



SeaChest™ for SSDs

User Guide

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When referring to drive capacity, one gigabyte, or GB, equals one billion bytes and one terabyte, or TB, equals one trillion bytes. Your computer's operating system may use a different standard of measurement and report a lower capacity. In addition, some of the listed capacity is used for formatting and other functions, and thus will not be available for data storage. Actual quantities will vary based on various factors, including file size, file format, features and application software. Actual data rates may vary depending on operating environment and other factors. The export or re-export of hardware or software containing encryption may be regulated by the U.S. Department of Commerce, Bureau of Industry and Security (for more information, visit www.bis.doc.gov), and controlled for import and use outside of the U.S. Seagate reserves the right to change, without notice, product offerings or specifications.

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1. Introduction

This document describes how to use the SeaChest™ toolset for SSDs. SeaChest is a collection of command line interface (CLI) utilities for managing Seagate solid state drives (SSDs) on a system. The SeaChest toolset for SSDs is a subset of a larger tool called SeaChest Utilities.

SeaChest Utilities provides the following features and tools for managing SSDs:

- Displays SSD information such as model, capacity, temperature, serial number, and life remaining
- Monitors the health of SSDs
- Displays Self-Monitoring Analysis and Reporting Technology (SMART) attributes
- Performs firmware updates (Seagate only)
- Runs diagnostic commands
- Runs erase commands (Seagate only)

NOTE SeaChest Utilities supports all SSDs; however the level of support for non-Seagate drives varies depending on each drive. Firmware update and erase commands, for example, are supported only for Seagate drives.

NOTE For open source applications, you can find the link to the openSeaChest tools, here: <https://github.com/Seagate/openSeaChest>

1.1 Supported Operating Systems

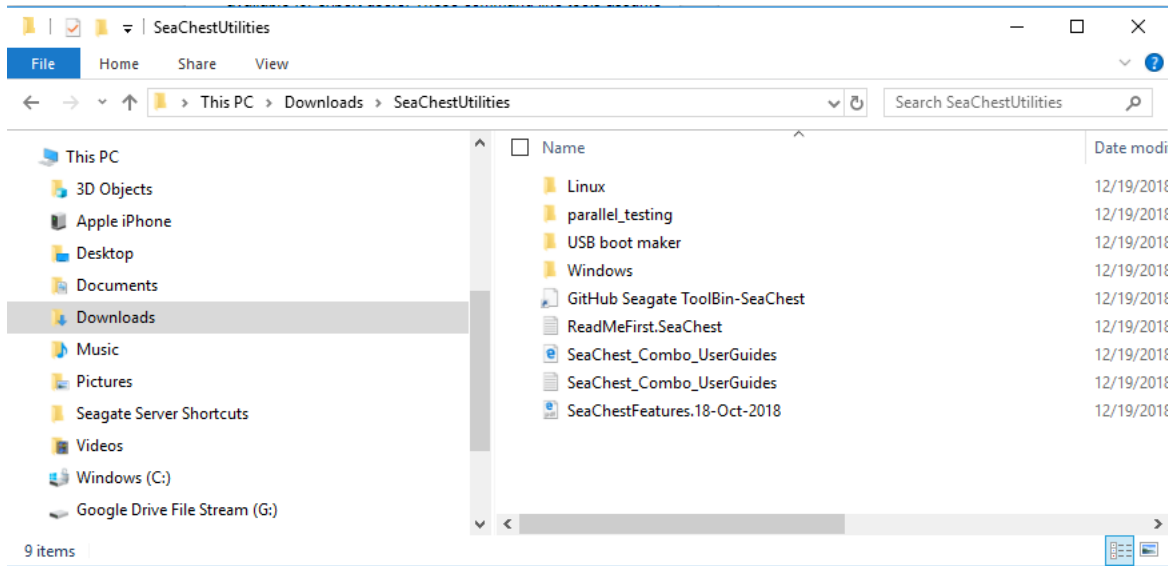
SeaChest Utilities is supported on the following operating systems:

- Windows
 - Windows
 - Windows Server
- Linux
 - Ubuntu
 - RedHat
 - CentOS
 - SUSE Linux Enterprise
 - Tiny Core (which provides the USB-bootable tool)

