

# **Test Results for Digital Data Acquisition Tool**

**Voom Technologies  
HardCopy III SATA Drive Capture Unit**

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# 1 Test Results for Digital Data Acquisition Tool

Tool Tested: HardCopy III  
Version: 1-04s  
Run Environments: n/a (HardCopyIII is a hardware device)  
Supplier: Voom Technologies, Inc.  
Address: 110 Saint Croix Trail South  
Lakeland MN 55043  
Tel: 612-998-1618  
Fax: 612-436-4030  
WWW: www.voomtech.com

## 2 Results Summary

The tested tool acquired all visible and hidden sectors completely and accurately from the test media without any anomalies.

## 3 Test Case Selection

Test cases are selected by comparing tool features to the assertions defined in [Digital Data Acquisition Tool Assertions and Test Plan Version 1.0](#). The list of tool assertions follows.

### 3.1 Assertions for Required Features

- DA-AM-01** The tool uses access interface SRC-AI to access the digital source.
- DA-AM-02** The tool acquires digital source DS.
- DA-AM-03** The tool executes in execution environment XE.
- DA-AM-04** If image file creation is specified, the tool creates an image file on filesystem type FS.
- DA-AM-06** All visible sectors are acquired from the digital source.
- DA-AM-07** All hidden sectors are acquired from the digital source.
- DA-AM-08** All sectors acquired from the digital source are acquired accurately.
- DA-AM-09** If unresolved errors occur while reading from the selected digital source. The tool notifies the user of the error type and location within the digital source.
- DA-AM-10** If unresolved errors occur while reading from the selected digital source, the tool uses a benign fill in the destination object in place of the inaccessible data.

## 3.2 Assertions for Optional Features

### 3.2.1 Assertions for Image Files

- DA-AO-01** If the tool creates an image file, the data represented by the image file is the same as the data acquired by the tool.
- DA-AO-02** If an image file format is specified, the tool creates an image file in the specified format.
- DA-AO-03** If there is an error while writing the image file, the tool notifies the user.
- DA-AO-04** If the tool is creating an image file and there is insufficient space on the image destination device to contain the image file, the tool shall notify the user.
- DA-AO-05** If the tool creates a multi-file image of a requested size then all the individual files shall be of the requested size, except that one file may be smaller.
- DA-AO-06** If the tool performs an image file integrity check on an image file that has not been changed since the file was created, the tool shall notify the user that the image file has not been changed.
- DA-AO-07** If the tool performs an image file integrity check on an image file that has been changed since the file was created, the tool shall notify the user that the image file has been changed.
- DA-AO-08** If the tool performs an image file integrity check on an image file that has been changed since the file was created, the tool shall notify the user of the affected locations.
- DA-AO-09** If the tool converts a source image file from one format to a target image file in another format, the acquired data represented in the target image file is the same as the acquired data in the source image file.
- DA-AO-10** If there is insufficient space to contain all files of a multi-file image and if destination device switching is supported, the image is continued on another device.

### 3.2.2 Assertions for Clone Creation

- DA-AO-11** If requested, a clone is created during an acquisition of a digital source.
- DA-AO-12** If requested, a clone is created from an image file.
- DA-AO-13** A clone is created using access interface DST-AI to write to the clone device.
- DA-AO-14** If an unaligned clone is created, each sector written to the clone is accurately written to the same disk address on the clone that the sector occupied on the digital source.
- DA-AO-15** If an aligned clone is created, each sector within a contiguous span of sectors from the source is accurately written to the same disk address on the clone device relative to the start of the span as the sector occupied on the original digital source. A span of sectors is defined to be either a mountable partition or a contiguous sequence of sectors not part of a mountable partition. Extended partitions, which may contain both mountable partitions and unallocated sectors, are not mountable partitions.
- DA-AO-16** If a subset of an image or acquisition is specified, all the subset is cloned.
- DA-AO-17** If requested, any excess sectors on a clone destination device are not modified.
- DA-AO-18** If requested, a benign fill is written to excess sectors of a clone.
- DA-AO-19** If there is insufficient space to create a complete clone, a truncated clone is created using all available sectors of the clone device.
- DA-AO-20** If a truncated clone is created, the tool notifies the user.
- DA-AO-21** If there is a write error during clone creation, the tool notifies the user.

### 3.2.3 Assertion for Tools Offering Block Hash Logging

**DA-AO-22** If requested, the tool calculates block hashes for a specified block size during an acquisition for each block acquired from the digital source.

### 3.2.4 Assertion for Tools Creating a Log File

**DA-AO-23** If the tool logs any significant information, the information is accurately recorded in the log file.

### 3.2.5 Assertion for Tools Offering Acquisition Without Requiring Write Protection of the Digital Source

**DA-AO-24** If the tool executes in a forensically safe execution environment, the digital source is unchanged by the acquisition process.

HardCopyIII images or clones entire physical devices. It cannot select a single partition, so test cases involving logical sources have been skipped. Also, HardCopyIII does not support all of the optional assertions. The most notable unsupported features are image file re-verification or manipulation or the creation of a truncated clone/image. Therefore, not all optional assertions are tested. Untested assertions: AO-05, AO-06, AO-07, AO-08, AO-09, AO-10, AO-12, AO-15, AO-16, AO-19, AO-20, AO-22, AO-24.

