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Special **REPORT**

Test Results for Forensic Media Preparation Tool: Logicube Omniclone 2Xi (Software version 1.53 June 19, 2009, Firmware version 9.0)

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NCJ 230566

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Kristina Rose

Acting Director, National Institute of Justice

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March 2010

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NIST
National Institute of
Standards and Technology
U.S. Department of Commerce

Contents

Introduction

The Computer Forensics Tool Testing (CFTT) program is a joint project of the National Institute of Justice (NIJ), the research and development organization of the U.S. Department of Justice (DOJ), and the National Institute of Standards and Technology's (NIST's) Office of Law Enforcement Standards and Information Technology Laboratory. CFTT is supported by other organizations, including the Federal Bureau of Investigation, the U.S. Department of Defense Cyber Crime Center, U.S. Internal Revenue Service Criminal Investigation Division Electronic Crimes Program, and the U.S. Department of Homeland Security's Bureau of Immigration and Customs Enforcement, U.S. Customs and Border Protection, and U.S. Secret Service. The objective of the CFTT program is to provide measurable assurance to practitioners, researchers, and other applicable users that the tools used in computer forensics investigations provide accurate results. Accomplishing this requires the development of specifications and test methods for computer forensics tools and subsequent testing of specific tools against those specifications.

Test results provide the information necessary for developers to improve tools, users to make informed choices, and the legal community and others to understand the tools' capabilities. The CFTT approach to testing computer forensic tools is based on well-recognized methodologies for conformance and quality testing. The specifications and test methods are posted on the CFTT Web site (http://www.cftt.nist.gov/) for review and comment by the computer forensics community.

This document reports the results from testing Logicube Omniclone 2Xi, against the *Forensic Media Preparation Tool Test Assertions and Test Plan Version 1.0*, available at the CFTT Web site (http://www.cftt.nist.gov/fmp-atp-pc-01.pdf).

Test results for other devices and software packages using the CFTT tool methodology can be found on NIJ's computer forensics tool testing Web page, http://www.ojp.usdoj.gov/nij/topics/technology/electronic-crime/cftt.htm.

How to Read This Report

This report is divided into five sections. The first section is a summary of the results from the test runs. This section is sufficient for most readers to assess the suitability of the tool for the intended use. The remaining sections of the report describe how the tests were conducted and provide documentation of test case run details that support the report summary. Section 2 gives justification for the selection of test cases from the set of possible cases defined in the test plan for forensic media preparation tools. The test cases are selected, in general, based on features offered by the tool. Section 3 presents any observed tool behaviors that are not covered by the test plan but, a tool user should be aware of. Section 4 lists hardware and software used to run the test cases with links to additional information about the items used. Section 5 contains a description of each test case. The description of each test run lists all test assertions used in the test case, the expected result and the actual result.

Test Results for Forensic Media Preparation Tool

Tool Tested:	Logicube Omniclone 2Xi
Version:	1.53 June 19, 2009
Serial No.	50432
Run Environments:	Custom

Supplier:	Logicube Los Angeles Corporate Headquarters 19755 Nordhoff Place Chatsworth, CA 91311
Tel:	(888) 494-8832 inside U.S. (818) 700-8488 outside U.S.
Email:	sales@logicube.com
WWW:	http://www.logicube.com

1. Results Summary

In all the test cases run against Logicube Omniclone 2Xi, all visible sectors were successfully overwritten. For the test cases that used drives containing an HPA or DCO, the tool behaved as designed by the vendor and did not overwrite hidden sectors.

- HPA remained intact, hidden sectors were not overwritten (FMP-03-HPA & FMP-03-DCO+HPA).
- DCO remained intact, hidden sectors were not overwritten (FMP-03-DCO & FMP-03-DCO+HPA).

2. Test Case Selection

Logicube Omniclone 2Xi was tested for its ability to overwrite sectors. The prime function of the device is a hard drive duplication system for cloning a master drive to one or two target drives. The device optionally supports a secondary function to wipe one or two target drives. This test report covers only the results of testing the wipe function.

The tested device has three bays for attaching hard drives. The bays are labeled Master, Target 1 and Target 2. Drives attached to the target bays can be overwritten with one of three user selectable patterns (0x00, 0xF6 or 0xFF) or with random data. It should be noted that in addition to any drives attached to the target bays, a drive must be attached to the master bay to serve as a work area. The drive attached to the work area is not wiped but is partially overwritten by the selected wipe pattern.

The test cases selected were limited to only those test cases defined by *Forensic Media Preparation Tool Test Assertions and Test Plan Version 1.0* and applicable to features supported by this tool.

Since Logicube Omniclone 2Xi does not support a secure erase mode those tests were omitted. All selected test cases were *WRITE* tests (cases FMP-01 and FMP-03).

Three hidden sector test cases (FMP-03) were included among the cases selected. They were included to measure the tool behavior in conjunction with hidden sectors.

The following cases were used in testing Logicube Omniclone:

- FMP-01-ATA28
- FMP-01-ATA28-TARGET2
- FMP-01-ATA48
- FMP-01-SATA28
- FMP-01-SATA48
- FMP-01-SATA48-TARGET2
- FMP-03-DCO
- FMP-03-DCO+HPA
- FMP-03-HPA

The following source interfaces were tested: ATA28, ATA48, SATA28, SATA48.

The tested device has the ability to wipe either one or two drives in a single run of the device. Test cases FMP-01-ATA28 and FMP-01-ATA28-TARGET2 are a single run of the device treated as two test cases for ease of presentation. One drive is attached to each target bay and then both drives are wiped by the device. Each of the two cases documents the results for one of the two drives attached for the run. Test case FMP-01-ATA28 documents the drive attached to Target 1 and test case FMP-01-ATA28-TARGET2 documents the drive attached to Target 2.

The cases FMP-01-SATA48 and FMP-01-SATA48-TARGET2 are another single run to wipe two drives at once. The remaining cases only use a single target drive attached to either the Target 1 or the Target 2 drive bays.

In addition to the target drives, several user selectable parameters can be set for tool operation, i.e., pass, speed and fill. Refer to the tool documentation for additional information about these parameters. The following table documents the settings for each test case:

Test Case	Target 1	Target 2	Pass	Speed	Fill
FMP-01-ATA28	56-IDE	57-IDE	0	udma 5	0x00
FMP-01-ATA28-TARGET2	56-IDE	57-IDE	0	udma 5	0x00
FMP-01-ATA48	53-IDE	none	1	udma 5	0xF6
FMP-01-SATA28	none	1D-LAP	2	udma 5	0xFF

Test Case	Target 1	Target 2	Pass	Speed	Fill
FMP-01-SATA48	43-SATA	33-SATA	0	udma 5	Rnd
FMP-01-SATA48-TARGET2	43-SATA	33-SATA	0	udma 5	Rnd
FMP-03-DCO	1D-LAP	none	1	udma 5	0x00
FMP-03-DCO+HPA	57-IDE	none	0	udma 5	Rnd
FMP-03-HPA	none	2C-SATA	2	udma	0xF6

3. Observations

There were two tool behaviors observed that should be noted. While the behaviors are outside the scope of testing, the behaviors are identified below.

