includes the following feature changes:</p> <ul style="list-style-type: none">• Power governor mode modified to update both drives in Intel® SSD DC P3608 Series products.• Enabled RSTe* 4.3 NVMe RAID support <p>Known compatibility issues with RAID volume configurations using RST version 13.2+.</p>
010	October 2015	2.3.0	<p>Update to documentation - The release of tool version 2.3.0 also includes a firmware and bootloader update for the Intel® SSD 750 Series products. The latest firmware revision is 8EV10171. The latest bootloader revision is 8B1B0131.</p> <p>Additionally this tool version fixes the following bug:</p> <ul style="list-style-type: none">• MR4 Firmware requires NSID to be set to 0xFFFFFFFF when getting log page 0x2. DCT 2.3.0 properly sets the NSID.



Revision	Date	Version	Description
009	September 2015	2.3.0	<p>The release of tool version 2.3.0 adds support for the Intel® Solid State Drive Data Center (Intel® SSD DC) P3608 Series. It also includes a firmware and bootloader update for the Intel® SSD DC P3700, P3600 and P3500 Series products. The latest firmware revision is 8DV10171. The latest bootloader revision is 8B1B0131.</p> <p>Additionally this tool version includes the following features for PCIe* and SATA devices:</p> <ul style="list-style-type: none"> • Added functionality to Enable/Disable Latency Tracking • Added functionality to Parse the read and write commands from Latency Tracking logs • Added functionality to read and/or modify the SM Bus Address for Intel® NVMe SSD Devices only • Updated Power Governor settings to add support for new Intel® SSD Product SKUs
008	August 2015	2.2.4	<p>This version adds a new firmware update for the Intel® SSD DC S3710, DC S3610, DC S3510, DC S3500 M.2 and DC S3500 HD Series. For all above listed products, the latest firmware revision is G2010140.</p>
007	May 2015	2.2.3	<p>This version adds tool support for new PCIe and SATA products in the Intel® SSD Data Center Family, as well as a new firmware and bootloader update for the Intel® Solid State Drive DC P3700, P3600 and P3500 Series.</p> <p>For the Intel® SSD DC P3500 Series, the latest firmware revision is 8DV10135. The latest bootloader revision is 8B1B012E.</p> <p>For the Intel® SSD DC P3700 and P3600 Series, the latest firmware revision is 8DV10151. The latest bootloader revision is 8B1B012F.</p> <p>This tool version contains:</p> <ul style="list-style-type: none"> • For the Linux DCT executable, added capability of the library files being relocated and ran from a different directory • Added functionality to turn On/Off Tool debug log file (Option to specify a name for the log file) • Added functionality to turn On/Off the Tool from loading and using the LSI Adapter Library • Various bugs fixes



Revision	Date	Version	Description
006	March 2015	2.2.1	<p>This version contains additional command support for both SATA and PCIe products, as well as a new firmware and bootloader update for the Intel® Solid State Drive DC P3700 and P3600 Series.</p> <p>The latest firmware revision is 8DV10131. The latest bootloader revision is 8B1B012E.</p> <p>This version contains:</p> <ul style="list-style-type: none">• Fix to NativeMaxLBA calculation for NVMe drives• Modification to the Dump feature – command now enabled with default behavior to output to the screen with the option to output to a file (see the Intel® SSD Data Center Tool User Guide for syntax changes).
005	February 2015	2.2.0	<p>This version added support for the Intel® SSD DC P3500 Series as well as a firmware and bootloader update for the Intel® SSD DC P3700 and P3600 Series. The latest firmware revision is 8DV10130. The latest bootloader revision is 8B1B012D.</p>
004	December 2014	2.1.6	<p>This version provides firmware update capability for Intel® Solid State Drive Data Center Family of products (P3700 and P3600 Series). The latest firmware revision is 8DV10110.</p>
003	October 2014	2.1.4	<p>This version provides firmware update capability for Intel® SSD DC P3700 and P3600 Series. The latest firmware revision is 8DV10102.</p>
002	September 2014	2.1.3	<p>This version contains additional command support for both SATA and PCIe products, as well as a new firmware update for Intel® SSD DC P3700 and P3600 Series.</p> <p>For this version of the tool, to view the correct drive capacity after issuing a Maximum LBA setting, you must refresh the Disk Management Utility. For Linux OS, you must perform a full power-off shutdown.</p> <p>The Standby Immediate command will not work on a host/OS drive.</p>



