



Intel® Solid-State Drive Data Center Tool

User Guide Version 1.0

Order Number: 327191-001

April 2012



INFORMATION IN THIS DOCUMENT IS PROVIDED IN CONNECTION WITH INTEL PRODUCTS. NO LICENSE, EXPRESS OR IMPLIED, BY ESTOPPEL 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.

UNLESS OTHERWISE AGREED IN WRITING BY INTEL, THE INTEL PRODUCTS ARE NOT DESIGNED NOR INTENDED FOR ANY APPLICATION IN WHICH THE FAILURE OF THE INTEL PRODUCT COULD CREATE A SITUATION WHERE PERSONAL INJURY OR DEATH MAY OCCUR.

Intel may make changes to specifications and product descriptions at any time, without notice. Designers must not rely on the absence or characteristics of any features or instructions marked "reserved" or "undefined." Intel reserves these for future definition and shall have no responsibility whatsoever for conflicts or incompatibilities arising from future changes to them. The information here is subject to change without notice. Do not finalize a design with this information.

The products described in this document may contain design defects or errors known as errata which may cause the product to deviate from published specifications. Current characterized errata are available on request.

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

Copies of documents which have an order number and are referenced in this document, or other Intel literature, may be obtained by calling 1-800-548-4725, or go to: <http://www.intel.com/design/literature.htm>

Intel and the Intel logo are trademarks of Intel Corporation in the U.S. and/or other countries.

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

Copyright © 2012 Intel Corporation. All rights reserved.



Contents

1	Introduction.....	5
1.1	Features.....	5
1.2	System Requirements.....	5
1.3	Known Issues	5
2	Command Line Options.....	6
2.1	-help.....	8
2.2	-list	8
2.3	-force.....	8
2.4	-filename [name of the file]	9
2.5	-verbose	9
2.6	-verify [pattern]	9
2.7	-seed [num].....	10
2.8	-device [num].....	10
2.9	-firmware_update.....	11
2.10	-power_setting [default max_performance].....	11
2.11	-drive [num "all"].....	12
2.12	-inquiry [page code(s) "all" NULL]	12
2.13	-log [page code(s) "all" NULL]	13
2.14	-erase	13
2.15	-resize [max LBA].....	14
2.16	-read [LBA] [Blockcount]	14
2.17	-write [LBA] [Blockcount] [pattern]	15
3	Error Codes	16
4	Examples.....	18
4.1	Display Tool Help	18
4.2	Display PCIe Devices and Drives	19
4.3	By-pass Prompt	19
4.4	Saving Data from the Drive	19



4.5	<i>Verbose Inquiry and Log Data</i>	19
4.6	<i>Verify Data Read</i>	19
4.7	<i>Set Random Seed</i>	20
4.8	<i>Display Drive Info</i>	20
4.9	<i>Display PCIe Device Info</i>	21
4.10	<i>SCSI Inquiry</i>	21
4.11	<i>SCSI Log Page</i>	24
4.12	<i>SCSI Full Format Unit</i>	25
4.13	<i>Set Max Address</i>	26
4.14	<i>SCSI Read</i>	26
4.15	<i>SCSI Write</i>	27
4.16	<i>Firmware Update</i>	28
4.17	<i>Change Power Setting</i>	28



1 Introduction

The purpose of this guide is to describe how to use the Intel® Solid-State Drive Data Center Tool (Intel SSD Data Center Tool or iSDCT). The tool provides a command line interface for interacting and issuing commands to the Intel® Solid-State Drive 910 Series (Intel SSD 910 Series) drives.

1.1 Features

This user guide describes the commands necessary for interacting with Intel SSD 910 drives. The functionality includes:

- Detecting drives and adapters attached on the system.
- Erasing data on the SSD by issuing a SCSI Full Format Unit command.
- Resizing the SSD by changing its max Logical Block Address (LBA).
- Updating the firmware for the SSD
- Issuing SCSI read and write commands to the SSD.
- Reading and parsing SCSI Inquiry pages and Log pages.
- Changing the drives performance by changing the Power Setting configuration.

1.2 System Requirements

The tool is supported on the following operating systems:

- Microsoft Windows Server* 2008 SP2 / R2
- Microsoft Windows Server* 2003
- Microsoft Windows* 7
- Red Hat Enterprise Linux (RHEL) 5.5, 5.6, 6.0, and 6.1
- SUSE 11

NOTE: On Microsoft Windows* 7, and Server 2008/R2, administrator access is required via one of the following methods:

- Open a command prompt as administrator and run the tool via the commands listed below.
- Disable User Account Control (UAC) where applicable and run the tool by running it in a command prompt.

NOTE: On Linux systems, the tool must run with root privileges. This can be done through either *sudo* or *su* commands.

1.3 Known Issues

There are currently no known issues with this tool.



2 Command Line Options

The Intel SSD Data Center Tool uses a Command Line Interface (CLI). Below is a table of the available command line options, and following the table is a detailed description of each option. Alternatively, the tool can be run without any options to display the table. For the purposes of illustration, the name of the tool for all examples will be "iSDCT.exe" to simplify documentation.

