

Samsung SSD DC Toolkit

User Guide

Revision 1.2

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Revision History

Revision	Description	Revision Date
1.0	Initial Release	Sep 15, 2016
1.1	Add sub options for ND and NC	Jan 1, 2017
1.2	Change Manual Format	Feb 15, 2017

Introduction

Samsung SSD DC Toolkit is designed to help users with easy-to-use disk management and diagnostic features for server and data center usage. In addition to providing vital SSD status information, SSD DC Toolkit will assist users in updating firmware, , initializing drives, and -, etc.

This document is intended as a guide for how to use Samsung SSD DC Toolkit under the Linux-based server/data center environments. It provides a command line interface to interact with the Samsung SSD Drives.

Cautions

1. Samsung SSD DC Toolkit is only for Samsung SSD products and is not recommended for use with other products.
2. Samsung Electronics is not liable for any data loss or other damages that occur while using the software.
3. Samsung is not able to provide any data restoration service in the event of data loss.

For more information, please refer to Samsung SSD DC Toolkit's End User License Agreement(EULA) at the end of this document.

Preface

This document describes how to use the Samsung SSD DC Toolkit software. .

Who should read this manual?

This manual is intended for Samsung SSD DC Toolkit users .Software users. This manual assumes that the user is familiar with Linux operating systems.

What does this manual cover?

This manual contains the following chapters and appendix:

- Chapter 1, Preface

- Chapter 2, Abbreviations, gives the description of various abbreviations.

- Chapter 3, Introduction, describes Samsung SSD DC Toolkit.

- Chapter 4, Command Line Options, describes the command line options for different features.

- Chapter 5, Examples, describes the features of the Samsung SSD DC Toolkit.

Abbreviations

Abbreviation	Description
ATA	Advanced Technology Attachment
HDD	Hard Disk Drive
CLI	Command Line Interface
IO	Input Output
PATA	Parallel ATA
SATA	Serial ATA
SSD	Solid State Drive
S.M.A.R.T.	Self-Monitoring, Analysis, and Reporting Technology
NVMe	Non-Volatile Memory Express

Features

This user guide describes the commands necessary to interact with Samsung SSD drives. The functionality includes:

Command	Description
List	Detect list of attached Samsung SSD Drives in the system
Firmware Update	Update the old firmware of the SSD to the new version
Erase	Erase data on the SSD by issuing an ATA Format Unit command
S.M.A.R.T	Display smart information and log temperature of the connected Samsung SSD drive, and estimate the lifetime of Samsung SSD
Set Max	Set the maximum address of the Samsung SSD to change its user capacity
Disk Info	Display current overprovisioning value; max address value; state of write cache; WWN; phy speed; power mode of the Samsung SSD
Vendor Utility	Collect and display Failure Analysis log or Power Loss Protection log from the Samsung SSD
Help	Show detailed help

System Requirements

Hardware Requirements

1. SSD

- The following Samsung SSDs are supported
 - Samsung SSD PM863*
 - Samsung SSD PM863a*
 - Samsung SSD SM863*
 - Samsung SSD SM863a*
 - Samsung SSD PM963*
- *Only for non-customized product

2. Others

- On Marvell controller, the DC Toolkit feature may not work properly after hot plugging.

Software Requirements

The tool is supported on the following environments.

Linux system requirements

OS	Comments
RHEL 5.7 and later	Refer to the C600 chipset table below
RHEL 6.1 and later	Refer to the C600 chipset table below
CentOS	Follows the same limitations as RHEL above
Ubuntu 12.04 LTS and later	Full support

System Requirements

- The table below lists the limited support for the Intel C600 chipset families due to the well-known ISCI (Intel SAS Driver) driver issue on Linux platform.

(<https://github.com/Xilinx/linux-xlnx/commits/master/drivers/scsi/isci?page=1>)

OS	Feature support	Comments
RHEL 5.7 and later	Limited support for some ATA commands including Secure Erase, Set Max Address, and FW Update	
RHEL 6.1 and 6.2	Limited support for some ATA commands including Secure Erase, Set Max Address, and FW Update	
RHEL 6.3	Limited support for some ATA commands including Secure Erase, Set Max Address, and FW Update. But it can be fully supported when patched with ISCI 1.4 for RHEL 6.3 (refer to comments on the right)	http://sourceforge.net/projects/intel-sas/files/RHEL6.3%20Driver%20Update%20v1.4.1/
RHEL 6.4 and later	Full support	

* Support for C600 chipsets has been determined by evaluations and tests in the major part, and the ISCI driver code analysis. On Linux systems, the tool must run with root privileges. This can be done through either sudo or su commands. On Marvell controller, the features of Samsung SSD DC Toolkit may not work properly after hot plugging. Samsung SSD DC Toolkit must be run with administrator privilege.

Known Issues specific to Linux

- Set Max Address and Secure Erase require a power cycle of SSD
- Set Max Address may not work on some Ubuntu distributions due to libATA restrictions
- The following operations are supported for SSDs when connected through the LSI HBA cards. LSI HBA latest bios using is recommended for proper operation:
- List, Firmware Update, Secure Erase, SMART, Set Max, Disk Information, Command History, and help features only.
- SMART Self-Test may not work for SSDs when connected through the LSI MegaRAID cards because of MegaRAID time out issue.
- The following operations are strongly recommended for RAID reconfiguration after command sending because of RAID information broken.
- Firmware Update, Secure Erase, Set Max
- In case of NVME device, Vendor unique (such as FA log) features may not work for SSDs in Linux kernel 4.2 or later.

Command Line Options

The Samsung SSD DC Toolkit uses Command Line Interface (CLI)

The table given below briefly explains the available command line options. The detailed description of each feature is provided in the next sections of this chapter. For the purpose of illustration, the name of the tool for all examples will be “DCToolkit” to simplify documentation.

Option	Arguments	Description	Used With
-H [--help]	N/A	Used to display the command line options	N/A
-C[-command -history]	N/A	Used to display the history of the previously executed commands.	N/A
[--force]	N/A	Used to bypass the user prompt.	-E [--erase] -F [--firmwareupdate] -NF [--nvme-format-namespace] -NM [--nvme-management-namespace] -ND [--nvme-firmware-download]
-d [--disk]	Disk Number.	Used to input the physical disk index listed in the --list command. Note: For --firmware-update, to select all disks -d [--disk] option should be followed by keyword “A”	-E [--erase] -F [--firmware-update] -S [--smart] -I [--info] -V [--vendor-utility] -NG [--nvme-get-log-pages] -NF [--nvme-format-namespace] -NM [--nvme-management-namespace] -ND [--nvme-firmware-download] -NC [--nvme-firmware-commit] -NV [--nvme-vendor-utility]