Revision	Date	Version	Description
001	June 2014	2.1	<p>Initial Release</p> <p>ISSUE: When modifying a MaximumLBA setting on a drive with a partition, the tool will proceed with the operation which means that valid data is left in the SSD media.</p> <p>Workaround: Remove all partitions on the drive and run the NVMe™ Format command before modifying the MaximumLBA setting.</p> <p>ISSUE: After completing a successful change of MaximumLBA, the new drive size does not appear.</p> <p>Workaround: After a successful change to MaximumLBA setting, complete a full power off shutdown, wait 5 seconds and restart. The correct drive size will now be reported.</p>



Product Firmware Revision History

Intel® Solid State Drive DC D3700 and D3600 Series Revision History

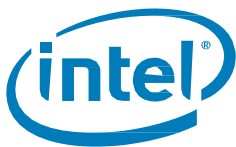
Date	Firmware Revision	Description
February 2017	8DV101H0 8B1B0133 8AP6Z511	<p>This version provides a firmware and bootloader update for the Intel® SSD DC D3700 and D3600 Series.</p> <p>This firmware version contains fixes for the following issues:</p> <ul style="list-style-type: none">• Multiple PCIe Link Dynamic Equalization updates• SQ Header Pointer Mismatch fix• Drive Drop issue under heavy IO testing• Drive unresponsive during concurrent IO and NVMe-MI Basic Management Commands• XN022 Assert Fixes• Sequential read performance improvement at end of life from firmware 8DV101D0

Intel® Solid State Drive DC P3700, P3600 and P3500 Series Revision History

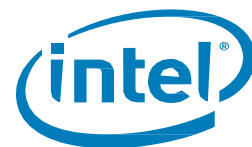
Date	Firmware Revision	Description
February 2017	8DV101H0 8B1B0133	<p>This version provides a firmware and bootloader update for the Intel® SSD DC P3700, P3600 and P3500 Series.</p> <p>This firmware version contains fixes for the following issues:</p> <ul style="list-style-type: none">• XN022 Assert Fixes• Sequential read performance improvement at end of life from firmware 8DV101F0• Misc. sightings closure and improvement on product health.



Date	Firmware Revision	Description
August 2016	8DV101F0 8B1B0133	<p>This version provides a firmware and bootloader update for the Intel® SSD DC P3700, P3600 and P3500 Series.</p> <p>This firmware version contains fixes for the following issues:</p> <ul style="list-style-type: none"> • Added NVME IO Queue Metrics log page support • Added Secure Erase Command Monitoring log page support • Updated Secure Erase Command User Data Erase option • Fix for drive entering disable logical mode after frequent, repeated O/S reboots • Prefetch activate/deactivate logic enhancement • Fix for sequential read performance decay • Fix for formatting 4k+DIF causing read errors when using Intel SPDK • Misc. sightings closure and improvement on product health.
December 2015	(P3500 only) 8DV10174 8B1B0131	<p>This tool version provides a firmware update for the Intel® SSD DC P3500 Series. No change to the bootloader.</p> <p>This firmware version contains fixes for the following issues:</p> <ul style="list-style-type: none"> • Fix for some use cases where user data may be inaccessible or at risk of loss (see Intel Advisory INTEL-SA-00047). • Misc. sightings closure and improvement on product health.
September 2015	8DV10171 8B1B0131	<p>This version provides a firmware and bootloader update for the Intel® SSD DC P3700, P3600 and P3500 Series.</p> <p>This firmware and bootloader version contains fixes for the following issues:</p> <ul style="list-style-type: none"> • Vendor Unique Command to change SM BUS address on "NVMe* Basic Management Command" • Improved TRIM IOPS operation • In-field Drive Configuration Update capability • Windows* Driver update with bug fixes • Misc. sightings closure and improvement on product health