Option	Arguments	Description	Used With
-help	NA	Display the command line options table.	NA
-list	NA	Scan the system for attached drives and adapters, and display the results.	NA
-force	NA	Used to bypass the user prompt.	-firmware_update, -erase, -power_setting
-filename	[name of the file]	Used to save data to a file.	-log, -inquiry, -read
-verbose	NA	Used to print a more detailed inquiry or log page data table.	-inquiry, -log
-verify	[pattern]	Used to verify the data read back from -read command against a known data pattern.	-read
-seed	[num]	Used to set the seed value for the random number generator.	-write, -verify
-device	[index num]	Used to select which attached PCIe SSD device to execute functions on.	-firmware_update, -power_setting
-firmware_update	NA	Used to update the selected Device's firmware. The firmware used for this feature is embedded within the tool. No binary file used. When the command runs, both the PCIe to SAS Controller and all SSDs are updated as needed. NOTE: Using any other software tool and binary file besides the iSDCT.EXE tool to update the PCIe to SAS controller firmware will render the drive useless and void the warranty. There is no recovery after loading a non-authorized PCIe to SAS controller firmware.	-device
-power_setting	[setting]	Change the device's power setting. Given setting can be either: Default, or max_performance. NOTE: The max_performance configuration requires strict host capabilities. See Section 2.10 for details.	-device



-drive	[index num "all"]	Used to select which attached drive to execute functions on.	-inquiry, -log, - erase, -resize, - read, -write
-inquiry	[page code(s) "all" NULL]	Used to read and parse SCSI inquiry pages.	-drive
-log	[page code(s) "all" NULL]	Used to read and parse SCSI log pages.	-drive
-erase	NA	Used to issue a Full SCSI format unit. NOTE: This operation can take as long as 20 minutes to complete.	-drive
-resize	[Max LBA]	Used to set the drives max LBA value.	-drive
-read	[LBA] [blockcount]	Used to issue a SCSI read 12 command	-drive
-write	[LBA] [blockcount] [pattern]	Used to issue a SCSI write 12 command	-drive



2.1 -help

Description:	Display the command line options table. This option takes precedence over all others. All other arguments will be ignored.
Arguments:	None.
Used with:	None.
Usage:	iSDCT.exe -help. See example: Display Tool Help

[Return to Command Line Options](#)

2.2 -list

Description:	Scan the system for attached PCIe devices and associated drives, and display the results. All other arguments will be ignored. Drives associated with an adapter will be displayed below their adapter. Use this option to see the PCIe device and drive indexes which are used by - device -drive.
Arguments:	None.
Used with:	None.
Usage:	iSDCT.exe -list. See example: Display PCIe Devices and Drives

[Return to Command Line Options](#)

2.3 -force

Description:	-force is used to bypass the user prompt.
Arguments:	None.
Used with:	-firmware update , -erase , -power setting
Usage:	See example: By-pass Prompt

[Return to Command Line Options](#)



2.4 –filename [name of the file]

Description:	The <code>--filename</code> option is used when data needs to be stored to a file. Currently used by <code>--log</code> and <code>--inquiry</code> to save .CSV files of the requested data. Also used by <code>--read</code> to save a binary file of the data read from the drive.					
Arguments:	<table><tr><th>Argument</th><th>Description</th></tr><tr><td>[name of the file]</td><td>A valid filename and path.</td></tr></table>		Argument	Description	[name of the file]	A valid filename and path.
Argument	Description					
[name of the file]	A valid filename and path.					
Used with:	--log , --inquiry , --read					
Usage:	See example: Saving Data from the Drive					

[Return to Command Line Options](#)

2.5 –verbose

Description:	–verbose is used to print a more detailed inquiry or log page data table.
Arguments:	None.
Used with:	–log , –inquiry
Usage:	iSDCT.exe –drive X –inquiry 0x03 –verbose. See example: Verbose Inquiry and Log Data

[Return to Command Line Options](#)

2.6 –verify [pattern]

Description:	-verify is used to verify the data read back from -read command against a known data pattern.					
Arguments:	<table><tr><th>Argument</th><th>Description</th></tr><tr><td>[pattern]</td><td>Pattern can be a valid hex value; for example, 0xC5. Pattern can also be "rand" if there is a need to use random data based off a seed.</td></tr></table>		Argument	Description	[pattern]	Pattern can be a valid hex value; for example, 0xC5. Pattern can also be "rand" if there is a need to use random data based off a seed.
Argument	Description					
[pattern]	Pattern can be a valid hex value; for example, 0xC5. Pattern can also be "rand" if there is a need to use random data based off a seed.					
Used with:	-read , -seed					
Usage:	iSDCT.exe -device Y -drive X -read 0 1 -verify 0xC5. See example: Verify Data Read					

[Return to Command Line Options](#)



2.7 -seed [num]

Description:	<p>-seed is used to set the seed value for the random number generator.</p> <p>Use this command with a "rand" pattern for either -write or -verify. The seed value will default to 0 if -seed is not used. -seed will be ignored if "rand" is not used for the pattern of -write and -verify.</p>					
Arguments:	<table><tr><th><u>Argument</u></th><th><u>Description</u></th></tr><tr><td>[num]</td><td>The numeric value to set the seed to.</td></tr></table>		<u>Argument</u>	<u>Description</u>	[num]	The numeric value to set the seed to.
<u>Argument</u>	<u>Description</u>					
[num]	The numeric value to set the seed to.					
Used with:	-write , -verify					
Usage:	iSDCT.exe -device Y -drive X -write 0 2 rand -seed 44. See example: Set Random Seed					

[Return to Command Line Options](#)

2.8 -device [num]

Description:	<p>-device is used to select which attached PCIe device to execute functions on.</p> <p>Run -list to see the PCIe device indexes for each attached drive.</p> <p>Detailed information about the specific PCIe device will be displayed when used with no additional options. Additional information includes the PCIe device link status and the drives associated with the PCIe device.</p>					
Arguments:	<table><tr><th><u>Argument</u></th><th><u>Description</u></th></tr><tr><td>[num]</td><td>The numeric value corresponds to the PCIe Device index from: -list.</td></tr></table>		<u>Argument</u>	<u>Description</u>	[num]	The numeric value corresponds to the PCIe Device index from: -list.
<u>Argument</u>	<u>Description</u>					
[num]	The numeric value corresponds to the PCIe Device index from: -list.					
Used with:	-firmware update , -power setting , -drive					
Usage:	iSDCT.exe -device 0. See example: Display PCIe Device Info					

