SEPT. 2012

NIJ

Special **REPORT**

Test Results for Digital Data Acquisition Tool:
VOOM HardCopy 3P – Firmware Version 2-04

nij.gov

NIJ

SEPT. 2012

Test Results for Digital Data Acquisition Tool: VOOM HardCopy 3P – Firmware Version 2-04

NIJ

John Laub
Director, National Institute of Justice

September 2012

Test Results for Digital Data Acquisition Tool:

VOOM HardCopy 3P – Firmware Version 2-04

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

Content

Introduction

The Computer Forensics Tool Testing (CFTT) program is a joint project of the National Institute of Justice (NIJ), the department of Homeland Security (DHS), and the National Institute of Standards and Technology (NIST) Law Enforcement Standards Office (OLES) and Information Technology Laboratory (ITL). CFTT is supported by other organizations, including the Federal Bureau of Investigation, the U.S. Department of Defense Cyber Crime Center, U.S. the 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 the VOOM HardCopy 3P – Firmware Version 2-04, against the *Digital Data Acquisition Tool Assertions and Test Plan Version 1.0*, available at the CFTT Web site (http://www.cftt.nist.gov/DA-ATP-pc-01.pdf).

Test results from other tools and the CFTT tool methodology can be found on NIJ's CFTT 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, discuss any anomalies that were encountered 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 Digital Data Acquisition tools. The test cases are selected, in general, based on features offered by the tool. Section 3 describes in more depth any anomalies summarized in the first section. 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 run. The description of each test run lists all test assertions used in the test case, the expected result and the actual result. Please refer to the vendor's owner manual for guidance on using the tool.

Test Results for Digital Data Acquisition Tool

Tool Tested: HardCopy 3P
Firmware Version: 2-04

Supplier: VOOM Technologies, Inc.

Address: 110 ST. Croix Trail South
                    Lakeland, Minnesota 55043

Tel: (651) 998-1618
Fax: (651) 436-4030
E-mail: support@voomtech.com
Web: http://www.voomtech.com/

1   Results Summary

The VOOM HardCopy 3P – Firmware Version 2-04 is designed to handle ATA and SATA source drives. The device can copy data to either one or two destination drives.

The tool acquired visible and hidden sectors from the test media completely and accurately for all test cases. For one test case, DA-08-HPA, when acquiring a physical drive containing hidden sectors, the size of the hidden area was reported incorrectly. Refer to section 3.1 for more details.

2   Test Case Selection

Test cases used to test disk imaging tools are defined in *Digital Data Acquisition Tool Assertions and Test Plan Version 1.0*. To test a tool, test cases are selected from the *Test Plan* document based on the features offered by the tool. Not all test cases or test assertions are appropriate for all tools. There is a core set of base cases (e.g., DA-06 and DA-08) that are executed for every tool tested. Tool features guide the selection of additional test cases. If a given tool implements a feature then the test cases linked to that feature are run. Table 1 lists the features available in the VOOM HardCopy 3P Firmware Version 2-04 and the linked test cases selected for execution. Table 2 lists the features not available in the HardCopy 3P and the test cases not executed.

Table 1. Selected Test Cases

Supported Optional Feature	Cases selected for execution
Create a clone during acquisition	01
Create a truncated clone from a physical device	04
Base Cases	06 and 08
Read error during acquisition	09
Insufficient space for image file	12
Fill excess sectors on a clone acquisition	19

Table 2. Omitted Test Cases

Unsupported Optional Feature	Cases omitted (not executed)
Create an unaligned clone from a digital source	02
Create an image of a partition	07
Create cylinder aligned clones	03, 15, 21 and 23
Create an image file in more than one format	10
Convert an image file from one format to another	26
Destination Device Switching	13
Device I/O error generator available	05, 11 and 18
Fill excess sectors on a clone device	20, 21, 22 and 23
Create a clone from an image file	14 and 17
Create a clone from a subset of an image file	16
Detect a corrupted (or changed) image file	24 and 25

Some test cases have different forms to accommodate parameters within test assertions. These variations cover the acquisition interface to the source media and the way that sectors are hidden on a drive. The following source interfaces were tested: ATA and SATA.

In addition, the HardCopy 3P has two data collection ports labeled "*IMAGE 1*" and "*IMAGE 2*" for connecting destination drives (used to collect disk image and clone output). Except for two instances, all device acquisitions involved the use of single target device ports. Test cases DA-01-SATA28, DA-01-SATA28-EVIDENCEII, DA-06-ATA48, and DA-06-ATA48-EVIDENCEII document tests that involved the use of two target device ports; DA-01-SATA28 and DA-01-SATA28-EVIDENCEII document the acquisition of a SATA28 device to clones on two target SATA drives and DA-06-ATA48 and DA-06-ATA48-EVIDENCEII document the use of the tool to create an image of an ATA48 drive on two target media storage drives.

Log files for disk imaging were created and stored on the destination media that contain significant information regarding the acquisition. The LCD interface displayed the progress status when cloning, but no tangible log file gets created.

The tool offers an optional feature that allows a host computer to control operation of the tool over a serial interface. The following test cases used this feature:

- DA-01-SATA48
- DA-04
- DA-06-ATA28
- DA-09

3   Results by Test Assertion

A test assertion is a verifiable statement about a single condition after an action is performed by the tool under test. A test case usually checks a group of assertions after the action of a single execution of the tool under test. Test assertions are defined and linked to test cases in *Digital Data Acquisition Tool Assertions and Test Plan Version 1.0*.

Table 3 summarizes the test results for all the test cases by assertion. The column labeled **Assertions Tested** gives the text of each assertion. The column labeled **Tests** gives the number of test cases that use the given assertion. The column labeled **Anomaly** gives the section number in this report where any observed anomalies are discussed.

Table 3. Assertions Tested

Assertions Tested	Tests	Anomaly
AM-01 The tool uses access interface SRC-AI to access the digital source.	16	
AM-02 The tool acquires digital source DS.	16	
AM-03 The tool executes in execution environment XE.	16	
AM-04 If clone creation is specified, the tool creates a clone of the digital source.	7	
AM-05 If image file creation is specified, the tool creates an image file on file system type FS.	9	
AM-06 All visible sectors are acquired from the digital source.	15	
AM-07 All hidden sectors are acquired from the digital source.	2	
AM-08 All sectors acquired from the digital source are acquired accurately.	15	
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.	1	
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.	1	
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.	8	
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.	1	
AO-05 If the tool creates a multifile image of a requested size then all the individual files shall be no larger than the requested size.	8	
AO-11 If requested, a clone is created during an acquisition of a digital source.	7	
AO-13 A clone is created using access interface DST-AI to write to the clone device.	7	
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.	7	

Assertions Tested	Tests	Anomaly
AO-17 If requested, any excess sectors on a clone destination device are not modified.	2	
AO-18 If requested, a benign fill is written to excess sectors of a clone.	1	
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.	1	
AO-20 If a truncated clone is created, the tool notifies the user.	1	
AO-23 If the tool logs any log significant information, the information is accurately recorded in the log file.	16	3.1
AO-24 If the tool executes in a forensically safe execution environment, the digital source is unchanged by the acquisition process.	16	

Two test assertions only apply in special circumstances. The first assertion, AO-22, is checked only for tools that create block hashes. Because the VOOM HardCopy 3P – Firmware Version 2-04 does not compute block hashes, assertion AO-22 was not checked. The second assertion, AO-24, was checked because the tool executes in a run time environment that does not modify attached storage devices. Table 4 lists the assertions that were not tested, usually due to the tool not supporting some optional feature, e.g., creation of cylinder aligned clones.

Table 4. Assertions not Tested

Assertions not Tested
AO-02 If an image file format is specified, the tool creates an image file in the specified format.
AO-03 If there is an error while writing the image file, the tool notifies the user.
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.
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.
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.
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.
AO-10 If there is insufficient space to contain all files of a multifile image and if destination device switching is supported, the image is continued on another device.
AO-12 If requested, a clone is created from an image file.

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.

AO-16 If a subset of an image or acquisition is specified, all the subset is cloned.

AO-21 If there is a write error during clone creation, the tool notifies the user.

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.

3.1 Acquisition of hidden sectors

In test case DA-08-HPA, when acquiring a physical drive containing hidden sectors, the size of the hidden area was reported incorrectly.

The size of the hidden area (HPA Size) was reported in the tool log file as -107,938,304 bytes instead of the expected value of 4,187,028,992 (HPA Sectors*512 or 8,177,791*512). Note that the expected value is slightly larger than the largest 32 bit signed integer ($2^{31} = 2,147,483,648$) and slightly smaller than the largest 32 bit unsigned integer ($2^{32} = 4,294,967,296$).

A plausible explanation is that the tool is using 32 bit arithmetic for calculating the size in bytes of the hidden area and an overflow has occurred. If this is the case, then any hidden area size 2^{31} bytes or greater cannot be correctly represented in a 32 bit integer and either a 64 bit integer should be used or a bounds check inserted to detect if a calculation might fail. If the bit representation of 4,187,028,992 (0xF990FE00) is placed into a 32 bit signed integer, the signed integer represented is -107,938,304, as was reported by the tool.

4 Testing Environment

The tests were run in the NIST CFTT lab. This section describes the test computers available for testing, using the support software, and notes on other test hardware.

4.1 Test Computers

One computer was used to run the tool via serial cable: **Dale**.

