Forensic UltraDock v5

Test Results for Hardware Write Block Device - Federated Testing Suite

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Homeland Security

Science and Technology

Test Results for Hardware Write Block Device:
Forensic UltraDock v5
Firmware Version f3.01.0005

Federated Testing Suite for Hardware Write Blocking

Contents

Introduction

The Computer Forensics Tool Testing (CFTT) program is a joint project of the Department of Homeland Security (DHS), the National Institute of Justice (NIJ), and the National Institute of Standards and Technology (NIST) Special Programs Office 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. 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 forensics tools is based on well-recognized methodologies for conformance and quality testing. Interested parties in the computer forensics community can review and comment on the specifications and test methods posted on the CFTT Web site (https://www.cftt.nist.gov/).

This document reports the results from testing the hardware write blocking function of the CRU Forensic UltraDock v5 device firmware version f3.01.0005 using the CFTT Federated Testing Test Suite for Hardware Write Blocking, Version 3.1-1.

Federated Testing is an expansion of the CFTT program to provide forensic investigators and labs with test materials for tool testing and to support shared test reports. The goal of Federated Testing is to help forensic investigators to test the tools that they use in their labs and to enable sharing of tool test results. CFTT's Federated Testing Forensic Tool Testing Environment and included test suites can be downloaded from https://www.cftt.nist.gov/federated-testing.html and used to test forensic tools. The results can be optionally shared with CFTT, reviewed by CFTT staff, and then shared with the community.

Test results from this and other tools can be found on DHS's computer forensics web page, https://www.dhs.gov/science-and-technology/nist-cftt-reports.

How to Read This Report

This report is organized into the following sections:

1. Tested Device Description. The tool name, version and vendor information are listed.
2. Results Summary. This section identifies any significant anomalies observed in the test runs. This section provides a narrative of key findings identifying where the tool meets expectations and provides a summary of any ways the tool did not meet expectations. The section also provides any observations of interest about the tool or about testing the tool including any observed limitations on tool use.
3. Test Environment. Description of hardware and software used in tool testing.
4. Test Result Details by Case. Automatically generated test results that identify anomalies.
5. Appendix: Additional details. Additional details for each test case.

Test Results for Hardware Write Block Device:
CRU Forensic UltraDock v5

1. Device Description

Device Name: CRU Forensic UltraDock v5
Firmware Version: f3.01.0005

Manufacturer Contact:

Manufacturer:	CRU Acquisition Group
Address:	1000 SE Tech Center Dr Suite 160 Vancouver, WA 98683
Tel:	(800) 260-9800
WWW:	https://www.cru-inc.com/

2. Results Summary

The tested device functioned as expected with no anomalies.

3. Test Environment

Hardware:
Custom PC with 12 USB 2, 3 eSATA, 2 FireWire 800 and 3 FireWire 400 ports.

Forensic UltraDock v5 Firmware Version: f3.01.0005
Serial Number: 03-007281B

4. Test Result Details by Case

This section presents test results grouped by case.

4.1. FT-HWB-ATA/IDE
4.1.1. Test Case Description

Test a write blocker's ability to write-protect an ATA/IDE drive. This test can be repeated to test multiple types of connections (interfaces) between a computer and the write blocker. Test the ability of the write blocker to block write commands from the ATA and SCSI command sets issued from a test computer from modifying an ATA/IDE drive.

4.1.2. Test Drive Description

Manufacturer, model & size of the test drive used for this test: IBM, IC35L040AVER07-0, 40GB

4.1.3. Test Evaluation Criteria

For each computer to blocker connection tested, the number of 'writes not blocked' should be 0.

4.1.4. Test Case Results

The following table presents results for the test case.

Test Results for FT-HWB-ATA/IDE		
Computer to Blocker Connection	**Write Commands Sent**	**Writes Not Blocked**
eSATA	36	0
FireWire 400	36	0
FireWire 800	36	0
USB 3	36	0

4.1.5. Case Summary

Test drive unchanged.

4.2. FT-HWB-SATA
4.2.1. Test Case Description

Test a write blocker's ability to write-protect a SATA drive. This test can be repeated to test multiple types of connections (interfaces) between a computer and the write blocker. Test the ability of the write blocker to block write commands from the ATA and SCSI command sets issued from a test computer from modifying a SATA drive.

4.2.2. Test Drive Description

Manufacturer, model & size of the test drive used for this test: Kingston, SVP1200S264G, 64GB

4.2.3. Test Evaluation Criteria

For each computer to blocker connection tested, the number of 'writes not blocked' should be 0.

4.2.4. Test Case Results

The following table presents results for the test case.

Test Results for FT-HWB-SATA		
Computer to Blocker Connection	**Write Commands Sent**	**Writes Not Blocked**
eSATA	36	0
FireWire 400	36	0
FireWire 800	36	0
USB 3	36	0

4.2.5. Case Summary

Test drive unchanged.