[Return to Command Line Options](#)



2.9 –firmware_update

Description:	<p>-firmware_update is used to update the selected PCIe device's firmware as well as each associated drive's firmware.</p> <p>Note: The Intel SSD Data Center Tool uses embedded firmware. No binary file is required.</p> <p>This command will update either / or both the PCIe controller firmware as well as the target SSD firmware as needed.</p> <p>If -force is not used then the user will be prompted whether or not to continue the command.</p>
Arguments:	None.
Used with:	-device
Usage:	iSDCT.exe -device X. See example: Firmware Update

[Return to Command Line Options](#)

2.10 –power_setting [default|max_performance]

Description:	<p>-power_setting is used to change the Intel SSD 910 Series drive power configuration.</p> <p>NOTE (1): Changing the power setting could damage the drive! Ensure the host system can meet the <u>300 LFM</u> and <u>28W</u> average power and <u>38W</u> peak power to the PCIe slot the drive is located, before changing from default power setting.</p> <p>NOTE (2): Only the 800GB SKU Drive is configurable and this setting is above and beyond data sheet specifications.</p> <p>If -force is not used then the user will be prompted whether or not to continue the command.</p>					
Arguments:	<table><tr><th><u>Argument</u></th><th><u>Description</u></th></tr><tr><td>[default max_performance]</td><td>Set the power configuration to the given setting.</td></tr></table>		<u>Argument</u>	<u>Description</u>	[default max_performance]	Set the power configuration to the given setting.
<u>Argument</u>	<u>Description</u>					
[default max_performance]	Set the power configuration to the given setting.					
Used with:	-device					
Usage:	iSDCT.exe -device X -power_setting max_performance.					

[Return to Command Line Options](#)



2.11 -drive [num | "all"]

Description:	<p>-drive is used to select which attached drive to execute functions on.</p> <p>Run -list to see the drive indexes for each attached drive.</p> <p>Basic drive information will be displayed if no additional options are used.</p>							
Arguments:	<table><tr><th>Argument</th><th>Description</th></tr><tr><td>[num]</td><td>The numeric value corresponds to the drive index from -list.</td></tr><tr><td>["all"]</td><td>"all" can be used to iterate functionality across all attached drives. Use caution when using the "all" argument as every one of the drives associated with the PCIe device will be affected by the command.</td></tr></table>		Argument	Description	[num]	The numeric value corresponds to the drive index from -list.	["all"]	"all" can be used to iterate functionality across all attached drives. Use caution when using the "all" argument as every one of the drives associated with the PCIe device will be affected by the command.
Argument	Description							
[num]	The numeric value corresponds to the drive index from -list.							
["all"]	"all" can be used to iterate functionality across all attached drives. Use caution when using the "all" argument as every one of the drives associated with the PCIe device will be affected by the command.							
Used with:	-inquiry , -log , -erase , -resize , -read , -write							
Usage:	iSDCT.exe -device Y -drive X. See example: Display Drive Info							

[Return to Command Line Options](#)

2.12 -inquiry [page code(s) | "all" | NULL]

Description:	<p>-inquiry is used to read and parse SCSI inquiry pages from the selected drive.</p> <p>Use page code of 0x00 to print a list of supported pages.</p>							
Arguments:	<table><tr><th>Argument</th><th>Description</th></tr><tr><td>[page code(s)]</td><td>This argument is optional. If no page code is given then the standard SCIS inquiry page will be parsed. It is possible to provide it with one or more page codes to parse.</td></tr><tr><td>["all"]</td><td>If the "all" is used, then all supported inquiry pages will be parsed</td></tr></table> <p>Note: page code arguments are hex values of the page code. I.E. 0x03, 0x00, etc.</p>		Argument	Description	[page code(s)]	This argument is optional . If no page code is given then the standard SCIS inquiry page will be parsed. It is possible to provide it with one or more page codes to parse.	["all"]	If the "all" is used, then all supported inquiry pages will be parsed
Argument	Description							
[page code(s)]	This argument is optional . If no page code is given then the standard SCIS inquiry page will be parsed. It is possible to provide it with one or more page codes to parse.							
["all"]	If the "all" is used, then all supported inquiry pages will be parsed							
Used with:	-drive							
Usage:	iSDCT.exe -device Y -drive X -inquiry 0x00 0x03. See example: SCSI Inquiry							

[Return to Command Line Options](#)



2.13 -log [page code(s) | "all" | NULL]

Description:	<p>-log is used to read and parse SCSI log pages from the selected drive.</p> <p>Use page code 0x00 to print a list of supported pages.</p>							
Arguments:	<table><tr><th>Argument</th><th>Description</th></tr><tr><td>[page code(s)]</td><td>This argument is optional. If no page code is given then the page code 0x00 will be parsed. It is possible to provide it with one or more page codes to parse.</td></tr><tr><td>["all"]</td><td>If the "all" option is used, then all supported inquiry pages will be parsed</td></tr></table> <p>Note: page code arguments are hex values of the page code. I.E. 0x03, 0x00, etc.</p>		Argument	Description	[page code(s)]	This argument is optional . If no page code is given then the page code 0x00 will be parsed. It is possible to provide it with one or more page codes to parse.	["all"]	If the "all" option is used, then all supported inquiry pages will be parsed
Argument	Description							
[page code(s)]	This argument is optional . If no page code is given then the page code 0x00 will be parsed. It is possible to provide it with one or more page codes to parse.							
["all"]	If the "all" option is used, then all supported inquiry pages will be parsed							
Used with:	-drive							
Usage:	iSDCT.exe -device Y -drive X -log. See example: SCSI Log Page							

[Return to Command Line Options](#)