3.1 Overwriting Drive in Master Bay

A small percentage (less than 1 percent) of the drive in the master drive bay is overwritten while the target drives are overwritten. The following table documents the number of sectors overwritten on the drive in the master bay. It should be noted that sometimes in addition to the fill value selected for the target drive, other fill values were written to the master.

Test Case	Target Fill	Sectors Overwritten on Master			Total Sectors on Master Drive
		0x00	0xF6	0xFF	
FMP-01-ATA28	0x00	131328			156301488
FMP-01-ATA48	0xF6	131072	131328	131072	234441648
FMP-01-SATA28	0xFF	131072		262400	156301488
FMP-01-SATA48	random	1311034 random values			488397168
FMP-03-DCO	0x00	262400		131072	312581808
FMP-03-HPA	0xF6	131072	131328	131072	488397168
FMP-03-DCO+HPA	random	1311034 random values			156301488

3.2 Random Overwrite Pattern

The random pattern used to overwrite the target drives in test cases FMP-01-SATA48, FMP-03-SATA48-TARGET2 and FMP-03-DCO+HPA is not a statistically uniform random distribution. Not all possible byte values are used (181--183 out of 256 possible values) and some byte values are used much more frequently than others, e.g., in test case FMP-01-SATA48 the letter ‘Z’ (0x5A) appears about six times (1,875,490,848 vs. 312,581,808) more frequently than the letter ‘T’ (0x54). It should also be noted that the distribution of the random data written is the same in all three cases.

4. Test Materials

4.1 Support Software

Several programs were used in the setup and analysis of the test drives. These include **hdat2** (download from: http://www.hdat2.com/download.html), **dsumm** (download

from: http://www.cftt.nist.gov/), **ransum** (download from: http://www.cftt.nist.gov/) and **diskwipe** from **FS-TST Release 2.0** (download from: http://www.cftt.nist.gov/diskimaging/fs-tst20.zip).

The **hdat2** program is used to create, remove and document hidden areas on a drive.

The **diskwipe** program initializes a hard drive with known content.

The **dsumm** program analyzes the content of a hard drive. It produces a summary of disk contents in terms of counts for each byte value present on the drive. For example, if a drive can contain 10GB (19531250 sectors of 512 bytes per sector) and the drive is wiped with zero bytes, then **dsumm** reports 10,000,000,000 zero bytes. The program also prints the first sector found with printable ASCII content. This is useful to identify where overwriting stopped e.g., at the start of a hidden sector area.

The **ransum** program examines a hard drive to identify sectors that do not contain the content written to the drive by the **diskwipe** program. The **ransum** output is a list of sector ranges classified as either *overwritten* or *unchanged*.

4.2 Test Drive Creation

The test drives are created to simplify post-test analysis simple. Every sector is given content that includes the sector address of the given sector in both cylinder/head/sector (C/H/S) format and logical block address (LBA) format. The remainder of the sector bytes is set to a constant fill value unique for each drive. This setup allows easy identification of any sectors not wiped. The following steps are used to setup a test drive:

1. The drive is initially filled with known content by the **diskwipe** program from FS-TST. The **diskwipe** program writes the sector address to each sector in both C/H/S and LBA format. The remainder of the sector bytes is set to a constant fill value unique for each drive. The fill value is noted in the **diskwipe** tool log file.
2. The **dsumm** program analyzes the drive contents. This documents the content of the drive. Each sector has unique content after the setup.
3. If the drive is intended for hidden area tests (FMP-03), an HPA, a DCO or both are created.
4. The drive size after creation of a hidden area is recorded.

4.3 Test Drive Analysis

The primary objective of the post-test analysis is to identify any sectors not overwritten by the tool. Most likely, this would be sectors in a hidden area. Therefore reporting the first sector with ASCII content (if any) is sufficient to determine if the hidden sectors have been overwritten. Examination of the byte counts reported by the **dsumm** program can provide additional verification if needed. The following steps are used to analyze a test drive after it has been wiped by the tool under test:

1. The size of the drive is recorded. This determines if the tool changes the size of a hidden area.
2. Any hidden areas still present on the drive are removed.
3. The **dsumm** program is run to determine the final content of the drive.
4. The **ransum** program is run for the random fill cases (FMP-01-SATA48, FMP-01-SATA48-TARGET2 & FMP-03-DCO+HPA) to clearly identify overwritten sectors.

4.4 Test Drives

The following hard drives were used in testing. The column labeled **Test Case** identifies the test case. The column labeled **Sectors** is the size of the drive with no DCO or HPA. The column labeled **Model** is the model of the drive as returned by the ATA IDENTIFY DEVICE command. The column labeled **Serial #** is the serial number as returned by the ATA IDENTIFY DEVICE command.

Test Case	Sectors	Model	Serial #
FMP-01-ATA28	156301488	WDC WD800BB-75CAA0	WD-WMA8E2108916
FMP-01-ATA28-TARGET2	80043264	Y040L0	Y2SM68LE
FMP-01-ATA48	312581808	WDC WD1600JB-00GVC0	WD-WMAL94865344
FMP-01-SATA28	234441648	HTS5425112K9SA00	080914BB6200WBKPDL
FMP-01-SATA48	312581808	ST9160310AS	9RX7Y1DP
FMP-01-SATA48-TARGET2	390721968	SP2004C	S07GJ1ULC07896
FMP-03-DCO	23444165	HTS542512K9SA00	080914BB6200WBKPDL2G
FMP-03-DCO+HPA	80043264	Maxtor 6Y040L0	Y2SM68LE
FMP-03-HPA	48838154	WDC WD2500AAKS-00VSA0	WD-WMART1591607

For FMP-03 test cases the layout of visible and hidden sectors is as follows. The column labeled **Test Case** identifies the test case. The column labeled **Size** is the number of visible sectors presented to the device for the test case. The column labeled **Hidden** is the size in sectors of the hidden area.

Test Case	Size	Total	Hidden (DCO+HPA)
FMP-03-DCO	23444165	234441648	210997483
FMP-03-DCO+HPA	77543264	80043264	2500000 (1000000+1500000)
FMP-03-HPA	48838154	488397168	439559014

5. Test Results

The main item of interest for interpreting the test results is determining the conformance of the tool under test with the test assertions. Conformance with each assertion tested by a given test case is evaluated by examining the **Log Highlights** box of the test report summary.

