

# User Guide

## Storage Executive Command Line Interface

---

### Introduction

This guide describes how to use Micron's Storage Executive command line interface (CLI) to monitor, manage, and configure Micron solid state drives (SSDs).

The CLI provides a list of commands for configuration and management, including:

- View all drives installed in a system and see current drive status and capacity, temperature, firmware version, and driver information
- View SMART attributes and data/error logs
- Run SMART self tests
- Update firmware
- Retrieve debug data
- Configure drive settings including interrupt coalescing, over-provisioning and Flex Capacity levels
- Remove all data from a drive by performing a sanitize drive, sanitize crypto scramble, physical security ID (PSID) revert, or secure erase operation
- Run the STANDBY IMMEDIATE command
- Prepare an NVMe drive for safe removal from a system
- Manage the namespace on an NVMe drive

For instructions on installing Storage Executive or using the Storage Executive graphical user interface, see the *Storage Executive User Guide*.

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## About the CLI

The Storage Executive command line interface (CLI) provides a list of commands for managing and monitoring supported Micron and Crucial SSDs in a local system. The CLI is intended for system administrators and can be used to automate Storage Executive operations.

## Supported SSDs

SSD	Model Number	
Micron NVMe™	<ul style="list-style-type: none"> <li>9300 Series</li> <li>9200 Series</li> <li>9100 Series</li> <li>7300 Series</li> <li>7100 Series</li> <li>2200</li> <li>2100AI, 2100AT</li> <li>2210</li> <li>2300</li> </ul>	
Micron SAS	<ul style="list-style-type: none"> <li>S610DC</li> <li>S630DC</li> <li>S650DC</li> <li>S655DC</li> </ul>	
Micron SATA	<ul style="list-style-type: none"> <li>5300 Series</li> <li>5210</li> <li>5200 Series</li> <li>5100 Series</li> <li>1100</li> <li>1300</li> <li>M500</li> </ul>	<ul style="list-style-type: none"> <li>M500DC</li> <li>M500IT</li> <li>M510</li> <li>M510DC</li> <li>M550</li> <li>M600</li> <li>P400m</li> </ul>
Crucial SATA	<ul style="list-style-type: none"> <li>MX-series</li> <li>BX-series</li> <li>M-series</li> </ul>	
Crucial NVMe	<ul style="list-style-type: none"> <li>P-series</li> <li>X8 Portable SSD</li> </ul>	<ul style="list-style-type: none"> <li>X6 Portable SSD</li> </ul>

## RAID Controller Support

RAID Controller	Details
Avago MegaRAID	<p>Drives connected to MegaRAID controllers appear with the following device name:</p> <p>mraidX:Y</p> <p>Where X indicates the ID of the MegaRAID controller and Y indicates the ID of the drive behind the controller.</p>

## Running the CLI

To run the CLI, execute the following in a command prompt:

Windows: **msecli.exe**

Linux: **msecli**

## Common Command Options

The CLI provides the following options for all commands:

Option	Description
<b>-r</b>	Runs the CLI in silent mode.
<b>-n</b>	Retrieves specified information for the given device name.
<b>-s</b>	Saves the output of the command to the specified file.

## Obtaining Help

To obtain CLI usage information, enter the following in the command prompt:

**msecli -?**

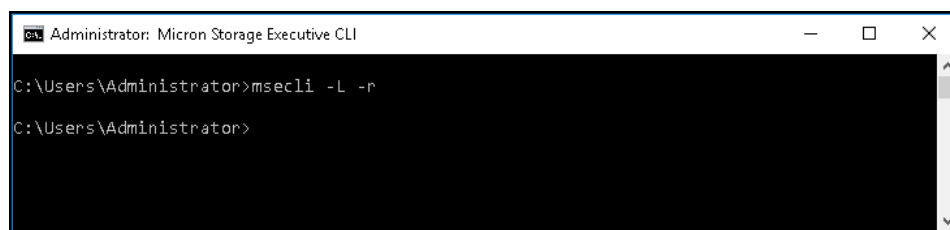
## Using Silent Mode

In silent mode, the CLI does not display output on the screen and does not request user input, if any, during its operation. If a command requires user confirmation, the default input value (yes) is used for those commands.

To run the CLI in silent mode, enter the following in the command prompt:

**msecli -L -r**

**Figure 1: CLI in Silent Mode**



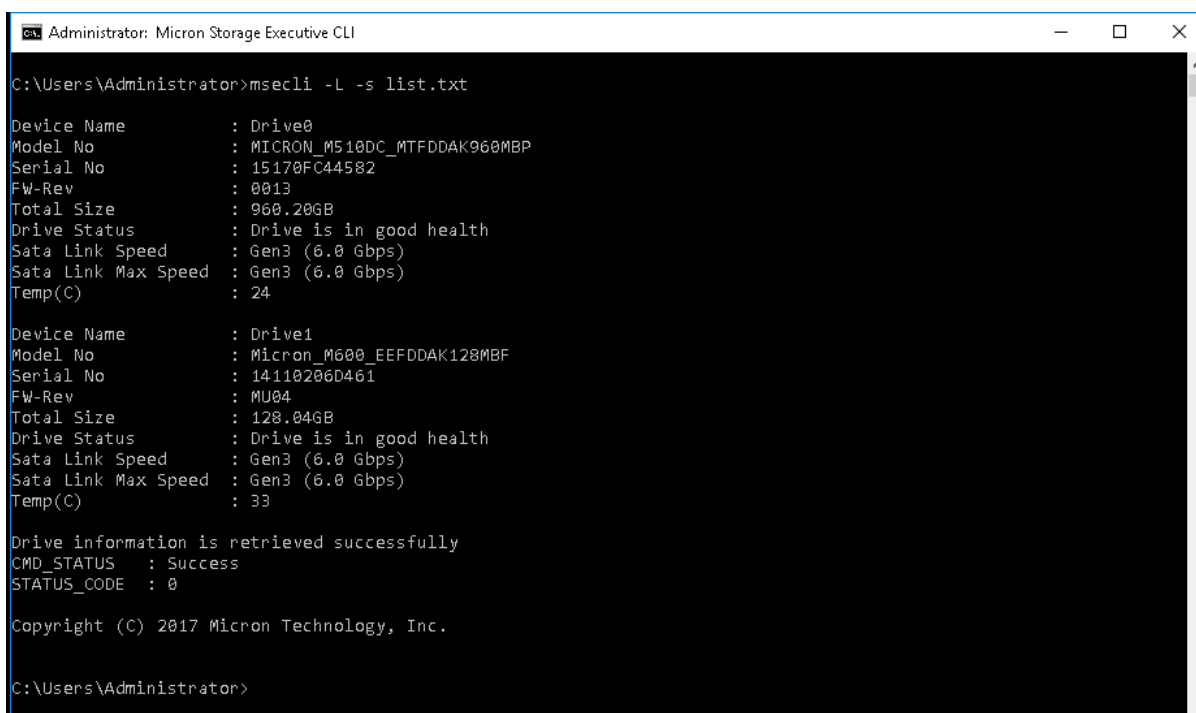
## Saving Command Output

The output of every command issued in the CLI can be saved as a .txt file. This file is created in the location from which the command is executed (Storage Executive installation folder by default), unless an absolute path is given.

1. At the command prompt, run the command for which output will be saved.
2. Enter the following in the command prompt: **msecli -L -s <output file name>**  
Replace <output file name> with the name for the saved file.

The command prompt displays the content of the saved file.

**Figure 2: Displaying Saved Output**



```

Administrator: Micron Storage Executive CLI
C:\Users\Administrator>msecli -L -s list.txt

Device Name       : Drive0
Model No          : MICRON_M510DC_MTFDDAK960MBP
Serial No         : 15170FC44582
FW-Rev           : 0013
Total Size        : 960.20GB
Drive Status      : Drive is in good health
Sata Link Speed   : Gen3 (6.0 Gbps)
Sata Link Max Speed : Gen3 (6.0 Gbps)
Temp(C)           : 24

Device Name       : Drive1
Model No          : Micron_M600_EEFDDAK128MBF
Serial No         : 14110206D461
FW-Rev           : MU04
Total Size        : 128.04GB
Drive Status      : Drive is in good health
Sata Link Speed   : Gen3 (6.0 Gbps)
Sata Link Max Speed : Gen3 (6.0 Gbps)
Temp(C)           : 33

Drive information is retrieved successfully
CMD_STATUS       : Success
STATUS_CODE      : 0

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C:\Users\Administrator>
  
```

## Displaying CLI Usage

Storage Executive supports many commands to manage Micron SSDs. Some commands are common to all Micron SSDs while others are specific to a certain type of SSD; for example, NVMe (7100 series, 9100 series, etc.) or SATA (M500, M510, M550, etc.).

To determine the commands available for a specific SSD or type of SSD, issue the following commands in this section.

## Displaying NVMe SSD Commands

Enter the following at the command prompt: `msecli -h -t`

**Figure 3: NVMe SSD Commands**

```
C:\Users\ngnanaselvan\Desktop>msecli.exe -h -t
USAGE:
msecli -L [-d!-P!-i!-j <json-file>] [-J] [-n <device-name>] [-r] [-s <out-filename>]
    Lists the basic information for all drives available in the system
msecli -S [-i] [-n <device-name>] [-r] [-s <out-filename>]
    Lists the SMART values for the supported parameters for the micron drives
    available in the system.
msecli -M [-i <value>] [-u <state-value>] [-n <device-name>] [-r] [-s <out-filename>]
    To manage Micron NUME drives.
msecli -D -n <device-name> [-r] [-s <out-filename>]
    Displays the Driver and Host Information for the given <device-name>
msecli -C [-i [-a <namespace id>]] [-n <device-name>] [-r] [-s <out-filename>]
    Displays the specified ATA command output data or to issue the
    Displays the identify device controller/Namespace details to the specified drive.
msecli -F [-U <fu-image-file>] [-S <fu-slot>] [-A] [-l] [-n <fu select>] [-n <device-name>] [-r] [-s <out-filename>]
    Manages the firmware update for Micron drives
msecli -I <UBI img-file> [-n <device-name>] [-o] [-i <firmware-slot>] [-r] [-s <out-filename>]
    Updates the UBI image in the specified Micron NUME drive.
msecli -U [-a] [-r] [-s <out-filename>]
    Displays the Micron Storage Executive current Version.
msecli -P <zip file name> [-n <device-name>] [-l <debug-level>] [-r] [-s <out-filename>]
    Collects debug data from the system for each Micron NUME drive
msecli -N [-l] [-c <namespace size>] [-a <lba index>] [-o] [-v] [-u]
    [-i] [-d <namespace ID>] [-e <ieee EUI>]
    [-f <namespace ID>] [-n <metadata size>] [-g <lba data size>] [-j <secure erase>]
    [-i] [-t]
    [-S <namespace ID>] [-H <Selftest Type>] [-n <NUME device-name>]
    This option provides the ability to manage the namespaces on a Micron
    NUME device.
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```



Enter the following at the command prompt: **mseccli -h -c**

### Figure 4: SATA SSD Commands

[illegible]



## Displaying SAS SSD Commands

Enter the following at the command prompt: `msecli -h -s`

**Figure 5: SAS SSD Commands**

```
C:\Users\ngnanaseivan\Desktop>msecli.exe -h -s
USAGE:
msecli -L [-d|-j <json-file>] [-J] [-n <device-name>] [-r] [-s <out-filename>]
    Lists the basic information for all drives available in the system
msecli -S [-i] [-t <Self-test type(0 : 11)>] [-n <device-name>] [-r] [-s <out-filename>]
    Lists the SMART values for the supported parameters for the micron drives
    available in the system.
msecli -M [-o <Max Address>] [-n <device-name>] [-r] [-s <out-filename>]
    To manage SAS drives.
msecli -X [-B] [-P -p <PSID>] [-n <device-name>] [-r] [-s <out-filename>]
    Performs Sanitize Block Erase, or PSID Revert for the specified SAS drive.
msecli -D -n <device-name> [-r] [-s <out-filename>]
    Displays the Driver and Host Information for the given <device-name>
msecli -C -b -n <device-name> [-r] [-s <out-filename>]
    Issues StandByImmediate command to the specific drive.
msecli -U [-a] [-r] [-s <out-filename>]
    Displays the Micron Storage Executive current Version.
msecli -P <zip file name> -n <device-name> [-l <debug-level>] [-r] [-s <out-filename>]
    Collects debug data from the system for each SAS drive
msecli -J [-b <NumBlocks>] [-l <Block Size>] [-p <Protection Type>] [-e <Protection Interval Exponent>] [-d] [-c] [-f] [-n <device-name>]
    Performs Format Unit operation on a specified SAS device.
msecli -F [-U <fw-ing-file>] [-A] [-l] [-n <device-name>] [-r] [-s <out-filename>]
    Manages the firmware update for Micron drives
msecli -U [-l <fw-folder-path>] -S <firmware-slot> [-n <model-number>] [-n <device-name>] [-v] [-j] [-J] [-r] [-s <out-filename>]
    Performs firmware update with the firmware folder for the specified
    SAS drive
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```

