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

CFTT Federated Testing Test Suite for Hardware Write Blocking, Version 3.1-1 on Ubuntu 16.04.3

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 Blocker			
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...

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0x30 WRITE SECTOR(S)* SECTOR UNMODIFIED (write unsuccessful). No changes to sector detected (write unsuccessful). 0x34 WRITE SECTOR(S) EXT* SECTOR UNMODIFIED (write unsuccessful). No changes to sector detected (write unsuccessful). 0xC5 WRITE MULTIPLE* SECTOR UNMODIFIED (write unsuccessful). No changes to sector detected (write unsuccessful). 0x39 WRITE VERIFY* SECTOR UNMODIFIED (write unsuccessful). No changes to sector detected (write unsuccessful). 0x31 WRITE SECTOR(S) W/O retries* SECTOR UNMODIFIED (write unsuccessful). 0xCE WRITE MULTIPLE FUA EXT* SECTOR UNMODIFIED (write unsuccessful). 0xCB WRITE DMA W/O retries* SECTOR UNMODIFIED (write unsuccessful). 0x3F WRITE LOG EXT INCOMPLETE (write unsuccessful). 0x3F WRITE LOG EXT INCOMPLETE (write unsuccessful). 0x57 WRITE LOG DMA EXT INCOMPLETE (write unsuccessful). 0x57 WRITE MULTIPLE (write unsuccessful). SECTOR UNMODIFIED (write unsuccessful). 0x58 CFA WRITE SECTORS SECTOR UNMODIFIED (write unsuccessful). 0x38 CFA WRITE SECTORS SECTOR UNMODIFIED (write unsuccessful). 0x50 CFA ERASE SECTORS SECTOR UNMODIFIED (write unsuccessful).	OXON [SCSI] WRITE (10)	SECTOR UNHODIFIED	
(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). 0x30 WRITE VERIFY* SECTOR UNMODIFIED No changes to sector detected (write unsuccessful). 0x31 WRITE SECTOR(S) w/o SECTOR UNMODIFIED No changes to sector detected (write unsuccessful). 0xCE WRITE MULTIPLE FUA EXT* OxCB WRITE DMA w/o SECTOR UNMODIFIED No changes to sector detected (write unsuccessful). 0xGB 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* (write unsuccessful). 0x38 CFA WRITE SECTORS SECTOR UNMODIFIED No changes to sector detected (write unsuccessful). 0x38 CFA WRITE SECTORS SECTOR UNMODIFIED No changes to sector detected (write unsuccessful).	0.20 LIDITE CECTOR(C)*	CECTOR INMORTETER	
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(write unsuccessful). 0x31 WRITE SECTOR(S) w/o SECTOR UNMODIFIED No changes to sector detected (write unsuccessful). 0xCE WRITE MULTIPLE FUA SECTOR UNMODIFIED No changes to sector detected (write unsuccessful). 0xCB WRITE DMA w/o 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 SECTOR UNMODIFIED No changes to sector detected (write unsuccessful). 0x38 CFA WRITE SECTORS SECTOR UNMODIFIED No changes to sector detected (write unsuccessful). 0xCO CFA ERASE SECTORS SECTOR UNMODIFIED No changes to sector detected (write unsuccessful).	0x3C WRITE VERIFY*	SECTOR UNMODIFIED	No changes to sector detected
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ØXCE WRITE MULTIPLE FUA SECTOR UNMODIFIED No changes to sector detected (write unsuccessful). ØXCB WRITE DMA w/o retries* SECTOR UNMODIFIED No changes to sector detected (write unsuccessful). ØX3F WRITE LOG EXT INCOMPLETE Pre-read failed, command may not be supported. ØX57 WRITE LOG DMA EXT INCOMPLETE Pre-read failed, command may not be supported. ØXCD CFA WRITE MULTIPLE WITHOUT ERASE* Write unsuccessful). ØX38 CFA WRITE SECTORS SECTOR UNMODIFIED No changes to sector detected (write unsuccessful). ØXCØ CFA ERASE SECTORS SECTOR UNMODIFIED No changes to sector detected ØXCØ CFA ERASE SECTORS SECTOR UNMODIFIED No changes to sector detected			
