

March 2020

Test Results for Hardware Write Block Device:

Coolgear SS-127ASD USB 3.0 to SATA/IDE Adapter with Write-Protection

Federated Testing: CRU WriteBlocking Validation Utility

Federated Testing Suite for Hardware Write Blocking

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Introduction

The Computer Forensics Tool Testing (CFTT) program is a joint project of the Department of Homeland (DHS) Security Science and Technology Directorate (S&T), 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, and U.S. Internal Revenue Service Criminal Investigation Division Electronic Crimes Program, as well as the DHS 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 website (<https://www.cftt.nist.gov/>).

This document reports the results from testing the hardware write blocking function of the Coolgear SS-127ASD USB 3.0 to SATA/IDE Adapter with Write-Protection using the CRU WriteBlocking Validation Utility, Version 2.0.2.1 and the CFTT Federated Testing Test Suite for Hardware Write Blocking, Version 3.1-1. The CRU WriteBlocking Validation Utility uses the same test method as the CFTT Federated Testing Test Suite for Hardware Write Blocking.

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.
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:** Automatically generated test results that identify anomalies.
5. **Appendix: Additional details:** Additional details for each test case.

Test Results for Hardware Write Block Device: Coolgear SS-127ASD USB 3.0 to SATA/IDE Adapter

1. Device Description

Device Name: SS-127ASD USB 3.0 to SATA/IDE Adapter with Write-Protection
Firmware Version: unknown

Manufacturer Contact:

Manufacturer: Coolgear Inc
Address: 5120 110th Avenue North
Clearwater, Florida 33760
Tel: (888) 688-2188
WWW: <https://www.coolgear.com/>

2. Results Summary

The system requirements for the Coolgear SS-127ASD USB 3.0 to SATA/IDE Adapter with Write-Protection device are Windows or Mac OS 10.8+. The SS-127ASD device was tested using the CRU WriteBlocking Validation Utility in Windows 10. The SS-127ASD was also tested using the CFTT Federated Testing Test Suite for Hardware Write Blocking in Ubuntu 16.04.3. When tested in line with the device's system requirements using the Windows 10 test environment, the SS-127ASD device functioned as expected when write-protecting an IDE drive but failed to block several write commands when write-protecting a SATA drive. When tested outside of the device's documented system requirements using the Ubuntu 16.04.3 environment, the device failed to block several write commands for SATA and IDE drives.

3. Test Environment

Hardware:

Dell OptiPlex 7060 – used to run the CRU WriteBlocking Validation Utility.

Custom PC with 12 USB 2, 3 eSATA, 2 FireWire 800 and 3 FireWire 400 ports used to run the CFTT Federated Testing Test Suite for Hardware Write Blocking.

Coolgear SS-127ASD USB 3.0 to SATA/IDE Adapter with Write-Protection

Software:

CRU WriteBlocking Validation Utility Version 2.0.2.1 on Windows 10 Enterprise, Version 1803, build 17134.1006

4. Test Result Details by Test Environment

The following sections present the test results by test environment.

4.1. Test Result Details by Case (Tests Run in Windows 10)

This section presents test results grouped by case for tests run in Windows 10 using the CRU WriteBlock Validation Utility.

4.1.1. FT-HWB-ATA/IDE

4.1.1.1 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.

4.1.1.2 Test Drive Description

Manufacturer, model & size of the test drive used for this test: Western Digital, WD800AAJB-00J3A0, 80GB

4.1.1.3 Test Evaluation Criteria

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

4.1.1.4 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
USB 3	37	0

4.1.1.5 Case Summary

Test drive unchanged.

4.1.2. FT-HWB-SATA

4.1.2.1 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.

4.1.2.2 Test Drive Description

Manufacturer, model & size of the test drive used for this test: Kingston, SVP1200S246G, 64GB

4.1.2.3 Test Evaluation Criteria

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

4.1.2.4 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
USB 3	37	0

4.1.2.5 Case Summary

Test drive unchanged.

4.1.3. FT-HWB-SATA-2

4.1.3.1 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.