## 3.3 Selected Test Cases

Supported Assertions	Cases Selected For Execution
All mandatory assertions	DA-01, DA-04, DA-05, DA-06, DA-07, DA-08, DA-09, DA-10, DA-11, DA-12, DA-19
AO-01	DA-06, DA-07, DA-08, DA-09
AO-02	DA-10
AO-03	DA-11 (not executed due to unavailability of error generation)
AO-04	DA-12
AO-05	DA-06, DA-07, DA-08, DA-09, DA-10
AO-11	DA-01, DA-04, DA-19
AO-13	DA-01, DA-04, DA-19
AO-14	DA-01, DA-04, DA-19
AO-17	DA-01
AO-18	DA-19
AO-21	DA-05 (not executed due to unavailability of error generation)
AO-23	DA-06, DA-07, DA-08, DA-09, DA-10 (HardCopyIII only creates a file during image creation. All other output must be captured as the tests are run by reading HardCopyIII's LCD display.)

Some test cases have variant forms to accommodate parameters within test assertions.

The following source interfaces were tested: SATA.

The following digital sources were tested: FAT32 and NTFS.

The image files were created on either FAT32 or NTFS partitions.

## 4 Testing Environment

The tests were run in the Voom Technologies lab.

### 4.1 Test Computer

Host **nistor2** has the following configuration:

Asus P5AD2-E Premium Motherboard

AMIBIOS v08.00.10

Intel Pentium 4 CPU 3.00Ghz stepping 04

Physical RAM: 3115780k, Swap: 3004112k

Optical drive: Sony DVD RW DRU-510A

Intel ICH6R South Bridge:

- 1 UDMA 100 Parallel ATA port
- 4 SATA ports

Silicon Image 3114R RAID controller:

- 4 SATA ports configured non-RAID

ITE 8212F IDE RAID controller:

- 2 UDMA 133 Parallel ATA ports configured non-RAID

Host **nistor2** is running Ubuntu Linux 8.04, kernel version 2.6.24-24-generic.

### 4.2 Test Drives

All hard drives had their parameters recorded by '`hdparm -I /dev/sdX`' where X is one of a, b, c, or d. The significant identifiers are listed below.

Label	Model	Serial #	Native LBA	Size
wd80.1	WDC WD800AAJS-00WAA0	WD-WCAS25804159	156301488	80026 MB
wd80.2	WDC WD800AAJS-00WAA0	WD-WCAS25708357	156301488	80026 MB
s640.1	SEAGATE ST3640323AS	9VK0BKC5	1250263728	640135 MB
s640.2	SEAGATE ST3640323AS	9VK0DQJT	1250263728	640135 MB
s640.3	SEAGATE ST3640323AS	9VK0DQYM	1250263728	640135 MB
s500.1	SEAGATE ST3500320AS	5QM2YAEF	976773168	500107 MB
s80.1	SEAGATE ST380815AS	6QZ4T826	156301488	80026 MB
f40.1	FUJITSU MHW2040BH	NZ19T7725VAN	78165360	40020 MB

### 4.3 Support Software

The [FS-TST Release 2.0](#) package of programs to support test analysis was used.

## 5 Test Results

All tests were performed by Christopher Biessener on HardCopyIII, SN: CF-08-A-00008. Test verification was performed on host **nistor2**.

Case Identifier	<b>DA-01</b>
Case Summary	Acquire a physical device using access interface AI to an unaligned clone.
Assertions	DA-AM-01    DA-AM-02    DA-AM-03    DA-AM-04    DA-AM-06    DA-AM-08 DA-AO-11    DA-AO-13    DA-AO-14    DA-AO-17    DA-AO-22    DA-AO-23 DA-AO-24
Test Date	Wed Aug 5 09:06:29 2009
Drives	<b>src:</b> s640.1 <b>dst1:</b> s640.2 <b>dst2:</b> s640.3
Setup	<p><b>src:</b> Model (ST3640323AS      ) serial # (                      9VK0BKC5) 1250263728 sectors wiped with B7 SHA-256: b01ad4973260202493f36b56d3388f76179fc610e992ac7410743fb9a9db47e0</p> <p><b>dst1:</b> Model (ST3640323AS      ) serial # (                      9VK0DQJT) 1250263728 sectors wiped with FF</p> <p><b>dst2:</b> Model (ST3640323AS      ) serial # (                      9VK0DQYM) 1250263728 sectors wiped with FF</p>
Highlights	<p><b>diskcmp DA-01 nistor2 cpb /dev/sdb B7 /dev/sdc FF (dst1):</b> Model (ST3640323AS      ) serial # (                      9VK0DQJT) Sectors compared: 1250263728 Sectors match:      1250263728 Sectors differ:      0 Bytes differ:      0 Diffs range 0 source read errors, 0 destination read errors</p> <p><b>diskcmp DA-01 nistor2 cpb /dev/sdb B7 /dev/sdd FF (dst2):</b> Model (ST3640323AS      ) serial # (                      9VK0DQYM) Sectors compared: 1250263728 Sectors match:      1250263728 Sectors differ:      0 Bytes differ:      0 Diffs range 0 source read errors, 0 destination read errors</p> <p><b>sha256sum /dev/sdb (src, post clone):</b> b01ad4973260202493f36b56d3388f76179fc610e992ac7410743fb9a9db47e0</p>