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ØXCB WRITE DMA w/o SECTOR UNMODIFIED No changes to sector detected (write unsuccessful). ØX3F WRITE LOG EXT INCOMPLETE Pre-read failed, command may not be supported. ØX57 WRITE LOG DMA EXT INCOMPLETE Pre-read failed, command may not be supported. ØXCD CFA WRITE MULTIPLE WITHOUT ERASE* SECTOR UNMODIFIED (write unsuccessful). ØX38 CFA WRITE SECTORS SECTOR UNMODIFIED (write unsuccessful). ØXCØ CFA ERASE SECTORS SECTOR UNMODIFIED No changes to sector detected ØXCØ CFA ERASE SECTORS SECTOR UNMODIFIED No changes to sector detected		Secretary States and Secretary	
retries* 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* 0x38 CFA WRITE SECTORS WITHOUT ERASE* 0xCO CFA ERASE SECTORS SECTOR UNMODIFIED No changes to sector detected (write unsuccessful). No changes to sector detected (write unsuccessful).		SECTOR LINMODIETED	
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 (write unsuccessful). 0x38 CFA WRITE SECTORS SECTOR UNMODIFIED (write unsuccessful). 0xC0 CFA ERASE SECTORS SECTOR UNMODIFIED (write unsuccessful). 0xC0 CFA ERASE SECTORS SECTOR UNMODIFIED (write unsuccessful).		SECTOR GIALODITIES	
be supported. 0x57 WRITE LOG DMA EXT INCOMPLETE Pre-read failed, command may not be supported. 0xCD CFA WRITE MULTIPLE WITHOUT ERASE* 0x38 CFA WRITE SECTORS WITHOUT ERASE* 0xCO CFA ERASE SECTORS SECTOR UNMODIFIED No changes to sector detected (write unsuccessful). No changes to sector detected (write unsuccessful).		TNCOMPLETE	
Øx57 WRITE LOG DMA EXT INCOMPLETE Pre-read failed, command may not be supported. ØxCD CFA WRITE MULTIPLE WITHOUT ERASE* SECTOR UNMODIFIED (write unsuccessful). Øx38 CFA WRITE SECTORS WITHOUT ERASE* SECTOR UNMODIFIED (write unsuccessful). ØxCØ CFA ERASE SECTORS SECTOR UNMODIFIED (write unsuccessful). ØxCØ CFA ERASE SECTORS SECTOR UNMODIFIED (write unsuccessful).	OVOL MUTIE FOR EVI	INCOMPLETE	
be supported. OxCD CFA WRITE MULTIPLE SECTOR UNMODIFIED No changes to sector detected (write unsuccessful). Ox38 CFA WRITE SECTORS SECTOR UNMODIFIED No changes to sector detected (write unsuccessful). OxCO CFA ERASE SECTORS SECTOR UNMODIFIED No changes to sector detected (write unsuccessful).	OVEZ LIDITE LOC DMA EVI	THEOMOLETE	
ØXCD CFA WRITE MULTIPLE SECTOR UNMODIFIED No changes to sector detected (write unsuccessful). ØX38 CFA WRITE SECTORS SECTOR UNMODIFIED No changes to sector detected (write unsuccessful). ØXCØ CFA ERASE SECTORS SECTOR UNMODIFIED No changes to sector detected	MX3/ WKIIE LUG DMA EXI	TINCOMPLETE	
WITHOUT ERASE* (write unsuccessful). 0x38 CFA WRITE SECTORS WITHOUT ERASE* (write unsuccessful). No changes to sector detected (write unsuccessful). 0xC0 CFA ERASE SECTORS SECTOR UNMODIFIED No changes to sector detected	0.00.054.1/0777	CTCTOR INVICTOR	
Øx38 CFA WRITE SECTORS SECTOR UNMODIFIED No changes to sector detected (write unsuccessful). ØxCØ CFA ERASE SECTORS SECTOR UNMODIFIED No changes to sector detected		SECTOR UNMODIFIED	
WITHOUT ERASE* (write unsuccessful). 0xC0 CFA ERASE SECTORS SECTOR UNMODIFIED No changes to sector detected			
0xC0 CFA ERASE SECTORS SECTOR UNMODIFIED No changes to sector detected		SECTOR UNMODIFIED	
(write unsuccessful).	0xC0 CFA ERASE SECTORS	SECTOR UNMODIFIED	
			(write unsuccessful).