5. Appendix: Additional Details
5.1. FT-HWB-ATA/IDE
5.1.1. eSATA

```
/usr/lib/cgi-bin/test-hwb Fri Jul  6 11:07:28 2018
@(#) test-hwb.c Linux Version 1.4 created 06/27/18 at 10:56:14
compiled Jun 27 2018 10:56:31 with gcc Version 5.4.0 20160609
@(#) wrapper.c Linux Version 1.5 support lib created 08/03/17 at 13:05:44
@(#) ataraw.c Linux Version 1.3 support lib created 08/03/17 at 13:05:44
@(#) ataraw.h Linux Version 1.3 created 08/03/17 at 13:06:12
cmd: /usr/lib/cgi-bin/test-hwb -bh -p /media/cftt/FT-LOGS/FT-HWB-ata/ GP
WoFat FT-HWB-ata esata ata /dev/sda
operator: GP
host: WoFat
test case: FT-HWB-ata
connection type: esata
drive/media type: ata
device: /dev/sda
```

Opcode	Command Name	Status	Lba/Sector	Result
30h	(ATA) WRITE SECTOR(S)	Sent	12288	Unchanged
CAh	(ATA) WRITE DMA	Sent	51712	Unchanged
CCh	(ATA) WRITE DMA QUEUED	Sent	52224	Unchanged
C5h	(ATA) WRITE MULTIPLE	Sent	50432	Unchanged
31h	(ATA) WRITE SECTOR(S) w/o retries	Sent	12544	Unchanged
CBh	(ATA) WRITE DMA w/o retries	Sent	51968	Unchanged
3Ch	(ATA) WRITE VERIFY	Sent	15360	Unchanged
34h	(ATA) WRITE SECTOR(S) EXT	Sent	13312	Unchanged
39h	(ATA) WRITE MULTIPLE EXT	Sent	14592	Unchanged
CEh	(ATA) WRITE MULTIPLE FUA EXT	Sent	52736	Unchanged
3Bh	(ATA) WRITE STREAM EXT	Sent	15104	Unchanged
35h	(ATA) WRITE DMA EXT	Sent	13568	Unchanged
3Dh	(ATA) WRITE DMA FUA EXT	Sent	15616	Unchanged
36h	(ATA) WRITE DMA QUEUED EXT	Sent	13824	Unchanged
3Eh	(ATA) WRITE DMA QUEUED FUA EXT	Sent	15872	Unchanged
3Ah	(ATA) WRITE STREAM DMA EXT	Sent	14848	Unchanged
38h	(ATA) CFA WRITE SECTORS W/O ERASE	Sent	14336	Unchanged
CDh	(ATA) CFA WRITE MULTIPLE W/O ERASE	Sent	52480	Unchanged
C0h	(ATA) CFA ERASE SECTORS	Sent	49152	Unchanged
0Ah	(SCSI) WRITE 6	Sent	2576	Unchanged
2Ah	(SCSI) WRITE 10	Sent	10768	Unchanged
AAh	(SCSI) WRITE 12	Sent	43536	Unchanged
8Ah	(SCSI) WRITE 16	Sent	35344	Unchanged
7Fh	(SCSI) WRITE 32	Sent	32528	Unchanged
2Eh	(SCSI) WRITE AND VERIFY 10	Sent	11792	Unchanged
AEh	(SCSI) WRITE AND VERIFY 12	Sent	44560	Unchanged
8Eh	(SCSI) WRITE AND VERIFY 16	Sent	36368	Unchanged
7Fh	(SCSI) WRITE AND VERIFY 32	Sent	32529	Unchanged
41h	(SCSI) WRITE SAME 10	Sent	16656	Unchanged
93h	(SCSI) WRITE SAME 16	Sent	37648	Unchanged

```
7Fh     (SCSI) WRITE SAME 32          Sent         32530        Unchanged
3Fh     (SCSI) WRITE LONG 10          Sent         16144        Unchanged
9Fh     (SCSI) WRITE LONG 16          Sent         40720        Unchanged
32h     (ATA)  WRITE LONG             Sent         12800        Unchanged
33h     (ATA)  WRITE LONG w/o retries Sent         13056        Unchanged
45h     (ATA)  WRITE UNCORRECTABLE EXT Sent        17664        Unchanged


36 writes sent, 0 write(s) not blocked, 0 write commands unsupported.


RESULTS: test drive unchanged


run start  Fri Jul  6 11:07:28 2018
run finish Fri Jul  6 11:07:29 2018
elapsed time 0:0:1
Normal exit


Status Key:
Sent -  the ioctl used to send this command returned without error and the
ATA error bit (if applicable) was not set.
Not supported -  the ioctl used to send this command return with an error
status or the command completed with the ATA error bit set.
Test terminated -  the test was terminated for dangerous commands because 3
or more previous commands were not blocked.


Result Key:
Unchanged -  no changes to the test drive were detected.
Not Blocked -  sending this command resulted in a change to the test drive.
This command was NOT blocked!
n/a -  Not applicable.
```