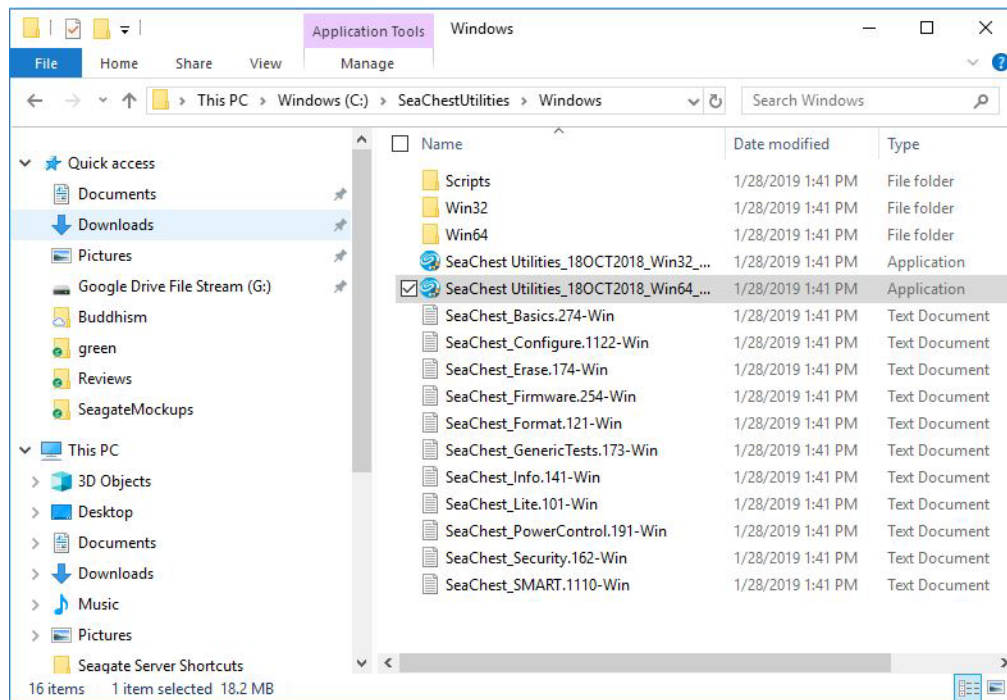
1.2 Installation

To install the SeaChest SSD toolset in Windows, you must first install the larger library of tools called SeaChest Utilities.

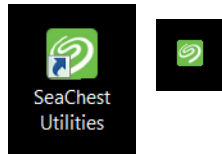
1. Go to the SeaChest Utilities support page on the Seagate website:
<https://www.seagate.com/support/software/seachest/>
2. Download SeaChest Utilities. The zip file downloads to your computer.
3. Right-click on the zip and Extract All. You should see the files shown below.



4. Open the folder for your operating system and click the SeaChest Utilities setup file.



5. Run the setup file and follow the instructions.
6. After installation, right-click the SeaChest Utilities desktop icon and pin to the taskbar.



7. Now you can open SeaChest from the taskbar.
8. When you click the SeaChest Utilities taskbar icon, a command window opens as shown here. This shows the short help output.

NOTE If you open any SeaChest utility without any other command line options, you get the short help output. To get the long help output add the `-h` command.

```
Administrator: SeaChest Utilities
=====
Usage
=====
    SeaChest_Basics [-d <physical_device>] {arguments} {options}

Examples
=====
    SeaChest_Basics --scan
    SeaChest_Basics -d PD? -i

Return codes
=====
    Generic/Common exit codes
    0 = No Error Found
    1 = Error in command line options
    2 = Invalid Device Handle or Missing Device Handle
    3 = Operation Failure
    4 = Operation not supported
    5 = Operation Aborted
    6 = File Path Not Found
    7 = Cannot Open File
    8 = File Already Exists
    Anything else = unknown error

Utility Options
=====
    --csmiIgnorePort
    --csmiUsePort
    --csmiVerbose
    --echoCommandLine
    --enableLegacyUSBPassthrough
    --forceATA
    --forceATADMA (SATA Only)
    --forceATAPIO (SATA Only)
    --forceATAUDMA (SATA Only)
    --forceSCSI
    -h, --help
    --hideLBACounter
    --hours [hours]
    --license
    --modelMatch [model Number]
    --minutes [minutes]
    --onlyFW [firmware revision]
    --onlySeagate
    -q, --quiet
    --sat12byte
    --seconds [seconds]
    -v [0-4], --verbose [0 | 1 | 2 | 3 | 4]
    -V, --version
```

