Test Results for Write-Protected Drive: Apricorn Secure Key NX Firmware Version 04444

Federated Testing Suite for Hardware Write Blocking

June 2020
This report was prepared for the Department of Homeland Security (DHS) Science and Technology Directorate (S&T) by the Office of Law Enforcement Standards of the National Institute of Standards and Technology.

For additional information about ongoing DHS S&T cybersecurity projects, please visit https://www.dhs.gov/science-and-technology/cybersecurity.
Test Results for Write-Protected Drive:
Apricorn Secure Key NX Firmware Version 0444

Federated Testing Suite for Hardware Write Blocking
Contents

Introduction ..................................................................................................................................... 5
How to Read This Report ............................................................................................................... 6
1 Device Description .................................................................................................................. 7
2 Testing Organization ............................................................................................................... 7
3 Results Summary .................................................................................................................... 7
4 Test Environment .................................................................................................................... 7
5 Test Result Details by Case .................................................................................................... 8
   5.1 FT-HWB-USB ................................................................................................................. 8
      5.1.1 Test Case Description ............................................................................................... 8
      5.1.2 Test Drive Description .............................................................................................. 8
      5.1.3 Test Evaluation Criteria ............................................................................................ 8
      5.1.4 Test Case Results ...................................................................................................... 8
      5.1.5 Case Summary .......................................................................................................... 8
6 Appendix: Additional Details ................................................................................................. 9
   6.1 FT-HWB-USB ................................................................................................................. 9
      6.1.1 USB 3 ........................................................................................................................ 9
   6.2 Test Setup & Analysis Tool Versions ............................................................................ 10
Introduction

The Computer Forensics Tool Testing (CFTT) program is a joint project of the Department of Homeland Security (DHS) 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, U.S. Internal Revenue Service Criminal Investigation Division Electronic Crimes Program, and 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 web site (https://www.cftt.nist.gov/).

This document reports the results from testing the read-only function of the Apricorn Secure Key NX device firmware version 0444 using the CFTT Federated Testing Test Suite for Hardware Write Blocking, Version 3.1.

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 test the tools that they use in their labs and 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 device name, version and vendor information are listed.
2. Testing Organization. Contact information and approvals.
3. Results Summary. This section identifies any significant anomalies observed in the test runs. This section provides a narrative of key findings identifying where the device meets expectations and provides a summary of any ways the device did not meet expectations. The section also provides any observations of interest about the device or about testing the device, including any observed limitations on device use.
4. Test Environment. Description of hardware and software used in device testing.
5. Test Result Details by Case. Automatically generated test results that identify anomalies.
6. Appendix: Additional details. Additional details for each test case.
Federated Testing Test Results for Write-Protected Drive: Apricorn Secure Key NX Firmware Version 0444

1 Device Description

Device Name: Secure Key NX
Firmware Version: 0444

Manufacturer Contact:

  Manufacturer: Apricorn
  Address: 12191 Kirkham Road
           Poway, CA 92064
  Tel: (800) 458-5448
  WWW: https://www.apricorn.com

2 Testing Organization

Organization conducting test: Apricorn
Contact: Kevin Su
Report date: 8-22-19
Authored by: Mark D

3 Results Summary

Data on the test device was unchanged.

4 Test Environment

Hardware: tests were run using a computer with an ASUS ROG STRIX B450-F Gaming motherboard, AMD Ryzen 5 2600 Six Core CPU, and 16 GB DDR4 Corsair memory.

Secure Key NX, firmware version 0444. Put the drive in read-only mode before testing to repeat the tests.
5 Test Result Details by Case

This section presents test results grouped by case.

5.1 FT-HWB-USB
5.1.1 Test Case Description

Test a USB key or USB portable drive’s ability to write-protect when Read-Only mode is enabled. Test the ability of the USB key or USB portable drive to block write commands from the ATA and SCSI command sets issued from a test computer.

5.1.2 Test Drive Description

Manufacturer, model & size of the test drive used for this test: Secure Key NX (ASK3-NX-xGB) configured in read-only mode; 32GB used for the test.

5.1.3 Test Evaluation Criteria

The number of ‘writes not blocked’ should be 0.

5.1.4 Test Case Results

The following table presents results for the test case.

<table>
<thead>
<tr>
<th>Computer to Drive Connection</th>
<th>Write Commands Sent</th>
<th>Writes Not Blocked</th>
</tr>
</thead>
<tbody>
<tr>
<td>USB 3</td>
<td>36</td>
<td>0</td>
</tr>
</tbody>
</table>