5.1.2. FireWire 400

```
/usr/lib/cgi-bin/test-hwb Fri Jul  6 11:08:39 2018
@(#) test-hwb.c Linux Version 1.4 created 06/27/18 at 10:56:14
compiled Jun 27 2018 10:56:31 with gcc Version 5.4.0 20160609
@(#) wrapper.c Linux Version 1.5 support lib created 08/03/17 at 13:05:44
@(#) ataraw.c Linux Version 1.3 support lib created 08/03/17 at 13:05:44
@(#) ataraw.h Linux Version 1.3 created 08/03/17 at 13:06:12
cmd: /usr/lib/cgi-bin/test-hwb -bh -p /media/cftt/FT-LOGS/FT-HWB-ata/ GP
WoFat FT-HWB-ata firewire400 ata /dev/sda
operator: GP
host: WoFat
test case: FT-HWB-ata
connection type: firewire400
drive/media type: ata
device: /dev/sda


Opcode  Command Name                 Status       Lba/Sector   Result
30h     (ATA)  WRITE SECTOR(S)       Sent         12288        Unchanged
CAh     (ATA)  WRITE DMA             Sent         51712        Unchanged
CCh     (ATA)  WRITE DMA QUEUED      Sent         52224        Unchanged
C5h     (ATA)  WRITE MULTIPLE        Sent         50432        Unchanged
31h     (ATA)  WRITE SECTOR(S) w/o retries   Sent           12544
        Unchanged
CBh     (ATA)  WRITE DMA w/o retries Sent         51968        Unchanged
3Ch     (ATA)  WRITE VERIFY          Sent         15360        Unchanged
```

```
34h      (ATA) WRITE SECTOR(S) EXT      Sent              13312          Unchanged
39h      (ATA) WRITE MULTIPLE EXT       Sent              14592          Unchanged
CEh      (ATA) WRITE MULTIPLE FUA EXT   Sent              52736          Unchanged
3Bh      (ATA) WRITE STREAM EXT         Sent              15104          Unchanged
35h      (ATA) WRITE DMA EXT            Sent              13568          Unchanged
3Dh      (ATA) WRITE DMA FUA EXT                 Sent           15616
         Unchanged
36h      (ATA) WRITE DMA QUEUED EXT     Sent              13824          Unchanged
3Eh      (ATA) WRITE DMA QUEUED FUA EXT Sent              15872          Unchanged
3Ah      (ATA) WRITE STREAM DMA EXT     Sent              14848          Unchanged
38h      (ATA) CFA WRITE SECTORS W/O ERASE       Sent           14336
         Unchanged
CDh      (ATA) CFA WRITE MULTIPLE W/O ERASE      Sent           52480
         Unchanged
C0h      (ATA) CFA ERASE SECTORS                 Sent           49152
         Unchanged
0Ah      (SCSI) WRITE 6                 Sent              2576           Unchanged
2Ah      (SCSI) WRITE 10                Sent              10768          Unchanged
AAh      (SCSI) WRITE 12                Sent              43536          Unchanged
8Ah      (SCSI) WRITE 16                Sent              35344          Unchanged
7Fh      (SCSI) WRITE 32                Sent              32528          Unchanged
2Eh      (SCSI) WRITE AND VERIFY 10     Sent              11792          Unchanged
AEh      (SCSI) WRITE AND VERIFY 12     Sent              44560          Unchanged
8Eh      (SCSI) WRITE AND VERIFY 16     Sent              36368          Unchanged
7Fh      (SCSI) WRITE AND VERIFY 32     Sent              32529          Unchanged
41h      (SCSI) WRITE SAME 10           Sent              16656          Unchanged
93h      (SCSI) WRITE SAME 16           Sent              37648          Unchanged
7Fh      (SCSI) WRITE SAME 32           Sent              32530          Unchanged
3Fh      (SCSI) WRITE LONG 10           Sent              16144          Unchanged
9Fh      (SCSI) WRITE LONG 16           Sent              40720          Unchanged
32h      (ATA) WRITE LONG               Sent              12800          Unchanged
33h      (ATA) WRITE LONG w/o retries   Sent              13056          Unchanged
45h      (ATA) WRITE UNCORRECTABLE EXT  Sent              17664          Unchanged


36 writes sent, 0 write(s) not blocked, 0 write commands unsupported.


RESULTS: test drive unchanged

run start Fri Jul  6 11:08:39 2018
run finish Fri Jul  6 11:08:39 2018
elapsed time 0:0:0
Normal exit


Status Key:
Sent -  the ioctl used to send this command returned without error and the
ATA error bit (if applicable) was not set.
Not supported -  the ioctl used to send this command return with an error
status or the command completed with the ATA error bit set.
Test terminated -  the test was terminated for dangerous commands because 3
or more previous commands were not blocked.


Result Key:
Unchanged -  no changes to the test drive were detected.
Not Blocked -  sending this command resulted in a change to the test drive.
This command was NOT blocked!
n/a -  Not applicable.
```

5.1.3. FireWire 800

```
/usr/lib/cgi-bin/test-hwb Fri Jul  6 11:05:52 2018
@(#) test-hwb.c Linux Version 1.4 created 06/27/18 at 10:56:14
compiled Jun 27 2018 10:56:31 with gcc Version 5.4.0 20160609
@(#) wrapper.c Linux Version 1.5 support lib created 08/03/17 at 13:05:44
@(#) ataraw.c Linux Version 1.3 support lib created 08/03/17 at 13:05:44
@(#) ataraw.h Linux Version 1.3 created 08/03/17 at 13:06:12
cmd: /usr/lib/cgi-bin/test-hwb -bh -p /media/cftt/FT-LOGS/FT-HWB-ata/ GP
WoFat FT-HWB-ata firewire800 ata /dev/sda
operator: GP
host: WoFat
test case: FT-HWB-ata
connection type: firewire800
drive/media type: ata
device: /dev/sda
```