Command Line Options

Option	Arguments	Description	Used With
<code>--force</code>	N/A	Used to bypass the user prompt.	-E [--erase] -F [--firmwareupdate] -NF [--nvme-format-namespace] -NM [--nvme-management-namespace] -ND [--nvme-firmware-download]
<code>-d [--disk]</code>	Disk Number.	Used to input the physical disk index listed in the --list command. Note: For --firmware-update, to select all disks -d [--disk] option should be followed by keyword "A"	-E [--erase] -F [--firmware-update] -S [--smart] -I [--info] -V [--vendor-utility] -NG [--nvme-get-log-pages] -NF [--nvme-format-namespace] -NM [--nvme-management-namespace] -ND [--nvme-firmware-download] -NC [--nvme-firmware-commit] -NV [--nvme-vendor-utility]
<code>-L [--list]</code>	N/A	Used to display a list of attached Samsung SSD Drives.	N/A
<code>-S [--smart]</code>	<code>-d [--disk]</code>	Used to select a specific drive connected to the system and get the SMART Value.	N/A
<code>-q [--query]</code>	N/A	Displays the available LBA percentage	<code>-S [--smart]</code>
<code>-t [--temperature]</code>	Optional file path or no argument.	Logs the temperature of the SSD in the file path provided or if no argument is given, then temperature will be logged into file in default folder, refer to Smart temperature logging file location	<code>-S [--smart]</code>

Command Line Options

Option	Arguments	Description	Used With
-a [--analyzer]	--start --stop	"--start" records the data needed to estimate lifetime of the SSD. "--stop" calculates the lifetime of the SSD from the recorded data.	-S [--smart]
-e [--execute]	--offlineshort --offlineextended --offlineselective --captiveshort --captiveextended --captiveselective --abort --checkstatus	"--[offline/captive]short/extended/selective]" execute SMART Short/Extended/Selective self-test routine in off-line/captive mode. "--abort" abort off-line mode self-test routine. "--checkstatus" get the current progress and result of off-line self-test.	-S [--smart]
-M [--setmax]	-d [--disk], -s [--set]	Performs SETMAX related operations on specified SSD.	N/A
-s [--set]	LBA address	Set Max address value with the given number.	-M [--setmax]
-r [--read-native-max]	N/A	Retrieve Native Max Address of the specified disk.	-M [--setmax]
-F [--firmware-update]	-d [--disk]	Used to update the firmware of the selected disk connected to HOST system.	N/A
-E [--erase]	-d [--disk]	Used to erase all the data on the drive by issuing an ATA Format Unit command.	N/A
-I [--info]	-d [--disk]	Used to display details of the selected disk.	N/A
-V [--vendor-utility]	-fa [--FALog-dump]	Used to execute Vendor Utility Commands for specified disk.	
-NG [--nvme-get-log-pages]	-d [--disk] -e [--error]	Display Log Pages on specified NVMe disk	

Command Line Options

Option	Arguments	Description	Used With
-e [--error]	count	Display the Error Information.	-NG [--nvme-get-log-pages]
-s [--smart]	N/A	Display the SMART/Health information.	-NG [--nvme-get-log-pages]
-f [--firmware]	N/A	Display the firmware slot information	-NG [--nvme-get-log-pages]
-t [--temperature]	N/A	Display the temperature of selected device.	-NG [--nvme-get-log-pages]
-l [--lifetime]	N/A	Display the remained life time of the selected device (%).	-NG [--nvme-get-log-pages]
-NF [--nvme-format-namespace]	-ue [--user-data-erase] -ce [--cryptographic-erase]	Execute format command on specified NVMe disk	
-ue [--user-data-erase]	N/A	Erase the all user data on selected device.	-NF [--nvme-format-namespace]
-ce [--cryptographic-erase]	N/A	All user data shall be erased cryptographically.	-NF [--nvme-format-namespace]
-NM [--nvme-management-namespace]	-sl [--set-lba]	Execute Namespace management command on specified NVMe disk	
-ND [--nvme-firmware-download]	-p [--path] -a [--action] -s [--slot]	Updates firmware to specified NVMe disk	
-NC [--nvme-firmware-commit]	-a [--action] -s [--slot]	Commit the firmware image on specified NVMe disk	
-NV [--nvme-vendor-utility]	-fa [--falog-dump]	Extract the log data from a coreview block of the SSD.	

How to Use DC Tool Kit

Starting SSD DC Toolkit software

Find a DCToolkit file and execute.

```
[root@localhost /]# ./DCToolkit
=====
Samsung SSD DC Toolkit RC3 Version 1.0.0
Copyright (C) 2016 SAMSUNG Electronics Co. Ltd. All rights reserved.
=====
Usage: ./DCToolkit [operation] ...

Allowed Operations:
-----
-L      [ --list                ] Shows disks attached to the system
-I      [ --info                ] Displays the disk details
-F      [ --firmware-update     ] Updates firmware to specified disk
-E      [ --erase               ] Securely Erases all data from specified disk
-S      [ --smart               ] Shows SMART values of specified disk
-M      [ --setmax               ] Perform SetMax related operations on specified disk
-V      [ --vendor-utility       ] Execute Vendor Unique command on specified disk
-NG     [ --nvme-get-log-pages   ] Display Log Pages on specified NVMe disk
-NF     [ --nvme-format-namespace ] Execute format command on specified NVMe disk
-NM     [ --nvme-management-namespace ] Execute management command on specified NVMe disk
-ND     [ --nvme-firmware-download ] Updates firmware to specified NVMe disk
-NC     [ --nvme-firmware-commit ] Commit the firmware image on specified NVMe disk
-NV     [ --nvme-vendor-utility   ] Execute Vendor Unique command on specified NVMe disk
-C      [ --command-history      ] Shows history of the previously executed commands
-H      [ --help                 ] Shows detailed help
-license [ -license              ] Shows the End User License Agreement
-----
-
```

-H [--help]

Display the command line options which are supported by DCToolkit application.

Arguments:	None
Used with:	None
Usage:	DCToolkit --help [or] DCToolkit -H

How to Use DC Tool Kit

```
[root@localhost /]# ./DCToolkit -H
=====
Samsung SSD DC Toolkit RC3 Version 1.0.0
Copyright (C) 2016 SAMSUNG Electronics Co. Ltd. All rights reserved.
=====
```

Argument	Description
-L [--list]	Shows disks attached to the system
-I [--info]	Displays the disk details
-d [--disk] Disk-Number of the disk whose details has to be displayed.	
-F [--firmware-update]	Updates firmware to specified disk
-d [--disk] Disk-Number of the disk or A to select all supported disks to update firmware on.	
-p [--fwpackage-path] Path to the directory containing firmware files.	
--force [--force] Enables the user to perform Firmware Download without prompting for any confirmations.	
-E [--erase]	Securely Erases all data from specified disk
-d [--disk] Disk-Number of the disk to be securely erased.	
--force [--force] Enables the user to perform Secure Erase without prompting for any confirmations.	

```
[root@localhost /]# ./DCToolkit -H
=====
Samsung SSD DC Toolkit RC3 Version 1.0.0
Copyright (C) 2016 SAMSUNG Electronics Co. Ltd. All rights reserved.
=====
```

Argument	Description
-L [--list]	Shows disks attached to the system
-I [--info]	Displays the disk details
-d [--disk] Disk-Number of the disk whose details has to be displayed.	
-F [--firmware-update]	Updates firmware to specified disk
-d [--disk] Disk-Number of the disk or A to select all supported disks to update firmware on.	
-p [--fwpackage-path] Path to the directory containing firmware files.	
--force [--force] Enables the user to perform Firmware Download without prompting for any confirmations.	
-E [--erase]	Securely Erases all data from specified disk
-d [--disk] Disk-Number of the disk to be securely erased.	
--force [--force] Enables the user to perform Secure Erase without prompting for any confirmations.	
-S [--smart]	Shows SMART values of specified disk
-d [--disk] Disk-Number of the disk to show S M A R T values of	

How to Use DC Tool Kit

-C [--command-history]

Display the list of CLI commands executed previously by the user.

