



Seagate® Nytro™ XP6302 Flash Accelerator Card Management Utility User Guide

Nytro XP6302-8B4096 (ST3500KN0012)

Nytro XP6302-8B2048 (ST1750KN0012)

Nytro XP6302-8B1536 (ST1300KN0012)

Revision History

Revision	Date	Description of Changes
Rev. B	May 2015	<ul style="list-style-type: none">■ Added 4 TB support-related information.■ Extract SMART Logs Command.■ SCSI UNMAP Command.■ Added SNMP information.
Rev. A	December 2014	Initial release.

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Nytro XP6302 Flash Accelerator Card Management Utility

1 Introduction

Use the Seagate® Nytro™ WarpDrive® and Nytro XP6302 Flash Accelerator Card Management utility (DDCLI) to update, format, and check the status of your Nytro and XP6302 cards. To download the Nytro product components, go to <http://www.seagate.com/products/solid-state-flash-storage/accelerator-cards/>,

- Click **Nytro™ XP6302 Flash Card**.
- Click **Support**.
- In the **Software and Tools**, select **Nytro Management Utility**.

2 Applicable Products

The following products use the Nytro management utility (DDCLI).

DEVICE NAMES	MODEL NAMES	USABLE CAPACITY
Nytro XP 6302	XP6302-8B4096 (ST3500KN0012)	3.5 TB
Nytro XP 6302	XP6302-8B2048 (ST1750KN0012)	1750 GB
Nytro XP 6302	XP6302-8B1536 (ST1300KN0012)	1300 GB

3 Hardware and Software Compatibility

The Nytro management utility (DDCLI) is compatible with the following hardware and software.

- Proprietary I/O protocol device
 - The utility supports only Nytro Flash cards that are based on the Fusion-MPT™ architecture and implemented according to the Message Passing Interface (MPI) v2.0 specification.
- Hardware platforms:
 - x86 and x64 or compatible
- Devices:
 - On-board Nytro Flash modules
- Operating systems:
 - Microsoft® Windows® x64
 - Windows Server 2008 R2 SP1
 - Windows Server 2008 R2
 - Windows Server® 2012 R2

-
- RHEL x32 and x64
 - RHEL 5.9 and 5.10
 - RHEL 6.5 and 6.6
 - RHEL 7.0
 - Solaris® x32 and x64
 - Version 10 U10
 - Version 11
 - SPARC Version 10 U10
 - SPARC Version 11 and 11.2
 - SUSE® Linux® Enterprise Server (SLES™) x32 and x64
 - SLES Version 11 SP3
 - CentOS® x32 and x64
 - Version 6.4 and 6.5
 - Ubuntu® x32 and x64
 - Version 12.04
 - Version 14.04 LTS
 - Debian® x32 and x64
 - Version 6.05
 - Version 7.0

NOTE Use the same driver.

- Fedora® x32 and x64
 - Version 19 and 20
- Oracle® Enterprise Linux (OEL™) x32 and x64
 - OEL 5.9 and 5.10
 - OEL 6.5
- VMware® x64
 - ESXi 5.1 and 5.5
- FreeBSD® x32 and x64
 - Version 9 and 9.2
 - Version 10
- Other software:
 - Nytro firmware – MPI v2.0

4 DDCLI Utility Version Information

You can determine the Nytro management utility version within the DDCLI utility. The following output provides an example of the Nytro management utility menu interface.

```
*****
Seagate WarpDrive Management Utility
Version 112.00.12.00 (2015.04.16)
Copyright (c) 2015 Seagate Technologies LLC. All Rights Reserved.
*****
```

ID	WarpDrive	Package Version	PCI Address
--	-----	-----	-----
1	XP6302-8B4096	13.00.02.00	00:1b:00:00

Select the WarpDrive [1-1 or 0:Quit]: *1*

1. List WarpDrive Information
2. Update Flash Package
3. Display WarpDrive Health
4. Locate WarpDrive
5. Format WarpDrive
6. Show Vital Product Data
7. Extract SMART Logs
8. Enable/Disable UNMAP feature

Select Operation [1-8 or 0:Quit]:

5 Interfaces

The Nytro management utility supports a command line interface (CLI) and a text menu interface.

5.1 Command Line Interface

To bring up the Nytro management utility in the CLI mode, use either of the following commands.

```
ddcli -c <Flash card number> [command] [parameters]
```

Or

```
ddcli -listall
```

Adhere to the following CLI guidelines:

- All commands, except the `-listall` command, are run with the `-c` option.
- The commands that require the `-c` option cannot run without a parameter. Only the `-listall` command can run without a parameter.

5.2 Text Menu Interface

To bring up the utility in the Text Menu mode, use the `ddcli` command without any options. The utility displays the following top-level menu, which shows a list of Nytro Flash cards in the system.

```
ID      WarpDrive      Package Version      PCI Address
--      -
1      XP6302-8B4096  13.00.02.00         00:1b:00:00
```

Select the WarpDrive [1-1 or 0:Quit]: *1*

After the Nytro Flash card in the following top-level menu is selected, the utility shows the following menu.

1. List WarpDrive information
2. Update Flash Package
3. Display WarpDrive Health
4. Locate WarpDrive
5. Format WarpDrive
6. Show Vital Product Data
7. Extract SMART Logs
8. Enable/Disable UNMAP feature

Select the operation [1-8 or 0:Quit]:

6 Commands

The following table lists all of the user commands supported by the Nytro management utility. The following sections provide detailed descriptions of the commands.

Table 1 List of Commands

Command	Description
<code>-help</code>	Shows help for command line usage (not available in menu mode).
<code>-listall</code>	Lists all Nytro Flash cards in the system (not available in menu mode).
<code>-list</code>	Lists all information for the selected Nytro Flash card.
<code>-updatepkg</code>	Updates the Nytro Flash card components with the Nytro Flash card package.
<code>-health</code>	Shows the health of the selected Nytro Flash card.
<code>-locate</code>	Locates the selected Nytro Flash card in the system. Use this command to start blinking the LED.
<code>-showvpd</code>	Shows the Nytro Flash card vital product data (VPD) information.
<code>-format</code>	Formats the selected Nytro Flash card.
<code>-c</code>	Selects a Nytro Flash card with the correct ID number (ID numbers range from 1 to 256).
<code>-getsmartlog</code>	Extracts SMART™ logs.
<code>-unmapSCSI</code>	Enables or disables the SCSI UNMAP feature.