Opcode	Command Name	Status	Lba/Sector	Result
30h	(ATA) WRITE SECTOR(S)	Sent	12288	Unchanged
CAh	(ATA) WRITE DMA	Sent	51712	Unchanged
CCh	(ATA) WRITE DMA QUEUED	Sent	52224	Unchanged
C5h	(ATA) WRITE MULTIPLE	Sent	50432	Unchanged
31h	(ATA) WRITE SECTOR(S) w/o retries	Sent	12544	Unchanged
CBh	(ATA) WRITE DMA w/o retries	Sent	51968	Unchanged
3Ch	(ATA) WRITE VERIFY	Sent	15360	Unchanged
34h	(ATA) WRITE SECTOR(S) EXT	Sent	13312	Unchanged
39h	(ATA) WRITE MULTIPLE EXT	Sent	14592	Unchanged
CEh	(ATA) WRITE MULTIPLE FUA EXT	Sent	52736	Unchanged
3Bh	(ATA) WRITE STREAM EXT	Sent	15104	Unchanged
35h	(ATA) WRITE DMA EXT	Sent	13568	Unchanged
3Dh	(ATA) WRITE DMA FUA EXT	Sent	15616	Unchanged
36h	(ATA) WRITE DMA QUEUED EXT	Sent	13824	Unchanged
3Eh	(ATA) WRITE DMA QUEUED FUA EXT	Sent	15872	Unchanged
3Ah	(ATA) WRITE STREAM DMA EXT	Sent	14848	Unchanged
38h	(ATA) CFA WRITE SECTORS W/O ERASE	Sent	14336	Unchanged
CDh	(ATA) CFA WRITE MULTIPLE W/O ERASE	Sent	52480	Unchanged
C0h	(ATA) CFA ERASE SECTORS	Sent	49152	Unchanged
0Ah	(SCSI) WRITE 6	Sent	2576	Unchanged
2Ah	(SCSI) WRITE 10	Sent	10768	Unchanged
AAh	(SCSI) WRITE 12	Sent	43536	Unchanged
8Ah	(SCSI) WRITE 16	Sent	35344	Unchanged
7Fh	(SCSI) WRITE 32	Sent	32528	Unchanged
2Eh	(SCSI) WRITE AND VERIFY 10	Sent	11792	Unchanged
AEh	(SCSI) WRITE AND VERIFY 12	Sent	44560	Unchanged
8Eh	(SCSI) WRITE AND VERIFY 16	Sent	36368	Unchanged
7Fh	(SCSI) WRITE AND VERIFY 32	Sent	32529	Unchanged
41h	(SCSI) WRITE SAME 10	Sent	16656	Unchanged
93h	(SCSI) WRITE SAME 16	Sent	37648	Unchanged
7Fh	(SCSI) WRITE SAME 32	Sent	32530	Unchanged
3Fh	(SCSI) WRITE LONG 10	Sent	16144	Unchanged
9Fh	(SCSI) WRITE LONG 16	Sent	40720	Unchanged

```
32h       (ATA) WRITE LONG                 Sent          12800          Unchanged
33h       (ATA) WRITE LONG w/o retries     Sent          13056          Unchanged
45h       (ATA) WRITE UNCORRECTABLE EXT    Sent          17664          Unchanged


36 writes sent, 0 write(s) not blocked, 0 write commands unsupported.


RESULTS: test drive unchanged


run start Fri Jul  6 11:05:52 2018
run finish Fri Jul  6 11:05:53 2018
elapsed time 0:0:1
Normal exit


Status Key:
Sent -  the ioctl used to send this command returned without error and the
ATA error bit (if applicable) was not set.
Not supported -  the ioctl used to send this command return with an error
status or the command completed with the ATA error bit set.
Test terminated -  the test was terminated for dangerous commands because 3
or more previous commands were not blocked.


Result Key:
Unchanged -  no changes to the test drive were detected.
Not Blocked -  sending this command resulted in a change to the test drive.
This command was NOT blocked!
n/a -  Not applicable.
```

5.1.4. USB 3

```
/usr/lib/cgi-bin/test-hwb Fri Jul  6 11:06:15 2018
@(#) test-hwb.c Linux Version 1.4 created 06/27/18 at 10:56:14
compiled Jun 27 2018 10:56:31 with gcc Version 5.4.0 20160609
@(#) wrapper.c Linux Version 1.5 support lib created 08/03/17 at 13:05:44
@(#) ataraw.c Linux Version 1.3 support lib created 08/03/17 at 13:05:44
@(#) ataraw.h Linux Version 1.3 created 08/03/17 at 13:06:12
cmd: /usr/lib/cgi-bin/test-hwb -bh -p /media/cftt/FT-LOGS/FT-HWB-ata/ GP
WoFat FT-HWB-ata usb3 ata /dev/sda
operator: GP
host: WoFat
test case: FT-HWB-ata
connection type: usb3
drive/media type: ata
device: /dev/sda


Opcode   Command Name                     Status        Lba/Sector     Result
30h       (ATA) WRITE SECTOR(S)            Sent          12288          Unchanged
CAh       (ATA) WRITE DMA                  Sent          51712          Unchanged
CCh       (ATA) WRITE DMA QUEUED           Sent          52224          Unchanged
C5h       (ATA) WRITE MULTIPLE             Sent          50432          Unchanged
31h       (ATA) WRITE SECTOR(S) w/o retries     Sent          12544
          Unchanged
CBh       (ATA) WRITE DMA w/o retries      Sent          51968          Unchanged
3Ch       (ATA) WRITE VERIFY               Sent          15360          Unchanged
34h       (ATA) WRITE SECTOR(S) EXT        Sent          13312          Unchanged
39h       (ATA) WRITE MULTIPLE EXT         Sent          14592          Unchanged
CEh       (ATA) WRITE MULTIPLE FUA EXT     Sent          52736          Unchanged
```

```
3Bh     (ATA) WRITE STREAM EXT          Sent            15104           Unchanged
35h     (ATA) WRITE DMA EXT             Sent            13568           Unchanged
3Dh     (ATA) WRITE DMA FUA EXT                 Sent            15616
        Unchanged
36h     (ATA) WRITE DMA QUEUED EXT      Sent            13824           Unchanged
3Eh     (ATA) WRITE DMA QUEUED FUA EXT Sent             15872           Unchanged
3Ah     (ATA) WRITE STREAM DMA EXT      Sent            14848           Unchanged
38h     (ATA) CFA WRITE SECTORS W/O ERASE       Sent            14336
        Unchanged
CDh     (ATA) CFA WRITE MULTIPLE W/O ERASE      Sent            52480
        Unchanged
C0h     (ATA) CFA ERASE SECTORS                 Sent            49152
        Unchanged
0Ah     (SCSI) WRITE 6                  Sent            2576            Unchanged
2Ah     (SCSI) WRITE 10                 Sent            10768           Unchanged
AAh     (SCSI) WRITE 12                 Sent            43536           Unchanged
8Ah     (SCSI) WRITE 16                 Sent            35344           Unchanged
7Fh     (SCSI) WRITE 32                 Sent            32528           Unchanged
2Eh     (SCSI) WRITE AND VERIFY 10      Sent            11792           Unchanged
AEh     (SCSI) WRITE AND VERIFY 12      Sent            44560           Unchanged
8Eh     (SCSI) WRITE AND VERIFY 16      Sent            36368           Unchanged
7Fh     (SCSI) WRITE AND VERIFY 32      Sent            32529           Unchanged
41h     (SCSI) WRITE SAME 10            Sent            16656           Unchanged
93h     (SCSI) WRITE SAME 16            Sent            37648           Unchanged
7Fh     (SCSI) WRITE SAME 32            Sent            32530           Unchanged
3Fh     (SCSI) WRITE LONG 10            Sent            16144           Unchanged
9Fh     (SCSI) WRITE LONG 16            Sent            40720           Unchanged
32h     (ATA) WRITE LONG                Sent            12800           Unchanged
33h     (ATA) WRITE LONG w/o retries    Sent            13056           Unchanged
45h     (ATA) WRITE UNCORRECTABLE EXT Sent             17664           Unchanged
```