Arguments:	None
Used with:	None
Usage:	DCToolkit -- command-history [or] DCToolkit -C

```
[root@localhost /]# ./DCToolkit -C
```

```
=====
Samsung SSD DC Toolkit RC3 Version 1.0.0
Copyright (C) 2016 SAMSUNG Electronics Co. Ltd. All rights reserved.
=====
```

S.No	Start Time	End Time	Command	Result	Remarks
1	18-Sep-2016 18:07:58	18-Sep-2016 18:08:01	-d 2:0 -V -fa	FAIL	Falog dump is failed
2	18-Sep-2016 18:08:50	18-Sep-2016 18:08:53	-d 2:0 -V -fa	FAIL	Falog dump is failed
3	18-Sep-2016 18:10:36	18-Sep-2016 18:10:39	-d 2:0 -V -fa	FAIL	Falog dump is failed
4	18-Sep-2016 18:10:42	18-Sep-2016 18:10:45	-d 2:0 -V -fa	FAIL	Falog dump is failed
5	18-Sep-2016 18:10:49	18-Sep-2016 18:10:52	-d 2:0 -V -fa	FAIL	Falog dump is failed
6	18-Sep-2016 18:32:02	18-Sep-2016 18:32:03	-L	SUCCESS	List completed.
7	18-Sep-2016 19:16:53	18-Sep-2016 19:16:54	-L	SUCCESS	List completed.
8	18-Sep-2016 19:42:58	18-Sep-2016 19:42:59	-L	SUCCESS	List completed.

How to Use DC Tool Kit

[--force]

--force is used to bypass all the acknowledgements displayed by the tool and intimates the tool to complete the operation specified without any further user inputs. This option must be used cautiously as it will not prompt the user for the confirmation, which may result in severe data loss.

Arguments:	None
Used with:	-E [--erase], -T [--trim], -F [--firmware-update] -NF [--nvme-format-namespace], -NM [--nvme-management-namespace], -ND [--nvme-firmware-download]
Usage:	DCToolkit -disk 1 --erase --force DCToolkit -disk 1 -firmware-update -p < fwpackage-path > --force DCToolkit -disk 1:c --nvme-format-namespace --user-data-erase --force DCToolkit -disk 1:c --nvme-management-namespace -set-lba 900000000 --force DCToolkit -disk 1:c --nvme-firmware-download --path {path} --action 1 --slot 0 --force [or] DCToolkit -d 1 -E --force DCToolkit -d 1 -F --p <fwpackage-path> --force DCToolkit -d 1:c --NF --ue --force DCToolkit -d 1:c --NM -sl 900000000 --force DCToolkit -d 1:c --ND -p {path} -a 1 -s 0 --force

```
[root@localhost /]# ./DCToolkit -d 1 -E --force
```

```
=====
Samsung SSD DC Toolkit RC3 Version 1.0.0
Copyright (C) 2016 SAMSUNG Electronics Co. Ltd. All rights reserved.
=====
```

```
-----
Disk Number: 1 | Model Name: NOHBAPM863a | Firmware Version: GXT50M3Q
-----
```

```
WARNING: Disk Index 1 is connected using Marvell HBA. So Magician features may not work properly.
-----
```

```
-----
Completed [ 100% ]
[Erase] Secure Erase completed successfully
-----
```

How to Use DC Tool Kit

-d [--disk]

--disk is used to input the physical disk index listed in the --list command.

Arguments:	None
Used with:	-E [--erase], -F [--firmware-update], S [--smart], -I [--info], -M [--setmax] -NG [--nvme-get-log-pages], -NF [--nvme-format-namespace], -NM [--nvme-management-namespace], -ND [--nvme-firmware-download], -NC [--nvme-firmware-commit]
Usage:	DCToolkit --disk 1 --erase DCToolkit --disk 1 --firmware-update --path <filepath> DCToolkit --disk 1 --smart DCToolkit --disk 1 --setmax --set 123456 DCToolkit --disk 1 --info DCToolkit -disk 1:c --nvme-format-namespace --user-data-erase DCToolkit -disk 1:c --nvme-management-namespace -set-lba 900000000 DCToolkit -disk 1:c --nvme-firmware-download -path {path} -action 1 -slot 0 DCToolkit -disk 1:c --nvme-firmware-commit -action 1 --slot 0 [or] DCToolkit -d 1 -E DCToolkit -d 1 -F -p <fwpackage-path> DCToolkit -d 1 -S DCToolkit -d 1 -M -s 123456 DCToolkit -d 1 -I DCToolkit -d 1:c --NF --ue DCToolkit -d 1:c --NM -sl 900000000 DCToolkit -d 1:c -ND -p {path} -a 1 -s 0 DCToolkit -d 1:c -NC -a 1 -s 0

※ Note: Arguments provided above are only for illustration purpose.

For SSDs directly connected to the system, the disk number should be inputted as "-d 0" and for RAID configuration "-d 2:0:1", where 2 -Library type, 0 -Controller number, and 1 -disk number.

How to Use DC Tool Kit

-L [--list]

Display a list of attached Samsung SSDs.

Arguments:	None
Used with:	None
Usage:	DCToolkit -list [or] DCToolkit -L

```
[root@localhost /]# ./DCToolkit -L
```

```
=====
Samsung SSD DC Toolkit RC3 Version 1.0.0
Copyright (C) 2016 SAMSUNG Electronics Co. Ltd. All rights reserved.
=====
WARNING: 1 Disks has LDM partition. This tool may not work properly.
WARNING: Disk Index 1 is connected using Marvell HBA. So Magician features may not work properly.
=====
```

Disk Number	Path	Model	Serial Number	Firmware	Optionrom Version	Capacity	Drive Health	Total Bytes Written
*0	/dev/sda			EXM02B6Q	N/A	238 GB	GOOD	0.57 TB
1	/dev/sdb	NOHBAPM863a	11111111111111111111	GXT50M3Q	N/A	223 GB	GOOD	0.00 TB
0:c	/dev/nvme0	SAMSUNGZ1LW1T9HMLS-000FB	S3HKNX0H900730	CXV82F1Q	PNUSR011	218 GB	GOOD	0.00 TB

※Note

For normal SSDs connected directly to the system, the “Disk Number” is displayed as a single or natural number (0 or 1 or 2 etc.), but under RAID configuration, the “Disk Number” will be shown in libtype:ctrlid:diskid format(eg- 2:0:1), where 2 – Library type, 0 – Controller Number and 1 – Disk Number. Refer to 4.3 Display Disk List.

In case of NVME device, the Disk Number is displayed as dual number (0:c or 1:c or 2:c etc).