## Displaying Commands for a Specific SSD

Enter the following at the command prompt: `msecli -h -n <device-name>`

**Figure 6: Specific SSD Commands**

```
[UNIK0000/system]msecli -h -n drive0
USAGE:
msecli -i [-d] [-j <json-file>] [-n <device-name>] [-r] [-s <out-filename>]

    Lists the basic information for all drives available in the system

msecli -S [-i] [-V] [-l <log-type>{0 | 1 | 2 | 3 | 6 | 7}] [-p [-j <json-file>] [-r]] [-t <Self-test type>{0 | 1 | 2 | 3 | 4 | 5}] [-g <gpi-log-address>] [-n <device-name>] [-r] [-s <out-filename>] [-b <bin-file-name>]

    Lists the SMART values for the supported parameters for the micron drives
    available in the system.

msecli -M [-l <state-value>] [-o <Max Address>] -n <device-name> [-r] [-s <out-filename>]

    To manage client drives.

msecli -X [-B] [-p <password>] [-P -p <PSID>] [-S] -n <device-name> [-r] [-s <out-filename>]

    Performs Secure Erase, Sanitize Block Erase, Crypto Scramble, or
    PSID Revert for the specified client drive

msecli -D -n <device-name> [-r] [-s <out-filename>]

    Displays the Driver and Host Information for the given <device-name>

msecli -C [-i [-a <namespace id>] | -b | -f <feature-code> -c <sector-count> -l <lba>] -n <device-name> [-r] [-s <out-filename>]

    Displays the specified ATA command output data or to issue the
    StandbyImmediate or Identify device commands to the specified drive.

msecli -V [-a] [-r] [-s <out-filename>]

    Displays the Micron Storage Executive current Version.

msecli -P <rip file name> -n <device-name> [-l <debug-level>] [-r] [-s <out-filename>]

    Collects debug data from the system for each client drive

msecli -F [[ -U <fw-img-file>] -A] [-l] -n <device-name> [-r] [-s <out-filename>]

    Manages the firmware update for Micron drives

msecli -U -i <fw-folder-path> [-m <model-number>] -n <device-name> [-v] [-r] [-s <out-filename>]

    Performs firmware update with the firmware folder for the specified
    Client drive

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```

## Displaying Drive Information

This section describes how to view:

- Basic and detailed drive information for all drives in a system or a specific drive
- Driver information
- ATA Identify Device data for a drive
- Firmware slot information (NVMe drives only)
- PCIe information (NVMe drives only)

## Displaying Basic Information for All Drives in a System

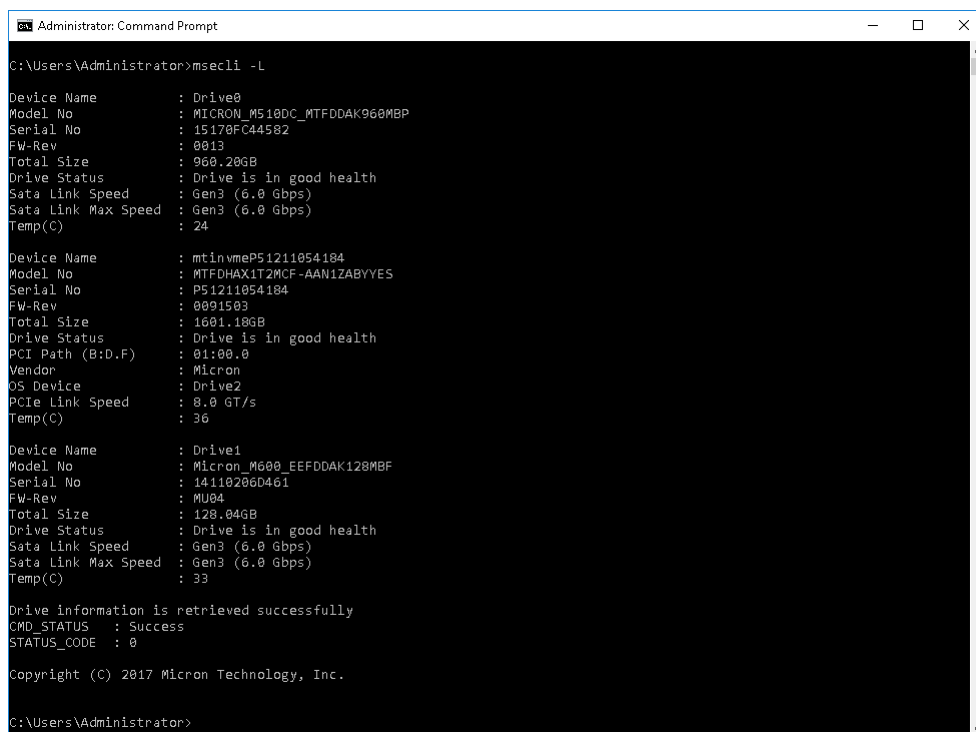
Use the following instructions to view basic information for all drives in a host system, including the drive's device name, model number, serial number, capacity, and status of each drive. All measurements for storage are displayed in gigabytes (GB). The drive's device name is necessary to issue subsequent commands to a drive.

**Note:** An error message displays if no drives are connected to the host system. PCI path is displayed in hexadecimal value.

Usage: `msecli -L [-d|-P|-i|-j <json-file>|-J] [-n <device-name>] [-r] [-s <out-filename>]`

1. Enter the following at the command prompt: `msecli -L`
2. The CLI displays information about all drives in the host system.

**Figure 7: Details for all Drives in the Host System**



```

Administrator: Command Prompt
C:\Users\Administrator>msecli -L

Device Name      : Drive0
Model No         : MICRON_M510DC_MTFDDAK960MBP
Serial No        : 15170FC44582
FW-Rev           : 0013
Total Size       : 960.28GB
Drive Status     : Drive is in good health
Sata Link Speed  : Gen3 (6.0 Gbps)
Sata Link Max Speed : Gen3 (6.0 Gbps)
Temp(C)          : 24

Device Name      : mtlnvmeP51211054184
Model No         : MTFDHAX1T2MCF-AAN1ZABYYES
Serial No        : P51211054184
FW-Rev           : 0001503
Total Size       : 1601.18GB
Drive Status     : Drive is in good health
PCI Path (B:D.F) : 01:00:0
Vendor           : Micron
OS Device        : Drive2
PCIe Link Speed  : 8.0 GT/s
Temp(C)          : 36

Device Name      : Drive1
Model No         : Micron_M600_EEFDDAK128MBF
Serial No        : 14110206D461
FW-Rev           : MU04
Total Size       : 128.04GB
Drive Status     : Drive is in good health
Sata Link Speed  : Gen3 (6.0 Gbps)
Sata Link Max Speed : Gen3 (6.0 Gbps)
Temp(C)          : 33

Drive information is retrieved successfully
CMD_STATUS      : Success
STATUS_CODE      : 0

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C:\Users\Administrator>
  
```

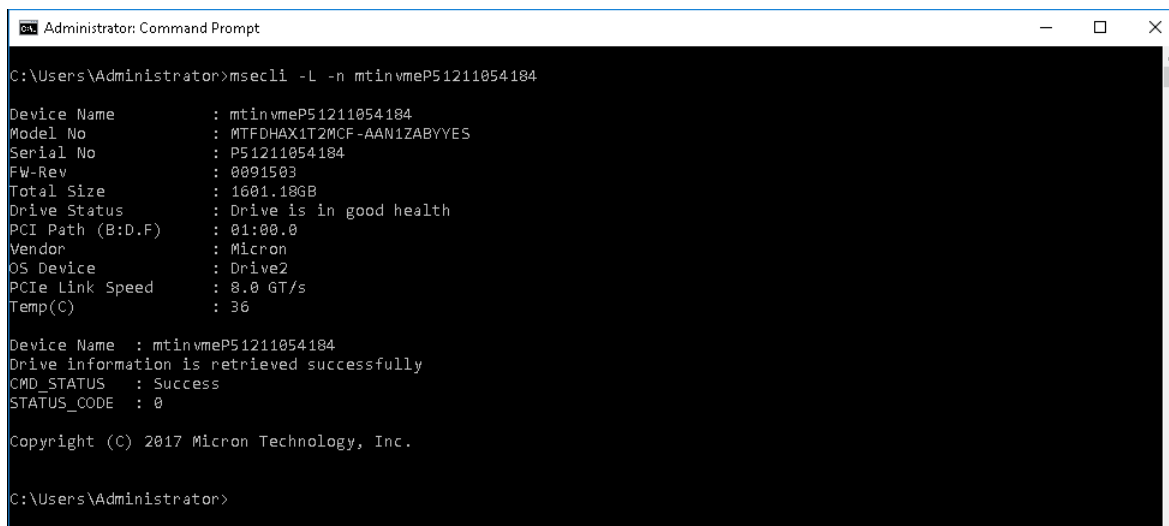
### Displaying Basic Information for a Specific Drive

Use the following instructions to view basic information for a specific drive, including the model number, serial number, capacity, and drive status.

Usage: `msecli -L [-d|-P|-i|-j <json-file>|-J] [-n <device-name>] [-r] [-s <out-filename>]`

1. Enter the following at the command prompt: `msecli -L -n <device-name>`  
Replace `<device-name>` with the drive's device name.
2. The CLI displays information about the specified drive.

**Figure 8: Details for a Specific Drive**



```

Administrator: Command Prompt
C:\Users\Administrator>msecli -L -n mtinvmeP51211054184

Device Name       : mtinvmeP51211054184
Model No          : MTFDHAX1T2MCF-AAN1ZABYYES
Serial No         : P51211054184
FW-Rev            : 0091503
Total Size        : 1601.18GB
Drive Status      : Drive is in good health
PCI Path (B:D.F)  : 01:00.0
Vendor            : Micron
OS Device         : Drive2
PCIe Link Speed   : 8.0 GT/s
Temp(C)           : 36

Device Name       : mtinvmeP51211054184
Drive information is retrieved successfully
CMD_STATUS        : Success
STATUS_CODE       : 0

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C:\Users\Administrator>
  
```

### Displaying Detailed Drive Information

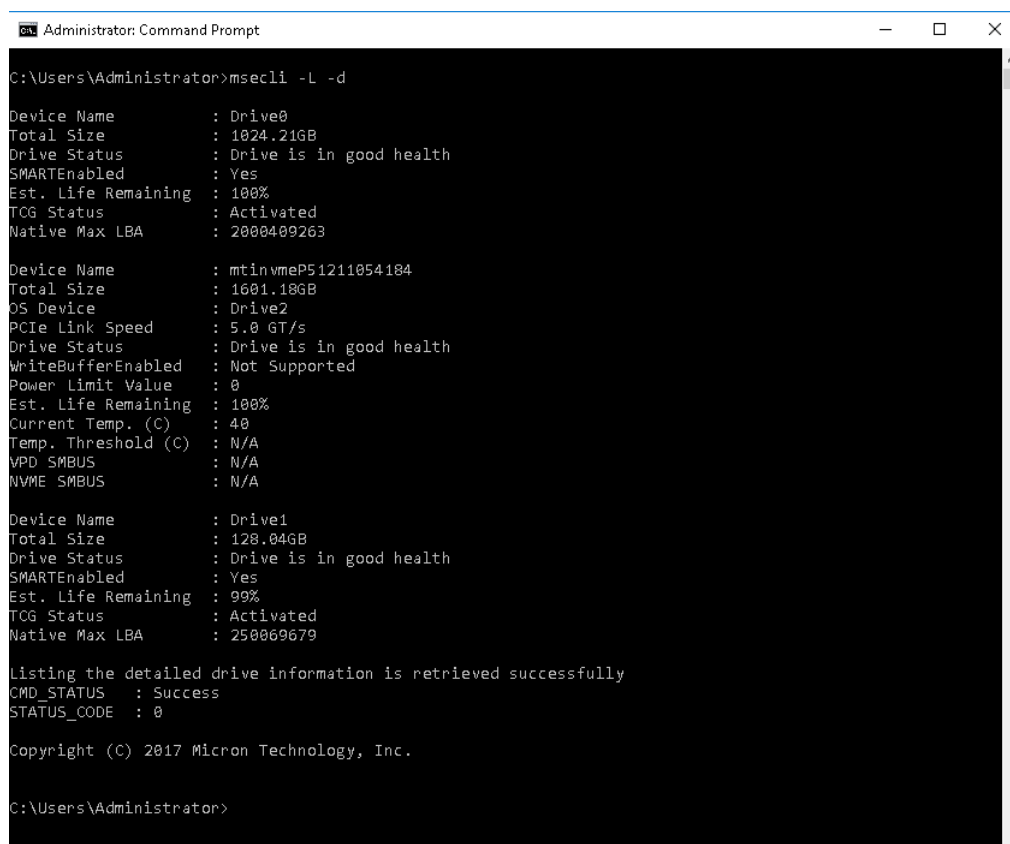
Use the following instructions to view detailed information about all available drives in the host system, including:

- Device name
- Total (available) size
- Drive status
- SMART enabled status
- Estimated life remaining
- TCG status
- Power limit status
- Native max LBA details
- Interrupt coalescing value (NVMe drives)
- Write buffer status (NVMe drives)

Usage: `msecli -L [-d|-P|-i|-j <json-file>|-J] [-n <device-name>] [-r] [-s <out-filename>]`

1. Enter the following at the command prompt: `msecli -L -d`
2. The CLI displays detailed information about all drives in the host system.

**Figure 9: Detailed Drive Information**



```

Administrator: Command Prompt
C:\Users\Administrator>msecli -L -d

Device Name       : Drive0
Total Size        : 1024.21GB
Drive Status      : Drive is in good health
SMARTEnabled      : Yes
Est. Life Remaining : 100%
TCG Status        : Activated
Native Max LBA    : 2000409263

Device Name       : mtinvmep51211054184
Total Size        : 1601.18GB
OS Device         : Drive2
PCIe Link Speed   : 5.0 GT/s
Drive Status      : Drive is in good health
WriteBufferEnabled : Not Supported
Power Limit Value  : 0
Est. Life Remaining : 100%
Current Temp. (C) : 40
Temp. Threshold (C) : N/A
VPD SMBUS         : N/A
NVME SMBUS        : N/A

Device Name       : Drive1
Total Size        : 128.04GB
Drive Status      : Drive is in good health
SMARTEnabled      : Yes
Est. Life Remaining : 99%
TCG Status        : Activated
Native Max LBA    : 250069679

Listing the detailed drive information is retrieved successfully
CMD_STATUS       : Success
STATUS_CODE      : 0

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C:\Users\Administrator>
  
```

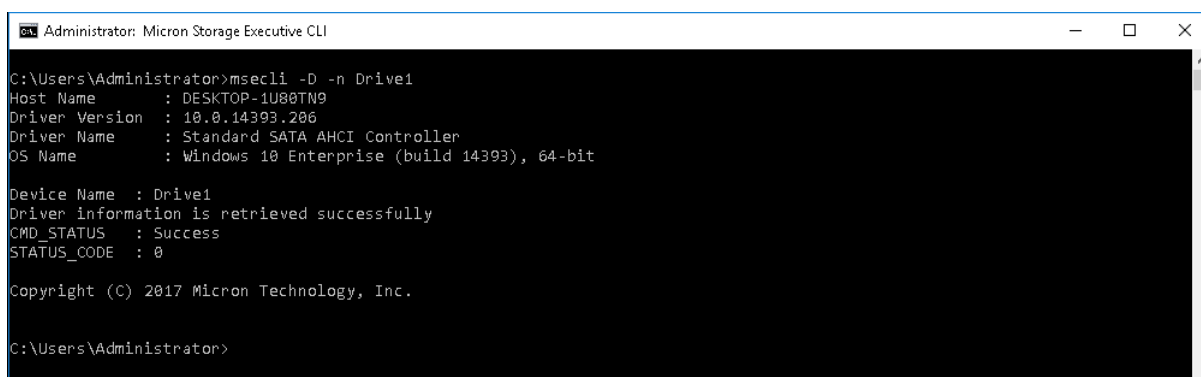
### Displaying Driver Information

Use the following instructions to display information about the driver, host operating system, and host name for a specific drive.

Usage: `msecli -D -n <device-name> [-r] [-s <out-filename>]`

1. Enter the following at the command prompt: `msecli -D -n <device-name>`  
Replace `<device-name>` with the drive's name.
2. The CLI displays driver information for the specified drive.

**Figure 10: Driver Information**



```

Administrator: Micron Storage Executive CLI

C:\Users\Administrator>msecli -D -n Drive1
Host Name      : DESKTOP-1U80TN9
Driver Version : 10.0.14393.206
Driver Name    : Standard SATA AHCI Controller
OS Name        : Windows 10 Enterprise (build 14393), 64-bit

Device Name    : Drive1
Driver information is retrieved successfully
CMD_STATUS     : Success
STATUS_CODE    : 0

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C:\Users\Administrator>
  
```

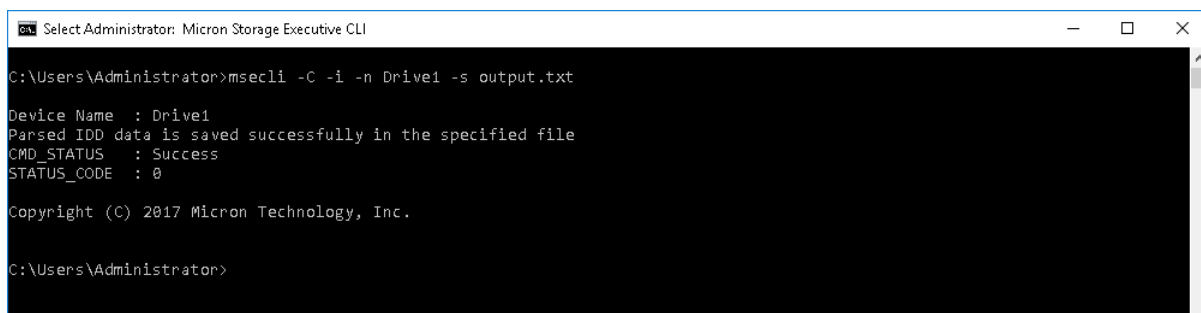
### Displaying ATA Identify Device Data

ATA identify device data can be saved to a text file or output to the screen. It is recommended to save the data to a text file using the `-s` option to ensure all parsed identify data can be read.

Usage: `msecli -C [-i [-a <namespace id>] | -b | -f <feature-code> -c <sector-count> -l <lba>] -n <device-name> [-r] [-s <out-filename>]`

1. Enter the following at the command prompt: `msecli -C -i -n <device-name>`.
2. When finished, the data outputs to the console or specified file.

**Figure 11: Display ATA Identify Device Data**