9. Scroll down to the command prompt: `C:\Program Files\Seagate\SeaChest>`. You can enter commands here.

```

Administrator: SeaChest Utilities
--abortDST
--phySpeed [0 | 1 | 2 | 3 | 4 | 5] (Seagate Only)
--readLookAhead [info | enable | disable]
--setMaxLBA newMaxLBA (Seagate Only)
--spinDown
--smartCheck
--restoreMaxLBA (Seagate Only)
--writeCache [info | enable | disable]

SATA Only:
=====
--smartAttributes [raw | analyzed] (SATA Only)

SAS Only:
=====
--readyLED [info | on | off | default] (SAS Only)
--sasPhy [phy number] (SAS Only)

Data Destructive Commands (Seagate only)
=====
--overwrite [starting LBA]
--overwriteRange [range]
--provision newMaxLBA
--trim or --unmap [starting LBA]
--trimRange or --unmapRange [range]

C:\Program Files\Seagate\SeaChest>
    
```

1.3 Conventions

The following table shows conventions used in this document.

Table 1 Conventions

Symbol	Meaning
->	Is defined as ...
a b	Alternatives (a or b)
[...]	Zero or one occurrence
{...}	Zero or more occurrences
(a b c)	Choose exactly one of the alternatives

1.3.1 Case Sensitivity

SeaChest SSD commands are cAsE SeNsITiVe.

2. Getting Started

2.1 Use Device Handle with All Commands

With the exception of the `-s [or] --scan` commands, shown below, you must use the drive name (device handle) before all commands. This tells your system the drive or drives on which to perform an operation.

NOTE SeaChest Utilities tools are accessible from Linux and Windows operating systems. In this guide, examples are shown as they appear in Windows.

To access SeaChest Utilities and find your device handles, perform the following steps.

1. At the command prompt, enter:

```
SeaChest_Basics -s [or] --scan
```

2. You can now see the following information.

```
C:\Program Files\Seagate\SeaChest>SeaChest_Basics -s
=====
SeaChest_Basics - Seagate drive utilities - NVMe Enabled
Copyright (c) 2014-2018 Seagate Technology LLC and/or its Affiliates, All Rights Reserved
SeaChest_Basics Version: 2.7.4-1_18_3 X86_64
Build Date: Oct 18 2018
Today: Thu Dec 20 15:19:52 2018
=====
Vendor   Handle   Model Number   Serial Number   FwRev
SATA     PD0      ST500LT032-1E9142   W3N0LAYK        0003SDM1
```

3. In this example, the handle or device name is PD0 for the only device in the system. You can enter a device handle before the command like this:

```
SeaChest_Basics -d PD0 [or] --device PD0
```

NOTE In Linux, this same device handle looks like this `-d /dev/sg0` or `--device /dev/sg0`

3. SSD-Customized Commands

Type the utility before each command, for example, SeaChest_Basics -V, --version

Table 2 SSD-Customized Commands

Command Name/Description	Utility	Command	SATA	SAS	NVMe
Basic Commands					
SeaChest Help (unique help for each utility)	SeaChest_Basics SeaChest_Security SeaChest_PowerControl	-h, --help --help --help	X	X	X
Show system properties	SeaChest_Basics	-V, --version	X	X	X
Show drives	SeaChest_Basics	-s, --scan	X	X	X
Device Information Commands					
Show drive properties (property asset) (property version) (power features) (interface)	SeaChest_Basics	-i, --deviceInfo	X	X	X
			X	X	X
			X	X	X
			X	X	X
Show drive security capabilities	SeaChest_Basics, SeaChest_Security	-i, --deviceInfo --tcgInfo	X	X	
Power Commands					
Show drive power-capabilities	SeaChest_PowerControl	-i, --deviceInfo --showEPCSettings --showPowerConsumption		X	
Show drive power mode	SeaChest_Basics	--checkPowerMode	X	X	X
Standby	SeaChest_PowerControl	--standby	X		
Test Commands					
Short self test	SeaChest_Basics	--shortDST --poll	X	X	X
Self test progress	SeaChest_Basics	--progress dst	X	X	X
Show self test log	SeaChest_SMART	--showDSTLog	X	X	
SMART Command					
Show drive SMART properties	SeaChest_Basics	--smartAttributes [raw analyzed]	X		
Firmware download	SeaChest_Basics	--downloadFW <FW file name>	X	X	X
Erase Commands					
Security Erase (can be aborted; stops if you enter passwords)	SeaChest_Erase	--secureErase	X		
Sanitize erase	SeaChest_Erase	--sanitize blockerase --poll--confirm this-will-erase-data.	X	X	X
Set Tunable Capacity Command					
Set tunable capacity	SeaChest_Basics	--provision, --setMax	X	X	X

3.1 Basic Commands

3.1.1 Help

Help output for all SeaChest tools is unique to that tool as shown below. To see help information for SeaChest utilities use the `-h [or] --help` commands.