-S [--smart]

Used to select a specific drive connected to the system and get the SMART Value.

For example, if --disk X is specified, where X is the physical disk index, it lists down the SMART attributes of the disk X connected to HOST system.

Also used to log temperature of the disk and estimate its life time and the percentage of the available LBA to replace.

Also used to execute SMART Self-Test.

How to Use DC Tool Kit

Arguments:	-t [--temperature] Enables the user to log the temperature of the disk. -q [--query] Displays the percentage of the available LBA to replace. -a [--analyzer] Displays the lifetime estimation of the disk by SMART value. --analyzer should be followed by either --start or --stop subcommands. -e [--execute] Execute SMART Self-Test. --execute should be followed by --offlineshort, --offlineextended, --offlineselective, --captiveshort, --captiveextended, --captiveelective, --abort, --checkstatus subcommands.
Used with:	--disk [or] -d
Usage:	DCToolkit --disk 1 --smart DCToolkit --disk 1 --smart --temperature : Use default folder location DCToolkit --disk 1 --smart --temperature /home/ : Use /home/ folder location DCToolkit --disk 1 --smart --query DCToolkit --disk 1 --smart --analyzer --start : Record the data needed to estimate the life time of SSD. DCToolkit --disk 1 --smart --analyzer --stop : Analyze the lifetime of the SSD using recorded data. DCToolkit --disk 1 --smart --execute --offlineshort DCToolkit --disk 1 --smart --execute --offlineextended DCToolkit --disk 1 --smart --execute --offlineselective DCToolkit --disk 1 --smart --execute --captiveshort DCToolkit --disk 1 --smart --execute --captiveextended DCToolkit --disk 1 --smart --execute --captiveelective DCToolkit --disk 1 --smart --execute --abort DCToolkit --disk 1 --smart --execute --checkstatus [or] DCToolkit -d 1 -S DCToolkit -d 1 -S -t : Uses default folder location DCToolkit -d 1 -S -t /home/ : Uses /home/ folder location DCToolkit -d 1 -S -q DCToolkit -d 1 -S -a --start : Records the data needed to estimate the life time of SSD. DCToolkit -d 1 -S -a --stop : Analyze the lifetime of the SSD using recorded data. DCToolkit -d 1 -S -e --offlineshort DCToolkit -d 1 -S -e --offlineextended DCToolkit -d 1 -S -e --offlineselective DCToolkit -d 1 -S -e --captiveshort DCToolkit -d 1 -S -e --captiveextended DCToolkit -d 1 -S -e --captiveelective DCToolkit -d 1 -S -e --abort DCToolkit -d 1 -S -e --checkstatus

How to Use DC Tool Kit

※ Note :

Default folder location is /usr/local/Magician/SMARTFiles/. Temperature will be logged into a file "Log_Temperature.txt" in default location if no valid file path is provided.

To estimate the lifetime of the SSD, first --analyzer should be run with --start and then with --stop subcommand. If "Wear Leveling Count" of the SSD is same when executing "--start" and "--stop" subcommands, then lifetime is displayed as infinite.

To check the current progress of SMART OFF-LINE SelfTest, "--checkstatus" subcommand should be used.

To stop the execution of SMART OFF-LINE SelfTest, "--abort" subcommand should be used.

Smart temperature logging file location

The default location for Smart temperature logging file is:

Linux: /usr/local/Magician/SMARTFiles/Log_Temperature.txt

[SMART Information]

```
[root@localhost /]# ./DCToolkit -d 1 -S
```

```
=====
Samsung SSD DC Toolkit RC3 Version 1.0.0
Copyright (C) 2016 SAMSUNG Electronics Co. Ltd. All rights reserved.
=====
```

```
WARNING: Disk Index 1 is connected using Marvell HBA. So Magician features may not work properly.
=====
```

```
Disk Number: 1 | Model Name: NOHBAPM863a | Firmware Version: GXT50M3Q
=====
```

ID	Description	Raw	Normalized	Worst	Threshold	Status
5	Reallocated Sector Count	0	100	100	10	OK
9	Power-on Hours	22	99	99	0	OK
12	Power-on Count	15	99	99	0	OK
177	Wear Leveling Count	94	98	98	5	OK
179	Used Reserved Block Count (total)	0	100	100	10	OK
180	Unused Reserved Block Count (total) - Warranty	784	100	100	10	OK
181	Program Fail Count (total)	0	100	100	10	OK
182	Erase Fail Count (total)	0	100	100	10	OK
183	Runtime Bad Count (total)	0	100	100	10	OK
184	Error Detection	0	100	100	97	OK
187	Uncorrectable Error Count	0	100	100	0	OK
190	Airflow Temperature	36	64	60	0	OK
194	HDD Temperature	1638436	64	60	0	OK
195	ECC Error Rate	0	200	200	0	OK
197	Current Pending Sector Count	0	100	100	0	OK
199	CRC Error Count	0	100	100	0	OK
202	SSD Mode Status	0	100	100	10	OK
235	POR Recovery Count	8	99	99	0	OK
241	Total LBAs Written	1	99	99	0	OK
242	Total LBAs Read	24385	99	99	0	OK
243	SATA Interface Downshifts (total)	1790976	100	100	0	OK
244	Thermal Throttle Status	0	100	100	0	OK
245	Timed Workload Media Wear	65535	100	100	0	OK
246	Timed Workload Host Read/Write Ratio	65535	100	100	0	OK
247	Timed Workload Timer	65535	100	100	0	OK
251	NAND Writes	0	100	100	0	OK

```
=====
WAI(Wear Acceleration Index): 44073040032.00
=====
```

```
[SUCCESS] Smart feature completed successfully.
=====
```

How to Use DC Tool Kit

[Temperature log]

```
[root@localhost /]# ./DCToolkit -d 1 -S -t
=====
Samsung SSD DC Toolkit RC3 Version 1.0.0
Copyright (C) 2016 SAMSUNG Electronics Co. Ltd. All rights reserved.
=====
WARNING: Disk Index 1 is connected using Marvell HBA. So Magician features may not work properly.
-----
Disk Number: 1 | Model Name: NOHBAPM863a | Firmware Version: GXT50M3Q
-----
Serial Number: 11111111111111111111      25-01-2017(17:50:46)      36 deg C

SMART: Temperature Logging: Successfully logged the temperature.
      File: /usr/local/Magician/SMARTFiles//Log_Temperature.txt
-----
[SUCCESS] Smart feature completed successfully.
-----
```

[SSD Lifetime Analyzer]

```
[root@localhost /]# ./DCToolkit -d 1 -S -a --start
=====
Samsung SSD DC Toolkit RC3 Version 1.0.0
Copyright (C) 2016 SAMSUNG Electronics Co. Ltd. All rights reserved.
=====
WARNING: Disk Index 1 is connected using Marvell HBA. So Magician features may not work properly.
-----
Disk Number: 1 | Model Name: NOHBAPM863a | Firmware Version: GXT50M3Q
-----
Analyzer: [INFO] Started the analyzer to get the lifetime estimation of disk.
-----
[SUCCESS] Smart feature completed successfully.
-----
[root@localhost /]# ./DCToolkit -d 1 -S -a --stop
=====
Samsung SSD DC Toolkit RC3 Version 1.0.0
Copyright (C) 2016 SAMSUNG Electronics Co. Ltd. All rights reserved.
=====
WARNING: Disk Index 1 is connected using Marvell HBA. So Magician features may not work properly.
-----
Disk Number: 1 | Model Name: NOHBAPM863a | Firmware Version: GXT50M3Q
-----
Analyzer:
-----
Start Time           : 2017:01:25  17:51:09
End Time             : 2017:01:25  17:51:20
Increase in P/E cycle : 0 (Ave. value)
Increase in Workload  : 0 GB
WAI(Wear Acceleration Index) : Calculation Failed because TBW is 0
Lifetime(Estimation)  : Infinite Days
-----
[SUCCESS] Smart feature completed successfully.
-----
```

How to Use DC Tool Kit

-F [--firmware-update]

Update the firmware of the selected Samsung SSD connected to the Host system.