```

Select Administrator: Micron Storage Executive CLI

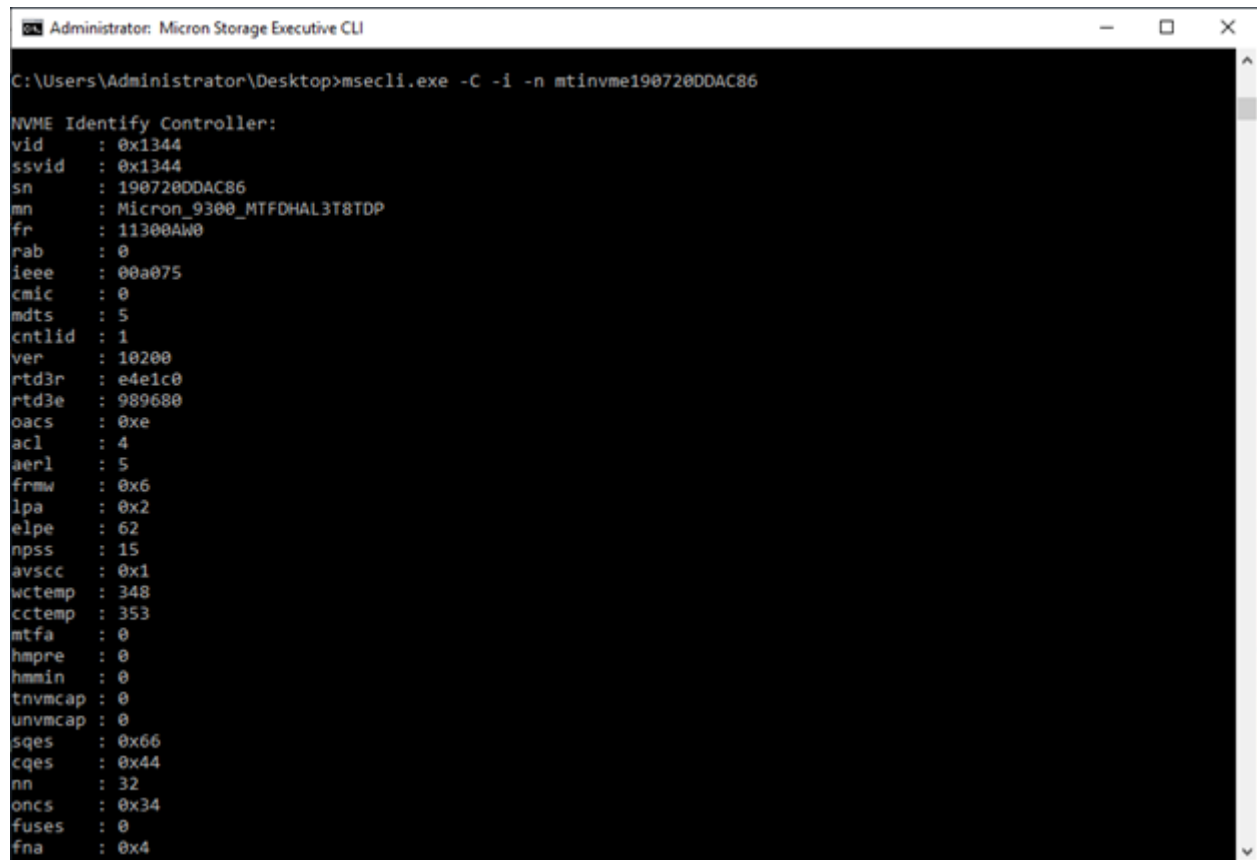
C:\Users\Administrator>msecli -C -i -n Drive1 -s output.txt

Device Name    : Drive1
Parsed IDD data is saved successfully in the specified file
CMD_STATUS     : Success
STATUS_CODE    : 0

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C:\Users\Administrator>
  
```

**Figure 12: Display NVMe Controller Data**



```
Administrator: Micron Storage Executive CLI
C:\Users\Administrator\Desktop>msecli.exe -C -i -n mtinvmc190720DDAC86

NVMe Identify Controller:
vid      : 0x1344
ssvid    : 0x1344
sn       : 190720DDAC86
mn       : Micron_9300_MTFDHAL3T8TDP
fr       : 11300AW0
rab      : 0
ieee     : 00a075
cmic     : 0
mdts     : 5
cntlid   : 1
ver      : 10200
rtd3r    : e4e1c0
rtd3e    : 989680
oacs     : 0xe
acl       : 4
aerl     : 5
frmw     : 0x6
lpa      : 0x2
elpe     : 62
npss     : 15
avsc     : 0x1
wctemp   : 348
cctemp   : 353
mtfa     : 0
hmpre    : 0
hmin     : 0
tnvmcap  : 0
unvmcap  : 0
sqes     : 0x66
cques    : 0x44
nn       : 32
oncs     : 0x34
fuses    : 0
fna      : 0x4
```

**Figure 13: Display NVMe Namespace IDD Data**

```
Administrator: Micron Storage Executive CLI
C:\Users\Administrator\Desktop>msecli.exe -C -i -a 1 -n mtinvm190720DDAC86

NVME Identify Namespace 1:
nsze      : 0x1bf1f72b0
ncap      : 0x1bf1f72b0
nuse      : 0x1bf1f72b0
nsfeat    : 0
nlbaf     : 3
flbaf     : 0
mc        : 0
dpc       : 0
dps       : 0
nmic      : 0x1
rescap    : 7
fpi       : 0
nawun     : 0
nawupf    : 0
nacwu     : 0
nabsn     : 0
nabo      : 0
nabspf    : 0
nvmcap    : 3840755982336
nguid     : 100000000000000000
eui64     : a0750120ddac86
lbaf 0    : ms:0 ds:9 rp:0x2 (in use)
lbaf 1    : ms:0 ds:12 rp:0
lbaf 2    : ms:0 ds:9 rp:0x2
lbaf 3    : ms:0 ds:12 rp:0

Device Name : mtinvm190720DDAC86
Parsed IDD data is retrieved successfully
CMD_STATUS  : Success
STATUS_CODE : 0

Copyright (C) 2019 Micron Technology, Inc.
```

## Displaying Firmware Slot Information (NVMe Drives Only)

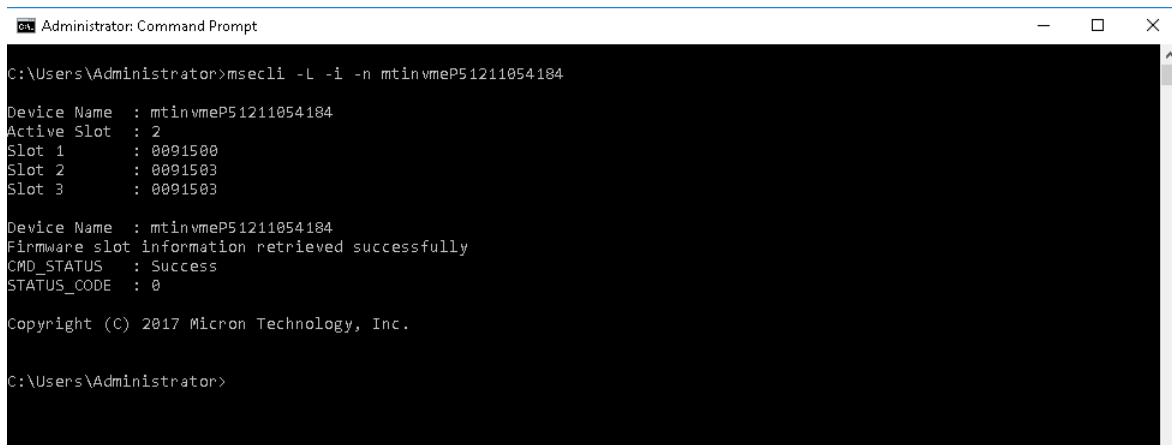
Use the following command to display firmware slot information for an NVMe drive.

Usage: msecli -L [-d|-P|-i|-j <json-file>|-J] [-n <device-name>] [-r] [-s <out-filename>]

1. Enter the following at the command prompt: **msecli -L [-d|-P|-i|-j <json-file>|-J] [-n <device-name>] [-r] [-s <out-filename>]**
2. The CLI displays firmware slot information about the specified drive.



**Figure 14: Firmware Slot Information for an NVMe Drive**



```
Administrator: Command Prompt
C:\Users\Administrator>msectli -L -i -n mtinvmep51211054184

Device Name   : mtinvmep51211054184
Active Slot   : 2
Slot 1        : 0001500
Slot 2        : 0001503
Slot 3        : 0001503

Device Name   : mtinvmep51211054184
Firmware slot information retrieved successfully
CMD_STATUS    : Success
STATUS_CODE   : 0

Copyright (C) 2017 Micron Technology, Inc.

C:\Users\Administrator>
```

### Displaying PCIe Information (NVMe Drives Only)

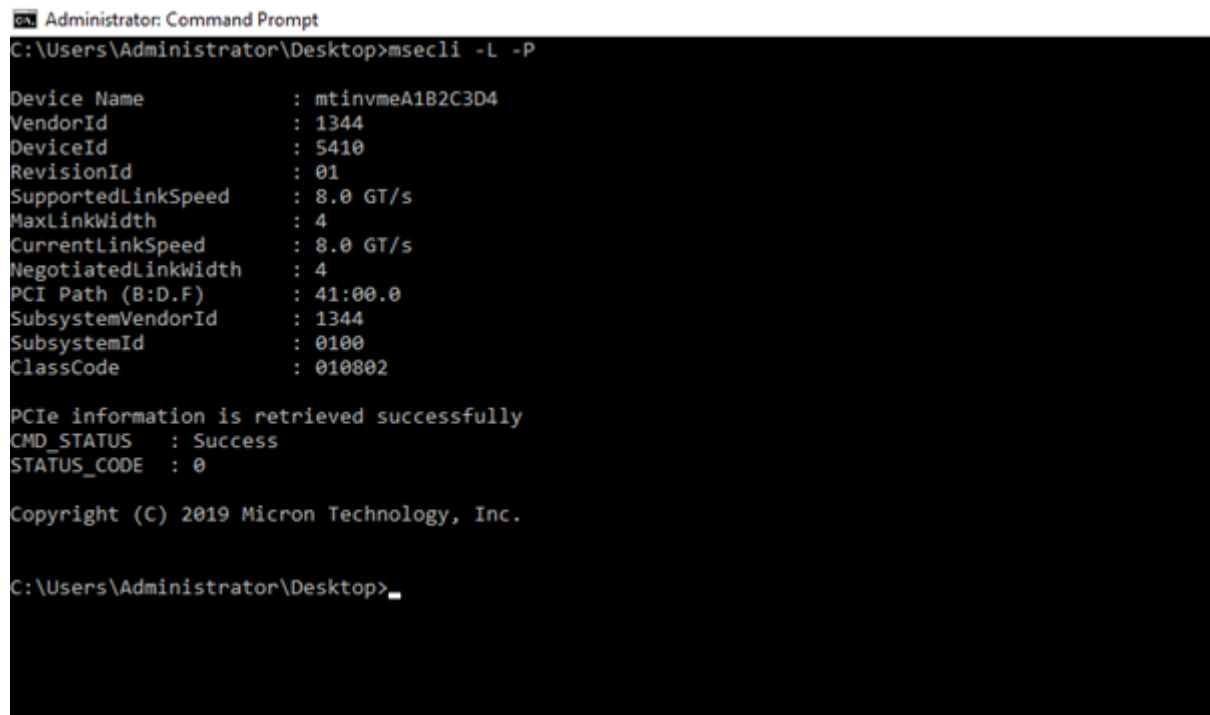
Use the following instructions to display PCIe information for an NVMe drive, including:

- Device name
- Vendor ID
- Device ID
- Revision ID
- Supported PCIe link speeds
- Maximum PCIe link width
- Current PCIe link speed
- Negotiated PCIe link width
- PCI location (path) of the PCIe controller (PCI bus slot info)
- Subsystem vendor ID
- Subsystem ID
- Class code

Usage: `msecli -L [-d|-P|-i|-j <json-file>|-J] [-n <device-name>] [-r] [-s <out-filename>]`

1. Enter the following at the command prompt: `msecli -L -P`
2. The CLI displays information for each available NVMe drive.

**Figure 15: PCIe Information**



```

Administrator: Command Prompt
C:\Users\Administrator\Desktop>msecli -L -P
Device Name       : mtinvmeA1B2C3D4
VendorId          : 1344
DeviceId          : 5410
RevisionId        : 01
SupportedLinkSpeed : 8.0 GT/s
MaxLinkWidth      : 4
CurrentLinkSpeed  : 8.0 GT/s
NegotiatedLinkWidth : 4
PCI Path (B:D.F)  : 41:00.0
SubsystemVendorId : 1344
SubsystemId       : 0100
ClassCode         : 010802

PCIe information is retrieved successfully
CMD_STATUS       : Success
STATUS_CODE      : 0