Case Identifier	<b>DA-01</b>	
	<b>sha256sum /dev/sdc (dst1):</b> b01ad4973260202493f36b56d3388f76179fc610e992ac7410743fb9a9db47e0  <b>sha256sum /dev/sdd (dst2):</b> b01ad4973260202493f36b56d3388f76179fc610e992ac7410743fb9a9db47e0	
Results by Assertion	AM-01 Source acquired using interface AI.	as expected
	AM-02 Source is type DS.	as expected
	AM-03 Execution environment is XE.	n/a
	AM-04 A clone is created.	as expected
	AM-06 All visible sectors acquired.	as expected
	AM-08 All sectors accurately acquired.	as expected
	AO-11 A clone is created during acquisition.	as expected
	AO-13 Clone created using interface AI.	as expected
	AO-14 An unaligned clone is created.	as expected
	AO-17 Excess sectors are unchanged.	as expected
	AO-22 Tool calculates hashes by block.	not supported
	AO-23 Logged information is correct.	not supported
	AO-24 Source is unchanged by acquisition.	as expected
	Analysis	The expected results were achieved.

Case Identifier	<b>DA-01d</b>
Case Summary	Acquire a physical device using access interface AI to an unaligned clone.
Assertions	DA-AM-01    DA-AM-02    DA-AM-03    DA-AM-04    DA-AM-06    DA-AM-08 DA-AO-11    DA-AO-13    DA-AO-14    DA-AO-17    DA-AO-22    DA-AO-23 DA-AO-24
Test Date	Wed Aug 12 09:48:39 2009
Drives	<b>src:</b> f40.1 <b>dst1:</b> wd80.1 <b>dst2:</b> wd80.2
Setup	<p><b>src:</b> Model (FUJITSU MHW2040B) serial # (NZ19T7725VAN            ) 78165360 sectors wiped with F1 SHA-256: 2296282c6f80170e903c0121d2799fd85dd525c65131dde89a760ba01979ea3a</p> <p><b>dst1:</b> Model (WDC WD800AAJS-00) serial # (            WD-WCAS25804159) 156301488 sectors wiped with D1</p> <p><b>dst2:</b> Model (WDC WD800AAJS-00) serial # (            WD-WCAS25708357) 156301488 sectors wiped with D2</p>
Highlights	<p><b>diskcmp DA-01d nistor2 cpb /dev/sdb f1 /dev/sdc d1 (dst1):</b> Model (WDC WD800AAJS-00) serial # (            WD-WCAS25804159) Sectors compared: 78165360 Sectors match:        78165360 Sectors differ:        0 Bytes differ:            0 Diffs range Source (78165360) has 78136128 fewer sectors than destination (156301488) Zero fill:                    0 Src Byte fill (F1):            0 Dst Byte fill (D1): 78136128 Other fill:                    0 Other no fill:                0 Zero fill range: Src fill range: Dst fill range: 78165360-156301487 Other fill range: Other not filled range: 0 source read errors, 0 destination read errors</p> <p><b>diskcmp DA-01d nistor2 cpb /dev/sdb f1 /dev/sdd d2 (dst2):</b> Model (WDC WD800AAJS-00) serial # (            WD-WCAS25708357) Sectors compared: 78165360 Sectors match:        78165360 Sectors differ:        0 Bytes differ:            0</p>