If --force is not used then the user will be prompted whether or not to continue the command.

Arguments:	<fwpackage-path> [This argument provides the path to the directory containing firmware files and it should be given just after the switch]
Used with:	--disk [or] -d
Usage:	DCToolkit --disk 1 --firmware-update --path < fwpackage-path > DCToolkit --disk A --firmware-update -p < fwpackage-path > [or] DCToolkit -d 1 -F -p < fwpackage-path > DCToolkit -d A -F -p < fwpackage-path >

./DCToolkit -d 1 -F -p ./EXT03X3Q.bin

```

.....
WARNING :Please Note that Firmware Upgrade may format the disk and you will loose your data.
Please Ensure that data backup is taken before proceeding to Firmware Upgrade.
if you are sure then only proceed, otherwise restart the application after taking a backup.
Continue Firmware Upgrade ? [ yes ]:yes
.....
Disk Number: 1 | Model Name: Samsung SSD 845DC EVO 960GB | Firmware Version: EXT05W3Q
.....
F/W Update: Disk is Updated with the New Firmware.
.....
Completed [ 100% ]
.....
[root@localhost 64bin]# ./magician -L
=====
Samsung(R) SSD Magician DC Version 1.0
Copyright (c) 2014 Samsung Corporation
=====
| Disk | Model | Serial | Firmware | Capacity | Drive | Total Bytes |
| Number | | Number | | | Health | Written |
|-----|-----|-----|-----|-----|-----|-----|
| *0 | SAMSUNG 843T | | DXM9103Q | 447 GB | GOOD | 0.01 TB |
| 1 | Samsung SSD 845DC EVO 960GB | S1R1NYAF500316W | EXT03X3Q | 894 GB | GOOD | 0.00 TB |
|-----|-----|-----|-----|-----|-----|

```

How to Use DC Tool Kit

-e [--erase]

Erase all the data on the drive by using an ATA Format Unit command.

If --force is not used then the user will be prompted whether or not to continue the command. --force option must be used cautiously as it will not prompt the user for the confirmation, which may result in severe data loss.

Arguments:	None
Used with:	--disk [or] -d
Usage:	DCToolkit --disk 1 --erase [or] DCToolkit -d 1 -E

```
[root@localhost /]# ./DCToolkit -d 1 -E
=====
Samsung SSD DC Toolkit RC3 Version 1.0.0
Copyright (C) 2016 SAMSUNG Electronics Co. Ltd. All rights reserved.
=====
-----
Disk Number: 1 | Model Name: NOHBAPM863a | Firmware Version: GXT50M3Q
-----
WARNING: Disk Index 1 is connected using Marvell HBA. So Magician features may not work properly.
-----
[[ WARNING ]]

All data on disk will be erased and cannot be recovered,
Please take a back up of any data if necessary.
Continue Secure Erase ? [ yes ]: yes
-----
Completed [ 100% ]
[Erase] Secure Erase completed successfully
-----
```

How to Use DC Tool Kit

-l [--info]

Display the details of the selected Samsung SSD.

Arguments:	None
Used with:	--disk [or] -d
Usage:	DCToolkit --disk 1 --info [or] DCToolkit -d 1 -l

```
[root@localhost /]# ./DCToolkit -L
```

```
=====
Samsung SSD DC Toolkit RC3 Version 1.0.0
Copyright (C) 2016 SAMSUNG Electronics Co. Ltd. All rights reserved.
```

```
=====
WARNING: 1 Disks has LDM partition. This tool may not work properly.
WARNING: Disk Index 1 is connected using Marvell HBA. So Magician features may not work properly.
```

Disk Number	Path	Model	Serial Number	Firmware	Optionrom Version	Capacity	Drive Health	Total Bytes Written
*0	/dev/sda			EXM02B6Q	N/A	238 GB	GOOD	0.57 TB
1	/dev/sdb	NOHBAPM863a	11111111111111111111	GXT50M3Q	N/A	223 GB	GOOD	0.00 TB
0:c	/dev/nvme0	SAMSUNG MZ1LW1T9HMLS-000FB	S3HKNX0H900730	CXV82F1Q	PNUSR011	218 GB	GOOD	0.00 TB

```
[root@localhost /]# ./DCToolkit -d 1 -l
```

```
=====
Samsung SSD DC Toolkit RC3 Version 1.0.0
Copyright (C) 2016 SAMSUNG Electronics Co. Ltd. All rights reserved.
```

```
=====
Disk Number: 1 | Model Name: NOHBAPM863a | Firmware Version: GXT50M3Q
```

```
WARNING: Disk Index 1 is connected using Marvell HBA. So Magician features may not work properly.
```

Over Provision	Write Cache	Max address	SCT Write Cache
No Partitions	Enabled	468862128	Not in effect
SATA Phy Speed	WWN	Power Status	
6.0Gb/s	5002538cffffffff	Active or Idle	

How to Use DC Tool Kit

-M [--setmax]

Perform SETMAX related operations on specified disk, which will decrease or increase the capacity of the SSD. (Can increase up to maximum capacity supported by the SSD).

Arguments:	-s [--set]: Set the disk's capacity by taking value in number of sectors in decimal. -r [--read-native-max]: Display the native max address of the disk in the form of LBA.
Used with:	--disk [or] -d
Usage:	DCToolkit --disk 1 --setmax --set 1234566 DCToolkit --disk 1 --setmax --read-native-max [or] DCToolkit -d 1 -M -s 1234566 DCToolkit -d 1 -M -r

[Setmax --set]

```
[root@localhost /]# ./DCToolkit -d 1 -M -s 180000000
=====
Samsung SSD DC Toolkit RC3 Version 1.0.0
Copyright (C) 2016 SAMSUNG Electronics Co. Ltd. All rights reserved.
=====
Disk Number: 1 | Model Name: NOHBAPM863a | Firmware Version: GXT50M3Q
=====
WARNING: Disk Index 1 is connected using Marvell HBA. So Magician features may not work properly.
=====
Disk Capacity updated to 85GB.
SET MAX Operation Completed. PowerCycle the disk.
=====
[root@localhost /]# ./DCToolkit -d 1 -I
=====
Samsung SSD DC Toolkit RC3 Version 1.0.0
Copyright (C) 2016 SAMSUNG Electronics Co. Ltd. All rights reserved.
=====
Disk Number: 1 | Model Name: NOHBAPM863a | Firmware Version: GXT50M3Q
=====
WARNING: Disk Index 1 is connected using Marvell HBA. So Magician features may not work properly.
=====
Over Provision      | Write Cache      | Max address      | SCT Write Cache
-----
No Partitions      | Enabled          | 1800000001       | Not in effect
-----
SATA Phy Speed     | WWN              | Power Status     |
-----
6.0Gb/s            | 5002538cffffff   | Active or Idle   |
=====
```