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C:\Users\Administrator\Desktop>_
  
```

## Displaying SMART Data and Error Logs

Self-Monitoring, Analysis, and Reporting Technology (SMART) is a monitoring framework used to detect and report various indicators of consistency and anticipate failures. SMART must be enabled on a drive to display data and logs for the drive.

This section describes how to:

- Display SMART data
- Display SMART error and self-test logs

## Displaying SMART Data

Use the following instructions to display a list of SMART attributes supported by each drive in the system. The CLI displays details for each attribute, including the value, threshold, and status.

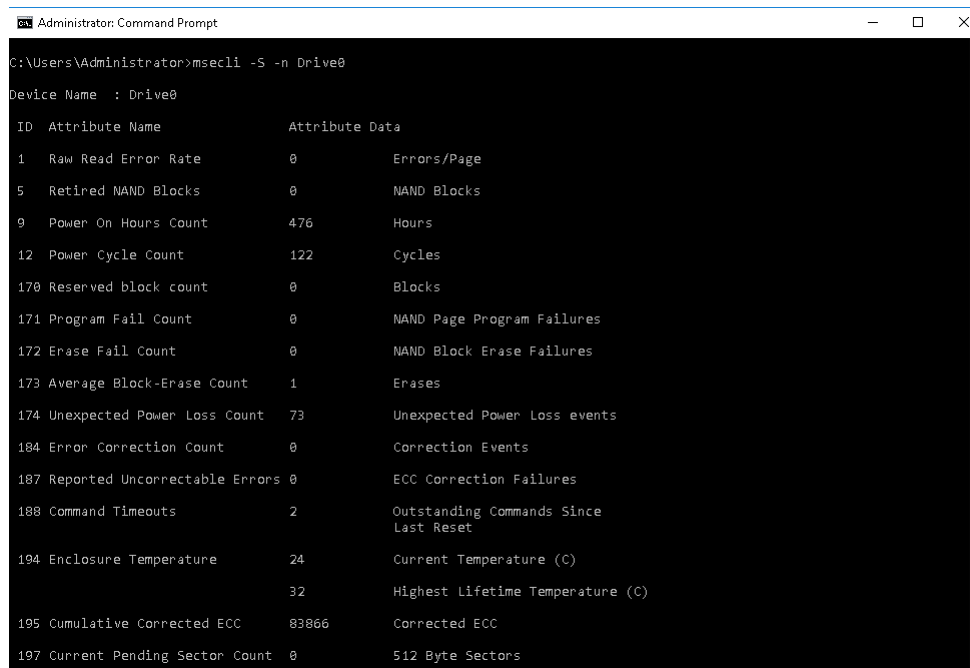
For a list of SMART attributes and attribute IDs, see Appendix A. SMART Attributes and Drive Statistics (page 49).

Usage: **msecli -S** [-i] [-V] [-l <log-type[0 | 1 | 2 | 3 | 6 | 7]>] [-p [-j <json-file>] [-J]] [-t <Self-test type[0 | 1 | 2 | 3 | 4 | 5]>] [-g <gpl-log-address>] [-n <device-name>] [-r] [-s <out-filename>] [-b <bin-file-name>]

1. To display SMART data for a specific drive, enter the following at the command prompt: **msecli -S -n <device-name>**  
To display SMART data for all drives, enter the following: **msecli -S**
2. The CLI displays the SMART data.

In Figure 16, the **Temp. Throttle Threshold in C** value is the temperature at which the firmware starts to throttle write performance to keep the drive within the operating temperature range. The **Temp. Shutdown Threshold in C** value is the temperature at which the firmware shuts down I/O traffic to prevent the drive's components from operating out of the specified range.

**Figure 16: SMART Attributes**



ID	Attribute Name	Attribute Data	
1	Raw Read Error Rate	0	Errors/Page
5	Retired NAND Blocks	0	NAND Blocks
9	Power On Hours Count	476	Hours
12	Power Cycle Count	122	Cycles
170	Reserved block count	0	Blocks
171	Program Fail Count	0	NAND Page Program Failures
172	Erase Fail Count	0	NAND Block Erase Failures
173	Average Block-Erase Count	1	Erases
174	Unexpected Power Loss Count	73	Unexpected Power Loss events
184	Error Correction Count	0	Correction Events
187	Reported Uncorrectable Errors	0	ECC Correction Failures
188	Command Timeouts	2	Outstanding Commands Since Last Reset
194	Enclosure Temperature	24	Current Temperature (C)
		32	Highest Lifetime Temperature (C)
195	Cumulative Corrected ECC	83866	Corrected ECC
197	Current Pending Sector Count	0	512 Byte Sectors

## Displaying SMART Logs

Use the following instructions to display available SMART logs. Analyzing these logs helps to identify errors in a drive.

Use the optional **-b <output-binary>** flag to save log data in a binary file.

**Note:** This feature is not supported by NVMe and SAS drives.

The following SMART logs can be generated:

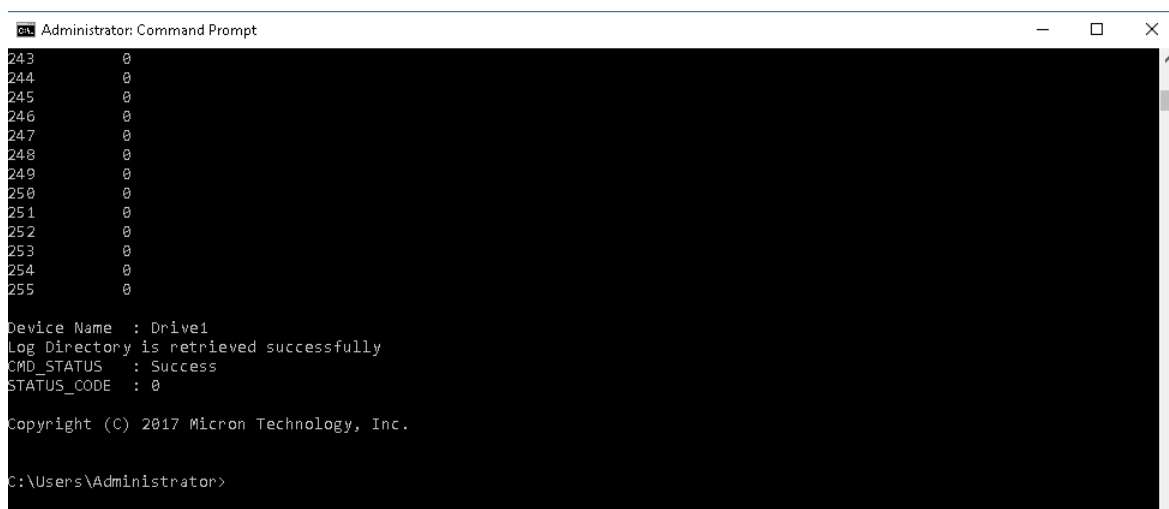
- **SMART error log directory (log type 0):** Displays the number of log pages.
- **SMART summary error log (log type 1):** Displays a summary of SMART log errors.
- **SMART comprehensive error log (log type 2):** Provides logging for 28-bit addressing only. It includes uncorrectable errors, ID Not Found errors for which the LBA request was valid, server errors, and write fault errors. This log does not include errors attributed to the receipt of faulty commands.
- **SMART extended error log (log type 3):** Provides logging for 28-bit and 48-bit entries. It includes uncorrectable errors, ID Not Found errors for which the LBA request was valid, server errors, and write fault errors. This log does not include errors attributed to the receipt of faulty commands.
- **SMART self test log (log type 6):** Displays the results of the SMART self-test for 28-bit addressing only.
- **Extended SMART self test log (log type 7):** Displays the results of the SMART self-test for 48-bit and 28-bit addressing.

Usage: **msectl -S [-l <log-type>[0 | 1 | 2 | 3 | 6 | 7]>] [-n <device-name>] [-r] [-s <out-file-name>] [-b<output-binary>]**

### Displaying a SMART Error Log Directory

1. Enter the following at the command prompt: `msecli -S -l 0 -n <device-name>`  
Replace `<device-name>` with the drive's device name.
2. The SMART error log directory displays.

**Figure 17: SMART Error Log Directory**



```
Administrator: Command Prompt
243      0
244      0
245      0
246      0
247      0
248      0
249      0
250      0
251      0
252      0
253      0
254      0
255      0

Device Name : Drive1
Log Directory is retrieved successfully
CMD_STATUS : Success
STATUS_CODE : 0

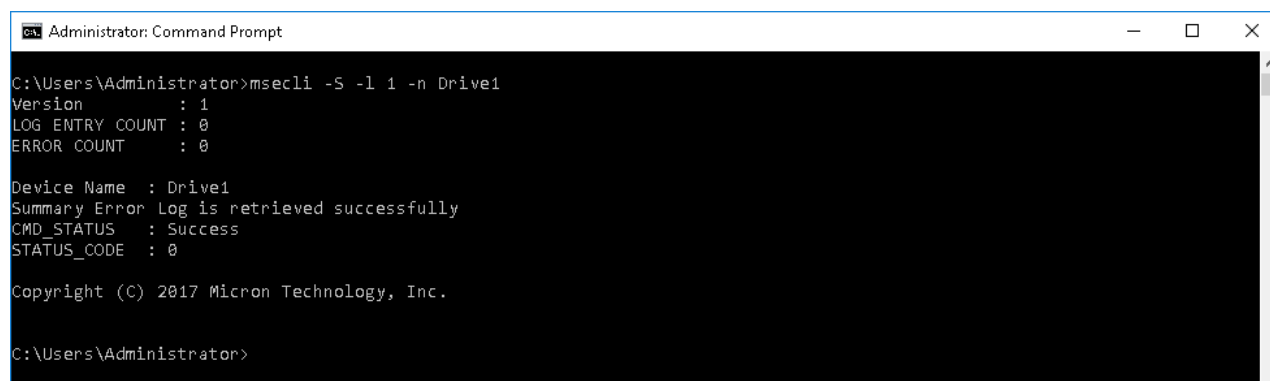
Copyright (C) 2017 Micron Technology, Inc.

C:\Users\Administrator>
```

### Displaying a SMART Summary Error Log

1. Enter the following at the command prompt: `msecli -S -l 1 -n <device-name>`  
Replace `<device-name>` with the drive's device name.
2. The SMART summary error log displays.

**Figure 18: SMART Summary Error Log**



```
Administrator: Command Prompt

C:\Users\Administrator>msecli -S -l 1 -n Drive1
Version      : 1
LOG ENTRY COUNT : 0
ERROR COUNT  : 0

Device Name : Drive1
Summary Error Log is retrieved successfully
CMD_STATUS : Success
STATUS_CODE : 0

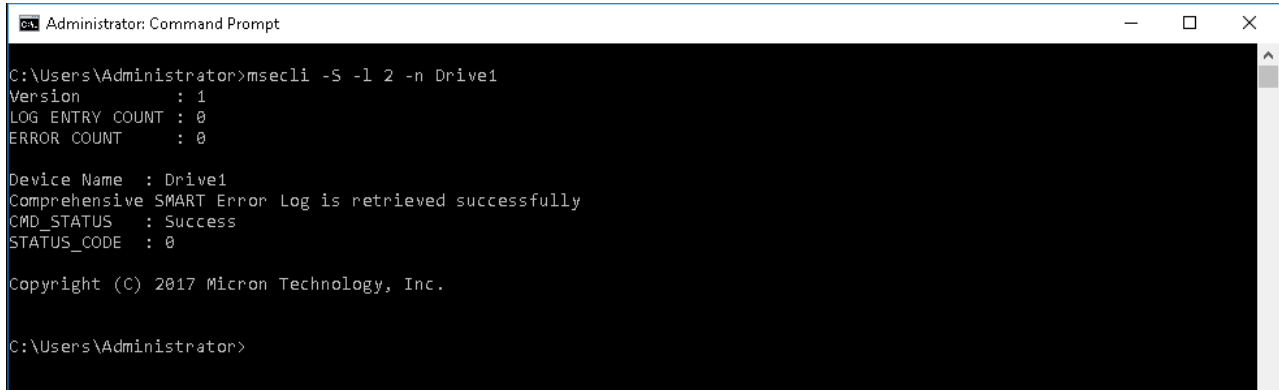
Copyright (C) 2017 Micron Technology, Inc.

C:\Users\Administrator>
```

#### Displaying a SMART Comprehensive Error Log

1. Enter the following at the command prompt: `msecli -S -l 2 -n <device-name>`  
Replace `<device-name>` with the drive's device name.
2. The SMART comprehensive error log displays.

**Figure 19: SMART Comprehensive Error Log**



```
Administrator: Command Prompt

C:\Users\Administrator>msecli -S -l 2 -n Drive1
Version          : 1
LOG ENTRY COUNT : 0
ERROR COUNT      : 0

Device Name      : Drive1
Comprehensive SMART Error Log is retrieved successfully
CMD_STATUS       : Success
STATUS_CODE      : 0

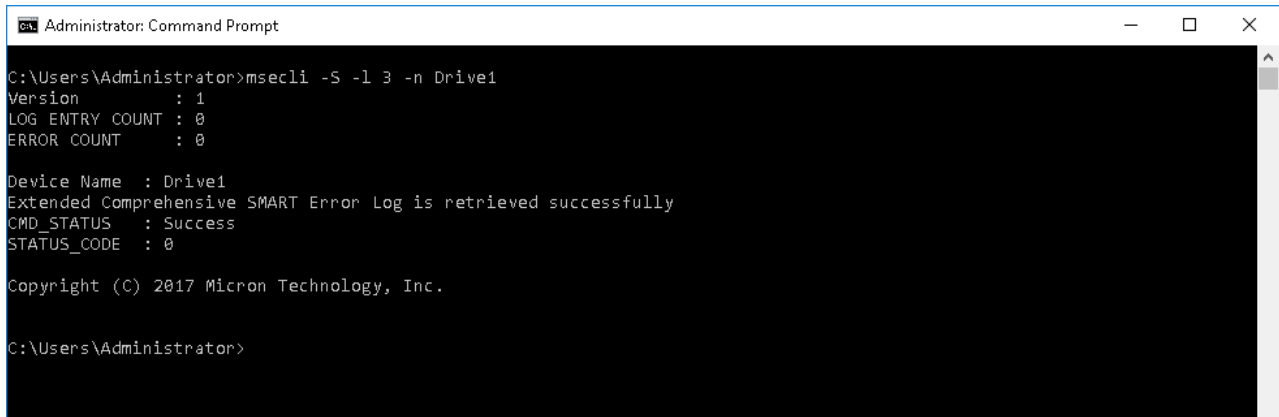
Copyright (C) 2017 Micron Technology, Inc.

C:\Users\Administrator>
```

#### Displaying a SMART Extended Error Log

1. Enter the following at the command prompt: `msecli -S -l 3 -n <device-name>`  
Replace `<device-name>` with the drive's device name.
2. The SMART extended error log displays.

**Figure 20: SMART Extended Error Log**



```
Administrator: Command Prompt

C:\Users\Administrator>msecli -S -l 3 -n Drive1
Version          : 1
LOG ENTRY COUNT : 0
ERROR COUNT      : 0

Device Name      : Drive1
Extended Comprehensive SMART Error Log is retrieved successfully
CMD_STATUS       : Success
STATUS_CODE      : 0

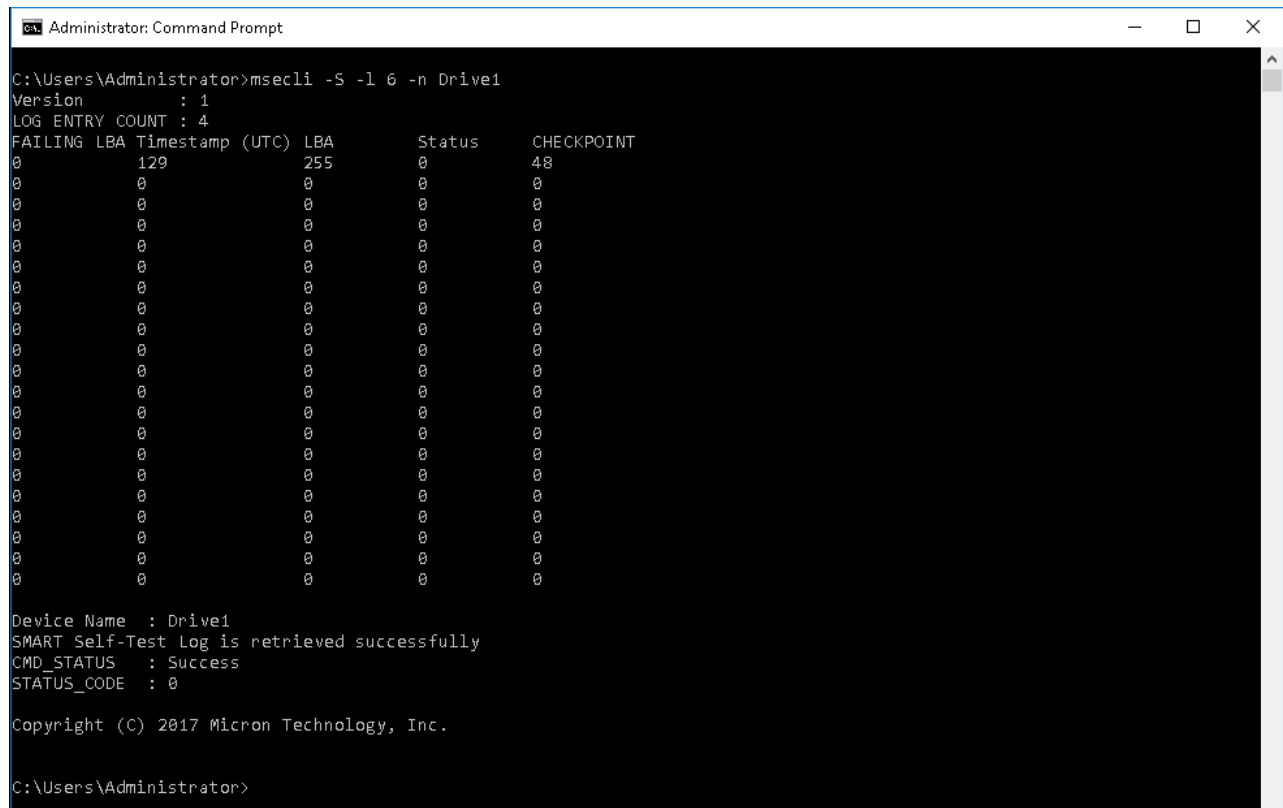
Copyright (C) 2017 Micron Technology, Inc.