4.1.3.2 Test Drive Description

Manufacturer, model & size of the test drive used for this test: Seagate, ST980811AS, 80GB

4.1.3.3 Test Evaluation Criteria

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

4.1.3.4 Test Case Results

The following table presents results for the test case.

Test Results for FT-HWB-SATA-2		
Computer to Blocker Connection	Write Commands Sent	Writes Not Blocked
USB 3	38	7

4.1.3.5 Case Summary

Blocker DID NOT block all writes. The device did not block the ATA WRITE SECTOR(S), WRITE SECTOR(S) EXT, WRITE DMA, WRITE DMA EXT, WRITE SECTOR(S) w/o retries, WRITE DMA w/o retries, and WRITE LOG EXT commands.

4.2. Test Result Details by Case (Tests Run in Ubuntu 16.04.3)

This section presents test results grouped by case for tests run in Ubuntu 16.04.3 using the CFTT Federated Testing Test Suite for Hardware Write Blocking.

4.2.1. FT-HWB-ATA/IDE

4.2.1.1 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.

4.2.1.2 Test Drive Description

Manufacturer, model & size of the test drive used for this test: Western Digital, WD800AAJB-00J3A0, 80GB

4.2.1.3 Test Evaluation Criteria

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

4.2.1.4 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
USB 3	31	3

4.2.1.5 Case Summary

Blocker DID NOT block all writes. The device did not block the ATA WRITE SECTOR(S), WRITE SECTOR(S) w/o retries, and WRITE SECTOR(S) EXT commands.

4.2.2. FT-HWB-SATA

4.2.2.1 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.

4.2.2.2 Test Drive Description

Manufacturer, model & size of the test drive used for this test: Kingston, SVP1200S246G, 64GB

4.2.2.3 Test Evaluation Criteria

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

4.2.2.4 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
USB 3	31	10

4.2.2.5 Case Summary

Blocker DID NOT block all writes. The device did not block the ATA WRITE SECTOR(S), WRITE DMA, WRITE MULTIPLE, WRITE SECTOR(S) w/o retries, WRITE DMA w/o retries, WRITE SECTOR(S) EXT, WRITE MULTIPLE EXT, WRITE MULTIPLE FUA EXT, WRITE DMA EXT, and WRITE DMA FUA EXT commands.

5. Appendix: Additional Details

5.1. Tests Run in Windows 10

5.1.1. FT-HWB-ATA/IDE

5.1.1.1 USB 3

2019-10-15 12:21:10 PM | Starting test...

0x35 WRITE DMA EXT*	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful).
0x3D WRITE DMA FUA EXT*	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful).
0x61 WRITE FPDMA QUEUED	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful).
0x3E WRITE DMA QUEUED FUA EXT*	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful).
0x2A [SCSI] WRITE (10)*	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful (0x79)).
0xCA WRITE DMA*	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful).
0xCC WRITE DMA QUEUED*	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful).
0x36 WRITE DMA QUEUED EXT*	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful).
0x8A [SCSI] WRITE (16)*	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful (0x79)).
0x30 WRITE SECTOR(S)*	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful).
0x34 WRITE SECTOR(S) EXT*	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful).
0xC5 WRITE MULTIPLE*	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful).
0x39 WRITE MULTIPLE EXT*	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful).
0x3C WRITE VERIFY*	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful).
0x31 WRITE SECTOR(S) w/o retries*	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful).
0xCE WRITE MULTIPLE FUA EXT*	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful).
0xCB WRITE DMA w/o retries*	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful).
0x3F WRITE LOG EXT	INCOMPLETE	Pre-read failed, command may not be supported.
0x57 WRITE LOG DMA EXT	INCOMPLETE	Pre-read failed, command may not be supported.
0xCD CFA WRITE MULTIPLE WITHOUT ERASE*	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful).
0x38 CFA WRITE SECTORS WITHOUT ERASE*	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful).
0xC0 CFA ERASE SECTORS	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful).