How to Use DC Tool Kit

[Setmax --read-native-max]

```
[root@localhost /]# ./DCToolkit -d 1 -M -r
=====
Samsung SSD DC Toolkit RC3 Version 1.0.0
Copyright (C) 2016 SAMSUNG Electronics Co. Ltd. All rights reserved.
=====
-----
Disk Number: 1 | Model Name: NOHBAPM863a | Firmware Version: GXT50M3Q
-----
WARNING: Disk Index 1 is connected using Marvell HBA. So Magician features may not work properly.
-----
Native SET MAX value of the disk is 468862127 LBAs.
-----
```

-V [--vendor-utility]

Used to execute Vendor Utility Commands

Arguments:	-fa [--FALog-dump] Enables the user to extract the log data from a coreview block of the SSD
Used with:	--disk [or] -d
Usage:	DCToolkit --disk 1 --vendor-utility --FALog-dump [or] DCToolkit -d 1 -V -fa

```
[root@localhost /]# ./DCToolkit -d 1 -V -fa
=====
Samsung SSD DC Toolkit RC3 Version 1.0.0
Copyright (C) 2016 SAMSUNG Electronics Co. Ltd. All rights reserved.
=====
-----
Disk Number: 1 | Model Name: NOHBAPM863a | Firmware Version: GXT50M3Q
-----
MODE #1: SATA_EXCEPTION_LOG

Created the log dump successfully
Path: /usr/local/Magician/VendorUtility/20170125_17h56m35s_GXT50M3Q_11111111111111111111_FALogDump.enc
-----
```

How to Use DC Tool Kit

- NG [--nvme-get-log-pages]

Display Log Pages on specified NVMe disk

Arguments:	-l [--lifetime] Display Log Pages on specified NVMe disk -e [--error] Display the Error Information. -s [--smart] Display the SMART/Health information. -f [--firmware] Display the firmware slot information. -t [--temperature] Display the temperature of selected device. -l [--lifetime] Display the remained life time of the selected device (%).
Used with:	--disk [or] -d
Usage:	DCToolkitD --disk 1:c --nvme-get-log-pages --error {count} DCToolkitD --disk 1:c --nvme-get-log-pages --smart DCToolkitD --disk 1:c --nvme-get-log-pages --firmware DCToolkitD --disk 1:c --nvme-get-log-pages --temperature DCToolkitD --disk 1:c --nvme-get-log-pages --lifetimeor [or] DCToolkitD -d 1:c -NG -e {count} DCToolkitD -d 1:c -NG -s DCToolkitD -d 1:c -NG -f DCToolkitD -d 1:c -NG -t DCToolkitD -d 1:c -NG -l

How to Use DC Tool Kit

```
[root@localhost ~]# ./DCToolkit -d 0:c -NG -s
```

```
=====
```

```
Samsung SSD DC Toolkit RC3 Version 1.0.0
```

```
Copyright (C) 2016 SAMSUNG Electronics Co. Ltd. All rights reserved.
```

```
=====
```

```
-----
```

```
Disk Number: 0:c | Model Name: SAMSUNG MZ1LW1T9HMLS-000FB | Firmware Version: CXV82F1Q
```

```
-----
```

Bytes	Description	Value
0	Critical Warning	0x00
2:1	Composite Temperature	0x013E
3	Available Spare	0x64
4	Available Spare Threshold	0x0A
5	Percentage Used	0x01
47:32	Data Units Read	0x00000000000000000000000000000002
63:48	Data Units Written	0x00000000000000000000000000000000
79:64	Host Read Commands	0x000000000000000000000000000000CD
95:80	Host Write Commands	0x00000000000000000000000000000000
111:96	Controller Busy Time	0x00000000000000000000000000000000
127:112	Power Cycle	0x00000000000000000000000000000001
143:128	Power On Hours	0x00000000000000000000000000000002
159:144	Unsafe Shutdowns	0x00000000000000000000000000000000
175:160	Media and Data Integrity Errors	0x00000000000000000000000000000000
191:176	Number of Error Information Log Entries	0x00000000000000000000000000000000
195:192	Warning Composite Temperature Time	0x00000000
199:196	Critical Composite Temperature Time	0x00000000
201:200	Temperature Sensor 1	0x013E
203:202	Temperature Sensor 2	0x0151
205:204	Temperature Sensor 3	0x0000
207:206	Temperature Sensor 4	0x0000
209:208	Temperature Sensor 5	0x0000
211:210	Temperature Sensor 6	0x0000
213:212	Temperature Sensor 7	0x0000
215:214	Temperature Sensor 8	0x0000

```
-----
```

```
[Success] Get Log Page Feature completed successfully
```

```
-----
```

How to Use DC Tool Kit

- NF [--nvme-format-namespace]

Execute format command on specified NVMe disk

Arguments:	-ue [--user-data-erase] Erase the all user data on selected device. -ce [--cryptographic-erase] All user data shall be erased cryptographically.
Used with:	--disk [or] -d
Usage:	DCToolkit --disk 1:c --user-data-erase --user-data-erase DCToolkitD --disk 1:c --nvme-format-namespace --cryptographic-erase [or] DCToolkit -d 1:c -NF -ue DCToolkit -d 1:c -NF -ce

```
[root@localhost /]# ./DCToolkit -d 0:c -NF -ue
```

```
=====
```

```
Samsung SSD DC Toolkit RC3 Version 1.0.0
```

```
Copyright (C) 2016 SAMSUNG Electronics Co. Ltd. All rights reserved.
```

```
=====
```

```
-----
```

```
Disk Number: 0:c | Model Name: SAMSUNG MZ1LW1T9HMLS-000FB | Firmware Version: CXV82F1Q
```

```
-----
```

```
[[ WARNING ]]
```

```
All data on disk will be erased and cannot be recovered.
```

```
Please take a back up of any data if necessary.
```

```
Continue Format Command ? [ yes ]: yes
```

```
-----
```

```
[NVMe Format] Format completed successfully
```

```
-----
```

How to Use DC Tool Kit

- NM [--nvme-management-namespace]