Dale has the following configuration:

Latitude D800
Processor, 80536, Pentium M Dothan, 1.7GHZ
Hard Drive, 60GB, 9.5MM, 7.2K Hitachi, Ibm Moraga
Assembly, Floppy Drive, 1.44M, 3.5"
Samsung CDRW/DVD
BIOS Version Phoenix ROM PLUS Version 1.10 A11

4.2 Support Software

A package of programs to support test analysis, FS-TST Release 2.0, was used. The software can be obtained from: http://www.cftt.nist.gov/diskimaging/fs-tst20.zip.

4.3 Test Drive Creation

There are three ways that a hard drive may be used in a tool test case: as a source drive that is imaged by the tool, as a media drive that contains image files created by the tool under test or as a destination drive on which the tool under test creates a clone of the source drive. In addition to the operating system drive formatting tools, some tools (**diskwipe** and **diskhash**) from the FS-TST package are used to setup test drives.

4.3.1 Source Drive

The setup of most source drives follows the same general procedure, but there are several steps that may be varied depending on the needs of the test case.

1. The drive is filled with known data 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 drive may be formatted with partitions as required for the test case.
3. An operating system may optionally be installed.
4. A set of reference hashes is created by the FS-TST **diskhash** tool. These include both SHA1 and MD5 hashes. In addition to full drive hashes, hashes of each partition may also be computed.
5. If the drive is intended for hidden area tests (DA-08), an HPA, a DCO or both may be created. The **diskhash** tool is then used to calculate reference hashes of just the visible sectors of the drive.

The source drives for DA-09 are created such that there is a consistent set of faulty sectors on the drive. Each of these source drives is initialized with **diskwipe** and then their faulty sectors are activated. For each of these source drives, a duplicate drive, with no faulty sectors, serves as a reference drive for comparison.

4.3.2 Media Drive

To setup a media drive, the drive is formatted with one of the supported file systems. A media drive may be used in several test cases.

4.3.3 Destination Drive

To setup a destination drive, the drive is filled with known data by the **diskwipe** program from FS-TST. Partitions may be created if the test case involves restoring from the image of a logical acquire.

4.4 Test Drive Analysis

For test cases that create a clone of a physical device, e.g., DA-01, DA-04, etc., the destination drive is compared to the source drive with the **diskcmp** program from the FS-TST package; for test cases that create a clone of a logical device, i.e., a partition, e.g.,

DA-02, DA-20, etc., the destination partition is compared to the source partition with the **partcmp** program. For a destination created from an image file, e.g., DA-14, the destination is compared, using either **diskcmp** (for physical device clones) or **partcmp** (for partition clones), to the source that was acquired to create the image file. Both **diskcmp** and **partcmp** note differences between the source and destination. If the destination is larger than the source it is scanned and the excess destination sectors are categorized as either, undisturbed (still containing the fill pattern written by **diskwipe**), zero filled or changed to something else.

For test case DA-09, imaging a drive with known faulty sectors, the program **ana-bad** is used to compare the faulty sector reference drive to a cloned version of the faulty sector drive.

For test cases such as DA-06 and DA-07 any acquisition hash computed by the tool under test is compared to the reference hash of the source to check that the source is completely and accurately acquired.

4.5 Note on Test Drives

The testing uses several test drives from a variety of vendors. The drives are identified by an external label that consists of a two digit hexadecimal value and an optional tag, e.g., 25-SATA. The combination of hex value and tag serves as a unique identifier for each drive. The two digit hex value is used by the FS-TST **diskwipe** program as a sector fill value. The FS-TST compare tools, **diskcmp** and **partcmp,** count sectors that are filled with the source and destination fill values on a destination that is larger than the original source.

5 Test Results

The main item of interest for interpreting the test results is determining the conformance of the device 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.

5.1 Test Results Report Key

The following table presents an explanation of each section of the test details in section 5.2. The Tester Name, Test Host, Test Date, Drives, Source Setup and Log Highlights sections for each test case are populated by excerpts taken from the log files produced by the tool under test and the FS-TST tools that were executed in support of test case setup and analysis.

Heading	Description
First Line:	Test case ID, name, and version of tool tested.
Case Summary:	Test case summary from *Digital Data Acquisition Tool Assertions and Test Plan Version 1.0.*
Assertions:	The test assertions applicable to the test case, selected from *Digital Data Acquisition Tool Assertions and Test Plan Version 1.0.*

Heading	Description
Tester Name:	Name or initials of person executing test procedure.
Test Host:	Host computer executing the test.
Test Date:	Time and date that test was started.
Drives:	Source drive (the drive acquired), destination drive (if a clone is created) and media drive (to contain a created image).
Source Setup:	Layout of partitions on the source drive and the expected hash of the drive.
Log Highlights:	Information extracted from various log files to illustrate conformance or non-conformance to the test assertions.
Results	Expected and actual results for each assertion tested.
Analysis	Whether or not the expected results were achieved.

5.2 Test Details

The test results are presented in this section.

5.2.1 DA-01-ATA28

Test Case DA-01-ATA28 Voom HardCopy 3P s/n: 3P-11-D-0305, Firmware Version 2-04	
Case Summary:	DA-01 Acquire a physical device using access interface AI to an unaligned clone.
Assertions:	AM-01 The tool uses access interface SRC-AI to access the digital source. AM-02 The tool acquires digital source DS. AM-03 The tool executes in execution environment XE. AM-04 If clone creation is specified, the tool creates a clone of the digital source. AM-06 All visible sectors are acquired from the digital source. AM-08 All sectors acquired from the digital source are acquired accurately. AO-11 If requested, a clone is created during an acquisition of a digital source. AO-13 A clone is created using access interface DST-AI to write to the clone device. 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. AO-17 If requested, any excess sectors on a clone destination device are not modified. 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. AO-23 If the tool logs any log significant information, the information is accurately recorded in the log file. AO-24 If the tool executes in a forensically safe execution environment, the digital source is unchanged by the acquisition process.
Tester Name:	jrr
Test Host:	HardCopy_3P
Test Date:	Mon Aug 15 11:12:28 2011
Drives:	src(01-IDE) dst (57-IDE) other (none)
Source Setup:	src hash (SHA1): < A48BB5665D6DC57C22DB68E2F723DA9AA8DF82B9 > src hash (MD5): < F458F673894753FA6A0EC8B8EC63848E > 78165360 total sectors (40020664320 bytes) Model (0BB-00JHC0) serial # (WD-WMAMC74171) N Start LBA Length Start C/H/S End C/H/S boot Partition type 1 P 000000063 020980827 0000/001/01 1023/254/63 0C Fat32X 2 X 020980890 057175335 1023/000/01 1023/254/63 0F extended 3 S 000000063 000032067 1023/001/01 1023/254/63 01 Fat12 4 x 000032130 002104515 1023/000/01 1023/254/63 05 extended 5 S 000000063 002104452 1023/001/01 1023/254/63 06 Fat16 6 x 002136645 004192965 1023/000/01 1023/254/63 05 extended

```
 7 S 000000063 004192902 1023/001/01 1023/254/63 16 other
 8 x 006329610 008401995 1023/000/01 1023/254/63 05 extended
 9 S 000000063 008401932 1023/001/01 1023/254/63 0B Fat32
10 x 014731605 010490445 1023/000/01 1023/254/63 05 extended
11 S 000000063 010490382 1023/001/01 1023/254/63 83 Linux
12 x 025222050 004209030 1023/000/01 1023/254/63 05 extended
13 S 000000063 004208967 1023/001/01 1023/254/63 82 Linux swap
14 x 029431080 027744255 1023/000/01 1023/254/63 05 extended
15 S 000000063 027744192 1023/001/01 1023/254/63 07 NTFS
16 S 000000000 000000000 0000/000/00 0000/000/00 00 empty entry
17 P 000000000 000000000 0000/000/00 0000/000/00 00 empty entry
18 P 000000000 000000000 0000/000/00 0000/000/00 00 empty entry
 1 020980827 sectors 10742183424 bytes
 3 000032067 sectors 16418304 bytes
 5 002104452 sectors 1077479424 bytes
 7 004192902 sectors 2146765824 bytes
 9 008401932 sectors 4301789184 bytes
11 010490382 sectors 5371075584 bytes
13 004208967 sectors 2154991104 bytes
15 027744192 sectors 14205026304 bytes
```

Log Highlights:	
	`====== Destination drive setup ======`
	`80043264 sectors wiped with 57`
	`====== Comparison of original to clone drive ======`
	`Sectors compared: 78165360`
	`Sectors match: 78165360`
	`Sectors differ: 0`
	`Bytes differ: 0`
	`Diffs range`
	`Source (78165360) has 1877904 fewer sectors than destination (80043264)`
	`Zero fill: 0`
	`Src Byte fill (01): 0`
	`Dst Byte fill (57): 1877904`
	`Other fill: 0`
	`Other no fill: 0`
	`Zero fill range:`
	`Src fill range:`
	`Dst fill range: 78165360-80043263`
	`Other fill range:`
	`Other not filled range:`
	`0 source read errors, 0 destination read errors`
	`====== Tool Settings: ======`
	`hash: MD5`
	`xe: tool interface`
	`re-verify: yes`
	`log file: no`
	`auto-wipe: disable`
	`dst port: 57-IDE port I`
	`====== Source drive rehash ======`
	`Rehash (SHA1) of source: A48BB5665D6DC57C22DB68E2F723DA9AA8DF82B9`

Results:

Assertion & Expected Result	Actual Result
AM-01 Source acquired using interface AI.	as expected
AM-02 Source is type DS.	as expected
AM-03 Execution environment is XE.	as expected
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

Test Case DA-01-ATA28 Voom HardCopy 3P s/n: 3P-11-D-0305, Firmware Version 2-04		
	AO-22 Tool calculates hashes by block.	option not available
	AO-23 Logged information is correct.	as expected
	AO-24 Source is unchanged by acquisition.	as expected
Analysis:	Expected results achieved	