36 writes sent, 0 write(s) not blocked, 0 write commands unsupported.

RESULTS: test drive unchanged

run start Fri Jul 6 11:06:15 2018
run finish Fri Jul 6 11:06:16 2018
elapsed time 0:0:1
Normal exit

Status Key:
Sent - the ioctl used to send this command returned without error and the
ATA error bit (if applicable) was not set.
Not supported - the ioctl used to send this command return with an error
status or the command completed with the ATA error bit set.
Test terminated - the test was terminated for dangerous commands because 3
or more previous commands were not blocked.

Result Key:
Unchanged - no changes to the test drive were detected.
Not Blocked - sending this command resulted in a change to the test drive.
This command was NOT blocked!
n/a - Not applicable.

5.2. FT-HWB-SATA
5.2.1. eSATA

```
/usr/lib/cgi-bin/test-hwb Fri Jul  6 11:12:03 2018
@(#) test-hwb.c Linux Version 1.4 created 06/27/18 at 10:56:14
compiled Jun 27 2018 10:56:31 with gcc Version 5.4.0 20160609
@(#) wrapper.c Linux Version 1.5 support lib created 08/03/17 at 13:05:44
@(#) ataraw.c Linux Version 1.3 support lib created 08/03/17 at 13:05:44
@(#) ataraw.h Linux Version 1.3 created 08/03/17 at 13:06:12
cmd: /usr/lib/cgi-bin/test-hwb -bh -p /media/cftt/FT-LOGS/FT-HWB-sata/ GP
WoFat FT-HWB-sata esata sata /dev/sda
operator: GP
host: WoFat
test case: FT-HWB-sata
connection type: esata
drive/media type: sata
device: /dev/sda
```

Opcode	Command Name	Status	Lba/Sector	Result
30h	(ATA) WRITE SECTOR(S)	Sent	12288	Unchanged
CAh	(ATA) WRITE DMA	Sent	51712	Unchanged
CCh	(ATA) WRITE DMA QUEUED	Sent	52224	Unchanged
C5h	(ATA) WRITE MULTIPLE	Sent	50432	Unchanged
31h	(ATA) WRITE SECTOR(S) w/o retries	Sent	12544	Unchanged
CBh	(ATA) WRITE DMA w/o retries	Sent	51968	Unchanged
3Ch	(ATA) WRITE VERIFY	Sent	15360	Unchanged
34h	(ATA) WRITE SECTOR(S) EXT	Sent	13312	Unchanged
39h	(ATA) WRITE MULTIPLE EXT	Sent	14592	Unchanged
CEh	(ATA) WRITE MULTIPLE FUA EXT	Sent	52736	Unchanged
3Bh	(ATA) WRITE STREAM EXT	Sent	15104	Unchanged
35h	(ATA) WRITE DMA EXT	Sent	13568	Unchanged
3Dh	(ATA) WRITE DMA FUA EXT	Sent	15616	Unchanged
36h	(ATA) WRITE DMA QUEUED EXT	Sent	13824	Unchanged
3Eh	(ATA) WRITE DMA QUEUED FUA EXT	Sent	15872	Unchanged
3Ah	(ATA) WRITE STREAM DMA EXT	Sent	14848	Unchanged
38h	(ATA) CFA WRITE SECTORS W/O ERASE	Sent	14336	Unchanged
CDh	(ATA) CFA WRITE MULTIPLE W/O ERASE	Sent	52480	Unchanged
C0h	(ATA) CFA ERASE SECTORS	Sent	49152	Unchanged
0Ah	(SCSI) WRITE 6	Sent	2576	Unchanged
2Ah	(SCSI) WRITE 10	Sent	10768	Unchanged
AAh	(SCSI) WRITE 12	Sent	43536	Unchanged
8Ah	(SCSI) WRITE 16	Sent	35344	Unchanged
7Fh	(SCSI) WRITE 32	Sent	32528	Unchanged
2Eh	(SCSI) WRITE AND VERIFY 10	Sent	11792	Unchanged
AEh	(SCSI) WRITE AND VERIFY 12	Sent	44560	Unchanged
8Eh	(SCSI) WRITE AND VERIFY 16	Sent	36368	Unchanged
7Fh	(SCSI) WRITE AND VERIFY 32	Sent	32529	Unchanged
41h	(SCSI) WRITE SAME 10	Sent	16656	Unchanged
93h	(SCSI) WRITE SAME 16	Sent	37648	Unchanged
7Fh	(SCSI) WRITE SAME 32	Sent	32530	Unchanged
3Fh	(SCSI) WRITE LONG 10	Sent	16144	Unchanged

```
9Fh    (SCSI) WRITE LONG 16          Sent        40720       Unchanged
32h    (ATA) WRITE LONG             Sent        12800       Unchanged
33h    (ATA) WRITE LONG w/o retries  Sent       13056       Unchanged
45h    (ATA) WRITE UNCORRECTABLE EXT Sent       17664       Unchanged

36 writes sent, 0 write(s) not blocked, 0 write commands unsupported.


RESULTS: test drive unchanged

run start Fri Jul  6 11:12:03 2018
run finish Fri Jul  6 11:12:04 2018
elapsed time 0:0:1
Normal exit


Status Key:
Sent -  the ioctl used to send this command returned without error and the
ATA error bit (if applicable) was not set.
Not supported -  the ioctl used to send this command return with an error
status or the command completed with the ATA error bit set.
Test terminated -  the test was terminated for dangerous commands because 3
or more previous commands were not blocked.


Result Key:
Unchanged -  no changes to the test drive were detected.
Not Blocked -  sending this command resulted in a change to the test drive.
This command was NOT blocked!
n/a -  Not applicable.
```