Execute management command on specified NVMe disk

Arguments:	-sl [--set-lba] Sets namespace lba size on selected device by capacity.
Used with:	--disk [or] -d
-Usage:	DCToolkit --disk 1:c --nvme-management-namespace --set-lba 900000000 [or] DCToolkit -d 1:c -NM -sl 900000000

```
[root@localhost /]# ./DCToolkit -d 0:c -NM -sl 1800000000
```

```
=====
Samsung SSD DC Toolkit RC3 Version 1.0.0
Copyright (C) 2016 SAMSUNG Electronics Co. Ltd. All rights reserved.
=====
```

```
-----
Disk Number: 0:c | Model Name: SAMSUNG MZ1LW1T9HMLS-000FB | Firmware Version: CXV82F1Q
-----
```

```
[[ WARNING ]]
```

```
Please Note that Set LBA feature feature may change the disk information and you will lose your data
Please Ensure that data backup is taken before proceeding to Set LBA feature
If you are sure then only proceed, otherwise restart the application after taking a backup
Continue Set LBA feature ? [ yes ]: yes
```

```
-----
[SUCCESS] Namespace Management feature completed successfully
-----
```

How to Use DC Tool Kit

- ND [--nvme-firmware-download]

Updates firmware to specified NVMe disk

Arguments:	-p [--path] Firmware image path to download on specified disk -a [--action] Specifies the action that is taken on the image downloaded with the Firmware Download Feature -s [--slot] Specifies the firmware slot that shall be used for Commit Action, if applicable Action: 0: Downloaded image replace the image specified by the Firmware Slot This image is not activated 1: Downloaded image replaces the image specified by the Firmware Slot. This image is activated at the next reset
Used with:	--disk [or] -d
Usage:	DCToolkit --disk 1 --nvme-firmware-download --path {path} --action 1 -slot 0 [or] DCToolkit -d 1:c -ND -p {path} -a 1 -s 0

[Detail Sub Option]

a0	download fw at slot	FW IMAGE DOWNLOAD COMMAND + FW COMMIT (Commit Action 000b)COMMAND	v1.1 SPEC
a1	download fw and activation after reset at slot	FW IMAGE DOWNLOAD COMMAND + FW COMMIT (Commit Action 001b)COMMAND	v1.1 SPEC

How to Use DC Tool Kit

```
[root@localhost /]# ./DCToolkit -d 0:c -ND -a 1 -s 1 -p ./CXV8001Q.bin
```

```
=====
```

```
Samsung SSD DC Toolkit RC3 Version 1.0.0
```

```
Copyright (C) 2016 SAMSUNG Electronics Co. Ltd. All rights reserved.
```

```
=====
```

```
-----
```

```
Disk Number: 0:c | Model Name: SAMSUNG MZ1LW1T9HMLS-000FB | Firmware Version: CXV82F1Q
```

```
-----
```

```
[[ WARNING ]]
```

```
Please Note that Firmware Update may format the disk and you will lose your data
```

```
Please Ensure that data backup is taken before proceeding to Firmware Update
```

```
If you are sure then only proceed, otherwise restart the application after taking a backup
```

```
Continue Firmware image download ? [ yes ]: yes
```

```
-----
```

```
[ERROR] Succeed to download the firmware image, but given slot is read only
```

```
-----
```

How to Use DC Tool Kit

-NC [--nvme-firmware-commit]

Commit the firmware image on specified NVMe disk

Arguments:	-a [--action] Specifies the action that is taken on the image downloaded with the Firmware Download Feature -s [--slot] Specifies the firmware slot that shall be used for the Commit Action, if applicable Action: 2: The image specified by the Firmware Slot is activated at the next reset 3: The image specified by the Firmware Slot is requested to be activated immediately without reset
Used with:	--disk [or] -d
-Usage:	DCToolkit --disk 1:c --nvme-firmware-commit --action 2 --slot 0 [or] DCToolkit -d 1:c -NC -a 2 -s 0

[Detail Sub Option]

a2	activation after reset at slot	FW COMMIT (Commit Action 010b) COMMAND	v1.1 SPEC
a3	activation immediately at slot	FW COMMIT (Commit Action 011b) COMMAND	v1.2 SPEC

```
[root@localhost /]# ./DCToolkit -d 0:c -NC -a 2 -s 1
```

```
=====
```

```
Samsung SSD DC Toolkit RC3 Version 1.0.0
```

```
Copyright (C) 2016 SAMSUNG Electronics Co. Ltd. All rights reserved.
```

```
=====
```

```
-----
```

```
Disk Number: 0:c | Model Name: SAMSUNG MZ1LW1T9HMLS-000FB | Firmware Version: CXV82F1Q
```

```
-----
```

```
[SUCCESS] Firmware Commit feature completed successfully
```

```
-----
```

How to Use DC Tool Kit

- NV [--nvme-vendor-utility]

Execute Vendor Unique command on specified NVMe disk

Arguments:	-fa [--falog-dump] Extract the log data from a coreview block of the SSD.
Used with:	--disk [or] -d
Usage:	DCToolkit --disk 1:c --nvme-vendor-utility --falog-dump [or] DCToolkit -d 1:c -NV -fa

```
[root@localhost /]# ./DCToolkit -d 0:c -NV -fa
```

```
=====
```

```
Samsung SSD DC Toolkit RC3 Version 1.0.0
```

```
Copyright (C) 2016 SAMSUNG Electronics Co. Ltd. All rights reserved.
```

```
-----
```

```
Disk Number: 0:c | Model Name: SAMSUNG MZ1LW1T9HMLS-000FB | Firmware Version: CXV82F1Q
```

```
-----
```

```
MODE #1: PLP_HANG
```

```
Created the log dump successfully
```

```
Path: /usr/local/Magician/VendorUtility/20170125_17h58m44s_CXV82F1Q_S3HKNX0H900730_FaLogDump.xml
```

```
-----
```

Examples

This chapter explains the details of the features along with the Command Terminal Input and screenshots of the respective features.

Display History of Commands

The Command history table can be displayed using the -C or --command-history command line option. Maximum of 500 command history will be displayed:

```
DCToolkit --command-history
or
DCToolkit -C
```

Display Tool Help

The help table can be displayed using the --help command line option:

```
DCToolkit --help
or
DCToolkit -H
```

Display Disk List

The -L or --list option will display a list of Samsung SSDs which shows the Model Name, Firmware version, Capacity, Disk Health, TBW etc.

```
DCToolkit --list
or
DCToolkit -L
```

Below figures show the console screen example of disk list display on Linux system

A sample snapshot of disk list feature is shown below, where 4:0:1 is displayed as Disk Number for SSD with model “MZ-7WD2400/0H3”.

4 - Library Type, 0 - Controller Number, 1 - Disk Number.

Disk List display on Linux

Disk Number	Path	Model	Serial Number	Firmware	Optionrom Version	Capacity	Drive Health	Total Bytes Written
*0	###.###PHYSICALDRIVE1	SAMSUNG SSD PM863	S15YNYAD433427	GXT33F3Q	N/A	223 GB	GOOD	0.26 TB

※ Note: To run any feature, the disk Number should be mentioned as displayed under the column “Disk Number” in the above snapshot (“-d 0” for only SATA Device and “-d 2:0:1” for RAID configuration, -d 0:c for NVME Device.)

Examples

SMART Information of the Disks

This feature is used to select a specific disk connected to the system and get the SMART value of the disk. This feature will also log the temperature of the SSD and display the estimated life time of the SSD and the percentage of the available LBA to replace.