C:\Users\Administrator>
```

### Displaying a SMART Self Test Log

1. Enter the following at the command prompt: `msecli -S -l 6 -n <device-name>`  
Replace `<device-name>` with the drive's device name.
2. The SMART self test log displays.

**Figure 21: SMART Self Test Log**



```

Administrator: Command Prompt

C:\Users\Administrator>msecli -S -l 6 -n Drive1
Version      : 1
LOG ENTRY COUNT : 4
FAILING LBA Timestamp (UTC) LBA      Status  CHECKPOINT
0           129             255    0       48
0           0              0        0       0
0           0              0        0       0
0           0              0        0       0
0           0              0        0       0
0           0              0        0       0
0           0              0        0       0
0           0              0        0       0
0           0              0        0       0
0           0              0        0       0
0           0              0        0       0
0           0              0        0       0
0           0              0        0       0
0           0              0        0       0
0           0              0        0       0
0           0              0        0       0

Device Name : Drive1
SMART Self-Test Log is retrieved successfully
CMD_STATUS  : Success
STATUS_CODE : 0

Copyright (C) 2017 Micron Technology, Inc.

C:\Users\Administrator>

```

1. Enter the following at the command prompt: **msecli -S -l 7 -n <device-name>**  
Replace **<device-name>** with the drive's device name.
2. The SMART extended self test log displays.

### Figure 22: SMART Extended Self Test Log

```
C:\Users\Administrator>msecli -S -l 7 -n Drive0
Version : 1
LOG ENTRY COUNT : 7
Failing LBA Timestamp (UTC) LBA Status CHECKPOINT
0 179 4 0 255
0 198 255 0 48
0 199 4 248 48
0 207 4 0 255
0 298 255 0 48
0 457 255 0 255
0 470 255 0 48
0 0 0 0 0
0 0 0 0 0
0 0 0 0 0
0 0 0 0 0
0 0 0 0 0
0 0 0 0 0
0 0 0 0 0
0 0 0 0 0
0 0 0 0 0
0 0 0 0 0
Device Name : Drive0
Extended SMART Self-Test Log is retrieved successfully
CMD_STATUS : Success
STATUS_CODE : 0

Copyright (C) 2017 Micron Technology, Inc.
```



### Displaying General Purpose Log (GPL) Data

Use the following command to display GPL page data.

Reading log page 0 displays the GPL directory with a count of available pages for each log address. Use the optional **-b <output-binary>** to save the log data in a binary file.

Usage: **msecli -S -g <GPL Log Address> -n <device-name> [-b <output-binary>] [-r] [-s <out-file-name>]**

1. Enter the following at the command prompt: **msecli -g 0 -n <device-name>**  
Replace **0** with the desired log address and **device-name** with the target device..
2. For log 0, the GPL directory is displayed. For all others, the raw data is displayed.

**Figure 23: GPL Data**

```
C:\WINDOWS\system32>msecli -S -g 0 -n Drive2
Version      : 1

PAGE NUMBER PAGE COUNT
1           0
2           0
3          16383
4           8
5           0
6           0
7           1
8           0
9           0
10          0
11          0
12          0
13          0
14          0
15          0
16          1
17          1
18          0
19          1
20          0
21          0
22          0
23          0
24          0
25          0
```

## Running SMART Self Tests

Use the following instructions to run SMART self tests on a specific drive. The supported tests (Short, Extended, Conveyance Self Test) can be run in either offline or captive mode.

**Note:** This feature is not supported by NVMe drives. With SAS drives, only Self Test types 1 and 2 are supported.

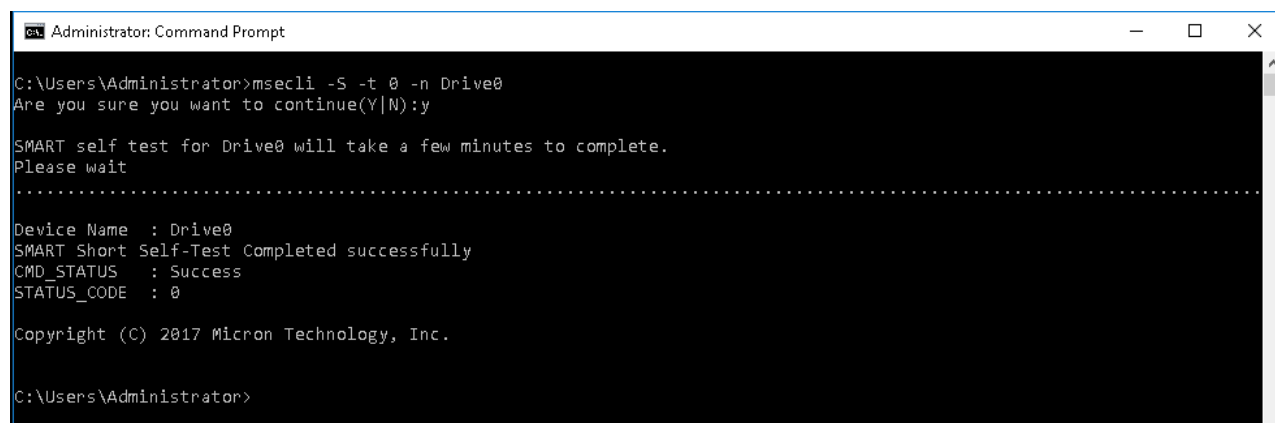
Usage: `msecli -S -t <self-test type> -n <device-name>`

Where **self-test type** is an integer:

- 0 = Short Self Test offline mode
- 1 = Extended Self Test offline mode
- 2 = Conveyance Self Test offline mode
- 3 = Short Self Test captive mode
- 4 = Extended Self Test captive mode
- 5 = Conveyance Self Test captive mode

1. Enter the following at the command prompt:  
`msecli -S -t <self-test type> -n <device-name>`
2. Enter Y when prompted.
3. The self test can take up to an hour depending on the test being run (Extended Self Test is the longest). A message appears when the test is complete.

**Figure 24: Running SMART Self Test**



```
Administrator: Command Prompt
C:\Users\Administrator>msecli -S -t 0 -n Drive0
Are you sure you want to continue(Y|N):y

SMART self test for Drive0 will take a few minutes to complete.
Please wait
.....

Device Name : Drive0
SMART Short Self-Test Completed successfully
CMD_STATUS : Success
STATUS_CODE : 0

Copyright (C) 2017 Micron Technology, Inc.

C:\Users\Administrator>
```

## Updating Firmware

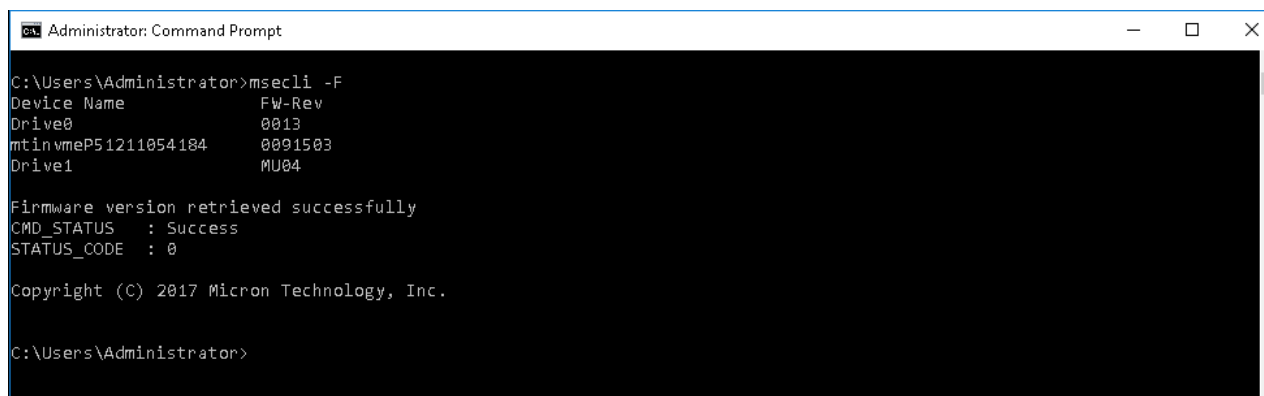
This section explains how to check for and perform a firmware update on supported drives.

### Checking the Firmware Version

Usage: `msecli -F`

1. Enter the following at the command prompt: `msecli -F`
2. The currently installed firmware version displays.

**Figure 25: Firmware Version**



```

Administrator: Command Prompt
C:\Users\Administrator>msecli -F
Device Name      FW-Rev
Drive0           0013
mtin vmeP51211054184  0091503
Drive1           MU04

Firmware version retrieved successfully
CMD_STATUS   : Success
STATUS_CODE  : 0

Copyright (C) 2017 Micron Technology, Inc.

C:\Users\Administrator>
  
```

## Updating Firmware

Usage: `msecli -U -i <fw-folder-path> -S <firmware-slot> [ -m <model-number> | -n <device-name> ] [-v] [-j] [-J] [-r] [-s <out-filename>]`

**Note:** Specify `-m <model-number>` instead of `-n <device-name>` to upgrade the firmware on all drives of the same model type. For NVMe drives, specify the firmware slot using the `-S su`-option.

1. Enter the following at the command prompt: `msecli -U -i <fw-folder-path> -n <device-name>`  
Replace `<fw-folder-path>` with the firmware folder for the drive.
2. Confirm the operation when prompted.
3. Press **Enter** to continue.

On Windows systems, a message indicates the progress and shows successful when complete. The system will boot into Windows again automatically.

On Linux systems, a message appears when the upgrade is successful.

**Figure 26: Firmware Update Successful**

```
Administrator: Micron Storage Executive CLI
C:\Users\Administrator\Desktop>msecli -U -i P1MU09E -n mtinvme18361E5087BD
This will update the 2200 drive in the system
Are you sure you want to continue(Y|N):y

Upgrading drive mtinvme18361E5087BD [Serial No. 18361E5087BD] to P1MU09E
.....
Device Name : mtinvme18361e5087bd
Firmware Update on mtinvme18361e5087bd Succeeded!
CMD_STATUS : Success
STATUS_CODE : 0

Copyright (C) 2019 Micron Technology, Inc.
```

**Figure 27: Firmware Update Successful**

```
Administrator: Micron Storage Executive CLI
C:\Users\Administrator\Desktop>msecli -U -i Firmwares\fwbin_5100 -n drive0
This will update the 5100PRO drive in the system
Are you sure you want to continue(Y|N):Y

Upgrading drive Drive0 [Serial No. 16361307869C] to D0MU047
.....
Device Name : Drive0
Firmware Update on Drive0 Succeeded!
CMD_STATUS : Success
STATUS_CODE : 0

Copyright (C) 2019 Micron Technology, Inc.
```

## Downloading a Single Firmware Image

This option downloads a raw firmware binary image to the specified Micron drive.

The optional **-S <fw-slot>** can be used to specify a firmware slot on an NVMe drive. If **-S** is not specified for an NVMe drive, the slot will be chosen automatically.

Usage: **msecli -F [-U <fw-image-file> | -S <fw-slot> | -A] [-I] [-m <fw select>] -n <device-name> [ -r ] [ -s <out-filename> ]**

1. Enter the following at the command prompt: **msecli -F -U <firmware binary image> -n <devicename>**
2. Confirm the operation when prompted.

A message indicates the firmware image update is in progress. When finished, a message indicates the operation was successful.

**Figure 28: Firmware Update**

```
Administrator: Command Prompt
c:\Users\Administrator>msecli -F -U firmware.bin -n Drive4

Trying to update current firmware for Drive4.
Are you sure you want to continue(Y|N):y

Firmware update for Drive4 will take a few minutes to complete.
Please wait
.....
Device Name : Drive4
Firmware update operation completed successfully.
Restart the server for the downloaded microcode to take effect.

CMD_STATUS : Success
STATUS_CODE : 0

Copyright (C) 2017 Micron Technology, Inc.

c:\Users\Administrator>
```

## Downloading and Activating Later

The standard firmware update options activate firmware immediately. The following commands can be used to download firmware to a SATA drive and activate it at a later time.

To download firmware for later use:

**msecli -F -U <firmware binary image> -l -n <device-name>**

**Figure 29: Download Firmware for Later Use**

```
C:\WINDOWS\system32>msecli -F -U c:\tmp\firmware.bin -l -n Drive2

Trying to download and save current firmware for Drive2.
Are you sure you want to continue(Y|N):y

Firmware Download and Save for later activation for Drive2 will take a few minutes to complete.
Please wait
.....
Device Name : Drive2
Firmware download and save operation success
CMD_STATUS : Success
STATUS_CODE : 0

Copyright (C) 2018 Micron Technology, Inc.
```

To activate downloaded firmware:

```
msecli -F -A -n <device-name>
```

**Figure 30: Activating Downloaded Firmware**

```
C:\WINDOWS\system32>msecli -F -A -n drive2

Trying to activate recently saved firmware for Drive2.
Are you sure you want to continue(Y|N):y

Device Name : Drive2
Activate downloaded firmware operation success
CMD_STATUS : Success
STATUS_CODE : 0

Copyright (C) 2018 Micron Technology, Inc.
```

To activate the firmware slot for NVMe drives:

```
msecli -F -S <slot number> -n <drive-name>
```

**Figure 31: Activating Downloaded Firmware**

```
C:\Users\Administrator\Desktop>msecli -F -S 1 -n mtinvmeA1B2C3D4

Setting Active FW slot will take a few seconds to complete.
Please wait.

Device Name : mtinvmeA1B2C3D4
Active FW Slot set successfully!
CMD_STATUS : Success
STATUS_CODE : 0

Copyright (C) 2019 Micron Technology, Inc.
```

## Selective Image Download (9200 Series Only)

The 9200 series firmware binaries have multiple firmware components that occasionally need to be updated individually. The following command lets you update specific components from the given firmware binary. The valid component options are: **ALL**, **EEP** and **OOB**.

Usage: `msecli -F -U <firmware_binary> -m <component> -n <device-name>`

1. Enter the following at the command prompt: `msecli -F -U <firmware_binary> -m [ALL|EEP|OOB] -n <device>`
2. The specified firmware component will be updated.

**Figure 32: Selective Image Download**

```
c:\Users\Administrator\Desktop>msecli -F -U allBinary.tar -m ALL -n mtinvme17217879382

Firmware update for mtinvme17217879382 will take a few minutes to complete.
Please wait
.....
Device Name : mtinvme17217879382
Firmware update operation completed successfully.
Restart the server for the downloaded microcode to take effect.