5.2.2 DA-01-ATA48

Test Case DA-01-ATA48 Voom HardCopy 3P s/n: 3P-11-D-0305, Firmware Version 2-04	
Case Summary:	DA-01 Acquire a physical device using access interface AI to an unaligned clone.
Assertions:	AM-01 The tool uses access interface SRC-AI to access the digital source. AM-02 The tool acquires digital source DS. AM-03 The tool executes in execution environment XE. AM-04 If clone creation is specified, the tool creates a clone of the digital source. AM-06 All visible sectors are acquired from the digital source. AM-08 All sectors acquired from the digital source are acquired accurately. AO-11 If requested, a clone is created during an acquisition of a digital source. AO-13 A clone is created using access interface DST-AI to write to the clone device. 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. AO-17 If requested, any excess sectors on a clone destination device are not modified. 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. AO-23 If the tool logs any log significant information, the information is accurately recorded in the log file. AO-24 If the tool executes in a forensically safe execution environment, the digital source is unchanged by the acquisition process.
Tester Name:	jrr
Test Host:	HardCopy_3P
Test Date:	Mon Aug 15 16:56:18 2011
Drives:	src(4C) dst (32-IDE) other (none)
Source Setup:	src hash (SHA1): < 8FF620D2BEDCCAFE8412EDAAD56C8554F872EFBF > src hash (MD5): < D10F763B56D4CEBA2D1311C61F9FB382 > 390721968 total sectors (200049647616 bytes) 24320/254/63 (max cyl/hd values) 24321/255/63 (number of cyl/hd) IDE disk: Model (WDC WD2000JB-00KFA0) serial # (WD-WMAMR1031111) N Start LBA Length Start C/H/S End C/H/S boot Partition type 1 P 000000063 390700737 0000/001/01 1023/254/63 Boot 07 NTFS 2 P 000000000 000000000 0000/000/00 0000/000/00 00 empty entry 3 P 000000000 000000000 0000/000/00 0000/000/00 00 empty entry 4 P 000000000 000000000 0000/000/00 0000/000/00 00 empty entry 1 390700737 sectors 200038777344 bytes
Log Highlights:	====== Destination drive setup ====== 488397168 sectors wiped with 32 ====== Comparison of original to clone drive ====== Sectors compared: 390721968 Sectors match: 390721968 Sectors differ: 0 Bytes differ: 0 Diffs range Source (390721968) has 97675200 fewer sectors than destination (488397168) Zero fill: 0 Src Byte fill (4C): 0 Dst Byte fill (32): 97675200 Other fill: 0 Other no fill: 0

	Test Case DA-01-ATA48 Voom HardCopy 3P s/n: 3P-11-D-0305, Firmware Version 2-04
	Zero fill range: Src fill range: Dst fill range: 390721968-488397167 Other fill range: Other not filled range: 0 source read errors, 0 destination read errors ====== Tool Settings: ====== hash:MD5 xe: tool interface re-verify: yes log file: no auto-wipe: disable dst port: 32-IDE port I ====== Source drive rehash ====== Rehash (SHA1) of source: 8FF620D2BEDCCAFE8412EDAAD56C8554F872EFBF
Results:	

Assertion & Expected Result	Actual Result
AM-01 Source acquired using interface AI.	as expected
AM-02 Source is type DS.	as expected
AM-03 Execution environment is XE.	as expected
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.	option not available
AO-23 Logged information is correct.	as expected
AO-24 Source is unchanged by acquisition.	as expected

Analysis:	Expected results achieved

5.2.3 DA-01-SATA28

	Test Case DA-01-SATA28 Voom HardCopy 3P s/n: 3P-11-D-0305, Firmware Version 2-04
Case Summary:	DA-01 Acquire a physical device using access interface AI to an unaligned clone.
Assertions:	AM-01 The tool uses access interface SRC-AI to access the digital source. AM-02 The tool acquires digital source DS. AM-03 The tool executes in execution environment XE. AM-04 If clone creation is specified, the tool creates a clone of the digital source. AM-06 All visible sectors are acquired from the digital source. AM-08 All sectors acquired from the digital source are acquired accurately. AO-11 If requested, a clone is created during an acquisition of a digital source. AO-13 A clone is created using access interface DST-AI to write to the clone device. 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. AO-17 If requested, any excess sectors on a clone destination device are not modified. 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. AO-23 If the tool logs any log significant information, the information is accurately recorded in the log file. AO-24 If the tool executes in a forensically safe execution environment, the digital source is unchanged by the acquisition process.

Test Case DA-01-SATA28 Voom HardCopy 3P s/n: 3P-11-D-0305, Firmware Version 2-04	
Tester Name:	jrr
Test Host:	HardCopy_3P
Test Date:	Wed Aug 17 09:42:50 2011
Drives:	src(07-SATA) dst (4D-SATA) other (none)
Source Setup:	src hash (SHA256): < CE65C4A3C3164D3EBAD58D33BB2415D29E260E1F88DC5A131B1C4C9C2945B8A9 > src hash (SHA1): < 655E9BDDB36A3F9C5C4CC8BF32B8C5B41AF9F52E > src hash (MD5): < 2EAF712DAD80F66E30DEA00365B4579B > 156301488 total sectors (80026361856 bytes) Model (WDC WD800JD-32HK) serial # (WD-WMAJ91510044) N Start LBA Length Start C/H/S End C/H/S boot Partition type 1 P 000000063 156280257 0000/001/01 1023/254/63 Boot 07 NTFS 2 P 000000000 000000000 0000/000/00 0000/000/00 00 empty entry 3 P 000000000 000000000 0000/000/00 0000/000/00 00 empty entry 4 P 000000000 000000000 0000/000/00 0000/000/00 00 empty entry 1 156280257 sectors 80015491584 bytes
Log Highlights:	====== Destination drive setup ====== 156301488 sectors wiped with 4D ====== Comparison of original to clone drive ====== Sectors compared: 156301488 Sectors match: 156301488 Sectors differ: 0 Bytes differ: 0 Diffs range 0 source read errors, 0 destination read errors ====== Tool Settings: ====== hash: MD5 xe: tool interface re-verify: yes log file: no auto-wipe: disable dst port: 4D-SATA port I ====== Source drive rehash ====== Rehash (SHA1) of source: 655E9BDDB36A3F9C5C4CC8BF32B8C5B41AF9F52E
Results:	

Assertion & Expected Result	Actual Result
AM-01 Source acquired using interface AI.	as expected
AM-02 Source is type DS.	as expected
AM-03 Execution environment is XE.	as expected
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.	option not available
AO-23 Logged information is correct.	as expected
AO-24 Source is unchanged by acquisition.	as expected

Analysis:	Expected results achieved

5.2.4 DA-01-SATA28-EVIDENCEII

Test Case DA-01-SATA28-EVIDENCEII Voom HardCopy 3P s/n: 3P-11-D-0305, Firmware Version 2-04	
Case Summary:	DA-01 Acquire a physical device using access interface AI to an unaligned clone.

Test Case DA-01-SATA28-EVIDENCEII Voom HardCopy 3P s/n: 3P-11-D-0305, Firmware Version 2-04	
Assertions:	AM-01 The tool uses access interface SRC-AI to access the digital source. AM-02 The tool acquires digital source DS. AM-03 The tool executes in execution environment XE. AM-04 If clone creation is specified, the tool creates a clone of the digital source. AM-06 All visible sectors are acquired from the digital source. AM-08 All sectors acquired from the digital source are acquired accurately. AO-11 If requested, a clone is created during an acquisition of a digital source. AO-13 A clone is created using access interface DST-AI to write to the clone device. 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. AO-17 If requested, any excess sectors on a clone destination device are not modified. 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. AO-23 If the tool logs any log significant information, the information is accurately recorded in the log file. AO-24 If the tool executes in a forensically safe execution environment, the digital source is unchanged by the acquisition process.
Tester Name:	jrr
Test Host:	HardCopy_3P
Test Date:	Wed Aug 17 11:21:18 2011
Drives:	src(07-sata) dst (49-SATA) other (none)
Source Setup:	src hash (SHA256): < CE65C4A3C3164D3EBAD58D33BB2415D29E260E1F88DC5A131B1C4C9C2945B8A9 > src hash (SHA1): < 655E9BDDB36A3F9C5C4CC8BF32B8C5B41AF9F52E > src hash (MD5): < 2EAF712DAD80F66E30DEA00365B4579B > 156301488 total sectors (80026361856 bytes) Model (WDC WD800JD-32HK) serial # (WD-WMAJ91510044) N Start LBA Length Start C/H/S End C/H/S boot Partition type 1 P 000000063 156280257 0000/001/01 1023/254/63 Boot 07 NTFS 2 P 000000000 000000000 0000/000/00 0000/000/00 00 empty entry 3 P 000000000 000000000 0000/000/00 0000/000/00 00 empty entry 4 P 000000000 000000000 0000/000/00 0000/000/00 00 empty entry 1 156280257 sectors 80015491584 bytes
Log Highlights:	====== Destination drive setup ====== 156301488 sectors wiped with 49 ====== Comparison of original to clone drive ====== Sectors compared: 156301488 Sectors match: 156301488 Sectors differ: 0 Bytes differ: 0 Diffs range 0 source read errors, 0 destination read errors ====== Tool Settings: ====== hash: MD5 xe: tool interface re-verify: yes log file: no auto-wipe: disable dst port: 49-SATA in port II ====== Source drive rehash ====== Rehash (SHA1) of source: 655E9BDDB36A3F9C5C4CC8BF32B8C5B41AF9F52E
Results:	