O. OA LIDTTE CTREAM DMA EVTY	CECTOR UNMORTETER	No shares to seetan datastad
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	SECTOR UNMODIFIED	No changes to sector detected
VERIFY (10)	SECTOR ON TODAY IED	(write unsuccessful).
, ,	CECTOR UNIMORITETER	
0xAE [SCSI] WRITE AND	SECTOR UNMODIFIED	No changes to sector detected
VERIFY (12)		(write unsuccessful).
0x8E [SCSI] WRITE AND	SECTOR UNMODIFIED	No changes to sector detected
VERIFY (16)		(write unsuccessful).
0x7F [SCSI] WRITE AND	SECTOR UNMODIFIED	No changes to sector detected
VERIFY (32)		(write unsuccessful (0x32)).
0x3F [SCSI] WRITE LONG	SECTOR UNMODIFIED	No changes to sector detected
(10)		(write unsuccessful).
0x9F [SCSI] WRITE LONG	SECTOR UNMODIFIED	No changes to sector detected
(16)		(write unsuccessful).
0x41 [SCSI] WRITE SAME	SECTOR UNMODIFIED	No changes to sector detected
(10)	SECTOR ON IODET TED	(write unsuccessful).
0x93 [SCSI] WRITE SAME	SECTOR UNMODIFIED	No changes to sector detected
(16)	SECTOR ONNODITIED	(write unsuccessful).
` '	CECTOR UNIMORIETER	
0x7F [SCSI] WRITE SAME	SECTOR UNMODIFIED	No changes to sector detected
(32)		(write unsuccessful (0x32)).
0x32 WRITE LONG w/	SECTOR UNMODIFIED	No changes to sector detected
retries*		(write unsuccessful).
0x33 WRITE LONG w/o	SECTOR UNMODIFIED	No changes to sector detected
retries*		(write unsuccessful).
0x45 WRITE UNCORRECTABLE	SECTOR UNMODIFIED	No changes to sector detected
EXT*		(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-SATA5.1.2.1 USB 3

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

O. OF LIDTTE DAY EVT*	CECTOR INMOSTETES	No shanna ka saata dataa t
0x35 WRITE DMA EXT*	SECTOR UNMODIFIED	No changes to sector detected
O 3D LIBITE DAY 5114 5VE*	CECTOR LINESCOTTER	(write unsuccessful (0x79)).
0x3D WRITE DMA FUA EXT*	SECTOR UNMODIFIED	No changes to sector detected
0.64 UDITE EDDUA QUEUE	CECTOR INDICATED	(write unsuccessful (0x79)).
0x61 WRITE FPDMA QUEUED	SECTOR UNMODIFIED	No changes to sector detected
0.05 UDTT DV 000000	CTCTOR INDICATION	(write unsuccessful (0x79)).
0x3E WRITE DMA QUEUED FUA	SECTOR UNMODIFIED	No changes to sector detected
EXT*		(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	SECTOR UNMODIFIED	No changes to sector detected
EXT*		(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	SECTOR UNMODIFIED	No changes to sector detected
retries*		(write unsuccessful (0x79)).
0xCE WRITE MULTIPLE FUA	SECTOR UNMODIFIED	No changes to sector detected
EXT*		(write unsuccessful (0x79)).
0xCB WRITE DMA w/o	SECTOR UNMODIFIED	No changes to sector detected
retries*		(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	SECTOR UNMODIFIED	No changes to sector detected
WITHOUT ERASE*		(write unsuccessful (0x79)).
0x38 CFA WRITE SECTORS	SECTOR UNMODIFIED	No changes to sector detected
WITHOUT ERASE*		(write unsuccessful (0x79)).
0xC0 CFA ERASE SECTORS	SECTOR UNMODIFIED	No changes to sector detected
		(write unsuccessful (0x79)).
0x3A WRITE STREAM DMA	SECTOR UNMODIFIED	No changes to sector detected
EXT*		(write unsuccessful (0x79)).
0x3B WRITE STREAM EXT	SECTOR UNMODIFIED	No changes to sector detected
		(write unsuccessful (0x79)).