6.1 List All Command

The `-listall` command lists all of the Nytro Flash cards in the system along with the following information:

- Nytro Flash card index
- Nytro Flash card name
- Nytro Flash card package version
- PCI address

The `-listall` command runs without any command line parameters. You need not specify the `-c` option on the command line.

6.1.1 Command Line Usage

Enter the following command in the CLI to run the `-listall` command.

Command Syntax

```
# ddcli -listall
```

Command Example

```
# ddcli -listall
```

Sample Output

When the `-listall` command runs as provided in the preceding example, the utility returns the following text.

ID	WarpDrive	Package Version	PCI Address
--	-----	-----	-----
1	XP6302-8B4096	13.00.02.00	00:1b:00:00

6.2 List Command

The `-list` command lists the information of a selected Nytro Flash card. In the CLI mode, select a Nytro Flash card by including its Nytro Flash card index.

The following information is displayed with the `-list` command:

- Nytro Flash card index
- Nytro Flash card name
- Nytro Flash card package version
- PCI address
- SAS address
- Physical device information, such as capacity, firmware revision, and so on.

6.2.1 Text Menu Option

The following top-level menu lists the Nytro Flash cards in the system and prompts you to select a Nytro Flash card on which to perform an operation.

command Syntax

```
# ddcli
```

Sample Output

```
*****
Seagate WarpDrive Management Utility
Version 112.00.12.00 (2015.04.16)
Copyright (c) 2015 Seagate Technologies LLC. All Rights Reserved.
*****
```

ID	WarpDrive	Package Version	PCI Address
1	XP6302-8B4096	13.00.02.00	00:1b:00:00

Select the WarpDrive [1-1 or 0:Quit]: *1*

1. List WarpDrive Information
2. Update Flash Package
3. Display WarpDrive Health
4. Locate WarpDrive
5. Format WarpDrive
6. Show Vital Product Data
7. Extract SMART Logs
8. Enable/Disable UNMAP feature

Select Operation [1-8 or 0:Quit]: *1*

WarpDrive Selected is XP6302-8B4096

WarpDrive Information

```
WarpDrive ID           : 1
PCI Address            : 00:1b:00:00
PCI Slot Number       : 0x02
PCI SubSystem DeviceId : 0x1314
PCI SubSystem VendorId : 0x1000
SAS Address           : 500605B 005EE45B0
Package Version       : 13.00.02.00
Firmware Version      : 112.00.12.00
Legacy BIOS Version   : 110.00.01.00
UEFI BSD Version      : 07.18.06.00
Chip Name             : Nytro XP6302
Board Name            : XP6302-8B4096
Board Assembly Number : 100766077A
Board Tracer Number   : SL442P0039
RAID Support          : YES
```

1. List WarpDrive Information
2. Update Flash Package
3. Display WarpDrive Health
4. Locate WarpDrive
5. Format WarpDrive

6. Show Vital Product Data
7. Extract SMART Logs
8. Enable/Disable UNMAP feature

6.2.2 Command Line Usage

Enter the following command in the CLI to run the `-list` command.

Command Syntax

```
# ddcli -c <Flash card number> -list
```

Command Example

```
# ddcli -c 1 -list
```

Sample Output

When the `-list` command runs as provided in the preceding example, the utility returns the following text.

```
*****
Seagate WarpDrive Management Utility
Version 112.00.12.00 (2015.04.16)
Copyright (c) 2015 Seagate Technologies LLC. All Rights Reserved.
*****
WarpDrive Selected is XP6302-8B4096
-----
WarpDrive Information
-----
WarpDrive ID           : 1
PCI Address            : 00:1b:00:00
PCI Slot Number       : 0x02
PCI SubSystem DeviceId : 0x1314
PCI SubSystem VendorId : 0x1000
SAS Address           : 500605B 005EE45B0
Package Version       : 13.00.02.00
Firmware Version      : 112.00.12.00
Legacy BIOS Version   : 110.00.01.00
UEFI BSD Version      : 07.18.06.00
Chip Name             : Nytro XP6302
Board Name            : XP6302-8B4096
Board Assembly Number : 100766077A
Board Tracer Number   : SL442P0039
RAID Support          : YES
```

Seagate WarpDrive Management Utility: Execution completed successfully.

6.3 Update Nytro Flash Card Package Command

The `-updatepkg` command updates the selected Nytro Flash card with the specified firmware package and you can also downgrade the package by using the same command. This command supports upgrades of only the Nytro Flash card firmware package. If the current firmware package version on the selected Nytro Flash card is higher than the specified firmware package version, the command returns an error.

If the `-updatepkg` command is successful, the following output appears:

```
WarpDrive package updated successfully message.
```

6.3.1 Text Menu Option

The following top-level menu lists the Nytro Flash cards in the system and prompts you to select a Nytro Flash card on which to perform an operation.

Command Syntax

```
# ddcli
```

Sample Output

```
*****
Seagate WarpDrive Management Utility
Version 112.00.12.00 (2015.04.16)
Copyright (c) 2015 Seagate Technologies LLC. All Rights Reserved.
*****
```

ID	WarpDrive	Package Version	PCI Address
1	XP6302-8B4096	13.00.02.00	00:1b:00:00

```
Select the WarpDrive [1-1 or 0:Quit]: 1
```

1. List WarpDrive Information
2. Update Flash Package
3. Display WarpDrive Health
4. Locate WarpDrive
5. Format WarpDrive
6. Show Vital Product Data
7. Extract SMART Logs
8. Enable/Disable UNMAP feature

```
Select Operation [1-8 or 0:Quit]: 2
```

```
Enter Flash Package File: XP6302-8B4096_13.00.02.00.bin
```

6.3.2 Command Line Usage

Enter the following line of text in the CLI to run the `-updatepkg` command. The path is optional. If you do not specify a path, the `ddcli` utility uses the current directory to locate the firmware file.