Assertion & Expected Result	Actual Result
AM-01 Source acquired using interface AI.	as expected

```
Test Case DA-01-SATA28-EVIDENCEII Voom HardCopy 3P s/n: 3P-11-D-0305, Firmware Version 2-
04
```

	AM-02 Source is type DS.	as expected
	AM-03 Execution environment is XE.	as expected
	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.	option not available
	AO-23 Logged information is correct.	as expected
	AO-24 Source is unchanged by acquisition.	as expected
Analysis:	Expected results achieved	

5.2.5 DA-01-SATA48

```
Test Case DA-01-SATA48 Voom HardCopy 3P s/n: 3P-11-D-0305, Firmware Version 2-04
```

Case Summary:	DA-01 Acquire a physical device using access interface AI to an unaligned clone.
Assertions:	AM-01 The tool uses access interface SRC-AI to access the digital source. AM-02 The tool acquires digital source DS. AM-03 The tool executes in execution environment XE. AM-04 If clone creation is specified, the tool creates a clone of the digital source. AM-06 All visible sectors are acquired from the digital source. AM-08 All sectors acquired from the digital source are acquired accurately. AO-11 If requested, a clone is created during an acquisition of a digital source. AO-13 A clone is created using access interface DST-AI to write to the clone device. 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. AO-17 If requested, any excess sectors on a clone destination device are not modified. 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. AO-23 If the tool logs any log significant information, the information is accurately recorded in the log file. AO-24 If the tool executes in a forensically safe execution environment, the digital source is unchanged by the acquisition process.
Tester Name:	jrr
Test Host:	HardCopy_3P
Test Date:	Thu Aug 18 15:07:45 2011
Drives:	src(0D-SATA) dst (32-IDE) other (none)
Source Setup:	src hash (SHA1): < BAAD80E8781E55F2E3EF528CA73BD41D228C1377 > src hash (MD5): < 1FA7C3CBE60EB9E89863DED2411E40C9 > 488397168 total sectors (250059350016 bytes) 30400/254/63 (max cyl/hd values) 30401/255/63 (number of cyl/hd) Model (WDC WD2500JD-22F) serial # (WD-WMAEH2678216) N Start LBA Length Start C/H/S End C/H/S boot Partition type 1 P 000000063 488375937 0000/001/01 1023/254/63 Boot 07 NTFS 2 P 000000000 000000000 0000/000/00 0000/000/00 00 empty entry 3 P 000000000 000000000 0000/000/00 0000/000/00 00 empty entry 4 P 000000000 000000000 0000/000/00 0000/000/00 00 empty entry 1 488375937 sectors 250048479744 bytes
Log Highlights:	====== Destination drive setup ====== 488397168 sectors wiped with 32 ====== Comparison of original to clone drive ====== Sectors compared: 488397168

```
Sectors match: 488397168
Sectors differ: 0
Bytes differ: 0
Diffs range
0 source read errors, 0 destination read errors


====== Tool Settings: ======
hash: MD5
xe: tool interface
re-verify: yes
log file: no
auto-wipe: disable
dst port: 32-IDE port II

OS: Microsoft Windows XP [Version 5.1.2600]


====== Source drive rehash ======
Rehash (SHA1) of source: BAAD80E8781E55F2E3EF528CA73BD41D228C1377
```

Results:		
	Assertion & Expected Result	**Actual Result**
	AM-01 Source acquired using interface AI.	as expected
	AM-02 Source is type DS.	as expected
	AM-03 Execution environment is XE.	as expected
	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.	option not available
	AO-23 Logged information is correct.	as expected
	AO-24 Source is unchanged by acquisition.	as expected

Analysis:	Expected results achieved

5.2.6 DA-04

Test Case DA-04 Voom HardCopy 3P s/n: 3P-11-D-0305, Firmware Version 2-04	
Case Summary:	DA-04 Acquire a physical device to a truncated clone.
Assertions:	AM-01 The tool uses access interface SRC-AI to access the digital source. AM-02 The tool acquires digital source DS. AM-03 The tool executes in execution environment XE. AM-04 If clone creation is specified, the tool creates a clone of the digital source. AM-06 All visible sectors are acquired from the digital source. AM-08 All sectors acquired from the digital source are acquired accurately. AO-11 If requested, a clone is created during an acquisition of a digital source. AO-13 A clone is created using access interface DST-AI to write to the clone device. 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. 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. AO-20 If a truncated clone is created, the tool notifies the user. 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. AO-23 If the tool logs any log significant information, the information is accurately recorded in the log file. AO-24 If the tool executes in a forensically safe execution environment, the digital source is unchanged by the acquisition process.

```
Test Case DA-04 Voom HardCopy 3P s/n: 3P-11-D-0305, Firmware Version 2-04

Tester Name:  | jrr
Test Host:    | HardCopy_3P
Test Date:    | Mon Aug 22 12:31:12 2011
Drives:       | src(01-IDE) dst (90) other (none)
Source        | src hash (SHA1): < A48BB5665D6DC57C22DB68E2F723DA9AA8DF82B9 >
Setup:        | src hash (MD5): < F458F673894753FA6A0EC8B8EC63848E >
              | 78165360 total sectors (40020664320 bytes)
              | Model (0BB-00JHC0 ) serial # ( WD-WMAMC74171)
              |  N Start LBA Length Start C/H/S End C/H/S boot Partition type
              |  1 P 000000063 020980827 0000/001/01 1023/254/63 0C Fat32X
              |  2 X 020980890 057175335 1023/000/01 1023/254/63 0F extended
              |  3 S 000000063 000032067 1023/001/01 1023/254/63 01 Fat12
              |  4 x 000032130 002104515 1023/000/01 1023/254/63 05 extended
              |  5 S 000000063 002104452 1023/001/01 1023/254/63 06 Fat16
              |  6 x 002136645 004192965 1023/000/01 1023/254/63 05 extended
              |  7 S 000000063 004192902 1023/001/01 1023/254/63 16 other
              |  8 x 006329610 008401995 1023/000/01 1023/254/63 05 extended
              |  9 S 000000063 008401932 1023/001/01 1023/254/63 0B Fat32
              | 10 x 014731605 010490445 1023/000/01 1023/254/63 05 extended
              | 11 S 000000063 010490382 1023/001/01 1023/254/63 83 Linux
              | 12 x 025222050 004209030 1023/000/01 1023/254/63 05 extended
              | 13 S 000000063 004208967 1023/001/01 1023/254/63 82 Linux swap
              | 14 x 029431080 027744255 1023/000/01 1023/254/63 05 extended
              | 15 S 000000063 027744192 1023/001/01 1023/254/63 07 NTFS
              | 16 S 000000000 000000000 0000/000/00 0000/000/00 00 empty entry
              | 17 P 000000000 000000000 0000/000/00 0000/000/00 00 empty entry
              | 18 P 000000000 000000000 0000/000/00 0000/000/00 00 empty entry
              |  1 020980827 sectors 10742183424 bytes
              |  3 000032067 sectors 16418304 bytes
              |  5 002104452 sectors 1077479424 bytes
              |  7 004192902 sectors 2146765824 bytes
              |  9 008401932 sectors 4301789184 bytes
              | 11 010490382 sectors 5371075584 bytes
              | 13 004208967 sectors 2154991104 bytes
              | 15 027744192 sectors 14205026304 bytes

Log           | ====== Destination drive setup ======
Highlights:   | 58633344 sectors wiped with 90
              | ====== Error Message: ======
              | Spinning Drive Source
              | Spinning Drive Dest 1
              | not enough space
              | for clone
              |
              |
              | ====== Tool Settings: ======
              | hash: n/a
              | xe: windows interface
              | re-verify: n/a
              | log file: no
              | auto-wipe: n/a
              | dst port: 90 port I
              |
              |
              | OS: Microsoft Windows XP [Version 5.1.2600]

Results:
```

Assertion & Expected Result	Actual Result
AM-01 Source acquired using interface AI.	as expected
AM-02 Source is type DS.	as expected
AM-03 Execution environment is XE.	as expected
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

Test Case DA-04 Voom HardCopy 3P s/n: 3P-11-D-0305, Firmware Version 2-04		
	AO-19 Truncated clone is created.	as expected
	AO-20 User notified that clone is truncated.	as expected
	AO-22 Tool calculates hashes by block.	option not available
	AO-23 Logged information is correct.	as expected
	AO-24 Source is unchanged by acquisition.	not checked
Analysis:	Expected results achieved	