2.14 -erase

Description:	<p>-erase is used to issue a SCSI full format unit to the selected drive and erase all data. NOTE: This command will take at least 20 minutes to complete the erasure of data on the drive specified.</p> <p>If -force is not used then the user will be prompted whether or not to continue the command.</p>	
Arguments:	None.	
Used with:	-drive	
Usage:	iSDCT.exe -device Y -drive X -erase. See example: SCSI Full Format Unit	

[Return to Command Line Options](#)



2.15 –resize [max LBA]

Description:	-resize is used to set the drives max LBA value.	
Arguments:		
	Argument	Description
	[max LBA]	The numeric value to set the max LBA to.
Used with:	-drive	
Usage:	iSDCT.exe -device Y -drive X -resize 2195555. See example: Set Max Address	

[Return to Command Line Options](#)

2.16 –read [LBA] [Blockcount]

Description:	<p>-read is used to issue a “SCSI Read 12” command to the drive.</p> <p>Use -filename to save a binary file of the data read.</p> <p>Use -verify to verify the data read against a given pattern.</p>							
Arguments:	<table><tr><th><u>Argument</u></th><th><u>Description</u></th></tr><tr><td>[LBA]</td><td>Start the read from this given LBA.</td></tr><tr><td>[Blockcount]</td><td>Number of blocks to read from the drive.</td></tr></table> <p>Note: LBA and Blockcount are both number values.</p>		<u>Argument</u>	<u>Description</u>	[LBA]	Start the read from this given LBA.	[Blockcount]	Number of blocks to read from the drive.
<u>Argument</u>	<u>Description</u>							
[LBA]	Start the read from this given LBA.							
[Blockcount]	Number of blocks to read from the drive.							
Used with:	-drive							
Usage:	iSDCT.exe -device Y -drive X -read 0 2. See example: SCSI Read							

[Return to Command Line Options](#)



2.17 -write [LBA] [Blockcount] [pattern]

Description:	-write is used to issue a "SCSI Write 12" command to the drive.									
Arguments:	<table><tr><th><u>Argument</u></th><th><u>Description</u></th></tr><tr><td>[LBA]</td><td>Start writing to the drive at this given LBA.</td></tr><tr><td>[Blockcount]</td><td>Number of blocks to write to the drive.</td></tr><tr><td>[pattern]</td><td>pattern is either the hex byte pattern desired to be written, or it is a "rand" to write random data. When using "rand" as the pattern, use -seed to change the seed value of the random number generator.</td></tr></table>		<u>Argument</u>	<u>Description</u>	[LBA]	Start writing to the drive at this given LBA.	[Blockcount]	Number of blocks to write to the drive.	[pattern]	pattern is either the hex byte pattern desired to be written, or it is a "rand" to write random data. When using "rand" as the pattern, use -seed to change the seed value of the random number generator.
<u>Argument</u>	<u>Description</u>									
[LBA]	Start writing to the drive at this given LBA.									
[Blockcount]	Number of blocks to write to the drive.									
[pattern]	pattern is either the hex byte pattern desired to be written, or it is a "rand" to write random data. When using "rand" as the pattern, use -seed to change the seed value of the random number generator.									
Used with:	-drive									
Usage:	iSDCT.exe -device Y -drive X -write 0 2 0xAB. See example: SCSI Write									

[Return to Command Line Options](#)



3 Error Codes

Below is a table of possible error and status codes returned from the tool. The first column lists the numeric value of the error/status code. This is the value returned by the tool. The second column lists a description for each error/status. For Microsoft Windows*, typing the following in the command prompt after running the tool displays the numeric Error/Status Code:

```
echo %errorlevel%
```

For Linux, using the "\$?" at the command line obtains the same results.

Error/Status Code	Description
4	ERROR: Failed to open the drive.
11	ERROR: Read-verify failed with given pattern.
18	Firmware is up to date.
66	The Intel SSD has pre-production firmware. Please contact Intel Customer Support for further assistance at the following website: http://www.intel.com/go/ssdsupport .
67	The Intel SSD has unsupported firmware. Please contact Intel Customer Support for further assistance at the following website: http://www.intel.com/go/ssdsupport .
73	ERROR: Invalid arguments provided. Run -help to see usage examples.
81	Command was cancelled by the user.
87	ERROR: Invalid drive index given. Use -scan to see the correct values for drive index.
202	ERROR: Given verify pattern value is not a valid hex value or 'rand'.
203	Read-verify successful
205	ERROR: Invalid SKU. Power Setting can only be changed on 800GB SKU.
206	ERROR: Invalid power setting given. Must be either 'default' or 'max_performance'.
207	ERROR: Invalid PCIe Device index.
208	ERROR: PCIe Device failed to open.



210	ERROR: Failed to write the file. (When -filename is used)
211	ERROR: SCSI mode sense command failed.
212	ERROR: SCSI mode select command failed.
213	ERROR: Failed to read SCSI log page.
214	ERROR: SCSI Inquiry command failed.
215	ERROR: Failed to erase the drive.
216	ERROR: Firmware update failed.
217	ERROR: Invalid inquiry page code given.
218	ERROR: Invalid log page code given.
220	ERROR: Given LBA and blockcount values will go beyond the drive's Max LBA.
221	ERROR: Invalid arguments were given for a read operation. Need [LBA] [blockcount]. [LBA] and [blockcount] need to be numeric.
222	ERROR: Invalid arguments were given for a write operation. Need [LBA] [blockcount] [pattern]. [LBA] and [blockcount] need to be numeric.
224	ERROR: Given Max LBA must be greater than 0.
226	ERROR: SCSI Read command failed.
227	ERROR: SCSI Write command failed.
242	ERROR: Failed to validate firmware download.
245	ERROR: Failed to reset adapter.
247	ERROR: PCIe firmware download failed.