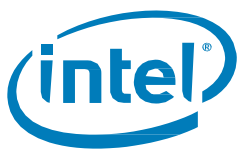
Date	Firmware Revision	Description
May 2015	8DV10135 8B1B012E 8DV10151 8B1B012F	<p>This version provides firmware update capabilities for Intel® SSD DC P3700, P3600 and P3500 Series.</p> <p>For the Intel® SSD DC P3500 Series, the latest firmware revision is 8DV10135. The latest bootloader revision is 8B1B012E. This is the production firmware/bootloader for the product.</p> <p>For the Intel® SSD DC P3700 and P3600 Series, the latest firmware revision is 8DV10151. The latest bootloader revision is 8B1B012F.</p> <p>This firmware/bootloader version contains fixes for the following issues:</p> <ul style="list-style-type: none"> • Pin11 Activity signal and Activity LED blink frequency varies with workload • Data Units Read and Data Units Write attributes reset after high count • High correctable errors reported during link training with drive behind PCIe switch
March 2015	8DV10131 8B1B012E	<p>This version provides firmware update capabilities for Intel® SSD DC P3700 and P3600 Series.</p> <p>The following issues are fixed in this release:</p> <ul style="list-style-type: none"> • Activity LED/Pin11 functionality during idle not meeting specification • OS may fail to boot from Intel® SSD DC P3700/P3600 in some platforms
February 2015	8DV10130 8B1B012D	<p>This firmware and bootloader are the production release version.</p> <p>The following issues are fixed in this firmware and bootloader revision:</p> <ul style="list-style-type: none"> • Endurance Analyzer feature cannot persist wear out info during power cycle • Drive incorrectly counts unsafe power shutdown events on warm reboots and resets • During IO activity, firmware image download/activate commands may timeout • Drive reports higher than actual data units read and write • Drive sub-4KB sequential write performance may be below 1MB/sec • Drive may be showing high values of host read/write commands fresh out of the box • Drive may disappear during S3/S4 cycling • Drive may not enumerate after an in-field bootloader update • Drive may not enumerate and/or enter disable logical mode following a warm reset



Date	Firmware Revision	Description
November 2014	8DV10110	<p>This version provides firmware update capability for Intel® SSD DC P3700 and P3600 Series.</p> <p>The following issues are also fixed in this release:</p> <ul style="list-style-type: none"> • Drive reports incorrect number of error information log entries • Surprise hot removal during firmware upgrade may cause the drive to enter disable logical mode • Drive may not enumerate on cold boot if connected to PLX*8732 switch • Drive may enter disable logical mode (BAD_CTX_1052) during unplanned power loss if there are outstanding NAND erases in progress • Drive may enter disable logical mode during reset handling with unplanned power loss • Drive may incorrectly display serial number and model number in BIOS Boot Override menu
October 2014	8DV10102	<p>This firmware revision has several continuous improvement optimizations intended to provide the best possible user experience with the Intel® SSD. The following issue is also fixed in this release:</p> <p>Drive may enter disable logical mode after warm reboot when running IOs</p>
September 2014	8DV10100	This firmware is the production release version

Intel® Solid State Drive DC P3608 Series Revision History

Date	Firmware Revision	Description
February 2017	8DV101H0 8B1B0133	<p>This version provides a firmware and bootloader update for the Intel® SSD DC P3608 Series.</p> <p>This firmware version contains fixes for the following issues:</p> <ul style="list-style-type: none"> • XN022 Assert Fixes • Sequential read performance improvement at end of life from firmware 8DV101F0 • Misc. sightings closure and improvement on product health.