0 04 [CCCT] UDITE (C)*	CECTOR INMORTETER	No. alconomic and the delicated
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	SECTOR UNMODIFIED	No changes to sector detected
VERIFY (10)		(write unsuccessful).
0xAE [SCSI] WRITE AND	SECTOR UNMODIFIED	No changes to sector detected
VERIFY (12)		(write unsuccessful).
0x8E [SCSI] WRITE AND	SECTOR UNMODIFIED	No changes to sector detected
VERIFY (16)		(write unsuccessful).
0x7F [SCSI] WRITE AND	SECTOR UNMODIFIED	No changes to sector detected
VERIFY (32)		(write unsuccessful (0x32)).
0x3F [SCSI] WRITE LONG	SECTOR UNMODIFIED	No changes to sector detected
(10)		(write unsuccessful).
0x9F [SCSI] WRITE LONG	SECTOR UNMODIFIED	No changes to sector detected
(16)		(write unsuccessful).
0x41 [SCSI] WRITE SAME	SECTOR UNMODIFIED	No changes to sector detected
(10)		(write unsuccessful).
0x93 [SCSI] WRITE SAME	SECTOR UNMODIFIED	No changes to sector detected
(16)		(write unsuccessful).
0x7F [SCSI] WRITE SAME	SECTOR UNMODIFIED	No changes to sector detected
(32)		(write unsuccessful (0x32)).
0x32 WRITE LONG w/	SECTOR UNMODIFIED	No changes to sector detected
retries*		(write unsuccessful (0x79)).
0x33 WRITE LONG w/o	SECTOR UNMODIFIED	No changes to sector detected
retries*		(write unsuccessful (0x79)).
0x45 WRITE UNCORRECTABLE	SECTOR UNMODIFIED	No changes to sector detected
EXT*		(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...