5.2.2. FireWire 400

```
/usr/lib/cgi-bin/test-hwb Fri Jul  6 11:10:40 2018
@(#) test-hwb.c Linux Version 1.4 created 06/27/18 at 10:56:14
compiled Jun 27 2018 10:56:31 with gcc Version 5.4.0 20160609
@(#) wrapper.c Linux Version 1.5 support lib created 08/03/17 at 13:05:44
@(#) ataraw.c Linux Version 1.3 support lib created 08/03/17 at 13:05:44
@(#) ataraw.h Linux Version 1.3 created 08/03/17 at 13:06:12
cmd: /usr/lib/cgi-bin/test-hwb -bh -p /media/cftt/FT-LOGS/FT-HWB-sata/ GP
WoFat FT-HWB-sata firewire400 sata /dev/sda
operator: GP
host: WoFat
test case: FT-HWB-sata
connection type: firewire400
drive/media type: sata
device: /dev/sda


Opcode  Command Name                 Status      Lba/Sector   Result
30h    (ATA) WRITE SECTOR(S)        Sent        12288       Unchanged
CAh    (ATA) WRITE DMA             Sent        51712       Unchanged
CCh    (ATA) WRITE DMA QUEUED      Sent        52224       Unchanged
C5h    (ATA) WRITE MULTIPLE        Sent        50432       Unchanged
31h    (ATA) WRITE SECTOR(S) w/o retries   Sent        12544
       Unchanged
CBh    (ATA) WRITE DMA w/o retries  Sent       51968       Unchanged
3Ch    (ATA) WRITE VERIFY          Sent        15360       Unchanged
34h    (ATA) WRITE SECTOR(S) EXT    Sent        13312       Unchanged
39h    (ATA) WRITE MULTIPLE EXT     Sent        14592       Unchanged
```

```
CEh     (ATA) WRITE MULTIPLE FUA EXT    Sent          52736         Unchanged
3Bh     (ATA) WRITE STREAM EXT          Sent          15104         Unchanged
35h     (ATA) WRITE DMA EXT             Sent          13568         Unchanged
3Dh     (ATA) WRITE DMA FUA EXT                 Sent          15616
        Unchanged
36h     (ATA) WRITE DMA QUEUED EXT      Sent          13824         Unchanged
3Eh     (ATA) WRITE DMA QUEUED FUA EXT Sent           15872         Unchanged
3Ah     (ATA) WRITE STREAM DMA EXT      Sent          14848         Unchanged
38h     (ATA) CFA WRITE SECTORS W/O ERASE       Sent          14336
        Unchanged
CDh     (ATA) CFA WRITE MULTIPLE W/O ERASE      Sent          52480
        Unchanged
C0h     (ATA) CFA ERASE SECTORS                 Sent          49152
        Unchanged
0Ah     (SCSI) WRITE 6                  Sent          2576          Unchanged
2Ah     (SCSI) WRITE 10                 Sent          10768         Unchanged
AAh     (SCSI) WRITE 12                 Sent          43536         Unchanged
8Ah     (SCSI) WRITE 16                 Sent          35344         Unchanged
7Fh     (SCSI) WRITE 32                 Sent          32528         Unchanged
2Eh     (SCSI) WRITE AND VERIFY 10      Sent          11792         Unchanged
AEh     (SCSI) WRITE AND VERIFY 12      Sent          44560         Unchanged
8Eh     (SCSI) WRITE AND VERIFY 16      Sent          36368         Unchanged
7Fh     (SCSI) WRITE AND VERIFY 32      Sent          32529         Unchanged
41h     (SCSI) WRITE SAME 10            Sent          16656         Unchanged
93h     (SCSI) WRITE SAME 16            Sent          37648         Unchanged
7Fh     (SCSI) WRITE SAME 32            Sent          32530         Unchanged
3Fh     (SCSI) WRITE LONG 10            Sent          16144         Unchanged
9Fh     (SCSI) WRITE LONG 16            Sent          40720         Unchanged
32h     (ATA) WRITE LONG                Sent          12800         Unchanged
33h     (ATA) WRITE LONG w/o retries    Sent          13056         Unchanged
45h     (ATA) WRITE UNCORRECTABLE EXT Sent            17664         Unchanged
```

36 writes sent, 0 write(s) not blocked, 0 write commands unsupported.