Command Syntax

To bring up the utility in the CLI mode, use the following command:

```
# ddcli -c <Flash card number> -updatepkg [optional:path]<firmware file name>
```

Command Example

```
# ddcli -c 1 -updatepkg XP6302-8B4096_13.00.02.00.bin
```

The following example uses the `/home/user` directory to find the firmware file, `XP6302-8B4096_13.00.02.00.bin`, which is located in the same directory as the DDCLI utility.

```
# ddcli -c 1 -updatepkg /home/user/XP6302-8B4096_13.00.02.00.bin
```

6.3.3 Error Handling

The following statements are true with regard to error handling:

- If a Nytro Flash card firmware update fails, the `-updatepkg` command terminates.
- If a firmware download fails on any of the Nytro Flash card components, the process terminates.

6.4 Health Reporting Command

The `-health` command shows the overall health status of a selected Nytro Flash card and its components. If any alert exists, this command shows the component causing the alert along with further information. The `-health` command `Overall Health` output includes the following states:

- GOOD. The Nytro Flash card is operating correctly. All operations are supported.
- WARNING. The Nytro Flash card is approaching failure. This output appears because of a decreased `Life Left` value, an increased `Temperature` value outside the set threshold, or also because of two-level BRM failure.
- ERROR. The Nytro Flash card is not operating. Contact *Seagate Support* for assistance.

The **Warranty Remaining** field in the output of the `-health` command appears as a percentage, which is between 0 percent and 100 percent. If the value is 0 percent, it indicates that the Nytro Flash card warranty has expired. If the Nytro Flash card warranty has expired, contact *Seagate Support*.

6.4.1 Text Menu Option

The following top-level menu lists the Nytro Flash cards in the system and prompts you to select a Nytro Flash card on which to perform an operation.

Command Syntax

```
# ddcli
```

Sample Output

```
*****
Seagate WarpDrive Management Utility
Version 112.00.12.00 (2015.04.16)
Copyright (c) 2015 Seagate Technologies LLC. All Rights Reserved.
*****
```

ID	WarpDrive	Package Version	PCI Address
1	XP6308-8B4096	13.00.02.00	00:1b:00:00

```
Select the WarpDrive [1-1 or 0:Quit]: 1
```

1. List WarpDrive Information
2. Update Flash Package
3. Display WarpDrive Health
4. Locate WarpDrive
5. Format WarpDrive
6. Show Vital Product Data
7. Extract SMART Logs
8. Enable/Disable UNMAP feature

```
Select Operation [1-8 or 0:Quit]: 3
```

```
Read SMART attributes forcibly from DFF? (Yes/No): yes
```

Display All attributes? (Yes/No): *no*

 Nytro XP6302-8B4096 Health

Backup Rail Monitor : GOOD

SSD Drive SMART Data Slot #: 4: Drive Serial Number 5L000XRG

----- Current (since last Power Cycle) -----
 Current Temperature 41 (degree C)

----- Cumulative -----
 Retired Block Count 0
 Power-On Hours 6017.6
 Uncorrectable RAISE Errors 0
 Maximum Lifetime Temperature 67 (degree C)
 SSD Life Left (PE Cycles) 100 (%)
 Total Writes From Host 14
 Total Reads To Host 88
 Warranty Remaining 100 (%)

SSD Drive SMART Data Slot #: 5: Drive Serial Number 5L000YXT

----- Current (since last Power Cycle) -----
 Current Temperature 42 (degree C)

----- Cumulative -----
 Retired Block Count 0
 Power-On Hours 5968.2
 Uncorrectable RAISE Errors 0
 Maximum Lifetime Temperature 68 (degree C)
 SSD Life Left (PE Cycles) 100 (%)
 Total Writes From Host 13
 Total Reads To Host 88
 Warranty Remaining 100 (%)

SSD Drive SMART Data Slot #: 6: Drive Serial Number 5L000QNC

----- Current (since last Power Cycle) -----
 Current Temperature 47 (degree C)

----- Cumulative -----
 Retired Block Count 0
 Power-On Hours 6025.8
 Uncorrectable RAISE Errors 0
 Maximum Lifetime Temperature 76 (degree C)
 SSD Life Left (PE Cycles) 100 (%)
 Total Writes From Host 16
 Total Reads To Host 89
 Warranty Remaining 100 (%)

SSD Drive SMART Data Slot #: 7: Drive Serial Number 5L000Z70

```

----- Current (since last Power Cycle) -----
Current Temperature                48          (degree C)

----- Cumulative -----
Retired Block Count                0
Power-On Hours                    6028.7
Uncorrectable RAISE Errors        0
Maximum Lifetime Temperature      76          (degree C)
SSD Life Left (PE Cycles)         100         (%)
Total Writes From Host            23
Total Reads To Host               88
Warranty Remaining                100         (%)

Overall Health:                    GOOD

```

6.4.2 Command Line Usage

Enter the following command in the CLI to run the `-health` command.

Command Syntax 1

To bring up the utility in the CLI mode, use either of the following commands:

```
# ddcli -c <Flash card number> -health [-fua | -all]
```

NOTE Use the `-all` option to fetch the SMART cached data from firmware.
Use the `-fua` option to read the SMART attributes directly from the SSDs.
Running the `-fua` option in rapid succession might cause a temporary performance degradation.