5.2.7 DA-06-ATA28

Test Case DA-06-ATA28 Voom HardCopy 3P s/n: 3P-11-D-0305, Firmware Version 2-04	
Case Summary:	DA-06 Acquire a physical device using access interface AI to an image file.
Assertions:	AM-01 The tool uses access interface SRC-AI to access the digital source. AM-02 The tool acquires digital source DS. AM-03 The tool executes in execution environment XE. AM-05 If image file creation is specified, the tool creates an image file on file system type FS. AM-06 All visible sectors are acquired from the digital source. AM-08 All sectors acquired from the digital source are acquired accurately. 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. AO-05 If the tool creates a multifile image of a requested size then all the individual files shall be no larger than the requested size. 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. AO-23 If the tool logs any log significant information, the information is accurately recorded in the log file. AO-24 If the tool executes in a forensically safe execution environment, the digital source is unchanged by the acquisition process.
Tester Name:	jrr
Test Host:	HardCopy_3P
Test Date:	Mon Aug 22 14:15:25 2011
Drives:	src(01-IDE) dst (none) other (29-LAP)
Source Setup:	src hash (SHA1): < A48BB5665D6DC57C22DB68E2F723DA9AA8DF82B9 > src hash (MD5): < F458F673894753FA6A0EC8B8EC63848E > 78165360 total sectors (40020664320 bytes) Model (0BB-00JHC0) serial # (WD-WMAMC74171) N Start LBA Length Start C/H/S End C/H/S boot Partition type 1 P 000000063 020980827 0000/001/01 1023/254/63 0C Fat32X 2 X 020980890 057175335 1023/000/01 1023/254/63 0F extended 3 S 000000063 000032067 1023/001/01 1023/254/63 01 Fat12 4 x 000032130 002104515 1023/000/01 1023/254/63 05 extended 5 S 000000063 002104452 1023/001/01 1023/254/63 06 Fat16 6 x 002136645 004192965 1023/000/01 1023/254/63 05 extended 7 S 000000063 004192902 1023/001/01 1023/254/63 16 other 8 x 006329610 008401995 1023/000/01 1023/254/63 05 extended 9 S 000000063 008401932 1023/001/01 1023/254/63 0B Fat32 10 x 014731605 010490445 1023/000/01 1023/254/63 05 extended 11 S 000000063 010490382 1023/001/01 1023/254/63 83 Linux 12 x 025222050 004209030 1023/000/01 1023/254/63 05 extended 13 S 000000063 004208967 1023/001/01 1023/254/63 82 Linux swap 14 x 029431080 027744255 1023/000/01 1023/254/63 05 extended 15 S 000000063 027744192 1023/001/01 1023/254/63 07 NTFS 16 S 000000000 000000000 0000/000/00 0000/000/00 00 empty entry 17 P 000000000 000000000 0000/000/00 0000/000/00 00 empty entry 18 P 000000000 000000000 0000/000/00 0000/000/00 00 empty entry 1 020980827 sectors 10742183424 bytes 3 000032067 sectors 16418304 bytes 5 002104452 sectors 1077479424 bytes 7 004192902 sectors 2146765824 bytes 9 008401932 sectors 4301789184 bytes 11 010490382 sectors 5371075584 bytes 13 004208967 sectors 2154991104 bytes 15 027744192 sectors 14205026304 bytes

Test Case DA-06-ATA28 Voom HardCopy 3P s/n: 3P-11-D-0305, Firmware Version 2-04	
Log Highlights:	====== Tool Settings: ====== hash: MD5 xe: windows interface dst: NTFS re-verify: yes log file: yes auto-wipe: enable dst port: 29-LAP port I OS: Microsoft Windows XP [Version 5.1.2600] ====== Image file segments ====== 1 40020664320 Aug 22 10:52 data001.dd 2 1497 Aug 22 11:03 data001.txt ======== Excerpt from Voom log ======== ModelNumber=WDC WD400BB-00JHC0 SerialNumber= WD-WMAMC7417100 TotalSectors=78165360 DCOStartLBA=0 DCOSectors=0 DCOSize=0 HPAStartLBA=0 HPASectors=0 HPASize=0 Image1 MD5=f458f673894753fa6a0ec8b8ec63848e Image2 MD5=0 ======== End of Excerpt from Voom log ======== ====== Source drive rehash ====== Rehash (SHA1) of source: A48BB5665D6DC57C22DB68E2F723DA9AA8DF82B9
Results:	

Assertion & Expected Result	Actual Result
AM-01 Source acquired using interface AI.	as expected
AM-02 Source is type DS.	as expected
AM-03 Execution environment is XE.	as expected
AM-05 An image 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.	option not available
AO-23 Logged information is correct.	as expected
AO-24 Source is unchanged by acquisition.	as expected

Analysis:	Expected results achieved

5.2.8 DA-06-ATA48

Test Case DA-06-ATA48 Voom HardCopy 3P s/n: 3P-11-D-0305, Firmware Version 2-04	
Case Summary:	DA-06 Acquire a physical device using access interface AI to an image file.
Assertions:	AM-01 The tool uses access interface SRC-AI to access the digital source. AM-02 The tool acquires digital source DS. AM-03 The tool executes in execution environment XE. AM-05 If image file creation is specified, the tool creates an image file on file system type FS. AM-06 All visible sectors are acquired from the digital source. AM-08 All sectors acquired from the digital source are acquired accurately. 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. AO-05 If the tool creates a multifile image of a requested size then all the individual files shall be no larger than the requested size.

Test Case DA-06-ATA48 Voom HardCopy 3P s/n: 3P-11-D-0305, Firmware Version 2-04	
	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. AO-23 If the tool logs any log significant information, the information is accurately recorded in the log file. AO-24 If the tool executes in a forensically safe execution environment, the digital source is unchanged by the acquisition process.
Tester Name:	jrr
Test Host:	HardCopy_3P
Test Date:	Mon Aug 22 16:16:10 2011
Drives:	src(4C) dst (none) other (32-IDE)
Source Setup:	src hash (SHA1): < 8FF620D2BEDCCAFE8412EDAAD56C8554F872EFBF > src hash (MD5): < D10F763B56D4CEBA2D1311C61F9FB382 > 390721968 total sectors (200049647616 bytes) 24320/254/63 (max cyl/hd values) 24321/255/63 (number of cyl/hd) IDE disk: Model (WDC WD2000JB-00KFA0) serial # (WD-WMAMR1031111) N Start LBA Length Start C/H/S End C/H/S boot Partition type 1 P 000000063 390700737 0000/001/01 1023/254/63 Boot 07 NTFS 2 P 000000000 000000000 0000/000/00 0000/000/00 00 empty entry 3 P 000000000 000000000 0000/000/00 0000/000/00 00 empty entry 4 P 000000000 000000000 0000/000/00 0000/000/00 00 empty entry 1 390700737 sectors 200038777344 bytes
Log Highlights:	====== Tool Settings: ====== hash: MD5 xe: tool interface dst: FAT32 re-verify: yes log file: yes auto-wipe: enable dst port: 32-IDE port I ====== Image file segments ====== 1 2676 data001.txt 2 2295595008 file.000 3 2295595008 file.001 . . . 86 2295595008 file.085 87 2295595008 file.086 88 332881920 file.087 ======== Excerpt from Voom log ======== ModelNumber=WDC WD2000JB-00KFA0 SerialNumber= WD-WMAMR1031111 TotalSectors=390721968 DCOStartLBA=0 DCOSectors=0 DCOSize=0 HPAStartLBA=0 HPASectors=0 HPASize=0 Image1 MD5=d10f763b56d4ceba2d1311c61f9fb382 Image2 MD5=d10f763b56d4ceba2d1311c61f9fb382 ======== End of Excerpt from Voom log ======== ====== Source drive rehash ====== Rehash (SHA1) of source: 8FF620D2BEDCCAFE8412EDAAD56C8554F872EFBF

Results:

Assertion & Expected Result	Actual Result
AM-01 Source acquired using interface AI.	as expected
AM-02 Source is type DS.	as expected
AM-03 Execution environment is XE.	as expected
AM-05 An image 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

Test Case DA-06-ATA48 Voom HardCopy 3P s/n: 3P-11-D-0305, Firmware Version 2-04	
	AO-05 Multifile image created.	as expected
	AO-22 Tool calculates hashes by block.	option not available
	AO-23 Logged information is correct.	as expected
	AO-24 Source is unchanged by acquisition.	as expected
Analysis:	Expected results achieved

5.2.9 DA-06-ATA48-EVIDENCEII

Test Case DA-06-ATA48-EVIDENCEII Voom HardCopy 3P s/n: 3P-11-D-0305, Firmware Version 2-04	
Case Summary:	DA-06 Acquire a physical device using access interface AI to an image file.
Assertions:	AM-01 The tool uses access interface SRC-AI to access the digital source. AM-02 The tool acquires digital source DS. AM-03 The tool executes in execution environment XE. AM-05 If image file creation is specified, the tool creates an image file on file system type FS. AM-06 All visible sectors are acquired from the digital source. AM-08 All sectors acquired from the digital source are acquired accurately. 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. AO-05 If the tool creates a multifile image of a requested size then all the individual files shall be no larger than the requested size. 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. AO-23 If the tool logs any log significant information, the information is accurately recorded in the log file. AO-24 If the tool executes in a forensically safe execution environment, the digital source is unchanged by the acquisition process.
Tester Name:	jrr
Test Host:	HardCopy_3P
Test Date:	Mon Aug 22 16:38:19 2011
Drives:	src(4C) dst (none) other (47-SATA)
Source Setup:	src hash (SHA1): < 8FF620D2BEDCCAFE8412EDAAD56C8554F872EFBF > src hash (MD5): < D10F763B56D4CEBA2D1311C61F9FB382 > 390721968 total sectors (200049647616 bytes) 24320/254/63 (max cyl/hd values) 24321/255/63 (number of cyl/hd) IDE disk: Model (WDC WD2000JB-00KFA0) serial # (WD-WMAMR1031111) N Start LBA Length Start C/H/S End C/H/S boot Partition type 1 P 000000063 390700737 0000/001/01 1023/254/63 Boot 07 NTFS 2 P 000000000 000000000 0000/000/00 0000/000/00 00 empty entry 3 P 000000000 000000000 0000/000/00 0000/000/00 00 empty entry 4 P 000000000 000000000 0000/000/00 0000/000/00 00 empty entry 1 390700737 sectors 200038777344 bytes
Log Highlights:	====== Tool Settings: ====== hash: MD5 xe: tool interface dst: FAT32 re-verify: yes log file: yes auto-wipe: enable dst port: 47-SATA port II ====== Image file segments ====== 1 2676 data001.txt 2 2295595008 file.000 3 2295595008 file.001 . . . 86 2295595008 file.085 87 2295595008 file.086

| | ```
   88      332881920 file.087
======== Excerpt from Voom log ========
ModelNumber=WDC WD2000JB-00KFA0
SerialNumber= WD-WMAMR1031111
TotalSectors=390721968
DCOStartLBA=0
DCOSectors=0
DCOSize=0
HPAStartLBA=0
HPASectors=0
HPASize=0
Image1 MD5=d10f763b56d4ceba2d1311c61f9fb382
Image2 MD5=d10f763b56d4ceba2d1311c61f9fb382
======== End of Excerpt from Voom log ========