5.1 Test Results Report Key

A summary of the actual test results is presented in this report. The following table presents a description of each section of the test report summary.

Heading	Description
First Line:	Test case ID, name, and version of tool tested.
Case Summary:	Test case summary from *Forensic Media Preparation Tool Test Assertions and Test Plan Version 1.0.*
Assertions:	The test assertions applicable to the test case, selected from *Forensic Media Preparation Tool Test Assertions and Test Plan Version 1.0.*
Tester Name:	Name or initials of person executing test procedure.
Analysis Host:	Host used to setup test drive and analyze final drive state.
Test Host:	Host computer executing the test.
Test Date:	Time and date that test was started.
Test Drive:	Drive erased by the tool under test.
Source Setup:	Report of the native drive size, the size of any hidden areas, the apparent size of the drive (as reported by an ATA IDENTIFY DEVICE command) and an analysis of initial drive contents.
Tool Settings:	Report of tool parameters set for each test run.
Log Highlights:	Report of the state of the drive after executing the tool under test, including the apparent drive size, size of hidden area and analysis of drive contents. The ASCII content of the first non-binary-zero sector is reported. For drives overwritten with a constant value, the number of times the value is counted in the **dsumm** program output should equal the size of the drive in bytes. If hidden sectors are present and they are not overwritten this can be verified by examination of the totals reported by the **dsumm** program.
Results:	Expected and actual results for each assertion tested.
Analysis:	Whether or not the expected results were achieved.

5.2 Test Details

5.2.1 FMP-01-ATA28

<table>
<tr><td colspan="2">Test Case FMP-01-ATA28 Logicube OmniClone 2Xi SW 1.53/FW 9.0</td></tr>
<tr><td>Case Summary:</td><td>FMP-01. Overwrite visible sectors using WRITE commands.</td></tr>
<tr><td>Assertions:</td><td>FMP-CA-01 All visible sectors shall be overwritten with the specified benign data.</td></tr>
<tr><td>Tester Name:</td><td>Csr</td></tr>
<tr><td>Analysis host:</td><td>Frank</td></tr>
<tr><td>Test host:</td><td>None</td></tr>
<tr><td>Test date:</td><td>Wed Sep 30 11:11:27 2009</td></tr>
<tr><td>Test drive:</td><td>56-IDE</td></tr>
<tr><td>Source Setup:</td><td>Initial setup size: 156301488 from total of 156301488 (with 0 hidden)
IDE disk: Model (WDC WD800BB-75CAA0) serial # (WD-WMA8E2108916)

Sector 0 is first sector with printable text
============= Start text =============
00000/000/01 000000000000VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
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VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
============= End text Sector 0 =============
9 <new line> characters inserted for readability

Totals for all sectors
summary format: <count> <hex value> <(actual character if printable)> ...
156301488 00 156301488 20 ( ) 312602976 2F (/)
1092738319 30 (0) 445157427 31 (1) 274740905 32 (2)
274642393 33 (3) 272159917 34 (4) 262536293 35 (5)
225709546 36 (6) 215483146 37 (7) 215483143 38 (8)
215483135 39 (9) 75907021680 56 (V)
Totals for non-ASCII sectors
summary format: <count> <hex value> <(actual character if printable)> ...

80026361856 bytes, 156301488 sectors, 14 distinct values seen
156301488 sectors have printable text</td></tr>
<tr><td>Tool Settings:</td><td>master: 15-LAP
target1: 56-IDE
target2: 57-IDE
rounds: 0
speed: udma 5
fill: 0x00</td></tr>
<tr><td>Log Highlights:</td><td>Size after tool runs: 156301488 from total of 156301488 (with 0 hidden)
Analysis of tool result --
Totals for all sectors
summary format: <count> <hex value> <(actual character if printable)> ...
80026361856 00
Totals for non-ASCII sectors
summary format: <count> <hex value> <(actual character if printable)> ...
80026361856 00

80026361856 bytes, 156301488 sectors, 1 distinct values seen
No sectors have printable text</td></tr>
<tr><td>Results:</td><td><table><tr><th>Assertion & Expected Result</th><th>Actual Result</th></tr><tr><td>FMP-CA-01 Visible sectors overwritten</td><td>as expected</td></tr></table></td></tr>
<tr><td>Analysis:</td><td>Expected results achieved</td></tr>
</table>

5.2.2 FMP-01-ATA28-TARGET2

Test Case FMP-01-ATA28-TARGET2 Logicube OmniClone 2Xi SW 1.53/FW 9.0	
Case Summary:	FMP-01. Overwrite visible sectors using WRITE commands.
Assertions:	FMP-CA-01 All visible sectors shall be overwritten with the specified benign data.
Tester Name:	csr
Analysis host:	frank
Test host:	none
Test date:	Wed Sep 30 11:19:39 2009
Test drive:	57-IDE
Source Setup:	Initial setup size: 80043264 from total of 80043264 (with 0 hidden) Model (Y040L0) serial # (Y2SM68LE) Sector 0 is first sector with printable text ============= Start text ============= 00000/000/01 000000000000WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWW WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWW WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWW WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWW WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWW WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWW WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWW WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWW ============= End text Sector 0 ============= 9 <new line> characters inserted for readability Totals for all sectors summary format: <count> <hex value> <(actual character if printable)> ... 80043264 00 80043264 20 ( ) 160086528 2F (/) 574506672 30 (0) 176739588 31 (1) 162605313 32 (2) 145334449 33 (3) 143775184 34 (4) 126105460 35 (5) 116912956 36 (6) 111830840 37 (7) 101752955 38 (8) 101388391 39 (9) 38901026304 57 (W) Totals for non-ASCII sectors summary format: <count> <hex value> <(actual character if printable)> ... 40982151168 bytes, 80043264 sectors, 14 distinct values seen 80043264 sectors have printable text
Tool Settings:	master: 15-LAP target1: 56-IDE target2: 57-IDE rounds: 0 speed: udma 5 fill: 0x00
Log Highlights:	Size after tool runs: 80043264 from total of 80043264 (with 0 hidden) Analysis of tool result -- Totals for all sectors summary format: <count> <hex value> <(actual character if printable)> ... 40982151168 00 Totals for non-ASCII sectors summary format: <count> <hex value> <(actual character if printable)> ... 40982151168 00 40982151168 bytes, 80043264 sectors, 1 distinct values seen No sectors have printable text
Results:	**Assertion & Expected Result** / **Actual Result** FMP-CA-01 Visible sectors overwritten / as expected
Analysis:	Expected results achieved