Command Example 1

```
# ddcli -c 1 -health
```

Sample Output 1

When the `-health` command runs as provided in the preceding example, the utility returns the following text.

```

*****
Seagate WarpDrive Management Utility
Version 112.00.12.00 (2015.04.16)
Copyright (c) 2015 Seagate Technologies LLC. All Rights Reserved.
*****

ID      WarpDrive      Package Version      PCI Address
--      -
1       XP6302-8B4096  13.00.02.00         00:1b:00:00

Select the WarpDrive [1-1 or 0:Quit]: 1
1. List WarpDrive Information
2. Update Flash Package
3. Display WarpDrive Health
4. Locate WarpDrive
5. Format WarpDrive
6. Show Vital Product Data
7. Extract SMART Logs
8. Enable/Disable UNMAP feature

Select Operation [1-8 or 0:Quit]: 3
Read SMART attributes forcibly from Nytro Flash module? (Yes/No): No

```

Display All attributes? (Yes/No): *No*

 Nytro XP6302-8B4096 Health

Backup Rail Monitor : GOOD

SSD Drive SMART Data Slot #: 4: Drive Serial Number 1

----- Current (since last Power Cycle) -----
 Current Temperature 38 (degree C)

----- Cumulative -----
 Retired Block Count 0
 Power-On Hours 18.6
 Uncorrectable RAISE Errors 0
 Maximum Lifetime Temperature 40 (degree C)
 SSD Life Left (PE Cycles) 100 (%)
 Total Writes From Host 0
 Total Reads To Host 0

SSD Drive SMART Data Slot #: 5: Drive Serial Number 2

----- Current (since last Power Cycle) -----
 Current Temperature 38 (degree C)

----- Cumulative -----
 Retired Block Count 0
 Power-On Hours 18.5
 Uncorrectable RAISE Errors 0
 Maximum Lifetime Temperature 40 (degree C)
 SSD Life Left (PE Cycles) 100 (%)
 Total Writes From Host 0
 Total Reads To Host 0

SSD Drive SMART Data Slot #: 6: Drive Serial Number 3

----- Current (since last Power Cycle) -----
 Current Temperature 38 (degree C)

----- Cumulative -----
 Retired Block Count 0
 Power-On Hours 18.4
 Uncorrectable RAISE Errors 0
 Maximum Lifetime Temperature 40 (degree C)
 SSD Life Left (PE Cycles) 100 (%)
 Total Writes From Host 0
 Total Reads To Host 0

SSD Drive SMART Data Slot #: 7: Drive Serial Number 4

----- Current (since last Power Cycle) -----
 Current Temperature 38 (degree C)

----- Cumulative -----
 Retired Block Count 0
 Power-On Hours 18.3

```

Uncorrectable RAISE Errors          0
Maximum Lifetime Temperature        39      (degree C)
SSD Life Left (PE Cycles)           100     (%)
Total Writes From Host               0
Total Reads To Host                  0
Warranty Remaining                   : 100 %
Temperature                           : 38 degree C
Overall Health                        : GOOD

```

1. List WarpDrive Information
2. Update Flash Package
3. Display WarpDrive Health
4. Locate WarpDrive
5. Format WarpDrive
6. Show Vital Product Data
7. Extract SMART Logs
8. Enable/Disable UNMAP feature

The Health command has an additional option `-all` in the CLI mode.

Command Syntax 2

To bring up the utility in the CLI mode, use the following command:

```
# ddcli -c <Flash card number> -health -all
```

Command Example 2

```
# ddcli -c 1 -health -all
```

Sample Output 2

```

*****
Seagate WarpDrive Management Utility
Version 112.00.12.00 (2015.04.16)
Copyright (c) 2015 Seagate Technologies LLC. All Rights Reserved.
*****

```

ID	WarpDrive	Package Version	PCI Address
--	-----	-----	-----
1	XP6302-8B4096	13.00.02.00	00:1b:00:00

Select the WarpDrive [1-1 or 0:Quit]: *1*

1. List WarpDrive Information
2. Update Flash Package
3. Display WarpDrive Health
4. Locate WarpDrive
5. Format WarpDrive
6. Show Vital Product Data
7. Extract SMART Logs
8. Enable/Disable UNMAP feature

Select Operation [1-8 or 0:Quit]: *3*

Read SMART attributes forcibly from DFF? (Yes/No): *No*

Display All attributes? (Yes/No): *Yes*

Nytro XP6209-4B2048 Health

 Backup Rail Monitor : GOOD

SSD Drive SMART Data Slot #: 4: Drive Serial Number 1

----- Current (since last Power Cycle) -----

Bytes Read	0	
Soft Read Error Rate	NA	
Wear Range Delta	0	(%)
Uncorrectable RAISE Errors	0	
Current Temperature	38	(degree C)
Uncorrectable ECC Errors	0	
SATA R-Errors (CRC) Error Count	0	

----- Cumulative -----

Retired Block Count	0	
Power-On Hours	18.6	
Device Power Cycle Count	2	
Gigabytes Erased	48	(Gigabytes)
Reserved (over-provisioned) Blocks	16000	
Program Fail Count	0	
Erase Fail Count 1	0	
Unexpected Power Loss Count	4	
I/O Error Detection Code Rate	0	
Uncorrectable RAISE Errors	0	
Maximum Lifetime Temperature	40	(degree C)
Cached SMART Data Age	00:01:40	(Hours:Minutes:Seconds)
SSD Life Left (PE Cycles)	100	(%)
Total Writes From Host	0	
Total Reads To Host	0	
Write Amplification	NA	
Reserved Blocks Remaining	100	(%)
Trim Count	0	

SSD Drive SMART Data Slot #: 5: Drive Serial Number 2

----- Current (since last Power Cycle) -----

Bytes Read	0	
Soft Read Error Rate	NA	
Wear Range Delta	0	(%)
Uncorrectable RAISE Errors	0	
Current Temperature	38	(degree C)
Uncorrectable ECC Errors	0	
SATA R-Errors (CRC) Error Count	0	

----- Cumulative -----

Retired Block Count	0	
Power-On Hours	18.5	
Device Power Cycle Count	2	
Gigabytes Erased	48	(Gigabytes)
Reserved (over-provisioned) Blocks	16000	
Program Fail Count	0	
Erase Fail Count 1	0	
Unexpected Power Loss Count	4	
I/O Error Detection Code Rate	0	
Uncorrectable RAISE Errors	0	
Maximum Lifetime Temperature	40	(degree C)

```

Cached SMART Data Age          00:01:40   (Hours:Minutes:Seconds)
SSD Life Left (PE Cycles)      100      (%)
Total Writes From Host         0
Total Reads To Host            0
Write Amplification            NA
Reserved Blocks Remaining      100      (%)
Trim Count                     0