4 Examples

4.1 Display Tool Help

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

iSDCT.exe -help

Argument	Description
-help	Display the help string and exit. All other arguments will be ignored. Example: <code>isdt.exe -help</code>
-list	Display a list of attached PCIe Devices and Drives. All other arguments will be ignored. Example: <code>isdt.exe -list</code>
-force	Bypass all the user prompts. Example: <code>isdt.exe -device 0 -drive 1 -erase -force</code>
-filename [X]	Use in conjunction with <code>-inquiry</code> <code>-log</code> and <code>-read</code> . Saves the parsed data to a CSV file if used with <code>-inquiry</code> and <code>-log</code> . Saves a binary file with data read if used with <code>-read</code> . X must be a valid file path and name. Example: <code>isdt.exe -device 0 -drive 1 -log 0x00 0x2F -filename logData.csv</code>
-verbose	Use in conjunction with <code>-inquiry</code> and <code>-log</code> . Increases the verbosity of the printed structures. Example: <code>isdt.exe -device 0 -drive 1 -inquiry -verbose</code>
-verify [X]	Use in conjunction with <code>-read</code> . Verifies the data read against the given byte pattern X. X must be a valid hex value. Or rand if using random data. Example: <code>isdt.exe -device 0 -drive 1 -read 0 256 -verify 0xAA</code>
-seed [X]	Set the seed value of the random generator to the given value. Used in conjunction with <code>-write</code> and <code>-read</code> with <code>-verify</code> when rand pattern is used. Example: <code>isdt.exe -device 0 -drive 1 -write 0 256 rand -seed 2</code>
-device [X]	Use to select a specific PCIe Device to interact with. X must be a valid PCIe Device index number. Run with no additional parameters to display more information about the device. Run <code>-list</code> to see attached devices and drives. Example: <code>isdt.exe -device 0</code>
-firmware_update	Update the firmware of the given PCIe Device. Example: <code>isdt.exe -device 0 -firmware_update</code>
-power_setting [X]	Use to set the given PCIe Device's performance setting. Only supported on 800GB SKUs. [X] must be a valid power setting: default or max_performance. To use this setting host system must support 300 LFM and both 28W Avg and 38W peak to the PCIe slot. Example: <code>isdt.exe -device 0 -power_setting max_performance</code>
-drive [X]	Use to select a specific drive of the selected PCIe Device to interact with. X must be a valid drive index number. If X is 'all' then functionality will be iterated through all drives of the selected PCIe Device. Run <code>-list</code> to see the selected PCIe Device's attached drives. Example: <code>isdt.exe -device 0 -drive 1</code>
-inquiry [page code]	Parse the given inquiry page code data from the <code>-drive</code> . If no page code is given then the standard SCSI inquiry data is parsed. Page code can be a list of one or more valid page codes. Use Page Code = 0x00 to display the list of supported page codes. Use 'all' for the page number to parse all inquiry pages. Use <code>-verbose</code> to return more detailed information. Use <code>-filename</code> to save output to a file. Example: <code>isdt.exe -device 0 -drive 1 -inquiry 0x0</code>
-log [page code]	Parse the given log page code data from the given <code>-drive</code> . If no page code is given then the supported log pages will be displayed. Page code can be a list of one or more valid page codes. Use 'all' for the page code to parse all log pages. Use <code>-verbose</code> to return more detailed information. Use <code>-filename</code> to save CSV output to a file. Example: <code>isdt.exe -device 0 -drive 1 -log</code>
-erase	Erase all the data on the drive by issuing a SCSI Format Unit command. Prompts the user for confirmation. Use <code>-force</code> to bypass prompt. Note: Erasing the drive could take 10+ minutes to complete. Example: <code>isdt.exe -device 0 -drive 1 -erase</code>
-resize [MaxLBA]	Set the <code>-drive</code> 's maximum LBA to the given value. Example: <code>isdt.exe -device 0 -drive 1 -resize 0x12345678</code>
-read [LBA] [blockcount]	Read the given number of blocks starting from the given LBA. Use <code>-filename</code> to save the binary data to a file. Example: <code>isdt.exe -device 0 -drive 1 -read 0 256 -filename readData.bin</code>
-write [LBA] [blockcount] [pattern]	Write the given pattern and the given number of blocks starting from the given LBA. Example: <code>isdt.exe -device 0 -drive 1 -write 0 256 0xAA</code>



It will also be displayed when no command line options are used:

iSDCT.exe

4.2 Display PCIe Devices and Drives

The `-list` option will display a list of detected PCIe devices and drives:

iSDCT.exe -list

PCIe Device Index	Port	Product Name	Power Setting
0	Scsi Port 2	Intel(R) SSD 910	Default

Drive Index	Model	Serial Number	Max LBA	Sector Size	SAS Address	Phy Num	Test Unit	Firmware
0	INTEL(R) SSD 910 200GB	XUU05SNB	390721967	512	5000CCA013005689	3	Ready	1200C008A40D
1	INTEL(R) SSD 910 200GB	XUU05SPB	390721967	512	5000CCA01300568E	5	Ready	1200C008A40D

4.3 By-pass Prompt

The `-force` option is used to bypass the confirmation prompt for `-firmware_update`, `-erase` and `-power_setting`.

4.4 Saving Data from the Drive

`-filename` option can be used with `-inquiry` and `-log` to save off a .CSV file of the requested data. See `-inquiry` examples and `-log` examples for more details. It can also be used with `-read` to save a binary file of the data read. See `-read` examples for more details.

4.5 Verbose Inquiry and Log Data

`-verbose` can be used with `-log` and `-inquiry` to print a more detailed data table of the requested data. See `-log` examples and `-inquiry` examples for more details.

4.6 Verify Data Read

`-verify` can be used with `-read` to verify the data read against a given pattern. See `-read` examples for more details.



4.7 Set Random Seed

-seed can be used with -write and -verify when using a "rand" pattern. See -write examples and -read examples for more details.