5.2.3 FMP-01-ATA48

Test Case FMP-01-ATA48 Logicube OmniClone 2Xi SW 1.53/FW 9.0	
Case Summary:	FMP-01. Overwrite visible sectors using WRITE commands.
Assertions:	FMP-CA-01 All visible sectors shall be overwritten with the specified benign data.
Tester Name:	csr
Analysis host:	frank
Test host:	none
Test date:	Thu Oct 1 09:56:21 2009
Test drive:	53-IDE

Source Setup:

```
Initial setup size: 312581808 from total of 312581808 (with 0 hidden)
IDE disk: Model (WDC WD1600JB-00GVC0) serial # (WD-WMAL94865344)

Sector 0 is first sector with printable text
============ Start text =============
00000/000/01 000000000000SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
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SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
============ End text Sector 0 =============
9 <new line> characters inserted for readability

Totals for all sectors
summary format: <count> <hex value> <(actual character if printable)> ...
   312581808 00        312581808 20 ( )    625163616 2F (/)
  1850492169 30 (0)    906528227 31 (1)    696435016 32 (2)
   541016511 33 (3)    522787395 34 (4)    514450557 35 (5)
   478352540 36 (6)    458495114 37 (7)    458481159 38 (8)
   449761088 39 (9) 151914758688 53 (S)
Totals for non-ASCII sectors
summary format: <count> <hex value> <(actual character if printable)> ...

160041885696 bytes, 312581808 sectors, 14 distinct values seen
312581808 sectors have printable text
```

Tool Settings:

```
master: 1C-SATA
target1: 53-IDE
target2: none
rounds: 1
speed: udma 5
fill: F6
```

Log Highlights:

```
Size after tool runs: 312581808 from total of 312581808 (with 0 hidden)
Analysis of tool result --
Totals for all sectors
summary format: <count> <hex value> <(actual character if printable)> ...
160041885696 F6
Totals for non-ASCII sectors
summary format: <count> <hex value> <(actual character if printable)> ...
160041885696 F6

160041885696 bytes, 312581808 sectors, 1 distinct values seen
No sectors have printable text
```

Results:

Assertion & Expected Result	Actual Result
FMP-CA-01 Visible sectors overwritten	as expected

Analysis:	Expected results achieved

5.2.4 FMP-01-SATA28

<table>
<tr><td colspan="2">Test Case FMP-01-SATA28 Logicube OmniClone 2Xi SW 1.53/FW 9.0</td></tr>
<tr><td>Case Summary:</td><td>FMP-01. Overwrite visible sectors using WRITE commands.</td></tr>
<tr><td>Assertions:</td><td>FMP-CA-01 All visible sectors shall be overwritten with the specified benign data.</td></tr>
<tr><td>Tester Name:</td><td>csr</td></tr>
<tr><td>Analysis host:</td><td>freddy</td></tr>
<tr><td>Test host:</td><td>none</td></tr>
<tr><td>Test date:</td><td>Thu Oct 1 10:24:56 2009</td></tr>
<tr><td>Test drive:</td><td>1D-LAP</td></tr>
<tr><td>Source Setup:</td><td>Initial setup size: 234441648 from total of 234441648 (with 0 hidden)
Model (HTS542512K9SA00) serial # (080914BB6200WBKPDL)

Sector 0 is first sector with printable text
============= Start text =============
00000/000/01 000000000000
============= End text Sector 0 =============
1 <new line> character inserted for readability

Totals for all sectors
summary format: <count> <hex value> <(actual character if printable)> ...
234441648 00 113938640928 1D 234441648 20 ( )
468883296 2F (/) 1461085523 30 (0) 678339301 31 (1)
497617498 32 (2) 407041791 33 (3) 391715334 34 (4)
376075228 35 (5) 347651457 36 (6) 332766225 37 (7)
332765657 38 (8) 332658242 39 (9)
Totals for non-ASCII sectors
summary format: <count> <hex value> <(actual character if printable)> ...

120034123776 bytes, 234441648 sectors, 14 distinct values seen
234441648 sectors have printable text</td></tr>
<tr><td>Tool Settings:</td><td>master: 18-LAP
target1: none
target2: 1D-LAP
rounds: 2
speed: udma 5
fill: FF</td></tr>
<tr><td>Log Highlights:</td><td>Size after tool runs: 234441648 from total of 234441648 (with 0 hidden)
Analysis of tool result --
Totals for all sectors
summary format: <count> <hex value> <(actual character if printable)> ...
120034123776 FF
Totals for non-ASCII sectors
summary format: <count> <hex value> <(actual character if printable)> ...
120034123776 FF

120034123776 bytes, 234441648 sectors, 1 distinct values seen
No sectors have printable text</td></tr>
<tr><td>Results:</td><td><table><tr><th>Assertion & Expected Result</th><th>Actual Result</th></tr><tr><td>FMP-CA-01 Visible sectors overwritten</td><td>as expected</td></tr></table></td></tr>
<tr><td>Analysis:</td><td>Expected results achieved</td></tr>
</table>

5.2.5 FMP-01-SATA48

Test Case FMP-01-SATA48 Logicube OmniClone 2Xi SW 1.53/FW 9.0	
Case Summary:	FMP-01. Overwrite visible sectors using WRITE commands.
Assertions:	FMP-CA-01 All visible sectors shall be overwritten with the specified benign data.
Tester Name:	csr
Analysis host:	frank
Test host:	none
Test date:	Mon Dec 14 15:29:19 2009
Test drive:	43-SATA
Source Setup:	Initial setup size: 312581808 from total of 312581808 (with 0 hidden) IDE disk: Model (ST3160815AS) serial # (9RX7Y1DP) Sector 0 is first sector with printable text ============= Start text ============= 00000/000/01 000000000000CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC ============= End text Sector 0 ============= 9 <new line> characters inserted for readability Totals for all sectors summary format: <count> <hex value> <(actual character if printable)> ... 312581808 00 312581808 20 ( ) 625163616 2F (/) 1850492169 30 (0) 906528227 31 (1) 696435016 32 (2) 541016511 33 (3) 522787395 34 (4) 514450557 35 (5) 478352540 36 (6) 458495114 37 (7) 458481159 38 (8) 449761088 39 (9) 151914758688 43 (C) Totals for non-ASCII sectors summary format: <count> <hex value> <(actual character if printable)> ... 160041885696 bytes, 312581808 sectors, 14 distinct values seen 312581808 sectors have printable text
Tool Settings:	master: 2C-SATA target1: 43-SATA target2: 33-SATA rounds: 0 speed: udma 5 fill: Rnd
Log Highlights:	Size after tool runs: 312581808 from total of 312581808 (with 0 hidden) Analysis of tool result -- Sector 0 is first sector with printable text ============= Start text ============= r`O-ZgZ_lR3N:D2~~gpnA^xN]]{>jvbf.f.JV!BFY *{6"<J&D l[zAlr^TVZfKR\50:2~tnB38^N;2>jvb.fJiVBFs*"6t"S& 2zrm{EZm*R!+W:J2~!n/^OF]NZ>jvb.fSJPVBCwmF(*6"j("&6 :zr|4ZtR>:!2#~\rn &^^4N2y>jvb+.f"J7V^B&4F*p6r"&a >Az ============= End text Sector 0 ============= 1 <new line> character inserted for readability