```

SSD Drive SMART Data Slot #: 6: Drive Serial Number 3

```

----- Current (since last Power Cycle) -----
Bytes Read                      0
Soft Read Error Rate           NA
Wear Range Delta                0          (%)
Uncorrectable RAISE Errors      0
Current Temperature            38          (degree C)
Uncorrectable ECC Errors        0
SATA R-Errors (CRC) Error Count 0
----- Cumulative -----
Retired Block Count            0
Power-On Hours                 18.5
Device Power Cycle Count       2
Gigabytes Erased               48          (Gigabytes)
Reserved (over-provisioned) Blocks 16000
Program Fail Count             0
Erase Fail Count 1             0
Unexpected Power Loss Count    4
I/O Error Detection Code Rate  0
Uncorrectable RAISE Errors      0
Maximum Lifetime Temperature   40          (degree C)
Cached SMART Data Age          00:01:40   (Hours:Minutes:Seconds)
SSD Life Left (PE Cycles)      100      (%)
Total Writes From Host         0
Total Reads To Host            0
Write Amplification            NA
Reserved Blocks Remaining      100      (%)
Trim Count                     0

```

SSD Drive SMART Data Slot #: 7: Drive Serial Number 4

```

----- Current (since last Power Cycle) -----
Bytes Read                      0
Soft Read Error Rate           NA
Wear Range Delta                0          (%)
Uncorrectable RAISE Errors      0
Current Temperature            38          (degree C)
Uncorrectable ECC Errors        0
SATA R-Errors (CRC) Error Count 0
----- Cumulative -----
Retired Block Count            0
Power-On Hours                 18.4
Device Power Cycle Count       2
Gigabytes Erased               48          (Gigabytes)
Reserved (over-provisioned) Blocks 16000

```

```

Program Fail Count          0
Erase Fail Count 1         0
Unexpected Power Loss Count 4
I/O Error Detection Code Rate 0
Uncorrectable RAISE Errors 0
Maximum Lifetime Temperature 39      (degree C)
Cached SMART Data Age      00:01:40 (Hours:Minutes:Seconds)
SSD Life Left (PE Cycles)  100      (%)
Total Writes From Host     0
Total Reads To Host        0
Write Amplification        NA
Reserved Blocks Remaining  100      (%)
Trim Count                 0

```

```

Warranty Remaining      : 100 %
Temperature             : 38 degree C
Overall Health          : GOOD

```

1. List WarpDrive Information
2. Update Flash Package
3. Display WarpDrive Health
4. Locate WarpDrive
5. Format WarpDrive
6. Show Vital Product Data
7. Extract SMART Logs
8. Enable/Disable UNMAP feature

6.5 Locate Nytro Card Command

The `-locate` command turns on the Status LED of the selected Nytro Flash card. Use this command to start blinking the LED on the specified Nytro Flash card to locate the selected card. You can view the LEDs on the rear of the system chassis. The Status LED turns off after 60 seconds. Refer to the *Seagate Nytro Application Acceleration Cards User Guide* for the exact LED locations.

6.5.1 Text Menu Option

The following top-level menu lists the Nytro Flash cards in the system and prompts you to select a Nytro Flash card on which to perform an operation.

Command Syntax

```
# ddcli
```

Sample Output

```

*****
Seagate WarpDrive Management Utility
Version 112.00.12.00 (2015.04.16)
Copyright (c) 2015 Seagate Technologies LLC. All Rights Reserved.
*****
ID      WarpDrive      Package Version      PCI Address
--      -
1       XP6302-8B4096  13.00.02.00         00:1b:00:00

Select the WarpDrive [1-1 or 0:Quit]: 1

```

1. List WarpDrive Information
2. Update Flash Package
3. Display WarpDrive Health
4. Locate WarpDrive
5. Format WarpDrive
6. Show Vital Product Data
7. Extract SMART Logs
8. Enable/Disable UNMAP feature

Select Operation [1-8 or 0:Quit]: *4*

Enter Operation [1:on]: *1*

6.5.2 Command Line Usage

Enter the following line of text in the CLI to run the `-locate` command.

Command Syntax

To bring up the utility in the CLI mode, use the following command:

```
# ddcli -c <Flash card number> -locate on
```

Command Example

```
# ddcli -c 1 -locate on
```

Sample Output

```
*****
Seagate WarpDrive Management Utility
Version 112.00.12.00 (2015.04.16)
Copyright (c) 2015 Seagate Technologies LLC. All Rights Reserved.
*****
Seagate WarpDrive Management Utility: Execution completed successfully.
```

6.6 Format Nytro Card Command

The `-format` command formats a Nytro Flash card. This command performs the following actions:

- Deletes the existing RAID volume (if present).
- Creates the RAID volume.

The `-format` command deletes the logical block address (LBA) tables and the current encryption key internal to the SSD drive. A new encryption key is randomly generated. The media, however, is not erased by default.

The `-format` command can modify the over-provisioning level of any Nytro Flash card.

If the Nytro Flash card operates in single volume mode (single, virtual device), over-provisioning is performed on all flash modules. Specify one of three discrete over-provisioning levels:

- `perf`: Choose this over-provisioning level for maximum performance when there is reduced performance and reduce capacity.
- `nom`: This over-provisioning point is optimized for performance and capacity. This level is the default.
- `cap`: Choose this option to maximize capacity at the expense of performance.

The `-s` command represents the silent-mode operation and removes the user prompt to continue with the `-format` command.

The `-format` command must take no more than two minutes to complete, depending on the number of drive modules. Based on the amount of data that is present in the Nytro Flash modules, the `-format` command could also take more than two minutes to complete.

CAUTION The `-format` command erases all of the data present on the Nytro Flash card drives.

- If the number of drives discovered is not equal to the value of `MaxPhysDisks`, prints the error and exits.

6.6.1 Text Menu Option

The following top-level menu lists the Nytro Flash cards in the system and prompts you to select a Nytro Flash card on which to perform an operation.