Date	Firmware Revision	Description
August 2016	8DV101F0 8B1B0133	<p>This version provides a firmware and bootloader update for the Intel® SSD DC P3608 Series.</p> <p>This firmware version contains fixes for the following issues:</p> <ul style="list-style-type: none">• Added NVME IO Queue Metrics log page support• Added Secure Erase Command Monitoring log page support• Updated Secure Erase Command User Data Erase option• Fix for drive entering disable logical mode after frequent, repeated O/S reboots• Prefetch activate/deactivate logic enhancement• Fix for sequential read performance decay• Fix for formatting 4k+DIF causing read errors when using Intel SPDK• Misc. sightings closure and improvement on product health.



Intel® Solid State Drive DC S3710 and DC S3610 Series Revision History

Date	Firmware Revision	Description
February 2017	G2010160	This firmware version includes support for the ACS-3 command set.
March 2016	G2010150	<p>The following changes are included in this firmware update:</p> <ul style="list-style-type: none"> Fixed SATA CRC errors seen when running at 3Gbps Corrected SMART 05h behavior Fixed power consumption on Staggered Spin-up. <p>This latest firmware also includes a fix for a specific use condition where in certain cases if the device receives a command that violates the SATA protocol specification, the drive may ASSERT or stop responding to host commands (See Intel Advisory INTEL-SA-00050).</p>
August 2015	G2010140	<p>This firmware revision has several continuous improvement optimizations intended to provide the best possible user experience with the Intel SSD.</p> <p>The following issues are also fixed in this release:</p> <ul style="list-style-type: none"> Added support for SMART Attribute F3h Modification to Secure Erase to include NAND Erase Improvements to the Maximum Latency for all Sequential and Random Write workloads Added a fourth PHY mode setting to accommodate long interconnects (> 8-inches)

Intel® Solid State Drive DC S3510 Series Revision History

Date	Firmware Revision	Description
March 2016	G2010150	<p>The following changes are included in this firmware update:</p> <ul style="list-style-type: none"> Fixed SATA CRC errors seen when running at 3Gbps Corrected SMART 05h behavior Fixed power consumption on Staggered Spin-up. <p>This latest firmware also includes a fix for a specific use condition where in certain cases if the device receives a command that violates the SATA protocol specification, the drive may ASSERT or stop responding to host commands (See Intel Advisory INTEL-SA-00050).</p>

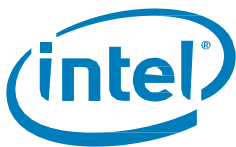


Date	Firmware Revision	Description
August 2015	G2010140	<p>This firmware revision has several continuous improvement optimizations intended to provide the best possible user experience with the Intel SSD.</p> <p>The following issues are also fixed in this release:</p> <ul style="list-style-type: none">• Added support for SMART Attribute F3h• Modification to Secure Erase to include NAND Erase• Improvements to the Maximum Latency for all Sequential and Random Write workloads• Added a fourth PHY mode setting to accommodate long interconnects (> 8-inches)



Intel® Solid State Drive DC S3700 Series Revision History

Date	Firmware Revision	Description
March 2016	5DV12270	This latest firmware include a fix for a specific use condition where in certain cases if the device receives a command that violates the SATA protocol specification, the drive may ASSERT or stop responding to host commands (See Intel Advisory INTEL-SA-00050).
June 2014	5DV10270	<p>This firmware revision has several continuous improvement optimizations intended to provide the best possible user experience with the Intel® SSD.</p> <p>The following issues are also fixed in this release:</p> <ul style="list-style-type: none"> • In the unlikely event that a drive fails, the drive will now report the correct serial number and actual capacity. The error code is available in ID block word 140 and GPL address 0xDD • When a power-off is less than 500ms the drive will automatically reset and allow proper drive enumeration • Support for both 512B and 4KB physical sector size • As blocks are retired, the SMART E8h value will decrease linearly • After a power cycle, timed workload variables will resume from the last saved values and update after 60 minutes and every minute thereafter • SMART Attribute 05h now has a normalized value of 100 • SMART Attribute C2h now reports the correct temperature