Test Case FMP-01-SATA48 Logicube OmniClone 2Xi SW 1.53/FW 9.0

```
Totals for all sectors
summary format: <count> <hex value> <(actual character if printable)> ...
   625163616 00        312581808 01       1875490848 02
   937745424 03        312581808 04        312581808 05
  1250327232 06        625163616 09       1562909040 0A
  1875490848 0E        625163616 11       1875490848 12
   312581808 14       1562909040 16        312581808 17
   312581808 19       1250327232 1A       1250327232 1C
  1250327232 1E       1250327232 1F        312581808 20 ( )
  1250327232 21 (!)   2188072656 22 (")    312581808 23 (#)
  1875490848 26 (&)    625163616 28 (()   1562909040 2A (*)
   625163616 2B (+)    312581808 2D (-)   1562909040 2E (.)
   312581808 2F (/)    312581808 30 (0)   2188072656 32 (2)
   625163616 33 (3)    937745424 34 (4)    312581808 35 (5)
  1562909040 36 (6)    312581808 37 (7)    312581808 38 (8)
  1562909040 3A (:)    312581808 3B (;)    312581808 3C (<)
  1875490848 3E (>)    937745424 41 (A)   1562909040 42 (B)
   312581808 43 (C)    625163616 44 (D)    312581808 45 (E)
  1562909040 46 (F)   1875490848 4A (J)    312581808 4B (K)
  1562909040 4E (N)    625163616 4F (O)    312581808 50 (P)
  1250327232 52 (R)    625163616 53 (S)    312581808 54 (T)
  1562909040 56 (V)    312581808 57 (W)    312581808 59 (Y)
  1875490848 5A (Z)    312581808 5B ([)    625163616 5C (\)
   937745424 5D (])   2188072656 5E (^)    312581808 5F (_)
   312581808 60 (`)    312581808 61 (a)   1250327232 62 (b)
  1875490848 66 (f)    625163616 67 (g)    312581808 69 (i)
  1562909040 6A (j)    937745424 6C (l)    937745424 6D (m)
  1250327232 6E (n)    625163616 70 (p)   1875490848 72 (r)
   312581808 73 (s)    937745424 74 (t)   1250327232 76 (v)
   312581808 77 (w)    312581808 78 (x)    312581808 79 (y)
  1250327232 7A (z)    937745424 7B ({)    312581808 7C (|)
  1562909040 7E (~)    312581808 7F       1250327232 81
  1875490848 82        312581808 83        312581808 84
   625163616 85       1562909040 86        312581808 87
   625163616 88       1250327232 8A        312581808 8B
   312581808 8C        312581808 8D       1562909040 8E
   312581808 90       1875490848 92        312581808 93
   312581808 94        312581808 95       1250327232 96
   625163616 97        937745424 98        312581808 99
  1562909040 9A        312581808 9B       1875490848 9E
   312581808 9F        312581808 A0        625163616 A1
  1875490848 A2        312581808 A3        312581808 A4
   312581808 A5       2188072656 A6        312581808 A8
   937745424 A9       1875490848 AA        312581808 AD
  1562909040 AE        312581808 AF        625163616 B0
   937745424 B1       1250327232 B2        312581808 B4
  1562909040 B5       1250327232 B6        625163616 B7
   625163616 B9       1250327232 BA        312581808 BB
   312581808 BC       1250327232 BE        625163616 C0
  1562909040 C2        312581808 C3        625163616 C4
   312581808 C5       1250327232 C6        312581808 C7
   312581808 C8        625163616 C9       1250327232 CA
  1562909040 CE        625163616 CF       1250327232 D2
   625163616 D3        625163616 D4       1250327232 D6
  1562909040 DA       1250327232 DE        937745424 DF
   937745424 E0        312581808 E1       1250327232 E2
   625163616 E3       1250327232 E6        312581808 E7
   312581808 E9       1875490848 EA        312581808 EB
   937745424 EC       1250327232 EE        625163616 F1
  1250327232 F2        937745424 F3        625163616 F5
  1562909040 F6       1562909040 FA        312581808 FB
   312581808 FC        625163616 FD       1562909040 FE
   312581808 FF
Totals for non-ASCII sectors
summary format: <count> <hex value> <(actual character if printable)> ...

160041885696 bytes, 312581808 sectors, 181 distinct values seen
312581808 sectors have printable text
```

Test Case FMP-01-SATA48 Logicube OmniClone 2Xi SW 1.53/FW 9.0	
	Runs of Sectors Unchanged or Overwritten First Sector Last Sector State 0 -- 312581807 Overwritten
Results:	**Assertion & Expected Result** / **Actual Result** FMP-CA-01 Visible sectors overwritten / as expected
Analysis:	Expected results achieved