====== Source drive rehash ======
Rehash (SHA1) of source: 8FF620D2BEDCCAFE8412EDAAD56C8554F872EFBF
``` |
| Results: | |

Assertion & Expected Result	Actual Result
AM-01 Source acquired using interface AI.	as expected
AM-02 Source is type DS.	as expected
AM-03 Execution environment is XE.	as expected
AM-05 An image 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.	option not available
AO-23 Logged information is correct.	as expected
AO-24 Source is unchanged by acquisition.	as expected

Analysis:	Expected results achieved

5.2.10 DA-06-SATA28

Test Case DA-06-SATA28 Voom HardCopy 3P s/n: 3P-11-D-0305, Firmware Version 2-04	
Case Summary:	DA-06 Acquire a physical device using access interface AI to an image file.
Assertions:	AM-01 The tool uses access interface SRC-AI to access the digital source. AM-02 The tool acquires digital source DS. AM-03 The tool executes in execution environment XE. AM-05 If image file creation is specified, the tool creates an image file on file system type FS. AM-06 All visible sectors are acquired from the digital source. AM-08 All sectors acquired from the digital source are acquired accurately. 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. AO-05 If the tool creates a multifile image of a requested size then all the individual files shall be no larger than the requested size. 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. AO-23 If the tool logs any log significant information, the information is accurately recorded in the log file. AO-24 If the tool executes in a forensically safe execution environment, the digital source is unchanged by the acquisition process.
Tester Name:	jrr
Test Host:	HardCopy_3P
Test Date:	Tue Aug 23 13:11:21 2011
Drives:	src(4B-SATA) dst (none) other (1E-LAP)
Source Setup:	src hash (SHA256): < F61ADE21982F803F64D2CEA2C9CA90C23056CA852CCC515D17827038154E8C1E > src hash (SHA1): < 70CC62B43F6A41CA4D6760AA0B9B4C415D3F48E2 >