Case Identifier	<b>DA-01d</b>																											
	<p> Diffs range  Source (78165360) has 78136128 fewer sectors than destination (156301488)  Zero fill: 0  Src Byte fill (F1): 0  Dst Byte fill (D2): 78136128  Other fill: 0  Other no fill: 0  Zero fill range:  Src fill range:  Dst fill range: 78165360-156301487  Other fill range:  Other not filled range:  0 source read errors, 0 destination read errors </p> <p> <b>sha256sum /dev/sdb (src, post clone):</b>  2296282c6f80170e903c0121d2799fd85dd525c65131dde89a760ba01979ea3a </p> <p> <b>sha256sum /dev/sdc (dst1):</b>  2296282c6f80170e903c0121d2799fd85dd525c65131dde89a760ba01979ea3a </p> <p> <b>sha256sum /dev/sdd (dst1):</b>  2296282c6f80170e903c0121d2799fd85dd525c65131dde89a760ba01979ea3a </p>																											
Results by Assertion	<table border="1"> <tr> <td>AM-01 Source acquired using interface AI.</td> <td>as expected</td> </tr> <tr> <td>AM-02 Source is type DS.</td> <td>as expected</td> </tr> <tr> <td>AM-03 Execution environment is XE.</td> <td>n/a</td> </tr> <tr> <td>AM-04 A clone is created.</td> <td>as expected</td> </tr> <tr> <td>AM-06 All visible sectors acquired.</td> <td>as expected</td> </tr> <tr> <td>AM-08 All sectors accurately acquired.</td> <td>as expected</td> </tr> <tr> <td>AO-11 A clone is created during acquisition.</td> <td>as expected</td> </tr> <tr> <td>AO-13 Clone created using interface AI.</td> <td>as expected</td> </tr> <tr> <td>AO-14 An unaligned clone is created.</td> <td>as expected</td> </tr> <tr> <td>AO-17 Excess sectors are unchanged.</td> <td>as expected</td> </tr> <tr> <td>AO-22 Tool calculates hashes by block.</td> <td>not supported</td> </tr> <tr> <td>AO-23 Logged information is correct.</td> <td>not supported</td> </tr> <tr> <td>AO-24 Source is unchanged by acquisition.</td> <td>as expected</td> </tr> </table>	AM-01 Source acquired using interface AI.	as expected	AM-02 Source is type DS.	as expected	AM-03 Execution environment is XE.	n/a	AM-04 A clone is created.	as expected	AM-06 All visible sectors acquired.	as expected	AM-08 All sectors accurately acquired.	as expected	AO-11 A clone is created during acquisition.	as expected	AO-13 Clone created using interface AI.	as expected	AO-14 An unaligned clone is created.	as expected	AO-17 Excess sectors are unchanged.	as expected	AO-22 Tool calculates hashes by block.	not supported	AO-23 Logged information is correct.	not supported	AO-24 Source is unchanged by acquisition.	as expected	
AM-01 Source acquired using interface AI.	as expected																											
AM-02 Source is type DS.	as expected																											
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AM-04 A clone is created.	as expected																											
AM-06 All visible sectors acquired.	as expected																											
AM-08 All sectors accurately acquired.	as expected																											
AO-11 A clone is created during acquisition.	as expected																											
AO-13 Clone created using interface AI.	as expected																											
AO-14 An unaligned clone is created.	as expected																											
AO-17 Excess sectors are unchanged.	as expected																											
AO-22 Tool calculates hashes by block.	not supported																											
AO-23 Logged information is correct.	not supported																											
AO-24 Source is unchanged by acquisition.	as expected																											
Analysis	The expected results were achieved.																											

Case Identifier	<b>DA-04</b>					
Case Summary	Acquire a physical device to a truncated clone.					
Assertions	DA-AM-01	DA-AM-02	DA-AM-03	DA-AM-04	DA-AM-06	DA-AM-08
	DA-AO-11	DA-AO-13	DA-AO-14	DA-AO-19	DA-AO-20	DA-AO-22
	DA-AO-23	DA-AO-24				
Test Date	Thu Aug 13 09:28:05 2009					
Drives	<b>src:</b> s640.1 <b>dst:</b> wd80.1					
Setup	No special setup was performed.					
Highlights	<b>HardCopyIII:</b> not enough space for clone					
Results by Assertion	AM-01 Source acquired using interface AI.				as expected	
	AM-02 Source is type DS.				as expected	
	AM-03 Execution environment is XE.				n/a	
	AM-04 A clone is created.				not created	
	AM-06 All visible sectors acquired.				not created	
	AM-08 All sectors accurately acquired.				not created	
	AO-11 A clone is created during acquisition.				not created	
	AO-13 Clone created using interface AI.				not created	
	AO-14 An unaligned clone is created.				not created	
	AO-19 Truncated clone is created.				not created	
	AO-20 User notified that clone is truncated.				not created	
	AO-22 Tool calculates hashes by block.				not supported	
	AO-23 Logged information is correct.				not supported	
	AO-24 Source is unchanged by acquisition.				as expected	
Analysis	HardCopyIII does not try to clone a source device if the destination device is not large enough to hold the entire source.					

Case Identifier	<b>DA-06</b>
Case Summary	Acquire a physical device using access interface AI to an image file.
Assertions	DA-AM-01    DA-AM-02    DA-AM-03    DA-AM-05    DA-AM-06    DA-AM-08 DA-AO-01    DA-AO-05    DA-AO-22    DA-AO-23    DA-AO-24
Test Date	Thu Aug 6 15:53:19 2009
Drives	<b>src:</b> f40.1 <b>dst:</b> wd80.1
Setup	<p><b>src:</b>  Model (FUJITSU MHW2040B) serial # (NZ19T7725VAN            )  78165360 sectors wiped with B7  SHA-256:  8d45ae4799661b5869e730cfb36236e203ed342525fcbcb071b1295484a68cd9</p> <p><b>dst:</b>  Model (WDC WD800AAJS-00) serial # (            WD-WCAS25804159)  156301488 sectors wiped with FF</p>
Highlights	<p><b>data001.txt (created by HardCopyIII):</b>  [Title]  text=DA-06</p> <p>[Geometry]  ModelNumber= FUJITSU MHW2040BH  SerialNumber=NZ19T7725VAN  MaximumLBA=78165360</p> <p>[Capture]  Retries=0  ReadErrors=0  WriteErrors=0  MaximumLBA=78165360  Source  SHA=8d45ae4799661b5869e730cfb36236e203ed342525fcbcb071b1295484a68cd9  Status=complete</p> <p>[NTFS CRCs]  00000000-00406f3f=d8d52584  00406f40-00806b3f=c34b352e  00806b40-00c0673f=b4091591  00c06740-0100633f=9c1b998c  01006340-01405f3f=75788676  01405f40-01805b3f=1f0546f3  01805b40-01c0573f=ef7c8e66  01c05740-0200533f=54454df2  02005340-02404f3f=efae5eee  02404f40-02804b3f=2ead416e  02804b40-02c0473f=5defb5f6  02c04740-0300433f=93effc94  03004340-03403f3f=fc9d23be  03403f40-03803b3f=41c1c110</p>