CMD_STATUS : Success
STATUS_CODE : 0

Copyright (C) 2018 Micron Technology, Inc.

c:\Users\Administrator\Desktop>_
```

## Retrieving Debug Data

Debug data from the device and operating system is provided to help debug any potential issues. If using VMware, debug data is saved as a .tar file. Otherwise, debug data is saved as a .zip file.

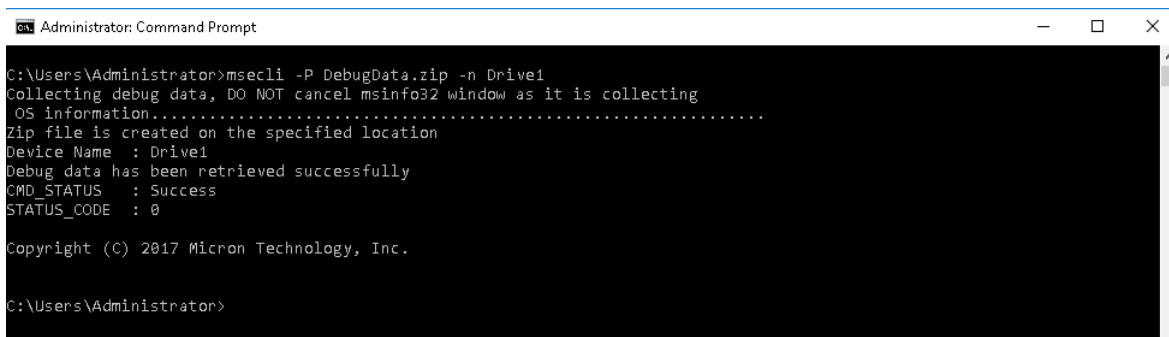
The optional **-l <debug-level>** flag can be used to specify the level of collected debug data. By default, the **ALL** level is selected and both OS and drive data are collected. OS data includes information about the operation system environment in which the drive is running. Drive data collected includes various SMART, GPL and vendor-specific logs.

Valid options for **-l <debug-level>** are: **ALL**, **OS** and **CTRL**.

Usage: **msecli -P <.zip or .tar filename> -n <device-name> [-r] [-s <out-filename>] [-l <debug-level>]**

1. Enter the following at the command prompt: **msecli -P <.zip or .tar file name> -n <device-name>**  
Replace **<.zip or .tar file name>** with the debug data file and **<device-name>** with the drive's device name. If a file path is not specified, the .zip or .tar file is saved to the current directory.
2. A message appears when the operation completes.

**Figure 33: Zip File Created Successfully**



```

Administrator: Command Prompt
C:\Users\Administrator>msecli -P DebugData.zip -n Drive1
Collecting debug data, DO NOT cancel msinfo32 window as it is collecting
OS information.....
Zip file is created on the specified location
Device Name : Drive1
Debug data has been retrieved successfully
CMD_STATUS : Success
STATUS_CODE : 0

Copyright (C) 2017 Micron Technology, Inc.

C:\Users\Administrator>
  
```



## Erasing a Drive

This section explains how to remove all data from a drive by performing a sanitize erase, sanitize crypto scramble, PSID revert, or secure erase operation.

### Performing a Sanitize Drive (Block Erase) Operation

The sanitize drive (block erase) operation is supported on all drives except for encrypted drives (those with TCG-enabled/password-protected). These drives must use the PSID revert operation to remove data. See Performing a PSID Revert (SATA and SAS Drives Only) (page 35).

This operation:

- Cannot be performed on mounted drives. Unmount the drive before proceeding.
- Cannot be performed on Windows systems in which the system partition is encrypted with Bitlocker.
- Will not complete on systems in IDE mode. Change to AHCI mode and then proceed with the operation.
- Cannot be performed on drives connected behind a RAID controller.

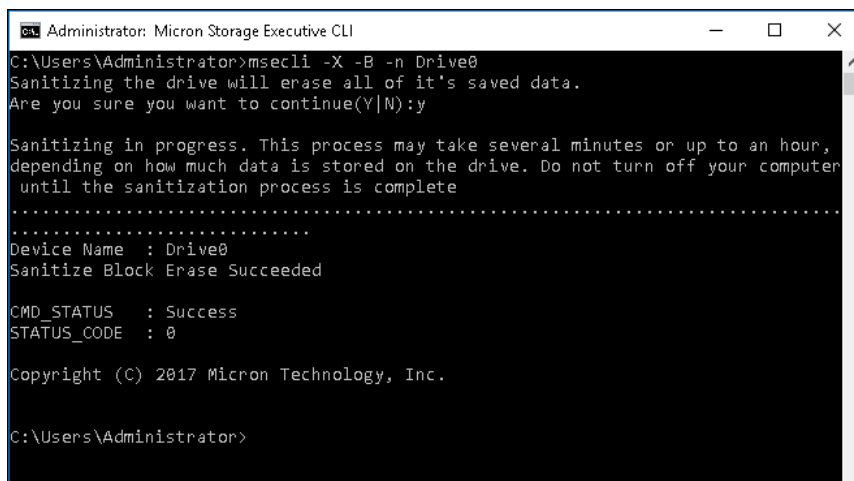
**CAUTION:** This operation completely removes all data from a drive. If possible, back up important data before performing the operation.

Usage: `msecli -X -B -n <device-name> [-r] [-s <out-filename>]`

1. Enter the following at the command prompt: `msecli -X -B -n <device-name>`
2. Confirm the operation when prompted.
3. Press **Enter** to continue.

A message indicates the operation is in progress. When finished, a message indicates the operation was successful.

**Figure 34: Sanitize Drive Successful**



```
Administrator: Micron Storage Executive CLI
C:\Users\Administrator>msecli -X -B -n Drive0
Sanitizing the drive will erase all of it's saved data.
Are you sure you want to continue(Y|N):y

Sanitizing in progress. This process may take several minutes or up to an hour,
depending on how much data is stored on the drive. Do not turn off your computer
until the sanitization process is complete
.....
.....
Device Name : Drive0
Sanitize Block Erase Succeeded

CMD_STATUS : Success
STATUS_CODE : 0

Copyright (C) 2017 Micron Technology, Inc.

C:\Users\Administrator>
```

### Performing a Sanitize Crypto Scramble Operation (SATA Drives Only)

This operation is not supported on encrypted drives (those with TCG-enabled/password-protected) and the BX100, BX200 and P400m drives. Encrypted drives must use the PSID revert operation to remove data. BX100, BX200 and P400m drives must use the Sanitize Block Erase operation to remove data.

This operation:

- Cannot be performed on mounted drives. Unmount the drive before proceeding.
- Cannot be performed on Windows systems in which the system partition is encrypted with Bitlocker.
- Will not complete on systems in IDE mode. Change to AHCI mode and then proceed with the operation.
- Cannot be performed on drives connected behind a RAID controller.

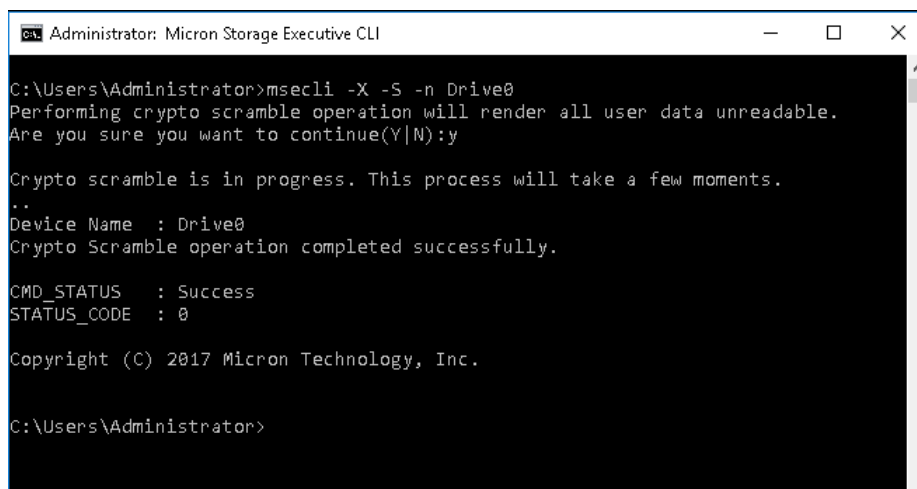
**CAUTION:** This operation completely removes all data from the drive. If possible, back up important data before performing the operation.

Usage: `msecli -X -S -n <device-name> [-r] [-s <output-filename>]`

1. Enter the following at the command prompt: `msecli -X -S -n <device-name>`
2. Confirm the operation when prompted.
3. Press **Enter** to continue.

A message indicates the operation is in progress. Another appears when the operation is successful.

**Figure 35: Sanitize Crypto Scramble Successful**



```

Administrator: Micron Storage Executive CLI
C:\Users\Administrator>msecli -X -S -n Drive0
Performing crypto scramble operation will render all user data unreadable.
Are you sure you want to continue(Y|N):y

Crypto scramble is in progress. This process will take a few moments.
..
Device Name : Drive0
Crypto Scramble operation completed successfully.

CMD_STATUS : Success
STATUS_CODE : 0

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C:\Users\Administrator>
  
```

### Performing a PSID Revert (SATA and SAS Drives Only)

This operation is supported on encrypted SATA and SAS drives only.

The PSID revert operation removes all data from an encrypted drive (one with TCG enabled/password-protected). It can also be used in the event that you have an encrypted drive for which you have lost the authentication code to return the drive to its factory default state.

TCG is automatically enabled on drives that are initialized in systems running Windows 8 or later, or it can be enabled with third-party software utilities. For more information on TCG, refer to <http://www.trustedcomputinggroup.org/>.

This operation cannot be performed on mounted drives. Unmount the drive before proceeding.

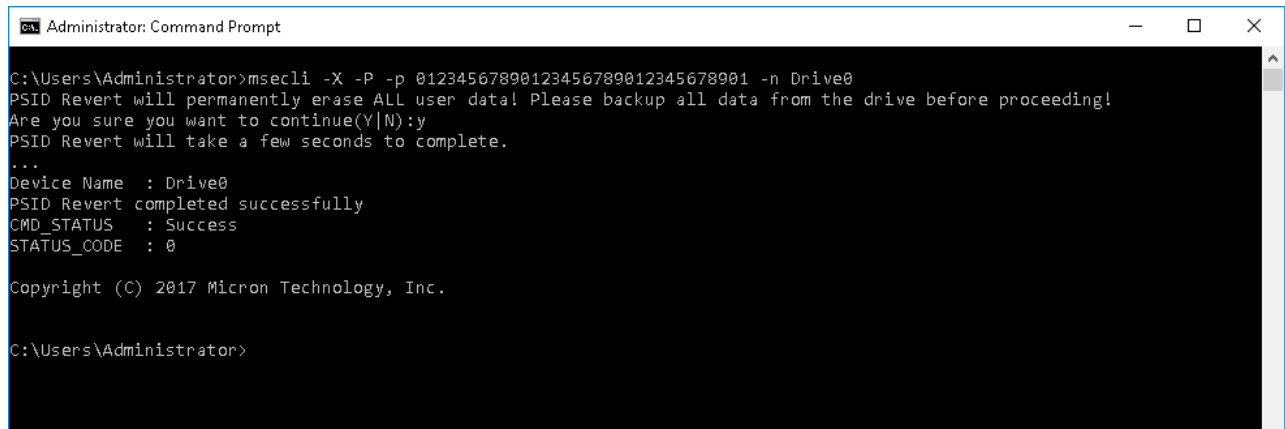
**CAUTION:** A PSID revert operation completely removes all data from the drive and returns the drive to its factory default state. If possible, back up important data before performing the operation.

Usage: **msecli -X -P -p <PSID-value> -n <device-name> [-r] [-s <output-filename>]**

1. Enter the following at the command prompt: **msecli -X -P -p <PSID-value> -n <device-name>**  
Replace <PSID-value> with the drive's PSID value. This value can be found on the drive's front label.
2. Confirm the operation when prompted.
3. Press **Enter** to continue.

A message indicates the operation was successful.

**Figure 36: PSID Revert Successful**



```
Administrator: Command Prompt
C:\Users\Administrator>msecli -X -P -p 01234567890123456789012345678901 -n Drive0
PSID Revert will permanently erase ALL user data! Please backup all data from the drive before proceeding!
Are you sure you want to continue(Y|N):y
PSID Revert will take a few seconds to complete.
...
Device Name : Drive0
PSID Revert completed successfully
CMD_STATUS : Success
STATUS_CODE : 0

Copyright (C) 2017 Micron Technology, Inc.

C:\Users\Administrator>
```

### Performing a Secure Erase

**CAUTION:** This operation completely removes all data from a drive. If possible, back up important data before performing the operation.

This operation cannot be performed on mounted drives. Unmount the drive before proceeding.

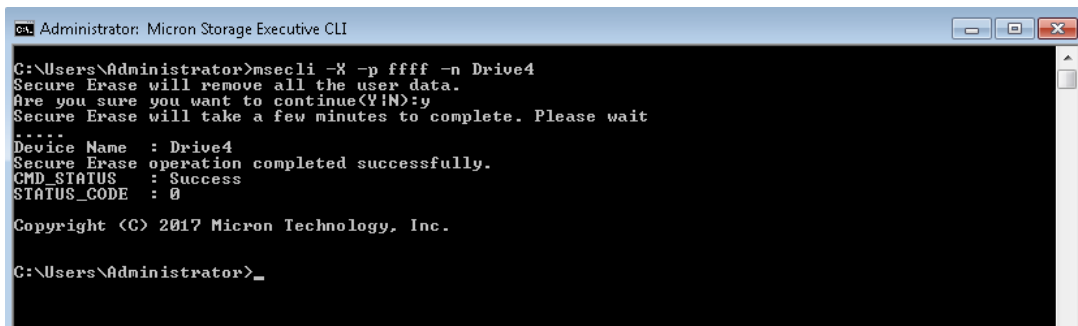
This command is not supported by drives in a security frozen state. For drives in this state, use the Sanitize Drive operation to remove user data.

Usage: `msecli -X -p <password> -n <device-name> [-r] [-s <output-filename>]`

1. Enter the following at the command prompt: `msecli -X -p <password> -n <device-name>`  
Replace `<password>` with `ffff` and `<device-name>` with the drive's name.
2. Confirm the operation when prompted.
3. Press **Enter** to continue.

A message indicates the operation is in progress. When finished, a message indicates the operation was successful.

**Figure 37: Secure Erase Successful**



```

Administrator: Micron Storage Executive CLI

C:\Users\Administrator>msecli -X -p ffff -n Drive4
Secure Erase will remove all the user data.
Are you sure you want to continue(Y|N):y
Secure Erase will take a few minutes to complete. Please wait
****
Device Name      : Drive4
Secure Erase operation completed successfully.
CMD_STATUS      : Success
STATUS_CODE     : 0

Copyright (C) 2017 Micron Technology, Inc.