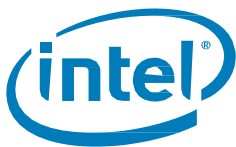
**Intel® Solid State Drive DC S3500 Series Revision History**

Date	Firmware Revision	Description
March 2016	(For DC S3500 M.2, DC S3500 HD only) G2010150 (For DC S3500 only) D2012370.	These latest firmware includes a fix for a specific use condition where in certain cases if the device receives a command that violates the SATA protocol specification, the drive may ASSERT or stop responding to host commands (See Intel Advisory INTEL-SA-00050).
August 2015	(For DC S3500 M.2, DC S3500 HD only) G2010140	Only applicable for the Intel SSD DC S3500 M.2 and DC S3500 HD Series. This firmware revision has several continuous improvement optimizations intended to provide the best possible user experience with the Intel SSD. The following issues are also fixed in this release: <ul style="list-style-type: none">• Added support for SMART Attribute F3h• Modification to Secure Erase to include NAND Erase• Improvements to the Maximum Latency for all Sequential and Random Write workloads• Added a fourth PHY mode setting to accommodate long interconnects (> 8-inches)
June 2014	D2010370	This firmware revision has several continuous improvement optimizations intended to provide the best possible user experience with the Intel® SSD. The following issues are also fixed in this release: <ul style="list-style-type: none">• In the unlikely event that a drive fails, the drive will now report the correct serial number and actual capacity. The error code is available in ID block word 140 and GPL address 0xDD• When a power-off is less than 500ms, the drive will automatically reset and allow proper drive enumeration• Support for both 512B and 4KB physical sector size• As blocks are retired, the SMART E8h value will decrease linearly• After a power cycle, timed workload variables will resume from the last saved values and update after 60 minutes and every minute thereafter• SMART Attribute 05h now has a normalized value of 100• SMART Attribute C2h now reports the correct temperature



Intel® Solid State Drive DC S3100 Series Revision History

Date	Firmware Revision	Description
August 2016	036D	<p>This tool version provides detection of whether user's Intel® SSD DC S3100 Series is eligible for the firmware update and directs them to use the Intel® SSD Firmware Update Tool.</p> <p>The following changes are included in the firmware update:</p> <ul style="list-style-type: none">• Fixes issue that BSOD occurs during S3/S4 resume on systems supporting devsleep• Mitigates a security vulnerability which in some cases resulted in corruption of user's data (see Intel Advisory INTEL-SA-00055)• Corrected SMART AAh, E8h, ABh, and ACh behavior• Corrected DIPM enabled after COMRESET issue• Corrected errant FIS causing BSOD when Write Cache disabled• Corrected SATA NCQ Command Error log reporting issue• Mitigated a security vulnerability which in some cases resulted in corruption of user's data. (see Intel Advisory INTEL-SA-00053)



Intel® Solid State Drive 750 Series Revision History

Date	Firmware Revision	Description
December 2015	8EV10174 8B1B0131	<p>This tool version provides a firmware update for the Intel® SSD 750 Series. No change to the bootloader.</p> <p>This firmware version contains fixes for the following issues:</p> <ul style="list-style-type: none">• Fixed LED behavior to appear LED-On when drive active and LED-Off when drive idle.• Fix for some use cases where user data may be inaccessible or at risk of loss. (see Intel Advisory INTEL-SA-00047)• Misc. sightings closure and improvement on product health.
October 2015	8EV10171 8B1B0131	<p>This version provides a firmware and bootloader update for the Intel® SSD 750 Series.</p> <p>This firmware and bootloader version contains fixes for the following issues:</p> <ul style="list-style-type: none">• Vendor Unique Command to change SM BUS address on "NVMe Basic Management Command"• Improved TRIM IOPS operation• In-field Drive Configuration Update capability• Windows* Driver update with bug fixes• Misc. sightings closure and improvement on product health