O. OF LIDTTE DMA EVT*	CECTOR MORTETER	Change to seeken detected
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	SECTOR UNMODIFIED	No changes to sector detected
FUA EXT*		(write unsuccessful (0x79)).
0x2A [SCSI] WRITE (10)*	SECTOR UNMODIFIED	No changes to sector detected
0X2A [3C31] WKITE (10)	SECTOR GRANDETT TED	(write unsuccessful (0x79)).
O CA LIDITE DMAY	CECTOR HORIETER	
0×CA 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	SECTOR UNMODIFIED	No changes to sector detected
EXT*		(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)	SECTOR MODIFIED	
1	SECTOR MODIFIED	Changes to sector detected.
EXT*		
0xC5 WRITE MULTIPLE*	SECTOR UNMODIFIED	No changes to sector detected
		(write unsuccessful (0x79)).
0x39 WRITE MULTIPLE	SECTOR UNMODIFIED	No changes to sector detected
EXT*		(write unsuccessful (0x79)).
0x3C WRITE VERIFY*	SECTOR UNMODIFIED	No changes to sector detected
OXSC MILIT VEILET	Decroit officering	(write unsuccessful (0x79)).
0x31 WRITE SECTOR(S)	SECTOR MODIFIED	Changes to sector detected.
	SECTOR MODIFIED	changes to sector detected.
w/o retries*		
0xCE WRITE MULTIPLE FUA	SECTOR UNMODIFIED	No changes to sector detected
EXT*		(write unsuccessful (0x79)).
0xCB WRITE DMA w/o	SECTOR MODIFIED	Changes to sector detected.
retries*		
0x3F WRITE LOG EXT	SECTOR MODIFIED	Changes to sector detected.
0x57 WRITE LOG DMA EXT	SECTOR UNMODIFIED	No changes to sector detected
OXS7 MILTE EGG BIBLEXI	Decroit officering	(write unsuccessful (0x79)).
0xCD CFA WRITE MULTIPLE	SECTOR UNMODIFIED	No changes to sector detected
WITHOUT ERASE*	SECION ONNIODIFIED	
	CECTOR LINIMORTETER	(write unsuccessful (0x79)).
0x38 CFA WRITE SECTORS	SECTOR UNMODIFIED	No changes to sector detected
WITHOUT ERASE*		(write unsuccessful (0x79)).
0xC0 CFA ERASE SECTORS	SECTOR UNMODIFIED	No changes to sector detected
		(write unsuccessful (0x79)).
0x3A WRITE STREAM DMA	SECTOR UNMODIFIED	No changes to sector detected
EXT*		(write unsuccessful (0x79)).
0x3B WRITE STREAM EXT	SECTOR UNMODIFIED	No changes to sector detected
OVOD MITTE STITEMED EVI	SECTOR GRANDELL TED	(write unsuccessful (0x79)).
OVON [COCT] LIBITE (C)*	CECTOR LINIMORTETER	
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	SECTOR UNMODIFIED	No changes to sector detected
VERIFY (10)		(write unsuccessful).
0xAE [SCSI] WRITE AND	SECTOR UNMODIFIED	No changes to sector detected
VERIFY (12)		(write unsuccessful).
0x8E [SCSI] WRITE AND	SECTOR UNMODIFIED	No changes to sector detected
VERIFY (16)		(write unsuccessful).
0x7F [SCSI] WRITE AND	SECTOR UNMODIFIED	No changes to sector detected
VERIFY (32)		(write unsuccessful (0x32)).
0x3F [SCSI] WRITE LONG	SECTOR UNMODIFIED	No changes to sector detected
(10)		(write unsuccessful).
0x9F [SCSI] WRITE LONG	SECTOR UNMODIFIED	No changes to sector detected
(16)		(write unsuccessful).
0x41 [SCSI] WRITE SAME	SECTOR UNMODIFIED	No changes to sector detected
(10)		(write unsuccessful).
0x93 [SCSI] WRITE SAME	SECTOR UNMODIFIED	No changes to sector detected
(16)		(write unsuccessful).
0x7F [SCSI] WRITE SAME	SECTOR UNMODIFIED	No changes to sector detected
(32)		(write unsuccessful (0x32)).
0x32 WRITE LONG w/	SECTOR UNMODIFIED	No changes to sector detected
retries*		(write unsuccessful (0x79)).
0x33 WRITE LONG w/o	SECTOR UNMODIFIED	No changes to sector detected
retries*		(write unsuccessful (0x79)).
0x45 WRITE	SECTOR UNMODIFIED	No changes to sector detected
UNCORRECTABLE EXT*		(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

 $\verb|cmd: /usr/lib/cgi-bin/test-hwb -bh -p /media/cftt/FT-LOGS/FT-HWB-ata/ GP| \\$

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)	Sent	12544	Not Blocked
	w/o retries			
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	Sent	14336	Unchanged
	W/O ERASE			
CDh	(ATA) CFA WRITE MULTIPLE	Sent	52480	Unchanged
	W/O ERASE			
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	1!	n/a
9Fh	(SCSI) WRITE LONG 16	Test terminated	1!	n/a

32h	(ATA)	WRITE	LONG	Test	terminated!	n/a
33h	(ATA)	WRITE	LONG w/o retrie	s Test	terminated!	n/a
45h	(ATA)	WRITE	UNCORRECTABLE E	XT 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	Commai	nd Name	е	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)	Sent	12544	Not Blocked
		w/o	retries			
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
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, 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.