```
src hash (MD5): < 746B4C06CDD5FBD67C0820DB4325B40C >
156301488 total sectors (80026361856 bytes)
Model (ST380815AS ) serial # ( 6QZ5C9V5)
 N Start LBA Length Start C/H/S End C/H/S boot Partition type
 1 P 000000063 020971520 0000/001/01 1023/254/63 AF other
 2 P 020971629 010485536 1023/254/63 1023/254/63 AF other
 3 P 031457223 006291456 1023/254/63 1023/254/63 A8 other
 4 X 037748679 008388694 1023/254/63 1023/254/63 05 extended
 5 S 000000039 004194304 1023/254/63 1023/254/63 AF other
 6 x 004194343 004194351 1023/254/63 1023/254/63 05 extended
 7 S 000000047 004194304 1023/254/63 1023/254/63 AF other
 8 S 000000000 000000000 0000/000/00 0000/000/00 00 empty entry
1 020971520 sectors 10737418240 bytes
2 010485536 sectors 5368594432 bytes
3 006291456 sectors 3221225472 bytes
5 004194304 sectors 2147483648 bytes
7 004194304 sectors 2147483648 bytes
```

Log Highlights:	``` ====== Tool Settings: ====== hash: SHA-256 xe: tool interface dst: NTFS re-verify: yes log file: yes auto-wipe: enable dst port: 1E-LAP port I ====== Image file segments ====== 1 80026361856 Aug 23 09:45 data001.dd 2 2089 Aug 23 10:11 data001.txt ======== Excerpt from Voom log ======== ModelNumber=ST380815AS SerialNumber= 6QZ5C9V5 TotalSectors=156301488 DCOStartLBA=0 DCOSectors=0 DCOSize=0 HPAStartLBA=0 HPASectors=0 HPASize=0 Image1 SHA=f61ade21982f803f64d2cea2c9ca90c23056ca852ccc515d17827038154e8c1e Image2 SHA=0 ======== End of Excerpt from Voom log ======== ====== Source drive rehash ====== Rehash (SHA1) of source: 70CC62B43F6A41CA4D6760AA0B9B4C415D3F48E2 ```

Results:

Assertion & Expected Result	Actual Result
AM-01 Source acquired using interface AI.	as expected
AM-02 Source is type DS.	as expected
AM-03 Execution environment is XE.	as expected
AM-05 An image 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.	option not available
AO-23 Logged information is correct.	as expected
AO-24 Source is unchanged by acquisition.	as expected

Analysis:	Expected results achieved

5.2.11 DA-06-SATA48

Test Case DA-06-SATA48 Voom HardCopy 3P s/n: 3P-11-D-0305, Firmware Version 2-04	
Case Summary:	DA-06 Acquire a physical device using access interface AI to an image file.
Assertions:	AM-01 The tool uses access interface SRC-AI to access the digital source.
	AM-02 The tool acquires digital source DS.
	AM-03 The tool executes in execution environment XE.
	AM-05 If image file creation is specified, the tool creates an image file on file system type FS.
	AM-06 All visible sectors are acquired from the digital source.
	AM-08 All sectors acquired from the digital source are acquired accurately.
	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.
	AO-05 If the tool creates a multifile image of a requested size then all the individual files shall be no larger than the requested size.
	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.
	AO-23 If the tool logs any log significant information, the information is accurately recorded in the log file.
	AO-24 If the tool executes in a forensically safe execution environment, the digital source is unchanged by the acquisition process.
Tester Name:	jrr
Test Host:	HardCopy_3P
Test Date:	Wed Aug 24 10:00:00 2011
Drives:	src(0B-SATA) dst (none) other (5E-SATA)
Source Setup:	src hash (SHA256): < 0026805624818CAEDAD12019DCDB16E79DE3C47CFE1C717193F9880B3DB32A9F >
	src hash (SHA1): < DA892EE968DD828F2F1B6825C1D3EF35062A0737 >
	src hash (MD5): < 1873847F597A69D0F5DB991B67E84F92 >
	488397168 total sectors (250059350016 bytes)
	30400/254/63 (max cyl/hd values)
	30401/255/63 (number of cyl/hd)
	Model (00JD-22FYB0) serial # (WD-WMAEH2677545)
Log Highlights:	====== Tool Settings: ======
	hash: SHA-256
	xe: tool interface
	dst: FAT32
	re-verify: yes
	log file: yes
	auto-wipe: enable
	dst port: 5E-SATA port II
	====== Image file segments ======
	1 3103 data001.txt
	2 2295595008 file.000
	3 2295595008 file.001
	. . .
	107 2295595008 file.106
	108 2295595008 file.107
	109 2135089152 file.108
	======== Excerpt from Voom log ========
	ModelNumber=WDC WD2500JD-22FYB0
	SerialNumber=WD-WMAEH2677545
	TotalSectors=488397168
	DCOStartLBA=0
	DCOSectors=0
	DCOSize=0
	HPAStartLBA=0
	HPASectors=0
	HPASize=0
	Image1 SHA=0

Test Case DA-06-SATA48 Voom HardCopy 3P s/n: 3P-11-D-0305, Firmware Version 2-04	
	Image2 SHA=0026805624818caedad12019dcdb16e79de3c47cfe1c717193f9880b3db32a9f
	======== End of Excerpt from Voom log ========
	====== Source drive rehash ======
	Rehash (SHA1) of source: DA892EE968DD828F2F1B6825C1D3EF35062A0737

Results:		
	Assertion & Expected Result	**Actual Result**
	AM-01 Source acquired using interface AI.	as expected
	AM-02 Source is type DS.	as expected
	AM-03 Execution environment is XE.	as expected
	AM-05 An image 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.	option not available
	AO-23 Logged information is correct.	as expected
	AO-24 Source is unchanged by acquisition.	as expected
Analysis:	Expected results achieved	

5.2.12 DA-08-DCO

Test Case DA-08-DCO Voom HardCopy 3P s/n: 3P-11-D-0305, Firmware Version 2-04	
Case Summary:	DA-08 Acquire a physical drive with hidden sectors to an image file.
Assertions:	AM-01 The tool uses access interface SRC-AI to access the digital source. AM-02 The tool acquires digital source DS. AM-03 The tool executes in execution environment XE. AM-05 If image file creation is specified, the tool creates an image file on file system type FS. AM-06 All visible sectors are acquired from the digital source. AM-07 All hidden sectors are acquired from the digital source. AM-08 All sectors acquired from the digital source are acquired accurately. 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. AO-05 If the tool creates a multifile image of a requested size then all the individual files shall be no larger than the requested size. 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. AO-23 If the tool logs any log significant information, the information is accurately recorded in the log file. AO-24 If the tool executes in a forensically safe execution environment, the digital source is unchanged by the acquisition process.
Tester Name:	jrr
Test Host:	HardCopy_3P
Test Date:	Thu Aug 25 09:55:07 2011
Drives:	src(15-SATA) dst (none) other (7B-SATA)
Source Setup:	src hash (SHA1): < 76B22DDE84CE61F090791DDBB79057529AAF00E1 > src hash (MD5): < 9B4A9D124107819A9CE6F253FE7DC675 > 156301488 total sectors (80026361856 bytes) Model (0JD-00HKA0) serial # (WD-WMAJ91513490) DCO Created with Maximum LBA Sectors = 140,000,000 Hashes with DCO in place: md5: E5F8B277A39ED0F49794E9916CD62DD9 sha1: AC64CF1B3736BB2FE40C14D871E6F207BC432C2F
Log Highlights:	====== Tool Settings: ====== hash: MD5 xe: tool interface dst: FAT32 re-verify: yes

Test Case DA-08-DCO Voom HardCopy 3P s/n: 3P-11-D-0305, Firmware Version 2-04	
	log file: yes auto-wipe: enable dst port: 7B-SATA port I ====== Image file segments ====== 1 1654 data001.txt 2 2295595008 file.000 3 2295595008 file.001 . . . 33 2295595008 file.032 34 2295595008 file.033 35 1976131584 file.034 ======== Excerpt from Voom log ======== ModelNumber=WDC WD800JD-00HKA0 SerialNumber=WD-WMAJ91513490 TotalSectors=156301488 DCOStartLBA=140000001 DCOSectors=16301487 DCOSize=8346361344 HPAStartLBA=0 HPASectors=0 HPASize=0 Image1 MD5=9b4a9d124107819a9ce6f253fe7dc675 Image2 MD5=0 ======== End of Excerpt from Voom log ======== ====== Source drive rehash ====== Rehash (SHA1) of source: AC64CF1B3736BB2FE40C14D871E6F207BC432C2F

Results:	

Assertion & Expected Result	Actual Result
AM-01 Source acquired using interface AI.	as expected
AM-02 Source is type DS.	as expected
AM-03 Execution environment is XE.	as expected
AM-05 An image 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.	option not available
AO-23 Logged information is correct.	as expected
AO-24 Source is unchanged by acquisition.	as expected

Analysis:	Expected results achieved

5.2.13 DA-08-HPA

Test Case DA-08-HPA Voom HardCopy 3P s/n: 3P-11-D-0305, Firmware Version 2-04	
Case Summary:	DA-08 Acquire a physical drive with hidden sectors to an image file.
Assertions:	AM-01 The tool uses access interface SRC-AI to access the digital source. AM-02 The tool acquires digital source DS. AM-03 The tool executes in execution environment XE. AM-05 If image file creation is specified, the tool creates an image file on file system type FS. AM-06 All visible sectors are acquired from the digital source. AM-07 All hidden sectors are acquired from the digital source. AM-08 All sectors acquired from the digital source are acquired accurately. 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. AO-05 If the tool creates a multifile image of a requested size then all the individual files shall be no larger than the requested size. 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.

Test Case DA-08-HPA Voom HardCopy 3P s/n: 3P-11-D-0305, Firmware Version 2-04	
	AO-23 If the tool logs any log significant information, the information is accurately recorded in the log file. AO-24 If the tool executes in a forensically safe execution environment, the digital source is unchanged by the acquisition process.
Tester Name:	jrr
Test Host:	HardCopy_3P
Test Date:	Wed Aug 24 14:14:07 2011
Drives:	src(7E) dst (none) other (4D-SATA)
Source Setup:	src hash (SHA1): < 60A77A87F1FA085B1808A88B19F6B36AECE52381 > src hash (MD5): < 62F17D0DF3EB0562E008A736154F71CF > 78177792 total sectors (40027029504 bytes) 65534/015/63 (max cyl/hd values) 65535/016/63 (number of cyl/hd) IDE disk: Model (MAXTOR 6L040J2) serial # (662201136780) HPA created Hashes with HPA in place Maximum Addressable Sector: 70,000,000 sha1: CC0CFFDE461D774228370DBAD1E4BD5C8413C346
Log Highlights:	====== Tool Settings: ====== hash: MD5 xe: tool interface dst: NTFS re-verify: yes log file: yes auto-wipe: enable dst port: 4D-SATA port I Write Block: Tableau T35e Forensic SATA/IDE Bridge ====== Image file segments ====== 1 40027029504 Aug 24 10:43 data001.dd 2 1507 Aug 24 10:53 data001.txt ======== Excerpt from Voom log ======== ModelNumber=MAXTOR 6L040J2 SerialNumber=662201136780 TotalSectors=78177792 DCOStartLBA=0 DCOSectors=0 DCOSize=0 HPAStartLBA=70000001 HPASectors=8177791 HPASize=-107938304 Image1 MD5=62f17d0df3eb0562e008a736154f71cf Image2 MD5=0 ======== End of Excerpt from Voom log ======== ====== Source drive rehash ====== Rehash (SHA1) of source: 60A77A87F1FA085B1808A88B19F6B36AECE52381
Results:	

Assertion & Expected Result	Actual Result
AM-01 Source acquired using interface AI.	as expected
AM-02 Source is type DS.	as expected
AM-03 Execution environment is XE.	as expected
AM-05 An image 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.	option not available
AO-23 Logged information is correct.	Incorrect HPA size

Test Case DA-08-HPA Voom HardCopy 3P s/n: 3P-11-D-0305, Firmware Version 2-04		
		reported
	AO-24 Source is unchanged by acquisition.	as expected
Analysis:	Expected results not achieved	

5.2.14 DA-09

Test Case DA-09 Voom HardCopy 3P s/n: 3P-11-D-0305, Firmware Version 2-04	
Case Summary:	DA-09 Acquire a digital source that has at least one faulty data sector.
Assertions:	AM-01 The tool uses access interface SRC-AI to access the digital source. AM-02 The tool acquires digital source DS. AM-03 The tool executes in execution environment XE. AM-05 If image file creation is specified, the tool creates an image file on file system type FS. AM-06 All visible sectors are acquired from the digital source. AM-08 All sectors acquired from the digital source are acquired accurately. 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. 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. 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. AO-05 If the tool creates a multifile image of a requested size then all the individual files shall be no larger than the requested size. 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. AO-23 If the tool logs any log significant information, the information is accurately recorded in the log file. AO-24 If the tool executes in a forensically safe execution environment, the digital source is unchanged by the acquisition process.
Tester Name:	jrr
Test Host:	HardCopy_3P
Test Date:	Thu Sep 1 13:54:55 2011
Drives:	src(ED-BAD-CPR4) dst (49-SATA) other (none)
Source Setup:	No before hash for ED-BAD-CPR4 Known Bad Sector List for ED-BAD-CPR4 Manufacturer: Maxtor Model: DiamondMax Plus 9 Serial Number: Y23EGSJE Capacity: 60GB Interface: SATA 35 faulty sectors 6160328, 6160362, 10041157, 10041995, 10118634, 10209448, 11256569, 14115689, 14778391, 14778392, 14778449, 14778479, 14778517, 14778518, 14778519, 14778520, 14778521, 14778551, 14778607, 14778626, 14778627, 14778650, 14778668, 14778669, 14778709, 14778727, 14778747, 14778772, 14778781, 14778870, 14778949, 14778953, 14779038, 14779113, 14779321
Log Highlights:	====== Destination drive setup ====== 156301488 sectors wiped with 49 ====== Comparison of original to clone drive ====== Sectors compared: 120103200 Sectors match: 120103165 Sectors differ: 35 Bytes differ: 17885 Diffs range 6160328, 6160362, 10041157, 10041995, 10118634,

```
                    10209448, 11256569, 14115689, 14778391-14778392, 14778449,
                    14778479, 14778517-14778521, 14778551, 14778607, 14778626-14778627,
                    14778650, 14778668-14778669, 14778709, 14778727, 14778747,
                    14778772, 14778781, 14778870, 14778949, 14778953, 14779038,
                    14779113, 14779321
                    Source (120103200) has 36198288 fewer sectors than destination (156301488)
                    Zero fill: 0
                    Src Byte fill (ED): 0
                    Dst Byte fill (49): 36198288
                    Other fill: 0
                    Other no fill: 0
                    Zero fill range:
                    Src fill range:
                    Dst fill range: 120103200-156301487
                    Other fill range:
                    Other not filled range:
                    0 source read errors, 0 destination read errors


                    ====== Tool Settings: ======
                    hash: MD5
                    xe: windows interface
                    re-verify: yes
                    log file: yes
                    auto-wipe: disable
                    dst port: 49-SATA port I

                    OS: Microsoft Windows XP [Version 5.1.2600]