4.8 Display Drive Info

-drive option is used to select a drive via drive index (see -list) to execute functions on. Additionally, use -drive by itself (no other options) to print out the basic drive information on a single drive:

iSDCT.exe -device 0 -drive 1

Device Index	Drive Index	Model	Serial Number	Max LBA	Sector Size	SAS Address	Phy Num	Test Unit	Firmware
0	1	INTEL(R) SSD 910 200GB	XVU05SPB	390721967	512	5000CCA01300568E	5	Ready	1200C000A40D
SUCCESS									

Or on all the drives:

iSDCT.exe -device 0 -drive all

Device Index	Drive Index	Model	Serial Number	Max LBA	Sector Size	SAS Address	Phy Num	Test Unit	Firmware
0	0	INTEL(R) SSD 910 200GB	XVU05SNB	390721967	512	5000CCA013005689	3	Ready	1200C000A40D
SUCCESS									
Device Index	Drive Index	Model	Serial Number	Max LBA	Sector Size	SAS Address	Phy Num	Test Unit	Firmware
0	1	INTEL(R) SSD 910 200GB	XVU05SPB	390721967	512	5000CCA01300568E	5	Ready	1200C000A40D
SUCCESS									



4.9 Display PCIe Device Info

Similar to -drive, -device is used to select an adapter to execute functions on. Also use -device by itself (no other command line options) to print out detailed information about the PCIe Device:

iSDCT.exe -device 0

```

PCIe Device's Link Status...
| Port 0 | Port 1 | Port 2 | Port 3 | Port 4 | Port 5 | Port 6 | Port 7 |
| off   | off   | off   | 6.0 G | off   | 6.0 G | off   | off   |

SUCCESS

```

PCIe Device Index	Port	Product Name	Power Setting
0	Scsi Port 2	Intel(R) SSD 910	Default

Drive Index	Model	Serial Number	Max LBA	Sector Size	SAS Address	Phy Num	Test Unit	Firmware
0	INTEL(R) SSD 910 200GB	XUU05SNB	390721967	512	5000CCA013005689	3	Ready	1200C000A40D
1	INTEL(R) SSD 910 200GB	XUU05SPB	390721967	512	5000CCA01300568E	5	Ready	1200C000A40D

4.10 SCSI Inquiry

-inquiry is used to parse the inquiry pages from the drive. If no arguments are given to -inquiry then the standard SCSI Inquiry structure is parsed:

iSDCT.exe -device 0 -drive 1 -inquiry

```

Inquiry Page = Standard Inquiry Page
| Description | Value |
| Vendor ID | INTEL(R) |
| Product ID | SSD 910 200GB |
| Product Revision Level | a40D |
| Unit Serial Number | XUU05SPB |
| Copyright Notice | Please contact your Intel field representative. |

SUCCESS

```

Device Index	Drive Index	Model	Serial Number	Max LBA	Sector Size	SAS Address	Phy Num	Test Unit	Firmware
0	1	INTEL(R) SSD 910 200GB	XUU05SPB	390721967	512	5000CCA01300568E	5	Ready	1200C000A40D

To parse multiple inquiry pages, provide the -inquiry with a list of one or more page codes (in hex format):

iSDCT.exe -device 0 -drive 1 -inquiry 0x00 0x03 0x80



```
Device | Drive | Model | Serial Number | Max LBA | Sector | SAS Address | Phy | Test | Firmware |
Index | Index | | | | Size | | | Num | Unit | |
-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
0 | 1 | INTEL(R) SSD 910 200GB | XUV05SPB | 390721967 | 512 | 5000CCA01300568E | 5 | Ready | 1200C000A40D |

Supported Page List. Inquiry Page = 0x00
-----|-----|
Description | Value |
-----|-----|
Supported Page List | 0x00 |
ACSII information - Firmware | 0x03 |
Unit Serial Number Page | 0x00 |
Device Identification Page | 0x03 |
Extended Inquiry Data and Protection Information Page | 0x06 |
Mode Page Policy Page | 0x07 |
SCSI Protocol Specific Information | 0x08 |
Power Condition Page | 0x0A |
Protocol Specific Logical Unit Information Page | 0x90 |
Device Type Specific Information Page | 0xB0 |
Device Type Specific Information Page | 0xB1 |
Vendor specific - Board Information | 0xD2 |
-----|-----|

ACSII information - Firmware. Inquiry Page = 0x03
-----|-----|
Description | Value |
-----|-----|
Microcode ID | MLGNA40D |
Build Number | 0x00443034 |
Build Date | Tue Apr 03 14:45:33 2012 |
Product ID | MLC |
Interface ID | SAS |
Code Type | EVAL |
User Name | |
Machine Name | |
Directory Name | |
Operating State | 0x00000005 |
Functional Mode | 0x00010007 |
Degraded Reason | 0x00000000 |
Broken Reason | 0x00000000 |
Code Mode | 0x00000002 |
Microcode Revision | C01A2016 |
Context Failure Reason | 0x00000000 |
-----|-----|

Unit Serial Number Page. Inquiry Page = 0x00
-----|-----|
Description | Value |
-----|-----|
Serial Number | XUV05SPB |
-----|-----|

SUCCESS
```

To parse all the inquiry pages, provide the "all" to -inquiry:

```
iSDCT.exe -device 0 -drive 1 -inquiry all
```

Use the -filename command line option to save a .CSV file of the requested inquiry page(s):

```
iSDCT.exe -device 0 -drive 1 -inquiry -filename stdInq.csv
```

```
Device | Drive | Model | Serial Number | Max LBA | Sector | SAS Address | Phy | Test | Firmware |
Index | Index | | | | Size | | | Num | Unit | |
-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
0 | 1 | INTEL(R) SSD 910 200GB | XUV05SPB | 390721967 | 512 | 5000CCA01300568E | 5 | Ready | 1200C000A40D |

Successfully saved inquiry data to: stdInq.csv
SUCCESS
```

Use the -verbose command line option to print a more detailed data table of the requested inquiry page(s).