Case Identifier	<b>DA-06</b>	
	<pre>03803b40-03c0373f=2fe03a6b 03c03740-0400333f=9b70d86b 04003340-04402f3f=8ce95c14 04402f40-04802b3f=741360dd 04802b40-04a8b56f=14b761c8  sha256sum /dev/sdb (src, post image): 8d45ae4799661b5869e730cfb36236e203ed342525fcbcb071b1295484a68cd9  sha256sum /mnt/data001.dd (image): 8d45ae4799661b5869e730cfb36236e203ed342525fcbcb071b1295484a68cd9</pre>	
Results by Assertion	AM-01 Source acquired using interface AI.	as expected
	AM-02 Source is type DS.	as expected
	AM-03 Execution environment is XE.	n/a
	AM-05 An image file is created on file system type FS.	as expected
	AM-06 All visible sectors acquired.	as expected
	AM-08 All sectors accurately acquired.	as expected
	AO-01 Image file is complete and accurate.	as expected
	AO-05 Multifile image created.	as expected
	AO-22 Tool calculates hashes by block.	not supported
	AO-23 Logged information is correct.	as expected
	AO-24 Source is unchanged by acquisition.	as expected
Analysis	The expected results were achieved.	

Case Identifier	<b>DA-07-NT</b>
Case Summary	Acquire a digital source of type DS to an image file.
Assertions	DA-AM-01    DA-AM-02    DA-AM-03    DA-AM-05    DA-AM-06    DA-AM-08 DA-AO-01    DA-AO-05    DA-AO-22    DA-AO-23    DA-AO-24
Test Date	Thu Aug 13 09:38:22 2009
Drives	<b>src:</b> wd80.1 <b>dst:</b> s640.1
Setup	<b>src:</b> Model (WDC WD800AAJS-00) serial # (      WD-WCAS25804159) 156301488 sectors wiped with D1 N    Start LBA Length      Start C/H/S End C/H/S    boot Partition type 1 P 000000063 156296384 0000/001/01 1023/254/63      07 NTFS SHA-256: c89d82b2bd8cd61b43caed610594e8d5800c8e3363e42087e681117fd6fb0119
Highlights	<b>data001.txt (created by HardCopyIII):</b> [Title] text=DA-07-NT  [Geometry] ModelNumber=WDC WD800AAJS-00WAA0 SerialNumber=      WD-WCAS25804159 MaximumLBA=156301488  [Capture] Retries=0 ReadErrors=0 WriteErrors=0 MaximumLBA=156301488 Source SHA=c89d82b2bd8cd61b43caed610594e8d5800c8e3363e42087e681117fd6fb0119 Status=complete  [NTFS CRCs] 00000000-00406f3f=dbeaac2e 00406f40-00806b3f=ade5429b 00806b40-00c0673f=948b8b27 00c06740-0100633f=2f2c814d 01006340-01405f3f=7f55629b 01405f40-01805b3f=4c334a25 01805b40-01c0573f=b0a648ff 01c05740-0200533f=c002ae50 02005340-02404f3f=ba5662cf 02404f40-02804b3f=fca3ce6a 02804b40-02c0473f=3f026890 02c04740-0300433f=4fb72fef 03004340-03403f3f=4d789986 03403f40-03803b3f=7305ce6e 03803b40-03c0373f=f111ebad 03c03740-0400333f=03d902cd

Case Identifier	<b>DA-07-NT</b>	
	04003340-04402f3f=e1aa96ec 04402f40-04802b3f=4e6b971b 04802b40-04c0273f=0981a78a 04c02740-0500233f=d2c4e772 05002340-05401f3f=f1bf4e78 05401f40-05801b3f=5bf44a24 05801b40-05c0173f=a71b40d7 05c01740-0600133f=6cb40d11 06001340-06400f3f=a3778456 06400f40-06800b3f=f946f41f 06800b40-06c0073f=17731a1b 06c00740-0700033f=52c9a476 07000340-07407d3f=a41de490 07407d40-0780793f=7efb05d6 07807940-07c0753f=c7f997a1 07c07540-0800713f=898cd275 08007140-08406d3f=dc088c34 08406d40-0880693f=d6c8409a 08806940-08c0653f=028a9871 08c06540-0900613f=e1786372 09006140-09405d3f=a934c924 09405d40-0950f8af=a8d0c3cf  <b>sha256sum /dev/sdb (src, post image):</b> c89d82b2bd8cd61b43caed610594e8d5800c8e3363e42087e681117fd6fb0119  <b>sha256sum /mnt/data001.dd (image):</b> c89d82b2bd8cd61b43caed610594e8d5800c8e3363e42087e681117fd6fb0119	
Results by Assertion	AM-01 Source acquired using interface AI.	as expected
	AM-02 Source is type DS.	as expected
	AM-03 Execution environment is XE.	n/a
	AM-05 An image file is created on file system type FS.	as expected
	AM-06 All visible sectors acquired.	as expected
	AM-08 All sectors accurately acquired.	as expected
	AO-01 Image file is complete and accurate.	as expected
	AO-05 Multifile image created.	as expected
	AO-22 Tool calculates hashes by block.	not supported
	AO-23 Logged information is correct.	as expected
	AO-24 Source is unchanged by acquisition.	as expected
Analysis	The expected results were achieved.	