0x3A WRITE STREAM DMA EXT*	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful).
0x3B WRITE STREAM EXT	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful).
0x0A [SCSI] WRITE (6)*	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful (0x79)).
0xAA [SCSI] WRITE (12)*	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful (0x79)).
0x7F [SCSI] WRITE (32)*	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful (0x32)).
0x2E [SCSI] WRITE AND VERIFY (10)	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful).
0xAE [SCSI] WRITE AND VERIFY (12)	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful).
0x8E [SCSI] WRITE AND VERIFY (16)	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful).
0x7F [SCSI] WRITE AND VERIFY (32)	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful (0x32)).
0x3F [SCSI] WRITE LONG (10)	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful).
0x9F [SCSI] WRITE LONG (16)	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful).
0x41 [SCSI] WRITE SAME (10)	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful).
0x93 [SCSI] WRITE SAME (16)	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful).
0x7F [SCSI] WRITE SAME (32)	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful (0x32)).
0x32 WRITE LONG w/ retries*	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful).
0x33 WRITE LONG w/o retries*	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful).
0x45 WRITE UNCORRECTABLE EXT*	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful).

2019-10-15 12:21:33 PM | Test complete.

Test Result - **PASS**. No sectors on the drive were modified during the test.

Results saved to the following location:

"C:\Program Files (x86)\CRU\WriteBlocking Validation Utility\Test Results\WriteBlockTest_2019_10_15_12_21_09.html".

Error Code Key

- **0x32**, The request is not supported.
- **0x79**, The semaphore timeout period has expired.

5.1.2. FT-HWB-SATA

5.1.2.1 USB 3

2019-10-09 03:30:21 PM | Starting test...

0x35 WRITE DMA EXT*	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful (0x79)).
0x3D WRITE DMA FUA EXT*	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful (0x79)).
0x61 WRITE FPDMA QUEUED	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful (0x79)).
0x3E WRITE DMA QUEUED FUA EXT*	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful (0x79)).
0x2A [SCSI] WRITE (10)*	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful (0x79)).
0xCA WRITE DMA*	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful (0x79)).
0xCC WRITE DMA QUEUED*	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful (0x79)).
0x36 WRITE DMA QUEUED EXT*	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful (0x79)).
0x8A [SCSI] WRITE (16)*	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful (0x79)).
0x30 WRITE SECTOR(S)*	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful (0x79)).
0x34 WRITE SECTOR(S) EXT*	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful (0x79)).
0xC5 WRITE MULTIPLE*	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful (0x79)).
0x39 WRITE MULTIPLE EXT*	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful (0x79)).
0x3C WRITE VERIFY*	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful (0x79)).
0x31 WRITE SECTOR(S) w/o retries*	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful (0x79)).
0xCE WRITE MULTIPLE FUA EXT*	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful (0x79)).
0xCB WRITE DMA w/o retries*	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful (0x79)).
0x3F WRITE LOG EXT	INCOMPLETE	Pre-read failed (0x79).
0x57 WRITE LOG DMA EXT	INCOMPLETE	Pre-read failed (0x79).
0xCD CFA WRITE MULTIPLE WITHOUT ERASE*	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful (0x79)).
0x38 CFA WRITE SECTORS WITHOUT ERASE*	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful (0x79)).
0xC0 CFA ERASE SECTORS	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful (0x79)).
0x3A WRITE STREAM DMA EXT*	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful (0x79)).
0x3B WRITE STREAM EXT	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful (0x79)).

0x0A [SCSI] WRITE (6)*	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful (0x79)).
0xAA [SCSI] WRITE (12)*	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful (0x79)).
0x7F [SCSI] WRITE (32)*	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful (0x32)).
0x2E [SCSI] WRITE AND VERIFY (10)	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful).
0xAE [SCSI] WRITE AND VERIFY (12)	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful).
0x8E [SCSI] WRITE AND VERIFY (16)	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful).
0x7F [SCSI] WRITE AND VERIFY (32)	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful (0x32)).
0x3F [SCSI] WRITE LONG (10)	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful).
0x9F [SCSI] WRITE LONG (16)	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful).
0x41 [SCSI] WRITE SAME (10)	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful).
0x93 [SCSI] WRITE SAME (16)	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful).
0x7F [SCSI] WRITE SAME (32)	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful (0x32)).
0x32 WRITE LONG w/ retries*	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful (0x79)).
0x33 WRITE LONG w/o retries*	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful (0x79)).
0x45 WRITE UNCORRECTABLE EXT*	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful (0x79)).