5.2.6 FMP-01-SATA48-TARGET2

Test Case FMP-01-SATA48-TARGET2 Logicube OmniClone 2Xi SW 1.53/FW 9.0	
Case Summary:	FMP-01. Overwrite visible sectors using WRITE commands.
Assertions:	FMP-CA-01 All visible sectors shall be overwritten with the specified benign data.
Tester Name:	csr
Analysis host:	frank
Test host:	none
Test date:	Mon Dec 14 12:44:01 2009
Test drive:	33-SATA
Source Setup:	Initial setup size: 390721968 from total of 390721968 (with 0 hidden) IDE disk: Model (SAMSUNG SP2004C) serial # (S07GJ1ULC07896) Sector 0 is first sector with printable text ============= Start text ============= 00000/000/01 00000000000033333333333333333333333333333333 33333333333333333333333333333333333333333333333333333333 33333333333333333333333333333333333333333333333333333333 33333333333333333333333333333333333333333333333333333333 33333333333333333333333333333333333333333333333333333333 33333333333333333333333333333333333333333333333333333333 33333333333333333333333333333333333333333333333333333333 33333333333333333333333333333333333333333333333333333333 33333333333333333333333333333333333333333333333333333333 333333333333333333333333333 ============= End text Sector 0 ============= 9 <new line> characters inserted for readability Totals for all sectors summary format: <count> <hex value> <(actual character if printable)> ... 390721968 00 390721968 20 ( ) 781443936 2F (/) 2245711842 30 (0) 1085211682 31 (1) 924880030 32 (2) 190651497045 33 (3) 652451193 34 (4) 638095887 35 (5) 593223154 36 (6) 568337370 37 (7) 568314834 38 (8) 559036707 39 (9) Totals for non-ASCII sectors summary format: <count> <hex value> <(actual character if printable)> ... 200049647616 bytes, 390721968 sectors, 13 distinct values seen 390721968 sectors have printable text
Log Highlights:	Size after tool runs: 390721968 from total of 390721968 (with 0 hidden) Analysis of tool result -- Sector 0 is first sector with printable text ============= Start text ============= r`O-ZgZ_lR3N:D2~~gpnA^xN]]{>jvbf.f.JV!BFY *{6"<J&D l[zAlr^TVZfKR\50:2~tnB38^N;2>jvb.fJiVBFs*"6t"S& 2zrm{EZm*R!+W:J2~!n/^OF]NZ>jvb.fSJPVBCwmF(*6"j("&6 :zr|4ZtR>:!2#~\rn &^^4N2y>jvb+.f"J7V^B&4F*p6r"&a >Az ============= End text Sector 0 ============= 1 <new line> character inserted for readability Totals for all sectors summary format: <count> <hex value> <(actual character if printable)> ... 781443936 00 390721968 01 2344331808 02 1172165904 03 390721968 04 390721968 05 1562887872 06 781443936 09 1953609840 0A 2344331808 0E 781443936 11 2344331808 12 390721968 14 1953609840 16 390721968 17 390721968 19 1562887872 1A 1562887872 1C 1562887872 1E 1562887872 1F 390721968 20 ( ) 1562887872 21 (!) 2735053776 22 (") 390721968 23 (#) 2344331808 26 (&) 781443936 28 (() 1953609840 2A (*) 781443936 2B (+) 390721968 2D (-) 1953609840 2E (.)

Test Case FMP-01-SATA48-TARGET2 Logicube OmniClone 2Xi SW 1.53/FW 9.0

```
   390721968 2F (/)    390721968 30 (0)   2735053776 32 (2)
   781443936 33 (3)   1172165904 34 (4)    390721968 35 (5)
  1953609840 36 (6)    390721968 37 (7)    390721968 38 (8)
  1953609840 3A (:)    390721968 3B (;)    390721968 3C (<)
  2344331808 3E (>)   1172165904 41 (A)   1953609840 42 (B)
   390721968 43 (C)    781443936 44 (D)    390721968 45 (E)
  1953609840 46 (F)   2344331808 4A (J)    390721968 4B (K)
  1953609840 4E (N)    781443936 4F (O)    390721968 50 (P)
  1562887872 52 (R)    781443936 53 (S)    390721968 54 (T)
  1953609840 56 (V)    390721968 57 (W)    390721968 59 (Y)
  2344331808 5A (Z)    390721968 5B ([)    781443936 5C (\)
  1172165904 5D (])   2735053776 5E (^)    390721968 5F (_)
   390721968 60 (`)    390721968 61 (a)   1562887872 62 (b)
  2344331808 66 (f)    781443936 67 (g)    390721968 69 (i)
  1953609840 6A (j)   1172165904 6C (l)   1172165904 6D (m)
  1562887872 6E (n)    781443936 70 (p)   2344331808 72 (r)
   390721968 73 (s)   1172165904 74 (t)   1562887872 76 (v)
   390721968 77 (w)    390721968 78 (x)    390721968 79 (y)
  1562887872 7A (z)   1172165904 7B ({)    390721968 7C (|)
  1953609840 7E (~)    390721968 7F       1562887872 81
  2344331808 82        390721968 83        390721968 84
   781443936 85       1953609840 86        390721968 87
   781443936 88       1562887872 8A        390721968 8B
   390721968 8C        390721968 8D       1953609840 8E
   390721968 90       2344331808 92        390721968 93
   390721968 94        390721968 95       1562887872 96
   781443936 97       1172165904 98        390721968 99
  1953609840 9A        390721968 9B       2344331808 9E
   390721968 9F        390721968 A0        781443936 A1
  2344331808 A2        390721968 A3        390721968 A4
   390721968 A5       2735053776 A6        390721968 A8
  1172165904 A9       2344331808 AA        390721968 AD
  1953609840 AE        390721968 AF        781443936 B0
  1172165904 B1       1562887872 B2        390721968 B4
  1953609840 B5       1562887872 B6        781443936 B7
   781443936 B9       1562887872 BA        390721968 BB
   390721968 BC       1562887872 BE        781443936 C0
  1953609840 C2        390721968 C3        781443936 C4
   390721968 C5       1562887872 C6        390721968 C7
   390721968 C8        781443936 C9       1562887872 CA
  1953609840 CE        781443936 CF       1562887872 D2
   781443936 D3        781443936 D4       1562887872 D6
  1953609840 DA       1562887872 DE       1172165904 DF
  1172165904 E0        390721968 E1       1562887872 E2
   781443936 E3       1562887872 E6        390721968 E7
   390721968 E9       2344331808 EA        390721968 EB
  1172165904 EC       1562887872 EE        781443936 F1
  1562887872 F2       1172165904 F3        781443936 F5
  1953609840 F6       1953609840 FA        390721968 FB
   390721968 FC        781443936 FD       1953609840 FE
   390721968 FF
Totals for non-ASCII sectors
summary format: <count> <hex value> <(actual character if printable)> ...

200049647616 bytes, 390721968 sectors, 181 distinct values seen
390721968 sectors have printable text


    Runs of Sectors Unchanged or Overwritten
First Sector      Last Sector      State
           0 --    390721967   Overwritten
```

Results:

Assertion & Expected Result	Actual Result
FMP-CA-01 Visible sectors overwritten	as expected