5.1.5 Case Summary

Test drive unchanged.
# 6 Appendix: Additional Details

## 6.1 FT-HWB-USB

### 6.1.1 USB 3

```
Appendix: Additional Details
6.1 FT-HWB-USB
6.1.1 USB 3

/usr/lib/cgi-bin/test-hwb Tue Sep 24 16:20:50 2019
@(#) test-hwb.c Linux Version 1.3 created 05/17/18 at 15:05:48
compiled May 17 2018 15:06:05 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-usb/ Mark_D.
AMD5 FT-HWB-usb usb3 usb /dev/sdc
operator: Mark_D.
host: AMD5
test case: FT-HWB-usb
connection type: usb3
drive/media type: usb
device: /dev/sdc
device type (ATA or SCSI - /usr/lib/cgi-bin/test-hwb tries to guess):
  SCSI

<table>
<thead>
<tr>
<th>Opcode</th>
<th>Command Name</th>
<th>Status</th>
<th>Lba/Sector</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>30h</td>
<td>(ATA) WRITE SECTOR(S)</td>
<td>Sent</td>
<td>12288</td>
<td>Unchanged</td>
</tr>
<tr>
<td>CBh</td>
<td>(ATA) WRITE DMA w/o retries</td>
<td>Sent</td>
<td>51968</td>
<td>Unchanged</td>
</tr>
<tr>
<td>34h</td>
<td>(ATA) WRITE SECTOR(S) EXT</td>
<td>Sent</td>
<td>13312</td>
<td>Unchanged</td>
</tr>
<tr>
<td>39h</td>
<td>(ATA) WRITE MULTIPLE</td>
<td>Sent</td>
<td>14592</td>
<td>Unchanged</td>
</tr>
<tr>
<td>3Ch</td>
<td>(ATA) WRITE DMA</td>
<td>Sent</td>
<td>52224</td>
<td>Unchanged</td>
</tr>
<tr>
<td>3Ch</td>
<td>(ATA) WRITE VERIFY</td>
<td>Sent</td>
<td>51712</td>
<td>Unchanged</td>
</tr>
<tr>
<td>39h</td>
<td>(ATA) WRITE SECTOR(S) EXT</td>
<td>Sent</td>
<td>13312</td>
<td>Unchanged</td>
</tr>
<tr>
<td>39h</td>
<td>(ATA) WRITE DMA FUA EXT</td>
<td>Sent</td>
<td>15104</td>
<td>Unchanged</td>
</tr>
<tr>
<td>35h</td>
<td>(ATA) WRITE DMA</td>
<td>Sent</td>
<td>13568</td>
<td>Unchanged</td>
</tr>
<tr>
<td>36h</td>
<td>(ATA) WRITE DMA</td>
<td>Sent</td>
<td>15616</td>
<td>Unchanged</td>
</tr>
<tr>
<td>3Ah</td>
<td>(ATA) WRITE DMA FUA EXT</td>
<td>Sent</td>
<td>14848</td>
<td>Unchanged</td>
</tr>
<tr>
<td>38h</td>
<td>(ATA) CFA WRITE SECTORS</td>
<td>Sent</td>
<td>14336</td>
<td>Unchanged</td>
</tr>
<tr>
<td>CDh</td>
<td>(ATA) CFA WRITE MULTIPLE</td>
<td>Sent</td>
<td>52480</td>
<td>Unchanged</td>
</tr>
<tr>
<td>C0h</td>
<td>(ATA) CFA ERASE SECTORS</td>
<td>Sent</td>
<td>49152</td>
<td>Unchanged</td>
</tr>
<tr>
<td>0Ah</td>
<td>(SCSI) WRITE 6</td>
<td>Sent</td>
<td>2576</td>
<td>Unchanged</td>
</tr>
<tr>
<td>2Ah</td>
<td>(SCSI) WRITE 10</td>
<td>Sent</td>
<td>10768</td>
<td>Unchanged</td>
</tr>
<tr>
<td>AAh</td>
<td>(SCSI) WRITE 12</td>
<td>Sent</td>
<td>43536</td>
<td>Unchanged</td>
</tr>
<tr>
<td>8Ah</td>
<td>(SCSI) WRITE 16</td>
<td>Sent</td>
<td>35344</td>
<td>Unchanged</td>
</tr>
<tr>
<td>7Fh</td>
<td>(SCSI) WRITE 32</td>
<td>Sent</td>
<td>32528</td>
<td>Unchanged</td>
</tr>
<tr>
<td>2Fh</td>
<td>(SCSI) WRITE AND VERIFY 10</td>
<td>Sent</td>
<td>11792</td>
<td>Unchanged</td>
</tr>
<tr>
<td>AEh</td>
<td>(SCSI) WRITE AND VERIFY 12</td>
<td>Sent</td>
<td>44560</td>
<td>Unchanged</td>
</tr>
<tr>
<td>8Eh</td>
<td>(SCSI) WRITE AND VERIFY 16</td>
<td>Sent</td>
<td>36368</td>
<td>Unchanged</td>
</tr>
<tr>
<td>7Fh</td>
<td>(SCSI) WRITE AND VERIFY 32</td>
<td>Sent</td>
<td>32529</td>
<td>Unchanged</td>
</tr>
<tr>
<td>41h</td>
<td>(SCSI) WRITE SAME 10</td>
<td>Sent</td>
<td>16656</td>
<td>Unchanged</td>
</tr>
<tr>
<td>93h</td>
<td>(SCSI) WRITE SAME 16</td>
<td>Sent</td>
<td>37648</td>
<td>Unchanged</td>
</tr>
</tbody>
</table>
```
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 Tue Sep 24 16:20:50 2019
run finish Tue Sep 24 16:20:50 2019
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 returned 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.

6.2 Test Setup & Analysis Tool Versions

Version numbers of tools used are listed.

<table>
<thead>
<tr>
<th>Setup &amp; Analysis Tool Versions</th>
</tr>
</thead>
<tbody>
<tr>
<td>test-hwb.c Linux Version 1.3 created 05/17/18 at 15:05:48</td>
</tr>
</tbody>
</table>

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, released 5/25/2018