RESULTS: test drive unchanged

run start Fri Jul 6 11:10:40 2018
run finish Fri Jul 6 11:10:40 2018
elapsed time 0:0:0
Normal exit

Status Key:
Sent - the ioctl used to send this command returned without error and the
ATA error bit (if applicable) was not set.
Not supported - the ioctl used to send this command return with an error
status or the command completed with the ATA error bit set.
Test terminated - the test was terminated for dangerous commands because 3
or more previous commands were not blocked.

Result Key:
Unchanged - no changes to the test drive were detected.
Not Blocked - sending this command resulted in a change to the test drive.
This command was NOT blocked!
n/a - Not applicable.

5.2.3. FireWire 800

```
/usr/lib/cgi-bin/test-hwb Fri Jul  6 11:11:27 2018
@(#) test-hwb.c Linux Version 1.4 created 06/27/18 at 10:56:14
compiled Jun 27 2018 10:56:31 with gcc Version 5.4.0 20160609
@(#) wrapper.c Linux Version 1.5 support lib created 08/03/17 at 13:05:44
@(#) ataraw.c Linux Version 1.3 support lib created 08/03/17 at 13:05:44
@(#) ataraw.h Linux Version 1.3 created 08/03/17 at 13:06:12
cmd: /usr/lib/cgi-bin/test-hwb -bh -p /media/cftt/FT-LOGS/FT-HWB-sata/ GP
WoFat FT-HWB-sata firewire800 sata /dev/sda
operator: GP
host: WoFat
test case: FT-HWB-sata
connection type: firewire800
drive/media type: sata
device: /dev/sda
```

Opcode	Command Name	Status	Lba/Sector	Result
30h	(ATA) WRITE SECTOR(S)	Sent	12288	Unchanged
CAh	(ATA) WRITE DMA	Sent	51712	Unchanged
CCh	(ATA) WRITE DMA QUEUED	Sent	52224	Unchanged
C5h	(ATA) WRITE MULTIPLE	Sent	50432	Unchanged
31h	(ATA) WRITE SECTOR(S) w/o retries	Sent	12544	Unchanged
CBh	(ATA) WRITE DMA w/o retries	Sent	51968	Unchanged
3Ch	(ATA) WRITE VERIFY	Sent	15360	Unchanged
34h	(ATA) WRITE SECTOR(S) EXT	Sent	13312	Unchanged
39h	(ATA) WRITE MULTIPLE EXT	Sent	14592	Unchanged
CEh	(ATA) WRITE MULTIPLE FUA EXT	Sent	52736	Unchanged
3Bh	(ATA) WRITE STREAM EXT	Sent	15104	Unchanged
35h	(ATA) WRITE DMA EXT	Sent	13568	Unchanged
3Dh	(ATA) WRITE DMA FUA EXT	Sent	15616	Unchanged
36h	(ATA) WRITE DMA QUEUED EXT	Sent	13824	Unchanged
3Eh	(ATA) WRITE DMA QUEUED FUA EXT	Sent	15872	Unchanged
3Ah	(ATA) WRITE STREAM DMA EXT	Sent	14848	Unchanged
38h	(ATA) CFA WRITE SECTORS W/O ERASE	Sent	14336	Unchanged
CDh	(ATA) CFA WRITE MULTIPLE W/O ERASE	Sent	52480	Unchanged
C0h	(ATA) CFA ERASE SECTORS	Sent	49152	Unchanged
0Ah	(SCSI) WRITE 6	Sent	2576	Unchanged
2Ah	(SCSI) WRITE 10	Sent	10768	Unchanged
AAh	(SCSI) WRITE 12	Sent	43536	Unchanged
8Ah	(SCSI) WRITE 16	Sent	35344	Unchanged
7Fh	(SCSI) WRITE 32	Sent	32528	Unchanged
2Eh	(SCSI) WRITE AND VERIFY 10	Sent	11792	Unchanged
AEh	(SCSI) WRITE AND VERIFY 12	Sent	44560	Unchanged
8Eh	(SCSI) WRITE AND VERIFY 16	Sent	36368	Unchanged
7Fh	(SCSI) WRITE AND VERIFY 32	Sent	32529	Unchanged
41h	(SCSI) WRITE SAME 10	Sent	16656	Unchanged
93h	(SCSI) WRITE SAME 16	Sent	37648	Unchanged
7Fh	(SCSI) WRITE SAME 32	Sent	32530	Unchanged
3Fh	(SCSI) WRITE LONG 10	Sent	16144	Unchanged
9Fh	(SCSI) WRITE LONG 16	Sent	40720	Unchanged

```
32h     (ATA) WRITE LONG              Sent        12800       Unchanged
33h     (ATA) WRITE LONG w/o retries  Sent        13056       Unchanged
45h     (ATA) WRITE UNCORRECTABLE EXT Sent        17664       Unchanged


36 writes sent, 0 write(s) not blocked, 0 write commands unsupported.


RESULTS: test drive unchanged


run start Fri Jul  6 11:11:27 2018
run finish Fri Jul  6 11:11:28 2018
elapsed time 0:0:1
Normal exit


Status Key:
Sent -  the ioctl used to send this command returned without error and the
ATA error bit (if applicable) was not set.
Not supported -  the ioctl used to send this command return with an error
status or the command completed with the ATA error bit set.
Test terminated -  the test was terminated for dangerous commands because 3
or more previous commands were not blocked.


Result Key:
Unchanged -  no changes to the test drive were detected.
Not Blocked -  sending this command resulted in a change to the test drive.
This command was NOT blocked!
n/a -  Not applicable.
```