Analysis: Expected results achieved

5.2.7 FMP-03-DCO

Test Case FMP-03-DCO Logicube OmniClone 2Xi SW 1.53/FW 9.0	
Case Summary:	FMP-03. Overwrite hidden sectors using WRITE commands.
Assertions:	FMP-CA-01 All visible sectors shall be overwritten with the specified benign data. FMP-AO-01 If there is a hidden area present and the tool supports overwriting sectors contained in a hidden area, then all sectors contained in the hidden area shall be overwritten with the specified benign data. FMP-AO-02 A hidden area may optionally be removed from the storage device.
Tester Name:	csr
Analysis host:	frank
Test host:	none
Test date:	Wed Sep 23 08:58:24 2009
Test drive:	1D-LAP
Source Setup:	Initial setup size: 23444165 from total of 234441648 (with 210997483 hidden) IDE disk: Model (Hitachi HTS542512K9SA00) serial # (080914BB6200WBKPDL2G) Sector 0 is first sector with printable text ============= Start text ============= 00000/000/01 000000000000 ============= End text Sector 0 ============= 1 <new line> character inserted for readability Totals for all sectors summary format: <count> <hex value> <(actual character if printable)> ... 23444165 00 11393864190 1D 23444165 20 ( ) 46888330 2F (/) 188309928 30 (0) 63142163 31 (1) 45070833 32 (2) 36015397 33 (3) 34483229 34 (4) 32919293 35 (5) 30077014 36 (6) 28588493 37 (7) 28588153 38 (8) 28577127 39 (9) Totals for non-ASCII sectors summary format: <count> <hex value> <(actual character if printable)> ... 12003412480 bytes, 23444165 sectors, 14 distinct values seen 23444165 sectors have printable text
Tool Settings:	master: 21-LAP target1: 1D-LAP target2: none rounds: 1 speed:udma 5 fill: 0x00
Log Highlights:	Size after tool runs: 23444165 from total of 234441648 (with 210997483 hidden) Analysis of tool result -- Sector 23444165 is first sector with printable text ============= Start text ============= 01459/084/39 000023444165 ============= End text Sector 23444165 ============= 1 <new line> character inserted for readability Totals for all sectors summary format: <count> <hex value> <(actual character if printable)> ... 12214409963 00 102544776738 1D 210997483 20 ( ) 421994966 2F (/) 1272775595 30 (0) 615197138 31 (1) 452546665 32 (2) 371026394 33 (3) 357232105 34 (4) 343155935 35 (5) 317574443 36 (6) 304177732 37 (7) 304177504 38 (8) 304081115 39 (9) Totals for non-ASCII sectors summary format: <count> <hex value> <(actual character if printable)> ... 12003412480 00

Test Case FMP-03-DCO Logicube OmniClone 2Xi SW 1.53/FW 9.0	
	120034123776 bytes, 234441648 sectors, 14 distinct values seen 210997483 sectors have printable text
Results:	**Assertion & Expected Result** / **Actual Result** FMP-CA-01 Visible sectors overwritten / as expected FMP-AO-01 Hidden sectors overwritten / DCO not overwritten FMP-AO-02 Hidden area final state is / in place
Analysis:	Expected results achieved

5.2.8 FMP-03-DCO+HPA

Test Case FMP-03-DCO-HPA Logicube OmniClone 2Xi SW 1.53/FW 9.0	
Case Summary:	FMP-03. Overwrite hidden sectors using WRITE commands.
Assertions:	FMP-CA-01 All visible sectors shall be overwritten with the specified benign data. FMP-AO-01 If there is a hidden area present and the tool supports overwriting sectors contained in a hidden area, then all sectors contained in the hidden area shall be overwritten with the specified benign data. FMP-AO-02 A hidden area may optionally be removed from the storage device.
Tester Name:	csr
Analysis host:	frank
Test host:	none
Test date:	Tue Dec 8 14:32:54 2009
Test drive:	57-IDE
Source Setup:	Size with DCO: 79043264 40.47 GB (1000000 sectors in DCO) Size with HPA: 77543264 39.70 GB (1500000 sectors in HPA) Initial setup size: 77543264 from total of 80043264 (with 2500000 hidden) IDE disk: Model (Maxtor 6Y040L0) serial # (Y2SM68LE) Sector 0 is first sector with printable text ============= Start text ============= 00000/000/01 000000000000WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWW WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWW WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWW WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWW WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWW WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWW WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWW WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWW WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWW ============= End text Sector 0 ============= 9 <new line> characters inserted for readability Totals for all sectors summary format: <count> <hex value> <(actual character if printable)> ... 79043264 00 79043264 20 ( ) 158086528 2F (/) 567903142 30 (0) 175145940 31 (1) 161040518 32 (2) 143988453 33 (3) 141445061 34 (4) 124798395 35 (5) 115720344 36 (6) 109744985 37 (7) 100701721 38 (8) 98463249 39 (9) 38415026304 57 (W) Totals for non-ASCII sectors summary format: <count> <hex value> <(actual character if printable)> ... 40470151168 bytes, 79043264 sectors, 14 distinct values seen 79043264 sectors have printable text
Tool Settings:	master: 15-LAP target1: 57-IDE target2: none rounds: 0 speed: udma 5 fill: Rnd
Log	Size after tool runs: 77543264 from total of 80043264 (with 2500000 hidden)

Test Case FMP-03-DCO-HPA Logicube OmniClone 2Xi SW 1.53/FW 9.0

Highlights:

```
Analysis of tool result --

Sector 0 is first sector with printable text
============= Start text =============
r`O-ZgZ_lR3N:D2~~gpnA^xN]]{>jvbf.f.JV!BFY
*{6"<J&D
l[zAlr^TVZfKR\50:2~tnB38^N;2>jvb.fJiVBFs*"6t"S&
2zrm{EZm*R!+W:J2~!n/^OF]NZ>jvb.fSJPVBCwmF(*6"j("&6
:zr|4ZtR>:!2#~\rn &^^4N2y>jvb+.f"J7V^B&4F*p6r"&a
>Az
============= End text Sector 0 =============
1 <new line> character inserted for readability

Totals for all sectors
summary format: <count> <hex value> <(actual character if printable)> ...
   157586528 00         77543264 01        465259584 02
   232629792 03         77543264 04         77543264 05
   310173056 06        155086528 09        387716320 0A
   465259584 0E        155086528 11        465259584 12
    77543264 14        387716320 16         77543264 17
    77543264 19        310173056 1A        310173056 1C
   310173056 1E        310173056 1F         80043264 20 ( )
   310173056 21 (!)    542802848 22 (")     77543264 23 (#)
   465259584 26 (&)    155086528 28 (()    387716320 2A (*)
   155086528 2B (+)     77543264 2D (-)    387716320 2E (.)
    82543264 2F (/)     94124624 30 (0)      4069190 31 (1)
   546475865 32 (2)    158322519 33 (3)    238326100 34 (4)
    80737374 35 (5)    390668976 36 (6)     83264234 37 (7)
    82448113 38 (8)      4971549 39 (9)    387716320 3A (:)
    77543264 3B (;)     77543264 3C (<)    465259584 3E (>)
   232629792 41 (A)    387716320 42 (B)     77543264 43 (C)
   155086528 44 (D)     77543264 45 (E)    387716320 46 (F)
   465259584 4A (J)     77543264 4B (K)    387716320 4E (N)
   155086528 4F (O)     77543264 50 (P)    310173056 52 (R)
   155086528 53 (S)     77543264 54 (T)    387716320 56 (V)
  1292543264 57 (W)     77543264 59 (Y)    465259584 5A (Z)
    77543264 5B ([)    155086528 5C (\)    232629792 5D (])
   542802848 5E (^)     77543264 5F (_)     77543264 60 (`)
    77543264 61 (a)    310173056 62 (b)    465259584 66 (f)
   155086528 67 (g)     77543264 69 (i)    387716320 6A (j)
   232629792 6C (l)    232629792 6D (m)    310173056 6E (n)
   155086528 70 (p)    465259584 72 (r)     77543264 73 (s)
   232629792 74 (t)    310173056 76 (v)     77543264 77 (w)
    77543264 78 (x)     77543264 79 (y)    310173056 7A (z)
   232629792 7B ({)     77543264 7C (|)    387716320 7E (~)
    77543264 7F        310173056 81        465259584 82
    77543264 83         77543264 84        155086528 85
   387716320 86         77543264 87        155086528 88
   310173056 8A         77543264 8B         77543264 8C
    77543264 8D        387716320 8E         77543264 90
   465259584 92         77543264 93         77543264 94
    77543264 95        310173056 96        155086528 97
   232629792 98         77543264 99        387716320 9A
    77543264 9B        465259584 9E         77543264 9F
    77543264 A0        155086528 A1        465259584 A2
    77543264 A3         77543264 A4         77543264 A5
   542802848 A6         77543264 A8        232629792 A9
   465259584 AA         77543264 AD        387716320 AE
    77543264 AF        155086528 B0        232629792 B1
   310173056 B2         77543264 B4        387716320 B5
   310173056 B6        155086528 B7        155086528 B9
   310173056 BA         77543264 BB         77543264 BC
   310173056 BE        155086528 C0        387716320 C2
    77543264 C3        155086528 C4         77543264 C5
   310173056 C6         77543264 C7         77543264 C8
   155086528 C9        310173056 CA        387716320 CE
   155086528 CF        310173056 D2        155086528 D3
   155086528 D4        310173056 D6        387716320 DA
   310173056 DE        232629792 DF        232629792 E0
    77543264 E1        310173056 E2        155086528 E3
```