The below Command Line option will perform the SMART operation:

```
DCToolkit --disk 1 --smart
DCToolkit --disk 1 --smart --temperature (use default location)
DCToolkit --disk 1 --smart --temperature /home/ (store the file in /home/)
DCToolkit --disk 1 --smart --query
DCToolkit --disk 1 --smart --analyzer --start (record data for
Lifetime estimation)
DCToolkit --disk 1 --smart --analyzer --stop (display the estimated
Lifetime)

DCToolkit --disk 1 --smart --execute --offlineshort
DCToolkit --disk 1 --smart --execute --offlineextended
DCToolkit --disk 1 --smart --execute --offlineselective
DCToolkit --disk 1 --smart --execute --captiveshort
DCToolkit --disk 1 --smart --execute --captiveextended
DCToolkit --disk 1 --smart --execute --captiveselective
DCToolkit --disk 1 --smart --execute --abort
DCToolkit --disk 1 --smart --execute --checkstatus

DCToolkitD --disk 1:c --nvme-get-log-pages --error {count}
DCToolkitD --disk 1:c --nvme-get-log-pages --smart
DCToolkitD --disk 1:c --nvme-get-log-pages --firmware
DCToolkitD --disk 1:c --nvme-get-log-pages --temperature
DCToolkitD --disk 1:c --nvme-get-log-pages --lifetimeor
or
DCToolkit -d 1 -S
DCToolkit -d 1 -S -t (use default location)
DCToolkit -d 1 -S -t /home/ (store the file in /home/)
DCToolkit -d 1 -S -q
DCToolkit -d 1 -S -a --start (record the data for Lifetime estimation)
DCToolkit -d 1 -S -a --stop (display the estimated Lifetime.)
DCToolkit -d 1 -S -e --offlineshort
DCToolkit -d 1 -S -e --offlineextended
DCToolkit -d 1 -S -e --offlineselective
DCToolkit -d 1 -S -e --captiveshort
DCToolkit -d 1 -S -e --captiveextended
DCToolkit -d 1 -S -e --captiveselective
DCToolkit -d 1 -S -e --abort
DCToolkit -d 1 -S -e --checkstatus
DCToolkitD -d 1:c -NG -e {count}
DCToolkitD -d 1:c -NG -s
DCToolkitD -d 1:c -NG -f
DCToolkitD -d 1:c -NG -t
DCToolkitD -d 1:c -NG -l
```

※ Note: If no file path is provided to -t command, temperature is logged in the file located at /usr/local/Magician/SMARTFiles/. Filename would be Log_Temperature.txt.

Examples

The default locations for Smart temperature logging files are:

Linux: /usr/local/Magician/SMARTFiles/Log_Temperature.txt

To estimate the life time of the SSD, run -a command with --start option and then with --stop option. If "ID 177" of SMART information is same during --start and --stop option, then life time is displayed as infinite.

To execute the SMART Self-Test, run -e command with appropriate sub option. If --offlineshort, --offlineextended, --offlineselective option selected, it will be stopped by --abort option. Its progress can be displayed with --checkstatus option. If --captiveshort, --captiveextended, --captiveselective option selected, it is impossible to escape the execution during the estimated time.

Firmware Update

This feature is useful for changing SSD's firmware from old version to new version.

The below given CLI input will perform the firmware update operation on the selected disk:

```
DCToolkit --disk 1 --firmware-update --path <fw-path>
DCToolkit --disk 1:c --nvme-firmware-download --path <fw-path> --
action 1 --slot 0
or
DCToolkit -d 1 -F -p <fw-path>
DCToolkit -d 1:c -ND -p <fw-path> -a 1 -s 0
```

Examples

Erase

Erase feature is designed to remove all user data from a drive permanently. This command will put the drive back to its original out-of-box state. This will initially restore its performance to the highest possible level and the best (lowest number) possible write amplification.

The below given CLI input will perform the erase operation on the selected disk:

```
DCToolkit --disk -1 --erase

DCToolkitD --disk 1:c --nvme-format-namespace --user-data-erase
DCToolkitD --disk 1:c --nvme-format-namespace --cryptographic-erase
or
DCToolkit -d 1 -E

DCToolkitD -d 1:c -NF -ue
DCToolkitD -d 1:c -NF -ce
```

- ※ Note: When the disk is in frozen state, the user has to unplug and plug-in the power cable and restart the erase operation.

Write amplification is an issue that occurs in SSDs that can decrease the lifespan of the SSD and impact performance. The lower the write amplification, the longer will be the lifespan of SSD.

Set Max Address

This feature is for setting maximum address of the SSD. The user has to input the number of sectors in decimal format. This feature is designed to set the physical capacity of SSD. This feature is only recommended to be used on the device at its initial set-up stage. In contrast to over-provisioning modifying max address may result in data loss, particularly when the max address is reduced.

This feature will update the disks capacity with user input value, only if it is successful in reading the max address value of the disk. After successful execution, the updated value of the disk can be observed in --list command.

```
DCToolkit --disk 1 --setmax --set 12345678
DCToolkit --disk 1 --setmax --read-native-max

DCToolkit --disk 1:c --nvme-management-namespace --set-lba
900000000
or
DCToolkit -d 1 -M -s 12345678
DCToolkit -d 1 -M -r

DCToolkit -d 1:c -NM -sl 900000000
```

Examples

Disk Info

This feature will display disk details such as Overprovision, Write Cache state, Max address value, SCT Write Cache state, WWN, Phy Speed, current Power Mode, etc. of the specified disk.

```
DCToolkit --disk 1 --info  
or  
DCToolkit -d 1 -I
```

Bypass confirmation prompt (--force)

The --force option is used to bypass the confirmation prompt for --erase, --trim and --firmware-update features.

```
DCToolkit --disk 1 --erase --force  
DCToolkit --disk 1 --firmware-update --path <filepath> --force  
  
DCToolkit --disk 1:c --nvme-format-namespace --user-data-erase --force  
DCToolkitD --disk 1:c --nvme-format-namespace --cryptographic-erase --  
force  
DCToolkit --disk 1:c --nvme-management-namespace --set-lba 900000000  
--force  
DCToolkit --disk 1:c --nvme-firmware-download --path {path} --action 1 --  
slot 0 --force
```

Vendor Utility

This feature will perform Vendor Utility features such as:

Get the FA-log-dump data

```
DCToolkit --disk 1 --vendor-utility --FALog-dump  
DCToolkit --disk 1:c --nvme-vendor-utility --falog-dump  
[or]  
DCToolkit -d 1 -V -fa  
DCToolkit -d 1:c -NV -fa
```

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Supported Commands for LSI RAID

Feature	Comments
-L [--list]	Show a disk(s) attached to the system
-F [--firmware-update]	Update firmware to specified disk
-E [--erase]	Securely Erase all data from specified disk
-S [--smart]	Show S.M.A.R.T values of specified disk
-M [--setmax]	Perform SetMax related operations on specified disk
-V [--vendor-utility]	Perform Vendor features specific to Samsung SSD
-C [--command-history]	Show history of the previously executed commands
-I [--info]	Display the disk details to the user
-H [--help]	Show detailed Help

End of Document

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