Command Syntax

```
# ddcli
```

Sample Output

```
*****
Seagate WarpDrive Management Utility
Version 112.00.12.00 (2015.04.16)
Copyright (c) 2015 Seagate Technologies LLC. All Rights Reserved.
*****
ID      WarpDrive      Package Version      PCI Address
--      -
1       XP6302-8B4096  13.00.02.00          00:1b:00:00
Select the WarpDrive [1-1 or 0:Quit]: 1

1.      List WarpDrive Information
2.      Update Flash Package
3.      Display WarpDrive Health
4.      Locate WarpDrive
5.      Format WarpDrive
6.      Show Vital Product Data
7.      Extract SMART Logs
8.      Enable/Disable UNMAP feature

Select Operation [1-8 or 0:Quit]: 5

Perform Over-provisioning? (Yes/No): No

WARNING: Formatting will result in loss of all data on the selected WarpDrive
device. Type YES if you would like to continue, or any other key to abort the
request: yes
Seagate WarpDrive Management Utility: Preparing WarpDrive for format.
Seagate WarpDrive Management Utility: Please wait. Format of WarpDrive is in
progress.....
Seagate WarpDrive Management Utility: WarpDrive format successfully completed.
```

6.6.2 Command Line Usage

Enter the following command in the CLI to format the SSD.

Command Syntax

To bring up the utility in the CLI mode, use the following command:

```
# ddcli -c <Flash card number> -format [-slot <ssd_slot>]
```

To format and over provision, use the following command:

```
# ddcli -c <Flash card number> -format [-slot <ssd_slot>]
[-op <-level <perf | nom | cap>> ] [ -s ]
```

Command Example

```
# ddcli -c 1 -format
```

Sample Output

```
*****
Seagate WarpDrive Management Utility
Version 112.00.12.00 (2015.04.16)
Copyright (c) 2015 Seagate Technologies LLC. All Rights Reserved.
*****
WARNING: Formatting will result in loss of all data on the selected WarpDrive
device. Type YES if you would like to continue, or any other key to abort the
request: yes
Seagate WarpDrive Management Utility: Preparing WarpDrive for format.
Seagate WarpDrive Management Utility: Please wait. Format of WarpDrive is in
progress.....
Seagate WarpDrive Management Utility: WarpDrive format successfully completed.

Seagate WarpDrive Management Utility: Execution completed successfully.
```

6.7 Show Flash Card Vital Product Data Information

The `-showvpd` command displays Vital Product Data (VPD) information.

6.7.1 Text Menu Option

The following top-level menu lists the Nytro Flash cards in the system and prompts you to select a Nytro Flash card on which to perform an operation.

Command Syntax

```
# ddcli
```

Sample Output

```
*****
Seagate WarpDrive Management Utility
Version 112.00.12.00 (2015.04.16)
Copyright (c) 2015 Seagate Technologies LLC. All Rights Reserved.
*****
ID      WarpDrive      Package Version      PCI Address
--      -
1      XP6302-8B4096  13.00.02.00          00:1b:00:00

Select the WarpDrive [1-1 or 0:Quit]: 1
```

1. List WarpDrive Information
2. Update Flash Package
3. Display WarpDrive Health
4. Locate WarpDrive
5. Format WarpDrive
6. Show Vital Product Data
7. Extract SMART Logs
8. Enable/Disable UNMAP feature

Select Operation [1-8 or 0:Quit]: 6

```
-----
                          VPD Information
-----
Product Name   : XP6302-8B4096
V0             : 03-25927-03B
V1             : SP34401640
V2             : 131114
V3             : 01
V4             : 4E
V5             : -----
V6             : --
V7             : P
RV             : 0xcb
-----
```

6.7.2 Command Line Usage

Enter the following command in the CLI to run the `-showvpd` command.

Command Syntax

To bring up the utility in the CLI mode, use the following command:

```
# ddcli -c 1 -showvpd
```

Sample Output

```
*****
Seagate WarpDrive Management Utility
Version 112.00.12.00 (2015.04.16)
Copyright (c) 2015 Seagate Technologies LLC. All Rights Reserved.
*****
-----
                          VPD Information
-----
Product Name   : XP6302-8B4096
V0             : 03-25927-03B
V1             : SP34401640
V2             : 131114
V3             : 01
V4             : 4E
V5             : -----
V6             : --
V7             : P
RV             : 0xcb
-----
Seagate WarpDrive Management Utility: Execution completed successfully.
```


6.8 Extract SMART Logs Command

The `-getsmartlog` command extracts additional SMART logs that can assist in issue debug and resolution. This command extracts two specific SMART logs for a single device or all devices if the `-slot` option is not used.

6.8.1 Text Menu Option

The following top-level menu lists the Nytro Flash cards in the system and prompts you to select a Nytro Flash card on which to perform an operation.

```
# ddcli
*****
Seagate WarpDrive Management Utility
Version 112.00.12.00 (2015.04.16)
Copyright (c) 2015 Seagate Technologies LLC. All Rights Reserved.
*****

ID      WarpDrive      Package Version      PCI Address
--      -
1       XP6302-8B4096  13.00.02.00          00:1b:00:00

Select the WarpDrive [1-1 or 0:Quit]: 1

1.      List WarpDrive Information
2.      Update Flash Package
3.      Display WarpDrive Health
4.      Locate WarpDrive
5.      Format WarpDrive
6.      Show Vital Product Data
7.      Extract SMART Logs
8.      Enable/Disable UNMAP feature

Select Operation [1-8 or 0:Quit]: 7

Get Log for single or all SSDs[ Enter 1:All or 0:Single]: 0
Enter SSD Slot number: 5
Enter Log File Path: /root
Successfully collected SSD Event Logs for Cage = 01 Location = Lower
Successfully collected System Event Logs for Cage = 01 Location = Lower
```

6.8.2 Command Line Usage

Enter the following line of text in the CLI to run the `-getsmartlog` command.