Test Case FMP-03-DCO-HPA Logicube OmniClone 2Xi SW 1.53/FW 9.0

```
   310173056 E6         77543264 E7         77543264 E9
   465259584 EA         77543264 EB        232629792 EC
   310173056 EE        155086528 F1        310173056 F2
   232629792 F3        155086528 F5        387716320 F6
   387716320 FA         77543264 FB         77543264 FC
   155086528 FD        387716320 FE         77543264 FF
Totals for non-ASCII sectors
summary format: <count> <hex value> <(actual character if printable)> ...

40982151168 bytes, 80043264 sectors, 183 distinct values seen
80043264 sectors have printable text


    Runs of Sectors Unchanged or Overwritten
First Sector      Last Sector      State
           0 --     77543263   Overwritten
    77543264 --     80043263   Unchanged
```

Results:

Assertion & Expected Result	Actual Result
FMP-CA-01 Visible sectors overwritten	as expected
FMP-AO-01 Hidden sectors overwritten	as expected
FMP-AO-02 Hidden area final state is	in place

Analysis: Expected results achieved

5.2.9 FMP-03-HPA

Test Case FMP-03-HPA Logicube OmniClone 2Xi SW 1.53/FW 9.0	
Case Summary:	FMP-03. Overwrite hidden sectors using WRITE commands.
Assertions:	FMP-CA-01 All visible sectors shall be overwritten with the specified benign data. FMP-AO-01 If there is a hidden area present and the tool supports overwriting sectors contained in a hidden area, then all sectors contained in the hidden area shall be overwritten with the specified benign data. FMP-AO-02 A hidden area may optionally be removed from the storage device.
Tester Name:	csr
Analysis host:	frank
Test host:	none
Test date:	Thu Sep 24 13:12:58 2009
Test drive:	2C-SATA

Source Setup:

```
Initial setup size: 48838154 from total of 488397168 (with 439559014 hidden)
IDE disk: Model (WDC WD2500AAKS-00VSA0) serial # (WD-WMART1591607)

Sector 0 is first sector with printable text
============= Start text =============
00000/000/01 000000000000,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
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,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
============= End text Sector 0 =============
9 <new line> characters inserted for readability

Totals for all sectors
summary format: <count> <hex value> <(actual character if printable)> ...
   488397168 00        488397168 20 ( ) 237361023648 2C (,)
   976794336 2F (/)   2735169210 30 (0)   1278997882 31 (1)
  1192805876 32 (2)    933260747 33 (3)    905775911 34 (4)
   805865997 35 (5)    749775664 36 (6)    718765480 37 (7)
   716559080 38 (8)    707761849 39 (9)
Totals for non-ASCII sectors
summary format: <count> <hex value> <(actual character if printable)> ...

250059350016 bytes, 488397168 sectors, 14 distinct values seen
488397168 sectors have printable text
```

Tool Settings:

```
master: 29-IDE
target1: none
target2: 2C-SATA
rounds: 2
speed: udma
fill: 0xF6
```

Log Highlights:

```
Size after tool runs: 48838154 from total of 488397168 (with 439559014
hidden)
Analysis of tool result --

Sector 48838154 is first sector with printable text
============= Start text =============
03040/008/51 000048838154,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
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```

Test Case FMP-03-HPA Logicube OmniClone 2Xi SW 1.53/FW 9.0

```
,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
============= End text Sector 48838154 =============
9 <new line> characters inserted for readability

Totals for all sectors
summary format: <count> <hex value> <(actual character if printable)> ...
   439559014 00        439559014 20 ( ) 213625680804 2C (,)
   879118028 2F (/)   2373754361 30 (0)   1160868248 31 (1)
  1083294696 32 (2)    849706859 33 (3)    824970482 34 (4)
   735048411 35 (5)    684566931 36 (6)    656657579 37 (7)
   654675730 38 (8)    646755011 39 (9)  25005134848 F6
Totals for non-ASCII sectors
summary format: <count> <hex value> <(actual character if printable)> ...
 25005134848 F6

250059350016 bytes, 488397168 sectors, 15 distinct values seen
439559014 sectors have printable text
```

Results:

Assertion & Expected Result	**Actual Result**
FMP-CA-01 Visible sectors overwritten	as expected
FMP-AO-01 Hidden sectors overwritten	HPA not overwritten
FMP-AO-02 Hidden area final state is	in place

Analysis: Expected results achieved

About the National Institute of Justice

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1. Partner with state and local practitioners and policymakers to identify social science research and technology needs.
2. Create scientific, relevant, and reliable knowledge—with a particular emphasis on terrorism, violent crime, drugs and crime, cost-effectiveness, and community-based efforts—to enhance the administration of justice and public safety.
3. Develop affordable and effective tools and technologies to enhance the administration of justice and public safety.

Dissemination

4. Disseminate relevant knowledge and information to practitioners and policymakers in an understandable, timely and concise manner.
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