Case Identifier	<b>DA-07-FAT</b>
Case Summary	Acquire a digital source of type DS to an image file.
Assertions	DA-AM-01    DA-AM-02    DA-AM-03    DA-AM-05    DA-AM-06    DA-AM-08 DA-AO-01    DA-AO-05    DA-AO-22    DA-AO-23    DA-AO-24
Test Date	Tue Aug 25 10:48:52 2009
Drives	<b>src:</b> wd80.1 <b>dst:</b> s640.1
Setup	<b>src:</b> Model (WDC WD800AAJS-00) serial # (      WD-WCAS25804159) N    Start LBA Length    Start C/H/S End C/H/S    boot Partition type 1 P 000000063 156296384 0000/001/01 1023/254/63      0C Fat32X SHA-256: fb5e299fdafe2690cbaa250f06b659bbcb70be5d16dd18411111158ab5b87b37
Highlights	<b>data001.txt (created by HardCopyIII):</b> [Title] text=DA-07-NT  [Geometry] ModelNumber=WDC WD800AAJS-00WAA0 SerialNumber=      WD-WCAS25804159 MaximumLBA=156301488  [Capture] Retries=0 ReadErrors=0 WriteErrors=0 MaximumLBA=156301488 Source SHA=fb5e299fdafe2690cbaa250f06b659bbcb70be5d16dd18411111158ab5b87b37 Status=complete  [FAT32 CRCs] FILE.000=72cfc209 FILE.001=a937efcf FILE.002=fbe26d36 FILE.003=668defd2 FILE.004=0ce0895c FILE.005=f777bbfd FILE.006=3e1f8e5f FILE.007=ecc05daf FILE.008=e1bad667 FILE.009=bdc7cd3e FILE.010=c9af20a7 FILE.011=d90fcff8 FILE.012=340886da FILE.013=bbd1fe69 FILE.014=1d595fbf FILE.015=31293f09 FILE.016=c3b05231

Case Identifier	<b>DA-07-FAT</b>																							
	<pre> FILE.017=36688125 FILE.018=3bd91bf7 FILE.019=9b358087 FILE.020=516709d2 FILE.021=8e26b0e1 FILE.022=900a74b6 FILE.023=cb7fba40 FILE.024=d70130c1 FILE.025=c9186dec FILE.026=288aa349 FILE.027=a79e0f0b FILE.028=20cbc127 FILE.029=d40189ef FILE.030=95f110de FILE.031=fcc890ee FILE.032=ed89f584 FILE.033=a8d3f9f8 FILE.034=0e413353  sha256sum /dev/sdb (src, post image): fb5e299fdafe2690cbaa250f06b659bbcb70be5d16dd18411111158ab5b87b37  cat file.*   sha256sum (image): fb5e299fdafe2690cbaa250f06b659bbcb70be5d16dd18411111158ab5b87b37 </pre>																							
Results by Assertion	<table border="1"> <tr> <td data-bbox="342 1003 1230 1052">AM-01 Source acquired using interface AI.</td> <td data-bbox="1230 1003 1508 1052">as expected</td> </tr> <tr> <td data-bbox="342 1052 1230 1100">AM-02 Source is type DS.</td> <td data-bbox="1230 1052 1508 1100">as expected</td> </tr> <tr> <td data-bbox="342 1100 1230 1148">AM-03 Execution environment is XE.</td> <td data-bbox="1230 1100 1508 1148">n/a</td> </tr> <tr> <td data-bbox="342 1148 1230 1197">AM-05 An image file is created on file system type FS.</td> <td data-bbox="1230 1148 1508 1197">as expected</td> </tr> <tr> <td data-bbox="342 1197 1230 1245">AM-06 All visible sectors acquired.</td> <td data-bbox="1230 1197 1508 1245">as expected</td> </tr> <tr> <td data-bbox="342 1245 1230 1293">AM-08 All sectors accurately acquired.</td> <td data-bbox="1230 1245 1508 1293">as expected</td> </tr> <tr> <td data-bbox="342 1293 1230 1341">AO-01 Image file is complete and accurate.</td> <td data-bbox="1230 1293 1508 1341">as expected</td> </tr> <tr> <td data-bbox="342 1341 1230 1390">AO-05 Multifile image created.</td> <td data-bbox="1230 1341 1508 1390">as expected</td> </tr> <tr> <td data-bbox="342 1390 1230 1438">AO-22 Tool calculates hashes by block.</td> <td data-bbox="1230 1390 1508 1438">not supported</td> </tr> <tr> <td data-bbox="342 1438 1230 1486">AO-23 Logged information is correct.</td> <td data-bbox="1230 1438 1508 1486">as expected</td> </tr> <tr> <td data-bbox="342 1486 1230 1545">AO-24 Source is unchanged by acquisition.</td> <td data-bbox="1230 1486 1508 1545">as expected</td> </tr> </table>		AM-01 Source acquired using interface AI.	as expected	AM-02 Source is type DS.	as expected	AM-03 Execution environment is XE.	n/a	AM-05 An image file is created on file system type FS.	as expected	AM-06 All visible sectors acquired.	as expected	AM-08 All sectors accurately acquired.	as expected	AO-01 Image file is complete and accurate.	as expected	AO-05 Multifile image created.	as expected	AO-22 Tool calculates hashes by block.	not supported	AO-23 Logged information is correct.	as expected	AO-24 Source is unchanged by acquisition.	as expected
AM-01 Source acquired using interface AI.	as expected																							
AM-02 Source is type DS.	as expected																							
AM-03 Execution environment is XE.	n/a																							
AM-05 An image file is created on file system type FS.	as expected																							
AM-06 All visible sectors acquired.	as expected																							
AM-08 All sectors accurately acquired.	as expected																							
AO-01 Image file is complete and accurate.	as expected																							
AO-05 Multifile image created.	as expected																							
AO-22 Tool calculates hashes by block.	not supported																							
AO-23 Logged information is correct.	as expected																							
AO-24 Source is unchanged by acquisition.	as expected																							
Analysis	The expected results were achieved.																							