Command Syntax

To bring up the Nytro management utility in the CLI mode, use the following command:

```
# ddcli -c <Flash card number> -getsmartlog [-slot <ssd_slot>] -path <path name>
```

Command Example

```
# ddcli -c 1 -getsmartlog -slot 4 -path /root
```

Sample Output

```
*****
Seagate WarpDrive Management Utility
Version 112.00.12.00 (2015.04.16)
Copyright (c) 2015 Seagate Technologies LLC. All Rights Reserved.
*****
Successfully collected SSD Event Logs for Cage = 01 Location = Lower
Successfully collected System Event Logs for Cage = 01 Location = Lower

Seagate WarpDrive Management Utility: Execution completed successfully.
```

6.9 SCSI UNMAP Command

The `-unmapSCSI` command enables or disable the SCSI UNMAP feature. In the CLI mode, select a Flash card by using the Nytro Flash card index.

Enter the following command to enable or disable the SCSI UNMAP feature:

```
# ddcli -c <Flash card number> -unmapSCSI [-enable|-disable]
```

6.9.1 Text Menu Option

The following top-level menu lists the Nytro Flash cards in the system and prompts you to select a Nytro Flash card on which to perform an operation.

Command Syntax

```
# ddcli
```

Sample Output

```
*****
Seagate WarpDrive Management Utility
Version 112.00.12.00 (2015.04.16)
Copyright (c) 2015 Seagate Technologies LLC. All Rights Reserved.
*****
ID      WarpDrive      Package Version    PCI Address
--      -
1       XP6302-8B4096  13.00.02.00       00:1b:00:00

Select the WarpDrive [1-1 or 0:Quit]: 1

1. List WarpDrive Information
2. Update Flash Package
3. Display WarpDrive Health
4. Locate WarpDrive
```

-
5. Format WarpDrive
 6. Show Vital Product Data
 7. Extract SMART Logs
 8. Enable/Disable UNMAP feature

Select Operation [1-8 or 0:Quit]: 8

Enter Unmap state [Enable:1/Disable:0]: 1

SCSI Unmap is enabled

Seagate WarpDrive Management Utility: Adapter reset done.

6.9.2 Command Line Usage

Enter the following command in the CLI to run the `-unmapSCSI` command.

Command Syntax

To bring up the Nytro management utility in the CLI mode, use the following command:

```
# ddcli -c <Flash card number> -unmapSCSI <-enable or -disable>
```

Command Example

```
# ddcli -c 1 -unmapSCSI -disable
```

Sample Output

When the `-unmapSCSI` command runs as provided in the preceding example, the utility returns the following text.

```
*****
Seagate WarpDrive Management Utility
Version 112.00.12.00 (2015.04.16)
Copyright (c) 2015 Seagate Technologies LLC. All Rights Reserved.
*****
```

SCSI Unmap is disabled

Seagate WarpDrive Management Utility: Adapter reset done.

Seagate WarpDrive Management Utility: Execution completed successfully.

7 Exception Handling

The following table lists all of the input validation errors.

Table 2 Error Messages

Error Message
Seagate WarpDrive Management Utility: Invalid command format specified on the command line.
Seagate WarpDrive Management Utility: Invalid argument: %s.
Seagate WarpDrive Management Utility: Invalid entry.
Seagate WarpDrive Management Utility: Incorrect number of command line parameters.
Seagate WarpDrive Management Utility: File doesn't exists or not a regular file. Name: %s.
Seagate WarpDrive Management Utility: No controllers found.
Seagate WarpDrive Management Utility: Failed getting controller information.
Seagate WarpDrive Management Utility: Insufficient memory.
Seagate WarpDrive Management Utility: Feature not supported in this release.
Seagate WarpDrive Management Utility: Error executing command %s.
Seagate WarpDrive Management Utility: Command terminated %s.
Seagate WarpDrive Management Utility: Format failed for Cage=%d Location=%s component.
Seagate WarpDrive Management Utility: Only %d out of %d components found.
Seagate WarpDrive Management Utility: Controller with index %d not found...!
Seagate WarpDrive Management Utility: WarpDrive is not in a proper state.
Seagate WarpDrive Management Utility: Preparing WarpDrive for format.
Seagate WarpDrive Management Utility: Couldn't prepare WarpDrive for format.
Seagate WarpDrive Management Utility: Format failed for component at "Cage=%d Location=%s".
Seagate WarpDrive Management Utility: WarpDrive could not be brought in usable state.
Seagate WarpDrive Management Utility: Invalid package signature.
Seagate WarpDrive Management Utility: Checksum error.
Seagate WarpDrive Management Utility: Package type not supported. Type: 0x%x
Seagate WarpDrive Management Utility: Invalid file size.

Table 2 Error Messages (Continued)

Error Message
Seagate WarpDrive Management Utility: Package does not contain required image.
Seagate WarpDrive Management Utility: Package type does not match controller.
Seagate WarpDrive Management Utility: Failed to get current package version from WarpDrive.
Seagate WarpDrive Management Utility: Cannot downgrade package version xx.xx.xx.xx to xx.xx.xx.xx.
Seagate WarpDrive Management Utility: Failed to Flash image. Type: 0x%x
Seagate WarpDrive Management Utility: Flash upgrade not allowed for component at "Cage: %d, Location: %s".
Seagate WarpDrive Management Utility: Failed to update component at "Cage: %d, Location: %s".

8 Installing and Configuring SNMP

This section describes how to install and configure SNMP on the Windows and Linux operating systems.

8.1 Installing and Configuring SNMP on Windows Operating System

1. Use SNMP Manager to retrieve the data (*mib* files must already be compiled). The *mib* files are available in the same location as *setup.exe* file.
2. Use the Trap utility to get the traps.

NOTE Before you install SNMP Agent, make sure that the SNMP service is installed in the system.

If you do not have SNMP service installed on your system, perform the following steps to install SNMP service:

8.2 Installing SNMP Service on Windows Server 2008 Operating System

Before you install the SNMP Agent, make sure that SNMP Service is installed in your system.

If you do not have SNMP Service installed on your system, perform the following steps to install SNMP Service for Windows 2008 System.