C:\Users\Administrator>_
  
```

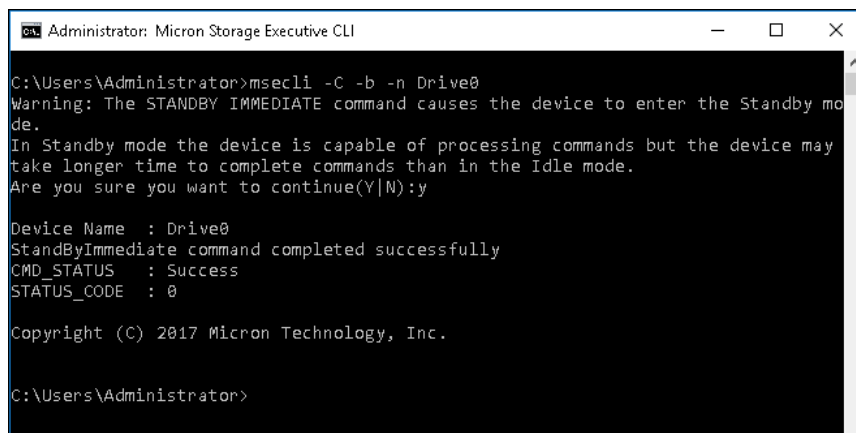
## Running the STANDBY IMMEDIATE Command

This command places the specified drive in standby mode. This is useful when preparing a drive for removal from a system or prior to shutdown. The drive will remain capable of processing commands but performance may be slower than if the drive were in an idle state.

Usage: `msecli -C [-i [-a <namespace id>] | -b | -f <feature-code> -c <sector-count> -l <lba> ] -n <device-name> [-r] [-s <out-filename>]`

1. Enter the following at the command prompt: `msecli -C -b -n <device-name>`  
Replace `<device-name>` with the drive's name.
2. Enter Y when the warning message appears.  
A message indicates the operation was successful.

**Figure 38: STANDBY IMMEDIATE Command**



```

Administrator: Micron Storage Executive CLI
C:\Users\Administrator>msecli -C -b -n Drive0
Warning: The STANDBY IMMEDIATE command causes the device to enter the Standby mode.
In Standby mode the device is capable of processing commands but the device may
take longer time to complete commands than in the Idle mode.
Are you sure you want to continue(Y|N):y

Device Name : Drive0
StandByImmediate command completed successfully
CMD_STATUS : Success
STATUS_CODE : 0

Copyright (C) 2017 Micron Technology, Inc.

C:\Users\Administrator>
  
```

## Configuring Drive Over-Provisioning

Over-provisioning reduces the accessible capacity of a drive while allocating more capacity for performing background tasks. The CLI provides two methods of changing over-provisioning capacity: specify the max number of LBAs or set desired drive capacity in GB (whole GB only).

**Warning: Over-provisioning erases all data on the drive. Back up all required data before performing this operation.**

Note: NVMe support is limited to the 9200, 2100AI and 2100AT Series.

Usage: `msecli -M [-k <value> | -l <state-value> | -u <value> | -i <value> | -w <state-value> | -p <state-value> | -P <state-value> | -o <Max Address> | -O <size in GB> ] -n <device-name> [-r] [-s <out-filename>]`

1. Enter the following at the command prompt to set the maximum number of LBAs:  
`msecli -M -o <Max Address> -n <device-name>`

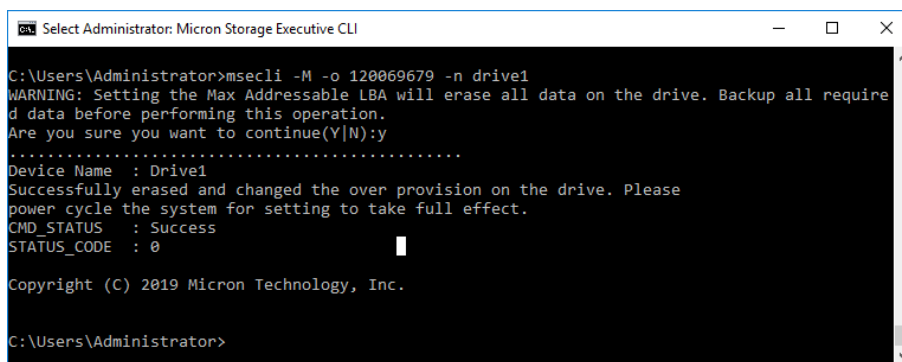
If specifying max address, replace `<Max Address>` with the new max addressable LBA, not to exceed the default for the drive. The default max LBA can be determined using the following command: `msecli -L -d -n <device name>`

Or, enter the following at the command prompt to set desired drive capacity in GB:

`msecli -M -O <Capacity in GB> -n <device-name>`

2. Enter Y to proceed with the operation.
3. A message indicates the operation was successful.
4. Power cycle the system for the settings to take effect.

**Figure 39: Changing Over-Provisioning Capacity via Max Address**



```

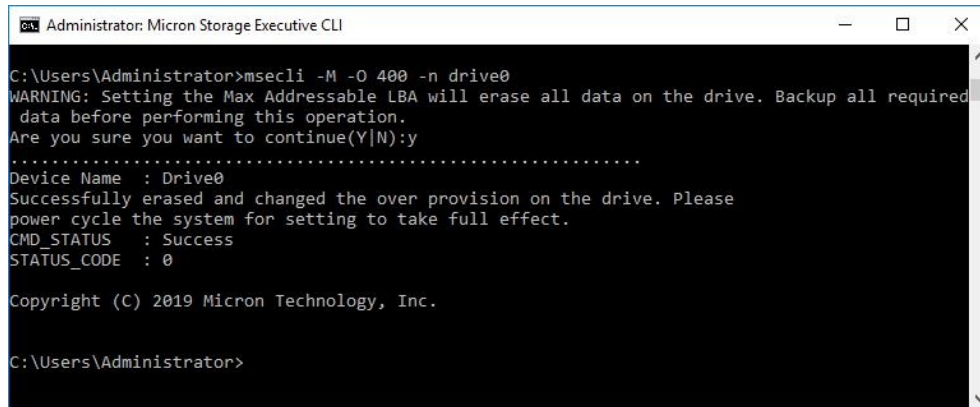
Select Administrator: Micron Storage Executive CLI

C:\Users\Administrator>msecli -M -o 120069679 -n drive1
WARNING: Setting the Max Addressable LBA will erase all data on the drive. Backup all required data before performing this operation.
Are you sure you want to continue(Y|N):y
.....
Device Name : Drive1
Successfully erased and changed the over provision on the drive. Please power cycle the system for setting to take full effect.
CMD_STATUS : Success
STATUS_CODE : 0

Copyright (C) 2019 Micron Technology, Inc.

C:\Users\Administrator>
  
```

**Figure 40: Changing Over-Provisioning via Drive Capacity**



```
Administrator: Micron Storage Executive CLI

C:\Users\Administrator>msecli -M -O 400 -n drive0
WARNING: Setting the Max Addressable LBA will erase all data on the drive. Backup all required
data before performing this operation.
Are you sure you want to continue(Y|N):y
.....
Device Name   : Drive0
Successfully erased and changed the over provision on the drive. Please
power cycle the system for setting to take full effect.
CMD_STATUS    : Success
STATUS_CODE   : 0

Copyright (C) 2019 Micron Technology, Inc.

C:\Users\Administrator>
```

## Managing Drive Physical Capacity

This section describes how to manage the physical capacity of a 2100AI or 2100AT drive. Physical capacity management (PCM) is also known as SLC namespaces or enhanced partitions.

Usage: `msecli -M [-k <value> | -l <state-value> | -u <value> | -i <value> | -w <state-value> | -p <state-value> | -P <state-value> | -b <% of TLC as SLC> | -L | -o <Max Address> | -O <size in GB> ] -n <device-name> [-r] [-s <out-filename>]`

**-b <% of TLC as SLC>**

Suboption of '-M'. Sets percentage of TLC as SLC on 2100AI and 2100AT. Valid inputs are 10, 20, 30, 40, 50, 100.

**-L**

Suboption of '-M'. Sets lock for physical configuration command on 2100AI and 2100AT.

**Figure 41: Allocating SLC Namespace Capacity (30% of Total Capacity)**

```
C:\Users\Pabitra\storagedirector\bin\Windows\x64\Release>msecli.exe -M -b 30 -n mtinvme1925226633F7
Device Name : mtinvme1925226633F7
Successfully created SLC physical capacity!
CMD_STATUS : Success
STATUS_CODE : 0
Copyright (C) 2019 Micron Technology, Inc.
```



## Formatting a Drive (SAS Drives Only)

This section describes how to format a supported SAS drive.

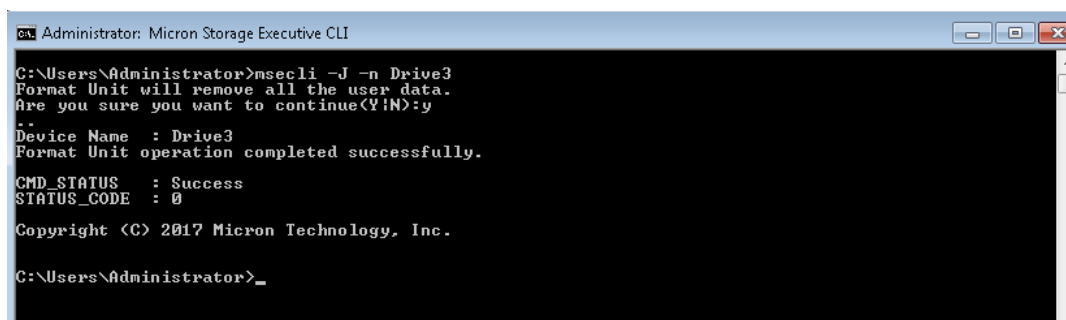
This option can be used to change the LBA size configuration from the default 512 bytes to any other LBA size supported by the drive. Changing LBA data size is not required for this operation to complete. See the product data sheet (available on [micron.com](http://micron.com)) for supported LBA sizes.

**CAUTION:** All data on the drive will be lost when performing this operation.

Usage: `msecli -J [-b <Number of Blocks> -l <LBA block size> ] [-p <Protection type> [-e <Protection Interval Exponent> ]] [-d] [-c] [-f] -n <device-name>`

1. Enter the following at the command prompt: `msecli -J -n <device-name>`  
Replace `<device-name>` with the name of the drive.
2. Confirm the operation when prompted.
3. Press Enter to continue.
4. A message indicates the operation is in progress. When finished, a message indicates the operation was successful.

**Figure 42: Format Drive Successful**



```

Administrator: Micron Storage Executive CLI

C:\Users\Administrator>msecli -J -n Drive3
Format Unit will remove all the user data.
Are you sure you want to continue(Y|N):y

Device Name : Drive3
Format Unit operation completed successfully.

CMD_STATUS : Success
STATUS_CODE : 0

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C:\Users\Administrator>_
  
```

## Configuring Interrupt Coalescing (NVMe Drives Only)

Interrupt coalescing is the process of taking successive command completion events and coalescing them into a single interrupt. When a high queue depth is used on an NVMe drive, this coalescing leads to fewer system interrupts, lower CPU utilization, and higher IOPS. For lower queue depth I/O activity, coalescing can increase latency. Changing this value increases or decreases the internal timeout length, enabling more or less I/Os to be completed with a single interrupt.

For NVMe drives, valid data values must be in the following hexadecimal format:

Bits 15:8 - Aggregation Time

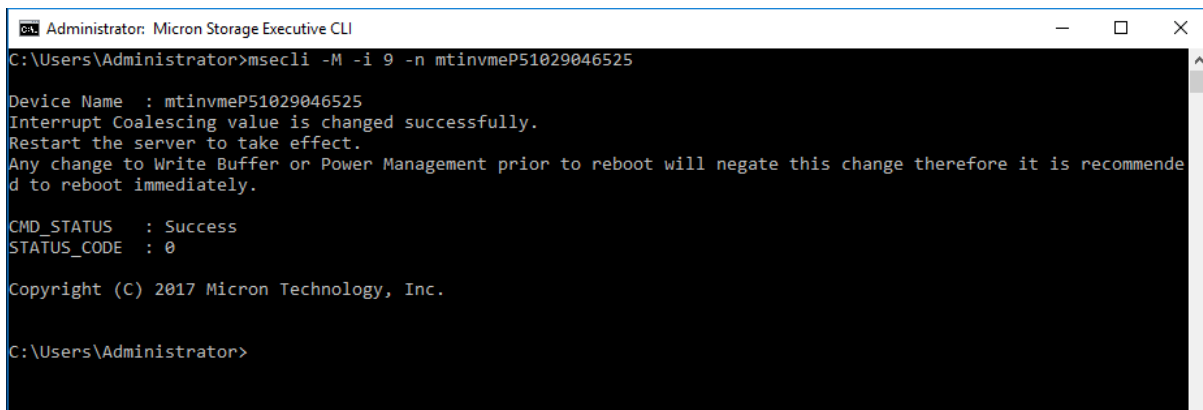
Bits 7:0 - Aggregation Threshold

Usage: `msecli -M [-k <value> | -l <state-value> | -u <value> | -i <value> | -w <state-value> | -p <state-value> | -P <state-value> | -o <Max Address> | -O <size in GB> ] -n <device-name> [-r] [-s <out-filename>]`

1. Enter the following at the command prompt: `msecli -M -i <coalescing value> -n <device-name>`  
Replace `<coalescing value>` with the new interrupt coalescing value and `<device-name>` with the name of the drive.
2. Confirm the operation when prompted.
3. Press **Enter** to continue.

A message indicates the operation was successful.

**Figure 43: Interrupt Coalescing Value Changed Successfully**



```
Administrator: Micron Storage Executive CLI
C:\Users\Administrator>msecli -M -i 9 -n mtinvmeP51029046525

Device Name : mtinvmeP51029046525
Interrupt Coalescing value is changed successfully.
Restart the server to take effect.
Any change to Write Buffer or Power Management prior to reboot will negate this change therefore it is recommended to reboot immediately.

CMD_STATUS : Success
STATUS_CODE : 0

Copyright (C) 2017 Micron Technology, Inc.

C:\Users\Administrator>
```

### Preparing to Remove a Drive (NVMe Drives Only)

This section describes how to prepare an NVMe drive to be safely removed from a system.

During the removal process, any cached data is automatically flushed to the drive and the driver unregisters the drive from the kernel. The drive can then be safely removed from the system. Users do not have permission to read, write, or monitor the drive after it is logically removed from system.

**Note:** Because of kernel limitations, these instructions are supported on RHEL 6.x, SLES, and Windows platforms only. The instructions are not supported on RHEL 5.x platforms.

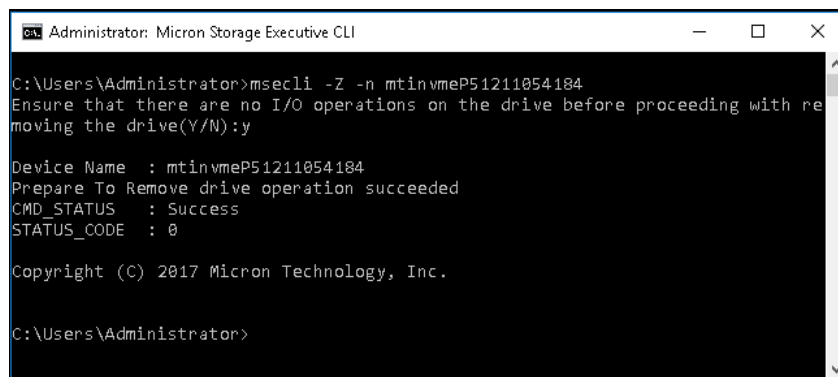
**CAUTION:** Do not perform a remove command when an I/O operation is in progress. Doing so will cause the remaining I/O to fail without any indication.

This operation cannot be performed on mounted drives. Unmount the drive before proceeding.

Usage: `msecli -Z -n <drive-id> [-r] [-s <out-filename>]`

1. Enter the following at the command prompt: `msecli -Z -n <device-name>`  
Replace `<device-name>` with the name of the drive.
2. A message indicates the drive was shut down successfully and has been prepared for removal. The drive can now be physically removed from the system.

**Figure 44: Drive Shut Down Successfully**



```
Administrator: Micron Storage Executive CLI
C:\Users\Administrator>msecli -Z -n mtinvmep51211054184
Ensure that there are no I/O operations on the drive before proceeding with removing the drive(Y/N):y

Device Name : mtinvmep51211054184
Prepare To Remove drive operation succeeded
CMD_STATUS : Success
STATUS_CODE : 0

Copyright (C) 2017 Micron Technology, Inc.