Table 3 Show System Properties

Parameter	Description
Command	SeaChest_Basics -h [or] --help SeaChest_Security --help SeaChest_PowerControl --help
Function	Shows help information for the SeaChest utilities.

3.1.2 Show System Properties

The SeaChest command to show system properties is, `-v, --version`.

Table 4 Show System Properties

Parameter	Description
Command	SeaChest_Basics --version
Function	Shows the following properties of the host system and the SeaChest utility: <ul style="list-style-type: none"> ■ Utility version ■ Build date ■ Compiled architecture ■ Compiler used ■ Compiler version ■ Operating System Type ■ Operating System version ■ Operating System name ■ Edition ■ RAID support

3.1.3 Show Drives

The SeaChest command to show drives on a system has two versions: `-s`, `--scan`.

NOTE You must start with a scan of the system to discover the device names. When you know the device handle names, you can enter further commands.

Table 5 Show Drives

Parameter	Description
Command	SeaChest_Basics <code>-s</code> [or] <code>--scan</code>
Function	<p>Shows a list of all drives on the system with the following information:</p> <pre> C:\Program Files\Seagate\SeaChest>SeaChest_Basics -s ----- SeaChest_Basics - Seagate drive utilities - NVMe Enabled Copyright (c) 2014-2018 Seagate Technology LLC and/or its Affiliates, All Rights Reserved SeaChest_Basics Version: 2.7.4-1_18_3 X86_64 Build Date: Oct 18 2018 Today: Thu Dec 20 15:19:52 2018 ----- Vendor Handle Model Number Serial Number FwRev SATA PD0 ST500LT032-1E9142 W3N0LAYK 0003SDM1 </pre> <p>NOTE Handle is the operating system's name for the device.</p>

3.2 Device Information Commands

3.2.1 Show Drive Properties

NOTE This command includes mixed-case letters.

Now that you know the drive names, you can use the `-i [or]--deviceInfo` command to see drive properties. See below for command syntax. `-d` means device (or drive), `PD<handle number>` is the device name, and `-i [or]--deviceInfo` is the command.

Table 6 Show Drive Properties

Parameter	Description
Command	<code>SeaChest_Basics -d PD<handle number> -i [or]--deviceInfo</code>
Function	Shows the following properties of a drive: <ul style="list-style-type: none"> ■ Product name ■ Serial number ■ Firmware number ■ MaxLBA ■ Interface speed ■ Security ■ World wide name ■ Capacity ■ Temperature ■ Power on time ■ Drive Self Test information ■ SMART status ■ Total Bytes Written
Comment	<code>SeaChest_Basics --usbChildInfo</code> Add this command to display details about drives in the USB enclosure.

3.2.2 Show Drive Security Capabilities

NOTE This command includes mixed-case letters.

PD<handle number> is the device handle and `-i [or]-deviceInfo`, `--tcgInfo` are the commands.

Table 7 Show Drive Security Capabilities

Parameter	Description
Command	SeaChest_Basics -d PD<handle number> -i, --deviceInfo [or] SeaChest_Security -d PD<handle number> --tcgInfo
Function	Shows the drive security capabilities.

3.3 Power Commands

3.3.1 Show Drive Power Capabilities

NOTE This command includes mixed-case letters.

The utility is `SeaChest_PowerControl`. PD<handle number> is the device name and `-i [or]--deviceInfo` [or]`--showEPCSettings` [or]`--showPowerConsumption` are the commands.