5.2.4. USB 3

```
/usr/lib/cgi-bin/test-hwb Fri Jul  6 11:10:59 2018
@(#) test-hwb.c Linux Version 1.4 created 06/27/18 at 10:56:14
compiled Jun 27 2018 10:56:31 with gcc Version 5.4.0 20160609
@(#) wrapper.c Linux Version 1.5 support lib created 08/03/17 at 13:05:44
@(#) ataraw.c Linux Version 1.3 support lib created 08/03/17 at 13:05:44
@(#) ataraw.h Linux Version 1.3 created 08/03/17 at 13:06:12
cmd: /usr/lib/cgi-bin/test-hwb -bh -p /media/cftt/FT-LOGS/FT-HWB-sata/ GP
WoFat FT-HWB-sata usb3 sata /dev/sda
operator: GP
host: WoFat
test case: FT-HWB-sata
connection type: usb3
drive/media type: sata
device: /dev/sda


Opcode  Command Name                  Status      Lba/Sector  Result
30h     (ATA) WRITE SECTOR(S)         Sent        12288       Unchanged
CAh     (ATA) WRITE DMA               Sent        51712       Unchanged
CCh     (ATA) WRITE DMA QUEUED        Sent        52224       Unchanged
C5h     (ATA) WRITE MULTIPLE          Sent        50432       Unchanged
31h     (ATA) WRITE SECTOR(S) w/o retries   Sent          12544
        Unchanged
CBh     (ATA) WRITE DMA w/o retries   Sent        51968       Unchanged
3Ch     (ATA) WRITE VERIFY            Sent        15360       Unchanged
34h     (ATA) WRITE SECTOR(S) EXT     Sent        13312       Unchanged
39h     (ATA) WRITE MULTIPLE EXT      Sent        14592       Unchanged
CEh     (ATA) WRITE MULTIPLE FUA EXT  Sent        52736       Unchanged
```

```
3Bh     (ATA) WRITE STREAM EXT          Sent          15104          Unchanged
35h     (ATA) WRITE DMA EXT             Sent          13568          Unchanged
3Dh     (ATA) WRITE DMA FUA EXT                  Sent          15616
        Unchanged
36h     (ATA) WRITE DMA QUEUED EXT      Sent          13824          Unchanged
3Eh     (ATA) WRITE DMA QUEUED FUA EXT Sent          15872          Unchanged
3Ah     (ATA) WRITE STREAM DMA EXT      Sent          14848          Unchanged
38h     (ATA) CFA WRITE SECTORS W/O ERASE        Sent          14336
        Unchanged
CDh     (ATA) CFA WRITE MULTIPLE W/O ERASE       Sent          52480
        Unchanged
C0h     (ATA) CFA ERASE SECTORS                  Sent          49152
        Unchanged
0Ah     (SCSI) WRITE 6                  Sent          2576           Unchanged
2Ah     (SCSI) WRITE 10                 Sent          10768          Unchanged
AAh     (SCSI) WRITE 12                 Sent          43536          Unchanged
8Ah     (SCSI) WRITE 16                 Sent          35344          Unchanged
7Fh     (SCSI) WRITE 32                 Sent          32528          Unchanged
2Eh     (SCSI) WRITE AND VERIFY 10      Sent          11792          Unchanged
AEh     (SCSI) WRITE AND VERIFY 12      Sent          44560          Unchanged
8Eh     (SCSI) WRITE AND VERIFY 16      Sent          36368          Unchanged
7Fh     (SCSI) WRITE AND VERIFY 32      Sent          32529          Unchanged
41h     (SCSI) WRITE SAME 10            Sent          16656          Unchanged
93h     (SCSI) WRITE SAME 16            Sent          37648          Unchanged
7Fh     (SCSI) WRITE SAME 32            Sent          32530          Unchanged
3Fh     (SCSI) WRITE LONG 10            Sent          16144          Unchanged
9Fh     (SCSI) WRITE LONG 16            Sent          40720          Unchanged
32h     (ATA) WRITE LONG                Sent          12800          Unchanged
33h     (ATA) WRITE LONG w/o retries    Sent          13056          Unchanged
45h     (ATA) WRITE UNCORRECTABLE EXT Sent          17664          Unchanged


36 writes sent, 0 write(s) not blocked, 0 write commands unsupported.


RESULTS: test drive unchanged

run start Fri Jul  6 11:10:59 2018
run finish Fri Jul  6 11:10:59 2018
elapsed time 0:0:0
Normal exit

Status Key:
Sent -  the ioctl used to send this command returned without error and the
ATA error bit (if applicable) was not set.
Not supported -  the ioctl used to send this command return with an error
status or the command completed with the ATA error bit set.
Test terminated -  the test was terminated for dangerous commands because 3
or more previous commands were not blocked.

Result Key:
Unchanged -  no changes to the test drive were detected.
Not Blocked -  sending this command resulted in a change to the test drive.
This command was NOT blocked!
n/a -  Not applicable.
```

5.3. Test Setup & Analysis Tool Versions

Version numbers of tools used are listed.

Setup & Analysis Tool Versions
test-hwb.c Linux Version 1.4 created 06/27/18 at 10:56:14

Tool: @(#) ft_hwb_prt_test_report.py Version 1.2 created 04/26/18 at 10:11:19
OS: Linux Version 4.13.0-37-generic
Federated Testing Version 3.1-1, released 06/27/2018