C:\Users\Administrator>
```

To use the drive again, restart the system.

## Namespace Management (NVMe Drives Only)

This section explains the options for managing the namespace on an NVMe drive.

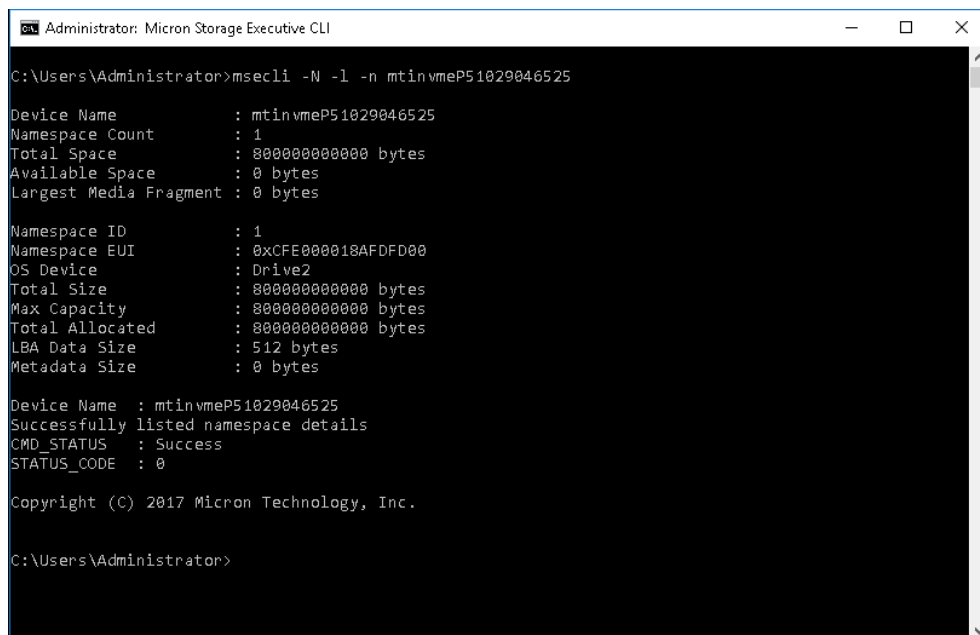
### Displaying Namespace Details

The following option displays details about the namespace on an NVMe drive, including the namespace ID which is used for namespace-specific operations.

Usage: `msecli -N [-l | [-c -b <namespace size> | -a <lba index> | -o | -v | -u | -i] | -d <namespace ID>] -e <ieee EUI> -y | -q <% of TLC as SLC> | [-f <namespace ID> -m <metadata size> -g <lba data size> | -j <secure erase> | -i | -t] | [-S <namespace ID> -H <Selftest Type>] -n <NVME device-name>`

1. Enter the following at the command prompt: `msecli -N -l -n <device-name>`
2. Namespace details for the specified NVMe drive appear.

**Figure 45: Display Namespace Details Command**



```
Administrator: Micron Storage Executive CLI

C:\Users\Administrator>msecli -N -l -n mtinvmeP51029046525

Device Name       : mtinvmeP51029046525
Namespace Count   : 1
Total Space       : 800000000000 bytes
Available Space   : 0 bytes
Largest Media Fragment : 0 bytes

Namespace ID      : 1
Namespace EUI     : 0xCFE000018AFDFD00
OS Device         : Drive2
Total Size        : 800000000000 bytes
Max Capacity      : 800000000000 bytes
Total Allocated   : 800000000000 bytes
LBA Data Size     : 512 bytes
Metadata Size     : 0 bytes

Device Name       : mtinvmeP51029046525
Successfully listed namespace details
CMD_STATUS        : Success
STATUS_CODE       : 0

Copyright (C) 2017 Micron Technology, Inc.

C:\Users\Administrator>
```

### Displaying LBA Formats for a Namespace

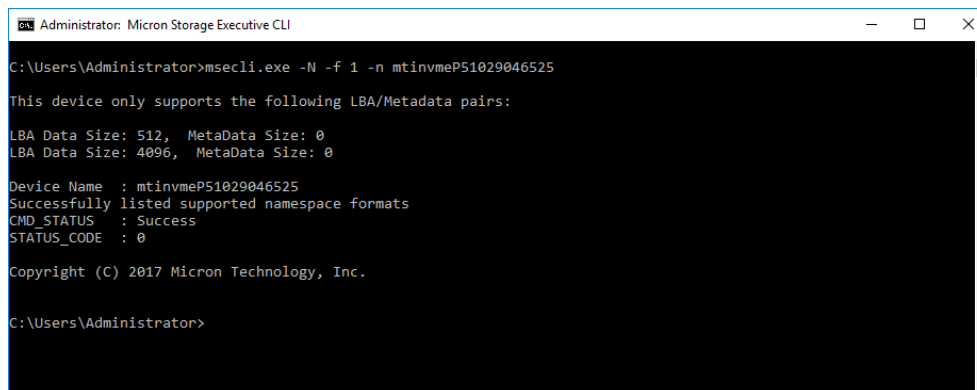
NVMe namespaces can support several different LBA formats (512 byte vs. 4096 byte). The following command displays the supported LBA formats for a given namespace.

Usage: `msecli -N [-l | [-c -b <namespace size> | -a <lba index> | -o | -v | -u | -i] | -d <namespace ID>] -e <ieee EUI> -y | -q <% of TLC as SLC> | [-f <namespace ID> -m <metadata size> -g <lba data size> | -j <secure erase> | -i | -t] | [-S <namespace ID> -H <Selftest Type>] -n <NVME device-name>`

1. Enter the following at the command prompt: `msecli -N -f <namespace-ID> -n <device-name>`

2. LBA formats for the specified namespace appear.

**Figure 46: Display LBA Formats for a Namespace**



```
Administrator: Micron Storage Executive CLI
C:\Users\Administrator>msecli.exe -N -f 1 -n mtinvmep51029046525
This device only supports the following LBA/Metadata pairs:
LBA Data Size: 512, Metadata Size: 0
LBA Data Size: 4096, Metadata Size: 0
Device Name : mtinvmep51029046525
Successfully listed supported namespace formats
CMD_STATUS : Success
STATUS_CODE : 0
Copyright (C) 2017 Micron Technology, Inc.
C:\Users\Administrator>
```

## Changing LBA Format on a Namespace

The following command changes the LBA format of a specified namespace. This can be used to change the LBA or metadata size of the namespace.

**WARNING:** This command causes all data on the namespace to be erased. Backup any data before proceeding. If you want to perform a secure erase as part of the format, see the Secure Erase Namespace section below. Make sure to offline/unmount the namespace OS device before attempting this operation.

Usage: **Usage:** msecli -N [-l] [[-c -b <namespace size> | -a <lba index> | -o | -v | -u | -i] | -d <namespace ID>] -e <ieee EUI> -y | -q <% of TLC as SLC> | [-f <namespace ID> -m <metadata size> -g <lba data size> | -j <secure erase> | -i | -t] | [-S <namespace ID> -H <Selftest Type>] -n <NVME device-name>

1. Enter the following at the command prompt: **msecli -N -f <namespace-ID> -m <metadata size> -g <LBA size> -n <device-name>**
2. When prompted, enter Y to proceed with the format.
3. The operation begins and may take up to a few minutes to complete.
4. After the operation completes, the namespace format is changed.

**Figure 47: Changing LBA Formats on a Namespace**

```
Administrator: Micron Storage Executive CLI
C:\Users\Administrator>msecli -N -f 1 -m 0 -g 4096 -n mtinvmep51029046525
Formatting the namespace will erase all data stored on that namespace.
Are you sure you want to continue(Y/N):y
Formatting the namespace may take a while to complete.
.
Device Name : mtinvmep51029046525
Successfully formatted namespace
CMD_STATUS : Success
STATUS_CODE : 0

Copyright (C) 2017 Micron Technology, Inc.

C:\Users\Administrator>
```

## Create SLC/TLC Namespace

This section describes how to create an SLC/TLC namespace on a 2100AI or 2100AT drive.

Usage: **msecli -N -c -y -n <device-name>**

**-y** Optional suboption of -c. This option creates a namespace command to specify SLC mode instead of the default TLC mode for 2100AI/AT drives.

**-q <% of TLC as SLC>**

Suboption of -N. This option is used to perform multiple operations, including NVME format, detach NS, delete NS, PCM(Physical Capacity Management), PCM Lock, Create SLC NS, Attach SLC NS.

Allocate and create SLC namespace using the following namespace management command (50% of total capacity):

**Figure 48: SLC Namespace Command**

```
C:\Users\Pabitra\storaagedirector\bin\Windows\x64\Internal>cd ..\Release\
C:\Users\Pabitra\storaagedirector\bin\Windows\x64\Release>msecli.exe -N -q 50 -n mtinvmep192522662EB7
Creating SLC namespaces will erase all data stored on the namespaces.
Are you sure you want to continue(Y/N):Y
.
Device Name : mtinvmep192522662EB7
Successfully created namespace. Please reboot or restart driver for new namespace to become available.
CMD_STATUS : Success
STATUS_CODE : 0

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C:\Users\Pabitra\storaagedirector\bin\Windows\x64\Release>
```

**Figure 49: Creating SLC Namespace in Already Allocated SLC Space**

```
C:\Users\Pabitra\storaagedirector\bin\Windows\x64\Release>msecli.exe -N -c -y -n mtinvmep1925226633F7
Device Name : mtinvmep1925226633F7
Successfully created namespace. Please reboot or restart driver for new namespace to become available.
CMD_STATUS : Success
STATUS_CODE : 0

Copyright (C) 2019 Micron Technology, Inc.
```

## Secure Erase Namespace

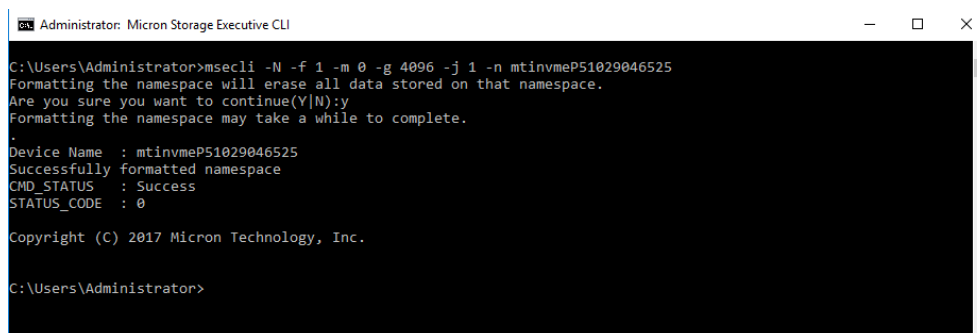
The section above covers changing the LBA format on a given namespace, which causes user data to be erased. This same command can be used to perform a secure erase or cryptographic erase (where supported) on the namespace. You do not need to change LBA format to perform a secure erase, simply set the metadata and LBA size to the current settings.

**WARNING:** A secure erase operation removes all user data on the namespace. Backup data before proceeding. Make sure to offline/unmount the namespace OS device before attempting this operation.

Usage: `msecli -N -f <namespace-ID> -m <metadata size> -g <LBA size> -j [ 1 (Secure Erase) | 2 (Cryptographic Erase)] -n <device-name>`

1. Enter the following at the command prompt: `msecli -N -f <namespace-ID> -m <metadata size> -g <LBA size> -j [ 1 | 2 ] -n <device-name>`
2. When prompted, enter Y to proceed with the secure erase operation.
3. The operation begins and may take up to a few minutes to complete.

**Figure 50: Secure Erase Namespace**



```
Administrator: Micron Storage Executive CLI
C:\Users\Administrator>msecli -N -f 1 -m 0 -g 4096 -j 1 -n mtinvmeP51029046525
Formatting the namespace will erase all data stored on that namespace.
Are you sure you want to continue(Y|N):y
Formatting the namespace may take a while to complete.
.
Device Name : mtinvmeP51029046525
Successfully formatted namespace
CMD_STATUS : Success
STATUS_CODE : 0

Copyright (C) 2017 Micron Technology, Inc.

C:\Users\Administrator>
```

### Displaying Storage Executive, API, and CLI Versions

Use the following instructions to display the installed version of Storage Executive, the API, and the CLI.

Usage: - msecli -V [-a] [-r] [-s <out-filename>]

1. Enter the following at the command prompt: - msecli -V [-a] [-r] [-s <out-filename>]
2. The currently installed version numbers display .

**Figure 51: Storage Executive, API, and CLI Versions**

```
C:\WINDOWS\system32>msecli -V -a

MSECLI VERSION           : 5.05.082019.01
API VERSION              : 5.05.082019.01
ABSOLUTE PATH            : C:\Program Files\Micron Technology\Micron Storage Executive\msecli.exe
Copyright (C) 2019 Micron Technology, Inc.

C:\WINDOWS\system32>
```



### Appendix A. SMART Attributes and Drive Statistics

This section lists standard SMART attributes, attribute IDs, and drive statistics supported by drive interface. For a customer-specific list of SMART attribute details, contact your Micron customer representative.

#### SATA Drives

**Table 1: SMART IDs and Attributes—SATA Drives**

ID	SMART Attribute Name
1	Raw Read Error Rate
5	Retired NAND Blocks
9	Power On Hours Count
12	Power Cycle Count
171	Program Fail Count
172	Erase Fail Count
173	Average Block-Erase Count
174	Unexpected Power Loss Count
180	Unused Reserved Block Count
183	SATA Interface Downshift
184	Error Correction Count
187	Reported Uncorrectable Errors
194	Enclosure Temperature
196	Reallocation Event Count
197	Current Pending Sector Count
198	SMART Off-Line Scan Uncorrectable Errors
199	Ultra-DMA CRC Error Count
202	Percentage Lifetime Used
206	Write Error Rate
210	RAIN Successful Recovery Page Count
246	Cumulative Host Write Sector Count
247	Host Program Page Count
248	FTL Program Page Count



#### SAS Drives

SAS drives do not natively support SMART. For these drives, Storage Executive pulls pertinent drive statistics from various sense log pages.

**Table 2: Drive Statistics—SAS Drives**

Name
Current Temperature
Highest Lifetime Temperature
Power Cycle Count
Percent Lifetime Used
Negotiated Logical Link Rate (Gbps)
Power on Hours Count

## Revision History

### Rev. H – 1/20

- Added 2100AI, 2100AT drives to supported drive list
- Added Manage Drive Physical Capacity section
- Added Create SLC Namespace section

### Rev. G – 10/19

- Added 7300, Crucial P-series, X8 Portable SSD drives to supported drive list
- Updated various screen shots

### Rev. F – 7/19

- Added 2200, P1, 9300 Series, 1300 drives to supported drive list
- Updated various screen shots and usage statements

### Rev. E – 3/19

- Updated Configuring Drive Over-Provisioning section

### Rev. D – 1/19

- Updated Formatting a Drive section (new screen shot)

### Rev. C – 4/18

- Added support for 5210, 5200 Series
- Added Displaying GPL Data section
- Updated Displaying SMART Logs and Retrieving Debug Data sections
- Added new firmware sections: Download and Activate Later and Selective Image Download

### Rev. B – 10/17

- Added support for 9200 Series
- Updated Configuring Drive Over-Provisioning section

### Rev. A – 3/17

- Initial release

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