2019-10-09 03:36:04 PM | Test complete.

Test Result - **PASS**. No sectors on the drive were modified during the test.

Results saved to the following location:

"C:\Program Files (x86)\CRU\WriteBlocking Validation Utility\Test Results\WriteBlockTest_2019_10_09_15_30_19.html".

Error Code Key

- **0x32**, The request is not supported.
- **0x79**, The semaphore timeout period has expired.

5.1.3. FT-HWB-SATA-2

5.1.3.1 USB 3

2020-03-13 01:41:12 PM | Starting test...

0x35 WRITE DMA EXT*	SECTOR MODIFIED	Changes to sector detected.
0x3D WRITE DMA FUA EXT*	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful (0x79)).
0x61 WRITE FPDMA QUEUED	INCOMPLETE	Post-check failed (0x0).
0x3E WRITE DMA QUEUED FUA EXT*	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful (0x79)).
0x2A [SCSI] WRITE (10)*	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful (0x79)).
0xCA WRITE DMA*	SECTOR MODIFIED	Changes to sector detected.
0xCC WRITE DMA QUEUED*	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful (0x79)).
0x36 WRITE DMA QUEUED EXT*	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful (0x79)).
0x8A [SCSI] WRITE (16)*	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful (0x79)).
0x30 WRITE SECTOR(S)*	SECTOR MODIFIED	Changes to sector detected.
0x34 WRITE SECTOR(S) EXT*	SECTOR MODIFIED	Changes to sector detected.
0xC5 WRITE MULTIPLE*	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful (0x79)).
0x39 WRITE MULTIPLE EXT*	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful (0x79)).
0x3C WRITE VERIFY*	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful (0x79)).
0x31 WRITE SECTOR(S) w/o retries*	SECTOR MODIFIED	Changes to sector detected.
0xCE WRITE MULTIPLE FUA EXT*	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful (0x79)).
0xCB WRITE DMA w/o retries*	SECTOR MODIFIED	Changes to sector detected.
0x3F WRITE LOG EXT	SECTOR MODIFIED	Changes to sector detected.
0x57 WRITE LOG DMA EXT	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful (0x79)).
0xCD CFA WRITE MULTIPLE WITHOUT ERASE*	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful (0x79)).
0x38 CFA WRITE SECTORS WITHOUT ERASE*	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful (0x79)).
0xC0 CFA ERASE SECTORS	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful (0x79)).
0x3A WRITE STREAM DMA EXT*	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful (0x79)).
0x3B WRITE STREAM EXT	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful (0x79)).
0x0A [SCSI] WRITE (6)*	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful (0x79)).
0xAA [SCSI] WRITE (12)*	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful (0x79)).

0x7F [SCSI] WRITE (32)*	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful (0x32)).
0x2E [SCSI] WRITE AND VERIFY (10)	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful).
0xAE [SCSI] WRITE AND VERIFY (12)	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful).
0x8E [SCSI] WRITE AND VERIFY (16)	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful).
0x7F [SCSI] WRITE AND VERIFY (32)	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful (0x32)).
0x3F [SCSI] WRITE LONG (10)	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful).
0x9F [SCSI] WRITE LONG (16)	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful).
0x41 [SCSI] WRITE SAME (10)	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful).
0x93 [SCSI] WRITE SAME (16)	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful).
0x7F [SCSI] WRITE SAME (32)	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful (0x32)).
0x32 WRITE LONG w/ retries*	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful (0x79)).
0x33 WRITE LONG w/o retries*	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful (0x79)).
0x45 WRITE UNCORRECTABLE EXT*	SECTOR UNMODIFIED	No changes to sector detected (write unsuccessful (0x79)).