                    ======== Excerpt from Voom log ========
                    Total Read Errors: 35
                    Error #1 @ LBA 6160328
                    Error #2 @ LBA 6160362
                    Error #3 @ LBA 10041157
                    Error #4 @ LBA 10041995
                    Error #5 @ LBA 10118634
                    Error #6 @ LBA 10209448
                    Error #7 @ LBA 11256569
                    Error #8 @ LBA 14115689
                    Error #9 @ LBA 14778391
                    Error #10 @ LBA 14778392
                    Error #11 @ LBA 14778449
                    Error #12 @ LBA 14778479
                    Error #13 @ LBA 14778517
                    Error #14 @ LBA 14778518
                    Error #15 @ LBA 14778519
                    Error #16 @ LBA 14778520
                    ======== End of Excerpt from Voom log ========
```

Results:

Assertion & Expected Result	Actual Result
AM-01 Source acquired using interface AI.	as expected
AM-02 Source is type DS.	as expected
AM-03 Execution environment is XE.	as expected
AM-05 An image 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
AM-09 Error logged.	as expected
AM-10 Benign fill replaces inaccessible sectors.	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.	option not available
AO-23 Logged information is correct.	as expected
AO-24 Source is unchanged by acquisition.	not checked

Analysis: Expected results achieved

5.2.15 DA-12

Test Case DA-12 Voom HardCopy 3P s/n: 3P-11-D-0305, Firmware Version 2-04	
Case Summary:	DA-12 Attempt to create an image file where there is insufficient space.
Assertions:	AM-01 The tool uses access interface SRC-AI to access the digital source. AM-02 The tool acquires digital source DS. AM-03 The tool executes in execution environment XE. AM-05 If image file creation is specified, the tool creates an image file on file system type FS. 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. AO-23 If the tool logs any log significant information, the information is accurately recorded in the log file. AO-24 If the tool executes in a forensically safe execution environment, the digital source is unchanged by the acquisition process.
Tester Name:	jrr
Test Host:	HardCopy_3P
Test Date:	Mon Aug 29 11:44:45 2011
Drives:	src(4B-SATA) dst (none) other (7B-SATA)
Source Setup:	src hash (SHA256): < F61ADE21982F803F64D2CEA2C9CA90C23056CA852CCC515D17827038154E8C1E > src hash (SHA1): < 70CC62B43F6A41CA4D6760AA0B9B4C415D3F48E2 > src hash (MD5): < 746B4C06CDD5FBD67C0820DB4325B40C > 156301488 total sectors (80026361856 bytes) Model (ST380815AS) serial # (6QZ5C9V5) N Start LBA Length Start C/H/S End C/H/S boot Partition type 1 P 000000063 020971520 0000/001/01 1023/254/63 AF other 2 P 020971629 010485536 1023/254/63 1023/254/63 AF other 3 P 031457223 006291456 1023/254/63 1023/254/63 A8 other 4 X 037748679 008388694 1023/254/63 1023/254/63 05 extended 5 S 000000039 004194304 1023/254/63 1023/254/63 AF other 6 x 004194343 004194351 1023/254/63 1023/254/63 05 extended 7 S 000000047 004194304 1023/254/63 1023/254/63 AF other 8 S 000000000 000000000 0000/000/00 0000/000/00 00 empty entry 1 020971520 sectors 10737418240 bytes 2 010485536 sectors 5368594432 bytes 3 006291456 sectors 3221225472 bytes 5 004194304 sectors 2147483648 bytes 7 004194304 sectors 2147483648 bytes
Log Highlights:	====== Error Message: ====== ECODE: 44 ====== Tool Settings: ====== hash: n/a xe: tool interface dst: NTFS re-verify: n/a log file: no auto-wipe: n/a dst port: 7B-SATA port I

Results:		
	Assertion & Expected Result	**Actual Result**
	AM-01 Source acquired using interface AI.	as expected
	AM-02 Source is type DS.	as expected
	AM-03 Execution environment is XE.	as expected
	AM-05 An image is created on file system type FS.	as expected
	AO-04 User notified if space exhausted.	as expected
	AO-23 Logged information is correct.	as expected

Test Case DA-12 Voom HardCopy 3P s/n: 3P-11-D-0305, Firmware Version 2-04		
	AO-24 Source is unchanged by acquisition.	not checked
Analysis:	Expected results achieved	

5.2.16 DA-19

Test Case DA-19 Voom HardCopy 3P s/n: 3P-11-D-0305, Firmware Version 2-04	
Case Summary:	DA-19 Acquire a physical device to an unaligned clone, filling excess sectors.
Assertions:	AM-01 The tool uses access interface SRC-AI to access the digital source. AM-02 The tool acquires digital source DS. AM-03 The tool executes in execution environment XE. AM-04 If clone creation is specified, the tool creates a clone of the digital source. AM-06 All visible sectors are acquired from the digital source. AM-08 All sectors acquired from the digital source are acquired accurately. AO-11 If requested, a clone is created during an acquisition of a digital source. AO-13 A clone is created using access interface DST-AI to write to the clone device. 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. AO-18 If requested, a benign fill is written to excess sectors of a clone. 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. AO-23 If the tool logs any log significant information, the information is accurately recorded in the log file. AO-24 If the tool executes in a forensically safe execution environment, the digital source is unchanged by the acquisition process.
Tester Name:	jrr
Test Host:	HardCopy_3P
Test Date:	Mon Aug 29 13:31:17 2011
Drives:	src(01-IDE) dst (29-LAP) other (none)
Source Setup:	src hash (SHA1): < A48BB5665D6DC57C22DB68E2F723DA9AA8DF82B9 > src hash (MD5): < F458F673894753FA6A0EC8B8EC63848E > 78165360 total sectors (40020664320 bytes) Model (0BB-00JHC0) serial # (WD-WMAMC74171) N Start LBA Length Start C/H/S End C/H/S boot Partition type 1 P 000000063 020980827 0000/001/01 1023/254/63 0C Fat32X 2 X 020980890 057175335 1023/000/01 1023/254/63 0F extended 3 S 000000063 000032067 1023/001/01 1023/254/63 01 Fat12 4 x 000032130 002104515 1023/000/01 1023/254/63 05 extended 5 S 000000063 002104452 1023/001/01 1023/254/63 06 Fat16 6 x 002136645 004192965 1023/000/01 1023/254/63 05 extended 7 S 000000063 004192902 1023/001/01 1023/254/63 16 other 8 x 006329610 008401995 1023/000/01 1023/254/63 05 extended 9 S 000000063 008401932 1023/001/01 1023/254/63 0B Fat32 10 x 014731605 010490445 1023/000/01 1023/254/63 05 extended 11 S 000000063 010490382 1023/001/01 1023/254/63 83 Linux 12 x 025222050 004209030 1023/000/01 1023/254/63 05 extended 13 S 000000063 004208967 1023/001/01 1023/254/63 82 Linux swap 14 x 029431080 027744255 1023/000/01 1023/254/63 05 extended 15 S 000000063 027744192 1023/001/01 1023/254/63 07 NTFS 16 S 000000000 000000000 0000/000/00 0000/000/00 00 empty entry 17 P 000000000 000000000 0000/000/00 0000/000/00 00 empty entry 18 P 000000000 000000000 0000/000/00 0000/000/00 00 empty entry 1 020980827 sectors 10742183424 bytes 3 000032067 sectors 16418304 bytes 5 002104452 sectors 1077479424 bytes 7 004192902 sectors 2146765824 bytes 9 008401932 sectors 4301789184 bytes 11 010490382 sectors 5371075584 bytes 13 004208967 sectors 2154991104 bytes 15 027744192 sectors 14205026304 bytes

Test Case DA-19 Voom HardCopy 3P s/n: 3P-11-D-0305, Firmware Version 2-04	
Log Highlights:	====== Destination drive setup ====== 156301488 sectors wiped with 29 ====== Comparison of original to clone drive ====== 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: 78136128 Src Byte fill (01): 0 Dst Byte fill (29): 0 Other fill: 0 Other no fill: 0 Zero fill range: 78165360-156301487 Src fill range: Dst fill range: Other fill range: Other not filled range: 0 source read errors, 0 destination read errors ====== Tool Settings: ====== hash: MD5 xe: tool interface re-verify: yes log file: no auto-wipe: enable dst port: 29-LAP port I ====== Source drive rehash ====== Rehash (SHA1) of source: A48BB5665D6DC57C22DB68E2F723DA9AA8DF82B9
Results:	

Assertion & Expected Result	Actual Result
AM-01 Source acquired using interface AI.	as expected
AM-02 Source is type DS.	as expected
AM-03 Execution environment is XE.	as expected
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.	option not available
AO-23 Logged information is correct.	as expected
AO-24 Source is unchanged by acquisition.	as expected

Analysis:	Expected results achieved

About the National Institute of Justice

A component of the Office of Justice Programs, NIJ is the research, development and evaluation agency of the U.S. Department of Justice. NIJ's mission is to advance scientific research, development and evaluation to enhance the administration of justice and public safety. NIJ's principal authorities are derived from the Omnibus Crime Control and Safe Streets Act of 1968, as amended (see 42 U.S.C. §§ 3721–3723).

The NIJ Director is appointed by the President and confirmed by the Senate. The Director establishes the Institute's objectives, guided by the priorities of the Office of Justice Programs, the U.S. Department of Justice, and the needs of the field. The Institute actively solicits the views of criminal justice and other professionals and researchers to inform its search for the knowledge and tools to guide policy and practice.

Strategic Goals

NIJ has seven strategic goals grouped into three categories:

Creating relevant knowledge and tools

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.
5. Act as an honest broker to identify the information, tools and technologies that respond to the needs of stakeholders.

Agency management

6. Practice fairness and openness in the research and development process.
7. Ensure professionalism, excellence, accountability, cost-effectiveness and integrity in the management and conduct of NIJ activities and programs.

Program Areas

In addressing these strategic challenges, the Institute is involved in the following program areas: crime control and prevention, including policing; drugs and crime; justice systems and offender behavior, including corrections; violence and victimization; communications and information technologies; critical incident response; investigative and forensic sciences, including DNA; less-than-lethal technologies; officer protection; education and training technologies; testing and standards; technology assistance to law enforcement and corrections agencies; field testing of promising programs; and international crime control.

In addition to sponsoring research and development and technology assistance, NIJ evaluates programs, policies, and technologies. NIJ communicates its research and evaluation findings through conferences and print and electronic media.

To find out more about the National Institute of Justice, please visit:

www.nij.gov

or contact:

National Criminal Justice
 Reference Service
P.O. Box 6000
Rockville, MD 20849–6000
800–851–3420
http://www.ncjrs.gov