Case Identifier	<b>DA-08</b>
Case Summary	Acquire a physical drive with hidden sectors to an image file.
Assertions	DA-AM-01    DA-AM-02    DA-AM-03    DA-AM-05    DA-AM-06    DA-AM-07 DA-AM-08    DA-AO-01    DA-AO-05    DA-AO-22    DA-AO-23    DA-AO-24
Test Date	Mon Aug 17 14:37:40 2009
Drives	<b>src:</b> wd80.1 <b>dst:</b> s640.1
Setup	A MS-DOS program called HDAT2 v4.53 was used to put an HPA and a DCO on the source drive. HPA at LBA 140000000 DCO at LBA 150000000 There is no linux tool available to read past the DCO, so a source SHA is not available pre or post image.
Highlights	<b>data001.txt (created by HardCopyIII):</b> [Title] text=DA-08  [Geometry] ModelNumber=WDC WD800AAJS-00WAA0 SerialNumber=        WD-WCAS25804159 MaximumLBA=156301488 DCOStartLBA=150000001 DCOSectors=6301487 DCOSize=3226361344 HPAStartLBA=140000001 HPASectors=10000000 HPASize=512000000  [Capture] Retries=0 ReadErrors=0 WriteErrors=0 MaximumLBA=78165360 Source SHA=c89d82b2bd8cd61b43caed610594e8d5800c8e3363e42087e681117fd6fb0119 Image1 SHA=c89d82b2bd8cd61b43caed610594e8d5800c8e3363e42087e681117fd6fb0119 Status=complete  [FAT32 CRCs] 00000000-00406f3f=279f61ef 00406f40-00806b3f=c34b352e 00806b40-00c0673f=b4091591 00c06740-0100633f=9c1b998c 01006340-01405f3f=75788676 01405f40-01805b3f=1f0546f3 01805b40-01c0573f=ef7c8e66 01c05740-0200533f=54454df2 02005340-02404f3f=efae5eee

Case Identifier	<b>DA-08</b>	
	02404f40-02804b3f=c93c0c56 02804b40-02c0473f=5defb5f6 02c04740-0300433f=93effc94 03004340-03403f3f=fc9d23be 03403f40-03803b3f=41c1c110 03803b40-03c0373f=2fe03a6b 03c03740-0400333f=9b70d86b 04003340-04402f3f=8ce95c14 04402f40-04802b3f=741360dd 04802b40-04c0273f=95074a50 04c02740-0500233f=0938834e 05002340-05401f3f=2a432a44 05401f40-05801b3f=80082e18 05801b40-05c0173f=7ce724eb 05c01740-0600133f=b748692d 06001340-06400f3f=788be06a 06400f40-06800b3f=22ba9023 06800b40-06c0073f=cc8f7e27 06c00740-0700033f=8935c04a 07000340-07407d3f=807c7b47 07407d40-0780793f=a50761ea 07807940-07c0753f=1c05f39d 07c07540-0800713f=5270b649 08007140-08406d3f=07f4e808 08406d40-0880693f=0d3424a6 08806940-08c0653f=d976fc4d 08c06540-0900613f=3a84074e 09006140-09405d3f=72c8ad18 09405d40-0950f8af=dae3a4eb	
Results by Assertion	AM-01 Source acquired using interface AI.	as expected
	AM-02 Source is type DS.	as expected
	AM-03 Execution environment is XE.	n/a
	AM-05 An image file is created on file system type FS.	as expected
	AM-06 All visible sectors acquired.	as expected
	AM-07 All hidden sectors acquired.	as expected
	AM-08 All sectors accurately acquired.	as expected
	AO-01 Image file is complete and accurate.	as expected
	AO-05 Multifile image created.	as expected
	AO-22 Tool calculates hashes by block.	not supported
	AO-23 Logged information is correct.	as expected
	AO-24 Source is unchanged by acquisition.	as expected
Analysis	The expected results were achieved.	