2020-03-13 01:42:44 PM | Test complete.

Test Result - **FAIL**. Sectors on the drive were modified during the test. Results saved to the following location:

"C:\Program Files (x86)\CRU\WriteBlocking Validation Utility\Test Results\WriteBlockTest_2020_03_13_13_41_11.html".

5.1.3.2 Error Code Key

- **0x32**, The request is not supported.
- **0x79**, The semaphore timeout period has expired.

5.2. Tests Run in Ubuntu 16.04.3

5.2.1. FT-HWB-ATA/IDE

5.2.1.1 USB 3

```
/usr/lib/cgi-bin/test-hwb Thu Jul 12 11:07:55 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/sdc
operator: GP
host: WoFat
test case: FT-HWB-ata
connection type: usb3
drive/media type: ata
device: /dev/sdc
```

Opcode	Command Name	Status	Lba/Sector	Result
30h	(ATA) WRITE SECTOR(S)	Sent	12288	Not Blocked
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	Not Blocked
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	Not Blocked
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	Test terminated!		n/a
9Fh	(SCSI) WRITE LONG 16	Test terminated!		n/a


```

32h      (ATA) WRITE LONG          Test terminated!          n/a
33h      (ATA) WRITE LONG w/o retries Test terminated!          n/a
45h      (ATA) WRITE UNCORRECTABLE EXT Test terminated!          n/a

```

31 writes sent, 3 write(s) not blocked, 0 write commands unsupported.

RESULTS: blocker DID NOT block all writes

```

run start Thu Jul 12 11:07:55 2018
run finish Thu Jul 12 11:09:38 2018
elapsed time 0:1:43
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. FT-HWB-SATA

5.2.2.1 USB 3

```

/usr/lib/cgi-bin/test-hwb Thu Jul 12 10:55:09 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/sdc
operator: GP
host: WoFat
test case: FT-HWB-sata
connection type: usb3
drive/media type: sata
device: /dev/sdc

```

Opcode	Command Name	Status	Lba/Sector	Result
30h	(ATA) WRITE SECTOR(S)	Sent	12288	Not Blocked
CAh	(ATA) WRITE DMA	Sent	51712	Not Blocked
CCh	(ATA) WRITE DMA QUEUED	Sent	52224	Unchanged
C5h	(ATA) WRITE MULTIPLE	Sent	50432	Not Blocked
31h	(ATA) WRITE SECTOR(S) w/o retries	Sent	12544	Not Blocked
CBh	(ATA) WRITE DMA w/o retries	Sent	51968	Not Blocked
3Ch	(ATA) WRITE VERIFY	Sent	15360	Unchanged
34h	(ATA) WRITE SECTOR(S) EXT	Sent	13312	Not Blocked
39h	(ATA) WRITE MULTIPLE EXT	Sent	14592	Not Blocked

CEh	(ATA) WRITE MULTIPLE FUA EXT	Sent	52736	Not Blocked
3Bh	(ATA) WRITE STREAM EXT	Sent	15104	Unchanged
35h	(ATA) WRITE DMA EXT	Sent	13568	Not Blocked
3Dh	(ATA) WRITE DMA FUA EXT	Sent	15616	Not Blocked
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	Sent	14336	Unchanged
	W/O ERASE			
CDh	(ATA) CFA WRITE MULTIPLE	Sent	52480	Unchanged
C0h	(ATA) CFA ERASE SECTORS	Sent	49152	Unchanged
	W/O ERASE			
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
A Eh	(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	Test terminated!		n/a
9Fh	(SCSI) WRITE LONG 16	Test terminated!		n/a
32h	(ATA) WRITE LONG	Test terminated!		n/a
33h	(ATA) WRITE LONG w/o retries	Test terminated!		n/a
45h	(ATA) WRITE UNCORRECTABLE EXT	Test terminated!		n/a

31 writes sent, 10 write(s) not blocked, 0 write commands unsupported.

RESULTS: blocker DID NOT block all writes

run start Thu Jul 12 10:55:09 2018
run finish Thu Jul 12 10:57:31 2018
elapsed time 0:2:22
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.