Note: Use the -filename option to save more detailed data to the .CSV file as well.



isDCT.exe -device 0 -drive 1 -inquiry 0x03 -verbose

```

Device | Drive | Model | Serial Number | Max LBA | Sector | SAS Address | Phy | Test | Firmware
Index | Index | | | | Size | | Num | Unit |
-----|-----|-----|-----|-----|-----|-----|-----|-----|-----
0 | 1 | INTEL(R) SSD 910 200GB | XU005SPB | 390721967 | 512 | 5000CCA01300568E | 5 | Ready | 1200C000A40D

ASCII information - Firmware. Inquiry Page = 0x03
Bytes | Bits | Description | Value
-----|-----|-----|-----
0 | 7:5 | Peripheral Device Type | 0x00
1 | 4:0 | Qualifier | 0x0
2-3 | 4:0 | Peripheral Device Type | 0x0
4 | Page Code | 0x03
5-23 | Page Length | 0x00CC
24-35 | Fields Length | 0x00
36-39 | Reserved | 0x00000000000000000000000000000000
40-41 | Microcode ID | MLGN440D
42-43 | Reserved | 0x772ED998
44-47 | Major Version | 0x3461
48-51 | Minor Version | 0x4430
52-79 | User Count | 0x00303030
80-81 | Build Number | 0x00443034
82-83 | Build Date | Tue Apr 03 14:45:33 2012
84-91 | Code ID | 0x4408
92-99 | Compatibility ID | 0xFFFF
100-107 | Product ID | MLC
108-119 | Interface ID | SAS
120-135 | Code Type | EVAL
136-167 | User Name |
168-171 | Machine Name |
172-175 | Directory Name |
176-179 | Operating State | 0x00000005
180-183 | Functional Mode | 0x00010007
184-187 | Degraded Reason | 0x00000000
188-195 | Broken Reason | 0x00000000
196-199 | Code Mode | 0x00000002
Microcode Revision | C010Z016
Context Failure Reason | 0x00000000

SUCCESS

```

To parse the inquiry page(s) of all drives, use the “all” with the -drive parameter:

isDCT.exe -device 0 -drive all -inquiry 0x80

```

Device | Drive | Model | Serial Number | Max LBA | Sector | SAS Address | Phy | Test | Firmware
Index | Index | | | | Size | | Num | Unit |
-----|-----|-----|-----|-----|-----|-----|-----|-----|-----
0 | 0 | INTEL(R) SSD 910 200GB | XU005SNB | 390721967 | 512 | 5000CCA013005689 | 3 | Ready | 1200C000A40D

Unit Serial Number Page. Inquiry Page = 0x80
Description | Value
-----|-----
Serial Number | XU005SNB

SUCCESS

Device | Drive | Model | Serial Number | Max LBA | Sector | SAS Address | Phy | Test | Firmware
Index | Index | | | | Size | | Num | Unit |
-----|-----|-----|-----|-----|-----|-----|-----|-----|-----
0 | 1 | INTEL(R) SSD 910 200GB | XU005SPB | 390721967 | 512 | 5000CCA01300568E | 5 | Ready | 1200C000A40D

Unit Serial Number Page. Inquiry Page = 0x80
Description | Value
-----|-----
Serial Number | XU005SPB

SUCCESS

```



4.11 SCSI Log Page

-log is used to parse the log pages from the drive. If no arguments are specified to the -log command then log page 0x00 will be parsed:

```
iSDCT.exe -device 0 -drive 1 -log
```

```
Device : Drive : Model : Serial Number : Max LBA : Sector : SAS Address : Phy : Test : Firmware :
Index : Index :
0 : 1 : INTEL(R) SSD 910 200GB : XUU05SPB : 390721967 : 512 : 5000CCA01300560E : 5 : Ready : 1200C000A40D :

Supported Page List. Log Page = 0x00
Description : Value :
Supported Page List : 0x00 :
Write Error Counter : 0x02 :
Read Error Counter : 0x03 :
Verify Error Counter : 0x05 :
Non-medium Error Counter : 0x06 :
Temperature : 0x0D :
Manufacturing Date Information : 0x0E :
Application Client Log : 0x0F :
Self Test Results : 0x10 :
Solid State Media : 0x11 :
Background Scan Medium Operation : 0x15 :
Protocol Specific Log Parameter : 0x18 :
Link Status : 0x1A :
SMART Status and Temperature Reading : 0x2F :
Vendor Specific : 0x30 :
Misc Data Counters : 0x37 :

SUCCESS
```

To parse multiple log pages, provide the -log with a list of one or more page codes (in hex format):

```
iSDCT.exe -device 0 -drive 1 -log 0x00 0x03 0x2F
```

It is possible to parse all the inquiry pages by providing "all" to the -log command.

NOTE: Some of the log structures are big and can produce large files.

```
iSDCT.exe -device 0 -drive 1 -log all
```

Use the -filename command line option to save a .CSV file of the requested log page(s):

```
iSDCT.exe -device 0 -drive 1 -log 0x2F -filename smartLog.csv
```

Use the -verbose command line option to print a more detailed data table of the requested log page(s).

Note: The -filename option can be used to save the more detailed data to .CSV:



```
iSDCT.exe -device 0 -drive 1 -log 0x2F -verbose
```

To parse the inquiry page(s) of all drives use "all" with the -drive parameter:

```
iSDCT.exe -device 0 -drive all -log 0x2F
```

4.12 SCSI Full Format Unit

-erase option is used to issue a SCSI Format Unit command and erase all the data on the drive.