Table 8 Show Drive Power Capabilities

Parameter	Description
Command	SeaChest_PowerControl -d PD<handle number> -i,--deviceInfo [or] SeaChest_PowerControl -d PD<handle number> --showEPCSettings [or] SeaChest_PowerControl -d PD<handle number> --showPowerConsumption
Function	Shows the drive power capabilities

3.3.2 Show Drive Power Mode

To show a drive's power mode, use this command:

Table 9 Show Power Mode

Parameter	Description
Command	SeaChest_Basics -d PD<handle number> --checkPowerMode
Function	Shows power mode of the drive. Here is an example: <pre>C:\Program Files\Seagate\SeaChest>SeaChest_Basics -d PD0 --checkPowerMode ----- SeaChest_Basics - Seagate drive utilities - NVMe Enabled Copyright (c) 2014-2018 Seagate Technology LLC and/or its Affiliates, All Rights Reserved SeaChest_Basics Version: 2.7.4-1_18_3 X86_64 Build Date: Oct 18 2018 Today: Fri Apr 12 16:13:53 2019 ----- \\.\PhysicalDrive0 - TOSHIBA KSG60ZMV512G M.2 2280 512GB - 78CB80FFK5TP - ATA Device is in the PM0: Active state or PM1: Idle State</pre>

3.3.3 Standby (SATA only)

NOTE This command includes mixed-case letters.

PD<handle number> is the device name, SeaChest_PowerControl is the utility, and --standby is the command.

Table 10 Standby

Parameter	Description
Command	SeaChest_PowerControl -d PD<handle number> --standby
Function	Puts the drive on standby power.

3.4 Test Commands

3.4.1 Short Self Test

NOTE This command includes mixed-case letters.

PD<handle number> is the device name, SeaChest_Basics is the utility, and `-shortDST --poll` is the command. This command provides active progress until the test completes. If `--poll` is omitted then you can go back later and check with `--progress dst`.

Table 11 Short Self Test

Parameter	Description
Command	<code>SeaChest_Basics -d PD<handle number> -shortDST --poll</code>
Function	Runs short self test.

3.4.2 Self Test Progress

NOTE This command includes mixed-case letters.

PD<handle number> is the device name, SeaChest_Basics is the utility, and `--progress dst` is the command.

Table 12 Self Test Progress

Parameter	Description
Command	<code>SeaChest_Basics -d PD<handle number> --progress dst</code>
Function	Shows self test progress.

3.4.3 Show Self Test Log

NOTE This command includes mixed-case letters.

PD<handle number> is the device name, SeaChest_SMART is the utility, and `--showDSTLog` is the command.

Table 13 Show Self Test Log

Parameter	Description
Command	<code>SeaChest_SMART -d PD<handle number> --showDSTLog</code>
Function	Shows self test log.

3.5 SMART Commands

3.5.1 Show Drive SMART Properties

NOTE This command includes mixed-case letters.

PD<handle number> is the device name, SeaChest_Basics is the utility, and --smartAttributes [raw | analyzed] is the command.

Table 14 Show SMART Properties

Parameter	Description
Command	SeaChest_SMART -d PD<handle number> --smartAttributes [raw analyzed]
Function	Shows SMART properties.

3.6 Firmware Commands

3.6.1 Download Firmware

To download firmware for Seagate drives, use this command:

Table 15 Show Drive Properties

Parameter	Description
Command	SeaChest_Basics -d PD<handle number> --downloadFW <firmware file name>
Function	Downloads firmware for Seagate drives.

3.7 Erase Commands

3.7.1 Security Erase

The Erase command is supported by Linux only.

`SeaChest_Erase` is the utility, and `--secureErase` is the command.

NOTE In Linux, the command is `-d /dev/sg`.

Table 16 Show Drive Properties

Parameter	Description
Command	<code>SeaChest_Erase -d /dev/sg --secureErase --confirm this-will-erase-data.</code>
Function	Erases the drive.
Comment	If the command operation is aborted, the drive remains locked by a temporary password.

3.7.2 Sanitize Erase

The Sanitize Erase command is supported by Linux only.

`SeaChest_Erase` is the utility.

Table 17 Show Drive Properties

Parameter	Description
Command	<code>SeaChest_Erase -d /dev/sg --sanitize blockerase --poll --confirm this-command-will-erase-data.</code>
Function	Erases the drive.
Comment	You cannot abort this command. If power is removed and reconnected, it continues where it left off.

3.8 Set Tunable Capacity Command

3.8.1 Set Tunable Capacity

`SeaChest_Basics` is the utility.

Table 18 Set Tunable Capacitys

Parameter	Description
Command	<code>SeaChest_Basics -d PD<handle number> --provision [or] --setMax</code>
Function	Sets tunable capacity.



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