Case Identifier	<b>DA-09</b>					
Case Summary	Acquire a digital source that has at least one faulty data sector.					
Assertions	DA-AM-01	DA-AM-02	DA-AM-03	DA-AM-05	DA-AM-06	DA-AM-08
	DA-AM-09	DA-AM-10	DA-AO-01	DA-AO-05	DA-AO-22	DA-AO-23
	DA-AO-24					
Test Date	Wed Aug 19 09:37:21 2009					
Drives	none					
Setup	No special setup was performed.					
Highlights	This test was not performed.					
Results by Assertion	AM-01 Source acquired using interface AI.					not performed
	AM-02 Source is type DS.					not performed
	AM-03 Execution environment is XE.					n/a
	AM-05 An image is created on file system type FS.					not performed
	AM-06 All visible sectors acquired.					not performed
	AM-08 All sectors accurately acquired.					not performed
	AM-09 Error Logged.					not performed
	AM-10 Benign fill replaces inaccessible sectors.					not performed
	AO-01 Image file is complete and accurate.					not performed
	AO-05 Multifile image created.					not performed
	AO-20 User notified that clone is truncated.					not performed
	AO-22 Tool calculates hashes by block.					not performed
	AO-23 Logged information is correct.					not performed
	AO-24 Source is unchanged by acquisition.					not performed
Analysis	Due to the unavailability of a hard drive with bad sectors, this test was not performed.					

Case Identifier	<b>DA-12</b>	
Case Summary	Attempt to create an image file where there is insufficient space.	
Assertions	DA-AM-01    DA-AM-02    DA-AM-03    DA-AM-05    DA-AO-04    DA-AO-23 DA-AO-24	
Test Date	Wed Aug 19 10:04:37 2009	
Drives	<b>src:</b> s640.1 <b>dst:</b> wd80.1	
Setup	No special setup was performed.	
Highlights	<b>HardCopyIII:</b> not enough space for image	
Results by Assertion	AM-01 Source acquired using interface AI.	as expected
	AM-02 Source is type DS.	as expected
	AM-03 Execution environment is XE.	n/a
	AM-05 An image file is created on file system type FS.	not created
	AO-04 User notified if space exhausted.	as expected
	AO-23 Logged information is correct.	not supported
	AO-24 Source is unchanged by acquisition.	as expected
Analysis	HardCopyIII does not try to image a source device if the destination device is not large enough to hold the entire source.	

Case Identifier	<b>DA-19</b>
Case Summary	Acquire a physical device to an unaligned clone, filling excess sectors.
Assertions	DA-AM-01    DA-AM-02    DA-AM-03    DA-AM-04    DA-AM-06    DA-AM-08 DA-AO-11    DA-AO-13    DA-AO-14    DA-AO-18    DA-AO-22    DA-AO-23 DA-AO-24
Test Date	Wed Aug 19 12:23:44 2009
Drives	<b>src:</b> wd80.1 <b>dst:</b> s640.1
Setup	<b>src:</b> Model (WDC WD800AAJS-00) serial # (      WD-WCAS25804159) 156301488 sectors wiped with D1 SHA-256: 7010c817a57488e322c6111432b3cb6b310dde9a7a51bffb38039020c44617af  <b>dst:</b> Model (ST3640323AS      ) serial # (      9VK0BKC5) 1250263728 sectors wiped with 64
Highlights	<b>diskcmp DA-19 nistor2 cpb /dev/sdb d1 /dev/sdc 64:</b> Model (ST3640323AS      ) serial # (      9VK0BKC5) Sectors compared: 156301488 Sectors match:      156301488 Sectors differ:      0 Bytes differ:      0 Diffs range Source (156301488) has 1093962240 fewer sectors than destination (1250263728) Zero fill:      1093962240 Src Byte fill (D1):      0 Dst Byte fill (64):      0 Other fill:      0 Other no fill:      0 Zero fill range: 156301488-1250263727 Src fill range: Dst fill range: Other fill range: Other not filled range: 0 source read errors, 0 destination read errors  <b>sha256sum /dev/sdb (src, post clone):</b> 7010c817a57488e322c6111432b3cb6b310dde9a7a51bffb38039020c44617af  <b>dd if=/dev/sdc bs=512 count=156301488   sha256sum (dst):</b> 7010c817a57488e322c6111432b3cb6b310dde9a7a51bffb38039020c44617af

Case Identifier	<b>DA-19</b>	
Results by Assertion	AM-01 Source acquired using interface AI.	as expected
	AM-02 Source is type DS.	as expected
	AM-03 Execution environment is XE.	n/a
	AM-04 A clone is created.	as expected
	AM-06 All visible sectors acquired.	as expected
	AM-08 All sectors accurately acquired.	as expected
	AO-11 A clone is created during acquisition.	as expected
	AO-13 Clone created using interface AI.	as expected
	AO-14 An unaligned clone is created.	as expected
	AO-18 Excess sectors are filled.	as expected
	AO-22 Tool calculates hashes by block.	not supported
	AO-23 Logged information is correct.	not supported
	AO-24 Source is unchanged by acquisition.	as expected
Analysis	The expected results were achieved.	