1. Go to **Control Panel > Program and Features**.
2. Click **Turn windows feature on/off** to select the windows components to install.
3. Select **Features** in the left side menu.
4. Click **Add Features**.
5. Select **SNMP Services**.
6. Click on **Next**.
7. Click **Install**.

SNMP installation starts. When prompted for the Windows 2008 CD, insert the CD and select **OK**, the installation resumes. SNMP installation resumes and SNMP service is installed in that system. After the installation completes, a confirmation message appears, which indicates that the installation was successful.

8.3 Configuring SNMP Service on Windows 2008 Server Operating System

1. Go to **Control Panel > Administrative Tools**.
2. Select **Services** from **Administrative Tools** window.
3. Select SNMP Service in the **Services** window.
4. Open SNMP Service, and right-click **Properties**.
5. Click the **Security** tab, and make sure that the **Accept SNMP Packets from any host** option is selected. Add a community with some keyword, for example, *public*.
6. Click the Traps tab, and the list of host IPs to which you want the traps to be sent with community name shows.

8.4 Installing SNMP on the Linux Operating System

Prerequisite for SNMP installation

The SNMP agent application depends upon standard SNMP Utils package. Ensure that the SNMP-Util package is present in the system before installing the SNMP agent RPM.

SNMP-Util package includes the RPMs, `net-snmp-libs`, `net-snmp-utils`, and additional dependent RPMs. Make sure that you install these RPMs from the operating system media before you install the SNMP agent RPM.

Before you install SNMP, check if the `libstdc++.so.6` Library is present in the `/usr/lib` directory, otherwise, install the Linux software component RPM that provides these libraries.

The Net-SNMP RPM installation is required before you install the agent RPMs. The Net-SNMP RPMs are available in the operating system DVD.

- If you are unable to install SNMP agent RPMs, use `rpm -ivh --force *.rpm`, and then uninstall the SNMP RPMs by using `rpm -e *.rpm`.
- If you are unable to install multiple RPMs and if cyclic redundancy issues occur, install all of the RPMs in one command line.

For example, `rpm -ivh net-snmp-5.4.2.1-8.1.x86_64.rpm perl-snmp-5.4.2.1-8.1.x86_64.rpm`

8.5 Installing SNMP Agent on RHEL

1. SNMP Agent RPMs install the agents.
2. RPM takes care of the required modifications in the `snmpd.conf` file to run the agent.

NOTE Before you start installing, check if there is any `pass` command that starts with **1.3.6.1.4.1.3582 OID** in the `snmpd.conf` file, if `pass` commands exist, delete all of the old `pass` commands that start with **1.3.6.1.4.1.3582 OID**.

This instruction is valid if a previous SNMP Agent was installed in the system.

3. The `snmpd.conf` file structure must be same as `lsi_mrdsnmpd.conf` file. For reference, a sample `conf` file (`lsi_mrdsnmpd.conf`) will be present in the `/etc/lsi_mrdsnmp` directory.
4. To run the SNMP query from a remote system, add the IP address of that system in the `snmpd.conf` file.

For example:

```
com2sec      snmpclient 172.28.136.112    public
```

Here, the IP address of the remote system is, 172.28.136.112.

5. For receiving SNMP trap into a particular system, add the IP address of that system in the **com2sec** section of `snmpd.conf` file.

For example, to get Trap in 10.0.0.144, add the following line to the `snmpd.conf` file.

```
#          sec.name  source      community
com2sec   snmpclient 10.0.0.144  public
```

6. To start or stop the SNMPD daemon.


```
/etc/init.d/snmpd start/stop
```
7. To start/stop the SNMP Agent daemon before issuing any SNMP query.


```
/etc/init.d/lsi_mrdsnmpd start/stop
```
8. Check the status of the SNMP Agent daemon by issuing the following command:


```
/etc/init.d/lsi_mrdsnmpd status
```

9. Issue an SNMP query, such as following:

```
snmpwalk -v1 -c public localhost .1.3.6.1.4.1.3582
```

10. Get the SNMP trap from local system by issuing the following command:

```
snmptrapd -P -F "%02.2h:%02.2j TRAP%w.%q from %A %v\n"
```

11. Perform the following steps to configure SNMP traps.

- a. Edit the `/etc/lsi_mrdsntp/sas-ir/sas_ir_TrapDestination.conf` file and add the IP address as shown in the following example:

```
#####
# Agent Service needs the IP addresses to sent trap
# The trap destination may be specified in this file or
# using snmpd.conf file. Following indicators can be set
# on "TrapDestInd" to instruct the agent to pick the IPs
# as the destination.
# 1 - IPs only from snmpd.conf
# 2 - IPs from this file only
# 3 - IPs from both the files
#####
TrapDestInd 2
#####Trap Destination IP#####
127.0.0.1 public
172.28.157.149 public
#####
```

- NOTE** If `TrapDestInd` in the preceding snippet is set to a value of 1, the IP addresses can be taken from `/etc/snmp/snmpd.conf` in the following format:

```
'com2sec snmpclient 172.28.157.149 public'
'Trapsink' and 'TrapCommunity' tokens are supported for sending
customised SNMP traps.
```

To send SNMP traps to custom ports, in the `sas_TrapDestination.conf` file, use as shown in the following example:

```
'172.28.157.149:1234 testComm'
```

In the preceding case, SNMP trap can be sent to IP, 172.28.157.149, at port number 1234 with community as `testComm`.

If no port number is mentioned, the default SNMP trap port 162 can be used for sending SNMP traps.

- NOTE** For the SNMP components to work correctly, the Linux system must have `snmp-net` packages (rpm).

It is assumed that `snmpd.conf` is located at `/etc/snmp` for Red Hat. You can change the file location from `/etc/init.d/lsi_mrdsnmpd` file.

The RPM upgrade option is not supported up to version v13.04.01.00. You must manually uninstall the previous SNMP package and install latest SNMP package.

The RPMs can be upgraded from v13.04.01.00 and later versions only.

Used the `rpm -Uvh <SNMP agent rpm>` command to upgrade the RPM.

This command uninstalls the previous SNMP RPM and installs the latest SNMP RPM.



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