Note: the full format takes at least 20 minutes to complete for a single drive

The -erase command supports erasing one target SSD at a time. Using the -all command results in a serial sequential erase of all drives on the PCIe device that in a 4 drive configuration could take over 80 minutes.

To work around this problem, open up a separate iSDCT window for each drive and issue the -erase command to each unique SSD on the PCIe device. This enables a parallel erase to occur and reduce the total erase and format time to that of a single drive.

```
iSDCT.exe -device 0 -drive 1 -erase
```

```
! Device ! Drive ! Model           ! Serial Number ! Max LBA ! Sector ! SAS Address      ! Phy ! Test ! Firmware !
! Index  ! Index !                  !               !         ! Size   !                ! Num  ! Unit !           !
! 0       ! 1     ! INTEL(R) SSD 910 200GB ! XU005SPB      ! 390721967 ! 512   ! 5000CC001300568E ! 5    ! Ready ! 1200C008A40D !

WARNING! Format will erase all the data on the drive!
Note: Erasing the drive could take 10+ minutes to complete.
Proceed with format? (Y/N): n
Command was cancelled by the user.
```

To bypass the user prompt use the -force option:

```
iSDCT.exe -device 0 -drive 1 -erase -force
```



4.13 Set Max Address

-resize is used to change the drive's max LBA:

```
iSDCT.exe -device 0 -drive 1 -resize 150000000
```

Device Index	Drive Index	Model	Serial Number	Max LBA	Sector Size	SAS Address	Phy Num	Test Unit	Firmware
0	1	INTEL(R) SSD 910 200GB	XVU05SPB	390721967	512	5000CCA01300568E	5	Ready	1200C008A40D
SUCCESS									

Device Index	Drive Index	Model	Serial Number	Max LBA	Sector Size	SAS Address	Phy Num	Test Unit	Firmware
0	1	INTEL(R) SSD 910 200GB	XVU05SPB	150000000	512	5000CCA01300568E	5	Ready	1200C008A40D
SUCCESS									

If the given LBA is over the drives physical maximum, an error is returned:

```
iSDCT.exe -device 0 -drive 1 -resize 999999999
```

Device Index	Drive Index	Model	Serial Number	Max LBA	Sector Size	SAS Address	Phy Num	Test Unit	Firmware
0	1	INTEL(R) SSD 910 200GB	XVU05SPB	390721967	512	5000CCA01300568E	5	Ready	1200C008A40D
ERROR: SCSI mode select command failed.									

4.14 SCSI Read

-read option is used to read a chunk of data off the drive. For example, to read 5 blocks starting from LBA 10 do the following:

```
iSDCT.exe -device 0 -drive 1 -read 10 5
```

To save a binary file of the data that is read by using the -filename option:

```
iSDCT.exe -device 0 -drive 1 -read 10 5 -filename readData.bin
```

Use the -verify option to check the data that is read against a given pattern. For example, a sector of 0xA5 is written to LBA 3 (see the write example below), to read back what was written and verify it:

```
iSDCT.exe -device 0 -drive 1 -read 3 1 -verify 0xA5
```



Device Index	Drive Index	Model	Serial Number	Max LBA	Sector Size	SAS Address	Phy Num	Test Unit	Firmware
0	1	INTEL(R) SSD 910 200GB	XUU05SPB	390721967	512	5000CCA01300568E	5	Ready	1200C008A40D

Read-verify successful!

If a different pattern is provided, the verify command will fail:

Device Index	Drive Index	Model	Serial Number	Max LBA	Sector Size	SAS Address	Phy Num	Test Unit	Firmware
0	1	INTEL(R) SSD 910 200GB	XUU05SPB	390721967	512	5000CCA01300568E	5	Ready	1200C008A40D

ERROR: Read-verify failed with given pattern.

If random data was written to the drive, use the "rand" with -verify to check the correct data pattern. The default seed value is 0. Use -seed to change it:

```
iSDCT.exe -device 0 -drive 1 -read 3 1 -verify rand
```

If a different seed value is used to verify than what was used to write with, then the verify command will fail because the write used different random data than the verify:

```
iSDCT.exe -device 0 -drive 1 -read 3 1 -verify rand -seed 1
```

4.15 SCSI Write

-write is used to write data patterns to the drive. For example, to write the byte pattern 0xA5 to LBA 1, do the following:

```
iSDCT.exe -device 0 -drive 1 -write 3 1 0xA5
```

The pattern written can also be random data. Instead of using 0xA5, add "rand" for the data.

```
iSDCT.exe -device 0 -drive 1 -write 3 1 rand
```

To change the seed value, use the -seed option:

```
iSDCT.exe -device 0 -drive 1 -write 3 1 rand -seed 4
```



4.16 Firmware Update

-firmware_update is used to update the firmware of the Intel SSD 910 Series. This function uses an embedded firmware file. It only allows the update embedded within the tool. No firmware binary is required.

```
iSDCT.exe -device 0 -drive 1 -firmware_update
```

4.17 Change Power Setting

-power_setting is used to change the device's power setting. The two options available are 'default' and 'max_performance.'

NOTE: This feature is only supported on 800GB SKUs

When used, this function prompts the user for confirmation of the power setting change before proceeding. This prompt is required to verify that host system requirements (300 LFM, 28W average and 38W peak) are present because a change to max_performance without host requirements being met could potentially damage the drive.

```
iSDCT.exe -device 0 -power_setting max_performance
```

```
Changing power setting to: MAX_PERFORMANCE
WARNING! You have selected to change the PCIe Devices power setting!
To use this setting host system must support 300 LFM
and both 28W Avg and 38W peak to the PCIe slot.

Proceed with the change? (Y|N): n
Command was cancelled by the user.
```



Revision History

Document Number	Revision Number	Description	Revision Date
TBD	1.0	Initial Release	4/12/12